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Original Article

Developing implementation strategies to adopt Enhanced Recovery After Surgery (ERAS®) guidelines

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Abstract

Background: Strong implementation strategies are critical to the success of Enhanced Recovery after Surgery (ERAS®) guidelines, though little documentation exists on effective strategies, especially in complex clinical situations and unfamiliar contexts. This study outlines the process taken to adopt a novel neonatal ERAS® guideline.

Methods: The implementation strategy was approached in a multi-pronged, concurrent but asynchronous fashion. Between September 2019 and January 2020, healthcare providers from various disciplines and different specialties as well as parents participated in the strategy. Multidisciplinary teams were created to consider existing literature and local contexts including potential facilitators and/or barriers. Task forces worked collaboratively to develop new care pathways. An audit system was developed to record outcomes and elicit feedback for revision.

Results: 32 healthcare providers representing 9 disciplines and 5 specialties as well as 8 parents participated. Care pathways and resources were created. Elements recommended for a successful implementation strategy included identification of champions, multidisciplinary stakeholder involvement, consideration of local contexts and insights, patient/family engagement, education, and creation of an audit system.

Conclusion: A multidisciplinary and structured process following principles of implementation science was used to develop an effective implementation strategy for initiating ERAS® guidelines.

Introduction

Enhanced Recovery After Surgery (ERAS®) guidelines are holistic, multidisciplinary tools used to deliver collaborative care to surgical patients throughout their perioperative journey[1–8]. ERAS programmes have successfully improved outcomes in multiple subspecialties by shortening length of stay, decreasing complications and improving patient satisfaction[6,7,9–11]. Multiple factors contribute to the success of ERAS in practice, including the nature of the guidelines themselves as well as structured implementation plans and audit systems that support their use[1,8].

It is becoming increasingly evident that methods of adopting, applying and sustaining an intervention, are just as important in realizing potential outcomes as the interventions themselves[12–15]. Attention to implementation science is particularly important when adopting complex healthcare interventions, such as ERAS® guidelines. ERAS protocols have become an accepted part of many adult surgical practices and successful strategies of implementation have built on an understanding and acceptance of standard elements of the ERAS® guidelines[8,16].

Few attempts have been made to create paediatric specific guidelines and none have targeted the neonatal population[17–19]; a unique group of patients and caregivers largely unfamiliar with ERAS principles[20,21]. The implementation of these guidelines required a novel approach to both neonatal surgical care and the application of ERAS.

Neonates have high rates of postoperative complications relating to a variety of physiologic and sociologic factors[22–24]. Significant practice variation exists and inconsistencies in care may contribute to the complication profile[1]. To address these concerns, this international team developed a neonatal intestinal resection ERAS® guideline through rigorous collaborative methods using best available evidence from the literature[25,26]. The published neonatal intestinal resection ERAS® guideline has been adopted at the Alberta Children's Hospital (ACH) after creating a robust implementation plan.

The aim of the present study was to outline the structured process used to implement the neonatal intestinal resection ERAS® guideline. It was anticipated that this study may act as a model to guide future strategies and other institutions as they

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embark on implementing ERAS, particularly among specialties less familiar with the concepts involved.

Methods

Principles of effective implementation science and adherence to the Standards for Quality Improvement Reporting Excellence guidelines were followed[27]. The model for implementation of the neonatal intestinal resection ERAS® guideline followed a planned-action framework and normalization process theory (NPT). Steps in the planned-action framework included identifying a problem, analyzing existing knowledge and evidence to solve the problem, adapting insights to local settings, reviewing potential barriers, tailoring interventions to the local setting, monitoring and evaluating the use and outcomes, and sustaining the change[15,28–30]. The NPT describes how agents (individuals or groups), objects (procedures or protocols) and contexts (physical or organizational structures) interact with each other to explain how interventions become, or fail to become, normalized in daily practice[12,15,31]. It consisted of four constructs; coherence, cognitive participation, collective action and reflexive monitoring[32].

The implementation design occurred in a step-by-step, concurrent but asynchronous process. Between September 2019 and January 2020, the overall strategy included identifying champions, creating multi-disciplinary task forces, creating new care pathways, producing tools and resources, engaging parents/families, educating users and developing an audit system. An overview of the process is depicted in *Fig. 1*.

Champions were identified to lead the initiative within their respective specialties based on their previous experience in using or developing ERAS protocols, their interest in the neonatal intestinal resection guideline and their clinical roles. Champions were responsible for overseeing the overall implementation process, obtaining support from their leaders, appointing representatives from their specialty for different task forces (discussed below), educating colleagues on ERAS principles prior to and throughout roll-out, modelling adoption and supporting operationalization of the guideline.

As the neonatal intestinal resection ERAS® guideline consists of 17 recommendations distributed into 10 major topics, individual multidisciplinary task forces approached each recommendation by identifying existing knowledge, local infrastructure and resources and barriers or facilitators of implementation. Each task force consisted of representation from all relevant stakeholders. Some topics were combined and tackled by a single task force. Individual task forces met in an asynchronous but concurrent manner throughout the process.

After evaluating available literature, existing resources and local contexts, each task force worked collaboratively to develop solutions to barriers of implementation. New care pathways and protocols were created through iterative consensus processes informed by multidisciplinary teams that satisfied all team members' priorities and concerns.

After new care pathways were created, task force members developed methods to integrate and embed new pathways into existing infrastructure. Subsequently, production of various resources ensued, including checklists, protocols and infographics to assist clinicians in modifying their practice patterns. Resources were reviewed, revised and approved for final use by all team members.

Parent stakeholders were engaged at multiple times throughout the guideline development and implementation process[25]. Parent advisors provided feedback on the initial proposal and feedback on the key topics that would require parental involvement. They also contributed to the determination and development of the final recommendations.

After ethics approval and individual participant consent, a focus group of parents who had an infant with a surgical diagnosis was convened within the neonatal intensive care unit (NICU). Parents discussed priorities in their child's care and shared experiences and perspectives of care. Parents were educated on ERAS principles and presented with the neonatal ERAS® guideline to provide input on how best to involve them as active partners in their child's care. Field notes and an audio recording were taken. Parents reviewed and offered feedback on ERAS parent materials and handouts.

After infants had been discharged, follow-up phone calls were conducted with participants by a member of the implementation team using a semi-structured script. Discussions surrounded the education and instructions provided to families at discharge. Areas of inquiry included parent perspectives on communication and transfer of information, strategies to prepare families for discharge as well as reflections on aspects that were performed well and areas requiring improvement. Field notes and audio recordings were taken.

A thematic analysis using N Vivo 12™ (QSR International) was completed on field notes and transcripts using an inductive approach. Codes were applied to concepts using a constant

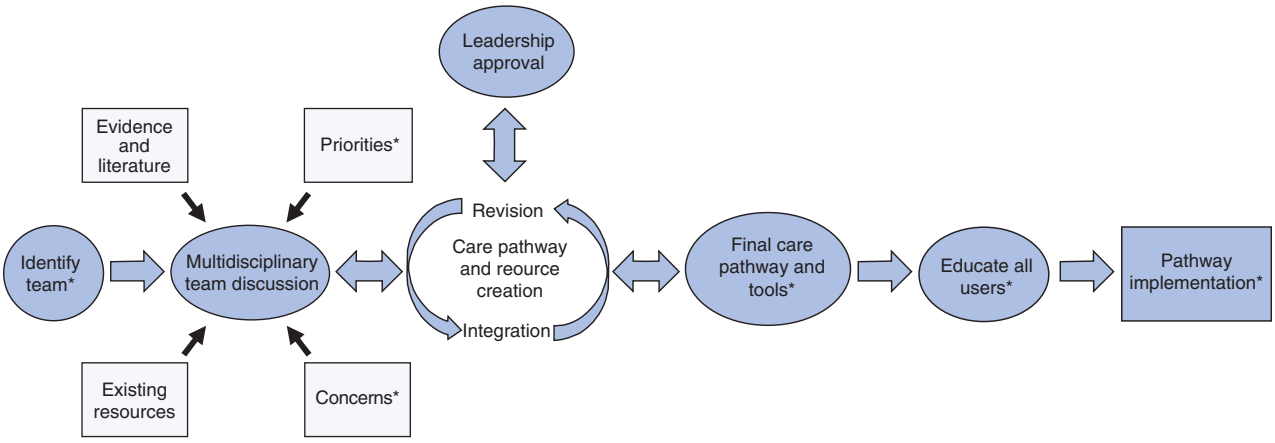

Fig. 1 Overview of the Alberta Children's Hospital neonatal Enhanced Recovery After Surgery® guideline implementation strategy
*denotes points of parent/family engagement

comparative approach by 2 reviewers to ensure reliability and agreement on codes.

Prior to roll-out, all healthcare providers were educated on the principles of ERAS as well as specifics of the neonatal ERAS® guideline and its impact on their clinical practice, using a variety of different education modalities. Poster and print materials were made widely available along with regular email updates and podcasts.

Print materials and handouts were created specifically for parental use and education. A parental education booklet was developed considering institutional contexts. It described ERAS principles, counseled parents of their key role as partners in their child's care, presented expectations of the typical perioperative journey and provided written discharge information.

Ongoing evaluation and tailoring of the guideline and implementation strategy is fundamental to ensuring continued success. As such, task forces identified objective measures for each recommendation to monitor user compliance with the guidelines (*Table S1*). Information was gathered on relevant patient outcome measures to evaluate overall guideline efficacy.

Separate surveys and interviews for parents and clinicians were developed to assess personal experiences and opinions of using the guideline and served to elicit suggestions for enhancing the guideline and implementation process. Review and revision of the strategy has been planned once 6 months of data and feedback has been acquired.

Results

Healthcare providers represented 9 separate disciplines and 5 specialties with a total of 32 individuals participating in at least one multidisciplinary task force (*Table S2*). There were 8 family advisors.

Champions and multidisciplinary task forces

Individuals acted as champions for surgery, anesthesia, neonatology, nursing and implementation (*Table S2*). Champions sat on multiple task forces and appointed representatives from their discipline for other task forces. In total, there were 8 task forces, each consisting of multidisciplinary representation from all relevant stakeholders (*Table S2*)

Care pathway creation

New care pathways were created by 7 of the 8 task forces. The most extensive change occurred in the team communication topic. An evaluation of the existing patient transfer and handover process identified patient care issues relating to potential miscommunication, patient/family privacy and patient safety. An example of the different priorities and concerns that were recognized by the separate disciplines is shown in *Table 1*. The multidisciplinary task force created a new perioperative patient and information transfer process (*Fig. 2*). The implementation champion ensured integration of the various new care pathways created by providing perspective on work being done by separate task forces.

Resource production

Task forces identified areas where users were considered likely to require support in integrating the ERAS® guidelines into daily workflow. Resources (tools, checklists, infographics) were created to act as reminders and support clinicians with successful adoption. An ERAS baby logo was created and attached to the patient chart, the unit patient board and door to the patient room to remind clinicians to manage the patient under the ERAS protocol.

Each recommendation had at least 1 resource associated with it. Some resources incorporated multiple recommendations and most recommendations were included in multiple resources. For example, separate checklists were created for the pre- and post-operative huddles. These incorporated all important and relevant information for the patient transfer as well as all elements from the briefing and de-briefing sections of the institutional safe surgery checklist as well as incorporating aspects of preventing hypothermia, antibiotic prophylaxis and perioperative analgesia recommendations (*Fig. 3*). All other resources created are shown in (*Table S3*).

Family engagement

There were 5 parent participants in the focus group. After reviewing the ERAS parent materials, feedback for improvements included information on pain management, available support for families and how parents can be more involved. These aspects were incorporated into the parent education booklet.

Follow-up phone calls were conducted 2 months after the focus group with 2 parent participants. The other 3 parent participants were ineligible as their infants were still in-patients Themes included the importance of communication and transmission of knowledge and the opportunity for hands-on practice of skills, both as simulation and actual performance, under direct expert observation.

Discussion

A rigorous process has been outlined to create a robust and diversely informed implementation strategy for the initiation of neonatal intestinal resection ERAS® guideline at this institution. This may serve as a model to develop future implementation strategies of ERAS® guidelines at this centre and other institutions.

Engagement of the entire neonatology team was particularly important to the success of the implementation plan. To date, ERAS® guidelines have mainly found success in the adult world and are only starting to gain traction in paediatric surgery[1,33]. Introduction of an ERAS programme presents a number of challenges for specialties generally unfamiliar with this approach. Paediatric subspecialty colleagues (such as nursing or pharmacy) had never had exposure to ERAS® guidelines, in contrast to surgeons and anaesthetists. Most existing ERAS® guidelines are developed with the expectation that patients are admitted on a surgical ward under the operating surgeon rather than an intensive care unit. A further component to the successful adoption of paediatric specific ERAS protocols is the partnership with parents[1]. A fundamental tenet of ERAS protocols is the commitment to providing care via a patient and family centered approach[17,33]. Involving parent stakeholders enabled the development of care pathways and educational materials geared specifically towards what mattered most for parents. These considerations highlight the importance of considering local contexts and factors and how they contribute to the overall success of an implementation strategy.

The main purpose of this paper was to provide the major elements and framework that seemed necessary to successfully implement a complex healthcare intervention (Table 2) and offer examples of the approach used in order to aid future teams looking to adopt ERAS® guidelines in complex clinical settings or novel environments.

Table 1 Priorities and concerns identified by multidisciplinary task force members for the patient transfer process

	Priorities	Concerns
Anaesthesia	Communication of patient information	Time/delay getting patient into the OR if NICU team not ready for transfer
Surgery	Full team present for huddles Teamwork	Previous 'silo' handover model
Neonatology	NICU team to continue to provide transport	Responsibility for other potentially sick babies in the NICU if waiting in OR holding to do preoperative huddle
OR RN	Communication Teamwork	Time/delay in patient transfer
NICU RN	Remain part of patient transfer team	Time provided to prepare patient for transfer
NICU RT	Remain part of patient transfer team	Equipment/technology issues, especially with HFO/HFJV
TM	Blood product distribution	Transfer of blood products between units
Transfer Process	Patient/family confidentiality/privacy Anxiety for other families in holding	Hypothermia risk Equipment/Technology issues

OR- operating room; NICU- neonatal intensive care unit; RN- registered nurse; RT- respiratory therapist; HFO- high frequency oscillator; HFJV- high frequency jet ventilation; TM- transfusion medicine

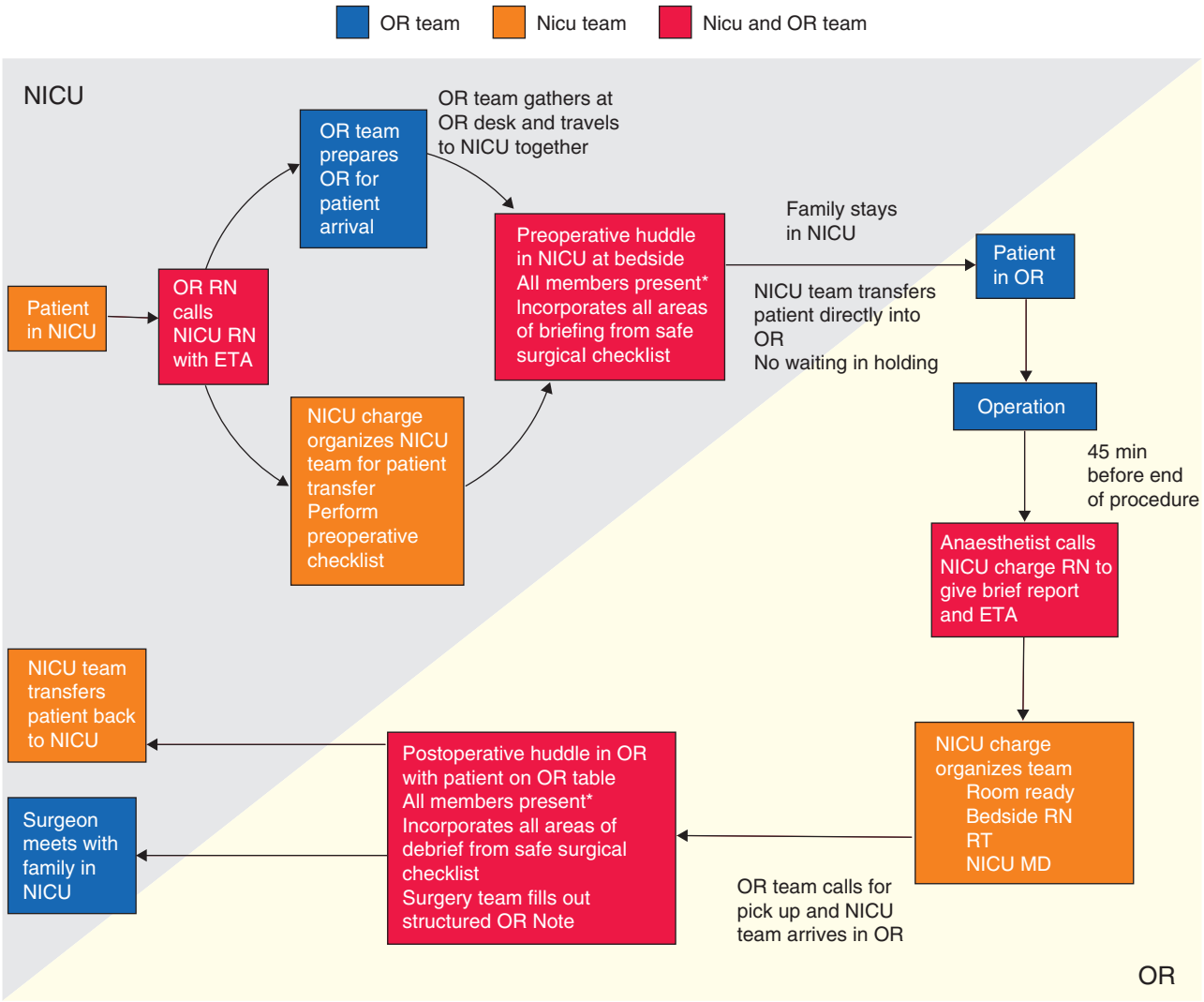

Fig. 2 Process map of new patient transfer process between the neonatal intensive care unit and the operating room

ERAS® guidelines should be implemented as a whole, as individual elements work synergistically to further improve outcomes. It is accepted, nevertheless, that this may not always be feasible. Teams who have little experience with ERAS protocols may begin by identifying a single or a few recommendations that will most benefit their environment. An option, termed horizontal adoption, identifies a single recommendation that may be broadly adopted across all patient populations.

Table 2 Major elements necessary to successfully implement complex healthcare interventions

Recommended elements
Identification of Champions
Multidisciplinary Stakeholder Involvement
Examination, Consideration and Tailoring of Local Contexts and Insights
Patient/Parental/Family Engagement
Education for all Providers
Audit and Evaluation System for Guideline and Implementation Strategy Revision

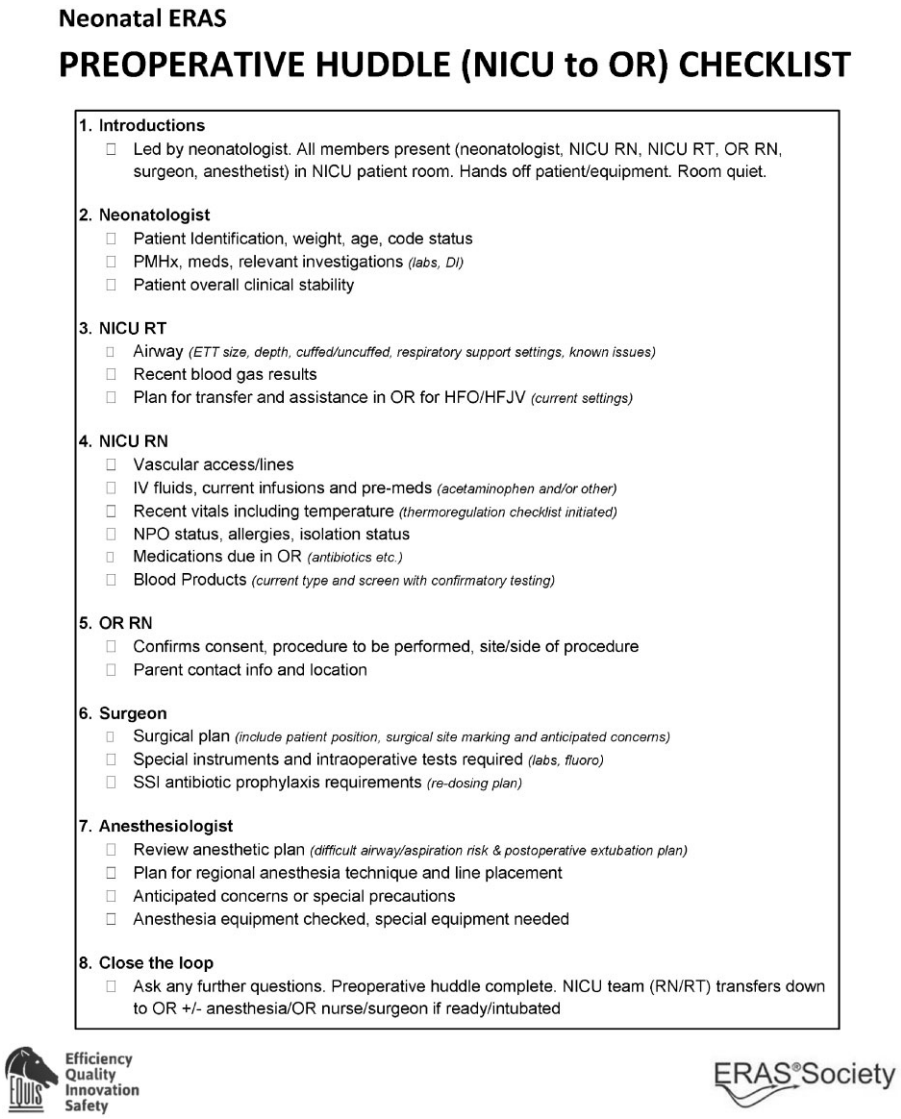

Fig. 3 Alberta Children's Hospital neonatal Enhanced Recovery After Surgery pre-operative huddle checklist tool
ERAS- enhanced recovery after surgery; NICU- neonatal intensive care unit; OR- operating room; RN- registered nurse; RT- respiratory therapist; PMHx- past medical history; DI- diagnostic imaging; ETT- endotracheal tube; HFO- high frequency oscillator; HFJV- high frequency jet ventilation; IV- intravenous; NPO- nil per os; SSI- surgical site infection.

The implementation of complex healthcare interventions requires a structured and intensive strategy to ensure that the intervention is adopted and integrated successfully into existing infrastructure and daily workflow[12,31,32]. A multidisciplinary and systematic approach with careful planning, following known elements of implementation science, can assist teams in addressing all factors and aspects necessary to develop successful implementation strategies for their complex interventions[12,15,31]. The strategy used here for implementing a neonatal ERAS® guideline may be a useful model to guide implementation of similar complex healthcare interventions.

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Supplementary material

Supplementary material is available at *BJS Open* online.

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