

Performance Understanding and Learning System (PULSE-KEY): development of a framework for implementation and performance evaluation of healthcare delivery models of care

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ABSTRACT

Objectives Efficient performance evaluation is essential for driving improvement, ensuring accountability and optimisation of outcomes in healthcare delivery. However, its complexity often leads to ineffective implementation. This article aims to advance the field of performance measurement within alternative healthcare delivery models of care through the development and validation of a comprehensive evaluation framework.

Design and participants A seven-stage methodological approach was adapted from the Health Care Quality Indicators Project and a conceptual analysis method. The first three stages, which have been previously published, included: (1) an extensive literature review, (2) engagement with consumers and patients through interviews and a discrete choice experiment and (3) involvement of stakeholders across the healthcare system via interviews and surveys. Building on this previous work, the present study advances the framework development through four additional stages: (4) development of a conceptual framework (identifying, categorising, synthesising concepts into outcome domains), (5) expert consultation, (6) validation using a real-world case study and (7) refinement for practical applicability and effectiveness in evaluating alternative healthcare delivery models of care.

Results The framework was developed by synthesising insights from phases 1–3 of our previously published work and refined through consultations with 25 experts, confirming its relevance, clarity and suitability for diverse audiences. This study also details the framework's validation, refinement and finalisation process. The final framework is structured around eight primary domains, covering implementation outcomes, effectiveness, safety, patient-centredness, healthcare provider experience, access, service delivery and economic evaluation. Within the implementation outcomes domain, three subdomains—adoptability, implementability and sustainability—are further delineated, providing a comprehensive assessment.

Conclusions The comprehensive evaluation framework developed in this study provides a vital tool for enhancing

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The systematic seven-stage process employed in this study enhances the rigour and reliability of the methodology.
- ⇒ The incorporation of diverse stakeholder perspectives, including practitioners, administrators, researchers and patients, strengthens the validity of the study's methodology.
- ⇒ However, it remains unknown if the opinions of the involved stakeholders fully represent the diversity of opinions in the healthcare community.
- ⇒ The methodological framework offers a structured approach to defining key performance indicators and understanding healthcare performance.

implementation and performance measurement in alternative healthcare delivery models. By integrating insights from various stakeholders, the framework promotes data-driven decisions on adopting, implementing and sustaining various healthcare delivery models. Through systematic application, this framework aims to drive tangible enhancements in patient outcomes, improve healthcare provider experiences, and optimise overall healthcare system efficiency.

INTRODUCTION

In the dynamic landscape of healthcare delivery, characterised by shifting demand-supply dynamics and evolving patient needs, the pursuit of efficiency and innovation has become paramount.^{1–4} Alternative healthcare delivery models have emerged as strategic solutions aiming to enhance the quality of patient care and experiences.^{5–8} These models redistribute healthcare responsibilities among various professionals and settings



to optimise resource allocation, while emphasising the utilisation of emerging technologies.⁹

Defined as innovative approaches for organising and delivering healthcare services, alternative healthcare delivery models represent a departure from traditional paradigms, seeking to address the complexities of modern healthcare delivery systems.⁹ These encompass a wide array of strategies, such as role substitution, expanded scope of practice, virtual care, digital hospitals, mobile health services, home-based care, group visits, collaborative care and team-based approaches. Despite their diversity, they share a common goal of improving access, efficiency and patient outcomes.^{8–11}

While the potential of alternative healthcare delivery models is widely recognised,^{5,7} essential questions persist: How do we accurately evaluate their value proposition? and What measures are necessary to ensure their performance aligns with expectations of sustained healthcare quality and delivery excellence? Answering these questions necessitates a comprehensive grasp of performance measurement,^{12,13} which encompasses a range of factors indicative of successful implementation, delivery, sustainability and scalability of alternative healthcare delivery models.⁶

Healthcare performance measurement assesses quality, including safety, efficiency and effectiveness, by collecting and analysing data against benchmarks to improve care and patient outcomes. This supports the adoption of best practices.^{14–16} As healthcare roles expand, performance measurement must go beyond traditional outcomes, capturing the broader effects of role substitution on patient care and system delivery. Comparing these roles with standard models is essential to evaluate their effectiveness, efficiency and impact on healthcare quality.^{1,12,17} Evaluation informs resource allocation decisions, helping implement and scale up models that offer value to the healthcare system.^{1,12,17}

Theories like Donabedian's Model of Quality 1988¹⁸ and the Balanced Scorecard approach¹⁹ guide performance measurement frameworks. Organisations are developing minimum standard sets to address gaps in condition-specific outcome measures,¹⁵ while researchers focus on benchmarking care quality across providers and countries. Global frameworks, such as those from Australia, the UK, the USA, the WHO and the Organisation for Economic Co-operation and Development, aim to improve healthcare system performance by emphasising effectiveness, equity and efficiency.²⁰ However, there is still uncertainty regarding outcome measures for role substitution and concerns about capturing relevant dimensions of healthcare quality in these models.^{1,12,17}

To address these fundamental questions, our group has conducted a series of foundational studies across three key stages. These previous studies included a systematic literature review,⁶ consumer and patient engagement^{21,22} and multistakeholder consultation.^{23,24} These studies have been crucial in deepening our understanding of performance measurement in healthcare delivery models by

capturing diverse perspectives and insights from stakeholders across the healthcare spectrum.

The systematic literature review critically examined existing theories, concepts and frameworks relevant to performance measurement in healthcare.⁶ Additionally, it analysed outcome measures employed in evaluating alternative healthcare delivery models, revealing gaps and limitations in current evaluation methodologies. This highlighted the need for a systematic and integrated approach to assess the efficacy of healthcare delivery models of care.⁶

Patient and consumer engagement efforts centred on understanding patients' perspectives within alternative healthcare delivery models of care. Through qualitative methods, including interviews, key dimensions valued by patients were identified, emphasising aspects such as timely access, continuity, integration, clinician expertise, interpersonal qualities, financial considerations and understanding of treatment options.²¹ A discrete choice experiment enhanced understanding of patients' preferences, highlighting the importance of effective communication, wait times and cost considerations in shaping their experiences.²²

Complementing these endeavours, multistakeholder engagement studies across various healthcare system levels provided insights into the complexities of performance evaluation within alternative healthcare delivery models.^{23,24} While there is strong support for performance evaluation principles, barriers such as resource constraints and lack of standardised frameworks highlighted the need for innovative measurement approaches.²³ Drawing on the Consolidated Framework for Implementation Research for analysis, these studies have highlighted the complex interplay of contextual and individual factors that shape both the implementation and evaluation of healthcare delivery models.²⁴ Moreover, they identified specific performance measures that can be incorporated into an evaluation framework, emphasising the crucial integration of implementation and healthcare delivery outcomes in the evaluation process.²⁴

Collectively, these studies highlighted the lack of systematic methodologies for assessing the value and performance of alternative healthcare delivery models. Consequently, it is crucial to establish a comprehensive framework to improve performance measurement and advance our understanding of these models by generating an evidence base regarding their effectiveness, including their broader social and economic implications. To bridge this gap, this study seeks to expand on these foundational works by developing and validating a comprehensive framework for assessing the performance of alternative healthcare delivery models.

METHODS

A seven-stage approach was used to guide the framework development, as illustrated in figure 1. This was adapted from the Health Care Quality Indicators Project²⁵ and

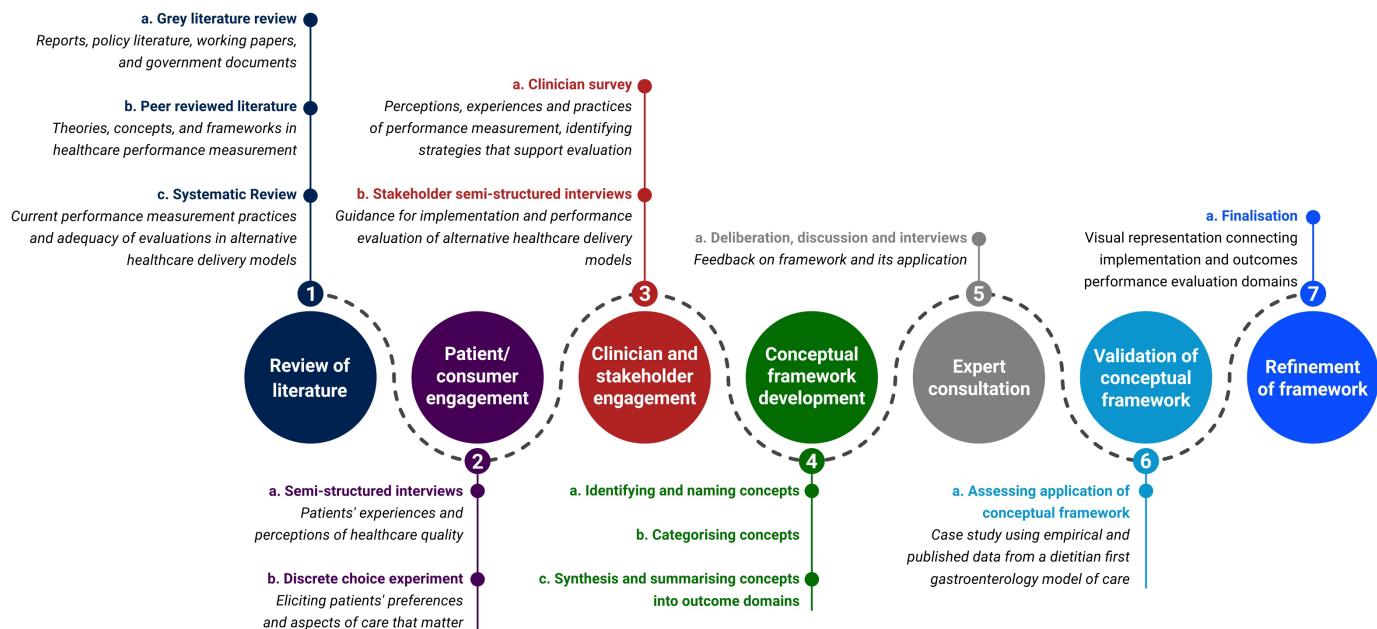


Figure 1 Development of a framework for performance evaluation of alternative healthcare delivery models of care.

the conceptual analysis method described by Jabareen.²⁶ These methods were chosen for their effectiveness in constructing frameworks capable of comprehensively addressing phenomena across diverse knowledge domains and stakeholder perspectives.²⁶ The first three stages of the seven-stage methodology laid the foundation for the current study and have been published elsewhere. Described in the introduction to set the stage for the current research, these comprised: (1) a comprehensive literature review,⁶ (2) consumer and patient engagement studies^{21 22} and (3) stakeholder engagement studies.^{23 24}

This paper advances the framework development process through four additional stages. These stages include: (1) the development of a conceptual framework involving the identification and categorisation of key concepts, synthesis and summarisation into outcome domains, (2) expert consultation to refine the framework, (3) validation of the conceptual framework using a real-world case study and (4) refinement and finalisation of the framework. This paper focuses on these four stages, expanding on the previously published work to complete the development of the framework.

Development of a conceptual framework

The development of the conceptual framework followed a systematic process involving several steps. Initially, insights gathered from previously published systematic review, as well as from patient/consumer and stakeholder engagement, formed the foundational pillars for identifying relevant concepts pertinent to healthcare performance measurement. These concepts were then named and categorised based on thematic similarities. This process, led by one researcher (RNM), laid the groundwork for establishing the framework's structure. To enhance robustness and comprehensiveness, multiple members of the research team conducted individual analyses, drawing

on their distinct expertise and viewpoints. Employing a triangulation approach, these independent analyses facilitated a thorough examination of the categorised concepts. Following this, the research team engaged in comparison and consensus-building exercises. Discrepancies in interpretation were discussed, and through iterative dialogue areas of agreement and divergence were addressed. This process not only ensured the integration of diverse viewpoints but also enhanced the validity and reliability of the conceptual framework.²⁷

The categorised concepts were then synthesised and integrated to form cohesive outcome domains that captured key dimensions within alternative healthcare delivery models. Finally, a summarisation phase was undertaken to refine redundant or overlapping concepts, ensuring clarity in the conceptual framework. This streamlining process aimed to optimise the framework's usability, enhancing its practical applicability in evaluating healthcare performance.

Expert consultation

In this phase, expert consultation was conducted to assess the potential utility and applicability of the proposed framework for measuring performance in alternative healthcare delivery models. A total of 25 experts were engaged in the consultation process, representing diverse sectors within the healthcare landscape. This included members from the research advisory group (n=5), healthcare practitioners (n=6), healthcare leaders (n=7), researchers (n=3), a consumer (n=1) and peers and colleagues not directly involved in the framework development process (n=3).

To guide these consultations, structured guidelines were developed for the selection of a panel of experts and solicitation of feedback. These were informed by the work of Rubio *et al*²⁷ and supplemented by self-developed



criteria tailored to the specific context of this study. The key domains of these guidelines encompassed relevance to current healthcare challenges, clarity of purpose and appropriateness for various healthcare system audiences. This comprehensive approach ensured that the expert feedback collected was not only thorough but also aligned with our study objectives.

A purposeful sampling strategy was employed to engage experts through a range of channels, such as structured interviews, email communications, presentations at healthcare leadership forums, professional meetings and participation in networking events. This approach ensured a robust exchange of insights and perspectives, enriching our understanding of the framework's applicability.

Experts provided detailed feedback, which was analysed to identify common themes and areas of divergence. This synthesis aimed to capture an overall sentiment expressed by experts regarding the framework's capacity to capture theoretical concepts underlying performance measurement in healthcare, ensuring comprehensive representation of healthcare delivery complexities. Furthermore, experts identified potential gaps in the framework's coverage of key performance domains, with a consensus threshold of 80% guiding decision-making on domain inclusion. Interpretation of these findings informed further refinement, ensuring the framework's effectiveness and utility across diverse healthcare contexts.

Validation of the conceptual framework using a real-world case study

We conducted a comprehensive validation using a case study of a dietitian first gastroenterology clinic (DFGC), an alternative healthcare delivery model showcasing professional role substitution implemented across Australia, New Zealand and the UK.^{28–30} The process aimed to assess the framework's ability to capture essential aspects of healthcare delivery and performance using real-world data, incorporating both empirical research and published studies within the context of this specific model of care.^{21 22 29 31 32}

All published data on the outcomes of the DFGC were extracted, mapped and validated against the conceptual framework developed through expert consultation. This process focused on assessing the framework's alignment with developed performance domains, including effectiveness, safety, patient-centredness, accessibility and service delivery (previously referred to as activity). These domains were evaluated based on data from several published studies,^{21 22 29 31 32} ensuring that the framework could robustly reflect the actual performance metrics associated with this model of care.

In addition to this, a previously published qualitative exploration of stakeholder experiences²⁴ provided valuable insights into healthcare professional perceptions domain. This study also explored key implementation outcome themes such as adoption, implementability and sustainability of the care model, further supporting the

framework's validation. The qualitative feedback helped to ensure that the framework captured not only the theoretical concepts but also the practical challenges and benefits experienced by those directly involved in implementing and supporting the DFGC.²⁴

Although economic evaluations were not available in published literature, we incorporated empirical data from a dietitian first model in Queensland, Australia. All patients discharged from the DFGC (n=122) over the initial 12-month period of operation were criteria matched with those managed under a traditional medical specialist model (n=62). Patients were matched based on the DFGC selection criteria described which included age, presenting condition, clinical categorisation and absence of concerning features.²³ Detailed patient-level data, including healthcare utilisation metrics and associated costs (such as direct and indirect costs for labour, imaging, pathology, pharmacy/drugs, equipment capital cost and specialist procedure services), were obtained from the health analytics and costing departments at a large tertiary hospital for the specified patient cohorts. Cost summaries provided breakdowns of the median costs and range for a complete gastroenterology episode of care per patient, whether managed by a medical specialist or a dietitian. Differences were tested for statistical significance using the Mann-Whitney test, given the non-normal distribution of the data.

Refinement and finalisation of the framework

Following the synthesis of stakeholder feedback, expert consultation insights and validation results, the conceptual framework underwent a process of refinement. This involved adjustments to enhance clarity, coherence and applicability across diverse alternative healthcare delivery models. An iterative process was employed in the development of a visual presentation, with successive refinements undertaken to further simplify and elucidate the depiction of performance domains. Special attention was given to delineating the interconnectedness between the implementation and healthcare delivery outcomes within the models of care.

RESULTS

Development of a conceptual framework

Building on insights and amalgamating concepts from previously published literature review, consumer engagement and stakeholder studies, a preliminary conceptual framework emerged. Following investigator triangulation, this framework elucidated the important relationship between individual and contextual factors that shaped the implementation of healthcare delivery models and outcomes. Guided by the Consolidated Framework for Implementation Research, the analysis identified contextual factors. These included innovation characteristics, representing unique features of the model; the inner setting, encompassing internal organisational factors; the outer setting, comprising external contextual influences;

the individuals' domain, defining roles and characteristics of stakeholders involved in implementation and the implementation process itself outlining the steps and strategies employed to execute the model. Additionally, the framework highlighted foundational outcome measures critical for evaluating model efficacy, including effectiveness, safety, patient-centredness, accessibility, activity (later renamed service delivery) and economic evaluation. Illustratively, figure 2A depicts this foundational conceptual framework.

Expert consultation

Results on expert consultation on relevance, clarity and appropriateness of framework for various audiences

Relevance of the framework

The data analysis revealed a unanimous consensus among experts regarding the relevance of the framework to current healthcare challenges and priorities. All 25 experts (100%) acknowledged the framework's alignment with the evolving landscape of healthcare delivery, emphasising its timeliness and applicability in addressing pressing issues within the healthcare system.

Clarity of purpose

Feedback from the expert consultation highlighted a strong consensus on the clarity of the framework's purpose and objectives. A significant majority, comprising 24 out of 25 experts (96%), affirmed the clarity of the framework in delineating its intended goals and outcomes, facilitating a clear understanding of its intended utility within healthcare settings.

Appropriateness for various audiences

There was broad agreement among experts regarding the framework's appropriateness for diverse audiences within the healthcare system. A vast majority, representing 24 out of 25 experts (96%), endorsed the framework as suitable for various stakeholders, including healthcare providers, policymakers, administrators, researchers and patients. They underlined the framework's versatility and relevance across different sectors, positioning it as a valuable tool for advancing performance measurement initiatives.

Identification of literature gap and recommendation

During the consultation, experts identified a literature gap related to the experiences of healthcare providers within alternative healthcare delivery models of care. Responding to this observation, the experts recommended the addition of this specific domain to capture the wide-ranging experiences of healthcare providers, enriching the framework with a more holistic perspective.

Consensus on domain inclusion

Experts unanimously supported the inclusion of safety and effectiveness as foundational domains for assessing performance within alternative healthcare delivery models. Furthermore, 23 out of 25 experts (92%) endorsed the inclusion of patient-centredness. Additionally, a substantial consensus (88%) advocated for

incorporating domains focusing on healthcare provider experiences and access. Economic evaluations received unanimous endorsement from all 25 experts as an integral component of the framework. Moreover, 92% supported the inclusion of activity, later renamed as service delivery, highlighting its importance in capturing the scope of tasks performed within healthcare delivery models. In addition to substantial feedback, experts provided recommendations on enhancing the visual representation of the framework to improve clarity and appeal to a broader audience within the healthcare community; shown in figure 2B.

Framework validation using a case study-impact of a DFGC

In this stage, the framework was applied to empirical and published research from the dietitian first gastroenterology model of care validating its effectiveness using real-world data.^{21 22 29 31 32}

DFGC service description

The establishment of dietitian-first gastroenterology clinics was one of several strategic responses to the challenges of demand and supply imbalances in gastroenterology. This model of care aimed to enhance patient access and experience while adhering to healthcare budget constraints.³¹ The criteria for inclusion in the dietitian-first gastroenterology clinics encompass category 2 patients (recommended to be seen within 3 months), aged between 18 and 50 years and referred with symptoms such as altered bowel motions, abdominal pain, constipation, diarrhoea, dyspepsia/heartburn/reflux and/or nausea or abdominal bloating. Exclusion criteria involved patients with 'red flags' highlighted in the general practitioner's referral letter, including significant unintentional weight loss (5%), unexplained iron deficiency, abnormal imaging, persistent abdominal pain, gastrointestinal bleeding, nocturnal diarrhoea, persistent vomiting, dysphagia and a history of specific conditions like polyps or gastrointestinal cancers. Trained dietitians fulfil expanded scope of practice roles under the supervision and clinical governance of consultant gastroenterologists. Their responsibilities include conducting comprehensive assessments, ordering pathology tests and offering guidance on empirical treatment and management strategies, including diet and lifestyle-related approaches. Patients identified for medical review are then scheduled for appointments in a consultant gastroenterology clinic. Once symptoms are satisfactorily resolved, patients are transitioned back to the care of their general practitioner.^{29 31}

Summary of impact and outcomes of a DFGC

Using the proposed framework to guide the identification, organisation and synthesis of existing research, we discovered that a model of care implemented at a major tertiary site in Queensland, Australia, led to improvements in:

Access, with reduced wait-times, reduced episode of care duration and lower percentage of patients who

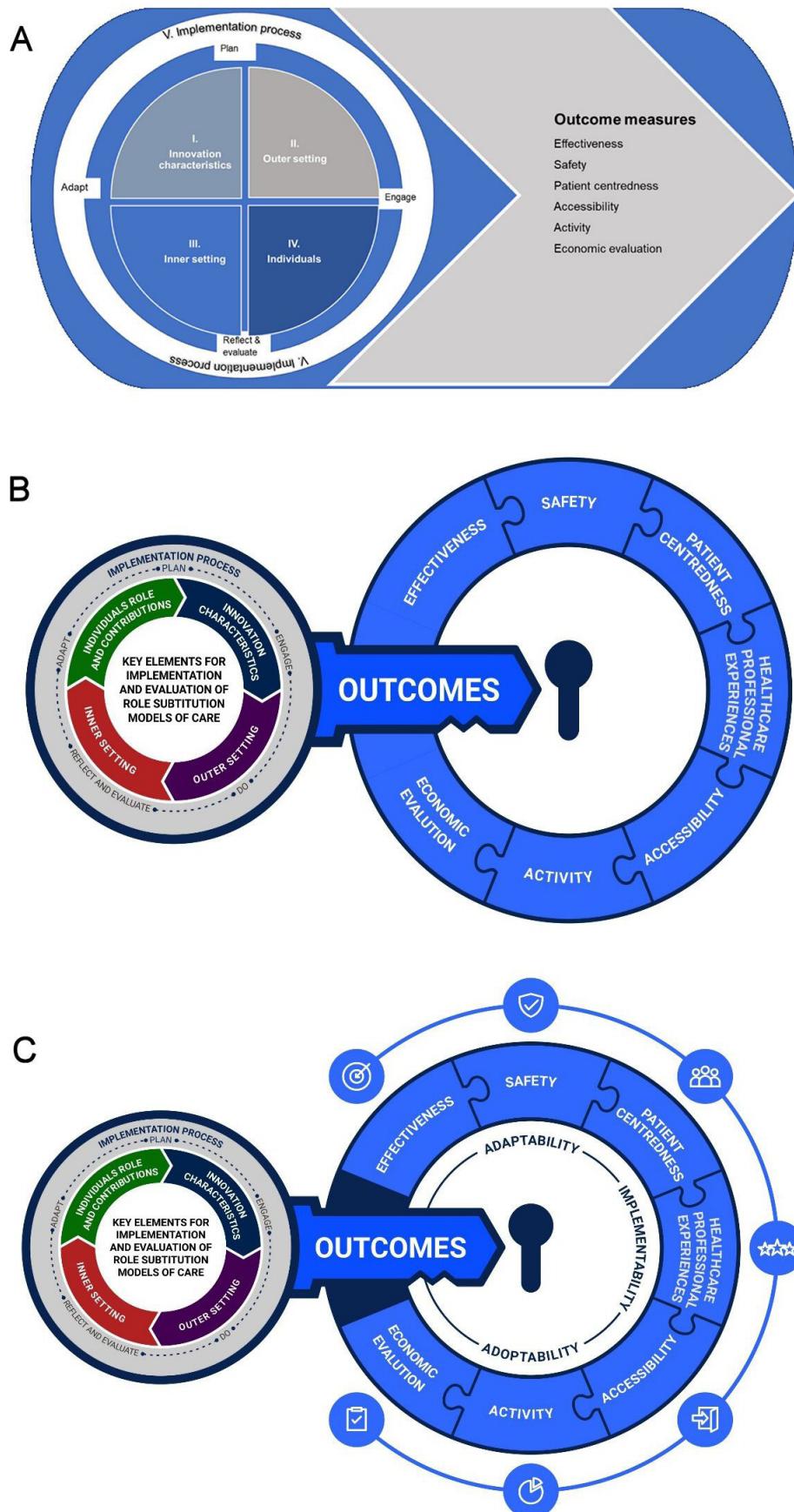


Figure 2 (A–C) Iterative process in the development of a framework for measuring performance in alternative healthcare delivery models of care. (A) After conceptual framework development. (B) After expert consultation. (C) Refinement of framework after expert consultation, validation, and advisory group input.

exceed clinically recommended times for care. *Activity* (later renamed to *service delivery*) was captured, with 15% of gastroenterology referrals triaged to the DFGC, three clinics a week and over 4200 occasions of service in 6 years.³¹ Safety was demonstrated with 1 out of 10 patients appropriately escalated for medical assessment by a gastroenterology consultant. In the small subset of patients who were rereferred, comparable to a traditional model cohort, there were no identified missed diagnoses or alternative diagnoses provided.³²

Patients centredness was demonstrated with reported overall improved patient experience, high patient satisfaction, with the care delivered providing aspects of quality healthcare that mattered to patients (continuity, longer consultations, management strategies).^{21 22} The *economic evaluations* showed that the median cost of an episode of care in the DFGC was approximately 40% of the cost of an episode of care in the traditional medical model of care. The revenue generated from activity-based funding was more than double when compared with the cost of staffing the clinic (unpublished data).

Patients seen in the DFGC had improved symptoms, quality of life, decreased absenteeism, increased

presenteeism and received reassurance demonstrating effectiveness of the model of care.²⁹ Furthermore, the model of care had low rereferral rates, which were comparable to the traditional model. Overall healthcare utilisation was lower in the dietitian first model, with less general practitioner referrals to other specialities when compared with the traditional medical model.³² Figure 3 shows a summary of these findings applying this framework.

Refinement and finalisation of the framework

After completing the validation exercise, conducting additional consultation with the research advisory group and on final reflections, it was recognised that incorporating implementation outcomes alongside innovation outcomes is crucial when evaluating new models of care. This acknowledgement highlights the importance of considering not only the outcomes related to the delivery of healthcare services but also the effectiveness of implementing these models in practice. Furthermore, a recommendation was made to rename the ‘activity’ domain to ‘service delivery’ to better encapsulate the full spectrum of activities involved in delivering care in alternative healthcare delivery models of care. This change aimed



Figure 3 Summary of outcomes measured in a dietitian first gastroenterology clinic using the proposed framework for performance evaluation of alternative healthcare delivery models of care.

GP- General Practitioner

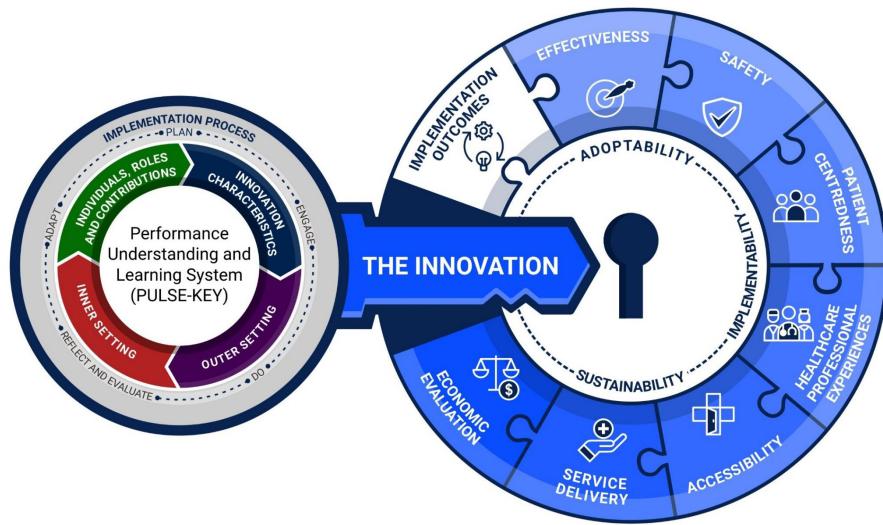


Figure 4 Performance Understanding and Learning System: a framework for measuring performance in alternative healthcare delivery models of care.

to improve the clarity and specificity of the framework, ensuring that all aspects of service provision and delivery could be accurately represented and assessed.

Recommendations were made to augment the utility of the proposed framework by including example outcome measures for each domain. This addition aimed to provide clarity and practical guidance for stakeholders using the framework in assessing the performance of alternative healthcare delivery models of care. The draft versions of the framework are visually depicted in figure 2A–C, showcasing the iterative process undertaken to enhance clarity, coherence and applicability across diverse models of care. Special attention was given to simplifying and elucidating the depiction of performance domains, while also emphasising the interconnectedness between implementation strategies, implementation and healthcare delivery outcomes within these models.

Finally, the framework was named the Performance Understanding and Learning System. This name plays on the analogy of key elements in implementation and evaluation acting as catalysts to unlock outcomes in healthcare delivery. It emphasises the framework's role in facilitating a deeper understanding of performance and driving learning within healthcare systems.

The final framework for measuring performance in alternative healthcare delivery models of care

The final framework is presented in figure 4 and illustrates eight domains (and three subconstructs) for measuring performance evaluation in alternative healthcare delivery models of care. Within our framework, we emphasise the pivotal role of the first domain; (1) implementation outcomes, in gauging the success or failure of implementation of the model of care. We have identified three key subconstructs for this purpose: (a) adoptability (*likelihood or extent the decision is made to deliver*), (b) implementability (*likelihood or extent model of care is successfully delivered*) and

(c) sustainability (*likelihood or extent the model of care is delivered over the long term*).

The framework also recognises the importance of innovation outcomes, which evaluates the overall success or shortcomings of the innovation, represented by the new model of care. The remaining seven domains and the definitions we have developed are encapsulated as follows: (2) effectiveness (*extent to which a healthcare intervention or service achieves its intended purpose or produces the desired outcomes*); (3) safety (*prevention of harm to patients during the delivery of care, involving minimising risks, errors and adverse events*); (4) patient centredness (*involvement of patients in their healthcare decisions and tailoring care to their individual preferences, needs and values*); (5) healthcare professional experiences (*subjective perspectives and insights of healthcare providers in delivering care*); (6) accessibility (*ease with which patients can obtain the care and services they need, taking into account factors like geographical location and availability of healthcare providers*); (7) service delivery (*actions and processes involved in the delivery of care*) and (8) economic evaluation (*assessment of the cost-effectiveness and efficiency of healthcare interventions or services determining the economic impact of a particular treatment or healthcare delivery model*). Figure 5 provides specific examples of indicators that can be applied within this framework to assess the performance of these models.

DISCUSSION

Our study makes a notable contribution to the field of healthcare delivery by developing a structured framework designed to assess the performance of models of care. This framework offers a systematic, yet pragmatic approach to evaluate these models and can be used by a wide array of stakeholders within healthcare delivery to inform decision-making. We have described eight key domains, and three subdomains provide a comprehensive

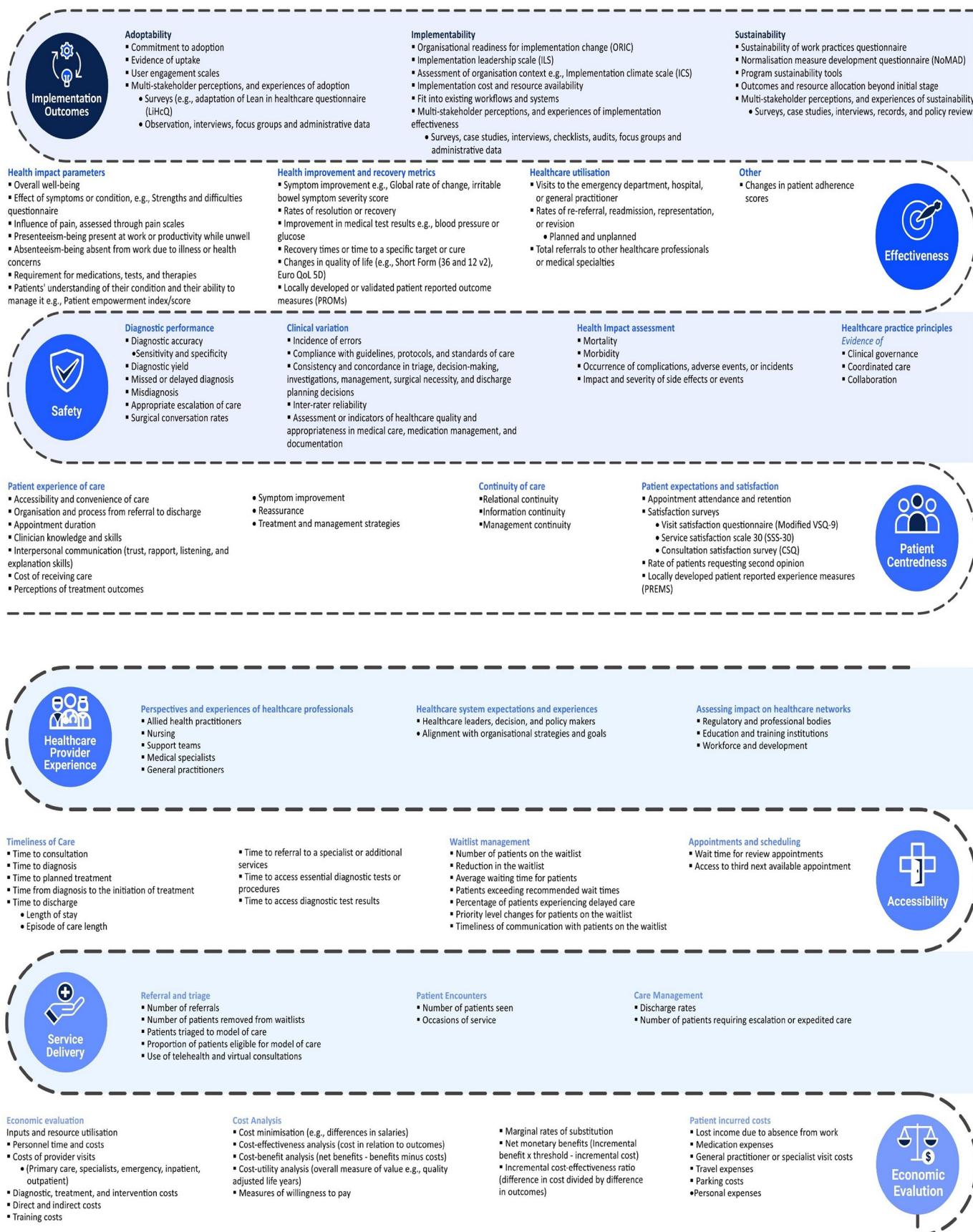


Figure 5 Examples of indicators that can be applied within a framework for performance evaluation of alternative healthcare delivery models of care.



approach to evaluate the impact of alternative healthcare delivery models of care.

One of the main strengths of our framework is its emphasis on incorporating the experiences of healthcare professionals. This inclusion ensures that the framework is grounded in real-world practice, making it more relevant and applicable for those involved in care delivery. It builds on other frameworks like the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance/sustainment) framework, which focuses primarily on the reach and effectiveness of interventions with less emphasis on aspects such as provider perspectives, unintended consequences or multilevel system impacts.^{33 34}

This framework also highlights the role of implementation outcomes in determining the success or failure of care model implementation. To this end, we have incorporated three key subconstructs for assessment: adoptability, implementability and sustainability. Conceptualising and measuring these implementation outcomes, our framework advances our understanding of the implementation processes. It not only enhances the efficiency of implementation research but also facilitates the comparative evaluation of different implementation strategies.

As highlighted by Proctor *et al*, it is widely recognised that the effectiveness of treatments and innovations depends on their successful implementation. Therefore, these implementation outcomes serve as essential prerequisites for achieving subsequent improvements in clinical or service outcomes.³⁵ This focus also builds on the Consolidated Framework for Implementation Research,³⁶ which provides a broad overview of contextual factors but lacks specific guidance on measuring implementation outcomes. Our framework offers targeted subconstruct indicators that can be directly assessed, thereby facilitating better evaluation of how models of care are implemented.

Our framework also shows the complexity and interconnectedness of performance domains in service delivery, patient experience and outcomes. Given the interdependencies between these constructs, overemphasising one aspect might inadvertently lead to unintended consequences, failing to provide a holistic or comprehensive view of performance.^{6 12 37 38} By considering multiple dimensions akin to the dimensions of quality framework,³⁹ including access, service delivery, safety, effectiveness, patient-centredness, healthcare provider experience and economic evaluation, our framework offers a well-rounded assessment of performance, thereby evaluating the impact and effectiveness of these models. The framework also offers guidance for both implementation and evaluation, filling a gap seen in many existing frameworks that focus solely on one aspect.

We have validated our framework using real-world examples, demonstrating its applicability and effectiveness in diverse contexts. This contrasts with other frameworks such as normalisation process theory which, while valuable in understanding how new practices become normalised, may not provide concrete empirical validation

in real-world settings.⁴⁰ Our practical validation enhances credibility and encourages adoption in various healthcare environments, similar to the approach taken by the implementation research logic model, which emphasises practical examples to support implementation.⁴¹

The framework's visual representation is clear and easy to understand, facilitating better communication of its concepts and fostering engagement among stakeholders. Frameworks can be complex and difficult to interpret; this framework's simplified visual layout aids in better stakeholder comprehension.

Our study builds on and extends the existing body of literature, which has generated increasing evidence on the impact of evolving healthcare delivery models. However, this previous work has not been comprehensively conducted across all relevant domains. While prior studies have explored various aspects of these models,^{56 12 42} our framework offers a more thorough approach by integrating multiple domains and both quantitative and qualitative indicators. This unified approach to performance measurement enables a more holistic evaluation, considering not only measurable outcomes but also contextual and experiential factors that are vital to understanding the success of healthcare delivery models. It is vital to recognise that several critical factors influencing performance, such as organisational culture, staff morale and patients' experiences, possess a qualitative dimension. These elements are not easily quantifiable, and when attempts are made to do this (eg, through use of attitude scales), the inherent qualitative aspects may be overlooked.^{37 43} To address this complexity, we advocate for a balanced mix of qualitative and quantitative measures (presented as example measures or indicators in the manuscript), tailored to the unique local context and requirements. This comprehensive perspective plays a vital role in tackling the complex nature of healthcare delivery, ensuring a more encompassing evaluation of performance and a deeper understanding of the impact of evolving healthcare models.

Study implications and areas for future research

The development of a framework for implementing and measuring performance in alternative healthcare delivery models of care marks a significant advancement with broad implications for healthcare. This tool will empower healthcare practitioners and administrators to evaluate model effectiveness, optimise resource allocation and drive positive change in clinical settings. Specifically, the economic evaluation domain of the framework plays a crucial role in this optimisation process. Indicators within this domain, such as cost-effectiveness analysis and resource utilisation metrics, enable stakeholders to assess how efficiently resources are being used and identify areas for improvement.

The service delivery and access domains also contribute to optimising resource allocation by providing insights into patient flow, service accessibility and the utilisation of healthcare services. By analysing these indicators,

healthcare providers can make informed decisions about resource distribution to enhance operational efficiency and patient outcomes.

Policymakers can use the framework to shape policies supporting model integration, fostering innovation and patient-centric care. Patients benefit from improved access, safety and personalised care. Quality improvement initiatives are facilitated, ensuring transparency and accountability in healthcare delivery. The emphasis on innovation encourages healthcare systems to be more agile and responsive. In education, the framework can be incorporated into curricula, equipping professionals with necessary skills for alternative healthcare delivery models. This study provides a platform for future research by providing a standardised method to evaluate and compare different models of care.

Further investigations can focus on testing and validating the framework across diverse healthcare settings, specialties and regions to assess generalisability. Future research should explore the long-term impact of alternative healthcare delivery models on patient outcomes, provider experiences and healthcare system efficiency through longitudinal studies. Comparative studies can identify best practices and inform decision-making for specific healthcare settings. Furthermore, exploring the role of technology, such as telehealth, artificial intelligence and electronic health records, in supporting and evaluating these models is crucial. Additionally, comprehensive research on the impact of healthcare policies and regulations on model implementation and performance evaluation is essential for a comprehensive understanding of their dynamics and effectiveness.

Strengths, limitations and key considerations

The involvement of various stakeholders, including practitioners, administrators, researchers and patients, in this study is valuable. However, it remains unknown whether their opinions fully represent the diversity of opinions in the healthcare community. While the framework provides a roadmap for key performance indicators and offers a balanced understanding of healthcare performance measurement, challenges exist in collecting and analysing real-world data.⁴⁴ Resource implications, data availability and lag effects between data capture and dissemination are notable concerns.⁴⁵ Additionally, the healthcare landscape's dynamic nature requires periodic review and updating of measures to accommodate changes.³⁷ Subjective domains within the framework, such as 'patient-centredness' and 'healthcare provider experience', present challenges in objective measurement, potentially introducing variability in performance assessment. Despite these challenges, the study's systematic seven-stage process, incorporation of diverse stakeholder perspectives and real-world case study application strengthen its validity and applicability. However, further validation and testing are warranted to assess the framework's generalisability and effectiveness across various healthcare settings.

Conclusion

This framework may serve as a catalyst to drive ongoing research and innovation in healthcare delivery models of care. By providing a structured approach to assessing these models, it fosters a deeper understanding of healthcare delivery challenges and opportunities. Our overarching goal is to enhance patient care, empower healthcare providers, and foster adaptability within healthcare organisations. We envisage this framework as a practical resource for enhancing healthcare performance with potential applications extending beyond alternative healthcare delivery models.

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Ethics approval This study involves human participants. This group of studies was performed in line with the principles of the Declaration of Helsinki with ethical approval granted by Gold Coast Hospital and Health Service (HREC/2020/QGC/62104) and Griffith University (GU Ref No: 2020/876). Informed consent was obtained from all participants and confidentiality was maintained by securely storing data and limiting access to authorised personnel. Participants gave informed consent to participate in the study before taking part.

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Data availability statement All data relevant to the study are included in the article or uploaded as online supplemental information.

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