
Article:
Coxon, A., Nielsen, K.M. orcid.org/0000-0001-9685-9570, Cross, J. et al. (1 more author) (2017) Implementing enhanced recovery pathways: a literature review with realist synthesis. Hospital practice, 45 (4). pp. 165-174. ISSN 2154-8331

https://doi.org/10.1080/21548331.2017.1351858

Implementing Enhanced Recovery Pathways: a literature review with realist synthesis

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Abstract

Objectives: Enhanced Recovery Pathways (ERPs) are an increasingly popular, evidenced-based approach to surgery, designed to improve patient outcomes and reduce costs. Despite evidence demonstrating the benefits of these pathways, implementation and adherence have been inconsistent.

Methods: Using realist synthesis, this review explored the current literature surrounding the implementation of ERPs in the UK. Knowledge consolidation between authors and consulting with field experts helped to guide the search strategy. Relevant medical and social science databases were search from 2000 to 2016, as well as a general web search. A total of 17 papers were identified, including original research, reviews, case studies and guideline documents. Full texts were analysed, cross-examined, and data extracted and synthesised.

Results: Several implementation strategies were identified, including the contexts in which these operated, the subsequent mechanisms of action that were triggered, and the outcome patterns they produced. Context-Mechanism-Outcome (CMO) configurations were generated, tested, and refined. These were grouped to develop two programme theories concerning ERP implementation, one related to the strategy of consulting with staff, the other with appointing a change agent to coordinate and drive the implementation process. These theories highlight instances in which implementation could be improved.

Conclusion: Current literature in ERP research is primarily focussed on measuring patient outcomes and cost effectiveness, and as a result, important detail regarding the implementation process is often not reported or described robustly. This review not only provides recommendations for future improvements in ERP implementation, but also highlights specific areas of focus for furthering ERP implementation research.

Keywords: Enhanced Recovery; Implementation; Realist Synthesis; Change agency; CMO configuration; Context-Mechanism-Outcome

1. Introduction

Originally developed in Denmark in the late 1990s [1], Enhanced Recovery Pathways (ERPs; also known as Enhanced Recovery After Surgery, or fast-track surgery programmes) represent an evidence-based, proactive approach to improving patient surgical outcomes. ERPs address all aspects of patient care throughout their surgery, from preoperative through to discharge and recovery. When successfully implemented, ERPs have been shown to consistently reduce length of hospital stay, and reduce patient readmission rates [2]. As well as these directly measurable benefits, ERPs have a number of secondary benefits as they empower patients and carers to become involved in the pathway of care. Since the early 2000s, ERPs have increased in popularity in the UK National Health Service (NHS) as a means of streamlining surgical procedures, reducing cost, and ultimately improving patient care and outcomes [3,4].

Although the evidence supporting the use of ERPs as a means of optimising surgical outcomes is continually growing, guidelines and research into the ERP implementation process is limited [5,6]. The focus in current ERP literature is predominantly on the effects the ERP has on patient outcomes, i.e. reducing length of hospital admission, or the impacts of specific elements within the ERP protocol. Limited attention has been paid to the process of implementing ERPs in hospitals, and to what extent they are successfully integrated and adhered to by staff. As the NHS faces severe constraints both to budgets and resources, careful consideration must be given to designing

evidence-based healthcare (such as ERPs) that can not only save money but also ultimately improve quality of patient care. An important part of this is ensuring that well-designed programmes and interventions are effectively implemented into practice, so that they are correctly executed and have the greatest possible positive impact on hospital processes. ERPs are ward-level protocols which require adherence from staff at all levels in order to be executed effectively.

The introduction of ERPs can often involve a significant change in ward processes, which may be met with some resistance [7–9]. Despite careful consideration given to the design of ERPs, accounts of successful implementation are inconsistent, with post-operative elements of ERPs (such as mobilisation and rehabilitation) often suffering low rates of adherence from staff [5,10]. Hospital wards are busy and complex environments, and integrating ERPs with existing practice can be challenging. ERPs are often not fully integrated into everyday ward practice. It is unclear in which contexts individual factors aiding or obstructing implementation become relevant, although a wide variety of barriers and facilitators of implementation have been suggested [8,11]. The effectiveness of an ERP is limited by the success of its implementation: unless the pathway is adhered to, it cannot achieve its aims.

The purpose of this review was to identify which implementation strategies result in the successful ERP implementation, by exploring the mechanisms of implementation, the contexts in which these operate, and what outcomes they bring about (developing what are known as context-mechanism-outcome, or CMO, configurations [12]).

A review of the current literature surrounding the implementation of ERPs in the UK involves synthesising a diverse range of literature concerning a complex intervention in complex settings. As such, it would be impossible for a single causal theory to consistently predict the outcomes of implementing ERPs in different contexts, i.e. different hospitals, different wards within the same hospital, or even the same ward but at contextually distinct times (e.g. different rotation of staff, different times in the year, or several years apart) [13]. Even if a narrower review were conducted

exploring the implementation of an ERP within a single surgical speciality, the local context of different hospitals (including organisational, ward level and individual level factors) affects the mechanism of implementation, and thereby the outcomes of the ERP.

Systematic reviews are an excellent method of measuring and assessing the extent to which interventions work, but are unable to unpick how, why, in what circumstances and for whom those interventions work, limiting their usefulness in informing the design of future interventions and their implementation strategies [14]. Additionally, existing ERP research is limited and varied in methods used and style of reporting, making meaningful comparison challenging. Because of this, it was agreed that a traditional systematic review approach would be unsuitable. Instead, a realist synthesis approach was adopted [13,15].

Realist synthesis is an increasingly popular method of evidence synthesis, which focusses on the production of programme theories in an attempt to explain why, when, how and in what circumstances interventions may or may not work [16]. Systematic reviews aim to minimise bias in order to analyse intervention effectiveness in isolation: realist synthesis accepts that interventions are not isolated mechanisms, but operate within different contexts, which impact outcomes. While systematic reviews are summative, realist synthesis aims to be explanatory, exploring the underlying and interrelated mechanisms of a phenomenon. Realist synthesis aims to consolidate existing research, providing a means of developing and describing underlying programme theories by which complex interventions are thought to work. Although not always explicitly stated in ERP design, implementation theory is implicit in the programme designers' assertion that, if executed in a certain way, an intervention will result in a desired outcome [15].

By synthesising a body of evidence and identifying key elements of context, mechanisms and outcomes, researchers generate abstract CMO configurations which explain the data. These can then be tested empirically, and refined where necessary, producing programme theory. These theories are not assumed to be absolute, and instead there is an implicit acceptance that they

cannot predict every outcome in every context, but pinpoint what works in what circumstances, and identify a number of demi-regularities [15] which can then provide practical guidance for similar interventions in future.

1.2 Review aims

The overall aim of this review was to explore the various implementation strategies used when introducing a new ERP, including what works, for whom, in what circumstances, to what extent, and how. By examining the existing literature, we will identify the mechanisms (M) by which the strategies operate, the contexts (C) in which these mechanisms are triggered, and the resulting patterns in outcomes (O). By reviewing and synthesising the available literature, we aimed to develop the underlying programme theories of ERP implementation, in order to inform future ERP implementation and optimise impact on patient outcomes.

2. Methods

Existing ERP research is limited and varied in methods used and style of reporting, making meaningful comparison challenging. After consideration, we decided that a realist synthesis approach would be the most appropriate for managing an "uneven body of evidence" such as this [13,17].

To guide the initial search strategy, a number of knowledge consolidation strategies were used. These strategies included an open discussion between the authors regarding our existing knowledge of knowledge translation, organisational interventions and behaviour change theories; consultation with field experts and researchers in ERP design and implementation, and a scoping search of existing ERP literature. From this initial stage, we developed initial propositions to be investigated and tested during the data synthesis process, to guide the development of later programme theories. The key propositions developed were:

1. If staff feel valued and involved in the ERP implementation process, then they are more likely to adhere to the pathway in practice

2. If managers and policy makers develop the ERP and implementation strategy with sensitivity to local context (including staffing levels, resources, organisational structure), the pathway is more likely to be adhered to, and will be sustainable in the long term

This process was also used to develop the key search terms, inclusion criteria and guiding questions for the main literature search.

2.1 Search strategy

A search of the literature was conducted, identifying papers dated from 2000 onwards, as ERPs were only introduced in the UK in the early 2000s. A combination of key words and search terms included enhanced recovery, fast-track surgery, multimodal surgery, implementation, integration, service improvement, national health service, hospital and acute. The search was conducted using databases including EBSCOhost, PsycINFO, MEDLINE and Cumulative Index of Nursing and Allied Health Literature (CINAHL), as well as Google Scholar and a general web search. Hand searching of journals was not deemed necessary due to the age of the research: as ERPs were only introduced in the UK from the early 2000s, any relevant literature will have been published within the last 15 years and therefore accessible via online databases. Reference lists of identified key articles were checked in order to ensure all relevant articles had been included in the review.

2.1.1 Inclusion criteria

Papers were included if they described some aspect of the ERP implementation process, including implementation strategies, barriers and facilitators to implementation, and/or ERP adherence and sustainability. All forms of literature were potentially eligible for inclusion in the review, including peer reviewed journal articles down to case reports and correspondence pieces, as long as the paper discussed instances of ERP implementation. Papers were excluded if they did not either describe the implementation process, the context in which the ERP was introduced, or if implementation was only mentioned briefly (i.e. no detail given about mechanism of implementation).

[FIGURE 1 HERE]

Figure 1. Search strategy

2.1.2 Identifying candidate papers

Initially, fourteen papers which described ERP implementation or adherence were identified for inclusion in the review [2,4,18–28]. Of these, six were original research papers, four were reviews of existing literature, one was a guideline document from the Royal College of Surgeons, one scientific impact paper from the Royal College of Obstetricians and Gynaecologists, one was a focus piece giving advice from experience of implementing ERPs, and the final paper included correspondence concerning a piece of original research (which included more detail about ERP implementation than in the research paper concerned). All of the original research papers reported findings from single-centre research projects, and covered a range of surgical specialities (two colorectal, two gynaecology/obstetrics, one orthopaedic, one urology). All of the papers identified at least one of the implementation strategies described in our a priori propositions.

Reference lists and studies included in the four review papers were checked for relevance, but the majority of these did not contain any additional information related to ERP implementation which had not already been covered by the reviews. However, included in the review by Paton et al [2] were a number of case studies compiled during a 2011 report by the Department of Health's "Enhanced Recovery Partnership Programme (ERPP)" [29]. Due to the report's relevance to this review, especially regarding consideration of implementation strategy across multiple sites (the ERPP involved 15 hospitals), this report and three of the original case studies were included in the review (meaning a total of 18 papers were included in the review).

2.2 Data extraction & synthesis

Unlike in a systematic review, publications are not rejected prior to inclusion in a realist review based on a quality appraisal. Instead, each candidate paper is mined for relevant data to further

develop the explanatory model [15]. Rather than papers being wholly rejected on the grounds of quality appraisal, the value of each paper is determined by its contribution to increasing understanding and addressing the review objectives. Pawson [15] advises against the use of data extraction forms in realist synthesis, as he argues that their rigid structure can limit the types and breadth of data extracted from a diverse range of sources. Instead, the data was analysed and extracted iteratively, being constantly related back to the review objectives.

3. Results

3.1 Papers included in review

Each of the included papers made some mention of at least one formal strategy used in the implementation of ERPs. The level of detail in reporting implementation strategy varied, but on the whole was limited, with a strongly outcome-focussed approach. None of the papers described a rationale for why a particular implementation strategy was chosen, although the design and content of the ERP itself was described in good detail in most cases. The most commonly used strategies were the tailoring of ERPs to fit local contexts and resources, the use of a multidisciplinary steering group to identify and design necessary changes, regular auditing in order to assess ERP compliance, rolling training programmes and the use of an “ERP champion” or change agent to coordinate and drive the implementation process. Some of these strategies were interdependent (for example, the change agents conducting the audits, the training programme agreed via a multidisciplinary working group, ERP tailoring discussed within the multidisciplinary working group or via change agent consultations with ward staff), and as such we analysed the data in detail, to synthesise the findings and develop CMO configurations which were suitably abstract to capture the essence of implementation.

[TABLE 1 HERE]

Table 1: summary of papers included in review

The majority of papers discussed the involvement of stakeholders in the ERP design and implementation process. The format of these varied, with some reporting the setup of multidisciplinary working groups or project teams [18,20–22,25,26,30–32] in order to contribute to the development of the pathway and agree the ERP goals. Stakeholder consultation served to cement existing team relationships and integrated working [20], provide opportunities for cross-disciplinary education, improve communication, and help staff to gain greater insight into the rationale and evidence base behind ERP elements (thus reducing resistance to change) [21,22]. One paper recommended consultation with a broad range of staff [33], not only a small, specifically selected core working group, in order to foster positive attitudes towards the pathway and gain a greater understanding of all aspects of the surgical pathway.

However, some papers reported little or no stakeholder involvement in the design and implementation process, but it is unclear whether or not this is simply due to a lack of detailed reporting. For example, Lee et al [19] do not mention stakeholder involvement in ERP design or implementation, but in their concluding comments, they discuss the importance of staff involvement in the change. Likewise, although Ahmed et al [24] do not directly discuss working groups in the design of the ERP, they discuss the role of stakeholder "buy in" to the ERP model, in order to challenge obsolete practice, and highlight the importance of good multidisciplinary working throughout the pathway.

Although the majority of papers reported some level of stakeholder consultation, one consistent observation was that this rarely involved therapies staff, healthcare assistants or support workers (i.e. staff primarily involved with patients' post-operative care and recovery). The main focus of ERP design and implementation involved consultation with pre- and intra-operative staff, such as surgeons, anaesthetists and nurse specialists. The post-operative stage suffers the lowest adherence rate across ERPs [23,24] and Lee et al [19] suggest this may be due to post-operative care staff preferring traditional methods of care, or viewing these as "kinder" to patients (e.g. meals in

bed, rather than encouraging mobilisation to eat in a dining room). This highlights the importance of identifying areas of non-adherence, in order to target ongoing staff training, and increase awareness and understanding of the rationale and evidence-base behind ERP elements.

The majority of papers discussed the importance of the role of a change agent (such as an Enhanced Recovery Nurse Practitioner, or ERP champion) in driving the ERP implementation process [2,4,18,20–23,29,31,32]. This role was usually occupied by a member of nursing staff, often recruited from existing ward nurses, but guidelines suggest that this role could be filled by staff from other specialities [23] (although this is not supported by existing evidence). One possible explanation for the success of using nurses as ERP champions in driving the ERP agenda is a good working knowledge of hospital nursing practices, and an existing rapport with staff (particularly true if the change agent is recruited internally). One of the papers did not appoint a change agent (due to lack of financial resources), but did suggest that had this been possible, this may have helped in the management of the pathway, increasing compliance and improving communication [19]. Generally, the role of change agent involved close communication with the multidisciplinary team, provided a main point of contact for both staff and patients, was responsible for ongoing ERP adherence audits [27], identifying and delivering ongoing training needs [4].

Staff in role of ERP change agent often did not have previous experience in this role, or of ERPs in general. To help develop the change agent's understanding of ERPs and inform their strategies for implementation, one of the change agents was given the opportunity to visit a ward with an already established ERP [18]. Although the unit visited was of a different clinical speciality to the change agent's own ward, this provided not only an opportunity for change agents to gain insights into the ERP implementation process (and inherent challenges), but also gave the agent a professional contact with significant experience and expertise, who could serve as a source of advice and support.

The use of a change agent to drive the implementation process should be distinct from over-reliance on this one individual, to the detriment of the overall life of the ERP. Rooth & Sidhu [18] observed a significant drop in ERP adherence during the change agent's period of annual leave, suggesting that appropriate and effective cross-cover of this role is vital for long-term sustainability and fidelity to the ERP.

3.2 Developing Programme Theories

Following analysis and synthesis, two programme theories were developed, encompassing a number of dependent CMO configurations. These theories were concerned with staff consultation and the use of a change agent in ERP implementation. Based on the extracted data, the desired outcomes of successful implementation were identified, and these were then tracked back to identify the mechanisms resulting in such outcomes, and the contexts necessary to trigger them. The literature was iteratively analysed on multiple occasions to extract any further relevant details, and from these we developed of CMO configurations. This was by identifying demi-regularities in the literature, examining outcome patterns and the conditions surrounding them. The extracted data was then synthesised to draw out the essential characteristics common to the implementation processes. These formed the basis of the initial CMO configurations. After the initial CMO configurations were developed they were compared with the source literature, tested, and refined as necessary. Figure 2 shows an outline of the CMO configurations developed as part of the "staff consultation" programme theory.

[FIGURE 2 HERE]

Figure 2. CMO configurations within programme theory of staff consultation

Staff consultation is hypothesised to work best when staff *feel valued and supported* both by their managers and by their colleagues, *have trusting and respectful interdisciplinary relationships*,

and there are *opportunities for staff to contribute to multidisciplinary discussions* (context); this facilitates *open discussion between different staff groups* (mechanisms); as a result, this allows for *identification of practical barriers to ERP implementation*, how these barriers might be realistically managed, and results in *improved pathway adherence* (outcome).

The current literature concerning ERPs is heavily outcomes-focused (adherence levels and patient outcomes), and has minimal detail about the implementation process (e.g. specifically who was involved in staff consultations, the level of involvement, the types of discussions conducted). This lack of detail makes it challenging to identify whether the process of implementation could relate, positively or negatively, to the outcomes achieved. Using the CMO configurations developed in Figure 2, it may be possible to speculate. For example, if certain staff groups are simply not invited to be involved in the consultation process, these staff do not have *opportunities to contribute to the multidisciplinary discussion* (context), meaning that the mechanisms of *open discussion between staff groups* and *staff communicate effectively within & between teams* may not be triggered. As a result, the extent to which *staff feel involved and invested in the ERP*, are *able to support and motivate colleagues*, and *understand the whole ERP and their roles within it* (outcomes) may be affected, thereby affecting ERP adherence.

Alternatively, certain staff groups may not *feel valued or supported* (context), which results in these staff not feeling *motivated or engaged in the consultation process* (failure to trigger mechanism), as a result, some *practical barriers fail to be identified and addressed* (desired outcome not achieved), and staff are unable to adhere to the ERP.

In the articles reviewed, not all of the elements, in the ERPs described, are adhered to fully. Commonly, post-operative elements related to mobilisation, rehabilitation and pain management, often demonstrate much lower levels of adherence than other stages in the ERP. However, based on this evidence, reasons for why this is the case is not clear. We hypothesise that this is in part due to the fact that this phase primarily involves therapies staff, healthcare and nursing assistants, who are

often not involved in policy design and staff consultation. The earlier phases of ERPs, which involve staff nurses, surgeons and anaesthetists, do not typically have adherence issues. It is possible that not all relevant staff groups are equally valued, or represented in the consultation process, which results in a lack of understanding of the pathway and its rationale, and as a result these staff lack the necessary skills, knowledge or motivation required to implement the ERP appropriately. However, in order to explore this hypothesis further, more detail is required regarding the context of implementation and its impact on how mechanisms operate. Another potential issue is frequent turnover of staff, or the use of agency staff, who may not be familiar with the ERP or its evidence base, highlighting a need for ongoing and rigorous training.

Figure 3 shows the CMO configurations concerned with the "change agent" programme theory.

[FIGURE 3 HERE]

Figure 3. CMO configurations within programme theory of change agency

Appointing a change agent/ERP champion is thought to work best when the change agent is *familiar with existing local practices*, has a *detailed understanding of the ERP and its rationale/evidence base*, has *good management skills*, and *rapport with a broad range of staff* (context). This enables the change agent to *drive the implementation process on the ground*, acting as a *main point of contact* to resolve ongoing issues, *identify areas for development* such as skills training needs, and *liaise directly and effectively with staff* to problem solve regarding barriers to implementation, generating *positive attitudes towards the ERP* (mechanisms). The outcome of this engagement in *increased staff understanding* of the ERP, *reduced resistance to change* and *improved staff adherence* to the pathway (outcomes).

Papers which discussed the use of a change agent in the ERP implementation process emphasised the importance of this role to develop good communication and cohesion. Studies not

using a change agent reflect that the process could be greatly improved had one been employed. However, this not without issues, as it requires an individual who has specific pre-existing skills and knowledge, to undertake a personally and professionally demanding role. Additionally, the change agent should be effective in sharing those skills and knowledge throughout the team, as overreliance on one individual to ensure the smooth running of an entire pathway can result in noticeable dips in adherence should that individual be removed [18].

4. Discussion

This review highlights the importance of a planned and well-coordinated process of implementation, in which members of all staff groups across the pathway are supported, informed, and enabled to implement the necessary changes to practice. This is reflected in the wider implementation research literature [34,35]. Regardless of surgical speciality, a theoretically-based and planned process of implementation results in sustained ERP adherence (and subsequent improved outcomes for patients).

Implementation strategies analysed in this review were variable with variable results. Although the implementation process was not the primary focus for the original articles, it is important to emphasise that the aims of an intervention can only be achieved if it is implemented appropriately [5]. If implementation strategies are not prioritised and considered carefully, this can limit the effectiveness and sustainability of the intervention, and this is reflected in the wider international ERP literature [36–38]. None of the papers described rationale for why strategies for implementation were selected, which suggests either a lack of reporting detail, a lack of evidence, or theory-based implementation.

It would be short-sighted to consider any programme theory complete. The lack of detail available made the process of developing CMO configurations challenging, as often important contextual information was absent. Although outcomes and mechanisms were relatively straight-forward to identify, contexts often had to be inferred. Although these were later refined and proved

to be robust in relation to the existing literature, the current programme theories would benefit from further development. Current work will use insights from this review to produce new details regarding ERP implementation in a specific context allowing more nuanced development of the programme theories.

4.1 Strengths and Limitations

The quality of a review is often limited by the primary literature upon which it is based. For the purposes of this review, only literature discussing ERPs in UK hospitals was included. Implementation strategy is context sensitive, and national context has a significant impact on how healthcare is delivered, managed and evaluated [39]. We decided that broadening the review to include the wider international literature would result in a loss of contextual specificity and therefore render the review less meaningful. Given the findings from this review, a further comparison with international literature may provide additional insights and transferable concepts.

Studies describing the ERP implementation process are limited, and the description of implementation is often brief, lacking important detail. Current reporting of ERP implementation has an overwhelmingly outcome-focussed approach, limiting the transferability of findings to other contexts, as it is challenging to identify what circumstances are needed to trigger specific mechanisms to produce the desired outcomes (i.e. ERP fidelity and sustainability).

It is possible that a different group of researchers conducting a realist review addressing the same aims may select different datasets for inclusion in their review, make different judgements about the data, highlight different areas of significance, categorise the contexts, mechanisms and outcomes differently, and subsequently develop different programme theories. However, this is true of any realist synthesis, and only further demonstrates the complexity of this research [40,13].

5. Conclusion

The programme theories proposed from this review are in their early stages of development. This review has highlighted important issues in the implementation, and subsequent reporting of

ERPs. We anticipate the findings will be useful in assisting hospital administrators and clinicians to design appropriate and effective implementation strategies. By proposing these programme theories, we would encourage other researchers to test them as part of future ERP implementation research. By reporting how implementation varies between different settings, further development and refinement of implementation theory can occur.

Funding

This paper was not funded.

Declaration of Interests

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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