

Sustaining improvement of hospital-wide initiative for patient safety and quality: a systematic scoping review

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ABSTRACT

Background Long-term sustained improvement following implementation of hospital-wide quality and safety initiatives is not easily achieved. Comprehensive theoretical and practical understanding of how gained improvements can be sustained to benefit safe and high-quality care is needed. This review aimed to identify enabling and hindering factors and their contributions to improvement sustainability from hospital-wide change to enhance patient safety and quality.

Methods A systematic scoping review method was used. Searched were peer-reviewed published records on PubMed, Scopus, World of Science, CINAHL, Health Business Elite, Health Policy Reference Centre and Cochrane Library and grey literature. Review inclusion criteria included contemporary (2010 and onwards), empirical factors to improvement sustainability evaluated after the active implementation, hospital(s) based in the western Organisation for Economic Co-operation and Development countries. Numerical and thematic analyses were undertaken.

Results 17 peer-reviewed papers were reviewed. Improvement and implementation approaches were predominantly adopted to guide change. Less than 6 in 10 (53%) of reviewed papers included a guiding framework/model, none with a demonstrated focus on improvement sustainability. With an evaluation time point of 4.3 years on average, 62 factors to improvement sustainability were identified and emerged into three overarching themes: People, Process and Organisational Environment. These entailed, as subthemes, actors and their roles; planning, execution and maintenance of change; and internal contexts that enabled sustainability. Well-coordinated change delivery, customised local integration and continued change effort were three most critical elements. Mechanisms between identified factors emerged in the forms of Influence and Action towards sustained improvement.

Conclusions The findings map contemporary empirical factors and their mechanisms towards change sustainability from a hospital-wide initiative to improve patient safety and quality. The identified factors and mechanisms extend current theoretical and empirical knowledgebases of sustaining improvement particularly with those beyond the active implementation. The provided conceptual framework offers an empirically evidenced and actionable guide to assist sustainable organisational change in hospital settings.

INTRODUCTION

Hospitals face heightening public expectations and regulatory requirements for safer and higher-quality care. In the Western

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Factors that influence successful initial implementation of change in healthcare settings are well documented but lack insight to inform change sustainability for hospital environments. Hospitals operate within structural and functional complexities that require comprehensive strategies to mobilise stakeholders across organisation to attain sustainable hospital-wide change.

WHAT THIS STUDY ADDS

⇒ The novel framework developed from this literature review provides empirically evidenced factors and their mechanisms of improvement sustainability and offers actionable guidance to drive sustainable organisational change in hospital settings.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The literature review findings narrow the theoretical and empirical gaps of how and what is required to sustain organisational change in hospital environments, with more yet to be explored. The actionable framework provided in this review may assist hospitals to plan for, execute and maintain organisational change with a focus on sustaining long-term improvement.

member nations of the Organisation for Economic Co-operation and Development (OECD),¹ the past two decades have witnessed waves of reforms to prioritise patient safety and quality^{2–8} following landmark reports and high-profile inquiries into the unsafe and low care quality.^{9–13} Amounting evidence reveals the unsustainable costs of substandard care^{14 15} and informs national policies, including financial penalties against preventable harm to hospitalised patients.¹⁶ In response, research^{17–20} and hospital activities^{21–23} have been increasingly dedicated to implementing change to improve patient safety and quality, including those aiming for hospital-wide improvement.^{24–26}

However, there is a void in the knowledge of how and what is required to sustain improvement from hospital-wide improvement

initiatives. Previous research estimated about 70% of organisational change initiatives fail to sustain the outcome,^{27 28} which has been demonstrated in many real-world examples.^{29–33} While influencing factors to successful implementation of hospital-based initiatives are well documented,^{34–36} they may be insufficient to inform how gained improvement can be sustained^{17 37} especially at an organisational level.^{38–40} Contemporary frameworks that inform change in healthcare fell short of comprehensively addressing elements required for improvement sustainability.^{41–43} Empirical evidence to inform how to sustain gained improvement is lacking.^{18 44 45} Moreover, change at an organisation level, compared with those limited within a ward/unit, bears greater complexity to mobilise larger groups of stakeholders of multiple business units and across the organisational hierarchy.^{45 46} Greater challenges exist in attaining sustained improvement and meaningful change from organisational change.^{39 47–49} The identified gap above with limited current understanding of improvement sustainability^{19 29 50} creates an investigation opportunity with a particular focus on hospital context.

Objective

This literature review aims to identify factors to and their roles in improvement sustainability of hospital-wide patient safety and quality initiatives. The review question is ‘How can improvement from hospital-wide patient safety and quality initiatives be sustained?’

METHODS

A scoping review⁵¹ was systematically conducted to map all available evidence for the multifaceted, but not well documented, issue of improvement sustainability following hospital-wide change.^{52–54} Later expansions to this method^{55 56} further informed this review with a translational-research focus for the healthcare field. The reporting of this review is structured by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses-ScR scoping review checklist.⁵⁷

Search strategies

Systematic searches⁵⁸ were undertaken on published and grey literature to synthesise knowledge from diverse study designs and sources.^{51 53} Search terms were developed based on the review question and in consultation with a university research librarian specialising in the healthcare field. The terms were formulated aligned with the Population-Intervention-Comparison-Outcome framework for its modifiability and higher sensitivity.⁵⁹ Modifications⁶⁰ were made in ‘Population’ (no limit) and ‘Comparison’ (changed to ‘Context’) to optimise search returns. The Intervention domain described activities of both patient safety and quality due to their inseparable coexistence in healthcare.^{61 62} The Outcome domain included sustainability and its synonyms.⁶³ Boolean operators, syntax and Medical Subject Headings were used. Grey literature searches used a combination of the

Table 1 Example of search strategy: world of science

Example of search terms (World of Science)	
1	AB=(safety OR “quality improvement”) AND AB=(program* OR initiative OR intervention OR project)
2	AB=(hospital OR healthcare OR “health care” OR “health service”) AND AB= (factor OR barrier OR condition OR facilit* OR influenc* OR enabl* OR context* OR imped*)
3	AB=(sustain* OR normal* OR routin* OR institutional* OR maint* OR continu*)
4	1 AND 2 AND 3
*Indicates truncation.	

formulated key search terms. Search strategies (table 1) were continuously refined to optimise the final search.⁵⁶

Searches for peer-reviewed publications were conducted on seven databases across health science and management for the multidisciplinary nature of hospital-wide change: PubMed, Scopus, World of Science, Cumulative Index of Nursing and Allied Health Literature, Health Business Elite, Health Policy Reference Centre and Cochrane Library. Additional searches included four grey literature databases (ProQuest, OpenDOAR, Open Grey, Bielefeld Academy Search Engine), hand searches in targeted flagship healthcare research entities as per eligibility criteria below (eg, Institute for Healthcare Improvement) and snowballing techniques.⁶⁴ Reference harvesting and citation searching⁶³ were performed on relevant studies and literature reviews captured by the screening process.

Eligibility criteria and selection of evidence sources

Studies were included if they met the seven inclusion criteria, applied in the following order: (1) published in year 2010 or later; (2) written in English language; (3) study conducted in Western (European, North American and Oceanian) OECD countries¹ where systems and standards for patient safety and quality are comparable; (4) hospital settings; (5) documented postimplementation evaluations of primary and empirical research only; (6) after implementation of ‘hospital-wide’ (based on provided description of change scale) intervention to improve patient safety and quality; and (7) records which report factors to sustained improvement. Citation management software, EndNote V.X9,⁶⁵ was used for title and abstract screening. The title and abstract were reviewed against the inclusion criteria and to determine relevance. Where it was unclear, full-text review was undertaken to identify information, such as change scale and change approach. Eligible records were reviewed in full text (figure 1).

Data items and charting process

Data items were extracted and charted into a customised matrix form (Microsoft Excel), including study characteristics, such as year of publication, and reported factors

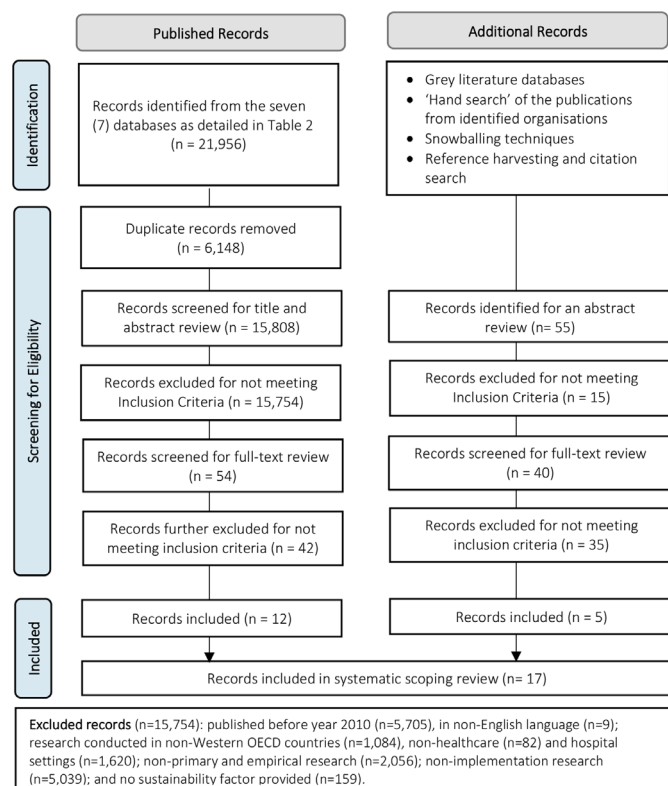


Figure 1 PRISMA (V.2020)¹⁰⁶ flow diagram of study selection. OECD, Organisation for Economic Co-operation and Development; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

relating to improvement sustainability. Change approach was categorised based on the documented methods. The work of Koczwara *et al*⁶⁶ was referred to when clarification between implementation and improvement approaches was necessary. These items aligned with the revised Standards for Quality Improvement Reporting Excellence (2.0).⁶⁷

Quality appraisal

A methodological appraisal of quality was not undertaken for this review as the scoping review methods are designed to map all available evidence.^{53 68} A lack of literature on the review subject necessitated collation of a variety of evidence to maximise the understanding of the subject. Furthermore, quality appraisal is not appropriate when scoping from a variety of evidence types and sources.^{69 70}

Method for the synthesis of results

The synthesis and summarisation^{51 56} of reviewed papers comprised numerical analysis in the study characteristics and thematic analysis⁷¹ on the extracted improvement sustainability factors. First, the extracted factors were categorised into facilitators (ie, positively contributed) and barriers (ie, negatively influenced). The keywords of these factors were then integrated into subthemes and consolidated into higher-level themes. A conceptual framework was generated based on observed interconnections

among the themes. A reversal of this process served as an audit framework.

All authors (SEJM, AH and KE) participated in regular team consultations during the process of the literature search, screening and the synthesis of the review result.

In this review, the term 'change' refers to the process and activities involved with change implementation and the term 'intervention' is used for the implemented means for improvement.⁶⁶

RESULTS

Literature search and screening

The search of peer-reviewed publications from the seven databases yielded 21 956 returns, while additional searches obtained 55 records (figure 1). Ninety-four records met the eligibility criteria for a full-text review resulting in 17 records^{38 72–87} included for this review.

Study characteristics

The 17 resulting papers (see online supplementary material) were peer-reviewed and included hospital-wide improvement initiatives undertaken in a total of 55 hospitals. Most included papers (n=13, 76%) were published in 2016–2020 and originated from North America (table 2). Papers most frequently evaluated influencing factors within 3 years (n=10, 59%) and on average 4.3 years after initiative completion. Single method qualitative (n=9, 53%) and quantitative (n=5, 29%) studies were more common than mixed-methods and multimethods studies (n=3, 18%). Intervention types included implementation of evidence-based practice (n=10, 59%), performance/efficiency improvement (n=3, 18%), patient safety (n=2, 12%), consumer-engagement models (n=2, 12%). Implementation science (n=9, 53%) and quality improvement (n=6, 35%) were frequently used approaches to change, while combinations of different approaches were also identified (n=2, 12%). Various frameworks/models were reported (n=9; 53%) as a guide to inform the implementation, commonly improvement cycles such as Plan–Do–Study–Act⁸⁸ and the Model for Improvement.⁸⁹

Enablers of and barriers to sustained improvement in patient safety and quality

A total of 62 factors to sustained improvement were identified from the 17 reviewed papers and emerged into three overarching themes: People, Process and Organisational Environment (table 3). Subthemes of People included actors and their roles in change; Process related to planning, execution and maintenance of change; Organisational Environment involved internal contexts that enabled sustained improvement. The overarching and subthemes are elaborated below in the order of change activities.

People: change implementation team

A dedicated task-force team to coordinate change process was an enabling facilitator. The team was seen as a role model to demonstrate leadership⁸¹ and acted

Table 2 Characteristics of reviewed records (n=17)

Category	No (%) of papers
Publication year	
2016–2020 (5 years)	13 (76)
2010–2015 (6 years)	4 (24)
Country of study conducted	
USA	10 (59)
Canada	3* (18)
UK	2 (12)
Australia	1 (6)
The Netherlands	1 (6)
Time point of postimplementation evaluation	
<1 year	1 (6)
1–3 years	9 (53)
3 years 1 month to 6 years	3 (18)
6 years 1 month to 9 years	3 (18)
Longer than 9 years	1 (6)
Study method	
Quantitative	5 (29)
Qualitative	9 (53)
Mixed methods	2 (12)
Multimethods	1 (6)
Intervention topic	
Evidence-based practice	10 (59)
Performance/efficiency improvement	3 (18)
Consumer-centred care models	2 (12)
Patient safety	2 (12)
Approach to change and reported framework/model used to inform change implementation (paper cited: lead author)	
Implementation science	9 (53)
A stepwise model for implementing changes ¹⁰⁷	Knops ⁷⁸
Patient Safety Roadmap	Hattie ⁷⁷
Improvement science	6 (35)
Plan–Do–Study–Act ⁸⁸	Rohatgi ⁸⁶
Model for Improvement ⁸⁹	Parand ⁸² Patel ⁸³
Model for Evaluating Patient Safety Interventions ¹⁰⁸	Stolldorf ⁸⁷
Individually developed four-phase model including Robust Process Improvement ¹⁰⁹	Pronovost ⁸⁵
Combination of different approaches	2 (12)
Improvement (the Quality Trilogy) ²³	Baker ⁷²
Change management (the Influencer Model) ¹¹⁰	
Improvement (Plan–Do–Study–Act) ⁸⁸	McLean ⁷⁹
Principles of reliability science ¹¹¹	

*Two papers^{38 73} are from the same study.

as main drivers for sustainable change.⁸⁰ Their expertise in making change and accountability,⁸⁰ their visibility³⁸ and continuity^{72 83} were critical to maintaining change momentum and engagement. Successful teams were supported by sufficient workforce for required workload.⁸⁰ Diversity of the membership, particularly executives and medical professionals was critical for sustaining improvement.^{73 78 82} A lack of multidisciplinary input resulted in insufficient social capital to bolster change.⁸⁰

People: leadership

Leadership at the organisational, departmental and ward levels was underscored for their impact on improvement sustainability. At the organisational level, support and engagement from hospital executives were vital,^{72 77 87} demonstrated by visible commitment^{72 77 80 87} and presence in change activities.^{38 76} This high-level leadership drove and maintained organisational engagement and prominence for the intervention. Conversely, executive-leadership turnover⁷² and insufficient involvement⁸⁰ hindered work required to sustain improvement.

The middle-level leadership was recognised as a linkage between leadership by senior leaders and front-line managers in ensuring accountability for sustaining the change.⁷³ Support from influential department senior staff legitimised the change.⁸¹ In contrast, disconnection in leadership and accountability between the involved wards/units and hospital departments resulted in a struggle to sustain gained improvement.⁷³

Ward/unit managers were seen as key local change drivers and the ‘maintainer’ of the intervention in front line.⁷⁴ Their positive attitude and displayed commitment motivated front-line staff to enact change in daily functions.⁷⁴ Manager continuity facilitated sustained improvement,^{74 77} while turnover impeded it.^{74 77} Where local leaders actively incorporated the intervention in ward practice, it was successfully integrated into routine.^{73 74}

People: staff who enact change

Staff capacity and their individual and collective perceptions of the value of the change influenced the integration of the intervention into routine. Improvement sustainability was impaired by high staff turnover,^{73 74 77} insufficient staffing^{77 84} and increased workload caused by change.^{73 74} High turnover resulted in a loss of intervention-related knowledge and experience built⁷³ and necessitated recurrent training of new staff.⁷⁴ Staffing instability disrupted routinisation of the intervention.⁷³ When change was introduced without sufficient staffing, staff struggled with competing priorities,⁷⁷ which impeded the continuity of the intervention.

Positive value-perception by staff of the change,⁷⁵ particularly benefits to patients^{73 78} and staff,^{38 78} were critical to accept and enact change in daily practice. Clear staff sense-making, congruent with their personal and professional values, led to normalising the intervention.⁷⁵ Perceived benefit was affected by the observability of relevant data presented directly to the involved staff.⁷³ When

Table 3 Improvement sustainability factors (frequency of appearance)

Theme/subtheme (% reported paper)	Facilitator (% reported paper)	Barrier (% reported paper)
1. People (82)		
1.1 Change implementation team (35)	<ul style="list-style-type: none"> ▶ Member/role continuity (12) ▶ Sufficient staff (6) ▶ Diverse (disciplines, management) (12) ▶ Change-effective (6), accountable (6), accessible (6) 	<ul style="list-style-type: none"> ▶ Burdensome workload (6) ▶ Lack of multidisciplinary input (6) ▶ Lack of accountability and ability to drive interest in the intervention (6)
1.2 Leadership (65)		
1.2.1 Organisational level (59)	<ul style="list-style-type: none"> ▶ Support (18) and facilitation (6); from the executive-level (18) and across the hospital (12) ▶ Visibly demonstrated (presence) commitment to the change as priority (18) 	<ul style="list-style-type: none"> ▶ Executive leadership change (6) ▶ Lack of commitment, involvement (6) ▶ Disconnected leadership across the hierarchy (6)
1.2.2 Departmental level (12)	<ul style="list-style-type: none"> ▶ Senior staff support (6) ▶ Consistent department/ward leadership (6) 	<ul style="list-style-type: none"> ▶ Disconnected department/ward leadership (6)
1.2.3 Ward level (18)	<ul style="list-style-type: none"> ▶ Site manager stability (6) ▶ Visible, consistent presence of the intervention in daily routine (6) 	<ul style="list-style-type: none"> ▶ Manager turnover (12) ▶ Low-level visibility and effort to continue the intervention in daily functions (6)
1.3 Staff who enact the change (59)		<ul style="list-style-type: none"> ▶ High staff turnover (18) ▶ Insufficient staffing (12); increased workload (6)
	<ul style="list-style-type: none"> ▶ Perceived positive value of intervention (18), benefit/improvement (18) ▶ Multidisciplinary collaboration (12) 	<p><u>Value alignment</u></p> <ul style="list-style-type: none"> ▶ Individual: negative (18), lack (12) of perceived value of the change/intervention ▶ Interprofessional: different opinions of the intervention (6), low engagement (12), collaboration (6)
2.Process (100)		
2.1 Planning for sustainability (12)	<ul style="list-style-type: none"> ▶ Planning for local adaptation (6) ▶ Garnering resource in the planning process (6) 	<ul style="list-style-type: none"> ▶ Unplanned for workflow integration after the active implementation phase (6)
2.2 Co-ordination & execution of the change (94)	<ul style="list-style-type: none"> ▶ Collective, multidisciplinary designing and delivery (18) ▶ Intervention easily accessible (6), evidence-based (12) ▶ Change guided by framework/model (24) ▶ Early involvement of front-line staff (18), timely progress report to stakeholders (18) ▶ Communication for change in relatable language in context (6); open and multidisciplinary (6) ▶ Leveraging existing resource: staff (18), similar interest groups (12), local 'champions' (12) 	<ul style="list-style-type: none"> ▶ 'Top-down' mandation (6) ▶ Intervention not widely applicable in context (6), requires further modification to fit into context (6) ▶ Lack of staff engagement (6), difficulty recruiting and retaining stakeholder (6) ▶ Negative words among staff (6) or externally (6), on the change
2.3 Organisational embedding of the change (71)	<ul style="list-style-type: none"> ▶ Aligning the change/ intervention with organisational priorities (18) ▶ Institutionalising/ making the intervention an organisational standard/norm (41) ▶ Building improvement capacity (18) 	<ul style="list-style-type: none"> ▶ No clear indication of prioritising the change/intervention (12) ▶ Clashes with existing policies, practices (6); conflicts with established care standard (6)

Continued

Table 3 Continued

Theme/subtheme (% reported paper)	Facilitator (% reported paper)	Barrier (% reported paper)
2.4 Local integration (82)	<ul style="list-style-type: none"> ▶ Accountability and ownership at the front line (24) ▶ Modifying the intervention to adapt to the local context (24) ▶ Integrating the intervention into local/ routine workflow (47) ▶ Stakeholder feedback-led integration/ modification (35) 	<ul style="list-style-type: none"> ▶ Insufficient local accountability (6) ▶ Lack of fit between the intervention and context (6) ▶ Low fidelity (6) ▶ Lack of integration into local flow (6)
2.5 Continued effort after the active change implementation (76)	<ul style="list-style-type: none"> ▶ Sharing evaluation of change progress, in a continuous (53), transparent (29) manner ▶ Continuous stakeholder engagement (24), education (18) ▶ Continuous reinforcement of the change (24) 	
3.Organisational environment (65)		
3.1 Hospital culture (18)	<ul style="list-style-type: none"> ▶ Open (6) and psychologically safe (6) towards innovation 	<ul style="list-style-type: none"> ▶ Innovation fatigue, negative previous change outcome (6) ▶ Accepts substandard quality (6)
3.2 Resources (35)	<ul style="list-style-type: none"> ▶ Funding (18) and management system (6) to support sustaining change effort 	<ul style="list-style-type: none"> ▶ Lack of resource to support sustaining change effort (12)
3.3 Infrastructure (29)	<ul style="list-style-type: none"> ▶ Quality management system to support improvement work (6) ▶ Equipment rearrangement to facilitate change (6) 	<ul style="list-style-type: none"> ▶ System (eg, IT) (6), physical lay-out (eg, Wards) (12) incompatible with the intervention

little advantage to themselves or patients was recognised, change activities were perceived as extra work.⁷³ Insufficient interest⁸³ and perception of problem,⁸⁰ or a lack of perceived benefit from change⁷³ hindered staff engagement in change.

Congruous and collective value realisation within and among involved groups enabled working relationship required for multidisciplinary collaboration and concerted integration of the intervention into routine practice.^{73 78} Conversely, conflicting perceptions of the value in the intervention,⁷⁸ low team engagement^{38 73} and a lack of inclusive communication among professionals and disciplines were⁸⁴ barriers to sustained change integration. Lack of acceptance⁷⁸ and low engagement from medical profession⁷³ was a shared barrier.

Process: planning for sustainability

Hospitals who successfully sustained improvement treated change as part of an ongoing improvement.⁸⁰ They dedicated a preparatory period to plan localised adaptations of the intervention⁸⁰ and garner resources to undertake activities for sustaining gained improvement.⁷⁷ In contrast, hospitals with less success viewed change as a grant-dependent and time-limited project without a comprehensive plan for workflow integration of the intervention.⁸⁰ The problem for improvement was not thoroughly investigated to identify causes to inform the embedding and integration of the intervention.⁸⁰

Process: co-ordination and delivery of change

The well-coordinated change delivery was emphasised in all but one of the reviewed papers. Collaborative approaches, such as codesign, to change process⁸⁷ and team-based implementation⁷² were essential for integrating and sustaining the intervention. Adopting a framework/model to inform change process was a facilitator providing a conceptual structure to change process and monitoring progress.^{79 80 82 83} Engagement, especially early,⁸⁶ with front-line staff allowed developing context-based solutions and fostering staff ownership.⁸⁵ Education⁷⁷ and timely feedback on the progress^{72 73 79} were essential elements of the engagement. Low staff engagement⁷⁵ and unstable stakeholder membership⁷⁷ were barriers. Relatable language, not jargons, used for change⁸² and open multidisciplinary communication⁸¹ were facilitators. In a large-scale change within public healthcare services, negative external communication (eg, media) caused negative perceptions and attitudes towards change among staff, resulting in change resistance.⁷⁵ Leveraging existing resources (eg, enthusiastic and capable staff) was a cost-saving strategy for sustainable change activities^{84 87} and for strengthening change momentums.^{76 82} Engaged staff acted as local champions and conduits to information and feedback of change progress.^{76 79} Converging the intervention to similar existing hospital initiatives was another strategy for a long-term synergy favourable to sustained improvement.⁷³

Presenting merits of intervention itself, such as easy accessibility⁷² and having an evidence base^{38 78} enhanced change acceptance and enacting the change. In contrast, low applicability⁷⁸ of and outdated⁷⁶ intervention were barriers. Introducing a merit-based and relevant intervention to local context facilitated change execution and enhanced improvement sustainability.

Process: organisational embedding

Improvement sustainability required organisation-level embedding of intervention into core operational structures and functions,⁸² and alignment with hospital policies⁷⁸ and external requirements.^{38 82} Successful hospitals institutionalised the intervention by standardising it in universal principles^{72 86} and embedding it in relevant job descriptions.⁸⁷ One example demonstrated an organisation-wide accountability plan to escalate and respond to performance slips⁸⁵ involving all stakeholders from front line to executives. Successful hospitals endeavoured to embed the intervention in their culture by ensuring ongoing use⁷⁶ as a new norm,⁷⁹ including it in staff on-boarding⁷⁶ and consistently showcasing rewards.⁸¹ Conversely, a lack of alignment with organisational priorities,⁷⁶ and conflicts with existing priorities,⁷⁷ standards⁷⁸ and policies⁸⁴ were barriers. Successful hospitals extended the change to building learning communities⁸⁵ and improvement expertise,⁸² supporting local champions⁷⁷ at an organisational level.

Process: local integration

Front-line staff ownership and contextualised integration of the intervention into routine workflow was a key to improvement sustainability. Shared accountability⁸⁶ and ownership⁷⁴ among staff and localised sustainability plans^{73 85} strengthened sustainability, while weaker accountability⁷³ diminished change momentum. Modifying the intervention to adapt to the local context made it more relevant to the context.⁷²⁻⁷⁴ In the case of implementing a predeveloped programme, high fidelity demonstrated benefits to sustainability, while low fidelity impaired delivering critical aspects of the programme.⁸⁰ A lack of fit or customisation to local contexts hindered coherent understanding of the intervention and the viability of continued improvement.⁷⁵ Integrating the intervention into local workflow^{74 76 80 82 86 87} was a fundamental facilitator, while routinising it provided 'reliability of occurrence'^{81 82} to involved staff. Sustained improvement also meant that the integration was co-led by stakeholders,^{77 87} informed by data evaluation^{80 81 85} with continual revisits to the implementation.³⁸

Process: continued effort following the active implementation

The second most emphasised element overall to improve sustainability was continued activities to reinforce change after the active implementation phase. The activities often took forms of ongoing evaluation^{72 81-83 85-87} and feedback⁸³ to all stakeholders from front line to executives.³⁸ Transparency^{83 85 86} and observability^{73 84} of

progress for involved staff facilitated sustainability. Shared learning,⁷⁷ ongoing stakeholder engagement^{72 74 75 86} and education^{73 83 86} played roles in continuing change momentum to support sustainability. Ongoing and regular reinforcement of change,^{74 85} aligned with organisational priorities,⁸² functioned as a continuing impetus for sustainability. Habitual and adaptive integrations of the intervention in regular ward functions (eg, hand-over) kept change-related dialogues alive.^{73 76}

Organisational environment: culture, resources and infrastructure

Perceived openness for and positive attitude to change were conducive to improvement sustainability.⁸⁰ Psychological safety shared among staff provided a non-judgemental space for them to speak up about change.⁸¹ Improvement initiatives faded where hospital staff recognised institutional tolerance to substandard care quality³⁸ or experienced change-related fatigue and confusion.⁷⁵ Negative legacies from failed initiatives and dominant sentiments of helplessness and defeatist attitudes were barriers.⁷⁵

Adequate resources were vital to embed and integrate of the intervention^{72 79} and continue activities to enable sustainability.⁸² Secured funding to support ongoing workforce for change activities ensured continuity of intervention and evaluation.⁸² Insufficient funding for intervention integration^{38 80} and discontinued staffing after the active implementation⁸⁰ disabled activities required to sustain improvement.

An established organisation-wide quality management system, comprising a structure and process, equipped for maintaining gained improvement.⁸⁵ Incompatible platforms, such as information and technology system⁷² and ward/unit layouts^{74 84} of the change site, impaired the sustainability of intervention.

DISCUSSION

This review aimed to identify enabling and hindering factors and their contributions to sustained improvement in patient safety and quality from hospital-wide initiatives. The 62 identified factors were formed into 11 subthemes and further consolidated into three overarching themes (table 3). Interconnections between them emerged as mechanisms of improvement sustainability (figure 2). Discussed below are more details on the emergent mechanisms and implications of the review findings, followed by strengths and limitations.

Connections between themes

Two overarching interrelationships emerged in the forms of Influence and Action (figure 2). Influence refers to a connection in which one affected the degree to which another is fulfilled, while Action describes a link between the actors and their activities to achieve improvement sustainability.

Influence form emerged in three areas. First, the factors of Organisational Environment appeared to influence those of People and Process. It was evident that hospital

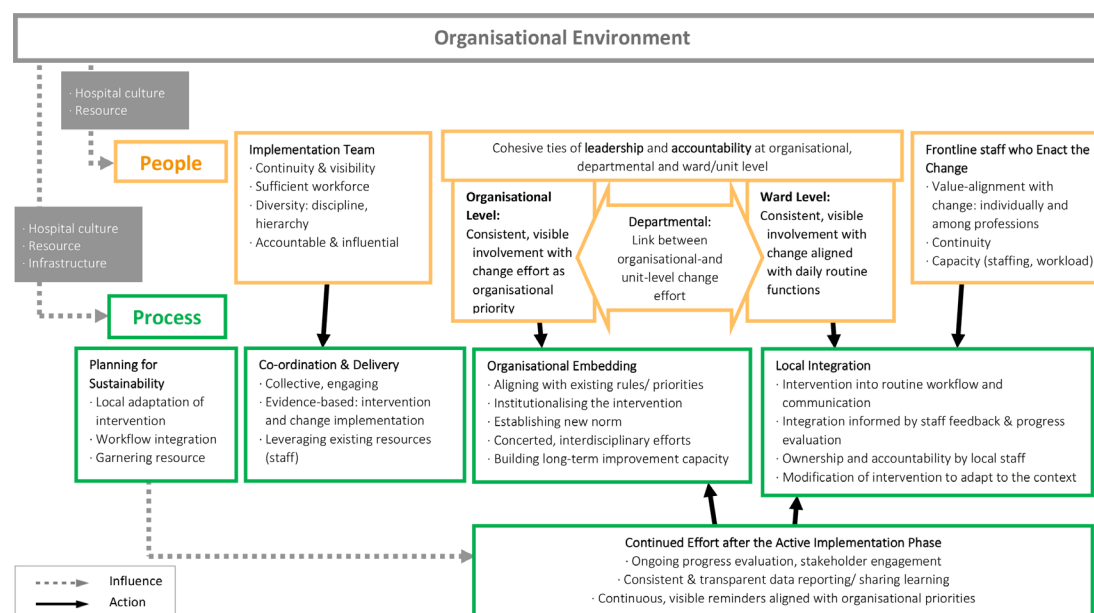


Figure 2 Mechanisms of improvement sustainability of hospital-wide patient safety and quality initiatives.

culture shaped how involved staff perceived^{38 75 80 81} and enacted⁸⁰ introduced change, while resources determined the level of activities and continuation of change.^{38 72 79 80 82} Infrastructure, as a procedural structure, provided a foundation on which change took place,⁸⁵ while physical layouts of change site affected compatibility and viability of the intervention.^{72 74 84} Second, coordination and delivery of change affected the extent to which local integrations were enabled. Multidisciplinary collaborations facilitated the integration by broadening staff engagement,^{81 82} while adopting a framework/model to guide change process provided a theoretical structure to change integration into workflow.^{79 80 82 83} Codedigned change process with staff enabled contextualised integration of the intervention.^{85 86} Third, activities of planning for sustainability equipped staff to integrate the intervention into routine and modify it to fit the context.⁸⁰ Secured resources to enable the planning activities allowed ongoing activities to support sustainability after the active implementation.⁷⁷

Action was observed between people and process themes—actors and their distinctive roles to enact change and sustain gained improvement. Managers across the top, middle and front-line levels were uniquely positioned to catalyse and sustain change at, respectively, the organisational,^{38 72 76 77 80 87} departmental^{73 81} and ward^{73 74 77} levels. Local staff realised and sustained change by integrating it in routine workflow.^{74 76 80 82 86 87} Continued monitoring and evaluation reinforced organisational embedding through informing executive-level decision making⁷² and hospital-wide learning communities related to change^{82 85} and local integrations through feedback-led modifications.^{38 77 80 81 85 87}

Analysis in relation to current literature

The identified factors echo those found in existing sustainability frameworks.^{18 20 63} The factors relating to

continuous contextual refinements of the intervention have been recognised as critical to maintain change effects.^{30 90} Emerged subthemes of process—plan for, execute and maintain change—mirror Lewin's three-step model of change,⁹¹ from which contemporary process models of planned organisational change used in healthcare originated.^{49 70 92} The demonstrated mechanisms of improvement sustainability (figure 2) are a distinctive theoretical articulation of the intricate dynamics of sustainability.^{17–20} Another distinction from this review is the identified empirical evidence of activities required particularly beyond the active implementation and their roles in improvement sustainability (ie, 'continued effort' subtheme).^{49 93} The emerged form of Influence from Organisational Environment on factors relating to People and Process reinforces the role of context as a determinant to change in healthcare.^{94 95} Organisational culture has long been recognised as a core element constituting change context which influences how successfully change can be implemented.^{95 96}

Although improvement or implementation approaches were predominantly applied in the reviewed hospital-wide change, combination of different approaches^{72 79} may indicate an opportunity for a comprehensive framework to guide organisational change in hospital settings.⁹² There were no sustainability-focused framework/model included in reviewed papers that guided change process. Two papers^{75 80} used sustainability-related concepts^{20 97 98} as an evaluation analysis tool. Otherwise, a theoretical guide to change or sustainability was absent.^{38 73 74 76 81 84} More robust and accurate reporting of used theoretical guides in real-world hospital-wide change could assist informing and advancing applications of those in practice, and ultimately, enhance sustainable improvement.^{99–101}

Contribution to practice and theory

This literature review responded to recognised theoretical and empirical gaps in improvement sustainability. The review findings further identified a paucity of sustainability-related theoretical foundation to support sustained improvement in patient safety and quality in hospital settings. Application of a guiding framework or model has been identified as a sustainability facilitator in providing a structure to change process.^{79 80 82 83} Yet only 53% (n=9) of the reviewed papers included a guiding framework/model, none with a demonstrated focus on improvement sustainability. Our novel framework (figure 2) offers hospitals a potential solution to the gap, by providing an empirically evidenced and actionable framework to guide sustainable organisational change in hospital environments. The framework is structured using the emerged chronological flow of change planning, execution and maintenance with specified actors and actions. The identified factors can be directly translated into strategies and actions. The identified leadership actions across the organisational hierarchy inform unique roles in their position²³ to catalyse and sustain change.¹⁰² Application of a sustainability-focused theoretical guide may assist hospitals to combat the prevalent likelihood of change failure.^{27–33}

From a theoretical perspective, the empirically evidenced mechanisms (figure 2) uncovered in this review provide new insight into existing sustainability frameworks with specific relevance to hospital settings.^{17–20} The identified factors spanning before, during and after change implementation narrow an empirical gap in understanding the activities required to enhance sustainability.⁵⁰ In particular, the factors and mechanisms beyond active implementation extend our understanding of the identified limits of current frameworks of change implementation in healthcare.^{41–43} Additionally, this review elaborates on the mechanisms optimising the fit between the intervention and context.^{17 49 93} Moreover, the postimplementation factors identified complement those already recognised in the literature on innovation implementation in hospitals^{34–36} and fill an empirical gap in the understanding of ‘maintenance’ of change, as widely described in literature of management and implementation.^{49 93} The empirically evidenced framework comprehensively represents the intricate process and the activities of involved actors during all stages of hospital-wide change towards improvement sustainability. From a practice perspective, the identified improvement sustainability factors can function as organisational variables for evaluating and predicting sustainability of change.¹⁰³ The framework offers actionable guidance to drive sustainable organisational change in hospital settings.

Strengths and limitations

Strengths of this review include the rigour in the adopted systematic approach to, and the extensive scope of, multidisciplinary literature examined for this review. This resulted in a large sample (55 hospitals) of evidence

sources originated from comparable healthcare contexts (Western OECD countries). This enabled a synthesis from rich empirical evidence and enhanced applicability of the review findings in similar settings. The sustainability factors were evaluated on average 4.3 years after the active change implementation phase. This maturity of empirical factors has strengthened validity and credibility of the findings. On the other hand, the selected national backgrounds limit the scope of generalisability of the review findings. Applicability can be affected by different organisational contexts between hospitals^{95 104} and their uniquely diverse complexity.^{45 46} The inclusion of a framework/model to have guided change implementation in only 53% (n=9) of the reviewed papers may be due to the focus of the papers being on postimplementation evaluation rather than change methodology. To this end, this review is unable to examine implications on improvement sustainability by different types of change approaches. Lastly, publication bias, by which positive results were more likely to be researched and published,¹⁰⁵ may have impacted the number of searched and retrieved records for this review.

CONCLUSION

Under People, Process and Organisational Environment themes, this review has mapped empirical factors to and mechanisms of sustained improvement from hospital-wide initiatives for patient safety and quality. The factors and mechanisms of sustainability recognised in all stages of change—before, during and after change implementation—with an influence of organisational environments demonstrate a holistic, intricate and dynamic landscape of sustainability. Distilled in a comprehensive framework (figure 2), the identified elements provide evidence on what is required for sustainability and how they enhance it. In particular, the postimplementation elements add to theoretical and empirical knowledgebase of change sustainability. The novel framework offers an actionable guidance to sustainable hospital-wide change that is empirically evidenced and detailed with identified actors across the hospital structure and their unique contributions. Using the insights from this review, exploration of the identified elements in real-world examples could bridge the gap between understanding and actualising improvement sustainability of hospital-wide change. Converging the knowledge provided, hospitals may further progress to realising meaningful and sustained organisational change beyond current gains in patient safety and quality.

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REFERENCES

- 1 Organisation for Economic Co-operation and Development. List of OECD member countries - Ratification of the convention on the OECD, n.d. Available: <https://www.oecd.org/about/document/ratification-oecd-convention.htm> [Accessed 14 June 2022].
- 2 Dyer C. Bristol inquiry condemns hospital's "club culture". *BMJ* 2001;323:181–81.
- 3 Holmes D. Mid Staffordshire scandal highlights NHS cultural crisis. *Lancet* 2013;381:521–2.
- 4 McLean J, Walsh M. Lessons from the inquiry into obstetrics and gynaecology services at King Edward Memorial Hospital 1990–2000. *Aust Health Rev* 2003;26:12.
- 5 Casali GL, Day GE. Treating an unhealthy organisational culture: the implications of the Bundaberg Hospital inquiry for managerial ethical decision making. *Aust. Health Review* 2010;34:73.
- 6 Cleary S, Duke M. Clinical governance breakdown: Australian cases of wilful blindness and whistleblowing. *Nurs Ethics* 2019;26:1039–49.
- 7 Powell M, Walshe K. 50 years of NHS inquiries: why they matter and what we can learn from them: the health Foundation, 2019. Available: <https://www.health.org.uk/news-and-comment/blogs/50-years-of-nhs-inquiries> [Accessed 09 Dec 2020].
- 8 Dunbar JA, Reddy P, Beresford B, et al. In the wake of hospital inquiries: impact on staff and safety. *Med J Aust* 2007;186:80–3.
- 9 Kennedy I. *The report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary 1984–1995: learning from Bristol*. London: The Stationery Office, 2001.
- 10 Francis R. *Report of the mid Staffordshire NHS Foundation trust public inquiry*. London: The Stationery Office, 2013.
- 11 Douglas N, Robinson J, Fahey K. *Inquiry into obstetric and gynaecological services at King Edward Memorial Hospital 1990–2000: final report*. Perth: Government of Western Australia, 2001.
- 12 Walker B. *Final report of the special Commission of inquiry into Campbelltown and Camden hospitals*. Sydney: Government of New South Wales, 2004.
- 13 Kohn LT, Corrigan JM, Donaldson MS. *To err is human: building a safer health system*. Washington (DC: National Academies Press (US), 2000.
- 14 Flott K, Fontana G, Darzi A. *The global status of patient safety*. London: Imperial College London, 2019.
- 15 Duckett S, Jorm C. *Safer care saves money*. Melbourne: Grattan Institute, 2018.
- 16 Slawomirski L, Aaraaen A, Klazinga N. *The economics of patient safety: strengthening a value-based approach to reducing patient harm at national level*. OECD, 2017.
- 17 Chambers DA, Glasgow RE, Stange KC. The dynamic sustainability framework: addressing the paradox of sustainment amid ongoing change. *Implement Sci* 2013;8:117.
- 18 Lennox L, Maher L, Reed J. Navigating the sustainability landscape: a systematic review of sustainability approaches in healthcare. *Implementation Sci* 2018;13:27.
- 19 Laur C, Bell J, Valaitis R, et al. The sustain and spread framework: strategies for sustaining and spreading nutrition care improvements in acute care based on thematic analysis from the More-2-Eat study. *BMC Health Serv Res* 2018;18:930.
- 20 Maher L, Gustafson D, Evans A. *Sustainability: model and guide*. NHS Institute for Innovation and Improvement, 2010.
- 21 Donnelly LF. Avoiding failure: tools for successful and sustainable quality-improvement projects. *Pediatr Radiol* 2017;47:793–7.
- 22 Lawson T, Weekes L, Hill M. Ensuring success and sustainability of a quality improvement project. *BJA Educ* 2018;18:147–52.
- 23 Scoville R, Little K, Rakover J, et al. *Sustaining improvement - IHI white paper*. Cambridge, Massachusetts: Institute for Healthcare Improvement, 2016.
- 24 Cadilhac DA, Andrew NE, Stroil Salama E, et al. Improving discharge care: the potential of a new organisational intervention to improve discharge after hospitalisation for acute stroke, a controlled before-after pilot study. *BMJ Open* 2017;7:e016010.
- 25 Staines A, Thor J, Robert G. Sustaining improvement? the 20-year Jönköping quality improvement program revisited. *Qual Manag Health Care* 2015;24:21–37.
- 26 Tucker S, Sheikholeslami D, Farrington M, et al. Patient, nurse, and organizational factors that influence Evidence-Based fall prevention for hospitalized oncology patients: an exploratory study. *Worldviews Evid Based Nurs* 2019;16:111–20.
- 27 Pieterse JH, Caniels MCJ, Homan T. Professional discourses and resistance to change. *J Organ Change Manag* 2012;25:798–818.
- 28 NHS Institute of Innovation and Improvement. Improvement leaders' guide: sustainability and its relationship with spread and adoption, 2017. Available: <https://www.england.nhs.uk/improvement-hub/publication/improvement-leaders-guide-sustainability-and-its-relationship-with-spread-and-adoption-general-improvement-skills/> [Accessed 13 Jun 2022].
- 29 Glasgow JM, Davies ML, Kaboli PJ. Findings from a national improvement collaborative: are improvements sustained? *BMJ Qual Saf* 2012;21:663–9.
- 30 Robert G, Sarre S, Maben J, et al. Exploring the sustainability of quality improvement interventions in healthcare organisations: a multiple methods study of the 10-year impact of the 'Productive Ward: Releasing Time to Care' programme in English acute hospitals. *BMJ Qual Saf* 2020;29:31–40.
- 31 Chassin MR. Improving the quality of health care: what's taking so long? *Health Aff* 2013;32:1761–5.
- 32 Baloh J, Zhu X, Ward MM. What influences sustainment and nonsustainment of facilitation activities in implementation? analysis of organizational factors in hospitals implementing TeamSTEPPS. *Med Care Res Rev* 2021;78:146–56.
- 33 Alexander JA, Hearld LR. The science of quality improvement implementation: developing capacity to make a difference. *Med Care* 2011;49 Suppl:S6–20.
- 34 Geerlings L, Rankin NM, Shepherd HL, et al. Hospital-Based interventions: a systematic review of staff-reported barriers and facilitators to implementation processes. *Implement Sci* 2018;13:36.
- 35 Chaudoir SR, Dugan AG, Barr CHI. Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures. *Implementation Sci* 2013;8:22.
- 36 Braithwaite J, Marks D, Taylor N. Harnessing implementation science to improve care quality and patient safety: a systematic review of targeted literature. *Int J Qual Health Care* 2014;26:321–9.
- 37 Aarons GA, Hurlburt M, Horwitz SM. Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Adm Policy Ment Health* 2011;38:4–23.
- 38 Fleiszer AR, Semenic SE, Ritchie JA, et al. An organizational perspective on the long-term sustainability of a nursing best practice guidelines program: a case study. *BMC Health Serv Res* 2015;15:535.
- 39 Wiltsey Stirman S, Kimberly J, Cook N, et al. The sustainability of new programs and innovations: a review of the empirical

- literature and recommendations for future research. *Implement Sci* 2012;7:17.
- 40 Scheirer MA. Linking sustainability research to intervention types. *Am J Public Health* 2013;103:e73–80.
 - 41 Ament SMC, Gillissen F, Moser A, et al. Factors associated with sustainability of 2 quality improvement programs after achieving early implementation success. A qualitative case study. *J Eval Clin Pract* 2017;23:1135–43.
 - 42 Ilott I, Gerrish K, Booth A, et al. Testing the consolidated framework for implementation research on health care innovations from South Yorkshire. *J Eval Clin Pract* 2013;19:915–24.
 - 43 Skingley A, Marshall J. Challenges of implementing and embedding a programme to improve care for older people with dementia on hospital wards. *Nurs Older People* 2018;30:29–33.
 - 44 Shelton RC, Cooper BR, Stirman SW. The sustainability of evidence-based interventions and practices in public health and health care. *Annu Rev Public Health* 2018;39:55–76.
 - 45 Cowie J, Nicoll A, Dimova ED, et al. The barriers and facilitators influencing the sustainability of hospital-based interventions: a systematic review. *BMC Health Serv Res* 2020;20:588.
 - 46 De Silva D. What's getting in the way? Barriers to improvement in the NHS. The Health Foundation, 2015. Available: <https://www.health.org.uk/publications/what%E2%80%99s-getting-in-the-way-barriers-to-improvement-in-the-nhs> [Accessed 30 Jun 2022].
 - 47 McCann L, Hassard JS, Granter E, et al. Casting the lean spell: the promotion, dilution and erosion of lean management in the NHS. *Hum Relat* 2015;68:1557–77.
 - 48 Buchanan D, Fitzgerald L, Ketley D, et al. No going back: a review of the literature on sustaining organizational change. *Int J Manag Rev* 2005;7:189–205.
 - 49 Stouten J, Rousseau DM, De Cremer D. Successful organizational change: integrating the management practice and scholarly literatures. *Acad Manag Ann* 2018;12:752–88.
 - 50 Lennox L, Eftychiou L, Matthew D, et al. What risks to sustainability are identified throughout care bundle implementation and how can they be addressed? a mixed methods case study. *BMJ Open* 2021;11:e048815.
 - 51 Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.
 - 52 Munn Z, Peters MDJ, Stern C, et al. Systematic review or scoping review? guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol* 2018;18:143.
 - 53 Peters MDJ, Godfrey CM, Khalil H, et al. Guidance for conducting systematic scoping reviews. *Int J Evid Based Healthc* 2015;13:141–6.
 - 54 Tricco AC, Lillie E, Zarin W, et al. A scoping review on the conduct and reporting of scoping reviews. *BMC Med Res Methodol* 2016;16:15.
 - 55 Eljiz K, Greenfield D, Vrklevski L, et al. Large scale healthcare facility redevelopment: a scoping review. *Int J Health Plann Manage* 2022;37:691–714.
 - 56 Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Sci* 2010;5:69.
 - 57 Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.
 - 58 Cooper C, Booth A, Varley-Campbell J, et al. Defining the process to literature searching in systematic reviews: a literature review of guidance and supporting studies. *BMC Med Res Methodol* 2018;18:85.
 - 59 Eriksen MB, Frandsen TF. The impact of patient, intervention, comparison, outcome (PICO) as a search strategy tool on literature search quality: a systematic review. *J Med Libr Assoc* 2018;106:420–31.
 - 60 Cooke A, Smith D, Booth A. Beyond PICO. *Qual Health Res* 2012;22:1435–43.
 - 61 Waring J, Allen D, Braithwaite J, et al. Healthcare quality and safety: a review of policy, practice and research. *Sociol Health Illn* 2016;38:198–215.
 - 62 Brown C, Hofer T, Johal A, et al. An epistemology of patient safety research: a framework for study design and interpretation. Part 1. Conceptualising and developing interventions. *Qual Saf Health Care* 2008;17:158–62.
 - 63 Fleischer AR, Semenic SE, Ritchie JA, et al. The sustainability of healthcare innovations: a concept analysis. *J Adv Nurs* 2015;71:1484–98.
 - 64 Braithwaite J, Zurynski Y, Ludlow K, et al. Towards sustainable healthcare system performance in the 21st century in high-income countries: a protocol for a systematic review of the grey literature. *BMJ Open* 2019;9:e025892.
 - 65 Clarivate Analytics. *EndNote [program]. EndNote X9 version*. Philadelphia, PA, 2013.
 - 66 Koczwara B, Stover AM, Davies L, et al. Harnessing the synergy between improvement science and implementation science in cancer: a call to action. *J Oncol Pract* 2018;14:335–40.
 - 67 Ogrinc G, Davies L, Goodman D, et al. SQUIRE 2.0 (*Standards for Quality Improvement Reporting Excellence*): revised publication guidelines from a detailed consensus process: Table 1. *BMJ Qual Saf* 2016;25:986–92.
 - 68 Tricco AC, Ashoor HM, Cardoso R, et al. Sustainability of knowledge translation interventions in healthcare decision-making: a scoping review. *Implement Sci* 2016;11:55.
 - 69 Cummings A, Lund S, Camppling N, et al. Implementing communication and decision-making interventions directed at goals of care: a theory-led scoping review. *BMJ Open* 2017;7:e017056.
 - 70 Kho J, Gillespie N, Martin-Khan M. A systematic scoping review of change management practices used for telemedicine service implementations. *BMC Health Serv Res* 2020;20:815.
 - 71 Nowell LS, Norris JM, White DE, et al. Thematic analysis: striving to meet the trustworthiness criteria. *Int J Qual Methods* 2017;16:1609406917733847.
 - 72 Baker D, Quinn B, Ewan V, et al. Sustaining quality improvement: long-term reduction of nonventilator hospital-acquired pneumonia. *J Nurs Care Qual* 2019;34:223–9.
 - 73 Fleischer AR, Semenic SE, Ritchie JA, et al. A unit-level perspective on the long-term sustainability of a nursing best practice guidelines program: an embedded multiple case study. *Int J Nurs Stud* 2016;53:204–18.
 - 74 Flowers K, Wright K, Langdon R, et al. Intentional rounding: facilitators, benefits and barriers. *J Clin Nurs* 2016;25:1346–55.
 - 75 Flynn R, Rotter T, Hartfield D, et al. A realist evaluation to identify contexts and mechanisms that enabled and hindered implementation and had an effect on sustainability of a lean intervention in pediatric healthcare. *BMC Health Serv Res* 2019;19.
 - 76 Ford JH, Wise M, Krahn D, et al. Family care map: sustaining family-centered care in Polytrauma rehabilitation centers. *J Rehabil Res Dev* 2014;51:1311–24.
 - 77 Hatlie MJ, Nahum A, Leonard R, et al. Lessons learned from a systems approach to engaging patients and families in patient safety transformation. *Jt Comm J Qual Patient Saf* 2020;46:158–66.
 - 78 Knops AM, Storm-Versloot MN, Mank APM, et al. Factors influencing long-term adherence to two previously implemented Hospital guidelines. *Int J Qual Health Care* 2010;22:421–9.
 - 79 McLean HS, Carriker C, Bordley WC. Good to great: quality-improvement initiative increases and sustains pediatric health care worker hand hygiene compliance. *Hosp Pediatr* 2017;7:189–96.
 - 80 Mitchell SE, Weigel GM, Laurens V, et al. Implementation and adaptation of the Re-Engineered discharge (red) in five California hospitals: a qualitative research study. *BMC Health Serv Res* 2017;17:291.
 - 81 Montague J, Crosswaite K, Lamming L, et al. Sustaining the commitment to patient safety huddles: insights from eight acute hospital ward teams. *Br J Nurs* 2019;28:1316–24.
 - 82 Parand A, Benn J, Burnett S, et al. Strategies for sustaining a quality improvement collaborative and its patient safety gains. *Int J Qual Health Care* 2012;24:380–90.
 - 83 Patel H, Morduchowicz S, Mourad M. Using a systematic framework of interventions to improve early discharges. *Jt Comm J Qual Patient Saf* 2017;43:189–96.
 - 84 Porter RB, Cullen L, Farrington M, et al. Ce: original research: exploring clinicians' perceptions about sustaining an evidence-based fall prevention program. *Am J Nurs* 2018;118:24–33.
 - 85 Pronovost PJ, Holzmueller CG, Callender T, et al. Sustaining reliability on accountability measures at the Johns Hopkins Hospital. *Jt Comm J Qual Patient Saf* 2016;42:51–2.
 - 86 Rohatgi N, Weng Y, Bentley J, et al. Initiative for prevention and early identification of delirium in medical-surgical units: lessons learned in the past five years. *Am J Med* 2019;132:1421–30.
 - 87 Stoldorf DP, Mixon AS, Auerbach AD, et al. Implementation and sustainability of a medication reconciliation toolkit: a mixed methods evaluation. *Am J Health Syst Pharm* 2020;77:1135–43.
 - 88 Demming W. *The new economics*. Cambridge, MA: MIT Press, 1993.
 - 89 Langley G, Moen R, Nolan K, et al. *The improvement guide: a practical approach to enhancing organizational performance*. San Francisco, CA: Jossey-Bass Publishers, 2009.
 - 90 Klinga C, Hasson H, Andreen Sachs M, et al. Understanding the dynamics of sustainable change: a 20-year case study of integrated health and social care. *BMC Health Serv Res* 2018;18:400.

- 91 Lewin K. Frontiers in group dynamics: concept, method and reality in social science; social equilibria and social change. *Hum Relat* 1947;1:5–41.
- 92 Harrison R, Fischer S, Walpole RL, *et al.* Where do models for change management, improvement and implementation meet? A systematic review of the applications of change management models in healthcare. *J Healthc Leadersh* 2021;13:85–108.
- 93 Grol RPTM, Bosch MC, Hulscher MEJL, *et al.* Planning and studying improvement in patient care: the use of theoretical perspectives. *Milbank Q* 2007;85:93–138.
- 94 Ogrinc G, Dolansky M, Berman AJ, *et al.* Different approaches to making and testing change in healthcare. *BMJ* 2021;374:n1010.
- 95 Nilsen P, Bernhardsson S. Context matters in implementation science: a scoping review of determinant frameworks that describe contextual determinants for implementation outcomes. *BMC Health Serv Res* 2019;19:189.
- 96 Li S-A, Jeffs L, Barwick M, *et al.* Organizational contextual features that influence the implementation of evidence-based practices across healthcare settings: a systematic integrative review. *Syst Rev* 2018;7:72.
- 97 May CR, Mair F, Finch T, *et al.* Development of a theory of implementation and integration: normalization process theory. *Implementation Sci* 2009;4:29.
- 98 Backer TE. *Finding the balance: program fidelity and adaptation in substance abuse prevention*. A state-of-the-art review.: US Department of Health and Human Services Substance Abuse and Prevention Center for Substance Abuse Prevention, 2002.
- 99 Lynch EA, Mudge A, Knowles S, *et al.* "There is nothing so practical as a good theory": a pragmatic guide for selecting theoretical approaches for implementation projects. *BMC Health Serv Res* 2018;18:857.
- 100 Davidoff F, Dixon-Woods M, Leviton L, *et al.* Demystifying theory and its use in improvement. *BMJ Qual Saf* 2015;24:228–38.
- 101 Lewin K. Problems of research in social psychology. In: Cartwright D, ed. *Field theory in social science: selected theoretical papers by Kurt Lewin*. London, England: Social Science Paperbacks, 1943–1944: 155–69.
- 102 Bauer MS, Damschroder L, Hagedorn H, *et al.* An introduction to implementation science for the non-specialist. *BMC Psychol* 2015;3:32.
- 103 Rapport F, Clay-Williams R, Churrua K, *et al.* The struggle of translating science into action: foundational concepts of implementation science. *J Eval Clin Pract* 2018;24:117–26.
- 104 Silver SA, McQuillan R, Harel Z, *et al.* How to sustain change and support continuous quality improvement. *Clin J Am Soc Nephrol* 2016;11:916–24.
- 105 Gagliardi AR, Alhabib S, members of Guidelines International Network Implementation Working Group. Trends in guideline implementation: a scoping systematic review. *Implement Sci* 2015;10:54.
- 106 Page MJ, McKenzie JE, Bossuyt PM, *et al.* The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71.
- 107 Grol R. Personal paper. beliefs and evidence in changing clinical practice. *BMJ* 1997;315:418–21.
- 108 Brown C, Lilford R. Evaluating service delivery interventions to enhance patient safety. *BMJ* 2008;337:a2764.
- 109 Nolan T, Haraden C, Griffin F. *Improving the reliability of health care*. Boston, MA: Institute for Healthcare Improvement, 2004.
- 110 The Joint Commission. Robust process improvement: the joint Commission, n.d. Available: <https://www.jointcommission.org/performance-improvement/joint-commission/robust-process-improvement/> [Accessed 13 June 2022].
- 111 Grenny J, Patterson K, Maxfield D, *et al.* *Influencer: the science of leading change*. New York, NY: McGraw Hill, 2013.