

**Building capacity to use evidence-informed approaches to implementation in
maternal-newborn care:
Development and evaluation of an implementation toolkit**

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Doctorate in Philosophy degree in Nursing

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Preface

Ethical Considerations

The research presented in this thesis was approved by the Ottawa Health Science Network Research Ethics Board (20210274-01H), the University of Ottawa Research Ethics Board (H-11-22-8739), and the Children's Hospital of Eastern Ontario Research Ethics Board (23/59X). Appendix A includes the approvals from the three research ethics boards.

Contributions of Authors

I, Jessica Reszel, the named doctoral candidate of this thesis, led all aspects of the thesis studies, including developing and managing the research teams, study conceptualization and design, collecting and analyzing data, and interpreting the findings. I led the drafting of all chapters, manuscripts, and the toolkit, and I am accountable for all aspects of the work. Appendix B details the contributions of each team member.

Formatting

This doctoral thesis is an article-based thesis and is formatted in accordance with guidelines from the University of Ottawa School of Nursing. The four papers in this thesis follow the style and referencing guidelines of the journal they were published in or submitted to. The remaining chapters follow the American Psychological Association (APA) 7th edition referencing style.

A Note on Language

Throughout this thesis, the descriptor “maternal-newborn” is used when referring to the settings and teams providing care to pregnant and birthing people and their infants (e.g., maternal-newborn hospitals, maternal-newborn teams, maternal-newborn care). At the time of writing, “maternal-newborn” remained a commonly used descriptor in the literature and health organizations and was used in this thesis for clarity and consistency. However, the term “maternal” is related to the word “mother” and is a gendered term. Not every pregnant and birthing person identifies as a mother or a woman, and I acknowledge that this term is not inclusive of all pregnant and birthing people’s identities and experiences.

In several instances, the term “stakeholder” is used in this thesis. In research and healthcare, the term stakeholder has been used to refer to individuals, groups, and organizations who may be interested in or affected by the results of a project or initiative. Recently, there has been growing recognition that this term should be replaced, due to its association with settlers using wooden stakes to claim Indigenous land. In this thesis, the term stakeholder appears when it was used in source material or participant quotes but has otherwise been replaced with alternatives such as “partners” or “interested and affected parties.”

Finally, because this thesis used an integrated knowledge translation (IKT) approach, in some instances I use the term “we” to refer to the collective activities undertaken by the study team of researchers and knowledge users. In other cases, I use the term “I” to signal activities that I led or was primarily responsible for.

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Thesis Abstract

Background: Pregnant and birthing people and their infants do not always receive care that aligns with best available evidence. Knowledge generated from implementation science can inform how to close these evidence-practice gaps. However, the implementation science literature is large and difficult to navigate, and there are limited opportunities for healthcare providers and leaders to learn about it.

Purpose: To develop and evaluate a toolkit to build the capacity of healthcare professionals and leaders to apply knowledge from implementation science in Ontario maternal-newborn hospital settings.

Methods: A multi-stage, mixed-methods study using an integrated knowledge translation approach. Stage 1 informed the content of the toolkit: (1) a mixed-methods study with implementation experts to identify essential content for teaching implementation practice; (2) a secondary qualitative analysis of interviews with maternal-newborn nursing leaders to learn about implementation approaches; (3) a cross-sectional survey of maternal-newborn healthcare professionals and leaders on their implementation approaches and learning needs. Stage 2 involved synthesizing the findings and co-producing the toolkit, grounded in the Implementation Roadmap. Stage 3 was a mixed-methods evaluation of the toolkit to assess acceptability, appropriateness, feasibility, usability, and intent to use.

Findings: 137 people were enrolled (33 implementation experts; 104 maternal-newborn healthcare professionals and leaders). Implementation experts identified core content needed to teach healthcare professionals about implementation. The secondary qualitative analysis and survey confirmed that current approaches to implementing evidence-informed practices do not fully align with recommendations from implementation science. Participants expressed a desire

for improving their capacity to apply evidence-informed implementation approaches. Data from stage 1 was synthesized to create a toolkit with 13 steps and 26 templates to support teams to improve their implementation processes. Evaluation participants indicated the toolkit is an acceptable and helpful resource that they intend to use and identified areas to improve usability and feasibility.

Conclusions: Knowledge from implementation science is not being applied consistently or comprehensively in Ontario maternal-newborn hospital settings. The toolkit is an implementation strategy that can help translate knowledge from implementation science into practice. Future work is needed to refine the toolkit, field-test it, and ascertain its effectiveness to improve implementation capacity, processes, and outcomes.

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List of Abbreviations

BFI	Baby Friendly Initiative
BORN	Better Outcomes Registry & Network Ontario
CFIR	Consolidated Framework for Implementation Research
CIHR	Canadian Institutes of Health Research
CMNRP	Champlain Maternal Newborn Regional Program (CMNRP)
COREQ	Consolidated Criteria for Reporting Qualitative Research
CROSS	Checklist for Reporting Of Survey Studies
EBSIS	Evidence-Based System for Innovation Supports
EDI	Equity, Diversity, Inclusion
EDIA	Equity, Diversity, Inclusion, Accessibility
EPIS	Exploration, Preparation, Implementation, Sustainment
FRAME	Framework for Reporting Adaptations and Modifications-Expanded
GRAMMS	Good Reporting of a Mixed Methods Study
GRIPP2-SF	Guidance for Reporting Involvement of Patients and the Public Short Form
HBHC	Healthy Babies Healthy Children
IAP2	International Association of Public Participation
ICMJE	International Council of Medical Journal Editors
IHI	Institute for Healthcare Improvement
IKT	Integrated Knowledge Translation
IKTRN	Integrated Knowledge Translation Research Network
KT	Knowledge Translation
KTA	Knowledge-to-Action Framework
LDRP	Labour, Delivery, Recovery, and Postpartum
MORE ^{OB}	Managing Obstetrical Risk Efficiently
NHS	National Health Service
NICU	Neonatal Intensive Care Unit
NPT	Normalization Process Theory
OMRU	Ottawa Model of Research Use
OTAS	Obstetric Triage Acuity Scale

PARiHS	Promoting Action on Research Implementation in Health Services
PCMCH	Provincial Council for Maternal and Child Health
PDCA	Plan-Do-Check-Act
PDSA	Plan-Do-Study-Act
PEIRS	Patient Engagement in Research Scale
PPH	Postpartum Hemorrhage
PPI	Patient and Public Involvement
QI	Quality improvement
RE-AIM	Reach, Effectiveness, Adoption, Implementation, and Maintenance
RNAO	Registered Nurses' Association of Ontario
SOGC	Society of Obstetricians and Gynaecologists of Canada
SWOT	Strengths, Weaknesses, Opportunities, Threats
TACT-A	Target, Action, Context, Timing, Actors
TDF	Theoretical Domains Framework
TOLAC	Trial Of Labor After Cesarean
TMFAs	Theories, Models, Frameworks, Approaches
UCD	User-Centered Design
UCD-11	User-Centered Design 11-item measure

Glossary of Terms

Term	Definition
Capacity building	Activities aimed at enhancing individuals' or teams' knowledge, skills, and confidence to effectively implement and sustain evidence-informed practices in healthcare settings.
Evidence-informed practice	Practices that integrate the best available research evidence with professional expertise, patient and family preferences, and the context.
Evidence-practice gap	The discrepancy between the best available evidence and actual clinical practice, which can lead to suboptimal care and outcomes.
Implementation Roadmap	A practical framework based on the Knowledge-to-Action cycle, implementation science, and implementation practice that guides teams through phases of identifying issues, building solutions, and sustaining evidence-informed practice changes in healthcare settings.
Implementation practice	The process of applying implementation science knowledge to real-world improvement initiatives to enhance the planning, implementation, and sustainability of evidence-informed practices.
Implementation resources	Practical tools, information, guides, and supports designed to help individuals and teams learn about and action best practices in implementation.
Implementation science	The study of methods to promote the systematic uptake of research findings and evidence-informed practices into routine healthcare.
Implementation strategy	Methods or actions aimed at facilitating the uptake and use of an evidence-informed practice, program, or innovation.
Integrated knowledge translation (IKT)	A collaborative research approach where researchers and knowledge users (e.g., healthcare professionals, patients, decision-makers) work together as equal partners throughout the research process to optimize the relevance and uptake of findings.
Intermediary	An individual or organization that acts as a bridge between an innovation developer and the intended users who facilitates and/or supports use of the innovation in practice.
Knowledge translation (KT)	The process of moving research evidence into practice, including synthesis, dissemination, exchange, and application (implementation), to close evidence-practice gaps.

Term	Definition
Knowledge user	An individual who may use, benefit from, or be affected by research (e.g., healthcare providers, patients, or policymakers).
Knowledge-to-Action (KTA) framework	A process model that outlines steps for creating and refining usable knowledge (knowledge funnel), and the dynamic, iterative process for implementing evidence into practice (action cycle).
Practice change initiative	A structured and planned effort or project to improve current practice to better align with the best available evidence; includes implementation projects/initiatives and improvement projects/initiatives.
Practitioner	An individual who works in a practice-based setting, like healthcare organizations, who could apply evidence from implementation science to their work (e.g., healthcare professionals and leaders).
Toolkit	A collection of information, guidance, and practical resources (e.g., templates, checklists) designed to support users in planning, implementing, and evaluating practice changes.
User	A person who directly or indirectly interacts with a product, system, or innovation.
User-centered design	An iterative design process that actively involves the intended users to understand and address their needs, preferences, and contexts in each stage of designing a product, system, or innovation; the goal is to maximize acceptance, usability, and feasibility in real-world settings.

Chapter 1: Introduction

The purpose of this thesis was to develop and evaluate a toolkit to support maternal-newborn hospital teams in implementing evidence-informed practice changes. To achieve this, I worked in partnership with the Better Outcomes Registry & Network (BORN) Ontario and other health system partners. In this chapter, I first present literature and contextual information to articulate the research problem and the objectives of this thesis. Second, I introduce the frameworks and approaches used and explain how they were applied across the thesis. Third, I describe the overall research design of the thesis and how the various data sources were integrated. Finally, I provide an overview of the structure of this article-based thesis.

1.1 Research problem

1.1.2 Evidence-practice gaps in maternal-newborn care

In Canada, birth is the top reason for admission to hospital and cesarean births are the most common inpatient surgery (Canadian Institute for Health Information, 2025). Although childbirth is a normal physiological event, the care received during this critical phase has become an important focus for quality improvement due to the impact on two people (birthing person and infant), the significance of the short- and long-term outcomes, and the high cost of liability and claims (Lassi et al., 2013; The Healthcare Insurance Reciprocal of Canada and the Canadian Medical Protective Association, 2018; Women & Children's Hospital Research Institute, 2016; World Health Organization, 2005).

However, across the maternal-newborn care spectrum there remain discrepancies between the best available evidence and clinical practice (i.e., evidence-practice gaps). While variation in practice and outcomes can result from differences in patient populations and is

therefore not inherently harmful, variation that persists despite evidence-based recommendations and that is not explained by patient characteristics can lead to patient harm and wasted health resources (Soll & McGuire, 2019).

Internationally, there is variation in use of childbirth interventions and outcomes, even after controlling for population characteristics (Seijmonsbergen-Schermer et al., 2020), signalling widespread evidence-practice gaps. For example, there is significant variation between high-income countries in practices such as labour augmentation, episiotomy, and cesarean births (Seijmonsbergen-Schermer et al., 2020), interventions that are beneficial when used appropriately, but harmful and costly when overused or used inappropriately (S. Miller et al., 2016).

At a national level, a recent systematic review found that about 30% of clinical practices in Canada are used inappropriately (i.e., underused or overused) (Squires et al., 2022). Several studies in this review were specific to maternal-newborn care: nine studies reported underused practices in maternal-newborn care (e.g., screening for infections in pregnancy, prescribing medication for gestational diabetes, prenatal counselling), with the percentage of underuse ranging from 1.1-79.3%. Four studies reported overused practices in maternal-newborn care (e.g., prenatal screening, cesarean births), with the percentage of overuse ranging from 0.7-69% (Squires et al., 2022).

In the province of Ontario, there are also examples of evidence-practice gaps and practice variation. For instance, in Ontario, 22.6% of pregnant people are induced for an indication of post-dates although they are less than 41 weeks' gestational age, well above the recommended target of <5%, with regional rates ranging from 7.5% to 43.4% (Dunn et al., 2016). Similarly, 52.2% of low-risk pregnant people having a repeat cesarean birth have it before 39 weeks, again

well above the recommended target of <11%, with regional rates ranging from 30.3% to 69.9% (Dunn et al., 2016). These evidence-practice gaps are persistent, with the provincial averages for both practices historically never reaching the evidence-based benchmarks (BORN Ontario, 2018).

These evidence-practice gaps have important implications for pregnant and birthing people, infants, families, and the healthcare system. Inappropriate care that does not align with best evidence can result in physical, social, and psychological harm, increase treatment burden, waste limited healthcare resources, and lead to dissatisfaction with healthcare (Brownlee & Korenstein, 2021; Glasziou et al., 2017; Hicks, 2015). For instance, overuse of cesarean births is costly, both due to the surgical intervention itself and the increased rate of admissions to neonatal intensive care units (Khangura et al., 2010; Longo et al., 2018) and can pose health risks to both the birthing person and infant (Angolile et al., 2023). Satisfaction with birth care may be affected, with birthing people being less satisfied when they had a cesarean birth, labour induction, or their infant was admitted to a neonatal intensive care unit (Donate-Manzanares et al., 2021; Konieczka et al., 2024).

In addition to the potential harms to patients and healthcare systems, variability in practice that is unjustified can lead to some people benefiting from evidence-based care, while others do not, which can lead to inequities. In Ontario, an individual who delivers at a low-performing hospital is less likely to receive evidence-based care and achieve optimal outcomes compared to someone who delivers at a top-performing hospital. For instance, the likelihood of an individual who delivered at a top-performing hospital leaving the hospital exclusively breastfeeding is 94.7%, compared to only 35.5% for an individual who delivered at a low-performing hospital (BORN Ontario, 2016).

There is a need to accelerate the uptake of evidence-based practices in maternal-newborn care settings to ensure that all pregnant and birthing people and their infants receive the right care at the right time and their decisions are supported. Measurement is a critical component of improving practice; access to high-quality data is required to identify whether a practice problem exists, to understand and quantify the problem, and to monitor, evaluate, and sustain improvements over time. Ontario has a well-established maternal-newborn data registry, the Better Outcomes Registry & Network (BORN) Ontario, that provides the necessary data and infrastructure to contribute to measuring, monitoring, and closing evidence-practice gaps.

1.1.3 The Ontario maternal-newborn context: BORN Ontario

BORN Ontario is the largest birth registry in Canada, collecting data on every birth in Ontario (~140,000 births per year), which translates to nearly 40% of births in Canada (Murphy et al., 2021). Over 250 organizations, including all maternal-newborn hospitals in the province, enter data on pregnancy, birth, postpartum care, and outcomes; each of these organizations can subsequently access their own BORN data for local use to inform continuous quality improvement (Murphy et al., 2021).

Funded by the Ontario Ministry of Health, part of BORN's mission is to “facilitate and improve care for pregnant individuals, children and youth by linking information and providers to address care gaps” (BORN Ontario, 2025). To date, BORN has applied various knowledge translation strategies to achieve this mission, with most falling in the diffusion (“let it happen”) and dissemination (“help it happen”) categories (Greenhalgh et al., 2004). For instance, BORN has created, maintained, and enhanced the BORN Information System (the BORN database), and provides the clinical, technical, and data expertise to support end-users to enter comprehensive and high-quality data into the database. BORN has also created resources for healthcare

providers and families (e.g., OMama website and app for pregnant people; provider tools to support prenatal screening) (BORN Ontario, 2015; Prenatal Screening Ontario, 2022), developed and shared tailored and timely data reports to inform decision-making (e.g., during the COVID-19 pandemic) (BORN Ontario, 2022a), and published peer-reviewed and grey literature reports on BORN data and maternal-newborn care (BORN Ontario, 2022b; PubMed, 2025). While these diffusion and dissemination strategies have successfully raised BORN's profile as an international leader in the collection, analysis, and dissemination of maternal-newborn data, there remain untapped opportunities to further advance BORN's role to support the *application* of this data in the Ontario health system. For instance, although only 14% of Ontario hospitals surveyed in 2015-2016 reported engaging with their BORN coordinator about practice change strategies, respondents indicated an interest in BORN further supporting clinical practice changes by helping with activities such as identification of evidence-practice gaps (65%), developing tailored strategies for change (33%), creating implementation plans (38%), and developing evaluation plans to monitor change (48%) (Dunn & Reszel, unpublished study data).

Despite access to BORN data and information, many Ontario hospitals are still not meeting evidence-informed practice benchmarks (Weiss et al., 2018) and face barriers to implementing practice changes (Reszel et al., 2019). Interviews with over 100 BORN users revealed that despite being alerted to potential practice issues from their BORN data, some teams faced challenges working as an interdisciplinary team to implement practice changes and some lacked a formal change framework (Reszel et al., 2019). These process-related challenges ultimately limit the mobilization of BORN data into meaningful practice changes. There are international calls to apply implementation science to improve implementation and adherence to evidence-informed guidelines in maternal-newborn care (S. Miller et al., 2016). Knowledge from

implementation science can inform how to support maternal-newborn teams to overcome barriers and build the capacity to plan, implement, evaluate, and sustain clinical practice changes within their local context.

1.1.4 Translating the science of implementation into practice

Implementation science is defined as the “study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services” (Eccles & Mittman, 2006, p. 1). Although a relatively new field, there has been a rapid increase in empirical and theoretical implementation research (Westerlund et al., 2019), including a growing number of theories, models, and frameworks to inform the effective implementation of evidence into clinical practice (Nilsen, 2015; Skolarus et al., 2017; Strifler et al., 2018; Tabak et al., 2012). Despite an abundance of research evidence on strategies to promote the uptake of evidence into practice, paradoxically, this implementation science evidence itself is not being implemented in practice (Harvey et al., 2023; Westerlund et al., 2019). There is therefore a need for increased efforts to translate knowledge from implementation science into practice settings to advance implementation practice (Westerlund et al., 2019).

1.1.4.1 Challenges in implementation practice. Implementation practice is defined as “the use of implementation mechanisms and activities informed by research and used by knowledgeable individuals, to facilitate the adoption, implementation, and sustainment of an evidence-based practice, model, or approach” (Vroom & Massey, 2022, p. 108). Organizational and practitioner capacity has been identified as a core challenge in advancing implementation practice (Vroom & Massey, 2022). For example, a survey of 374 allied health professionals found that, overall, they reported low confidence in implementing evidence into clinical practice,

especially related to key implementation activities such as selecting frameworks, implementing changes, and conducting assessments of barriers and drivers (Barrimore et al., 2020).

Similar challenges apply to nursing as well. Nurses are often the “agents of change” who are tasked with leading projects and ensuring their success (Udod & Wagner, 2018). However, literature around nurses’ engagement in quality improvement (a related field to implementation that shares the same goal of improving healthcare services and outcomes (Leeman et al., 2021)) suggests that nurses may not be adequately prepared to lead and engage in this work. Although nurses report positive attitudes towards improvement work, nurses’ knowledge and skill proficiency in this area has been found to be low (Prochnow et al., 2023; Tschannen et al., 2021, 2023), with over one-third of new nurses reporting not being prepared to participate effectively (Kovner et al., 2010).

This noted lack of knowledge, skills, and preparedness reflects the insufficient attention to these topics in healthcare provider training. Nurses and other healthcare providers are often not taught implementation in their training or in continuing education (Vroom & Massey, 2022; Westerlund et al., 2019) and there is a need for further capacity building in this area (Roberts et al., 2023). While there are a growing number of capacity-building initiatives focused on knowledge translation and implementation, the majority of these are targeted at researchers to learn about implementation science (i.e., how to undertake an implementation research project), and fewer are aimed at practitioners (i.e., how to apply implementation science knowledge in clinical practice) (Davis & D’Lima, 2020; Kislov et al., 2014; Proctor & Chambers, 2017).

1.1.4.2 Implementation toolkits. There are various strategies that can be used to translate implementation science evidence into practice and build implementation capacity, such as training, tools, technical assistance, and assessment and feedback (Leeman et al., 2015).

Tools, which may be defined as “any electronic or print resource that practitioners might use to plan, implement, or evaluate an intervention” (Leeman et al., 2015, p. 3), are an important strategy for distilling implementation evidence into a practical, user-friendly format for practitioners (Ovretveit et al., 2017). Multiple tools, resources, and educational materials can be packaged together to form a toolkit, with the goal of sharing knowledge, educating users, and changing behaviour (Barac et al., 2014; Yamada et al., 2015). Although more rigorous studies are needed, a systematic review found evidence that toolkits are a promising strategy for moving evidence into practice (Yamada et al., 2015). Toolkits may also increase user knowledge and confidence, change attitudes towards implementation, and inform implementation planning activities (Reszel et al., 2022a, 2022b).

Despite the development of many toolkits (Barac et al., 2014; Yamada et al., 2015), the content of these toolkits typically focuses on the implementation of specific clinical interventions or practices, rather than providing guidance on the implementation process itself (Thoele et al., 2020). Given that *how* a practice is implemented is as important as *what* is being implemented, there may be advantages to developing toolkits that focus on the implementation process more broadly, rather than on pre-defined clinical practices. First, the implementation process is generally transferable across practice issues and working through the implementation process for one clinical problem can build the capacity for future implementation projects on other clinical practices. Second, local, provincial, and national practice priorities shift; a process-based toolkit may better stand the test of time as clinical priorities change. Finally, and perhaps most importantly, a process-based toolkit can help move away from an “outside-in” approach where external initiatives that are not aligned with local priorities are imposed in clinical settings, which can lead to staff disempowerment, burnout, and moral distress (W. L. Miller et al., 2019).

Instead, a topic-agnostic toolkit focused on the overall implementation process can empower teams to identify their own practice priorities, which may ultimately lead to more successful changes. For example, Nilsen et al (2020) asked healthcare providers, 40% of whom were nurses, to reflect on successful changes they had experienced in their practice. A core element of successful changes was the ability for the clinicians themselves to be able to identify, initiate, and influence the change.

1.1.5 Summary of research problem and rationale for thesis

In summary, there remain evidence-practice gaps in maternal-newborn care settings that contribute to increased risk of harm for patients and the health system. BORN Ontario provides a powerful data registry that can support the identification of practice issues and the monitoring of changes over time. However, maternal-newborn teams face challenges translating BORN data into meaningful and actionable practice changes. Evidence from the field of implementation science can inform how to support these teams to overcome common barriers and build the capacity to plan, implement, evaluate, and sustain clinical practice changes within their local contexts. One strategy to build implementation capacity is to distill implementation science knowledge into practical resources, such as toolkits, for healthcare providers and leaders to use.

The goal of this thesis was therefore to build implementation capacity in maternal-newborn teams, in partnership with BORN and other health-system partners, by developing and evaluating an “implementation toolkit” for the Ontario maternal-newborn context. By increasing the implementation knowledge and skills of healthcare professionals and leaders, implementation processes may be strengthened, which in turn can help reduce evidence-practice gaps.

1.2 Objectives

To achieve this goal, this thesis had five objectives. The first three objectives were focused on confirming the need for the toolkit and informing the content of the toolkit; the fourth objective involved creating the toolkit; and the fifth objective focused on evaluating the toolkit draft.

1. To explore what implementation capacity-building developers and deliverers identify as essential training content for teaching implementation practice;
2. To describe the implementation practices of maternal-newborn teams in Ontario and identify potential areas for improvement;
3. To identify maternal-newborn teams' implementation capacity-building needs and preferences for toolkit format and delivery;
4. To co-produce an implementation toolkit, using the data from objectives 1-3; and
5. To conduct an evaluation to determine maternal-newborn healthcare professionals' and leaders' perceptions of the toolkit and explore strategies for toolkit improvement and implementation.

1.3 Frameworks and approaches

This thesis used three frameworks: the Knowledge-to-Action (KTA) framework (Graham et al., 2006), a user-centered design framework (Vaisson et al., 2021; Witteman et al., 2015), and the Implementation Roadmap (Harrison & Graham, 2021). In addition, this thesis used an integrated knowledge translation (IKT) approach (Canadian Institutes of Health Research, 2012; Kothari et al., 2017). These four frameworks and approaches are briefly introduced next.

1.3.1 Knowledge-to-Action (KTA) Framework

The KTA framework is a process model based on planned-action theories that outlines the implementation steps needed to generate change (Graham et al., 2006; Nilsen, 2015). The

KTA framework comprises two parts: knowledge creation and knowledge application (Graham et al., 2006). While the KTA framework has most often been used to guide the implementation of clinical practice changes, it can also be used to guide the “meta-process” of translating knowledge about knowledge translation and implementation into practice (Bennett et al., 2016).

This thesis used the action cycle of the KTA framework to guide the steps taken to develop the implementation toolkit. Figure 1.1 illustrates how the study objectives mapped to the steps in the action cycle. First, objectives 1 to 3 explored the existing knowledge on how to teach healthcare providers and leaders about implementation and identified the implementation learning needs and preferences of the intended toolkit users (identify problem, identify knowledge). Next, objective 4 integrated this knowledge into a prototype of the toolkit (adapt knowledge). Finally, objective 5 involved identifying potential barriers and facilitators to using the toolkit and potential strategies to improve and implement the toolkit (assess barriers and facilitators, identify strategies). It was not feasible to complete the remaining steps in the action cycle due to the time constraints of a doctoral program; however, this thesis laid a foundation for completing the next steps in the action cycle.

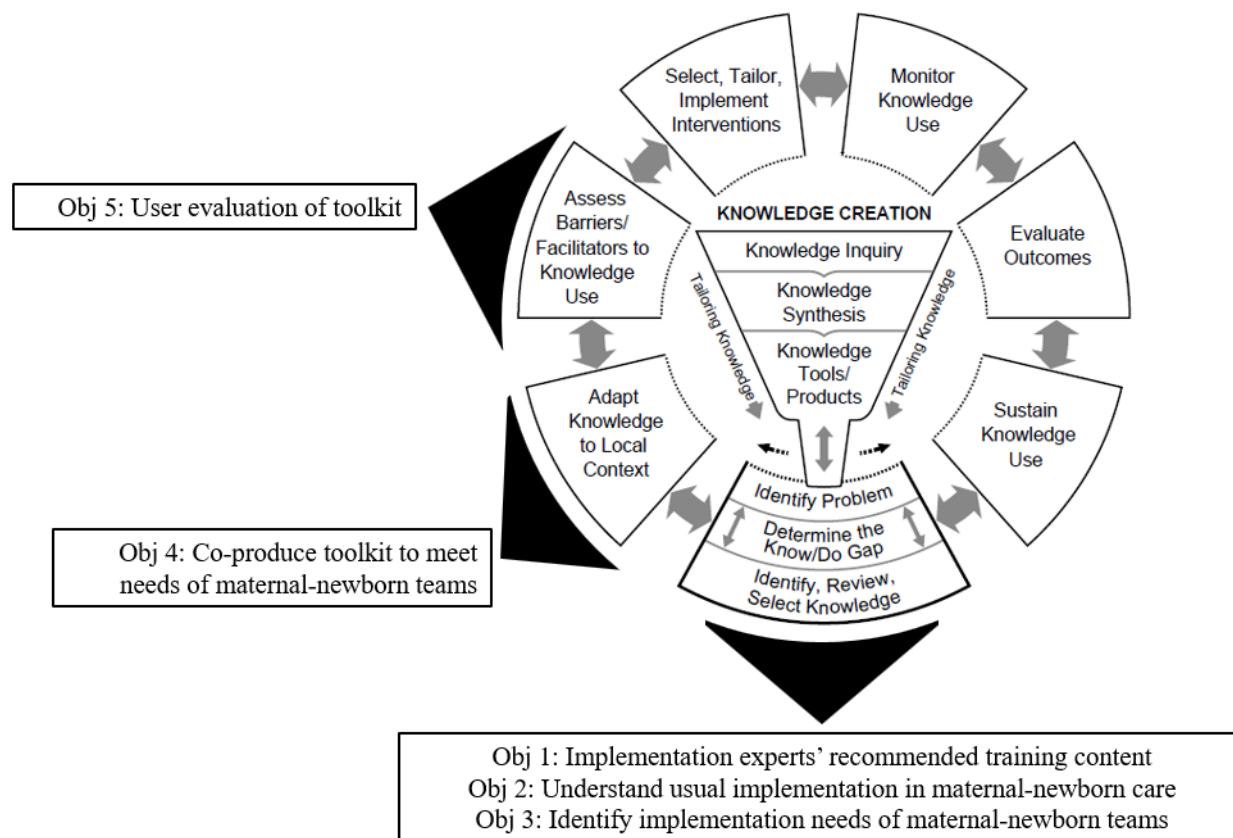
Figure 1.1 Thesis objectives organized by the Knowledge-to-Action (KTA) Framework

Image from Knowledge Translation in Health Care: Moving from Evidence to Practice, Second Edition. Sharon E. Straus, Jacqueline Tetroe and Ian D. Graham. 2013. Used with permission from John Wiley and Sons.

1.3.2 User-centered design

User-centered design is defined as “an iterative design process in which designers focus on the users and their needs in each phase of the design process” (Interaction Design Foundation, 2016, ¶1) and aims to ensure innovations are designed in a way that aligns with user needs and contexts (Interaction Design Foundation, 2016). The design of an innovation has important implications for if and how it is used, and influences whether users find the innovation to be

acceptable, useful, relevant, and feasible (Dopp et al., 2019; Proctor et al., 2011). Applying user-centered design can help better align innovations with the needs and preferences of users, ultimately improving the fit between evidence-based practices, implementation strategies, and the contexts in which they are used (Dopp et al., 2020).

This thesis followed the core phases of a user-centered design conceptual framework: (1) understand users (objectives 1 to 3), (2) develop and refine prototype (objective 4), (3) observe user interactions with prototype (objective 5) (Vaisson et al., 2021; Witteman et al., 2015), which are briefly described next. To inform the initial prototype, it is essential to understand the needs, contexts, and goals of the target audience (i.e., the “users”); this information can be collected through existing literature, observations, and needs assessments (Vaisson et al., 2021). Using the information gathered on users, a prototype is then developed, usually through a multi-step process working from a basic model to a more fulsome prototype (Vaisson et al., 2021). Next, the prototype is shared with the target users for content review and pilot or usability testing, which may be conducted through interviews, surveys, or observations (Vaisson et al., 2021). Although organized by three development phases, user-centered design is an iterative process, and some activities may be completed concurrently and repeated as the innovation is refined for real-world implementation. This thesis applied this user-centered design framework by completing one cycle (i.e., working through the three phases one time), with the intent of completing future iterative cycles to further refine the toolkit.

1.3.3 Implementation Roadmap

The Implementation Roadmap is informed by implementation science evidence, existing implementation theories (KTA framework and CAN-IMPLEMENT), and the implementation experiences of real-world teams (Harrison & Graham, 2021). It includes three core phases: (1)

issues identification and clarification; (2) build solutions and field-test; and (3) implement, evaluate, and sustain. The phases are further broken down into steps and activities, which provide clear and tangible guidance for interdisciplinary implementation teams in clinical contexts (Harrison & Graham, 2021). The framework’s pragmatic focus on the “how to” of implementation made it well suited to a project aimed at developing a practical implementation toolkit.

This thesis applied the Implementation Roadmap in three ways. First, it informed aspects of the individual study methods, including analysis and interpretation (Study 1, Study 2) and the design of data collection tools (Study 3). Second, the Implementation Roadmap was used as a framework to summarize, compare, and contrast the findings of the first three studies. Third, the Implementation Roadmap served as the guiding framework for the toolkit itself, providing an evidence-informed approach with core phases, steps, and activities for implementation teams to work through.

1.3.4 Integration of frameworks across thesis

Table 1.1 illustrates how the three complementary frameworks were applied across the three thesis stages and five objectives.

Table 1.1 Application of KTA framework, user-centered design, and Implementation Roadmap across thesis stages

Thesis Stage	Thesis objectives (Corresponding chapter)	KTA phase	User-centered design phase	Implementation Roadmap application
1	• Objective 1 (Chapter 3) • Objective 2 (Chapter 4)	• Identify problem • Identify knowledge	• Understand user needs and contexts	• Analysis and interpretation of study findings • Design of data collection tools

Thesis Stage	Thesis objectives (Corresponding chapter)	KTA phase	User-centered design phase	Implementation Roadmap application
	Objective 3 (Chapter 5)			
2	Objective 4 (Chapter 6)	Adapt knowledge	Develop prototype	- Findings from objectives 1-3 were compared and contrasted by the Implementation Roadmap steps - Adaptation of Implementation Roadmap as underlying structure of toolkit
3	Objective 5 (Chapter 7)	- Identify barriers, facilitators - Identify strategies	Observe user interactions with prototype	Assessment of user perceptions of the potential fit and application of adapted Implementation Roadmap (toolkit)

1.3.5 Integrated knowledge translation (IKT) approach

This thesis used an IKT approach, which involves researchers and knowledge users (i.e., individuals who may use, benefit from, or be affected by the research) working together as equal partners throughout the research process (Canadian Institutes of Health Research, 2012; Kothari et al., 2017). In this thesis, the team was composed of both researchers (doctoral candidate and Thesis Advisory Committee) and knowledge users (people with lived experience, healthcare professionals and leaders, and staff from BORN) who worked together to design, conduct, analyze, and share the research findings. Chapter 2 describes the IKT approach in more detail and Chapter 8 shares the learnings and impacts from using an IKT approach in this thesis.

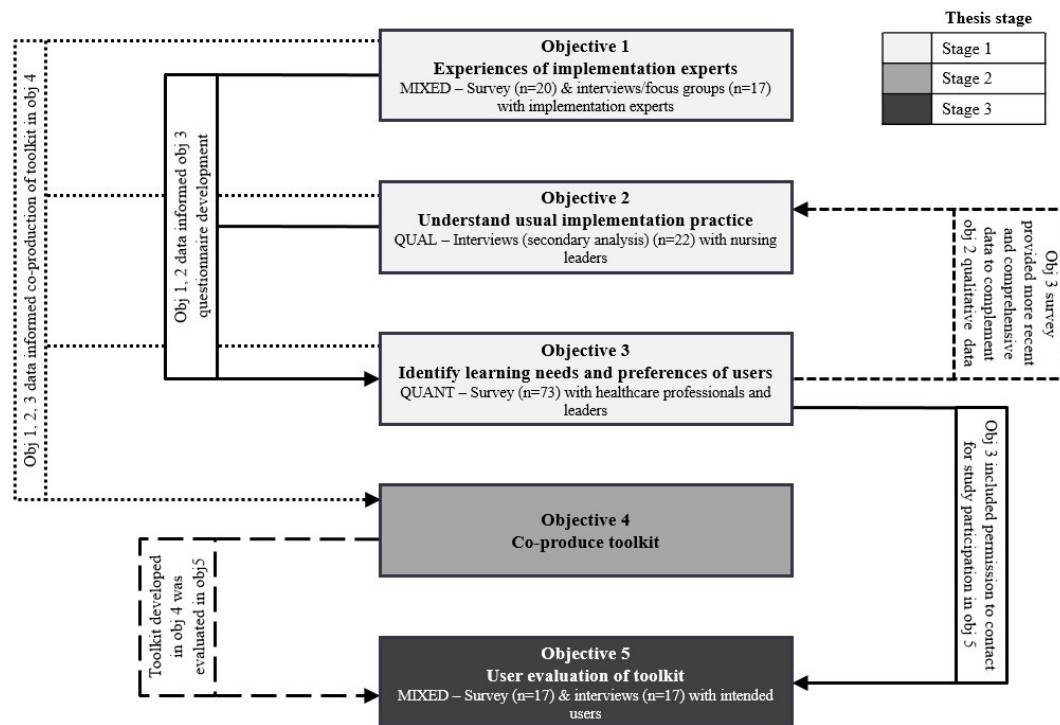
1.4 Overall thesis research design

This thesis used a mixed-methods design, which involves the collection of both quantitative and qualitative data that is integrated to provide insights into the research question beyond what either data type could provide alone (Creswell, 2022). Study 1 collected both quantitative and qualitative data through a questionnaire, interviews, and focus groups with implementation experts. Study 2 was qualitative and included a secondary analysis of interviews conducted with maternal-newborn nursing leaders. Study 3 collected quantitative data through a questionnaire with maternal-newborn healthcare professionals and leaders. Study 4 collected both quantitative and qualitative data through a questionnaire and interviews with maternal-newborn healthcare professionals and leaders.

Data integration occurred at the level of the study design, methods, and reporting (Fetters et al., 2013), which are each described next. At a *design level*, this thesis used a multi-stage mixed-methods approach, which involves distinct phases of data collection and is commonly used to design, implement, and evaluate interventions (Fetters et al., 2013). At a *methods level*, this thesis integrated the data sources through building, merging, and connecting (Fetters et al., 2013). “Building” occurred by using the findings from objective 1 (mixed-methods study of implementation experts) and objective 2 (secondary qualitative analysis of interviews with nursing leaders) to inform the development of the questionnaire in objective 3 (cross-sectional survey of maternal-newborn units). “Merging” of data occurred by bringing together the findings from objectives 1 (mixed), 2 (quantitative), and 3 (qualitative) and organizing it by the Implementation Roadmap steps to identify commonalities, differences, and implications for the toolkit content (objective 4). Finally, “connecting” was used by recruiting participants from objective 3 (cross-sectional survey of maternal-newborn units) to take part in objective 5 (mixed-

methods toolkit evaluation). At a *reporting level*, the multiple data sources were integrated through a narrative weaving approach (Fetters et al., 2013). Although the thesis reports the findings of the objectives as standalone chapters, Chapter 8 (Integrated Discussion) presents overarching themes that emerged across the overall thesis. Figure 1.2 provides a visual summary of how the data from the different thesis objectives interrelate.

Figure 1.2 Summary of how thesis objectives interrelate



1.5 Organization of thesis

This article-based thesis includes four manuscripts and additional chapters to provide details on the approach used (Table 1.2). **Chapter 1** (current chapter) introduces the research problem, the thesis objectives, the frameworks and overall design, and the structure of the thesis. **Chapter 2** describes the IKT approach used throughout the thesis, including how the partnership was initiated and maintained.

Chapters 3 to 5 then present the first three manuscripts generated from Stage 1 of the thesis, which aimed to establish the need for the toolkit and identify what content should be included. **Chapter 3** is the first manuscript (addressing thesis objective 1) and presents the results of a mixed-methods study with implementation experts on the content and approaches most important for building implementation capacity in healthcare providers and leaders.

Chapter 4 presents the second manuscript (addressing thesis objective 2), which was a secondary qualitative analysis of interviews with maternal-newborn nursing leaders to understand their current approaches to implementing practice changes. **Chapter 5** is the third manuscript (addressing objective 3) and reports on the findings from a cross-sectional survey of Ontario maternal-newborn hospitals to identify the extent to which current implementation processes align with an implementation science process framework, perceived importance and confidence completing different implementation activities, and preferences for learning about implementation.

Stage 2 of the thesis aimed to develop the implementation toolkit. **Chapter 6** addresses objective 4 and provides details on how the data from Chapters 3 to 5 were used to create the toolkit and situates the toolkit as an “implementation strategy” that aims to improve the processes used to implement evidence-informed practices. The toolkit draft developed in this thesis is included in Appendix D.

Stage 3 of the thesis aimed to evaluate the initial toolkit draft. **Chapter 7** is the fourth manuscript (addressing objective 5) and reports on a mixed-methods study to understand target users’ perceptions of the toolkit and opportunities for improvement.

Finally, **Chapter 8** is an integrated discussion that presents the overarching findings of the thesis, the impact of using an IKT approach, and implications for practice, education, the health system, and future research.

Tables, figures, and additional files are embedded within their respective chapters. General appendices are included at the end of the thesis to provide research ethics board approvals, details of research team member contributions, an overarching reporting guideline, and the draft version of the toolkit.

Table 1.2 Thesis structure and content

Chapter	Chapter title	Chapter Objectives	Study design	Citation
1	Introduction	To articulate the research problem; the thesis objectives, methodology, and approach; and the structure of the thesis.	—	—
2	Description of integrated knowledge translation (IKT) approach	To describe how an IKT approach was operationalized in the thesis.	—	—
3	Essential content for teaching implementation practice in healthcare: A mixed-methods study of teams offering capacity-building initiatives	To explore what implementation capacity-building developers and deliverers identify as essential training content for teaching implementation practice. (Thesis objective 1)	Convergent mixed-methods (questionnaire & interviews or focus groups)	Published: Reszel, J., et al. (2023). Essential content for teaching implementation practice in healthcare: A mixed-methods study of teams offering capacity-building initiatives. <i>Implementation Science Communications</i> , 4, 151. doi:10.1186/s43058-023-00525-0 (Paper 1)
4	Planning and implementing practice changes in Ontario maternal-newborn hospital units: A secondary qualitative analysis	To identify what implementation steps teams take (or not) and identify strengths and potential areas for improvement based on best practices in implementation science. (Thesis objective 2)	Supplementary qualitative secondary analysis	Published: Reszel, J., et al. (2023). Planning and implementing practice changes in Ontario maternal-newborn hospital units: A secondary qualitative analysis. <i>BMC Pregnancy and Childbirth</i> , 23, 735. doi:10.1186/s12884-023-06042-1 (Paper 2)
5	Implementation processes and capacity-building needs in Ontario maternal-newborn care hospital settings: A cross-sectional survey	To understand maternal-newborn teams' approaches to implementing practice changes and the extent to which their implementation processes aligned with an implementation science planned-action framework; and perceptions of importance and confidence completing implementation activities. (Thesis objective 3)	Cross-sectional survey	Published: Reszel, J., et al. (2025). Implementation processes and capacity-building needs in Ontario maternal-newborn care hospital settings: A cross-sectional survey. <i>BMC Nursing</i> , 24, 10, doi:10.1186/s12912-024-02643-z (Paper 3)

Chapter	Chapter title	Chapter Objectives	Study design	Citation
6	Creating and situating the implementation toolkit	To describe the process used to create the toolkit and situate it as an implementation strategy. (Thesis objective 4)	—	—
7	User evaluation of an implementation toolkit for maternal-newborn settings	To evaluate the toolkit for acceptability, appropriateness, feasibility, usability, and potential adoption to inform future improvements. (Thesis objective 5)	Convergent mixed-methods (questionnaire & interviews)	Provisionally accepted: Reszel, J., et al. (2025). User evaluation of an implementation toolkit for maternal-newborn care settings. <i>JBI Evidence Implementation</i> , revisions submitted August 2025. (Paper 4)
8	Integrated discussion	To integrate the findings of the thesis, describe the impact of the IKT approach, and highlight implications for practice, education, the health system, and research.	—	—

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Chapter 2: Description of integrated knowledge translation approach

This doctoral thesis used an integrated knowledge translation (IKT) approach, which is “a model of collaborative research where researchers work with knowledge users¹ who identify a problem and have the authority to implement the research recommendations” (Kothari et al., 2017, p. 299). There are a growing number of trainees who are applying an IKT approach in their projects; however, information on why trainees engage in IKT and the process and strategies they use to initiate and maintain their partnership are infrequently reported (Cassidy et al., 2021). In response to this identified gap, in this chapter I describe why I selected an IKT approach and how I operationalized it in my thesis research, including how I initiated and managed the partnerships and a description of team member roles. Later, in the Integrated Discussion (Chapter 8), I reflect on how an IKT approach affected the research and my doctoral experience, as well as lessons learned. The organization and content of these IKT chapters draw inspiration from the Integrated Knowledge Translation Research Network’s (IKTRN) casebook series (Integrated Knowledge Translation Research Network, 2022). I used the Guidance for Reporting Involvement of Patients and the Public Short Form (GRIPP2-SF) to inform the writing of the IKT process (Staniszewska et al., 2017) (Appendix C).

2.1 Reflecting on my positionality related to IKT

2.1.1 How I came to IKT

Between 2006 and 2010, I completed my Bachelor of Science in Nursing and became licensed as a Registered Nurse. During my undergraduate training, I worked as a research

¹A knowledge user is defined as “an individual who is likely to be able to use research results to make informed decisions about health policies, programs and/or practices.” (Canadian Institutes of Health Research, 2024, ¶1)

assistant on studies focused on maternal-newborn care. It was these research experiences that made me confident that I wanted to pursue a research-focused career path; I subsequently completed my Master of Science in Nursing and started working as a research nurse and research coordinator. However, being a nurse (largely viewed as a clinical profession) working in a research setting challenged my professional identity, and I found it difficult to reconcile how my identity as a researcher intersected with my identity as a nurse.

When I started my first job as a research nurse in a hospital and found myself working alongside other nurses, I felt especially insecure about contributing my insights, because without clinical knowledge, what did I really know as a nurse? This initial uncertainty about whether I could be perceived as someone with legitimate nursing knowledge undoubtedly influenced my eventual alignment, and comfort, with an IKT approach. For instance, as I started to work on more interdisciplinary research teams, I saw that in well-functioning teams, each member came with their own set of knowledge and skills and no single person was meant to be the authority on the entire project. My lack of clinical knowledge was not a detriment to the team—in fact, my ability to recognize the limits of my own knowledge and experiences could create the necessary space for others on the team to contribute meaningfully to shape the work, a core tenet of IKT.

As I have continued to study and use an IKT approach, I now also appreciate that applied researchers have an ethical imperative to ensure the questions we ask, the methods we use to answer those questions, and the way we share and apply the findings are informed by the people and groups who are affected by and interested in the research. I therefore chose to use an IKT approach in my doctoral thesis, by partnering with healthcare providers and leaders, hospital intermediaries, and a parent to create a resource (implementation toolkit) that meets an identified knowledge user need. Ultimately, I believed that applying an IKT approach to the research

process would result in a toolkit that was more useful, useable, and ultimately used (Kothari et al., 2022).

2.1.2 My insider-outsider status

As my research career progressed, I was fortunate to work with different research teams that partnered with healthcare providers, health system leaders, parents, and patients throughout the research process, although not every team explicitly applied the label of IKT to their approach. Some of my earlier experiences using an IKT approach were through my work at BORN Ontario, which later became the organizational partner for this thesis. Because of my past and current relationship with BORN, it was important to reflect on my evolving “insider-outsider” position (Corbin Dwyer & Buckle, 2009) relative to my partner organization throughout this IKT project.

Before starting my PhD, I had been employed by BORN as a research coordinator in full-time, part-time, and casual roles. At the time of starting my PhD, I remained a casual employee which made me, in some ways, an “insider” to the organization. This insider status afforded me advantages such as established trust and acceptance by BORN staff, as well as practical benefits, such as access to a BORN email address, access to BORN distribution lists for study recruitment, and inclusion in organization-wide meetings where I learned about broader organizational initiatives and priorities that may have affected my study. I was also an “outsider” in the sense that at the time of starting my study, I had been removed from full-time employment at BORN for several years, and I primarily identified as a PhD student who spent my working hours studying and developing research skills.

Although my doctoral project was well aligned with BORN’s mission and grounded in previous BORN-led research, it also pushed the boundaries of how BORN currently engaged in

knowledge translation activities. It was this boundary pushing that I saw as the main benefit of my insider-outsider status: as an insider, I had sufficient organizational knowledge and pre-existing relationships to design and initiate a relevant study in partnership with BORN; however, as an outsider, I had the freedom to question the “usual” way of engaging in knowledge translation at BORN and could explore alternate approaches without being confined by current operational work plans and resources.

Three years into my PhD, BORN posted a Knowledge Translation Specialist position, which I applied for and successfully obtained. This ultimately shifted my position to that of a true insider in the organization, where most of my time was spent engaged in operational projects across teams, with the remainder of my time spent completing the development and testing of the implementation toolkit. The terms of this new employment relationship made clear the organization’s commitment to the product I was developing, signalling my PhD project was viewed as important to their operational goals. While balancing my new responsibilities at BORN with completing the toolkit involved a learning curve, my new insider perspective provided several privileges in the later stages of my PhD study, including the chance to make connections and synergies between my study and other organizational priorities I was previously unaware of, and the chance to be part of discussions related to organizational planning, which informed my thinking around post-PhD implementation planning and evaluation of the toolkit.

2.2 Initiating the IKT partnership

2.2.1 Deciding on the team composition

There were several factors that influenced the decisions about the number and types of people needed on the research team. First, I followed the academic regulations set by the University of Ottawa School of Nursing to form my Thesis Advisory Committee, which must

include a supervisor and a minimum of two other members. This Thesis Advisory Committee and I comprised the “researchers” on the team.

Next, as I began exploring the topic, stages, and goal of my thesis project, I worked with my Thesis Advisory Committee to identify categories of knowledge users who should be involved in the work. We identified three levels of future toolkit users: primary users, secondary users, and tertiary users. We identified the primary user of the toolkit as staff leading and participating in implementation projects in Ontario maternal-newborn hospitals (e.g., healthcare providers such as nurses, clinical educators, managers, and directors). We considered BORN Ontario (the organization) as a secondary user, or an “intermediary,” as they may have a future role in hosting the toolkit and facilitating its use. Finally, we identified pregnant and birthing people as tertiary users, as they would ultimately be affected by the changes in care and processes that are brought about by toolkit use. With these categories in mind, I aimed to identify at least one person from each user type to join the team.

When working virtually, a committee size of 6 to 12 members has been recommended to allow for diverse membership while also encouraging equal participation (Oliver et al., 2018). I therefore aimed for a team within this size range to have sufficient representation from researchers and the identified user groups, while also facilitating meaningful engagement in study processes.

2.2.2 Identifying and inviting team members

Following university requirements, I formed my Thesis Advisory Committee members at the end of my first year of studies in July 2022. I worked with my supervisor (Dr. Ian Graham) to identify two researchers with the methodological and content expertise to guide me through my

doctoral studies (Dr. Sandra Dunn, Dr. Christine Cassidy). I subsequently developed my research proposal, and my Thesis Advisory Committee approved it in November 2022.

Between January and February 2023, I worked to identify knowledge user partners. I decided to leverage existing relationships wherever possible and identified individuals within my past and current professional networks who fit into the three different knowledge user categories (primary, secondary, tertiary). For the primary users, I contacted two individuals (Marnie Lightfoot, Ashley Quosdorf) whom I had previously collaborated with on a project (one as a colleague, one as a study participant).

For the secondary users (intermediaries), I worked with management at BORN Ontario to decide on a fair and feasible process for selecting BORN staff to dedicate time to my thesis. Given the knowledge translation focus of my project, BORN agreed that it aligned with the portfolio of their current Knowledge Translation Specialist (Dr. Olivia Daub). Next, I presented to BORN's Clinical Engagement Team, which includes the BORN staff who communicate and engage with hospitals directly. I shared information on the goals of my study, the stages, the work requirements, and the potential benefits to BORN. Interested staff were instructed to reach out to their manager to express their interest in joining the team. The manager then selected the staff (Kaamel Hafizi, Allison Wood) and connected them with me. Later in my study when I was focusing on developing the toolkit, we decided that we needed representation from BORN leadership to ensure alignment between the toolkit and the organization. I invited the manager of BORN's Clinical Engagement Team (Mireille Cloutier), who was also my manager in my new Knowledge Translation Specialist position, to formally join the team.

To find a tertiary user, I reached out to the Champlain Maternal Newborn Regional Program (CMNRP), which has an existing Family Advisory Committee. The CMNRP lead for

this committee emailed a summary of my study and invited interested parents to contact me directly to learn more. An experienced parent advisor (Dahlia Pervez) subsequently joined the research team.

As team members joined, I emailed them the research proposal and a table summarizing the study milestones, activities, and anticipated time commitments. I booked a virtual 1:1 meeting with each person to review the overall study plan, discuss the specific tasks and timelines, and explore their interests and needs. Generally, the discussions involved the following:

- Introductions (or re-introductions) to one another
- Overview of the:
 - study and an opportunity to ask questions about it
 - research team (i.e., researchers and knowledge users)
 - proposed tasks and timelines
- Questions for knowledge users:
 - Does the time commitment seem reasonable? Are there any time points where you are unavailable? What days and times are generally best for you?
 - How do you prefer to connect and engage? Most of the work will be done virtually by email or virtual meetings. Are you comfortable working this way? Is there another method you prefer?
 - What do you hope to get out of this study? Are there any phases of the study that are of particular interest to you?

By March 2023, we had formed our initial 10-person team of researchers and knowledge users, which later evolved to an 11-person team in March 2024 (Table 2.1). Although I have

labeled members as “researchers” or “knowledge users,” many team members contributed their knowledge, skills, and experiences from multiple domains. For instance, some researchers were clinicians, some knowledge users had research experience, and all team members had experienced pregnancy, birth, and parenting. I refer to team members by their *primary* role on the team, while acknowledging that in many ways this dichotomy is too simplistic.

Table 2.1 The IKT team (in alphabetical order by last name)

Team member name	Primary role on team	Primary affiliations	Other experiences^a
Dr. Christine Cassidy	Researcher (Thesis Advisory Committee member)	Associate Professor, School of Nursing, Dalhousie University Clinician Scientist, IWK Health	Clinical – nurse Lived experience – new parent
Mireille Cloutier	Knowledge user (BORN leadership)	Manager, Clinical Engagement Team, BORN Ontario	Clinical – genetic counsellor, quality improvement Lived experience – parent
Dr. Olivia Daub	Researcher* (KT and implementation) <i>*Previously a knowledge user (BORN)</i>	Assistant Professor, School of Communication Disorders, Western University Knowledge Translation Specialist, BORN Ontario	Clinical – pediatric speech language pathologist Lived experience – new parent
Dr. Sandra Dunn	Researcher (Thesis Advisory Committee member)	Knowledge Translation Specialist & Project Advisor, BORN Ontario Adjunct Professor, School of Nursing, University of Ottawa	Clinical – nurse Lived experience – parent, grandparent

Team member name	Primary role on team	Primary affiliations	Other experiences^a
Dr. Ian Graham	Researcher (Thesis supervisor)	Distinguished Professor, School of Epidemiology and Public Health, University of Ottawa Senior Scientist, Ottawa Hospital Research Institute	Medical sociologist Lived experience – parent
Kaamel Hafizi	Knowledge user (BORN link to hospitals)	Regional Coordinator, BORN Ontario	Lived experience – new parent
Marnie Lightfoot	Knowledge user (Health system leadership)	Regional Director, Women and Children’s Health Network	Clinical – nurse Lived experience – parent
Dahlia Pervez	Knowledge user (Parent research advisor)	Parent of two young children born in hospital	Professional – lawyer Lived experience – parent
Ashley Quosdorf	Knowledge user (Nursing)	Nurse Educator, Neonatal Intensive Care Unit, The Ottawa Hospital	Clinical – nurse Lived experience – new parent
Jessica Reszel	Researcher (Doctoral candidate)	Doctoral candidate, School of Nursing, University of Ottawa Knowledge Translation Specialist, BORN Ontario	Clinical – nurse Lived experience – parent
Allison Wood	Knowledge user (BORN link to hospitals)	Regional Coordinator, BORN Ontario	Clinical – obstetric sonographer Lived experience – new parent

^a*Other experiences are provided to illustrate the diversity of professional and personal experiences of team members only; this does not imply that team members functioned in their other professional roles on the research team. However, these other roles may have influenced their views and perspectives on the project.*

2.3 Managing the partnership

2.3.1 *Level and modes of engagement*

The International Association of Public Participation's (IAP2) Spectrum of Participation includes five levels of engagement, ranging from “inform” to “empower.” In my doctoral thesis, knowledge users were engaged at the “collaborate” level (International Association for Public Participation, 2024). At this level, knowledge users are equal partners in the research process and contribute to decision-making throughout the life of the project.

Cassidy et al use the term “modes of engagement” to describe the IKT activities that knowledge users are involved in (Cassidy et al., 2021). In this study, we used several modes of engagement, all of which were virtual. The modes of engagement are described below.

Two-way email communication. Early in the partnership we all introduced ourselves via email. I regularly shared study materials for review and feedback, including draft questionnaires and question guides, summaries of results for interpretation, and manuscript drafts. Given the busy personal and professional responsibilities of each team member, email was an efficient communication method that allowed each person to review and respond on their own time, generally within two weeks. Upon receiving feedback, I would carefully review all comments and document the decisions. I would follow up with the team to share the revised document, as well as a summary describing what changes were made or not and why.

One-way email communication. Throughout the partnership, I also sent email communications to share study updates with the team, such as announcing the launch of a survey or providing an update on a manuscript submission. These communications were intended to keep everyone invested in the project and its progress, anticipate upcoming steps, and acknowledge the team's contributions to date.

Individual virtual meetings. As needed, I met 1:1 with team members. These meetings were either initiated by me when I needed to discuss a study-related issue with a team member with particular expertise, or initiated by a team member when they wanted to offer their feedback verbally rather than by email. These check-ins made it easier to discuss more complex questions or feedback and served as an opportunity to build connections with one another through synchronous communication.

Structured feedback form. Once the first draft of the toolkit was developed, I embedded feedback questions within the toolkit draft and shared it with the study team to complete. This method allowed me to collect feedback on the toolkit in an organized and systematic way and provide guidance to team members on the review process. This feedback was then used to revise and improve the next iteration of the toolkit for user evaluation.

2.3.2 Team member roles

In total, the partnership lasted 30 months (March 2023 to August 2025). Each team member was involved in different steps throughout the research process. Decisions about who would participate in each step were provisionally made during the writing of the study protocol (before team establishment) but was negotiated with each person at the time they joined the research team based on their personal interests and availability. Table 2.2 summarizes the involvement of the different team members throughout the research process, including co-authoring peer-reviewed papers together. Appendix B provides a more detailed summary of team member involvement in each paper. We followed the International Committee of Medical Journal Editors (ICMJE) authorship criteria to determine who qualified for authorship and to describe contributions (International Committee of Medical Journal Editors [ICMJE], 2020).

Table 2.2 Team member involvement in research activities^a

	Researchers					Knowledge users					
	JR	IG	CC	SD	OD	MC	KH	ML	DP	AQ	AW
Research question	●	●	●	●							
Research proposal	●	●	●	●							
Research ethics board approvals	●	●		●							
Admin pre-launch ^b	●	●									
Development of data collection tools	●	●	●	●	●	●	●	●	●	●	●
Recruitment	●					●	●	●			●
Data collection	●				●						
Data analysis & interpretation	●	●	●	●	●	●	●	●	●	●	●
Toolkit development	●	●	●	●	●	●	●	●	●	●	●
Dissemination	●	●	●	●	●	●	●	●	●	●	●
Implementation	●	●	●	●	●	●	●	●	●	●	●

^aResearch activities adapted from Dillon 2017 et al (Dillon et al., 2017) (selected because it was used in Cassidy et al's scoping review of IKT in trainee-led research (Cassidy et al., 2021))

^bIncluding team training and orientation, budget planning, and management

2.4 Conclusion

The use of an IKT approach positioned our team to co-design and conduct rigorous studies that informed the development, refinement, and preliminary evaluation of a relevant and evidence-informed toolkit. These activities are described next in Chapters 3 to 7.

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Chapter 3: Essential content for teaching implementation practice in healthcare: A mixed-methods study of teams offering capacity-building initiatives

This chapter was published in *Implementation Science Communications*. In this study I collaborated with a team of implementation scientists and implementation practitioners to learn about what content is essential to teach individuals and teams how to apply implementation science knowledge in their practice-based settings. Under the guidance of my Thesis Advisory Committee, I led the conceptualization and design of the study, collected the data by administering questionnaires and facilitating interviews and focus groups, analyzed and interpreted the data, and wrote the first draft of the manuscript. The co-authors contributed to conceptualizing and designing the study, and/or collecting and analyzing data, and/or interpreting the findings. All co-authors made significant contributions to critically revising this manuscript and approved the final version.

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Abstract***Background***

Applying the knowledge gained through implementation science can support the uptake of research evidence into practice; however, those doing and supporting implementation (implementation practitioners) may face barriers to applying implementation science in their work. One strategy to enhance individuals' and teams' ability to apply implementation science in practice is through training and professional development opportunities (capacity-building initiatives). Although there is an increasing demand for and offerings of implementation practice capacity-building initiatives, there is no universal agreement on what content should be included. In this study, we aimed to explore what capacity-building developers and deliverers identify as essential training content for teaching implementation practice.

Methods

We conducted a convergent mixed-methods study with participants who had developed and/or delivered a capacity-building initiative focused on teaching implementation practice. Participants completed an online questionnaire to provide details on their capacity-building initiatives; took part in an interview or focus group to explore their questionnaire responses in depth; and offered course materials for review. We analyzed a subset of data that focused on the capacity-building initiatives' content and curriculum. We used descriptive statistics for quantitative data and conventional content analysis for qualitative data, with the data sets merged during the analytic phase. We presented frequency counts for each category to highlight commonalities and differences across capacity-building initiatives.

Results

Thirty-three individuals representing 20 capacity-building initiatives participated. Study participants identified several core content areas included in their capacity-building initiatives: (1) taking a process approach to implementation; (2) identifying and applying implementation theories, models, frameworks, and approaches; (3) learning implementation steps and skills; (4) developing relational skills. In addition, study participants described offering applied and pragmatic content (e.g., tools and resources) and tailoring and evolving the capacity-building initiative content to address emerging trends in implementation science. Study participants highlighted some challenges learners face when acquiring and applying implementation practice knowledge and skills.

Conclusions

This study synthesized what experienced capacity-building initiative developers and deliverers identify as essential content for teaching implementation practice. These findings can inform the development, refinement, and delivery of capacity-building initiatives, as well as future research directions, to enhance the translation of implementation science into practice.

3.1 Background

With significant time lags between evidence production and implementation [1], there is a longstanding need to accelerate the uptake of research findings into practice to improve healthcare processes and outcomes. The growing implementation science literature provides information on effective methods for moving evidence into practice; however, this scientific knowledge is large, complex, and may be challenging to apply. This has led to a paradoxical research-practice gap, whereby the evidence produced in implementation science is not being applied in real-world practice settings [2]. Thus, there have been recent calls to improve the mobilization of implementation science knowledge beyond the scientific community and into practice settings [3,4].

Moving implementation science into practice requires a workforce of implementation practitioners who understand how to apply the science of implementation. In this paper, we define “implementation practitioners” as those who are “doing” the implementation of evidence-informed practices, as well as those who are supporting or facilitating implementation efforts [5]. This may include point-of-care staff, managers, quality improvement professionals, intermediaries, implementation support staff, and policymakers. To build the workforce of implementation practitioners, there is a need for training and professional development opportunities, which we call “capacity-building initiatives.” While there are an increasing number of implementation capacity-building initiatives available [6,7], these programs often focus on teaching researchers about implementation science, with fewer aimed at teaching how to apply implementation science to improve implementation of evidence in practice settings (i.e., implementation practice) [7–9]. A recent systematic review [7] of the academic literature included 31 papers (reporting on 41 capacity-building initiatives) published between 2006 and

2019. The review found that many capacity-building initiatives were intended for researchers at a postgraduate or postdoctoral level, and there were fewer options for implementation practitioners working in practice settings.

While there are some examples of practitioner-focused capacity-building initiatives in the literature [10-22], most are being developed and delivered in isolation and not published in the academic or grey literature. In addition, reviewing this literature revealed that most of these publications focus on reporting evaluations of the short- and long-term outcomes of the capacity-building initiatives, with only high-level details of the specific training content and the rationale for this content. Despite the development of competencies [23,24] and frameworks [22] for implementation research and practice that have been informed through primary studies, literature reviews, and convening experts, to our knowledge, there has not been a consensus-building approach to date. Thus, there is limited synthesized information on what content is currently included in implementation practitioner capacity-building initiatives and no universal agreement or guidance on what content should be included to effectively teach implementation practitioners.

The increasing demand for and offerings of implementation practice capacity-building initiatives provide an opportunity to synthesize and learn from the individuals and teams offering this training. Our research team, which is composed of implementation scientists, implementation practitioners, clinicians, health leaders, and trainees, conducted a mixed-methods study to explore the experiences of teams offering capacity-building initiatives focused on implementation practice to inform the future development of high-quality training initiatives. The study had three aims. The first aim, which is the focus of this paper, was to describe what capacity-building initiative developers and deliverers identified as essential training content for

teaching implementation practice. The other two aims (to be reported on elsewhere) were to describe and compare the similarities and differences between the capacity-building initiatives (e.g., structure, participants) and explore the experiences of those developing and delivering capacity-building initiatives for practitioners.

3.2 Methods

We used the Good Reporting of a Mixed Methods Study (GRAMMS) checklist [25] to inform our reporting (Additional file 3.1).

3.2.1 Study design

The overall study was a convergent mixed-methods study [26] (cross-sectional survey and qualitative descriptive design [27]) that applied an integrated knowledge translation approach [28] where all study participants were invited to contribute to the analysis, interpretation, and reporting of the study. Here we report on one component of the larger study. Specifically, we focus on a subset of the quantitative and qualitative data reporting on the content and curriculum of the capacity-building initiatives.

3.2.2 Study participants

We enrolled English-speaking individuals who had experience developing and/or delivering a capacity-building initiative that focused on teaching learners how to apply implementation science knowledge and skills to improve the implementation of evidence-informed practices in practice settings. The capacity-building initiatives must have been offered in the last ten years and could be offered in any geographical location or online. We excluded capacity-building initiatives that focused on training researchers or graduate students to undertake implementation research.

We used purposive sampling. First, using the professional networks of the study team, we compiled a list of capacity-building initiatives and the primary contact (e.g., training lead). Second, three team members (JR, IDG, AM) independently screened the capacity-building initiatives included in Davis and D’Lima’s systematic review [7], consulting the full-text papers as needed to identify initiatives focused on implementation practice. Finally, we used snowball sampling to identify other individuals who had developed and delivered capacity-building initiatives. The first author (JR) invited the potential participants by email. If no response was received, an email reminder was sent two weeks and four weeks after the initial invitation.

Once the primary contact for a capacity-building initiative was enrolled, they had the opportunity to share the study invitation with their other team members. This resulted in some capacity-building initiatives having more than one person enrolled in the study, providing multiple perspectives on the development and delivery of the initiative. For simplicity, we refer to them as “teams” regardless of whether there was one person enrolled or multiple people enrolled.

3.2.3 Data collection

First, participants completed an online questionnaire developed by the study team, which included closed-ended and open-ended questions (Additional file 3.2 presents the subset of questions used in this analysis that focused on the content and curriculum). The questionnaire was piloted internally by two team members, and minor changes were made to improve functionality (e.g., branching logic), comprehensiveness (e.g., adding open text boxes for respondents), and clarity (e.g., defining key terms used). We asked for one completed questionnaire per capacity-building initiative. When there were multiple team members enrolled

in the study, they could nominate one person to complete the questionnaire on their behalf or complete the questionnaire together.

After completing the questionnaire, all participants were interviewed individually or in a focus group via videoconference to explore the questionnaire responses and discuss the capacity-building initiative in more detail. Individual interviews were used when there was only one team member enrolled; focus groups were used when there were two or more team members. The interviews and focus groups were facilitated by one of three research team members, all of whom identified as women and were trained in qualitative interviewing: JR is a master's prepared registered nurse; OD is a master's prepared speech-language pathologist with doctoral training in health rehabilitation sciences research and a knowledge translation specialist; JL is a doctoral prepared researcher with expertise in patient engagement. A semi-structured question guide was developed by the first and senior author (JR, IDG) and shared with the broader team. We used the team feedback to update the question guide, including adding new questions and probes, re-ordering the questions to improve flow, and refining the wording of the questions for clarity (Additional file 3.2 presents the subset of questions used in this analysis that focused on the content and curriculum).

Finally, we asked participants to share any capacity-building initiative materials to provide further details (e.g., scientific or grey literature publications, website materials, training agendas, promotional materials). We only collected publicly available materials to minimize concerns around the sharing/disclosing of proprietary content.

The questionnaire and publicly available materials provided data on what content is currently included in the capacity-building initiatives. The interview and focus group data provided information on why certain content was included, as well as how and why content

changed over time. Together, this provided information on what we have labeled “essential content,” which is a reflection of both what study participants have chosen to include in their training initiatives, and their views on priority content areas for implementation practitioners based on their own experiences developing and delivering the initiatives.

3.2.4 Data analysis

Closed-ended questionnaire responses were analyzed using descriptive statistics. Frequencies (counts and percentages) were calculated for nominal data. Medians and ranges were calculated for continuous data. The questionnaire responses, qualitative transcripts, and course materials shared by participants were uploaded to NVivo12Pro for data management [29]. The merged dataset was analyzed using conventional content analysis, with the codes emerging inductively from the data [30]. Two authors (JR, OD) started by independently reading the data and coding all segments that pertained to training content and curriculum. They met regularly to compare their coding, discuss and resolve differences, build and revise the coding scheme, and group codes into categories. When the coding scheme was well-developed, and the coders were coding consistently (which occurred after coding data from one-third of the teams), the remaining data were coded by either JR or OD. The coding was then audited by one of seven members of the broader research team (HA, DMB, LBG, AMH, SCH, AEL, DS). These seven team members were “senior reviewers” with subject matter expertise in implementation science and practice [31]. They audited the coding and offered their feedback on how the text segments were labeled and categorized. This feedback was discussed by the two primary coders (JR, OD) and the senior author (IDG). The review process resulted in: (1) changes to which codes were applied to specific text segments, (2) changes to the coding structure, including splitting existing codes into more precise labels, and (3) re-organizing existing codes into new categories. The

final coding scheme was applied to the data. Finally, we categorized the identified theories, models, frameworks, and approaches (i.e., other methods in implementation) (TMFAs) [32] according to the three main aims described by Nilsen [33]: to guide, to understand or explain, or to evaluate implementation. We also categorized the identified implementation steps and skills according to the three phases in the Implementation Roadmap [34]: issue identification and clarification; build solutions; and implement, evaluate, sustain.

3.2.5 Integration of quantitative and qualitative data

We used integration approaches at several levels. At the methods level, we used *building* where the interview probes were developed based on questionnaire responses [26]. We also used *merging* by bringing the questionnaire and interview/focus group data together for analysis [26], giving both datasets equal priority. At the interpretation and reporting level, we used a *narrative weaving* approach to describe the categories informed by both datasets [26]. The integration of quantitative and qualitative data contributed to an *expansion* of our understanding of the capacity-building initiative content [26], with the questionnaire contributing to identifying what content is included and the interview/focus group data providing the rationale for the content.

3.2.6 Strategies to enhance methodological rigor

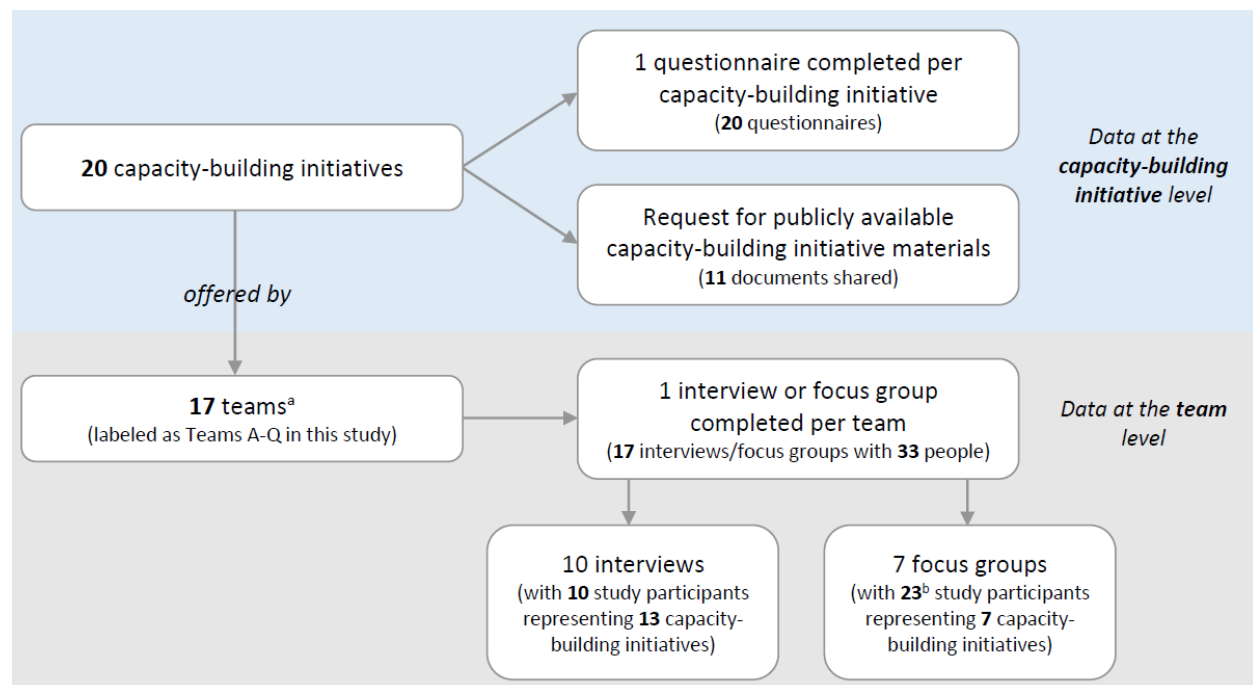
Dependability and confirmability [35] were enhanced by maintaining a comprehensive audit trail including raw data (e.g., verbatim transcripts), iterations of coding and coding schemes, and notes from data analysis meetings. To enhance credibility and confirmability [35] 35% of the data were coded independently by two people. All study participants were sent a summary of their data prepared by the research team and were asked to review it for accuracy and comprehensiveness (i.e., member checking the data). In addition, having senior reviewers with content expertise audit the coding helped make sense of the different implementation

concepts and terms in the data, ensuring that data were coded and categorized accurately. Finally, interested study participants were involved in the sense-making process through their involvement in writing and critically revising this manuscript. We aimed to facilitate an assessment of the transferability [35] of the findings by describing contextual information on the capacity-building initiatives and study participants.

3.3 Results

We enrolled 33 people (representing 17 teams) who developed and delivered capacity-building initiatives focused on implementation practice. Collectively, these 33 study participants shared information on 20 unique capacity-building initiatives that were offered by their 17 teams (Figure 3.1). We indicate the denominator throughout the results to make clear when the results refer to capacity-building initiative level data, which was largely collected through the questionnaire and the shared capacity-building initiative materials (n=20) or team-level data, which was largely collected through interviews and focus groups (n=17).

Between September 2021 and November 2022, we collected 20 questionnaire responses (i.e., one per capacity-building initiative) and conducted 10 online interviews and 7 online focus groups (i.e., one per team) (Figure 3.1). The focus groups included between 2 to 6 people. Interviews lasted an average of 60 minutes (range=51-77 minutes) and focus groups lasted an average of 68 minutes (range=51-79 minutes). We received materials for 11 out of 20 capacity-building initiatives, specifically: 6 publications, 2 course agendas, 2 course advertisements, and 1 website.

Figure 3.1 Summary of data collected

^aOne team reported on 3 capacity-building initiatives and one team reported on 2 capacity-building initiatives. All other teams reported on 1 capacity-building initiative only. Teams participating in this study comprised between 1 and 6 people.

^bFive study participants took part in two focus groups.

3.3.1 Study participants

The 33 study participants represented a blend of both research and practice experience. Half of the study participants (n=17/33, 52%) currently identified as both a research professional (researcher or implementation scientist) and a practice-based professional (clinician or implementation practitioner). Three-quarters of study participants (n=24/33, 73%) were currently involved in implementation in practice settings (clinician or implementation practitioner or manager/leader) (Table 3.1). Nearly all study participants reported having experience in implementation practice (n=31/33, 94%). Of those with experience, the median number of years' experience was 9 (range=4-30 years).

Table 3.1 Demographic characteristics of study participants (N=33)

Characteristic	
Gender – n (%)	
Woman	27 (82)
Man	6 (18)
Current professional identity – n (%)^a	
Researcher or implementation scientist	26 (79)
Clinician ^b	14 (42)
Implementation practitioner	17 (52)
Manager/leader	3 (9)
Years of experience – median (range)	
Developing capacity-building initiatives	6 (0-22)
Delivering capacity-building initiatives	5 (1-22)
Providing adult education	10 (0-36)

^aParticipants were able to select more than one response option

^bStudy participants had clinical training in disciplines such as kinesiology, medicine, nursing, nutrition, occupational therapy, physical therapy, psychology, public health, and speech-language pathology.

3.3.2 Contextual information on capacity-building initiatives

The capacity-building initiatives (n=20) had been offered a median of 4 times (range=1-35 offerings) between 2009 and 2022 (Table 3.2).

Table 3.2 Contextual information on capacity-building initiatives (N=20)

Characteristic	
Type of organization offering capacity-building initiative – n (%)^a	
Health services organization	10 (50)
Academic organization	6 (30)
Organization providing implementation support	5 (25)
Professional association	2 (10)
Private sector organization	1 (5)
Mode of delivery of capacity-building initiative – n (%)	
Combination of online and in-person	10 (50)
In-person only	6 (30)
Online only	4 (20)
Length of capacity-building initiative (hours) – median (range)^b	
16 (3-30)	
Location where capacity-building initiative was offered – n (%)^c	
North America	9 (45)
Australia	7 (35)
Europe	3 (15)
Asia	2 (10)
Africa	1 (5)
Offered online only	4 (20)
Types of participants that take part in capacity-building initiative – n (%)^a	
Point-of-care clinicians	19 (95)
Implementation/quality improvement leads	18 (90)
Managers/administrators	17 (85)
Researchers	16 (80)
Intermediaries/implementation support staff	13 (65)
Graduate and postgraduate trainees	13 (65)
Evaluators	8 (40)
Policymakers	7 (35)
Funders	5 (25)
Health consumers or patients	5 (25)
Focus of capacity-building initiative – n (%)	
General – not specific to a specific context	13 (65)
Rehabilitation	5 (25)
Dementia	1 (5)
Patient safety	1 (5)
Minimum entry requirements for capacity-building initiative – n (%)^a	
No specific requirements	13 (65)
Specific professional background or discipline	7 (35)
Membership or affiliation with a specific organization or group	3 (15)
Attendance at a specific conference or meeting	2 (10)

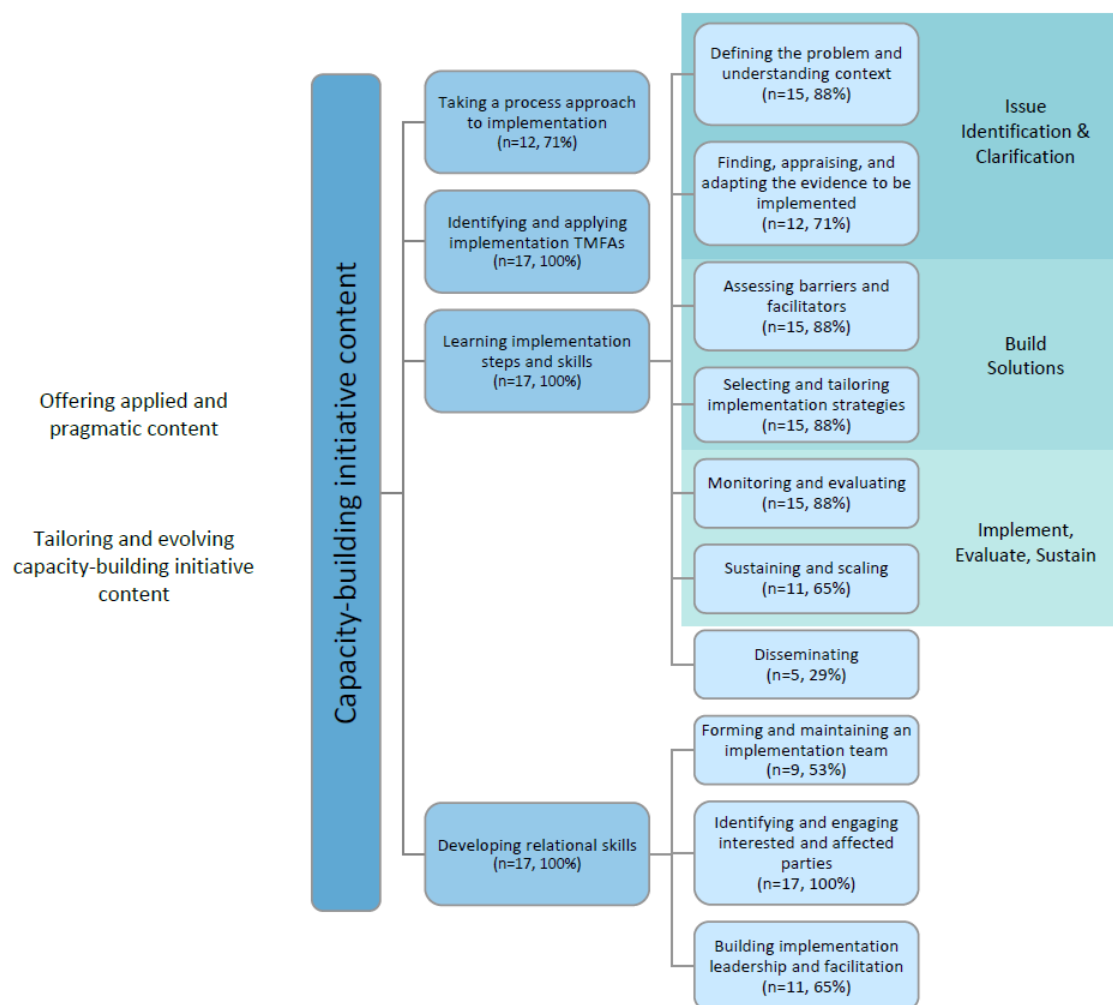
^aRespondents could select more than one response option.

^bData reflects direct teaching time and does not include additional time learners may spend on self-directed learning or mentorship activities.

^cSome initiatives were offered in more than one location.

3.3.3 Capacity-building initiative content

Nine of 17 teams (53%) explicitly described their capacity-building initiatives as introductory level. Study participants identified a variety of content areas included in their capacity-building initiatives, which we present according to four categories and 10 sub-categories, as well as the overarching categories of applied and pragmatic content and tailoring and evolving content (Figure 3.2). Illustrative quotes are presented in Table 3.3.

Figure 3.2 Organization of study findings

The number of teams that discussed each category is indicated in brackets; the teams could have identified/described the category in any or all of the data sources: questionnaire, interview or focus group, shared capacity-building initiative materials. TMFAs, theories, models, frameworks, approaches.

Table 3.3 Illustrative quotes

Category	Sub-category	Illustrative Quotes
1. Taking a process approach to implementation	—	“A lot of people don’t recognize how long this [implementation] process can take...I think helping people understand that this is a dynamic process and that it is fluid and things will change. Flexibility is important and sometimes there will be other competing priorities that this [implementation project] might have to go on hold for, and that’s okay.” (Team I)
2. Identifying and applying implementation TMFAs	—	“They [learners] struggle with many of the frameworks including applying the frameworks and being able to see how this works in their context. How would they apply it? Do they need to adapt it? What does that literally look like?” (Team N)
3. Learning implementation steps and skills	3.1 Defining the problem and understanding context	“Often a course jumps straight into cycles and context and the intervention and the stakeholders and the context. But what we often were finding with a lot of different clinician groups was that the conceptualization of the problem was pretty shaky and the healthcare providers really jumped to solutions. So we have spent quite a lot of time pondering how we get to the bottom of a problem.” (Team D)
	3.2 Finding, appraising, and adapting the evidence to be implemented	“The challenge is that groups think they want to implement something, but they haven’t actually figured out what is the thing that needs to be implemented? And is there good evidence for it? And are we doing the right thing by wanting to implement it? Or is this just ‘we heard about it and we think it’s a good idea,’ but maybe there isn’t really good evidence for it?” (Team H)
	3.3 Assessing barriers and facilitators	“The barriers and facilitators piece is absolutely fundamental because our process historically has just been ‘I want you to adopt this new thing.’ Then I tell you in a meeting and then I hope you just do it. I don’t think about like have I convinced you it’s important? Do you know where to find the form? Is there an algorithm that tells you when and how to do this? Why should you do it?

Category	Sub-category	Illustrative Quotes
		How's it going to impact patient care? Whatever practice you're trying to change, what keeps them from changing?" (Team A)
	3.4 Selecting and tailoring implementation strategies	"What are their barriers or facilitators and what strategies will they use to support people to change their behavior? In my mind, if people don't have that then nothing else matters; there's no reason to proceed because chances are you arbitrarily picked implementation strategies not knowing they were implementation strategies, and you will move forward with them even though they don't address underlying barriers to change." (Team N)
	3.5 Monitoring and evaluating	"Clinicians may or may not appreciate the value of measuring the evidence practice gap at the beginning and then again later on [...] It wasn't just for research purposes, but being able to communicate to the team that what you've been doing has made this amount of change." (Team L)
		"They [learners] are often people who haven't had much experience with measurement and evaluation and often feel a bit threatened by measurement and evaluation. So it's really trying to think about what might be simple things that you could measure? What are the meaningful things? How does it relate to your problem?" (Team D)
	3.6 Sustaining and scaling	"When we were getting close to wrapping up, we look at the [Knowledge-to-Action] cycle again and outcomes of interest—what metrics they wanted to measure and issues around sustainability, explaining how difficult it is to sustain these efforts in many settings." (Team K)
	3.7 Disseminating	"It's important to provide a fulsome understanding of what knowledge translation encompasses. So looking at some of the jargon or buzz words that people hear and where they sit within the knowledge translation umbrella of dissemination and implementation and really helping people to understand the difference between the two." (Team J)

Category	Sub-category	Illustrative Quotes
4. Developing relational skills	4.1 Forming and maintaining an implementation team	“We cover how to assemble the right team to develop and progress a project to support implementation of a specific innovation.” (Team G)
	4.2 Identifying and engaging interested and affected parties	“Part of the training was learning to engage them [clinical team members and administrators] early in the process and knowing that they had to do that rather than just going in and doing what they wanted to implement and then saying ‘oh we’re doing this by the way.’” (Team L)
	4.3 Building implementation leadership and facilitation	“A decent amount of time in our program is devoted to leadership development—thinking about yourself as a leader and thinking about facilitation and relationships...those are skills not everybody has, so people need ongoing development in those areas.” (Team O)
5. Offering applied and pragmatic content	—	“It [capacity-building initiative] was an opportunity to bring people together to expose them to an array of tools. The feedback that we got from people was that they were so grateful that somebody had done this compilation for them and that they now had a package that they could walk away with and use in the way that they felt most appropriate.” (Team B)
6. Tailoring and evolving capacity-building initiative content	—	“We’re constantly tweaking and adjusting the content to tailor it to the personalities and the projects. It is a very comprehensive full on three-days, but that’s just our personalities to want to make it really tailored...we don’t just rinse and repeat the same course because it’s easy.” (Team F)
	—	“One of the biggest things that we’ve done in the last couple of years is really making sure that we take an intersectionality lens right from the very beginning and get people to reflect on our positions within the project, the biases that we bring, and thinking about who is on the team? Who is not on the team?” (Team P)

TMFAs=theories, models, frameworks, approaches

3.3.3.1 Taking a process approach to implementation. Twelve teams (n=12/17, 71%) described the importance of teaching learners to take a process approach to implementation. Participants highlighted that because learners tend to be action-focused, they needed to include content on the importance of taking a thoughtful approach and not jumping in too quickly without a thorough plan. To do this, these teams included content on how to develop a comprehensive implementation plan. Teaching this process approach also required information on how long the process can take, its iterative nature, and the need to be adaptable as things change.

3.3.3.2 Identifying and applying implementation TMFAs. All 17 teams reported that their capacity-building initiatives included two or more implementation TMFAs. In total, study participants identified 37 unique TMFAs that were introduced in their capacity-building initiatives (Table 3.4). The most common were the Knowledge-to-Action Framework (n=14/20), Theoretical Domains Framework (n=11/20), COM-B Model for Behavior Change (n=9/20), RE-AIM (n=9/20), Consolidated Framework for Implementation Research (n=8/20), and the Behavior Change Wheel (n=5/20). The remaining TMFAs were all used by four or fewer capacity-building initiatives.

Eleven capacity-building initiatives used a TMFA as the underpinning structure for the training content: nine were based on the Knowledge-to-Action framework, one was based on the Behavior Change Wheel, and one was based on the Awareness-to-Adherence Model.

Table 3.4 Theories, models, frameworks, and approaches (n=37) included in the 20 capacity-building initiatives

Theories, models, frameworks, and approaches (TMFAs) ^a	# capacity-building initiatives
KTA (Knowledge-to-Action) Framework [36]	14
TDF (Theoretical Domains Framework) [37]	11
COM-B Model for Behavior Change [38]	9
RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) [39,40]	9
CFIR (Consolidated Framework for Implementation Research) [41,42]	8
Behavior Change Wheel [38]	5
Dynamic Sustainability Framework [43]	4
NHS (National Health Service) Sustainability Model [44]	4
Interactive Systems Framework for Dissemination and Implementation [45]	3
PARiHS (Promoting Action on Research Implementation in Health Services) Framework [46]	3
EBSIS (Evidence-based System for Innovation Support) [47]	2
Integrated Knowledge Translation [48]	2
NPT (Normalization Process Theory) [49,50]	2
Proctor's Implementation Outcomes [51]	2
Quality Implementation Framework [52]	2
Rogers Diffusion of Innovation [53]	2
ADAPT Process Model [54]	1
Awareness-to-Adherence Model [55]	1
CAN-Implement [56]	1
Complexity theory [57]	1
End-of-Grant Knowledge Translation [48]	1
EPIS Framework (Exploration, Preparation, Implementation, Sustainment) [58,59]	1
Forms and Functions [60]	1
FRAME (Framework for Reporting Adaptations and Modifications-Expanded) [61]	1
IHI (Institute for Healthcare Improvement) Model for Improvement [62]	1
IHI (Institute for Healthcare Improvement) Psychology of Change Framework [63]	1
Implementation Process Model [64]	1
Iowa Model of Evidence-Based Practice [65]	1
Network Mapping [66,67]	1
OMRU (Ottawa Model of Research Use) [68]	1
R=MC2 Readiness Framework [69]	1
Soft Systems Theory [70]	1
Systems Thinking [71]	1
Systems Pathways [57]	1
Systems Readiness [72]	1
TACT-A (Target, Action, Context, Timing, Actors) Framework [73]	1
Theory of Planned Behavior [74]	1

^a*Presented in order of frequency*

Of the 20 capacity-building initiatives, 16 (80%) included at least one TMFA that *guides* implementation; 16 (80%) included at least one TMFA that *explains* implementation; and 10 (50%) included at least one TMFA to *evaluate* implementation. Eight of the 20 capacity-building initiatives (40%) included TMFAs from all three aims; six (30%) included TMFAs from two aims (guide/explain=4, explain/evaluate=1, guide/evaluate=1); and six (30%) included TMFAs from one aim only (guide=3, explain=3).

Nine teams (n=9/17, 53%) described the importance of focusing on the “how,” showing learners the menu of options and helping them to understand how to appropriately select and apply TMFAs to the different stages of their implementation projects. One team described introducing tools to facilitate the selection of TMFAs (e.g., Dissemination & Implementation Models in Health [75], T-CaST [76,77]).

Teams noted that the content on TMFAs was often challenging for learners, with one team describing it as “bamboozling” (Case M). Challenges were due to learner anxiety with the academic nature and language of TMFAs, as well as difficulties understanding how they can be applied to their work. To address these challenges, teams changed their capacity-building initiative content to make it less theoretical (i.e., less focus on *telling* them about theories), with an increased focus on how to apply theory in implementation projects. Other teams described including information to reinforce the flexible application of TMFAs, emphasizing the ability to try one out and re-visit the choice if it is not meeting the project needs.

3.3.3.3 Learning implementation steps and skills. All 17 teams described how their training content focused on practical implementation skills to complete various steps in the process. Teams described seven core steps (Figure 3.2).

3.3.3.3.1 Defining the problem and understanding context. Fifteen teams (n=15/17, 88%) identified the importance of teaching learners to clearly define what problem the implementation project is aiming to address. Examples of this content included: clarifying what the problem is, understanding the context and current practice, using data to show the problem (evidence-practice gap), understanding the root cause of a problem, defining a problem that is specific and feasible to address, and understanding the problem from different perspectives.

Teams described spending a significant amount of time on this content due to its foundational nature for learning about subsequent steps in the implementation process. However, one participant cautioned the need to strike a balance between helping learners to thoroughly define and understand their problem without going so in-depth that they lose sight of what they are trying to accomplish within their implementation project.

3.3.3.3.2 Finding, appraising, and adapting evidence. Many teams (n=12/17, 71%) described content about the evidence to be implemented as critical, including how to find, appraise, and adapt evidence for the context in which it is being implemented. Several teams described how learners could be quick to select the evidence to be implemented based on hearing about something “bright and shiny” (Team M), learnings from conferences and meetings, or papers reporting on a single study. Because of this, training content on how to conduct a more comprehensive search and appraisal of the evidence was essential.

Specifically, teams included content on the importance of ensuring there is evidence to support what is being implemented, how to search for research evidence, the importance of considering other forms of evidence such as staff and patient experiences, how to merge research evidence with experiential knowledge, considerations for ensuring the fit of the evidence to be implemented with the implementation setting, and understanding the appraised quality and levels

of evidence (e.g., the evidence pyramid). Two teams (n=2/17, 12%) acknowledged that even after learners acquired some knowledge and skills to search for and appraise evidence, they rarely had the time to undertake these tasks in their day-to-day professional roles. Therefore, making learners aware of resources to support this work was important.

Seven teams (n=7/17, 41%) described training content related to adapting the evidence, practice, or innovation being implemented to fit with the local context. The concept of adaptation could be challenging for learners accustomed to working in a more “top-down” or directive model, where they assumed the evidence, practice, or innovation would be implemented as is. In these cases, teams identified that it was especially important to include information on how the organizational context and group needs should be considered to optimize the uptake and sustainability of the evidence, practice, or innovation being implemented.

3.3.3.3 Assessing barriers and facilitators. Fifteen teams (n=15/17, 88%) discussed the fundamental importance of including content on how to systematically assess for barriers and facilitators that are likely to influence implementation. Teams shared how learners may either skip right from evidence selection to implementation solutions or erroneously believe that simply telling people a change is being made should be enough to result in behavior change. Teaching learners about the determinants that may influence the adoption (or lack of adoption) of evidence and the process for identifying these determinants was, therefore, identified as critical by nearly all teams. The content for this stage frequently included different TMFAs to guide the work (e.g., Theoretical Domains Framework [TDF] [37], Consolidated Framework for Implementation Research [CFIR] [41,42]).

3.3.3.3.4 Selecting and tailoring implementation strategies. Fifteen teams (n=15/17, 88%) highlighted the importance of teaching learners how to select implementation strategies

using a structured approach that aligns with and addresses the identified barriers. Teams shared that learners may default to using familiar implementation strategies (such as education); therefore, teaching about the full range of implementation strategies was important. The capacity-building initiatives frequently included content and activities on how to map identified barriers to specific evidence-based implementation strategies and how to prioritize which ones to select. Again, teams described relevant resources (such as the Expert Recommendations for Implementing Change [ERIC] Taxonomy [78], the Behavior Change Technique [BCT] Taxonomy [79], and the Behavior Change Wheel [38]) that they used to help learners understand and apply the implementation strategy selection process.

3.3.3.3.5 *Monitoring and evaluating.* Fifteen teams (n=15/17, 88%) described training content related to monitoring and evaluating implementation. Teams shared how they reinforced the importance of evaluating implementation projects to make course corrections and show the impact of their work. Three teams (n=3/17, 18%) acknowledged that monitoring and evaluation can be unfamiliar and intimidating to learners and ensured that the content covered the “nuts and bolts” of monitoring the implementation process and conducting an outcome evaluation. Five capacity-building initiatives (n=5/20, 25%) included logic models as a tool to plan for evaluations; other TMFAs included RE-AIM [39,40] and Proctor’s implementation outcomes [51].

3.3.3.3.6 *Sustaining and scaling.* Eleven teams (n=11/17, 65%) stated they included content on sustainability, such as tools for sustainability planning, determinants of sustainability, strategies for assessing and enhancing sustainability, and challenges with sustaining change over time. One team (n=1/17, 6%) described including information on spread and scale. Although this content was often introduced near the end of the capacity-building initiative, teams reminded

learners that sustainability needs to be considered at the beginning and throughout the implementation process.

3.3.3.3.7 Disseminating. Five teams (n=5/17, 29%) included content on how to disseminate the findings of implementation projects. Content included strategies to disseminate project findings to interested and affected parties and decision-makers, as well as dissemination through scientific venues such as conference presentations and publications.

While all capacity-building initiatives (n=20/20) focused on the implementation of evidence into practice, two teams (n=2/17, 12%) also included information on how to undertake a dissemination project (e.g., developing a resource to share evidence). Teams also described the need to teach learners about the full spectrum of knowledge translation and the distinction between dissemination and implementation.

3.3.3.4 Developing relational skills. All teams (n=17/17) discussed the importance of learning about the relational skills required throughout the implementation process, with one participant describing it as the “most neglected part of capacity building” (Case N).

Teams identified three main content areas for teaching these relational skills: forming and maintaining an implementation team, identifying and engaging interested and affected parties, and building implementation leadership and facilitation. Cutting across these three main areas, there were general examples of other relational content, including how to build trusting relationships, work inter-professionally, navigate power differences and hierarchies, and communication skills.

3.3.3.4.1 Forming and maintaining an implementation team. Nine teams (n=9/17, 53%) discussed content on how to build an implementation team and define roles, how to manage team dynamics, and how to engage members throughout the implementation project.

3.3.3.4.2 Identifying and engaging interested and affected parties. All teams (n=17/17) described content related to identifying and engaging interested and affected parties. Topics included the value of engagement, identifying and mapping key influencers, strategies for engagement, tailoring engagement approaches, and evaluating engagement.

Fourteen teams (n=14/17, 82%) stated they included content on the importance of engaging health consumers (e.g., patients, families, caregivers). While some capacity-building initiatives only briefly discussed this, others described more detailed content, such as the rationale for and importance of consumer engagement, guidance for reimbursing health consumer partners, and strategies for working with health consumers. Two teams (n=2/17, 12%) highlighted the importance of having this content delivered by health consumers themselves to showcase their experiences and stories.

3.3.3.4.3 Building implementation leadership and facilitation. Eleven teams (n=11/17, 65%) included content on the knowledge and skills needed to be a facilitator of the implementation process including: the role of the facilitator, effective leadership, change management, managing resistance, and motivating others. Learners entering the capacity-building initiative may not recognize their ability to be an implementation leader; it was, therefore, important to include content that encouraged learners to reflect on their current attitudes and skills as a leader, work on leadership development, and help learners see themselves as leaders of implementation.

3.3.3.5 Offering applied and pragmatic content. All teams (n=17/17) discussed the importance of applied content for teaching implementation practice. Teams acknowledged the growing and complex implementation science literature and highlighted the importance of content that effectively distills this literature into pragmatic and accessible content for learners

(e.g., top five tips, toolkits, case examples). Teams reported that including practical tools and resources in the capacity-building initiatives was important so that learners had something tangible they could apply in their practice. Thirteen teams (n=13/17, 76%) named at least one additional resource that they shared with learners. Twenty-seven unique resources were identified (Table 4.5).

Table 3.5 List of additional resources (n=27) shared in the 20 capacity-building initiatives

Additional resources (n=27) shared in the capacity-building initiatives (presented in alphabetical order)
APRAISE Tool [80] Behavior Change Technique (BCT) Taxonomy [79] CADTH Rx for Change Database [81] Methods of Patient & Public Engagement: A Guide [82] CIHR's A Guide to Evaluation in Health Research [83] Dissemination & Implementation Models in Research & Practice [75] Eisenhower Matrix [84] EPOC (Effective Practice and Organisation of Care) Taxonomy [85] ERIC (Expert Recommendations for Implementing Change) Taxonomy [78] Getting to Outcomes [86] Health Consumers Queensland [87] IAP2 (International Association for Public Participation) [88] Institute of Health Economics report on Effective Dissemination of Research Findings [89] Implementation Mapping [90] King's Improvement Science (KIS) Guide to Evaluation Resources [91] Knowledge Translation Planning Template [92] KTDRR (Center on Knowledge Translation for Disability & Rehabilitation Research) KT Strategies Database [93] NHS (National Health Service) Institute for Innovation and Improvement Sustainability Guide [94] NIRN (National Implementation Research Network) [95] Ready, Set, Change! Decision Support Tool [96] SBAR Tool (Situation, Background, Assessment, Recommendation) [97] Sustain Tool (PSAT [Program Sustainability Assessment Tool] and CSAT [Clinical Sustainability Assessment Tool]) [98] T-CAST (Theory, Model, and Framework Comparison and Selection Tool) [76,77] The 7 Ps (Programs, Practices, Policies, Procedures, Principles, Pills, Products) [99] The Engagement Toolkit [100] Theory and Techniques Tool [101] TICD (Tailored Implementation for Chronic Diseases) Checklist [102]

3.3.3.6 Tailoring and evolving capacity-building initiative content. Seven teams (n=7/17, 41%) described the importance of tailoring the content to each group of learners. While some teams acknowledged that there is content that is “locked in” or “universal,” other content can be tailored to meet the specific needs of learners (for example, based on learners’ area of practice, implementation projects, baseline knowledge, and learning needs).

Of the 20 capacity-building initiatives, 17 (85%) had been offered more than one time. These teams described changes to their training content over time (Table 3.6). These content changes were prompted by feedback received via formal learner evaluation forms; informal check-ins with learners during the capacity-building initiative; observations of what learners are asking questions about or struggling with; and new developments in the fields of knowledge translation, implementation science, and adult education.

Table 3.6 Examples of changes to content in capacity-building initiatives

Type of change to capacity-building initiative content	Examples
Removing content or decreasing content that was not aligned with learners’ needs or preferences	• Removing specific tools and resources that were not helpful to learners • Decreasing theoretical content • Removing content that was not relevant to learners (e.g., media training)
Adding content or increasing time spent on content that aligns with learners’ needs or preferences	• New developments in implementation science • Specific implementation steps such as clarifying the problem, consumer engagement • Adding new tools and resources developed by the capacity-building initiative team (e.g., implementation decision aids, workbooks)
Changing the presentation of content	• Reducing the depth of content • Shifting to more practical content • Increasing the number of case examples • Updating the language used to align with developments in the field

Teams shared emerging topics that are becoming increasingly important to include in their capacity-building initiatives. More recent offerings of the capacity-building initiatives have taught learners about taking an intersectionality lens, considerations for equity, diversity, and inclusion, and applying a principled approach to partnerships.

3.4 Discussion

This study aimed to describe what capacity-building initiative developers and deliverers identify as essential content for teaching implementation practice. Based on the experiences of 17 teams that delivered 20 capacity-building initiatives, we identified four categories of content, including taking a process approach to implementation, implementation TMFAs, implementation steps and skills, and relational skills, as well as the overarching categories of applied and pragmatic content, and tailored and evolving content. These findings provide an overview of the content being covered by a variety of capacity-building initiatives worldwide and the rationale for this content. Learning about the rationale for the content provided insights into some of the challenges current and aspiring implementation practitioners face, both in the learning process and in their practice settings. These findings provide a foundation for building, refining, and researching capacity-building initiatives to further develop the implementation practice workforce, which is essential for scaling the implementation of evidence globally.

In this study, teams identified 37 different TMFAs and 27 additional resources that were introduced across the 20 capacity-building initiatives. While some of these were applied across a substantial number of capacity-building initiatives (e.g., Knowledge-to-Action framework [36]), most were used infrequently. This finding signals a general lack of consensus about what TMFAs and resources to use, a finding reported elsewhere [103]. A recent scoping review identified over 200 knowledge translation practice tools (i.e., tools that guide how to do

knowledge translation) [104]. This has created a potentially overwhelming number of TMFAs that are used infrequently and/or inappropriately [105,106], with many practitioners reporting a lack of confidence in choosing a framework [107]. It is worth reflecting on whether the people developing and delivering capacity-building initiatives are propagating this challenge by sharing and endorsing so many TMFAs and resources, especially without equipping learners with the tools needed to select and implement appropriate TMFAs. While some teams in our study did describe the importance of content on how to identify and select appropriate TMFAs, only one team identified the use of selection tools to facilitate this process. As more practice-based selection tools are developed and tested [104,106], they may be helpful to implementation practitioners as they explore the large number of potential TMFAs to apply in their work.

The capacity-building initiatives in this study aligned with current understanding of core pillars [22] and essential competencies for implementation practice [23,108]. Leppin and colleagues [22] identified three core pillars: understanding evidence-based interventions and implementation strategies; using theories, models, and frameworks during the implementation process; and methods and approaches to implementation research. The content in our included capacity-building initiatives closely aligned with the first two pillars, with less emphasis on the third pillar of implementation research. Moore and Khan identified 37 competencies linked to nine core implementation activities: inspire stakeholders and develop relationships, build implementation teams, understand the problem, use evidence to inform all aspects of implementation, assess the context, facilitate implementation, evaluate, plan for sustainability, and brokering knowledge [23]. The capacity-building initiatives we examined in our study generally covered these nine activities, although some were described less frequently (e.g., building an implementation team, sustainability). While the depth of our data did not allow for a

direct comparison between the capacity-building initiative content and the more detailed individual competencies, future work should explore the alignment between training content and current and emerging competencies for implementation practice and science. For instance, novel competencies are emerging related to equity considerations in implementation science [109].

While some teams in our study described including new content on equity in their capacity-building initiatives, further work is needed to explore how this training content aligns with these emerging competencies, how effectively it is developing implementation practitioners' capacity to integrate equity considerations during implementation, and whether there are differences in equity considerations for implementation research versus implementation practice.

We identified several areas where, despite learning content in the capacity-building initiative, practitioners might experience challenges applying this knowledge in practice. First, although about 70% of the capacity-building initiatives in our study included content on how to find, appraise, and adapt evidence, there were concerns about whether learners could (or should) action these skills in day-to-day practice, given the time-intensive nature. This concern aligns with a systematic review that found “lack of time” as a top barrier to healthcare providers searching for, appraising, and learning from evidence [110]. Support from librarians has been shown to have positive outcomes (e.g., time savings for healthcare providers, more timely information for decision making) [111], although we acknowledge that librarians may not be easily accessible in all practice-based settings. Second, nearly all teams included content on monitoring and evaluation. However, based on the collective experiences of our team of implementation scientists and implementation practitioners, monitoring and evaluation is often not done (or not done in depth) in practice-based settings. Setting up effective data collection and monitoring systems has been identified as one of the top ten challenges to improving quality in

healthcare, with settings often lacking the required expertise and infrastructure [112]. It is possible that the high proportion of teams including monitoring and evaluation content in their training is in response to this gap and an attempt to better equip learners with the required knowledge to effectively apply these skills in their settings.

The topic of sustainability was included by less than two-thirds of the teams. Given the growing attention on sustainability and scalability [113–115], this was surprising. There are several potential explanations. First, it is possible that sustainability concepts were integrated throughout the other content and not explicitly articulated as a separate content area by study participants. Second, most of the capacity-building initiatives in our study were time-limited, introductory courses. While most capacity-building initiatives introduced process models (e.g., KTA framework [36], Quality Implementation Framework [52], EPIS [58,59]), which encourage consideration of the full implementation process from planning to sustainability, it is possible that the focus of the training was on the earlier phases of the models, with less attention to the longer-term activities of sustainability and scalability. However, sustainability needs to be considered early and often [116,117] and it is worth considering who bears this responsibility. Johnson et al [118] raised a similar question and recommended sustainability planning be a “dynamic, multifaceted approach with the involvement of all those who have a stake in sustainability such as funders, researchers, practitioners, and program beneficiaries” [118]^(p. 7). It is thus important to ensure that capacity-building initiatives are equipping learners with the knowledge and skills to enhance sustainability and scalability throughout the full implementation process.

All teams described the importance of relational skills in the implementation process, from forming and maintaining a core implementation team, to engaging interested and affected

parties in the implementation process, to effectively leading and facilitating implementation. Relational skills are required to work effectively in implementation practice, with about half of the 37 implementation core competencies being relational in nature [23]. In addition, an international survey of implementation experts most frequently identified collaboration knowledge and skills (e.g., interpersonal skills, networking and relationship building, teamwork and leadership skills, motivational skills, and ability to work with other disciplines and cultures) as the most helpful competency [24]. Our study also provided several examples of how this relational content is evolving in alignment with societal priorities and emerging areas in the fields of knowledge translation and implementation science, including integrated knowledge translation [28] and co-production [119] approaches, power differences and dynamics [120], equity, diversity, and inclusion, intersectionality considerations [121–126], and taking a principled approach to partnerships [127,128]. It is promising that many teams offering capacity-building initiatives are staying abreast of these latest advances and priorities in developing the knowledge and skills of implementation practitioners.

3.4.1 Strengths and limitations

We used a comprehensive recruitment approach to enroll a geographically diverse sample of participants with a variety of implementation, clinical, and research experiences, providing an international perspective on implementation practice training. We used a recent systematic review [7] as one strategy to identify published capacity-building initiatives; however, it is important to acknowledge that we did not conduct a comprehensive review of the literature, and some capacity-building initiatives may have been missed. Furthermore, the inclusion of English-speaking participants only may have limited the identification and participation of other capacity-building initiative developers and deliverers. In addition, the current study focused on

capacity-building initiatives offered primarily in the health sector. Implementation science and practice span many fields, offering an opportunity to replicate this study design to examine commonalities and unique content needs across different regions and contexts.

The use of primary and multiple data collection methods facilitated the collection of in-depth information on both what content is covered in the capacity-building initiatives, as well as how and why this content is included. However, it is important to acknowledge that we only received capacity-building initiative materials from 11 of the 20 programs, which may have limited the comprehensiveness of the information on each initiative. In addition, the discussion guide asked participants about “critical content,” and participants may therefore have only highlighted the “core” content in the time-limited interviews and focus groups. As such, while our findings provide an overview of what experts in the field identify as important training content, this is likely not reflective of every possible topic covered across capacity-building initiatives. Furthermore, while study participants shared what they included in their initiatives and why those content areas are important, this may not be representative of the optimal training content for all settings. Given that the purpose of this study was not to assess the outcomes of the capacity-building initiatives, we cannot ascertain whether specific capacity-building initiative content is associated with better learner or health-system outcomes, which is an important area for future work.

Although this work extends our knowledge of key training content for implementation practice, content and curriculum are just one component of designing and delivering effective implementation practice training programs. Our team is currently working to synthesize additional data to describe the structure, format, and evaluation approaches of the capacity-building initiatives, as well as describe the experiences of the teams who facilitate the training.

3.5 Conclusion

The results of this study highlight what experienced capacity-building initiative developers and deliverers identify as essential content for teaching implementation practice. These learnings may be informative to researchers, educators, and implementation practitioners working to develop, refine, and deliver capacity-building initiatives to enhance the translation of implementation science into practice. Future research is needed to better understand how the training content influences implementation outcomes.

3.6 Declarations

3.6.1 Ethics approval and consent to participate

This study received approval from the Ottawa Health Science Network Research Ethics Board (20210274-01H). All participants provided written informed consent before the questionnaire and reconfirmed consent verbally prior to starting the interview or focus group.

3.6.2 Consent for publication

Not applicable.

3.6.3 Availability of data and materials

The interview and focus group transcripts analyzed in this study are not publicly available due to them containing information that could compromise research participant privacy/consent. The questionnaire and data are available from the corresponding author on reasonable request.

3.6.4 Competing interests

HA, DMB, BEC, LBG, AMH, SCH, EAL, JLM, MRR, WR, DS, IDG, SB, ATB, AEC, SK, JEM, CP, SES, AT were each involved in the development and/or delivery of one or more of the capacity-building initiatives included in this study.

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3.8 Additional files

Additional File 3.1 Completed reporting checklist - Good Reporting of A Mixed Methods

Study (GRAMMS)^a

Item #	GRAMMS item description	Reported in section
1	Describe the justification for using a mixed methods approach to the research question.	3.2.5 Methods - Integration
2	Describe the design in terms of the purpose, priority and sequence of methods.	3.2.1 Methods - Design 3.2.3 Methods - Data collection 3.2.5 Methods - Integration
3	Describe each method in terms of sampling, data collection and analysis.	3.2.2 Methods - Study participants 3.2.3 Methods - Data collection 3.2.4 Methods - Data analysis
4	Describe where integration has occurred, how it has occurred and who has participated in it.	3.2.5 Methods - Integration
5	Describe any limitation of one method associated with the presence of the other method.	N/A
6	Describe any insights gained from mixing or integrating methods	3.2.5 Methods - Integration 3.4.1 Discussion - Strengths & limitations

^aO'Cathain A, Murphy E, Nicholl J. The quality of mixed methods studies in health services research. *J Health Serv Res Policy*. 2008;13: 92-98.

Additional File 3.2 Questions from questionnaire and discussion guide analyzed in study**SURVEY QUESTIONS***(used in this analysis)*

What are the stated aims or goals of your capacity-building initiative?	
What implementation science theories, models and frameworks are included in your capacity-building initiative?	
Is there a particular theoretical approach underpinning your capacity-building initiative (e.g., pedagogical theory, implementation theory)?	☐ Yes ☐ No If “yes”, please specify:
What practical implementation skills do you teach in your capacity-building initiative?	
Is relationship/team building part of your course content/curriculum?	☐ Yes ☐ No If “yes”, please explain what aspects:
Does your capacity-building initiative include information on how to engage health consumers and patients in the implementation process?	☐ Yes ☐ No
If you have any additional comments on your capacity-building initiative, please enter them here.	

INTERVIEW QUESTIONS

(used in this analysis)

1. How did you ensure that your capacity-building initiative met the needs of the practitioners? Did any knowledge users take part in the development?
 - Tell me about your approach to working with interested and affected parties (and patients, if applicable)
2. I have looked over the survey responses [*provided by you or your team*] and want to talk more in depth about your capacity-building initiative.
 - Tell me more about the **content/curriculum** in your capacity-building initiative [*probe specific survey questions from the “content & curriculum” section as needed, plus additional probes below*].
 - What is critical content? Was all of it essential or were some parts more important than others and how come?
 - Tell me about the relationship and team building content in your capacity-building initiative (if applicable).
 - Do you change the content depending on the audience? How and why?
3. Now let’s talk about what you have learned related to how to best teach practitioners implementation.
 - What have you learned about teaching others about how to implement best practices?
 - What concepts/skills do participants find challenging to acquire? What strategies did you use to help participants with these challenges?
 - Many current capacity-building initiatives are designed for implementation *scientists*. Are there any key differences in the content and format of your implementation *practice* capacity-building initiative, compared to a one targeted at scientists? Any key similarities?
4. Overall, what worked well with the capacity-building initiative?
5. What challenges have you encountered delivering the capacity-building initiative?
 - Has anything gone wrong?
 - Anything to avoid?
6. Thinking about these factors that worked well and those that were more challenging, if you could re-design the capacity-building initiative:
 - What would you change? How come?
 - What aspects would you keep? How come?
7. Do you have any other experiences, observations or insights about developing and/or delivering capacity-building initiatives that you would like to share with me today?

Chapter 4: Planning and implementing practice changes in Ontario maternal-newborn hospital units: A secondary qualitative analysis

This chapter was published in *BMC Pregnancy and Childbirth* in their collection “Quality improvement in maternal and reproductive health services.” In this study I collaborated with a team of maternal-newborn healthcare providers, hospital intermediaries, a parent representative, and researchers to learn about how maternal-newborn hospital teams implement practice changes in their settings and identify potential areas for improvement. Under the guidance of my Thesis Advisory Committee, I led the conceptualization and design of the study, analyzed and interpreted the existing qualitative data, and wrote the first draft of the manuscript. The co-authors contributed to conceptualizing and designing the study, and/or analyzing data, and/or interpreting the findings. All co-authors made significant contributions to critically revising this manuscript and approved the final version.

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Abstract***Background***

Moving evidence into practice is complex, and pregnant and birthing people and their infants do not always receive care that aligns with the best available evidence. Implementation science can inform how to effectively move evidence into practice. While there are a growing number of examples of implementation science being studied in maternal-newborn care settings, it remains unknown how real-world teams of healthcare providers and leaders approach the overall implementation process when making practice changes. The purpose of this study was to describe maternal-newborn hospital teams' approaches to implementing practice changes. We aimed to identify what implementation steps teams take (or not) and identify strengths and potential areas for improvement based on best practices in implementation science.

Methods

We conducted a supplementary qualitative secondary analysis of 22 interviews completed in 2014-2015 with maternal-newborn nursing leaders in Ontario, Canada. We used directed content analysis to code the data to seven steps in an implementation framework (Implementation Roadmap): identify the problem and potential best practice; assemble local evidence; select and customize best practice; discover barriers and drivers; tailor implementation strategies; field-test, plan evaluation, prepare to launch; launch, evaluate, and sustain. Frequency counts are presented for each step.

Results

Participants reported completing a median of 4.5 of 7 Implementation Roadmap steps (range=3-7), with the most common being identifying a practice problem. Other steps were described less frequently (e.g., selecting and adapting evidence, field-testing, outcome

evaluation) or discussed frequently but not optimally (e.g., barriers assessment). Participants provided examples of how they engaged point-of-care staff throughout the implementation process, but provided fewer examples of engaging pregnant and birthing people and their families. Some participants stated they used a formal framework or process to guide their implementation process, with the most common being quality improvement approaches and tools.

Conclusions

We identified variability across the 22 hospitals in the implementation steps taken. While we observed many strengths, we also identified areas where further support may be needed. Future work is needed to create opportunities and resources to support maternal-newborn healthcare providers and leaders to apply principles and tools from implementation science to their practice change initiatives.

4.1 Background

Improving the quality of care in maternal-newborn settings is an international, national, and local priority [1–3]. Despite ongoing improvement efforts, pregnant and birthing people and their infants continue to receive care that is not always aligned with the best available evidence [4, 5]. Moving evidence into practice is complex and remains an ongoing challenge in healthcare. Studies have revealed that individuals and organizations face many barriers to implementing evidence into practice, including lack of skills with few opportunities for training, unsupportive organizational cultures and the undervaluing of evidence, as well as limited time and physical and human resources [6]. In maternal-newborn care specifically, clinical practice changes can be particularly complex due to the involvement of different healthcare providers (e.g., nurses, physicians, midwives), care that focuses on two different patient populations (e.g., the pregnant or birthing person and infant), and the fact that some practices are affected by separate hospital units (e.g., birthing unit, mother-baby unit, neonatal intensive care unit).

Implementation science is defined as “the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice” [7]. Although the field of implementation science has developed rapidly over the past two decades, its full potential has not yet been realized [8]. There is emerging discussion about how the knowledge gained through implementation science has largely remained in the scientific domain, and has not been well translated into practice-based settings such as healthcare [9, 10]. It is important to assess if and how implementation evidence, principles, and tools are being applied to identify opportunities to optimize evidence-informed implementation.

Within maternal-newborn care, there are increasing examples of implementation science applications, focusing on topics such as prioritizing content areas for implementation research

[11] and practice [12], identifying and examining the effectiveness of different implementation strategies [13–15], and exploring barriers and facilitators to implementation [15–17]. While this literature makes an essential contribution to advancing our understanding of evidence-informed strategies to implement evidence and the potential challenges, it typically has not focused on the entire implementation process needed to bring about change (i.e., taking a planned action [18] approach to changes). Recently, there have been more examples of how teams work through the overall implementation process being published as best practice implementation reports [19–21]. However, these reports are typically focused on a practice change in a single setting, and by virtue of publishing their work, likely over-represent teams that are more familiar (and potentially more successful) with implementation processes. To complement this existing literature, there is a need to shift from learning about single implementation strategies or single projects to also looking more holistically at how maternal-newborn teams implement practice changes in their day-to-day work.

The province of Ontario, Canada provides a unique opportunity to learn about the process of moving evidence into practice. Every birthing hospital in the province has access to a perinatal data registry called the Better Outcomes Registry & Network (BORN) Ontario, which captures data on nearly every birth in the province [22]. Contributing hospitals can use their own BORN data to facilitate practice improvements [22], for example, to identify evidence-practice gaps, understand current practice, and monitor and evaluate implementation projects. Although hospitals have access to this large and robust data system, it remains largely unknown what processes teams are using to implement practice changes and how well their processes align with current best practices in implementation science.

In 2012, BORN launched the Maternal Newborn Dashboard (“the dashboard”), which is an online audit and feedback system that maternal-newborn hospital teams can use to facilitate practice change improvements. The dashboard includes six key performance indicators related to practices such as newborn screening, episiotomies, breastfeeding, repeat elective cesarean sections, Group B streptococcus screening, and inductions [23]. In 2014, an evaluation of the dashboard commenced, providing an opportunity to learn how Ontario maternal-newborn hospitals approach practice changes and how they use the dashboard to support their work. One part of the evaluation involved interviews with nursing leaders in Ontario maternal-newborn hospitals about how they implement practice changes.

Using these data, we aimed to understand maternal-newborn leaders’ usual approaches to implementing practice changes in their hospital units, including what steps they take or not, and identify potential areas where the implementation process could be improved.

4.2 Methods

While the focus of this current paper is to present the results of a qualitative secondary analysis, as per the reporting guidance of Beck [24], we report the methods of the primary study for context, as well as the methods for this current secondary analysis. We used the Consolidated Criteria for Reporting Qualitative Research checklist (Additional file 4.1) to guide our reporting [25].

4.2.1 Methods for previously conducted primary study

The methods for the primary study, which was one part of a larger mixed-methods evaluation, were detailed in a published protocol [23] and are summarized below.

4.2.1.1 Objectives. The objective of the primary study was to qualitatively explore potential factors that may explain the differences among maternal-newborn hospitals in their use

of the dashboard. Because the purpose of the interviews was to inform the development of a questionnaire for all Ontario maternal-newborn hospitals to measure the identified factors, the interview data were never prepared for publication.

4.2.1.2 Design. The primary study used a qualitative descriptive design [26].

4.2.1.3 Sample. A criterion-based approach [27] was used to identify a purposeful sample of obstetrical managers and directors at maternal-newborn hospitals in Ontario, Canada, reflecting different birth volumes, acuity levels, geographic locations, and engagement with the dashboard. Obstetrical managers and directors were targeted due to their knowledge of clinical practice, quality improvement processes, and dashboard use at their organization. A total of 34 individuals were invited by email: three declined participation, nine did not respond, and 22 consented. The researchers assessed for data saturation throughout recruitment, data collection, and analysis. Recruitment stopped when interviews did not lead to new information [28].

4.2.1.4 Data collection. The original research team developed a semi-structured interview guide (Additional file 4.2) informed by the Promoting Action on Research Implementation in Health Services (PARIHS) framework [29], the Organizational Readiness for Knowledge Translation (OR4KT) tool [30, 31], and the Knowledge-to-Action framework [32]. The interviews were conducted between November 2014 and March 2015 by one of two female research staff (master's-prepared research coordinator with expertise in quality improvement; research assistant with maternal-newborn nursing experience). Both interviewers had qualitative research experience and were trained by the study investigators. The interviewers did not have a prior relationship with study participants. The interviews, which lasted an average of 34 minutes (range of 17 minutes to 49 minutes), were completed by telephone and audio-recorded. Interviews were transcribed verbatim by a transcriptionist and verified by the research team.

4.2.2 Methods for current secondary analysis of primary study

4.2.2.1 Objectives. The objectives of this current secondary analysis were to: (1) describe maternal-newborn teams' approaches to implementing practice changes; (2) identify the implementation steps and activities that teams do and do not take; and (3) identify any strengths and potential areas for improvement based on best practices in implementation science.

4.2.2.2 Design. The study we report here is a supplementary analysis [33]. Specifically, we conducted a more detailed analysis of one component of the dataset (i.e., approaches to implementing practice changes) that was not the focus of the primary study [33].

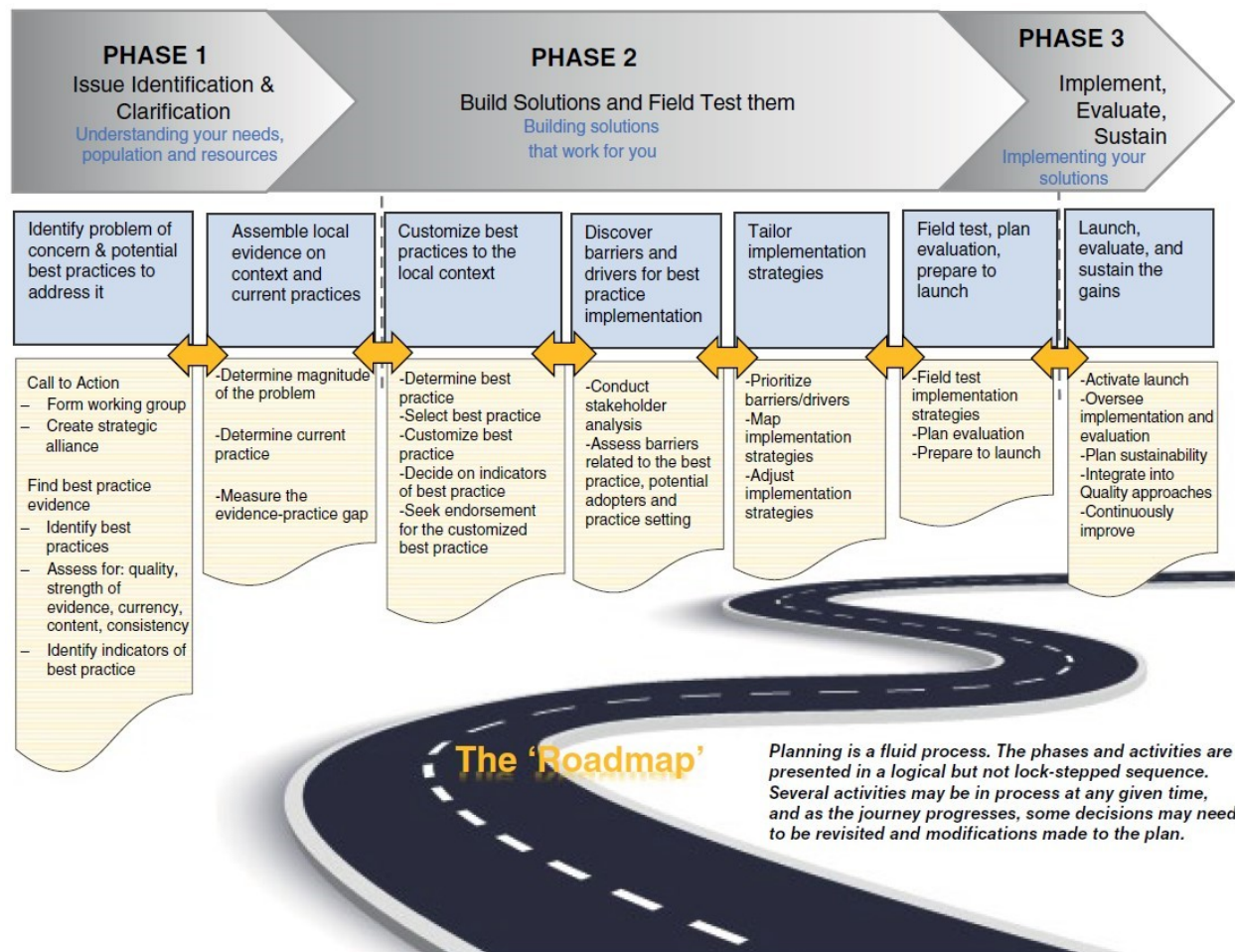
4.2.2.3 Researchers' relationship to the primary dataset. The lead researcher for this secondary analysis (Reszel) was a research coordinator for the overall evaluation study [23], but was not directly involved in the collection or analysis of the primary dataset. The co-principal investigator (Dunn) and a co-investigator (Graham) from the primary study were involved in this secondary analysis and provided contextual and methodological details as needed.

4.2.2.4 Data used. We obtained permission from the co-principal investigator of the primary study (Dunn) and research ethics board approval to access the de-identified transcripts. Aggregate demographic information was provided for contextual information. We did not collect any new supplementary data.

4.2.2.5 Assessment of quality and fit of dataset for secondary analysis. Of the 22 interviews, 21 transcripts were available. There was no transcript for one interview due to the audio-recorder malfunctioning; however, detailed notes from this interview were available. There were specific questions in the semi-structured interview guide focused on participants' usual practice change processes (questions 6-11 in Additional file 2), providing a rich dataset to

assess if and how these practice change processes aligned with best practices in implementation science.

4.2.2.6 Data analysis. We conducted a directed content analysis [34], using NVivo12 Pro for data management [35]. We used an implementation framework, the Implementation Roadmap [36], as the initial coding scheme. As a “planned action” framework [18], the Implementation Roadmap provides comprehensive guidance to facilitate implementation, presenting the necessary steps and activities to effectively plan and execute implementation projects [36]. It was therefore anticipated that coding according to the Implementation Roadmap would provide insight into the comprehensiveness of the teams’ approaches and highlight which steps were being taken or not. The initial coding scheme included the seven steps in the Implementation Roadmap, namely: (1) identify the problem of concern and potential best practice; (2) assemble local evidence on context and current practices; (3) select and customize best practice to local context; (4) discover barriers and drivers for best practice implementation; (5) tailor implementation strategies; (6) field-test, plan evaluation, prepare to launch; and (7) launch, evaluate, and sustain the gains (Figure 4.1).

Figure 4.1 The Implementation Roadmap

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Each transcript was read in its entirety and coded by one team member (Reszel). Text was coded to the Implementation Roadmap steps where possible and frequency counts presented. Any content that could not be coded to the Implementation Roadmap was assigned a new code. For instance, we coded examples of engagement using the applicable levels described by Manafò et al (e.g., inform, consult, involve, collaborate) [37]. The codes were grouped into broader categories. The coder (Reszel) met weekly with one other team member (Graham), who was the

developer of the Implementation Roadmap, to discuss the coding and emerging trends. Once coding was completed, another team member (Daub), who has expertise in knowledge translation and implementation, reviewed all coded transcripts for accuracy and comprehensiveness. Throughout this review, the coders (Reszel, Daub) met to discuss the coding and categories and to reach consensus. The coding of the transcripts was subsequently updated. The coding review did not result in any changes to the coding scheme.

Finally, a summary of the analysis was presented to and discussed by the broader research team, which included a parent representative (Pervez), clinicians (Cassidy, Dunn, Lightfoot, Quosdorf), hospital intermediaries (Hafizi, Wood), and implementation science experts (Cassidy, Dunn). This discussion served to confirm and challenge the analysts' interpretation and informed the final presentation of results.

4.2.3 Author positionality

Before presenting the results, we briefly describe our positionality. Our team includes healthcare providers and leaders, pregnant people and parents, intermediaries, and researchers of maternal-newborn care, with many of us having experience in multiple domains. We believe that the care provided to pregnant and birthing people should be informed by the best available evidence. We recognize it can be challenging to implement evidence-informed practices, but we believe that these challenges can be overcome and that maternal-newborn teams should be supported to develop the knowledge and skills to apply evidence in practice. This position influenced the question we chose to investigate, and our professional and lived experiences informed the interpretation of our findings.

4.3 Results

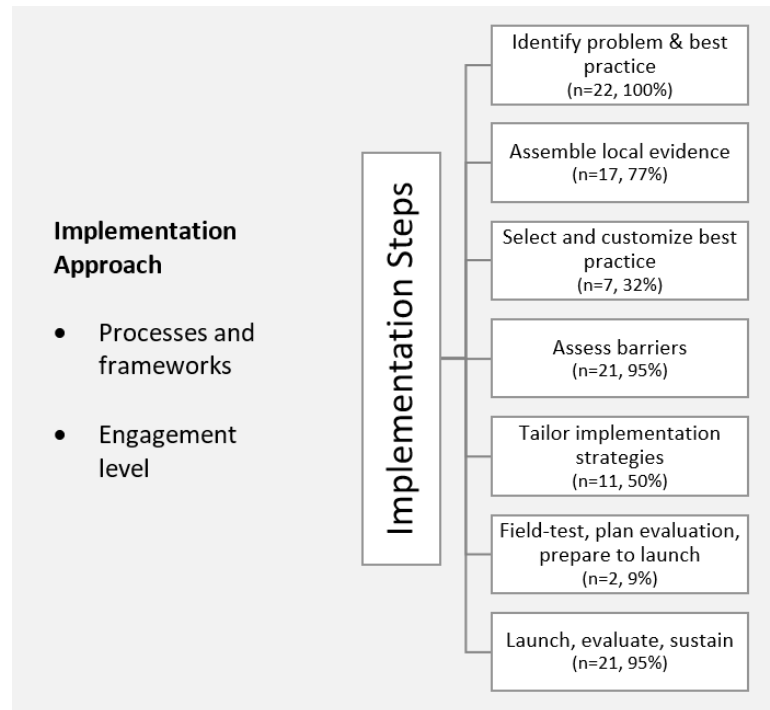
Participants came from diverse hospital settings in Ontario, representing different professional roles, levels of care, and birth volumes (Table 4.1).

Table 4.1 Demographic information of interview participants (N=22)

Characteristic	n (%)
Participant role	
Clinical Manager	10 (45)
Director or Senior Leader	8 (36)
Quality Improvement Lead (RN)	3 (14)
Clinical Nurse Specialist	1 (5)
Hospital level of maternal-newborn care*	
Low risk (level 1)	6 (27)
Moderate risk (level 2)	13 (59)
High risk (level 3)	3 (14)
Number of births per year	
≤500	5 (23)
501-2499	7 (32)
≥2500	10 (45)

**As per the Provincial Council for Maternal and Child Health (PCMCH) Perinatal, Birthing and Newborn Levels of Care Guidance Document [38]*

We present our results under two main categories: (1) implementation steps, including the seven steps in Implementation Roadmap [36], and (2) implementation approach, including processes/frameworks and engagement level (Figure 4.2).

Figure 4.2 Organization of study findings

4.3.1 Implementation steps

Across the sites, there were examples of each Implementation Roadmap step (Figure 4.3). The most frequently described steps were identifying the problem and potential best practice (n=22, 100%); assembling local evidence (n=17, 77%); and identifying barriers and drivers (n=21, 95%). The least frequently described steps were selecting and customizing the best practice (n=7, 32%) and field-testing, planning evaluations, and preparing to launch (n=2, 9%). Participants described using a median of 4.5 out of the 7 implementation steps (range of 3 to 7). One participant mentioned all seven steps in their interview.

Figure 4.3 Implementation steps by hospital site

	Hospital																						Total (n, %)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Identify problem of concern and potential best practice	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	22 (100)
Assemble local evidence on context and current practices		x	x	x	x	x		x		x	x	x	x	x	x	x	x	x			x	x	17 (77)
Select and customize best practice to local context						x						x	x	x		x	x	x					7 (32)
Discover barriers and drivers for best practice implementation	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	21 (95)
Tailor implementation strategies				x						x		x	x	x	x	x		x	x		x	x	11 (50)
Field-test, plan evaluation, prepare to launch												x									x		2 (9)
Launch, evaluate, and sustain the gains	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	21 (95)
*Total steps discussed (out of 7)	3	4	4	5	4	5	3	4	3	5	4	7	6	6	5	5	4	6	4	3	6	5	Median = 4.5
Named framework or process						x		x	x	x		x	x			x				x		x	9 (41)

**Discussed does not mean it was done optimally; but there was at least a general mention of the step*

4.3.1.1 Identify problem of concern and potential best practice to address it. All

participants (n=22) described how their teams came to identify a potential practice problem that needed to be addressed. The problem was identified through provincial, regional, or organizational priorities or mandates; emerging evidence learned through conferences, publications, and guidelines; seeing a red signal on their dashboard; and through seeing how their practice rates compared to other hospitals:

“The thing that actually drove the change wasn’t the evidence, it wasn’t the talking or creating a need, it was ‘okay, here we are, we’re red [on the dashboard] and this is embarrassing’...now we’re being compared to other people and how we fit in and it wasn’t pretty.” (Participant 5)

About one-third of participants (n=7, 32%) discussed how they identify potential best practices that could address the problem. Sources included research literature, clinical practice guidelines (e.g., Registered Nurses’ Association of Ontario [RNAO], Society of Obstetricians

and Gynecologists of Canada [SOGC]), and evidence from obstetrical safety training programs (e.g., MORE^{OB}).

Only one participant mentioned appraising the evidence underlying the potential best practice.

4.3.1.2 Assemble local evidence on context and current practices. Most participants (n=17/22, 77%) gave at least one example of how they learn about their current practice and the context in which the practice is occurring. This assessment occurred by collecting data and team experiences and impressions. Participants mentioned local data sources such as the BORN data registry and the dashboard, abstracted data from decision support, chart audits, and informal discussions with staff.

“You have subjective impressions of ‘we have a problem here; we know we do too many social inductions.’ You get that subjective perspective from staff and physicians but what the data does is make it clear. There’s no arguing with: here’s how many you did, right?”
(Participant 10)

Participants described how they used different data sources to “drill down” to specific cases and explore precipitating factors, leading to a more fulsome understanding of what may be driving current practice (e.g., patient demographics, specific healthcare providers, time of day, data entry).

Finally, two participants (9%) described conducting what would be considered a formal “gap-analysis” to measure the difference between current practice and the best practice they are targeting (i.e., the evidence-practice gap).

4.3.1.3 Select and customize best practices to local context. One-third of participants (n=7/22, 32%) discussed how their teams select and customize the best practice for their setting. While no participants described a structured process for selecting the specific best practice to be implemented, five participants (23%) explained the importance of securing the support or endorsement of others. This support was achieved through sharing the evidence for the best practice in an understandable way, showing how the best practice aligns with provincial and regional priorities, and ongoing discussions to share and resolve concerns, as described by a participant:

“People don’t stay up at night trying to do things wrong, so helping them understand the rationale for *why*—taking that extra time to appraise the research and look at translating that so it’s in simple terms that they would be able to understand why. Sometimes telling them who else has already done it this way helps with the buy-in and engagement as well.” (Participant 6)

One participant described the challenge of working as an interprofessional team where different professions rely on and value different sources of evidence, highlighting the need for a tailored approach to build support for the selected best practice. Finally, only one participant described how they customized the best practice, providing the example of modifying the recommendation to make it more achievable in their setting. There were no examples of teams customizing the best practice to align with their context by explicitly considering the who, what, how, and when.

4.3.1.4 Discover barriers for best practice implementation. Nearly all participants (n=21/22, 95%) stated they consider potential barriers to implementing the selected best practice. Participants generally described the barriers assessment process as informal, involving

brainstorming among the working group and general discussions with the broader clinical team. Several participants stated they were just familiar with the “usual” barriers based on their previous experience, resulting in a barriers assessment not being repeated for the current practice change initiative.

Three participants (14%) described a more systematic approach to assessing barriers, detailing specific steps they take to identify barriers and the application of a framework:

“When you do your root cause analysis you always look at opportunities and barriers. So it’s a SWOT [Strengths, Weaknesses, Opportunities, Threats] analysis, right? What are we doing well? What are we not doing well? What can we improve on? And then what are we anticipating from a change perspective is going to be a barrier? Who do we have to engage to eliminate that?” (Participant 10)

No participants described assessing which barriers are feasible to address or prioritizing which barriers to target for the most impact.

4.3.1.5 Tailor implementation strategies. All participants (n=22) provided examples of strategies they use to implement practice changes in their settings (i.e., implementation strategies). In total, participants identified 14 different implementation strategies, with the most frequently mentioned being meetings and discussion, interprofessional teamwork, and staff education, training, or coaching (Table 4.2).

Table 4.2 Implementation strategies used by study participants to implement practice changes

Implementation strategies	n (%)
Meetings and discussion	20 (91)
Interprofessional teamwork	18 (82)
Staff education, training, coaching	16 (73)
General communication and information sharing	15 (68)
Learning from other sites	15 (68)
Champions	14 (64)
Audit and feedback	11 (50)
Engaging quality improvement (QI) or implementation expert	9 (41)
Developing policies and guidelines	9 (41)
Service re-organization	9 (41)
Patient education and engagement	6 (27)
Relationship building	6 (27)
Reminders	6 (27)
Equipment	1 (5)

Half the participants (n=11, 50%) indicated they take some steps to tailor the implementation strategies, either by tailoring them to identified barriers or by tailoring them to the local context. Five participants (23%) gave examples of how they consider the identified barriers when choosing which implementation strategies to use. For example, one participant described how they changed the days they were offering a specific clinical service to address an identified barrier to meeting best practice guidelines:

“A perceived barrier was that physicians couldn’t get a scheduled time for their cesarean section after 39 weeks so they were doing them earlier. We thought okay, that’s a barrier that we were really only doing elective sections from Monday to Friday. So we’re working at removing that barrier by doing a bit more planning with anesthesia to plan the cesarean section on a weekend.” (Participant 21)

Seven participants (32%) indicated that they take some steps to tailor the implementation strategies to the local context. For instance, some participants described how instead of “recreating the wheel” they looked to strategies used by other sites and adapted them to fit with their local culture and ways of doing things.

4.3.1.6 Field-test, plan evaluation, prepare to launch. Two participants (9%) described piloting or trialing their change initiatives prior to full-scale implementation. These “tests of change” were described as an important way to engage a core group of key supports and gather their feedback on what works and what does not. This information was then used to adjust the selected strategies prior to broader implementation:

“And then being willing to trial something rather than implement something and just say ‘this is how it is.’ So we’ve adapted to try an idea and then if it doesn’t work, adjust it to what we’ve learned from that experience.” (Participant 12)

No participants described developing an evaluation plan prior to implementation or completing a pre-launch assessment.

4.3.1.7 Launch, evaluate, and sustain the gains. Nearly all participants (n=21, 95%) stated they engaged in some form of evaluation and/or sustainability activities. The most frequently described activity was monitoring adherence to the best practice. Eighteen participants (82%) described how they monitored their practice change initiative over time by using tools such as the BORN data registry and the dashboard to track changes in rates and colored signals. This monitoring data could be used to assess whether the implementation strategies were effectively bringing about the desired change, or if the strategies needed to be adjusted or boosted:

“The BORN data lets us know exactly where we’re sitting, how big the problem is, and when you can pull it month-to-month you can kind of get a glimpse as to: are we making any improvements in the interventions [best practices]? We rolled out a signed consent for formula supplementation—did that make any difference in our rates? The lunch and learns that we do around supplementation and around breastfeeding issues and techniques—are they making any difference?” (Participant 13)

Participants described how the monitoring results were shared with staff via meetings and posting on unit boards and communicated to leadership (e.g., division chiefs) and committees (e.g., quality and safety committees). However, some participants described the challenge of monitoring changes without access to timely data. Fewer participants described undertaking process evaluations or impact evaluations, with only one participant stating they also evaluate process indicators and patient outcomes.

Many participants (n=16, 73%) stated that they were taking steps to ensure the sustainability of their practice changes. Examples of sustainability strategies included partnering with healthcare providers from the onset to secure their buy-in; making organizational changes that entrench the change in day-to-day work; ongoing monitoring for non-adherence; and maintaining ongoing communication with the team about the practice change. As described by one participant:

“We’re measuring it consistently and communicating that back to the clinicians: the physicians, the nurses, the midwives. What works well is if you measure it, people pay more attention to it. So that will definitely be one of our initiatives to make sure that it is sustained.” (Participant 15)

4.3.2 Implementation approach

4.3.2.1 Processes and frameworks. Nine participants (41%) named at least one formal process or framework they used to guide their change process. These processes and frameworks included Lean (n=5), Plan-Do-Study-Act (PDSA) or Plan-Do-Check-Act (PDCA) (n=5), Baby Friendly Initiative (BFI) steps (n=3), project management (n=1), as well as theories such as adult learning theory (n=1) and change management theory (n=1). One participant described the benefit of having a consistent process that is applied across different practice change initiatives to help the team understand the steps:

“It [previous practice change initiative] was a good exercise to go through with the staff...when it came time to launch our next project, they’re understanding it’s the same—we’re going to follow the same model.” (Participant 12)

Another nine participants (41%) stated that their organization did not use a formal process or framework to guide the change process, with one participant stating they “fly by the seat of [their] pants” (Participant 2). The remaining participants (n=4, 18%) stated their organizations do use a formal framework to guide practice changes, but they were not able to name it, as expressed by one director:

“I’m sure if you talked to somebody else, they could tell you what our actual change management tool is that we use. I just don’t have a good handle on that this morning, but it’s the basic principles that everyone else uses.” (Participant 4)

4.3.2.2 Engagement level. Five participants (23%) gave examples that indicated their level of engagement with point-of-care staff was meant to inform staff of the changes. This tended to be one-way communication from the working group to point-of-care staff about what decision was made and how it will be implemented. For instance, when asked if clinical staff

offer their opinions on practice changes, one manager stated: “No, I don’t think so. We just made an executive decision around what we thought would help” (Participant 18).

Over three-quarters of participants (n=17, 77%) provided examples of two-way exchanges with point-of-care staff during the implementation process. Participants most frequently provided examples of how they *consulted* with point-of-care staff (n=12, 55%), for example, by asking for suggestions on what practice changes to prioritize or soliciting input on how the change process is working. These consultations occurred through formal ticket systems (i.e., staff submit ideas and suggestions), meetings and huddles, emails, and informal conversations.

Other participants (n=6, 27%) described *involving* point-of-care staff (and in one case, patient advisors) in the change process through their involvement in unit committees and councils, as described by one participant:

“We have a patient and family-centered care steering committee, which is comprised of both hospital employees and patient advisors, and we solicit their input quite frequently with different actions that we need to take.” (Participant 13)

Two participants (9%) described *collaborating* with point-of-care staff by including them in the core implementation working group as equal partners in the process:

“They’re [clinical staff] part of the working group, so they participate in the change. They contribute in terms of the root cause identification, in terms of ideas, problem solving, what do they want to try, what do they think will work, what are the barriers. All of that, they’re involved in it.” (Participant 10)

4.4 Discussion

In this study we aimed to explore how maternal-newborn hospital teams implement practice changes in their units. We learned about the usual implementation processes, focusing on what steps teams do and do not take. By comparing the described steps to an implementation framework, the Implementation Roadmap [36], we identified which steps were most frequently discussed (e.g., identifying a problem), which were less frequently discussed (e.g., selecting and adapting evidence, evaluation), and which were discussed frequently but not optimally (e.g., barriers assessment). We identified many strengths, including efforts to work through varied implementation steps, the depth of experiential knowledge, and efforts to engage point-of-care staff. By noting gaps in the implementation process, we identified potential areas where further capacity development and support may be needed.

Across the 22 sites, only one participant described all seven steps, with most describing four or less steps, potentially signaling that sites' implementation processes are not comprehensive. Although we do not know what the sites' implementation outcomes were (and therefore cannot make inferences about the effectiveness of the different approaches), our previous work identified that teams who were successful in their practice change initiatives were more likely to have used a formal framework (like the Implementation Roadmap) to guide their implementation process [39]. Furthermore, we identified variability across the sites regarding which implementation steps are taken. This is consistent with other studies that have reported differences in what, when, and how implementation steps are taken [40, 41]. There are several potential explanations for this variability. First, we expect that the nature of the change (e.g., size, complexity) may influence the number of steps that teams take, with smaller, simpler changes resulting in fewer steps taken. Second, the urgency of a change may prevent some steps

from being taken (e.g., field-testing), such as when units are required to implement changes immediately due to organizational or provincial mandates (as we recently observed during the COVID-19 pandemic). Third it is likely that the education and training experience of the implementation leader influences the process used. In our study, participants were predominantly nursing leaders who would have been trained in nursing clinical practice. Despite nurses frequently being tasked with improvement work, implementation practice and quality improvement are not typically included in nursing education programs and there are few opportunities for ongoing professional development in these areas [42, 43]. There is a need to better equip nurses with implementation science knowledge and skills to better position them to translate evidence-informed practices into care [44].

Some of the most frequently identified implementation steps were identifying a problem and best practice, assembling local evidence, and monitoring and evaluation. While it is promising to see so many sites engaging in these steps, it is important to consider how access to the BORN dashboard and registry may have contributed to these high numbers, and thus not necessarily be reflective of what is occurring in the broader maternal-newborn system outside of Ontario. The dashboard facilitates identification of a problem by alerting teams with a colored signal (red or yellow) when best practice is not being met; it assists with learning about current practice by allowing users to drill down into specific cases to explore factors that may be driving the observed rates; and it allows users to monitor changes over time by observing changes in their rates and colored signals [23, 45]. Other settings may not have access to a similar data system that has been designed to facilitate and improve care; rather, many teams rely on data systems designed for collecting data for clinical and administrative purposes, rather than monitoring and evaluation purposes [46, 47]. While our findings speak to the value of a

dashboard for facilitating specific steps in the implementation process, our findings also highlight the need for teams to actively engage in implementation steps *beyond* using a dashboard. For instance, although many participants reported monitoring their dashboard (a largely passive activity), no participants described developing an evaluation plan beforehand and only one participant described undertaking a process and impact evaluation. More attention to active evaluation planning, consideration of broader outcomes (e.g., implementation outcomes, service outcomes, and client outcomes [48]), and resources to support evaluation are needed to better assess the effect of the practice change initiatives.

Although assessing barriers was one of the most frequently mentioned steps, study participants rarely described a comprehensive or theory-based approach, with some relying on experiential knowledge of barriers acquired through past projects. While the application of tacit knowledge is particularly useful in familiar situations [49], each practice change initiative is unique and relying on knowledge gained through past projects alone risks missing opportunities to learn about other relevant, current factors. In addition, few participants described selecting their implementation strategies based on the identified barriers or evidence. This challenge has been described elsewhere, with teams selecting strategies based on familiarity or the ISLAGIATT (“it seemed like a good idea at the time”) principle [50, 51]. While participants provided some examples of implementation strategies, it is important to note that this list is not exhaustive compared to the wide-ranging implementation strategies identified in the literature [52]. In our study, the most frequently identified implementation strategies were educational in nature, which aligns with previous literature [53, 54]. However, the barriers to practice change are often multi-factorial (e.g., at the individual, interpersonal, organizational, and system level), going beyond individual knowledge deficits. This requires implementation strategies that are

tailored to the change being implemented, the identified multi-level barriers, and the implementation context [55]. Given there is evidence to suggest that tailoring implementation strategies to identified barriers can positively influence practice changes [56], there are opportunities to build further capacity in this area.

Less than half of participants named a process or framework that they use to guide the implementation process. Several study participants stated they used a framework or process but could not name it. Of those that did identify a process or framework, no one identified a comprehensive implementation framework (e.g., planned action framework [18]) that guided the full implementation process. Unsurprisingly, the most frequently identified processes and frameworks were grounded in quality improvement approaches (e.g., Lean, PDSA). Recently, there has been increased interest in the intersection between quality improvement and implementation science, with calls for the two complementary fields to better align [57, 58]. Adding implementation science to existing quality improvement approaches may have several benefits including an increased emphasis on using evidence-informed practices and a focus on applying theory-driven and systemic approaches to assessing determinants of practice and selecting implementation strategies [36]. We assert that implementation science can enhance (not replace) these existing quality improvement approaches and tools, providing a systematic and comprehensive approach for teams.

We identified examples of how teams engaged point-of-care staff to varying degrees in the implementation process, with most providing examples of two-way exchanges between the implementation working group and staff. Governance structures such as unit councils were identified as a means to facilitate this engagement. The COVID-19 pandemic may have resulted in changes to shared governance, with clinical priorities quickly shifting and “nonessential”

activities such as council meetings sometimes suspended [59]. Because our data were collected pre-pandemic, it is unknown what shared governance structures remain in place and how this may have changed staff engagement. Our future work will explore the existing shared governance infrastructure and how it is used to facilitate engagement of point-of-care staff in the implementation process. While our study provided many examples of how point-of-care staff are engaged in practice changes, only one study participant described engaging patients or families and six described using patient education and engagement as an implementation strategy. Given the limited examples of engaging patients in the working group itself, there remain opportunities for earlier partnership with patients in the implementation process. Indeed, patients and caregivers can contribute meaningfully to the implementation process and can be a powerful motivator for changes [60].

4.4.1 Limitations and strengths

We acknowledge this study has several limitations, many of which are inherent to conducting a secondary analysis. The interview questions were not designed to probe for the different Implementation Roadmap steps. The results need to be interpreted with caution; a participant not describing a step may in fact reflect a lack of precision in the interview questions, rather than an indication that the participant did not do it, or lacks the knowledge or skills to do it. Conversely, a participant stating they completed a step does not necessarily mean it was actually completed (or completed optimally). In addition, implementation science continues to grow yearly, and it is possible that at the time of the interviews, participants may not have had access to the same implementation language to articulate the Implementation Roadmap steps. However, implementation science has not been well translated to practice-based settings [9, 10, 43], and so this challenge would likely remain if the interviews were conducted today. To

mitigate this challenge, we were liberal with our coding and coded according to participants' descriptions, regardless of the specific terms used.

Next, our results may be influenced by social desirability bias, whereby participants shared information they perceived as socially acceptable, rather than sharing information that reflects their true reality [61]. For instance, some participants may have attempted to describe a more thorough implementation process than is actually used in practice. Brief or vague answers may be an indication of social desirability tendencies [61]; we were therefore attentive to this in our analysis, identifying where participants provided short answers without any elaboration on when or how the step is actually performed and highlighted this in our results (e.g., barriers assessment). However, social desirability was likely not an issue across all participants, as some did explicitly acknowledge their lack of awareness or completion of some steps.

Finally, it is important to acknowledge that at the time of analysis, the data were eight years old and these results may not reflect implementation practice in maternal-newborn hospitals today. To mitigate this limitation, each member of our research team was involved in interpreting the data, many of whom are clinicians embedded in maternal-newborn care. Based on our collective experience, and the knowledge that practice changes slowly [62], these findings would likely still ring true today. These results are being used to develop a survey to distribute to all Ontario maternal-newborn hospital units to learn about what Implementation Roadmap steps teams are currently taking, their confidence completing them, and their perception of their importance. The results we report here are informing the development of survey questions to probe identified gaps and to tailor the question wording to align with local language. The upcoming survey will complement this qualitative secondary analysis by providing updated data from a wider sample of hospitals, allowing us to better understand what gaps and needs remain.

Conducting a secondary analysis also offered several strengths. Given the current demands on our health system and its leaders, we may not have been able to enroll the same number of study participants in today's conditions. Given the sufficient fit between the original dataset and our question, conducting a secondary analysis eliminated the participant burden that would have been required to collect new qualitative data from busy clinicians and administrators [24]. Another strength of our study was the application of a recent evidence-informed framework (Implementation Roadmap [36]) that synthesizes theoretical and experiential knowledge in implementation science and practice, allowing us to interpret the data in a new light and identify future areas for research and practical support. Finally, our study makes a unique contribution to the literature by describing and comparing the implementation approaches of many maternal-newborn teams. With data from 22 sites (about one-quarter of birthing hospitals in the province), our sample provides insight into the implementation processes of diverse teams, highlighting commonalities and differences. These insights serve as potential areas to focus future implementation capacity-building efforts in maternal-newborn health services.

4.5 Conclusion

Overall, we observed variability in the reported implementation processes used by 22 maternal-newborn hospital units. While participants provided many examples of steps and activities they use to implement practice changes, we identified several areas where teams may need additional support. These results provide a foundation for future work to explore current implementation practice in maternal-newborn hospitals and will inform the development of tailored practice change resources, informed by implementation science, for maternal-newborn healthcare providers and leaders.

4.6 Declarations

4.6.1 Ethics approval and consent to participate

Ethics approval for the secondary analysis reported in this paper was obtained from the University of Ottawa Research Ethics Board (H-11-22-8739). The Children's Hospital of Eastern Ontario (CHEO) Research Ethics Board (#13/218X) and the University of Ottawa Research Ethics Board (A01-14-03) approved the primary study. Prior to starting the interview, a research staff reviewed the study information letter with each participant and obtained their verbal informed consent. Due to the interviews being conducted by telephone and the low risk to participants, the abovementioned research ethics boards approved the use of verbal informed consent. All methods were carried out in accordance with relevant guidelines and regulations.

4.6.2 Consent for publication

Not applicable.

4.6.3 Availability of data and materials

The dataset used in this secondary analysis (i.e., interview transcripts) are not publicly available due to them containing information that could compromise research participant privacy/consent, but they are available from the corresponding author on reasonable request.

4.6.4. Competing interests

The authors declare no competing interests.

4.6.5 Funding

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4.8 Additional files

Additional File 4.1 Completed reporting checklist - Consolidated criteria for reporting

qualitative research (COREQ)^a

	Item #	COREQ Item and Guide questions / description	Reported in section
Domain 1: Research team and reflexivity			
Personal characteristics	1	Interviewer/facilitator: Which author/s conducted the interview or focus group?	4.2.1.4
	2	Credentials: What were the researcher's credentials? <i>e.g. PhD, MD</i>	4.2.1.4
	3	Occupation: What was their occupation at the time of the study?	4.2.1.4
	4	Gender: Was the researcher male or female?	4.2.1.4
	5	Experience and training: What experience or training did the researcher have?	4.2.1.4
Relationship with participants	6	Relationship established: Was a relationship established prior to study commencement?	4.2.1.4
	7	Participant knowledge of the interviewer: What did the participants know about the researcher? <i>e.g. personal goals, reasons for doing the research</i>	-
	8	Interviewer characteristics: What characteristics were reported about the interviewer/facilitator? <i>e.g. Bias, assumptions, reasons and interests in the research topic</i>	4.2.1.4 4.2.3
Domain 2: Study design			
Theoretical framework	9	Methodological orientation and theory: What methodological orientation was stated to underpin the study? <i>e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis</i>	4.2.1.2
Participant selection	10	Sampling: How were participants selected? <i>e.g. purposive, convenience, consecutive, snowball</i>	4.2.1.3
	11	Method of approach: How were participants approached? <i>e.g. face-to-face, telephone, mail, email</i>	4.2.1.3
	12	Sample size: How many participants were in the study?	4.2.1.3
	13	Non-participation: How many people refused to participate or dropped out? Reasons?	4.2.1.3
Setting	14	Setting of data collection: Where was the data collected? <i>e.g. home, clinic, workplace</i>	4.2.1.4
	15	Presence of non-participants: Was anyone else present besides the participants and researchers?	4.2.1.4
	16	Description of sample: What are the important characteristics of the sample? <i>e.g. demographic data, date</i>	4.2.1.3 Table 4.1
Data collection	17	Interview guide: Were questions, prompts, guides provided by the authors? Was it pilot tested?	Additional file 4.2
	18	Repeat interviews: Were repeat interviews carried out? If yes, how many?	-

	Item #	COREQ Item and Guide questions / description	Reported in section
	19	Audio/visual recording: Did the research use audio or visual recording to collect the data?	4.2.1.4
	20	Field notes: Were field notes made during and/or after the interview or focus group?	4.2.2.5
	21	Duration: What was the duration of the interviews or focus group?	4.2.1.4
	22	Data saturation: Was data saturation discussed?	4.2.1.3
	23	Transcripts returned: Were transcripts returned to participants for comment and/or correction?	-
Domain 3: Analysis and findings			
Data analysis	24	Number of data coders: How many data coders coded the data?	4.2.2.6
	25	Description of the coding tree: Did authors provide a description of the coding tree?	Figure 4.2
	26	Derivation of themes: Were themes identified in advance or derived from the data?	4.2.2.6
	27	Software: What software, if applicable, was used to manage the data?	4.2.2.6
	28	Participant checking: Did participants provide feedback on the findings?	4.2.2.6
Reporting	29	Quotations presented: Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? <i>e.g. participant number</i>	4.3
	30	Data and findings consistent: Was there consistency between the data presented and the findings?	4.3 4.4
	31	Clarity of major themes: Were major themes clearly presented in the findings?	4.3
	32	Clarity of minor themes: Is there a description of diverse cases or discussion of minor themes?	4.3

^aTong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *Int J Qual Heal Care*. 2007;19:349–57. doi: 10.1093/intqhc/mzm042

Additional File 4.2 Semi-structured interview guide

1. Do you access the dashboard yourself? If yes, what features do you find the most useful/least useful?

[If no, proceed to Question 3]

Probes:

- a. Dashboard visual data displays such as the dashboard homepage (stoplight signals)?
 - b. Dashboard reports and sub-reports (data tables with numbers, rates confidence intervals, comparator data)?
 - c. Dashboard audit features and functionality (sub-report that links with the record level data entered into the BORN Information System at your site; missing data reports)?
 - d. Key performance indicator definitions (details provided below each of the data tables to clarify inclusion/exclusion criteria for each key performance indicator)?
 - e. Knowledge-to-Action Evidence Summaries (evidence to support each key performance indicator available on the BORN website)?
2. Who else accesses the dashboard? Do you think they share the same sentiment in terms of what they find most and least useful about the dashboard?
 3. If someone else in your organization accesses the dashboard for you, can you comment on the features they find most or least useful?
 4. How is data entered into the BORN Information System at your site (e.g. manual versus electronic medical record, clerk versus clinicians, retrospective versus real-time)?
 5. What problems or barriers have you (or your delegate) encountered using the dashboard?

Probes:

- a. Computer issues with network access to the BORN Information System (e.g. slow system)?
 - b. Lack of resources (e.g. computer stations) and time to enter the data?
 - c. Availability of appropriate staff to enter data and run the reports?
 - d. Staff attitudes, resistance, perceptions about the credibility of the data?
 - e. Other priorities?
6. Thinking of a recent project (if there's one using the dashboard key performance indicators, please use that one), can you tell me a bit about how you plan for this kind of practice change in your hospital? Are there specific structures or processes in place to support change?

Probes:

- a. How did you know there was a practice issue that needed to be addressed? If the project relates to the dashboard, can you tell me how the key performance indicator was selected?
 - Organizational or provincial priorities?
 - Directives from the Chief of Obstetrics or other administrator?

- Degree of difficulty of the practice change issue?
- b. How did you know there was a practice issue that needed to be addressed?
- c. Did you use a framework to guide the change process (e.g. Plan-Do-Study-Act, Knowledge-to-Action cycle, etc.)?
- d. Were barriers to change assessed?
- e. How were the interventions /strategies to solve the evidence-practice gap selected?
- f. Was the change monitored?
- g. What is the current status of this process change?
- h. Were there specific interventions used to ensure sustainability?
- i. What was the outcome of that project?

Thinking of the project you just described to me...

7. Who was involved in the change process?

Probes:

- a. Who was the designated leader responsible for the change?
- b. How did the leader(s) facilitate change?
 - Sent memos, scheduled workshops, gathered the team to discuss the issue
 - Do they normally take a proactive or reactive approach to change?
- c. Champions with responsibility to facilitate change?
- d. Quality or departmental committees that met regularly to discuss practice change issues?
- e. Someone responsible for the different components of the change process (e.g. evidence-practice gap identification, barriers assessment, implementation, evaluation etc.)
- f. Who normally sees the dashboard data? Are your clinicians informed about the dashboard key performance indicators?

8. What about *team involvement* in the change process? How did your clinical staff contribute to the change process?

Probes:

- a. Managers solicited opinions of clinical staff regarding practice change issues?
- b. Discussed practice change issues at team meetings?
- c. The team routinely works together to formulate action plans and monitor performance?

9. Were there different *inter-professional perspectives* evident for this practice issue? If yes, was there a formal process used to work through the inter-professional differences? Please describe the process.

Probes:

- a. If there was a practice issue that touched both physician and midwifery practice, for example, how were decisions made about priorities or strategies for change?
- b. Would you say decisions were driven by power, structures, or personalities around the table or was there a specific process used to resolve differences?

10. What *organizational supports* are available or have you used to help team members address issues related to practice change? [e.g. dashboard key performance indicator or other practice issues]

Probes:

- a. Internal resources/supports within your organization
 - Champions or other resources/supports you have control over?
 - Formal mechanism to obtain feedback related to proposed change?
 - What resources or supports would be helpful to assist you with practice change?
 - b. External resources/supports from other organizations
 - Access to BORN Coordinators?
 - BORN webinars and training?
 - Resources produced by other organizations (e.g., Provincial Council for Maternal and Child Health (PCMCH) webinars)?
11. **[Only for those with a dashboard example]** Is this change process the same for other projects in your hospital or is there something special about the dashboard?
- a. What about for other key performance indicators?
12. Though we have attempted to be thorough in our questions, is there anything that perhaps we didn't cover that you think would be important to note in terms of use of the dashboard or the key performance indicator data?

Chapter 5: Implementation processes and capacity-building needs in Ontario maternal-newborn care hospital settings: A cross-sectional survey

This chapter was published in *BMC Nursing*. In this study I collaborated with a team of maternal-newborn healthcare providers, hospital intermediaries, a parent representative, and researchers to identify the implementation capacity-building needs of maternal-newborn hospital teams, and their preferences for learning about implementation. Under the guidance of my Thesis Advisory Committee, I led the conceptualization and design of the study, analyzed and interpreted the survey data, and wrote the first draft of the manuscript. The co-authors contributed to conceptualizing and designing the study, and/or analyzing data, and/or interpreting the findings. All co-authors made significant contributions to critically revising this manuscript and approved the final version.

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Abstract

Background

Maternal-newborn care does not always align with the best available evidence. Applying implementation science to change initiatives can help move evidence-informed practices into clinical settings. However, it remains unknown to what extent current implementation practices in maternal-newborn care align with recommendations from implementation science, and how confident nurses, other health professionals, and leaders are completing steps in the implementation process. We aimed to understand Ontario maternal-newborn teams' (1) approaches to implementing practice changes and the extent to which their implementation processes aligned with an implementation science planned-action framework; and (2) perceptions of importance and confidence completing implementation activities.

Methods

We conducted a cross-sectional survey between September-November 2023. Using purposive sampling, we invited Ontario maternal-newborn nurses, other healthcare professionals, and leaders who had experience participating in or leading implementation projects to complete an online questionnaire. The questionnaire was informed by an implementation science framework, which includes three core phases (identify issue; build solutions; implement, evaluate, sustain). The questions probed respondents' perceptions of frequency of completion, importance, and confidence for each of the 28 implementation activities. We used descriptive statistics for the closed-ended questions and grouped the written responses into categories.

Results

We received 73 responses from 57 Ontario maternal-newborn hospitals, the majority being nurses in point-of-care and leadership roles. Nearly all respondents agreed that each of the

28 implementation activities were important. Respondents reported always completing a median of 8 out of 28 activities, with the number of activities completed declining from phase 1 through to 3. Most respondents indicated they were somewhat confident completing the implementation activities and agreed their teams would benefit from increasing their knowledge and skills to use an evidence-informed approach to implementing practice changes.

Conclusions

Despite viewing implementation activities as important, many teams are not consistently doing them and lack confidence, particularly in later phases of the implementation process. These findings inform where further capacity-building and supports may be needed to enable maternal-newborn nurses, other healthcare professionals, and leaders to apply implementation science to their change initiatives.

5.1 Background

Although often a healthy event, childbirth is the most frequent reason for hospitalization in Canada and the United States [1,2]. Given the risk for negative short- and long-term consequences for both the pregnant or birthing person and their infant(s), ensuring that high quality and evidence-based care is provided is essential. Improving maternal-newborn care has therefore become an international priority and there has been a growing focus on the implementation of quality care in these settings [3]. However, evidence-practice gaps remain. For instance, compared to evidence-informed recommendations, there continues to be overuse of practices such as cesarean births, inductions, and formula supplementation [4], among others. This overuse may further strain limited financial and human resources, lead to patient dissatisfaction, and cause physical, psychological, and social harm [5,6].

Closing these evidence-practice gaps requires evidence-based *implementation* [7]. Implementation science aims to develop and test methods and strategies to effectively move evidence into practice [8]. Despite a growing body of literature, implementation science has not been well translated into practice-based settings [9]. This has created a “secondary gap” where healthcare teams can identify the need to implement evidence into practice to improve care and outcomes, but they do not necessarily use evidence to inform the processes they use to implement that evidence into practice [10]. However, there are a growing number of examples of teams successfully applying implementation science informed approaches in maternal-newborn care [11–13] and other settings [14], illustrating the potential of implementation science in improving care processes and outcomes in healthcare settings.

Nurses are frequently tasked with leading and supporting change initiatives, and there are increasing calls for nursing to embrace and apply implementation science in their practice to

further improve evidence-based practice [10,15]. Yet many healthcare providers, including nurses, are not aware of or confident using current evidence on how to implement evidence-based programs, guidelines, or innovations [16]. Nurses and other healthcare professionals are often not exposed to implementation science in their training, and clinical demands, lack of resources and time, and lack of professional development opportunities may preclude them from learning about implementation science and its applications to their work [9,10,17].

Given that capacity for implementation (i.e., whether you have enough people with the right skills), has been identified as one of the key factors for implementation success [18], understanding current implementation practice and implementation capacity-building needs in nursing and healthcare settings is critical to inform future interventions and supports. As a first step to explore this, our research team previously conducted a secondary qualitative analysis of 22 interviews with nursing managers and directors in Ontario, Canada [19], and compared their described implementation approach to an implementation science framework [20]. Overall, there was variability in implementation steps taken across hospitals. Several implementation steps were described infrequently or sub-optimally, suggesting that real-world processes were not as comprehensive as the implementation framework used for comparison [19]. However, limitations of the secondary analysis were the inability to assess the implementation process at a more detailed activity level, and the lack of information about healthcare providers' perceptions of the importance or value of different steps and their confidence completing them. To build on this work, we sought to collect more comprehensive and recent primary data from a broader range of Ontario maternal-newborn nurses, other healthcare professionals, and leaders.

5.1.1 Guiding framework

The implementation framework that guided this study was the Implementation Roadmap [20]. The Implementation Roadmap is a planned-action framework (also known as an implementation process model [21]) that is informed by best practices in implementation science and practice [20]. We chose the Implementation Roadmap as it consolidates concepts and steps from established knowledge translation and implementation frameworks (e.g., Knowledge-to-Action framework [22], CAN-Implement [23]) as well as experiential knowledge from implementation science and practice experts. The Implementation Roadmap was designed to guide professionals, including nurses, through the core phases, steps, and activities of the implementation process (based on best practices in implementation science and practice), making it a suitable framework for exploring the current implementation practices of maternal-newborn teams.

5.1.2 Study aims

In this study we aimed to understand Ontario maternal-newborn teams': (1) approaches to implementing practice changes, including who is involved and which activities are done, and how closely their processes align with an implementation science planned-action framework (the Implementation Roadmap [20]); and (2) perceived importance and confidence completing different implementation activities.

5.2 Methods

We used the Checklist for Reporting Of Survey Studies (CROSS) to guide the writing of this manuscript [24] (see Additional file 5.1 for completed checklist).

5.2.1 Design

We used a cross-sectional survey design. This study was exploratory in nature and as such, we did not have pre-existing hypotheses for statistical testing.

5.2.2 Study setting and sampling

The setting for our study was Ontario, Canada, which has over 140,000 births per year. There are 93 hospitals in Ontario that provide perinatal, birthing and newborn care [25], with most of these of births occurring in hospital [26]. Data on nearly every birth is captured in Ontario's prescribed birth registry, the Better Outcomes Registry & Network (BORN) Ontario, which provides important data on maternal-newborn healthcare and outcomes to contributing hospitals, researchers, and policymakers [27].

We used purposive sampling. Using BORN Ontario's internal contact list (which included BORN's primary contacts from 91 out of 93 hospitals), we compiled a list of individuals who were expected to be involved in implementation projects to improve practice, such as directors, nursing managers, clinical nurse educators, and nurses (N=278 contacts across 91 hospitals). While it was anticipated that these contacts would meet the eligibility criteria, if they did not meet eligibility criteria or were unable to participate, we asked them to forward the invitation email to other colleagues (i.e., snowball sampling). We included nearly all Ontario maternal-newborn hospitals in our sampling frame (n=91) and aimed to collect at least one response from each hospital. To assess the representativeness of the sample, we compared the acuity levels and geographical locations of the responding organizations to the distribution across the province as a whole (Additional file 5.3).

We followed Dillman's guidelines for survey distribution and reminders [28,29], with recruitment occurring over a nine-week period (September to November 2023). Contacts

received a “pre-notice” email from their designated BORN coordinator, providing an alert about the upcoming questionnaire from a known contact. The lead researcher then sent the survey email invitation and two email reminders (at 2 weeks and 4 weeks) to all contacts. Lastly, the internal BORN coordinators did a final personal telephone or email reminder (as per their usual communication methods) to their non-responding contacts.

5.2.3 Inclusion and exclusion criteria

The inclusion criteria were individuals who: (1) work in an Ontario maternal-newborn hospital unit (i.e., labour and delivery, postpartum, neonatal intensive care unit, or special care nursery); (2) are responsible for leading, supervising, or participating in implementation projects, quality improvement projects, or practice change initiatives in their current role; and (3) read and understand English.

5.2.4 Instrument

Because there was no existing validated questionnaire that met our needs, the research team developed the questionnaire, informed by two main sources.

First, we used the Implementation Roadmap activities, which are spread across three main phases: phase 1 involves issue identification and clarification; phase 2 involves building solutions and field-testing them; and phase 3 involves implementing, evaluating, and sustaining [20]. The activities in this framework became a series of 28 questionnaire items to understand which are viewed as important, which are typically done, and which activities respondents feel confident completing (Table 5.1). We slightly modified the breakdown and wording of the Implementation Roadmap activities to better align with language used by nursing managers and directors in our previous interviews with a similar sample [19] and to increase understandability

based on team feedback. The developer of the framework was involved in this process and ensured the integrity of the framework’s activities was maintained.

Table 5.1 Implementation Roadmap activities as presented in questionnaire

PHASE 1 – Issue identification and clarification 1. Identify a relevant problem or issue 2. Form a working group 3. Involve stakeholders as partners throughout change initiative 4. Create a formal implementation plan 5. Use research evidence to identify potential programs, guidelines, practices, or innovations to solve problem 6. Assess the quality of the program, guideline, practice, or innovation 7. Identify or create a tangible indicator of best practice 8. Collect local data to learn about current practice in your setting 9. Compare current practice in your setting to the best practice to determine how big the “gap” is
PHASE 2 – Build solutions and field test them 10. Work as a team to select the best practice to be implemented 11. Analyze best practice for who needs to do what, when, to whom, and under what circumstances 12. Confirm that key stakeholders endorse the selected best practice 13. Customize the selected best practice for your setting 14. Conduct a stakeholder analysis 15. Assess the barriers and drivers to implementing the best practice 16. Prioritize the identified barriers that are feasible to address 17. Select change strategies to address the identified barriers 18. Field-test the selected change strategies 19. Create a plan for a process evaluation 20. Create a plan for an outcome evaluation
PHASE 3 – Implement, evaluate, sustain 21. Complete a pre-launch checklist 22. Create a sustainability plan 23. Use data to assess if the best practice is being used 24. Use data to assess if use of best practice resulted in the desired outcomes 25. Use the monitoring and evaluation findings to adjust the change strategies 26. Use strategies to sustain use of the best practice over time 27. Use data to assess if sustainability strategies are maintaining use of best practice
Throughout implementation process 28. Consider equity, diversity, and inclusion (EDI)

Second, we used our findings from a previous secondary qualitative analysis of interviews with maternal-newborn nursing leaders [19] to identify areas for exploration in this current survey. Our previous study identified the need to better understand the specific roles involved in the various implementation phases, the mechanisms for engagement, and considerations for equity, diversity, and inclusion (EDI); we included these topics in the questionnaire used in this study to probe these areas.

The research team, which included experts in nursing, implementation science, and implementation practice, reviewed the study questionnaire to assess its face validity. The questionnaire was piloted by two maternal-newborn nurses with experience leading implementation initiatives. Changes were made to enhance clarity (e.g., defining terms, including examples), flow (e.g., re-ordering the questions), and functionality (e.g., changing large matrices to individual questions). While feedback suggested the questionnaire was long and may not be feasible for busy healthcare providers and leaders to complete, we made the decision to maintain the length of the questionnaire to facilitate a comprehensive understanding of respondents' views and approaches to implementing practice changes.

The final questionnaire had 159 questions across six parts. Question formats included 135 closed-ended questions (including multi-select, single-select, and rating scale formats) and 24 open-ended questions (including substitution, extension, and expansion questions [30]). This paper reports on the first three questionnaire sections: eligibility screening, demographics, and implementation process and steps (see Additional file 5.2 for full questionnaire).

5.2.5 Data collection

Respondents were asked to complete an online questionnaire hosted in REDCap (Research Electronic Data Capture), a secure, web-based software platform designed to support data capture for research studies [31]. The questionnaire took approximately 20 to 30 minutes to complete. The questionnaire was an “open survey,” meaning there was one generic link for all respondents. To minimize the risk of multiple entries by the same person, we collected detailed demographic information (including hospital name, unit name, and role), which allowed us to identify and remove duplicate entries if needed.

5.2.6 Data analysis

We imported the questionnaire responses into SPSS (version 29) for analysis. We used descriptive statistics for the close-ended questions. We excluded records that did not answer any questions beyond the 28 Implementation Roadmap activities. For nominal and ordinal data, we present frequencies and percentages to show the response distribution across categories. For continuous data, we present measures of central tendency (medians, interquartile ranges [IQR], ranges). For open-ended text boxes, we grouped the written responses into categories and provide frequency counts, where appropriate, to illustrate recurring topics. There was some missing data from respondents skipping questions; we indicate the denominator throughout to make clear the number of respondents and missingness for each question.

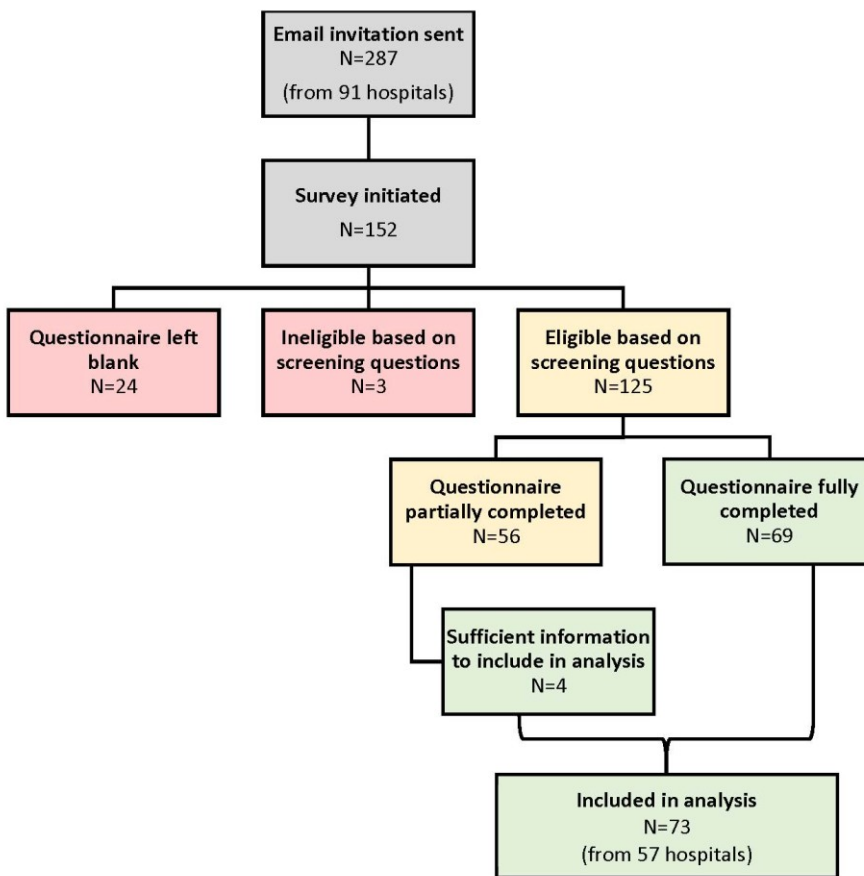
5.2.7 Ethical considerations

This study was approved by the Children’s Hospital of Eastern Ontario (CHEO) Research Ethics Board (protocol #23/59X) and the University of Ottawa Research Ethics Board (H-12-23-9959). The questionnaire homepage included detailed information on the study and consent was implied by starting the questionnaire. The questionnaire included indirect identifiers (e.g.,

hospital name, unit type, role), which together could identify the respondent; however, these were optional. To protect confidentiality, only the required research team members had access to the REDCap database and identifying information was saved in a master list separate from the data.

5.3 Results

Between September 20, 2023 and November 22, 2023, 73 individuals completed the questionnaire. Figure 5.1 presents a flow diagram of the number of responses received and those that were included in this analysis. We obtained a response rate of 26% (73/278). Across the 73 respondents, there was at least one response from nearly two-thirds of Ontario maternal-newborn hospitals (57/91, 63% of maternal-newborn hospitals). There were 13 hospitals that had a response from more than one person; we included these records as the individuals represented different units and/or different professional roles.

Figure 5.1 Response flow diagram

Note: We calculated the individual response rate by dividing the number of questionnaires included in the analysis ($n=73$ questionnaires) by the number of people who received the questionnaire ($n=278$ people) ($73/278$, individual response rate = 26%). We calculated the organizational response rate by dividing the number of maternal-newborn hospitals with at least one response ($n=57$ hospitals) by the number of maternal-newborn hospitals that were contacted ($n=91$ hospitals) ($57/91$, organizational response rate = 63%). We calculated the questionnaire completion rate by dividing the number of questionnaires in the analysis ($n=73$) by the number of questionnaires initiated by eligible individuals ($n=125$ people started the questionnaire) ($73/125$, questionnaire completion rate = 58%).

5.3.1 Demographic and contextual information

Respondents came from a variety of roles and settings (Table 5.2), with the majority being nurses working in various clinical and leadership capacities (n=58, 80.6%). Most respondents identified as women, which is consistent with the distribution of the overall nursing workforce in the geographical region where this survey was conducted [32]. The distribution of geographical locations and acuity levels of the 57 hospitals respondents were from were very similar to that of all maternal-newborn hospitals in the province (see Additional file 5.3 for comparison). Thirty respondents (30/73, 41%) indicated they had training in implementation: 10 reported training in implementation science (10/73, 14%) and 29 reported training in knowledge translation/implementation practice (29/73, 40%).

Table 5.2 Respondents' demographic information

Characteristic	
Gender identity (N=73) – n (%)	
Woman	71 (97.3)
Man	1 (1.4)
Prefer not to answer	1 (1.4)
Professional role (N=72) – n (%)	
Manager	32 (44.4)
Nurse	12 (16.7)
Nurse educator	7 (9.7)
Program director	5 (6.9)
Midwife	5 (6.9)
Quality improvement or implementation support	3 (4.2)
Advanced practice nurse	2 (2.8)
Physician	1 (1.4)
Other (care facilitator; charge nurse; clinical lead)	5 (6.9)
Highest level of education completed (N=71) – n (%)	
College diploma	14 (19.7)
Bachelor's degree	38 (53.5)
Master's degree	18 (25.4)
Doctoral degree	1 (1.4)
Type of maternal-newborn unit respondent works in (N=73) – n (%)^a	
Labour and delivery unit	59 (80.8)
Postpartum unit	53 (72.6)
Neonatal intensive care unit or Special care nursery	25 (34.2)
Level of acuity^b (N=72) – n (%)	
Low risk (level 1)	27 (37.5)
Moderate risk (level 2)	30 (41.7)
High risk (level 3)	15 (20.8)
Geographical region^b (N=72) – n (%)	
Central Ontario	20 (27.8)
East Ontario	17 (23.6)
North East Ontario	8 (11.1)
North West Ontario	6 (8.3)
Toronto Ontario	6 (8.3)
West Ontario	15 (20.8)
Years of experience in maternal-newborn care (N=73)	
Median	17
Interquartile range	12
Range	0-35
Years of experience <i>supervising or leading</i> practice change initiatives or implementation/quality improvement projects (N=61)^c	
Median	5
Interquartile range	8
Range	1-29

Characteristic	
Years of experience <i>participating in practice change initiatives or implementation/quality improvement projects</i> (N=47)^d	
Median	10
Interquartile range	10
Range	1-30

^aRespondents could select more than one response option

^bAs per the Provincial Council for Maternal and Child Health (PCMCH)[25]

^cOnly respondents who indicated they had experience leading or supervising practice change initiatives/implementation projects were asked this question

^dOnly respondents who indicated they had experience participating in practice change initiatives/implementation projects were asked this question

Overall, respondents identified that there was room to improve the quality of care in maternal-newborn settings. Fifty-five respondents (75.3%) felt the proportion of inappropriate care (overuse, underuse, misuse) in Ontario maternal-newborn care settings was about the same as the 30% median reported in a recent national study [33]. Thirteen respondents (17.8%) thought the proportion was higher, reporting a median of 50% (range=38-74%). Five respondents (6.8%) thought the proportion was lower, reporting a median of 20% (range=20-25%).

Respondents (n=69) wrote examples of clinical practice changes they are currently implementing or are planning to implement in the future (see Additional file 5.4 for full list of categories). The most common topics included infant feeding practices (breastfeeding) (n=25, 36%), inductions (n=22, 32%), general education and training initiatives (n=18, 26%), cesarean births (n=16, 23%), internal service re-organization (n=16, 23%), and oxytocin (n=13, 19%).

5.3.2 Implementation process and activities

We present our findings on approaches to implementing practice changes in three main categories: (1) current use of any formal implementation processes and frameworks; (2) individuals involved in implementation efforts, organized by the three Implementation Roadmap

phases; and (3) perceived importance and completion of implementation activities, organized by the 28 activities in Implementation Roadmap.

5.3.2.1 Current use of any formal implementation processes and frameworks. Just over half of respondents reported that their organization either did not have a formal process to facilitate practice changes (n=18/69, 26.1%) or they were unsure whether it had a process (n=17/69, 24.6%). The remaining respondents indicated that their organization had a mandatory process (n=16/69, 23.2%) or an optional process (n=18/69, 26.1%) to facilitate practice changes.

For those who answered they had a mandatory or optional process, respondents briefly described their process. Of the 25 that answered, 11 (44%) identified an approach that typically guides their change process (e.g., continuous quality improvement). Thirteen respondents (52%) described their process as using different committees, meetings, and approval processes. Seventeen respondents also indicated that they used a formal framework, model, or theory to facilitate the change process, the most frequent examples were Plan, Do, Study, Act (PDSA) (n=13), root cause analysis (n=13), and Lean methodology (n=10).

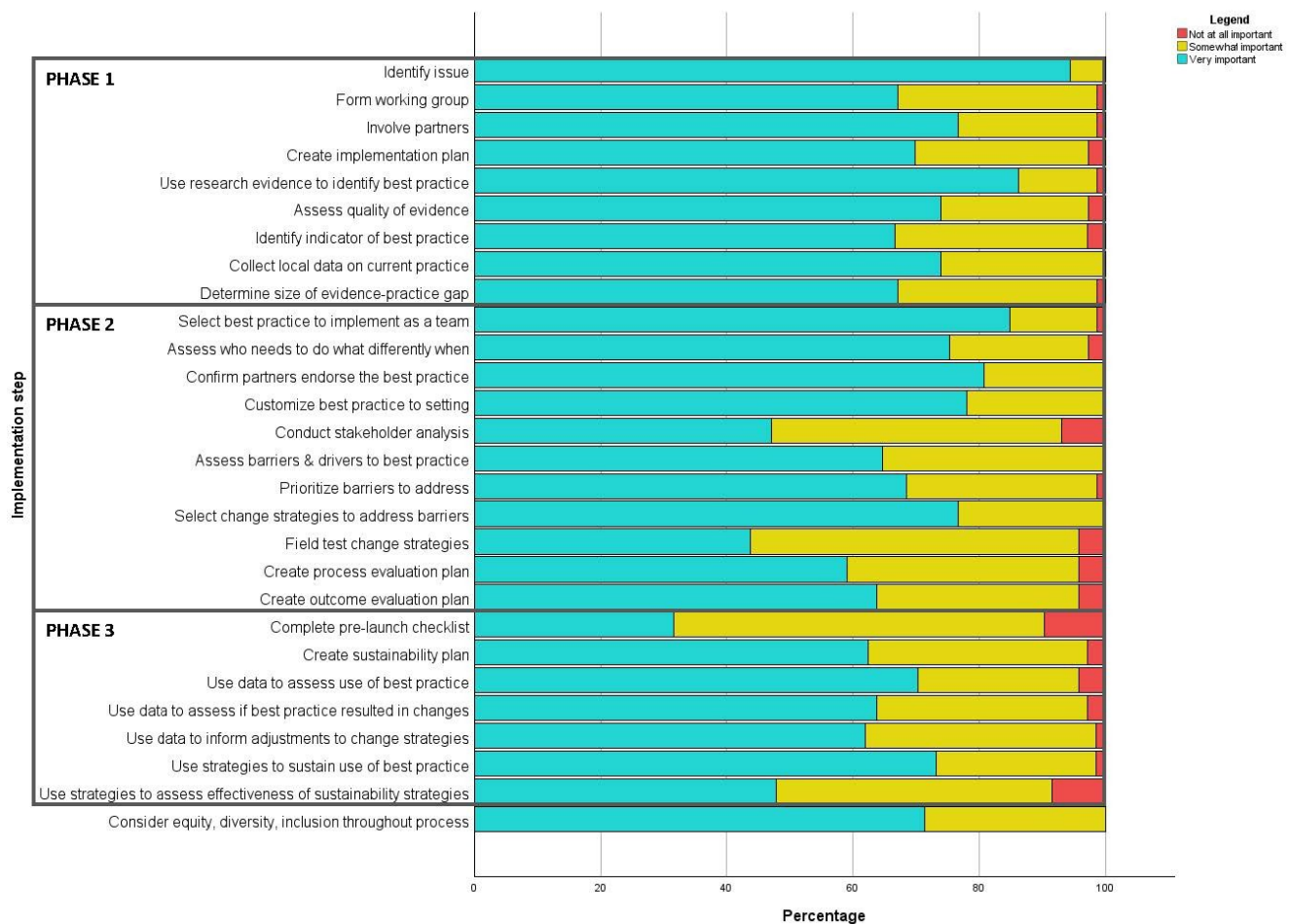
5.3.2.2 Individuals involved in hospital implementation efforts. Respondents reported different roles that are typically involved in the core phases of the Implementation Roadmap (Table 5.3). Nurse managers and clinical nurse educators were most frequently responsible for leading the process. Nurses at point-of-care, physicians, and nurse managers were most frequently involved in identifying the problem to be addressed; nurse managers and clinical nurse educators were most frequently involved in developing the solutions; and clinical nurse educators, nurse managers, and nurses at point-of-care were most frequently involved in implementing the solutions. The number of roles involved varied by phase, slightly decreasing as teams worked through the implementation phases.

Table 5.3 Roles and involvement in core phases of implementation process (N=70)

	n (%)			
	Primarily responsible for leading the overall implementation process	Identifying a problem that needs to be addressed	Developing solution(s) to address the problem	Implementing the solution(s) in practice
Program director – n (%)	21 (30.0)	39 (55.7)	32 (45.7)	16 (22.9)
Manager – n (%)	50 (71.4)	58 (82.9)	59 (84.3)	53 (75.7)
Clinical educator – n (%)	47 (67.1)	46 (65.7)	57 (81.4)	58 (82.9)
Nurses working at point-of-care – n (%)	24 (34.3)	63 (90.0)	50 (71.4)	53 (75.7)
Physicians – n (%)	30 (42.9)	61 (87.1)	45 (64.3)	38 (54.3)
Midwives – n (%)	14 (20.0)	45 (61.6)	37 (52.9)	33 (47.1)
Decision support personnel/analysts/QI – n (%)	5 (7.1)	13 (18.6)	13 (18.6)	7 (10.0)
Pregnant and birthing people – n (%)	5 (7.1)	40 (57.1)	18 (25.7)	4 (5.7)
Family members/caregivers – n (%)	5 (7.1)	40 (57.1)	20 (28.6)	7 (10.0)
Median number of roles involved – median (IQR)	2 (1.25)	6 (4)	5 (3)	4 (3)

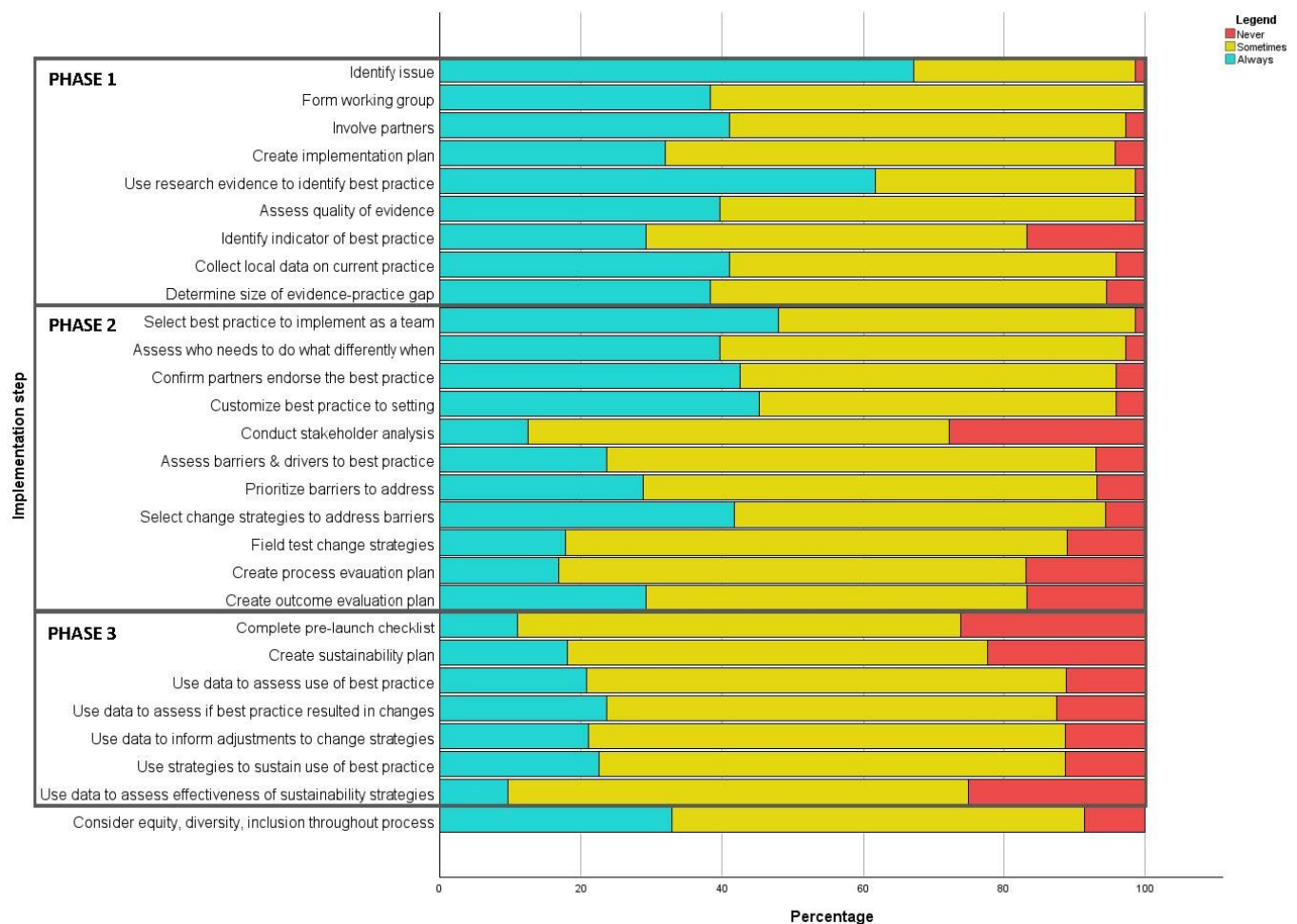
Respondents (N=70) identified various systems for engaging people in the implementation process including staff huddles (n=64, 91.4%), patient and family advisory councils (n=44, 62.9%), staff unit councils (n=37, 52.9%), ticket systems for staff to submit ideas and feedback (n=33, 47.1%), and ticket systems for patients and families to submit ideas and feedback (n=32, 45.7%).

5.3.2.3 Importance and completion of implementation activities. Nearly all respondents (>90%) agreed that each of the 28 activities in the implementation process were “very” or “somewhat” important (Figure 5.2).

Figure 5.2 Perceptions of importance of each implementation activity

Nearly half of respondents indicated their teams “always” or “sometimes” complete each of the 28 implementation activities (n=29/63, 46%). Respondents reported their teams “always” complete a median of 8 out of 28 activities (29% of activities, range=0-28). The number of activities reported as “always” completed declined from phase 1 through to 3: respondents “always” completed a median of 4 of 9 activities in phase 1 (44% of phase 1 activities), a median of 3 of 11 activities in phase 2 (27% of phase 2 activities), and a median of 0 of 7 activities in phase 3 (0% of phase 3 activities). Additional file 5.5 illustrates the different implementation activities reported by each respondent with complete data (n=63).

Figure 5.3 illustrates respondents' perceptions of how frequently the 28 implementation activities are completed in their settings. The seven activities (i.e., bottom quartile) that were most frequently reported as “never” done were: conduct a stakeholder analysis (n=20/72; 27.8%); complete a pre-launch checklist (n=19/73; 26.0%); use data to assess if sustainability strategies are maintaining use of best practice (n=18/72, 25.0%); create a sustainability plan (n=16/72, 22.2%); create a plan for a process evaluation (n=12/71, 16.9%); identify or create a tangible indicator of best practice (n=12/72, 16.7%); and create a plan for an outcome evaluation (n=12/72, 16.7%). Six of these seven activities were from phase 2 or 3 of the implementation process. The complete data (frequencies and percentages) by implementation activity are presented in Additional file 5.6.

Figure 5.3 Perceptions of how often each implementation activity is done

When asked if equity, diversity, and inclusion (EDI) are considered in the implementation process, 23 (32.9%) reported “always,” 41 (58.6%) reported “sometimes,” and 6 (8.6%) reported “never” considering EDI. Of those who stated they “always” or “sometimes” consider EDI, the steps that most frequently included EDI considerations were consulting with interested and affected parties (n=46/64, 71.9%) and when learning about potential barriers to implementing solutions (n=44/64, 68.8%) (see Additional file 5.7).

When comparing the frequencies across implementation activities that were rated as “very” important and also reported as “always” done, we observed the most congruence in phase 1, and the least congruence in phase 3 (Table 5.4). For example, of the 69 respondents who

indicated that identifying a relevant problem or issue is “very important,” 49 (71%) said they “always” did the activity and 20 (29%) reported only doing it “sometimes” or “never.”

Table 5.4 Proportion of respondents reporting their teams view an activity as “very important” who also said their team “always” does it

	Implementation activity	n/N (%) ^a
PHASE 1	Identify a relevant problem or issue	49/69 (71.0) ^b
	Form a working group	26/49 (53.1)
	Involve stakeholders as partners throughout change initiative	30/56 (53.6)
	Create a formal implementation plan	23/51 (45.1)
	Use research evidence to identify potential programs, guidelines, practices, or innovations to solve problem	44/63 (69.8) ^b
	Assess the quality of the program, guideline, practice, or innovation	29/54 (53.7) ^b
	Identify or create a tangible indicator of best practice	21/48 (43.8)
	Collect local data to learn about current practice in your setting	29/54 (53.7) ^b
	Compare current practice in your setting to the best practice to determine how big the “gap” is	28/49 (57.1) ^b
PHASE 2	Work as a team to select the best practice to be implemented	35/62 (56.5) ^b
	Analyze best practice for who needs to do what, when, to whom, and under what circumstances	28/55 (50.9)
	Confirm that key stakeholders endorse the selected best practice	31/59 (52.5)
	Customize the selected best practice for your setting	31/57 (54.4) ^b
	Conduct a stakeholder analysis	9/33 (27.3) ^c
	Assess the barriers and drivers to implementing the best practice	16/46 (34.8)
	Prioritize the identified barriers that are feasible to address	21/50 (42.0)
	Select change strategies to address the identified barriers	30/56 (53.6)
	Field-test the selected change strategies	13/32 (40.6)
	Create a plan for a “process evaluation”	12/42 (28.6) ^c
	Create a plan for an “outcome evaluation”	21/46 (45.7)
PHASE 3	Complete a pre-launch checklist	8/23 (34.8)
	Create a “sustainability plan”	13/45 (28.9) ^c
	Use data to assess if the best practice is being used	15/50 (30.0) ^c
	Use data to assess if use of best practice resulted in the desired outcomes	17/46 (37.0)
	Use the monitoring and evaluation findings to adjust the change strategies	15/44 (34.1) ^c
	Use strategies to sustain use of the best practice over time	16/52 (30.8) ^c
	Use data to assess if sustainability strategies are maintaining use of best practice	7/34 (20.6) ^c

Consider equity, diversity, and inclusion (EDI) throughout the implementation process	22/50 (44.0)

^aThe denominator (N) is the number of respondents who reported the activity is “very important.” The numerator (n) includes respondents who reported the activity is “very important AND reported they “always” did it.

^bTop quartile

^cBottom quartile

Overall, respondents who indicated their organization had a mandatory or optional formal process or framework to facilitate practice changes reported completing more implementation activities than those who did not have a formal process or framework (Table 5.5).

Table 5.5 Comparison of number of implementation activities “always” done and use of formal processes and frameworks (n=62)

	Number of 28 implementation activities “always” done ^a	
	Median (IQR)	Range
Organization has <i>mandatory</i> formal process to facilitate change process (n=15)	9 (13)	3-26
Organization has <i>optional</i> formal process to facilitate change process (n=14)	8.5 (20.25)	0-28
Organization <i>does not</i> have formal process to facilitate change process (n=16)	5 (6.5)	0-21
<i>Unsure</i> if organization has formal process to facilitate change process (n=17)	9 (7.5)	0-19
<i>Of those who said they used a “mandatory” or “optional” formal process to facilitate the change process:</i>		
Use a formal framework, model, or theory to facilitate change process (N=14 ^b)	15 (13.25)	5-28
Do not use formal framework, model, or theory to facilitate change process (N=10 ^b)	4.5 (10.75)	0-26

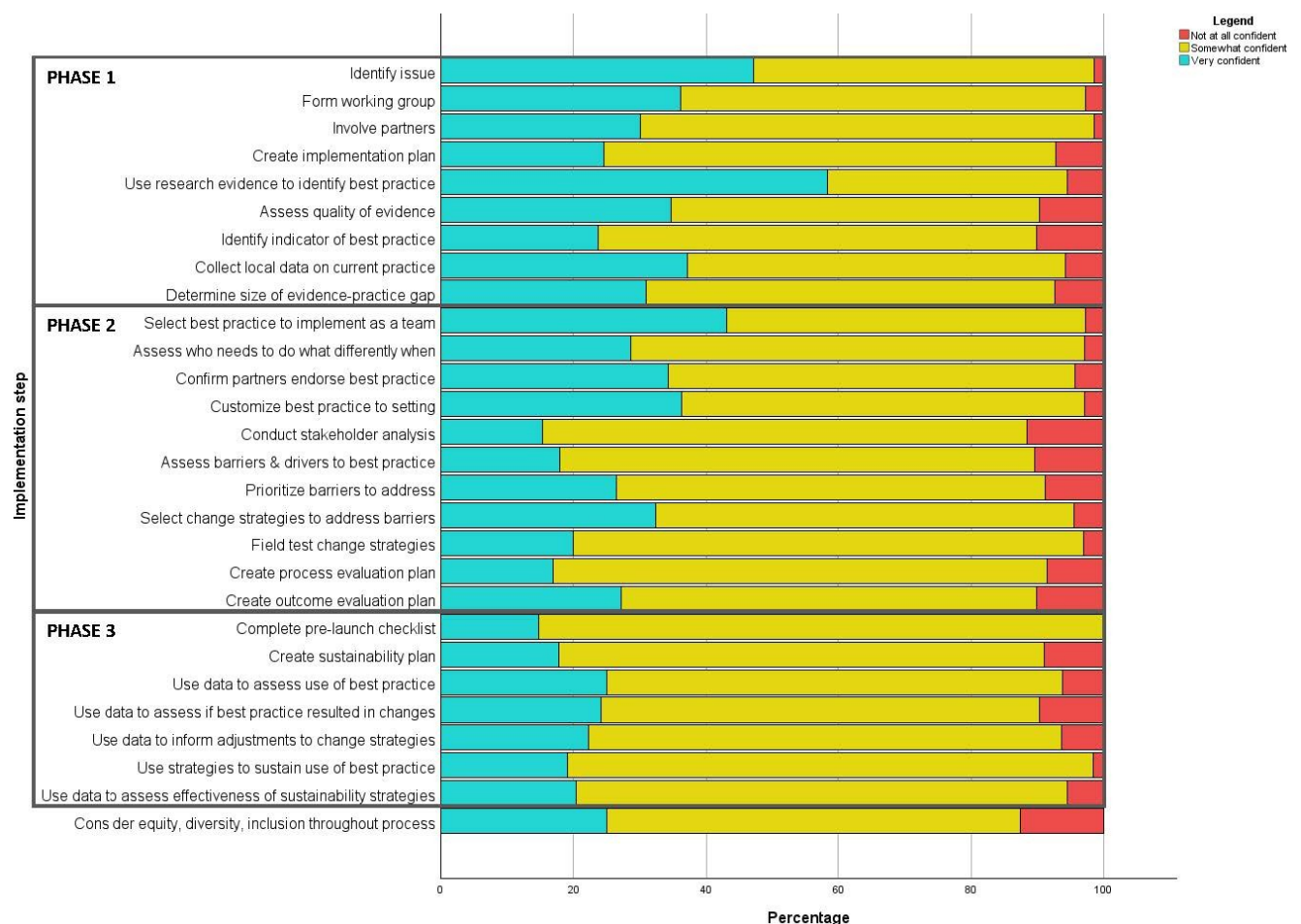
^aOnly includes respondents with complete data on all implementation activities

^bOnly includes those who said they used a “mandatory” or “optional” formal process to facilitate the change process

5.3.3 Perceived confidence and implementation capacity-building needs

About two-thirds of respondents reported receiving formal training in one or more of quality improvement (n=45/73, 61.6%), knowledge translation and implementation practice (n=29/73, 39.7%), and implementation science (n=10/73, 13.7%). Respondents most frequently rated their knowledge and confidence in using evidence-informed approaches to change clinical practice as “moderate.” Those who reported having previous formal training more frequently reported higher levels of knowledge and confidence (see Additional file 5.8).

Figure 5.4 illustrates respondents’ perceptions of their teams’ confidence for each of the 28 implementation activities. Most respondents indicated their teams were “somewhat” confident across the activities, except for “use research evidence to identify best practice,” where the majority said “very” confident. There were several activities where more than 10% of the sample indicated their teams were “not at all” confident: consider equity, diversity, and inclusion (EDI) (12.5%), conduct a stakeholder analysis (11.5%), assess barriers and drivers to implementing the best practice (10.4%), identify or create a tangible indicator of best practice (10.2%), and create a plan for an outcome evaluation (10.2%).

Figure 5.4 Perceptions of confidence doing each implementation activity

Note: Only respondents who indicated they “always” or “sometimes” do the step were asked about their confidence levels.

Overall, most respondents strongly agreed or agreed that their teams would benefit from increasing their knowledge (88.4%) and skills (92.8%) on how to use an evidence-informed approach to implementing clinical practice changes. In addition, most respondents strongly agreed or agreed that their team could benefit from having an evidence-informed process (89.8%) and would value resources to guide the implementation process (95.7%) (Table 5.6).

Table 5.6 Respondent perceptions of needs related to evidence-informed approaches for implementing practice changes (N=69)

	n (%)				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Our team could benefit from <i>increasing our knowledge</i> about evidence-informed approaches to implementing clinical practice changes	30 (43.5)	31 (44.9)	6 (8.7)	2 (2.9)	0 (0)
Our team could benefit from <i>increasing our skills</i> to apply evidence-informed approaches to implementing clinical practice changes	32 (46.4)	32 (46.4)	4 (5.8)	1 (1.4)	0 (0)
Our team could benefit from <i>having an evidence-informed process</i> to guide the clinical practice change process in our setting	29 (42.0)	33 (47.8)	6 (8.7)	1 (1.4)	0 (0)
Our team is motivated to <i>use evidence-informed processes and strategies</i> to bring about clinical practice changes	29 (43.3)	28 (41.8)	10 (14.9)	0 (0)	0 (0)
Our team would value (appreciate) a <i>resource or toolkit</i> to guide our clinical practice change process	44 (63.8)	22 (31.9)	2 (2.9)	1 (1.4)	0 (0)

5.4 Discussion

In this study we aimed to explore the implementation processes and implementation capacity-building needs of maternal-newborn nurses, other healthcare professionals, and leaders. We grounded our data collection in an implementation planned-action framework, the Implementation Roadmap, to identify how usual implementation practices compare to recommendations from implementation science. We also learned about respondents' perceptions of importance and confidence completing various implementation activities. Together, this

highlights specific phases and activities where maternal-newborn teams may need additional support in the implementation process.

About half of respondents indicated their organization had a mandatory or optional practice change process or framework, and we observed that these respondents more frequently reported always completing activities in the Implementation Roadmap. This is unsurprising given that theories, models, and frameworks encourage a systematic and structured implementation process and creates a shared language and understanding among team members, which may ultimately increase success and sustainability [10,16,34]. In addition, some respondents named a formal theory, model, or framework they use. Similar to our previous findings [19], most of these were approaches and tools grounded in quality improvement rather than implementation planned-action frameworks. With the growing recognition that implementation science can inform and improve change initiatives in healthcare settings, it will be important to consider how implementation science and quality improvement practice can work together to achieve optimal processes and outcomes [35].

Respondents identified a variety of roles that are involved in different phases of the implementation process. Nurses in both leadership and clinical roles were the most frequently selected role for leading change initiatives, identifying problems to address, developing solutions, and implementing solutions. These results highlight the substantial and essential role that nurses play in implementing practice changes [15].

We observed that overall, there was strong involvement from nursing managers throughout the implementation process, which is promising given that leadership behaviors of nurse managers affect the unit climate for the implementation of evidence-based practices [36]. However, the involvement of senior leadership was lower, which likely reflects their role in

providing general support and infrastructure rather than engaging in the day-to-day activities.

Senior nurse leaders have been identified as a key group that can embed implementation science in their organizations [37]. Given our findings that evaluation and sustainability planning and execution were some of the least frequently completed activities, there may be a particularly important role for senior nurse leaders to play in supporting these activities.

We observed that pregnant and birthing people and their families were less frequently involved in the implementation process, a finding consistent with our previous qualitative study [19]. While about half of respondents indicated pregnant and birthing people and their families were involved in identifying problems (likely through patient feedback systems and patient and family advisory committees), there was a notable decrease in the number of respondents who said they were also involved in developing and implementing solutions. This may be a missed opportunity given that involving patients in co-designing solutions can result in improvements to care, service delivery, and governance [38].

Overall, we found that most respondents perceived the three phases and 28 implementation activities to be important, aligning with our previous work in a different setting [39]. Despite these generally positive ratings of importance, we observed that these implementation activities were not always done. There are several potential explanations for the discrepancy between viewing an activity as important but not doing it. Implementation is complex and there are multi-level barriers to implementing evidence in practice [40]. Implementation is often done with limited time and resources in conditions that are rapidly changing, resistant to change, and subject to policies and regulations [41], and this may account for some implementation activities not being feasible to complete, despite being viewed as important. It is also possible that the difference relates to a lack of knowledge and skill in how to

complete the activity. This is consistent with respondents most frequently indicating they were “somewhat” confident across the implementation activities, suggesting that room for improvement exists. Given that healthcare professionals are typically not taught about implementation and improvement practice in their training, nor are there sufficient professional development opportunities in this area [9,42], it is unsurprising that nurses and other healthcare professionals are reported to have low knowledge [43] and skill proficiency in quality improvement [44] and low confidence in knowledge translation and implementation [45,46].

We observed a general decrease in respondents’ ratings of importance, completion, and confidence when moving across the three implementation phases. Variability in practitioner perceptions across the implementation process has been reported in previous studies [45–48]. For instance, allied health professionals reported higher confidence levels in the earlier steps of the implementation process (e.g., identifying an evidence-practice gap, finding and appraising evidence), and reported lower confidence levels with activities later in the process (e.g., implementation, monitoring, evaluation) [45,46]. McNett et al [48] described three core implementation stages (initiating, maintaining, completing and sustaining) and found that respondents reported moderate difficulty completing each of the stages, with the difficulty ratings increasing across stages. Similarly, respondents rated their success higher in the first phase, with success ratings decreasing in stages 2 and 3. This aligns with our findings that respondents’ ratings of importance, completion, and confidence were highest in the first phase, and decreased in later phases, and signals that nurses, other healthcare professionals, and leaders may need additional support in later implementation activities.

Most respondents identified a need to increase their knowledge and skills in using an evidence-informed approach to implementing practice changes. Our study and previous literature

[45,46] suggest that nurses and other healthcare professionals are in fact interested in learning more about how to implement evidence into practice. Respondents who had previous training in implementation, quality improvement, or knowledge translation rated their knowledge and confidence more positively than those with no training. Implementation capacity-building interventions may result in positive outcomes including increased knowledge and understanding of implementation and an increase in self-reported ability to implement [49]. While we acknowledge that training and tools alone would be insufficient, it is promising to see there is an appetite for further learning about how to effectively move evidence into practice. Ongoing work is needed to develop and evaluate evidence-informed tools, resources, and training initiatives to support the application of implementation science in clinical and health services settings.

5.4.1 Strengths and limitations

Despite use of strategies known to improve response rates (e.g., pre-notice, reminders) [50], our individual response rate and questionnaire completion rate were only 26% and 58%, respectively. These numbers may reflect the feasibility of the questionnaire for busy healthcare providers and leaders, which took longer than the recommended 10 minutes [50]. Despite this, we obtained at least one response from nearly two-thirds of maternal-hospitals in Ontario, providing good representation of both geographical locations and acuity levels of maternal-newborn units across the province. However, due to recruitment occurring in Ontario, Canada only, the sample may not be representative of maternal-newborn teams in other jurisdictions, and the findings should therefore be generalized with caution.

It is important to note that most respondents were nurses and therefore our findings likely do not reflect the perceptions of other healthcare professionals. However, this nursing perspective is essential given that nurses are often the ones responsible for leading and

participating in implementing practice changes. Another limitation is that all data is self-reported; this means that when a respondent said their team completed an implementation activity, we do not know whether this is accurate, nor can we say that it was done optimally. In addition, it is possible that respondents may have answered questions in a way that reflected positively on themselves and their units (i.e., social response bias). However, in many cases, respondents indicated activities their teams did not complete or areas where they were not confident, suggesting that respondents were likely not overestimating.

Finally, it is important to acknowledge that although we assessed face validity, the questionnaire did not undergo validity and reliability testing. In addition, in the questionnaire section with the 28 Implementation Roadmap activities we used a simple three-point scale to assess importance, completion, and confidence. While this decision was made to make the lengthy questionnaire easier to complete, we acknowledge that this poses limitations for our analysis, preventing us from obtaining a more nuanced understanding of respondents' ratings.

5.4.2 Recommendations for research

This work highlights several opportunities for future research. First, while this study identified general patterns across implementation phases, we do not know the reasons for these differences. Future research could explore these gaps by asking respondents for more details on the “why” behind these findings. Second, given the limited evidence on how implementation science is being applied by practitioners in healthcare settings, further research is needed to explore this in settings beyond maternal-newborn care and in other jurisdictions. Third, while in this study we focused on describing implementation processes, future research is needed to understand how different implementation steps and activities result in different clinical and implementation outcomes. Finally, promoting equity and better engaging patients throughout the

implementation process have been identified as implementation research priorities in maternal health [51]. While we assessed how frequently respondents consider equity and engage patients throughout implementation, further research is needed to develop effective strategies to facilitate these essential components of effective, person-centered, and equitable implementation.

5.4.3 Implications for nursing

Implementing best practices in organizations is a collective activity, and leadership has been identified as an important mediator that can facilitate or hinder implementation [52]. Nurse managers have indicated a desire to learn about implementation and better support clinical staff [53]; ongoing supports and opportunities are needed to further enhance nursing leaders' ability to foster environments that facilitate implementation. There are also considerations for nursing education. To date, nursing education programs have embedded evidence-based practice and research methods in curricula; however, there is a need to also include content on how to actually implement evidence into practice [54], including exposure to implementation science and its application to nursing practice.

5.5 Conclusion

While respondents generally viewed implementation activities as important, teams did not always complete the steps or feel confident doing them, particularly in later phases of the implementation process. These findings support the need and interest for further resources, support, and training in using an evidence-informed approach to implementation and will inform the development of a tailored resource for nurses, other healthcare professionals, and leaders in maternal-newborn care settings. Until health systems adopt an evidence-informed process to implement evidence-informed practices, patients will continue to be denied optimal care, resources will be wasted, and equitable health outcomes will be challenging to achieve.

5.6 Declarations

5.6.1 Ethics approval and consent to participate

This study was approved by the Children’s Hospital of Eastern Ontario (CHEO) Research Ethics Board (protocol #23/59X) and the University of Ottawa Research Ethics Board (H-12-23-9959). The questionnaire homepage included detailed information on the study and consent was implied by starting the questionnaire. All methods were carried out in accordance with relevant guidelines and regulations.

5.6.2 Consent for publication

Not applicable.

5.6.3 Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request. For the purpose of this thesis, tables that were not published in the paper are included at the end of this chapter (Additional file 5.9) for additional information and context.

5.6.4 Competing interests

The authors declare that they have no competing interests.

5.6.5 Funding

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5.8 Additional Files

Additional File 5.1 Checklist for Reporting Of Survey Studies (CROSS)^a

Section/topic	Item #	CROSS Item description	Reported in section (page)
Title and abstract			
Title and abstract	1a	State the word “survey” along with a commonly used term in title or abstract to introduce the study’s design.	Title page
	1b	Provide an informative summary in the abstract, covering background, objectives, methods, findings/results, interpretation/discussion, and conclusions.	Abstract
Introduction			
Background	2	Provide a background about the rationale of study, what has been previously done, and why this survey is needed.	Background
Purpose/aim	3	Identify specific purposes, aims, goals, or objectives of the study.	Background
Methods			
Study design	4	Specify the study design in the methods section with a commonly used term (e.g., cross-sectional or longitudinal).	Methods
Data collection methods	5a	Describe the questionnaire (e.g., number of sections, number of questions, number and names of instruments used).	Instrument
	5b	Describe all questionnaire instruments that were used in the survey to measure particular concepts. Report target population, reported validity and reliability information, scoring/classification procedure, and reference links (if any).	N/A
	5c	Provide information on pretesting of the questionnaire, if performed (in the article or in an online supplement). Report the method of pretesting, number of times questionnaire was pre-tested, number and demographics of participants used for pretesting, and the level of similarity of demographics between pre-testing participants and sample population.	Instrument
	5d	Questionnaire if possible, should be fully provided (in the article, or as appendices or as an online supplement).	Additional File 5.2
Sample characteristics	6a	Describe the study population (i.e., background, locations, eligibility criteria for participant inclusion in survey, exclusion criteria).	Inclusion & exclusion Table 5.1
	6b	Describe the sampling techniques used (e.g., single stage or multistage sampling, simple random sampling, stratified sampling, cluster sampling, convenience sampling). Specify the locations of sample participants whenever clustered sampling was applied.	Setting and sampling
	6c	Provide information on sample size, along with details of sample size calculation.	Results
	6d	Describe how representative the sample is of the study population (or target population if possible), particularly for population-based surveys.	Results; Table 5.1; Additional File 5.3
Survey administration	7a	Provide information on modes of questionnaire administration, including the type and number of contacts, the location where the survey was conducted (e.g., outpatient room or by use of online tools, such as SurveyMonkey).	Data collection

Section/topic	Item #	CROSS Item description	Reported in section (page)
	7b	Provide information of survey's time frame, such as periods of recruitment, exposure, and follow-up days.	Setting and sampling
	7c	Provide information on the entry process: →For non-web-based surveys, provide approaches to minimize human error in data entry. →For web-based surveys, provide approaches to prevent “multiple participation” of participants.	Data collection
Study preparation	8	Describe any preparation process before conducting the survey (e.g., interviewers' training process, advertising the survey).	Setting and sampling
Ethical considerations	9a	Provide information on ethical approval for the survey if obtained, including informed consent, institutional review board [IRB] approval, Helsinki declaration, and good clinical practice [GCP] declaration (as appropriate).	Ethical considerations
	9b	Provide information about survey anonymity and confidentiality and describe what mechanisms were used to protect unauthorized access.	Ethical considerations
Statistical analysis	10a	Describe statistical methods and analytical approach. Report the statistical software that was used for data analysis.	Data analysis
	10b	Report any modification of variables used in the analysis, along with reference (if available).	N/A
	10c	Report details about how missing data was handled. Include rate of missing items, missing data mechanism (i.e., missing completely at random [MCAR], missing at random [MAR] or missing not at random [MNAR]) and methods used to deal with missing data (e.g., multiple imputation).	Data analysis
	10d	State how non-response error was addressed.	N/A
	10e	For longitudinal surveys, state how loss to follow-up was addressed.	N/A
	10f	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for non-representativeness of the sample.	N/A
	10g	Describe any sensitivity analysis conducted.	N/A
Results			
Respondent characteristics	11a	Report numbers of individuals at each stage of the study. Consider using a flow diagram, if possible.	Figure 5.2
	11b	Provide reasons for non-participation at each stage, if possible.	Figure 5.2
	11c	Report response rate, present the definition of response rate or the formula used to calculate response rate.	Results
	11d	Provide information to define how unique visitors are determined. Report number of unique visitors along with relevant proportions (e.g., view proportion, participation proportion, completion proportion).	Figure 5.2
Descriptive results	12	Provide characteristics of study participants, as well as information on potential confounders and assessed outcomes.	Table 5.1 Table 5.2 Figure 5.3 Figure 5.4

Section/topic	Item #	CROSS Item description	Reported in section (page)
			Table 5.3 Table 5.4 Figure 5.5 Table 5.5 Additional Files 5.5-5.8
Main findings	13a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates along with 95% confidence intervals and p-values.	N/A
	13b	For multivariable analysis, provide information on the model building process, model fit statistics, and model assumptions (as appropriate).	N/A
	13c	Provide details about any sensitivity analysis performed. If there are considerable amount of missing data, report sensitivity analyses comparing the results of complete cases with that of the imputed dataset (if possible).	N/A
Discussion			
Limitations	14	Discuss the limitations of the study, considering sources of potential biases and imprecisions, such as non-representativeness of sample, study design, important uncontrolled confounders.	Strengths and limitations
Interpretations	15	Give a cautious overall interpretation of results, based on potential biases and imprecisions and suggest areas for future research.	Discussion
Generalizability	16	Discuss the external validity of the results.	Strengths and limitations
Other sections			
Role of funding source	17	State whether any funding organization has had any roles in the survey's design, implementation, and analysis.	Title page
Conflict of interest	18	Declare any potential conflict of interest.	Title page
Acknowledgements	19	Provide names of organizations/persons that are acknowledged along with their contribution to the research.	Title page

"Sharma A, Minh Duc NT, Luu Lam Thang T, et al. A Consensus-Based Checklist for Reporting of Survey Studies (CROSS). J Gen Intern Med. 2021;36(10):3179-3187. doi:10.1007/s11606-021-06737-1

Additional File 5.2 Study questionnaire

**Note that this paper reports on data from Parts A, B, C only.*

Part A: Screening Questions

1. Are you involved in maternal-newborn care in an Ontario hospital? (e.g., labour and delivery, postpartum, neonatal intensive care)
 - ☐ Yes
 - ☐ No

2. In your current role, do you:
[please check all that apply]
 - ☐ Supervise practice change initiatives or implementation/ quality improvement projects
 - ☐ Lead practice change initiatives or implementation/ quality improvement projects
 - ☐ Participate in practice change initiatives or implementation/ quality improvement projects
 - ☐ None of the above – I do not supervise, lead, or participate in practice change initiatives or implementation/quality improvement projects

If Yes to 1 and any of the first three options in 2, then the participant can move on to the rest of the questionnaire.

If No to 1 or None of the above in 2, then the participant will be told they are ineligible and prompted to close the questionnaire.

Part B: Demographics

1. What is your gender identity?
(Please check all that apply)
 - ☐ Man
 - ☐ Woman
 - ☐ I identify my gender as (please specify): *[open text box to write answer]*
 - ☐ Prefer not to answer

2. What is your current role?
 - ☐ Manager
 - ☐ Program director
 - ☐ Nurse
 - ☐ Nurse educator
 - ☐ Advanced practice nurse
 - ☐ Midwife
 - ☐ Physician
 - ☐ Decision support
 - ☐ Quality improvement or implementation support
 - ☐ Other, please specify: _____

3. What is the highest level of education that you have completed?
 - ☐ High school diploma
 - ☐ College diploma
 - ☐ Bachelor's degree

- Master's degree
- Doctoral degree
- Other: _____

4. How many years of experience do you have in maternal-newborn care? _____ years
5. How many years of experience do you have *supervising or leading* practice change initiatives or implementation/quality improvement projects? _____ years

How many years of experience do you have *participating in* implementation projects, quality improvement projects, or practice change initiatives? _____ years

6. Have you had formal training (e.g., courses, workshops, programs) in any of the following areas?
(Please check all that apply)
- ☐ Knowledge translation (KT), knowledge mobilization, implementation practice
 - ☐ Implementation science
 - ☐ Quality improvement
7. How knowledgeable are you about using evidence-informed approaches to change clinical practice?
- Extremely knowledgeable
 - Very knowledgeable
 - Moderately knowledgeable
 - Slightly knowledgeable
 - Not at all knowledgeable
8. How confident are you in following an evidence-informed approach to changing clinical practice?
- Extremely confident
 - Very confident
 - Moderately confident
 - Slightly confident
 - Not at all confident
9. What type of maternal-newborn unit(s) do you currently work in?
(Please check all that apply)
- ☐ Labour and delivery
 - ☐ Postpartum
 - ☐ Neonatal intensive care unit
 - ☐ Special Care Nursery
 - ☐ Other, please specify: _____
10. What level of **perinatal and birthing** care does your hospital provide? *[this question will appear if respondent selects labour and delivery or postpartum in question above].*
- ☐ Level I
 - ☐ Level II
 - ☐ Level III
11. What level of **newborn** care does your hospital provide? *[this question will appear if respondent selects SCN or NICU in question above].*
- ☐ Level I
 - ☐ Level II

☐ Level III

12. What regional network is your hospital part of?

(As per PCMCH: <https://www.pcmch.on.ca/regional-networks-operational-forum/>)

- ☐ Maternal, Newborn, Child and Youth Network (MNCYN)
- ☐ Southern Ontario Maternal Child and Youth Network (SOMCYN)
- ☐ Women & Children's Health Network (WCHN)
- ☐ Toronto Region Maternal Child Health Network (TRMCHN)
- ☐ Northern Maternal Child Network (NMCN)
- ☐ Champlain Maternal Newborn Regional Program (CMNRP) and Kids Come First Health Team (KCFHT)
- ☐ We are not currently part of a regional network
- ☐ Unsure

13. Which hospital do you work in?

(Please note that this information will only be used to facilitate reminders about questionnaire completion and will not be reported)

A recent study identified that about 30% of all care in Canada is “inappropriate,” meaning that patients have not received care that aligns with the best available evidence. This suggests that many practices (e.g., diagnostics, therapies and procedures, medications) are being overused (i.e., used when not needed), underused (i.e. not used when needed), or misused (i.e., used incorrectly).

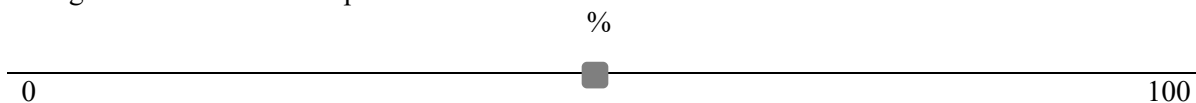
As you answer the next question(s), think about your overall experiences and knowledge from working in maternal-newborn care.

14. I think that the proportion of inappropriate care (overuse, underuse, misuse) in Ontario maternal-newborn care settings is:

- ☐ Higher than the 30% average reported in the study
- ☐ About the same as the 30% average reported in the study
- ☐ Lower than the 30% average reported in the study

15. (If higher or lower than 30% average) In Ontario maternal-newborn hospital settings, what proportion of care do you think is "inappropriate"? (i.e., diagnostics, therapies, procedures, and medications that are overused, underused, or misused)

Change the slider to set a response.



16. Please briefly state any clinical practice change initiatives your unit is *currently* working on (e.g., reducing cesarean sections, increasing breastfeeding rates, etc.)

17. Please briefly state any clinical practice change initiatives your unit is *planning* to work on in the future.

Part C: Usual Approaches to Practice Change Initiatives[†]

Changing practice can involve many steps, and different teams may use different processes and steps to implement changes. In this next section, we present 28 different steps that you may or may not do. Please think about how your team *typically* approaches clinical practice changes in your setting. Based on your experience, we are interested in:

- which steps your team thinks are important or not;
- which steps your team typically does or not; and
- which steps your team feels confident doing or not.

Please note that the following questions focus on your *team*. In some cases, you may feel uncertain about how to answer questions about your team, but we ask that you do your best to pick the answer that reflects your perception of your team.

Throughout this section we use the term “practice change initiative” to refer to any formal attempt to change a clinical practice, care process, or policy in your hospital setting. A practice change initiative could be focused at the individual level (e.g., trying to change the way healthcare professionals provide care) or at a unit/organizational level (e.g., trying to implement a new process or policy), but the end goal is to improve an outcome.

We also use the term “stakeholders” to refer to individuals who are interested in and/or affected by the practice change initiative. Examples of stakeholders include pregnant and birthing people and their families, healthcare providers, and managers/leaders.

[†] Note that in the online version of the questionnaire, this section was presented as a series of individual questions, rather than as a matrix.

[illegible]

[illegible]

[illegible]

	A. How important is this step to your team?			B. How often does your team do this step?			C. How confident is your team doing this step?		
	Very important	Somewhat important	Not at all important	Always	Sometimes	Never	Very confident	Somewhat confident	Not at all confident
evaluate the <i>outcomes and impact</i>)									
25. Use the monitoring and evaluation findings to <i>adjust the change strategies</i> as needed	○	○	○	○	○	○	○	○	○
26. Use strategies to help sustain use of the best practice over time	○	○	○	○	○	○	○	○	○
27. Collect and analyze data to assess whether the sustainability strategies are helping to maintain use of the best practice (i.e., monitor sustainability strategies)	○	○	○	○	○	○	○	○	○
Finally, let's think about equity, diversity, and inclusion.									
28. Consider equity, diversity, and inclusion (EDI) in the practice change process	○	○	○	○	○	○	○	○	○

29. You indicated that your team “sometimes” or “always” considers equity, diversity, and inclusion (EDI) in the practice change process. During which steps does your team explicitly consider EDI?
- ☐ When creating the core working group (*e.g., aiming for diversity and representation on the team*)
 - ☐ When consulting with interested and affected parties (*e.g., aiming for consultation with a diverse group*)
 - ☐ When prioritizing what practice problem needs to be addressed (*e.g., prioritizing problems to improve equity*)
 - ☐ When selecting or modifying the specific solution (guideline, program, practice) to be implemented (*e.g., using solutions that meet EDI criteria*)
 - ☐ When learning about potential barriers to implementing the solution (*e.g., including questions to explore EDI considerations*)
 - ☐ When evaluating the practice change (*e.g., selecting EDI-relevant outcome measures*)
 - ☐ When working to sustain the practice change (*e.g., including EDI considerations for sustaining the change*)
 - ☐ Other (specify): _____

30. Who is usually *primarily responsible for leading* the practice change process in your setting (i.e., the person leading the implementation team)?

**The people leading practice changes may be different depending on the type of change. For this question, think about what happens most often.*

- ☐ Program director
- ☐ Manager
- ☐ Clinical educator
- ☐ Nurses working at point-of-care
- ☐ Physicians
- ☐ Midwives
- ☐ Decision support personnel/analysts
- ☐ Pregnant and birthing people
- ☐ Family members/caregivers
- ☐ Other: _____
- ☐ Unsure

Please enter any comments you have on who typically leads the practice change process in your setting:

31. Who typically contributes to the different phases of the practice change process in your setting?

**The people involved in practice changes may be different depending on the type of change. For this question, think about what happens most often.*

	<i>Identifying a problem that needs to be addressed</i>	<i>Developing solution(s) to address the problem</i>	<i>Implementing the solution(s) in practice</i>
Program director	☐	☐	☐
Manager	☐	☐	☐
Clinical educators	☐	☐	☐
Nurses working at point-of-care	☐	☐	☐
Physicians	☐	☐	☐
Midwives	☐	☐	☐
Decision support personnel/analysts	☐	☐	☐
Pregnant and birthing people	☐	☐	☐
Family members/caregivers	☐	☐	☐
Other (specify):	☐	☐	☐
Unknown	☐	☐	☐

Please enter any other comments you have on who contributes to the different phases in the practice change process in your setting:

32. Do you currently use any of the following systems to engage people in the practice change process?

- ☐ Staff unit councils
- ☐ Patient and Family Advisory Councils
- ☐ Ticket systems for *staff* to submit ideas and feedback
- ☐ Ticket systems for *patients and families* to submit ideas and feedback

- ☐ Staff huddles
☐ Unsure
☐ Other: _____

33. Does your organization have a formal process that is used to facilitate clinical practice change initiatives?
- ☐ Yes, we have a *mandatory* process that must be used for clinical practice changes
 - ☐ Yes, we have an *optional* process that we may choose to use (or not) for clinical practice changes
 - ☐ No, we do not have a process
 - ☐ Unsure

33a) If yes to Question 33, please briefly describe process: _____

33b) If yes to Question 33, does your team typically use a formal framework/model/theory to facilitate the clinical practice change process?

- ☐ Yes
- ☐ No
- ☐ Unsure

33c) If yes to Question 33b, please indicate which framework(s) you use to guide the clinical practice change process?

(Please check all that apply)

- ☐ Plan, Do, Study, Act (PDSA)
☐ Root Cause Analysis
☐ SWOT Analysis
☐ LEAN Methodology
☐ Knowledge to Action Framework
☐ Other framework, please specify: _____

If no or unsure to Question 33, do you think having a formal process to guide clinical practice change initiatives would be helpful to your team?

- ☐ Yes
- ☐ No
- ☐ Maybe
- ☐ Unsure

34. Other comments about the clinical practice change process typically used in your setting: _____

35. To what extent do you agree with the following statements?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Our team could benefit from <i>increasing our knowledge</i> about evidence-informed approaches to implementing clinical practice changes	☐	☐	☐	☐	☐

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Our team could benefit from <i>increasing our skills</i> to apply evidence-informed approaches to implementing clinical practice changes	☐	☐	☐	☐	☐
Our team could benefit from <i>having an evidence-informed process</i> to guide the clinical practice change process in our setting	☐	☐	☐	☐	☐
Our team is motivated to <i>use evidence-informed processes and strategies</i> to bring about clinical practice changes	☐	☐	☐	☐	☐
Our team would value (appreciate) a <i>resource or toolkit</i> to guide our clinical practice change process	☐	☐	☐	☐	☐

Part D: Resources to Support Practice Change Initiatives

We are currently developing an evidence-informed toolkit (e.g. a collection of information and resources) to guide maternal-newborn teams through the process of implementing clinical practice changes. The next questions are about this new resource.

1. Generally, how does your team prefer to learn new information? From the list below, please select your **top three** learning approaches.

- ☐ Independent, self-directed learning using educational materials
- ☐ Online courses or workshops that are directed by an instructor
- ☐ In-person courses or workshops that are directed by an instructor
- ☐ Learning by doing (experiential learning)
- ☐ Tailored coaching or mentoring by a content expert
- ☐ Participating in a community of practice to learn from others
- ☐ Other, please specify: _____

2. How important would the following features be in a practice change toolkit?

	Very important	Somewhat important	Not important
Information explaining <i>what</i> steps to take in the clinical practice change process	☐	☐	☐
Information explaining <i>why</i> undertaking various steps in the clinical practice change process is critical	☐	☐	☐
Information explaining <i>how</i> to undertake various steps in the clinical practice change process	☐	☐	☐
<i>Lessons learned</i> from other maternal-newborn teams during their practice change initiatives	☐	☐	☐

	Very important	Somewhat important	Not important
<i>Links to other resources</i> to support practice change initiatives	☐	☐	☐
<i>Tools and templates</i> to support practice change initiatives	☐	☐	☐
Access to an <i>online version</i> of the toolkit	☐	☐	☐
Access to a <i>paper-based version</i> of the toolkit	☐	☐	☐

3. Are there any other important features that you would like in a practice change toolkit? _____
4. When the toolkit becomes available, how likely would your team be to use it?
- ☐ Very likely
 - ☐ Likely
 - ☐ Neutral
 - ☐ Unlikely
 - ☐ Very unlikely
 - ☐ I don't know
5. When the toolkit becomes available, would any of these additional resources be of interest to you and your team?
- (Please check all that apply)
- ☐ Webinar providing an overview of the toolkit's content and how to use it
 - ☐ Ongoing support from a BORN staff member to advise on using the toolkit
 - ☐ Community of practice to connect with other maternal-newborn teams using the toolkit
 - ☐ Brief user tip sheets on how to apply the toolkit
 - ☐ A webpage to access toolkit content, tools, and templates
 - ☐ A slide deck on the toolkit's content that can be tailored for your own use
 - ☐ Other ideas, please specify: _____

Part E: Perceptions of BORN's role

1. If BORN Ontario offered training on how to apply the toolkit in your practice change initiatives, how likely would your team be to access this training?
- ☐ Very likely
 - ☐ Likely
 - ☐ Neutral
 - ☐ Unlikely
 - ☐ Very unlikely
 - ☐ I don't know
2. If BORN Ontario offered ongoing support and consultations on how to implement practice changes in maternal-newborn care, how likely would your team be to use this service?
- ☐ Very likely
 - ☐ Likely
 - ☐ Neutral
 - ☐ Unlikely
 - ☐ Very unlikely
 - ☐ I don't know

If answered “unlikely” or “very unlikely” to Question 35 and/or Question 36...

Please tell us why your team would be “unlikely” or “very unlikely” to use the training or support:
(Please check all that apply)

- ☐ Our team does not require additional education or training on implementing practice change initiatives
- ☐ Our team has access to other *internal* resources to support practice change initiatives
- ☐ Our team has access to other *external* resources to support practice change initiatives
- ☐ BORN is not an organization that our team recognizes as having the expertise to support our practice change initiatives
- ☐ Other reasons, please specify: _____

Part F: Future contact

In about 6-12 months we plan to have a draft of the toolkit ready for review. At that time, we will be looking for volunteers to read the toolkit draft and provide feedback on what they like, what they do not like, what is missing, and how the toolkit could be improved to best meet the needs of maternal-newborn teams.

1. Would you be willing to be contacted in 6-12 months to be asked if you might be interested in taking part in reviewing the toolkit?

Please know that selecting “yes” does not commit you to taking part in future study phases. You will receive a study invitation with more information at a later date, and you can make a decision to take part or not at that time.

- ☐ Yes
- ☐ No

[If participant selects yes]:

Thank you for your willingness to be contacted in the upcoming months for future phases of this study! Please click on the link below to enter in your details. The contact form will open in a new tab to ensure that your personal information is not associated with your questionnaire responses.

[\[URL\]](#)

Info at new contact URL:

Thank you for agreeing to be contacted by our project team in the future about reviewing the toolkit draft. Please know that providing your name and contact information here does not commit you to any future involvement. You will receive a study invitation with more information at a later date, and you can make a decision to take part or not at that time.

Please note that because this information is not connected with your questionnaire, you may be asked to answer similar questions again. We appreciate you taking the time to enter this information.

2. Please enter your email address to use for future contact: _____
3. What type of unit do you work in?
(Please check all that apply)
 - ☐ Labour and delivery
 - ☐ Postpartum
 - ☐ Neonatal Intensive Care
 - ☐ Special Care Nursery

☐ Other, please specify: _____

4. What level of **perinatal and birthing** care does your hospital provide? *[this question will appear if respondent selects labour and delivery or postpartum in question above].*

- ☐ Level I
☐ Level II
☐ Level III

5. What level of **newborn** care does your hospital provide? *[this question will appear if respondent selects SCN or NICU in question above].*

- ☐ Level I
☐ Level II
☐ Level III

6. What is your role?

- ☐ Manager
☐ Program director
☐ Nurse
☐ Nurse educator
☐ Advanced practice nurse
☐ Midwife
☐ Physician
☐ Decision support
☐ Quality improvement or implementation support
☐ Other, please specify: _____

7. Please rate your level of experience in the following activities:

	Novice	Intermediate	Expert
Implementing practice change initiatives	☐	☐	☐
Quality improvement projects	☐	☐	☐

8. Other comments: _____

Additional File 5.3 Organization-level demographics

Variable	Survey sample n (%)	Comparison to province (N=91) n (%)
Level of care – n (%)^b		
Low risk (level 1)	24 (42.1)	40 (44.0)
Moderate risk (level 2)	25 (43.9)	41 (45.0)
High risk (level 3)	8 (14.0)	10 (11.0)
Geographical region – n (%)^b		
Central	16 (28.1)	22 (24.2)
East	14 (24.6)	20 (22.0)
North East	7 (12.3)	10 (11.0)
North West	5 (8.8)	6 (6.6)
Toronto	4 (7.0)	6 (6.6)
West	11 (19.3)	27 (29.7)

^aAcross the 73 respondents, 57 organizations were represented: 12 hospitals had 2 responses; 1 hospital had 4 responses. 1 respondent did not indicate what hospital they were from.

^bAs per the Provincial Council for Maternal and Child Health (PCMCH) [25]

Additional File 5.4 Categories of practice change initiatives/implementation projects identified by survey respondents (N=69)

Category*	Number of respondents		Example(s) of responses
	Currently working on practice change in this area	Plan to work on practice change in this area	
Infant feeding	20	5	- Increasing breastfeeding rates - Becoming BFI designated
Inductions	17	5	- Reducing elective inductions of labour - Standardizing induction booking
Caesarean births	14	2	- Reducing cesarean birth rates - Improving cesarean birth scheduling
Oxytocin	13	0	Implementing PCMCH Oxytocin Induction Recommendations
Education & training	11	7	- Bringing MORE^{OB} to our hospital - Sending staff to higher volume centers for experience
Internal service re-organization	10	6	- Implementing LDRP model of care - Implementing late preterm care on postpartum units
Postpartum hemorrhage	8	3	PPH risk assessment and reduction
Fetal health surveillance	8	0	Implementing newest SOGC Fetal Health Surveillance guideline
Infection prevention and treatment	7	0	- Decreasing nosocomial infection rates - Antibiotic stewardship
Triage practices	7	1	Standardizing triage by implementing OTAS
Skin-to-skin care	6	2	Increasing skin to skin for the first 4 hours of admission to NICU
Collaboration with external organizations & providers	5	3	Increasing HBHC referrals
Pain management	5	3	Initiating newborn pain management policy
Skin-to-skin care	5	2	Increasing skin-to-skin care
VBAC/TOLAC	4	2	Implementing TOLAC Bundle
Documentation and charting	4	2	Developing standard electronic documentation
Patient experience and EDI	4	1	EDI work in front facing care
Hyperbilirubinemia	4	0	Introducing a hyperbilirubinemia procedure

Category*	Number of respondents		Example(s) of responses
	Currently working on practice change in this area	Plan to work on practice change in this area	
Extremely premature infant care	2	4	Improving shared decision making for extremely premature infants
Antenatal	2	3	Developing Antepartum Standards of Practice
Neonatal Abstinence Syndrome	2	3	Implementing Eat, Sleep, Console

*All other topics were reported by 3 or less respondents. Examples include: admission practices (n=3); length of stay (n=3); patient education (n=3); blood draws (n=3); hypoglycemia (n=2); developmental care (n=2); mental health (n=2); plus 44 other topics listed by one respondent only.

Abbreviations: **BFI**: Baby Friendly Initiative; **EDI**: Equity, Diversity, and Inclusion; **HBHC**: Healthy Babies Healthy Children; **LDRP**: Labor, Delivery, Recovery, and Postpartum; **MORE^{OB}**: Managing Obstetrical Risk Efficiently; **NICU**: Neonatal Intensive Care Unit; **OTAS**: Obstetric Triage Acuity Scale; **PCMCH**: Provincial Council for Maternal and Child Health; **PPH**: Postpartum Hemorrhage; **SOGC**: Society of Obstetricians and Gynaecologists of Canada; **TOLAC**: Trial Of Labor After Cesarean.

Additional File 5.5 Implementation activities done (reported by respondent)

Legend

+	Respondent indicated their team “always” does this activity
~	Respondent indicated their team “sometimes” does this activity
—	Respondent indicated their team “never” does this activity
—	A single underline indicates a disagreement between two participants from the same site (always/sometimes)*
≡	A double underline indicates a disagreement between two participants from the same site (always/never or sometimes/never)*

*Notes:

10 sites had more than one respondent (identified by the hospital ID number plus a letter). Any discrepancies between these respondents are indicated with a single or double underline (see legend above). When examining all disagreements, respondents disagreed on a median of 12.5 activities (range=8-21 activities). When excluding disagreements involving “always/sometimes”, respondents disagreed on a median of 2.5 activities (range=0-10 steps).

		PHASE 1									PHASE 2										PHASE 3								# steps "Always" done		
ID	Hospital ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		28	
142	37	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	28	
108	52	+	+	+	+	+	+	+	+	+	+	+	+	~	+	+	+	+	~	+	+	+	+	+	+	+	+	+	+	26	
41	31A	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	~	+	+	+	+	+	~	+	+	+	+	26	
84	10D	+	+	+	+	+	+	+	+	+	+	+	+	~	+	+	+	+	~	+	+	+	+	~	+	+	+	+	+	25	
127	15	+	+	+	+	+	~	+	~	+	+	+	+	+	+	+	+	+	~	~	+	+	~	+	+	+	+	~	~	21	
75	10A	+	~	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	~	~	+	+	~	~	+	+	+	+	~	21	
78	10B	+	+	+	~	+	+	+	+	+	+	+	+	+	~	+	+	+	+	+	+	+	~	+	~	~	+	~	+	21	
140	45	+	+	+	~	+	+	~	+	+	+	+	+	~	+	+	+	+	+	~	+	+	+	+	+	+	+	+	~	21	
144	38	+	+	+	+	~	+	+	~	~	+	+	+	+	~	+	+	+	~	~	+	+	~	+	+	~	~	+	+	19	
46	-	+	+	+	+	+	+	+	+	+	+	+	~	~	+	~	+	+	~	~	+	+	~	~	~	+	~	+	+	17	
89	20	+	+	+	+	+	+	+	+	+	+	+	+	~	+	+	+	+	~	~	~	~	~	~	~	~	~	~	~	16	
141	17	+	+	+	~	+	~	~	+	~	+	~	~	~	~	+	+	+	~	+	+	+	+	~	~	+	+	~	~	15	
105	41	+	+	~	+	+	~	~	+	+	~	~	~	+	~	+	+	+	+	+	+	+	~	~	~	~	+	~	~	15	
124	19	+	~	~	+	+	~	+	~	+	+	~	+	+	+	+	+	+	~	~	+	+	~	~	~	+	~	~	~	15	
60	8	+	~	+	~	+	~	~	+	~	+	~	~	~	+	+	+	~	~	~	~	~	~	~	+	+	+	+	~	13	
17	26	+	+	~	~	+	+	+	+	+	+	+	+	+	~	+	~	~	+	~	~	~	+	~	~	~	+	+	+	~	13
64	56	+	~	~	~	+	+	+	+	~	~	+	+	~	~	+	+	+	+	~	~	+	~	~	~	~	~	~	~	+	13
29	39A	+	~	~	~	+	+	+	+	+	~	+	~	~	~	~	+	~	~	~	~	~	~	~	~	~	~	~	~	12	
67	48	+	~	~	+	+	+	+	~	+	~	~	~	~	~	~	~	~	~	~	~	+	~	+	+	+	~	~	~	+	12
101	54	+	~	~	~	~	+	+	~	~	+	~	~	~	~	~	~	+	+	~	+	+	+	+	~	~	~	~	~	~	11
131	33	+	~	~	~	~	~	~	~	+	+	~	~	~	~	+	~	+	+	+	+	+	+	+	+	+	~	~	~	~	10
76	44	+	+	+	~	~	+	~	~	~	+	+	~	~	~	+	+	+	+	~	~	~	~	~	~	~	~	~	~	~	10
5	27A	+	+	+	+	+	~	~	~	~	~	+	+	~	~	~	~	+	~	~	~	~	~	~	~	~	~	~	~	~	10
145	3	~	+	~	+	+	~	+	+	+	+	+	~	~	~	~	~	~	~	~	~	~	~	~	+	~	~	~	~	~	9
103	16	+	~	+	~	+	~	~	+	+	+	+	~	~	~	~	+	~	~	~	+	+	+	+	~	~	~	~	~	~	9

		PHASE 1									PHASE 2										PHASE 3								# steps "Always" done		
ID	Hospital ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		28	
59	22	+	~	+	+	~	+	~	+	~	+	+	+	+	~	~	~	~	~	-	~	~	~	~	~	~	~	~	~	~	9
3	24	+	+	~	~	~	~	~	~	~	+	+	+	+	-	~	~	~	~	+	~	~	~	-	+	+	~	~	~	~	9
114	47	+	+	+	~	+	+	~	~	~	+	~	+	~	~	~	~	~	+	~	~	~	~	~	~	~	~	-	+	~	9
15	32B	1~	1+	~	11	+	1+	11~	~	1+	~	1+	~	1+	11~	11~	11~	~	1+	~	~	~	1+	11~	~	~	~	11~	~	~	9
125	12	+	~	~	+	+	~	~	+	~	+	~	+	~	~	~	~	~	~	~	+	~	~	~	~	~	+	~	~	~	8
106	50	~	+	~	~	+	+	~	~	+	~	~	+	+	~	~	~	~	~	~	~	~	~	~	+	~	~	~	~	+	8
81	10C	+	1+	+	1~	1~	+	1~	1~	1~	+	+	1~	+	1~	1~	1~	1~	1~	1~	1~	1~	1~	1~	1~	1~	+	1~	1~	1~	8
92	31B	+	1~	1~	1~	+	1~	+	1~	+	+	1~	1~	1~	+	1~	+	1~	~	1~	~	1~	1~	1~	~	1~	1~	1~	1~	+	8
107	46B	+	~	~	1~	+	+	~	1+	1+	1+	~	~	+	~	~	~	1~	~	~	~	1+	1~	~	~	~	~	~	11~	~	8
47	49B	~	1~	1+	~	1+	1+	1+	~	1+	~	1+	1+	~	~	~	~	~	1+	11~	11~	11~	~	~	~	~	~	~	~	~	8
88	40	~	~	~	~	+	+	+	~	+	~	~	~	+	~	~	+	~	~	~	~	~	~	~	~	~	~	~	+	~	7
71	46A	+	~	~	~	1+	+	+	~	~	1~	~	~	+	~	~	~	1+	~	~	~	1~	1+	~	~	~	~	11	11	11	7
128	53A	~	1+	1~	1+	~	~	~	~	+	1+	1+	~	11	~	~	~	~	~	~	~	~	~	~	1~	1~	~	~	~	11+	7
16	21	+	~	+	~	~	~	~	+	~	~	+	~	+	~	~	~	+	~	~	~	~	~	~	~	~	~	-	~	~	6
83	2	+	~	~	~	+	+	+	+	~	~	~	~	~	-	-	-	~	~	~	~	~	~	~	~	~	~	~	~	~	5
129	4	+	~	~	~	+	+	~	~	~	~	~	+	~	~	~	~	+	~	~	~	~	~	~	~	~	~	~	~	~	5
21	11	~	~	+	~	~	~	~	-	+	~	~	~	~	+	+	~	~	-	-	-	-	-	-	-	-	~	-	-	~	5
45	13	+	~	+	~	+	+	~	~	~	~	~	~	~	~	~	~	~	~	~	~	-	~	~	~	~	~	~	~	+	5
19	14	~	~	~	~	~	~	~	-	~	~	~	+	~	~	~	~	~	+	+	~	~	~	~	~	+	+	~	~	~	5
33	36	+	~	~	~	~	~	~	~	~	+	+	~	~	-	~	~	~	~	~	~	~	~	~	~	~	~	~	~	+	5
27	43	+	~	+	~	+	~	~	~	~	~	~	+	+	-	~	~	~	~	~	~	-	-	-	-	-	-	-	-	~	5
136	5	~	~	-	~	+	~	~	~	~	+	~	+	-	~	~	~	~	~	~	-	-	-	-	-	~	-	-	~	~	4
95	34	+	+	~	~	+	~	~	~	+	~	~	~	~	~	~	~	-	~	~	~	~	-	~	~	~	~	~	~	~	4
56	35	+	~	~	~	-	-	-	-	-	+	~	~	-	~	~	~	~	~	~	~	~	-	~	-	-	~	-	-	+	4
150	53B	~	1~	1+	1~	~	~	~	~	+	1~	~	~	11~	~	~	~	~	~	~	~	~	~	~	1+	1+	~	~	~	11	4
116	42	~	+	-	~	+	~	-	~	-	~	~	+	-	-	-	~	~	~	~	~	~	-	-	-	-	-	-	-	~	3
30	07B	+	~	~	~	~	~	~	~	~	~	~	~	~	11~	~	~	~	~	11~	11~	11~	~	~	~	~	~	~	1+	~	3
39	23B	~	~	~	11	1+	~	-	~	~	~	11	~	~	~	~	~	11~	11~	11	11	-	-	-	-	-	-	-	-	-	2
13	32A	1+	1~	~	11	+	1~	11	~	1~	~	1~	~	11	11	11	11	1~	~	~	~	1~	11	11	~	~	~	11	~	~	2
143	39B	1~	~	~	1~	1~	1~	+	1~	11	~	~	~	11	~	~	1~	1+	~	~	~	~	1~	~	1~	~	~	~	~	1~	2
132	29	~	~	~	~	~	~	-	+	~	~	~	~	-	-	-	~	~	~	-	-	-	-	-	-	-	-	-	-	-	1
44	57	+	~	~	~	~	~	~	-	~	~	~	-	-	-	~	~	~	~	~	-	-	-	-	-	-	-	-	-	-	1
8	7A	+	~	~	~	~	~	~	11	~	~	~	~	~	11	~	~	~	11	11	11	11	11	11	~	~	~	~	~	1~	1

		PHASE 1									PHASE 2										PHASE 3								# steps "Always" done	
ID	Hospital ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		28
34	49A	?	+	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
49	9	?	?	?	?	?	?	?	-	-	-	-	-	-	-	?	?	-	-	-	-	-	?	-	?	?	?	-	?	?
65	18	-	?	?	?	?	?	?	?	?	?	?	?	-	-	?	?	?	?	-	-	?	-	?	-	?	?	?	?	?
36	23A	?	?	?	?	?	?	-	?	?	?	?	?	?	?	?	?	?	?	?	?	?	-	?	?	?	-	?	?	-
130	27B	?	?	?	?	?	?	?	?	?	?	?	?	-	-	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

Additional File 5.6 Importance, completion, and confidence with Implementation activities

		How important is this step to your team?			How often does your team do this step?			How confident is your team doing this step? ^a		
		Very important n (%)	Somewhat important n (%)	Not at all important n (%)	Always n (%)	Sometimes n (%)	Never n (%)	Very confident n (%)	Somewhat confident n (%)	Not at all confident n (%)
PHASE 1	Identify a relevant problem or issue	69 (94.5)	4 (5.5)	0 (0)	49 (67.1)	23 (31.5)	1 (1.4)	33 (47.1) ^b	36 (51.4) ^b	1 (1.4) ^b
	Form a working group	49 (67.1)	23 (31.5)	1 (1.4)	28 (38.4)	45 (61.6)	0 (0)	26 (36.1) ^c	44 (61.1) ^c	2 (2.8) ^c
	Involve stakeholders as partners throughout change initiative	56 (76.7)	16 (21.9)	1 (1.4)	30 (41.1)	41 (56.2)	2 (2.7)	21 (30.0) ^c	48 (68.6) ^c	1 (1.4) ^c
	Create a formal implementation plan	51 (69.9)	20 (27.4)	2 (2.7)	23 (31.9) ^c	46 (63.9) ^c	3 (4.2) ^c	17 (24.6) ^c	47 (68.1) ^c	5 (7.2) ^c
	Use research evidence to identify potential programs, guidelines, practices, or innovations to solve problem	63 (86.3)	9 (12.3)	1 (1.4)	45 (61.6)	27 (37.0)	1 (1.4)	42 (58.3)	26 (36.1)	4 (5.6)
	Assess the quality of the program, guideline, practice, or innovation	54 (74.0)	17 (23.3)	2 (2.7)	29 (39.7)	43 (58.9)	1 (1.4)	25 (34.7)	40 (55.6)	7 (9.7)
	Identify or create a tangible indicator of best practice	48 (66.7) ^c	22 (30.6) ^c	2 (2.8) ^c	21 (29.2) ^c	39 (54.2) ^c	12 (16.7) ^c	14 (23.7) ^b	39 (66.1) ^b	6 (10.2) ^b
	Collect local data to learn about current practice in your setting	54 (74.0)	19 (26.0)	0 (0)	30 (41.1)	40 (54.8)	3 (4.1)	26 (37.1)	40 (57.1)	4 (5.7)
	Compare current practice in your setting to the best practice to determine how big the “gap” is	49 (67.1)	23 (31.5)	1 (1.4)	28 (38.4)	41 (56.2)	4 (5.5)	21 (30.9) ^c	42 (61.8) ^c	5 (7.4) ^c
PHASE 2	Work as a team to select the best practice to be implemented	62 (84.9)	10 (13.7)	1 (1.4)	35 (47.9)	37 (50.7)	1 (1.4)	31 (43.1)	39 (54.2)	2 (2.8)
	Analyze best practice for who needs to do what, when, to whom, and under what circumstances	55 (75.3)	16 (21.9)	2 (2.7)	29 (39.7)	42 (57.5)	2 (2.7)	20 (28.6) ^c	48 (68.6) ^c	2 (2.9) ^c
	Confirm that key stakeholders endorse the selected best practice	59 (80.8)	14 (19.2)	0 (0)	31 (42.5)	39 (53.4)	3 (4.1)	24 (34.3)	43 (61.4)	3 (4.3)
	Customize the selected best practice for your setting	57 (78.1)	16 (21.9)	0 (0)	33 (45.2)	37 (50.7)	3 (4.1)	25 (36.2) ^c	42 (60.9) ^c	2 (2.9) ^c
	Conduct a stakeholder analysis	34 (47.2) ^c	33 (45.8) ^c	5 (6.9) ^c	9 (12.5) ^c	43 (59.7) ^c	20 (27.8) ^c	8 (15.4) ^c	38 (73.1) ^c	6 (11.5) ^c
	Assess the barriers and drivers to implementing the best practice	46 (64.8) ^b	25 (35.2) ^b	0 (0) ^b	17 (23.6) ^c	50 (69.4) ^c	5 (6.9) ^c	12 (17.9) ^c	48 (71.6) ^c	7 (10.4) ^c
	Prioritize the identified barriers that are feasible to address	50 (68.5)	22 (30.1)	1 (1.4)	21 (28.8)	47 (64.4)	5 (6.8)	18 (26.5)	44 (64.7)	6 (8.8)
	Select change strategies to address the identified barriers	56 (76.7)	17 (23.3)	0 (0)	30 (41.7) ^c	38 (52.8) ^c	4 (5.6) ^c	22 (32.4) ^c	43 (63.2) ^c	3 (4.4) ^c
	Field-test the selected change strategies	32 (43.8)	38 (52.1)	3 (4.1)	13 (17.8)	52 (71.2)	8 (11.0)	13 (20.0)	50 (76.9)	2 (3.1)
	Create a plan for a “process evaluation”	42 (59.2) ^c	26 (36.6) ^c	3 (4.2) ^c	12 (16.9) ^b	47 (66.2) ^b	12 (16.9) ^b	10 (16.9) ^b	44 (74.6) ^b	5 (8.5) ^b
	Create a plan for an “outcome evaluation”	46 (63.9) ^c	23 (31.9) ^c	3 (4.2) ^c	21 (29.2) ^c	39 (54.2) ^c	12 (16.7) ^c	16 (27.1) ^b	37 (62.7) ^b	6 (10.2) ^b
PHASE 3	Complete a pre-launch checklist	23 (31.5)	43 (58.9)	7 (9.6)	8 (11.0)	46 (63.0)	19 (26.0)	8 (14.8)	46 (85.2)	0 (0)
	Create a “sustainability plan”	45 (62.5) ^c	25 (34.7) ^c	2 (2.8) ^c	13 (18.1) ^c	43 (59.7) ^c	16 (22.2) ^c	10 (17.9) ^c	41 (73.2) ^c	5 (8.9) ^c
	Use data to assess if the best practice is being used	50 (70.4) ^b	18 (25.4) ^b	3 (4.2) ^b	15 (20.8) ^c	49 (68.1) ^c	8 (11.1) ^c	16 (25.0) ^c	44 (68.8) ^c	4 (6.3) ^c
	Use data to assess if use of best practice resulted in the desired outcomes	46 (63.9) ^c	24 (33.3) ^c	2 (2.8) ^c	17 (23.6) ^c	46 (63.9) ^c	9 (12.5) ^c	15 (24.2) ^b	41 (66.1) ^b	6 (9.7) ^b
	Use the monitoring and evaluation findings to adjust the change strategies	44 (62.0) ^b	26 (36.6) ^b	1 (1.4) ^b	15 (21.1) ^b	48 (67.6) ^b	8 (11.3) ^b	14 (22.2) ^b	45 (71.4) ^b	4 (6.3) ^b
	Use strategies to sustain use of the best practice over time	52 (73.2) ^b	18 (25.4) ^b	1 (1.4) ^b	16 (22.5) ^b	47 (66.2) ^b	8 (11.3) ^b	12 (19.0) ^b	50 (79.4) ^b	1 (1.6) ^b
	Use data to assess if sustainability strategies are maintaining use of best practice	34 (47.9) ^b	31 (43.7) ^b	6 (8.5) ^b	7 (9.7) ^c	47 (65.3) ^c	18 (25.0) ^c	11 (20.4) ^c	40 (74.1) ^c	3 (5.6) ^c
	Consider equity, diversity, and inclusion (EDI) throughout the implementation process	50 (71.4) ^d	20 (28.6) ^d	0 (0) ^d	23 (32.9) ^d	41 (58.6) ^d	6 (8.6) ^d	16 (25.0) ^d	40 (62.5) ^d	8 (12.5) ^d

^aDenominator only includes those who indicated they “always” or “sometimes” do the step.^bTwo respondents skipped this question; denominator adjusted accordingly.^cOne respondent skipped this question; denominator adjusted accordingly.^dThree respondents skipped this question; denominator adjusted accordingly.

Note: 10 records had at least one missing value in this set of questions (63 had complete response set).

Green font = Top quartile

Red font = Bottom quartile

Additional File 5.7 Equity, diversity, and inclusion (EDI) considerations during implementation process (N=64)

Steps during which team explicitly considers EDI^a	n (%)^b
When creating the core working group (e.g., aiming for diversity and representation on the team)	41 (64.1)
When consulting with interested and affected parties (e.g., aiming for consultation with a diverse group)	46 (71.9)
When prioritizing what practice problem needs to be addressed (e.g., prioritizing problems to improve equity)	39 (60.9)
When selecting or modifying the specific solution (guideline, program, practice) to be implemented (e.g., using solutions that meet EDI criteria)	32 (50.0)
When learning about potential barriers to implementing the solution (e.g., including questions to explore EDI considerations)	44 (68.8)
When evaluating the practice change (e.g., selecting EDI-relevant outcome measures)	22 (34.4)
When working to sustain the practice change (e.g., including EDI considerations for sustaining the change)	24 (37.5)

^a*Respondents could select more than one response option*

^b*Denominator only includes those who answered “always” or “sometimes” to the question “How often does your team consider equity, diversity, and inclusion (EDI) throughout the implementation process?”*

Additional File 5.8 Training, knowledge, and confidence related to using an evidence-informed approach to implement clinical practice changes (N=72)

		Any previous training^a	No previous training^a
Self-rated knowledge using evidence-informed approaches to change clinical practice	Extremely or very knowledgeable	21 (43.8)	4 (16.7)
	Moderately knowledgeable	21 (43.8)	13 (54.2)
	Not at all or slightly knowledgeable	6 (12.5)	7 (29.2)
Self-rated confidence using evidence-informed approaches to change clinical practice	Extremely or very confident	26 (54.2)	7 (28.0)
	Moderately confident	20 (41.7)	13 (52.0)
	Not at all or slightly confident	2 (4.2)	5 (20.0)

^aTraining includes any one of quality improvement, knowledge translation, implementation practice, or implementation science.

Additional File 5.9 Additional data tables on participants' desire for an implementation toolkit and preferred learning approaches and supports (unpublished)

When the toolkit becomes available, how likely would your team be to use it? (N=69)

Rating	Number of respondents n (%)
Very likely	27 (39)
Likely	40 (58)
Neutral	2 (3)
Unlikely	0 (0)
Very unlikely	0 (0)
I don't know	0 (0)

How important would the following features be in a practice change toolkit? (N=69)

	Very important n (%)	Somewhat important n (%)	Not important n (%)
Information explaining <i>what</i> steps to take in the clinical practice change process	68 (99)	1 (1)	0 (0)
Information explaining <i>why</i> undertaking various steps in the clinical practice change process is critical	53 (77)	16 (24)	0 (0)
Information explaining <i>how</i> to undertake various steps in the clinical practice change process	64 (93)	5 (7)	0 (0)
<i>Lessons learned</i> from other maternal-newborn teams during their practice change initiatives	56 (81)	13 (19)	0 (0)
<i>Links</i> to other resources to support practice change initiatives	59 (86)	9 (13)	1 (1)
<i>Tools and templates</i> to support practice change initiatives	64 (94)	4 (6%)	0 (0)
Access to an <i>online</i> version of the toolkit	66 (97)	2 (3)	0 (0)
Access to a <i>paper-based</i> version of the toolkit	38 (56)	21 (31)	9 (13)

Generally, how does your team prefer to learn new information? From the list below, please select your top three learning approaches (N=69)

Learning approach	Number of respondents who selected option in their top 3 preferences n (%)
Independent, self-directed learning using educational materials	28 (41)
Online courses or workshops that are directed by an instructor	46 (67)
In-person courses or workshops that are directed by an instructor	53 (77)
Learning by doing (experiential learning)	31 (45)
Tailored coaching or mentoring by a content expert	19 (28)
Participating in a community of practice to learn from others	14 (20)
Other - simulations	1 (1)

When the toolkit becomes available, would any of these additional resources be of interest to you and your team? (N=69)

Resource	n (%)
Webinar providing an overview of the toolkit's content and how to use it	59 (86)
Ongoing support from a BORN staff member to advise on using the toolkit	47 (68)
Community of practice to connect with other maternal-newborn teams using the toolkit	36 (52)
Brief user tip sheets on how to apply the toolkit	61 (88)
A webpage to access toolkit content, tools, and templates	55 (80)
A slide deck on the toolkit's content that can be tailored for your own use	50 (73)
Other ideas – checklist and timelines	1 (1)

If BORN Ontario offered training on how to apply the toolkit in your practice change initiatives, how likely would your team be to access this training? (N=69)

Rating	Number of respondents n (%)
Very likely	30 (44)
Likely	31 (45)
Neutral	7 (10)
Unlikely	0 (0)
Very unlikely	1 (1)
I don't know	0 (0)

If BORN Ontario offered ongoing support and consultations on how to implement practice changes in maternal-newborn care, how likely would your team be to use this service? (N=70)

Rating	Number of respondents n (%)
Very likely	28 (40%)
Likely	31 (44%)
Neutral	11 (16%)
Unlikely	0 (0%)
Very unlikely	0 (0%)
I don't know	0 (0%)

Chapter 6: Creating and situating the implementation toolkit

The previous three chapters (Chapters 3, 4, 5) described a series of studies that were conducted to inform the toolkit. The next step was to synthesize these data and draft the toolkit. The purpose of this chapter is to describe the process used to create the first draft of the toolkit and how it may be conceptualized as an implementation strategy. First, I describe how the previous studies informed the development of the toolkit, introduce the toolkit as an implementation strategy, and describe the principles used to guide the toolkit development process and content. Next, I describe how the results from the previous chapters were used to inform the toolkit draft, the process used to obtain team feedback on the initial draft, and the resulting changes. Finally, I specify and operationalize the components of the toolkit as an implementation strategy. Together, this information is intended to provide transparency on how the toolkit was developed and describe how the toolkit is situated within implementation science.

6.1 Confirming the need for the toolkit

Overall, the findings from Studies 2 and 3 (Chapters 4 and 5) demonstrated that current implementation processes in Ontario maternal-newborn settings are not fully aligned with recommendations from implementation science, and there are areas for improvement. Healthcare providers and leaders indicated they are interested in learning more about evidence-informed approaches to implementation and desire resources to guide their practice change initiatives (Study 3, Chapter 5). These findings provided sufficient rationale to move forward with drafting the toolkit.

6.2 Situating the toolkit as an implementation strategy

Before describing how the toolkit was drafted, it is important to clarify how it may be labeled and situated within current concepts in implementation science. In implementation science and practice, there is a need to be clear about the *thing* (practice, program, innovation) that is being implemented, and the *things we do* to facilitate uptake and adoption of the thing (Curran, 2020). The *things we do* to facilitate uptake of practices, programs, and innovations are known as *implementation strategies*, which are “methods or actions that aim to overcome implementation barriers, increase the pace and effectiveness of implementation, and sustain interventions over time” (The Centre for Effective Services, 2022, ¶1). In this thesis, I aimed to develop an implementation strategy (in this case, a toolkit) to strengthen the implementation processes used by teams when implementing evidence-informed practices. The quality of the implementation process is a known determinant that influences implementation success. For example, in the Consolidated Framework for Implementation Research (CFIR), the Implementation Process domain identifies nine constructs influencing implementation success (e.g., working as a team, assessing needs, tailoring strategies, and evaluation) (Damschroder et al., 2022). I aimed to create a toolkit that addresses those constructs and more that could be used as an implementation strategy to help teams overcome implementation-process related barriers.

6.3 Purpose and guiding principles

Before drafting the toolkit, the team defined its scope and purpose. The primary purpose of the toolkit was to further develop healthcare professionals’ and leaders’ capacity to implement evidence-informed practices. The secondary purpose of the toolkit was to guide practitioners to use BORN data, information, and resources throughout the implementation process, where appropriate, to support practice changes. Given the diversity of the potential users and settings,

we aimed to design a toolkit that would be broadly applicable and written for those who were new to implementation science and practice.

The team used guiding principles to inform the toolkit drafting process. Consistent with the user-centered design and integrated knowledge translation (IKT) approaches described in Chapter 1 and Chapter 2, respectively, partnering with knowledge users and integrating their diverse experiences was central to the process. While the goal was to ground the toolkit in the best available evidence from implementation science, we also aimed to integrate the experiential knowledge of healthcare providers, leaders, and those with lived experience receiving maternal-newborn care. We believed that toolkit development should be intentional and systematic: we carefully assessed the findings from the earlier studies and documented decisions about how to apply them; we negotiated the roles and responsibilities of the different team members in drafting the toolkit; and we collected feedback on the toolkit draft from the team, documenting which changes were made or not, with the rationale. We aimed to keep our draft simple with limited features so we could remain nimble in responding to changes through our multiple feedback cycles. The guiding principles used to inform toolkit development were adapted and expanded to inform the toolkit content itself (see Table 6.1).

Table 6.1 Guiding principles for developing toolkit content^a

The implementation process requires:
• Systematic planning to achieve successful practice changes that are sustained; • Integration of the best available evidence with the expertise of healthcare providers/staff and the needs and preferences of patients and families to inform what changes are implemented; • Use of evidence from implementation science and practice to inform the change process used; • Leadership and facilitation to drive and nurture implementation; • Engagement of partners and interested and affected parties throughout the process to ensure practice changes are person- and family-centered and clinician friendly; • An approach that is rigorous but pragmatic to optimize benefit and impact; and • Consideration of equity, diversity, and inclusion (EDI) in each phase and step of the process

^a*Adapted from (Graham et al., 2022)*

6.4 Developing the initial toolkit draft

Upon completing Studies 1, 2, 3 (Chapters 3, 4, 5), we synthesized the findings and organized them according to the Implementation Roadmap (Harrison & Graham, 2021). Specifically, we identified what the studies contributed to each of the Implementation Roadmap steps, what was similar and different across the studies, and how the findings could inform the content of the toolkit draft. Table 6.2 presents a summary of this synthesis.

Table 6.2 Summary of findings from Studies 1, 2, 3 organized by Implementation Roadmap steps

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 (Mixed-methods) Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 (Secondary analysis) Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 (Provincial survey) Perspective = Healthcare professionals and leaders (n=73)			
Identify problem	15/17 (88%) described this - Requires significant time as foundational for all other content - Need to strike balance—be thorough without losing sight	22/22 (100%) described this - Different ways to identify problems (e.g., dashboard; provincial, regional, organizational priorities; guidelines)	- Identifying relevant issue in top quartile for importance, completion, confidence (95% very important, 67% always do, 47% very confident) - Room for improvement as only 47% are very confident doing it	All studies found this step is important (“foundational”)	Only 67% in Study 3 “always” identified a problem—potentially signals more top-down initiatives	- Created pathways in toolkit for different starting points (including top-down initiatives) - Used examples of how teams identify problems to address (Study 2) - Highlighted comprehensive process to identify and understand issue, but kept focused on moving users to next steps
Form a team; engage partners	- All discussed importance of relational skills in implementation 9/17 (53%) described forming and maintaining an implementation team 17/17 described how to identify and engage interested and affected parties	5/22 (23%) described <i>informing</i> staff of changes 12/22 (55%) described <i>consulting</i> with staff 6/22 (27%) described <i>involving</i> staff 2/22 (9%) described <i>collaborating</i> with staff as partners	- Form a working group (67% very important, 38% always do, 36% very confident) - Involve stakeholders throughout implementation (77% very important, 41% always do, 30% very confident)	- Both experts (Study 1) and practitioners (Study 3) identified forming a team and engaging partners as important - Practitioners in Studies 2,3 reported low rates of engaging with interested and affected parties	- Experts focused more on need for relational skills in implementation (Study 1) than practitioners (Studies 2,3) - More experts described overall engagement and patient engagement (Study 1) than	- Emphasized importance of and how to form a core implementation team - Emphasized importance of and how to engage partners throughout entire implementation process

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 (Mixed-methods) Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 (Secondary analysis) Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 (Provincial survey) Perspective = Healthcare professionals and leaders (n=73)			
	14/17 (82%) described how to include health consumers (patients) 11/17 (65%) discussed building implementation leadership and facilitation	1/22 (5%) described involving patient advisors	- Conduct stakeholder analysis (47% very important, 13% always do, 15% very confident) - Confirm stakeholders endorse practice (81% very important, 43% always do, 34% very confident) - The number of roles engaged in process decreased from phase 1-3		practitioners (Studies 2,3)	- Included content on engaging patients and families - Emphasized relational nature of implementation, including content and reflection questions on trust, power, and working inter-professionally
Identify best practice	12/17 (71%) described this - Teams may jump to “bright and shiny” things or single studies; need to teach searching and appraisal skills - Teach other forms of evidence (e.g., experiential) - Difficult to fit in team’s roles; important to make aware of resources	7/22 (32%) described identifying evidence 1/22 (5%) described appraising evidence 1/22 (5%) described customizing the best practice	- Identifying evidence, assessing quality, customizing evidence were nearly all in top quartile for importance, completion, confidence - Room for improvement as completion and confidence still low - Use research evidence (62%)	- This step is important from perspective of experts and practitioners (Studies 1,3) - Few practitioners assessing and adapting evidence (Studies 1,2,3) - Additional support needed (recommendation for information specialist resources)	- More experts described this than practitioners (Study 1 vs 2) - More practitioners indicated doing this step in Study 3 vs Study 2 (but asked explicitly in Study 3)	- Provided guidance on how to identify best practices - Used examples of where to find guidelines - Provided guidance on why and how to appraise evidence - Explained evidence can be adapted and how - Directed users to resources (e.g.

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 (Mixed-methods) Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 (Secondary analysis) Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 (Provincial survey) Perspective = Healthcare professionals and leaders (n=73)			
	Many do not know evidence can be adapted; need to show how to assess organizational context and adapt evidence to optimize fit		always do, 58% very confident) - Assess evidence (40% always do, 35% very confident) - Adapt evidence (45% always do, 36% very confident)	in Study 1 aligns with lower confidence levels in Study 3)		information specialist) Cautioned against jumping to solutions too quickly and without sufficient evidence
Assemble local evidence on context and current practices	15/17 (88%) described this - Highlighted need to measure evidence-practice gap, assess context, and explore problem from multiple perspectives	17/22 (77%) described learning about current practice 2/22 (9%) measured evidence-practice gap	- Collect local data to learn about current practice (74% very important, 41% always do, 37% very confident) - Determine evidence-practice gap (67% very important, 38% always do, 31% very confident)	- Assessing current practice is important from perspective of experts and practitioners (Studies 1,2,3) - Few practitioners are measuring the evidence practice gap (Studies 2,3)	More experts described importance of measuring evidence-practice gap than practitioners (Study 1 vs Studies 2,3)	- Used examples of how to learn about current practice (e.g., engage decision support) - Highlighted importance of measuring evidence-practice gap and how to do it - Highlighted importance of context and multiple perspectives
Discover barriers and drivers	15/17 (88%) described this - Teams often skip this step and jump from evidence	21/22 (95%) described this; however, most were in general descriptions:	Importance of assessing and prioritizing barriers and drivers was moderate (65% and	Assessing barriers and drivers is viewed as important from perspective of experts and	Only experts identified implementation TMFs to assess barriers and drivers (Study 1);	Introduced implementation TMFs to facilitate assessing barriers and drivers, while acknowledging

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 (Mixed-methods) Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 (Secondary analysis) Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 (Provincial survey) Perspective = Healthcare professionals and leaders (n=73)			
	- selection to implementation - Teaching often includes theories, models, frameworks (TMFs)	- Only 3/22 (14%) described a systematic process (using quality improvement (QI) approach) 0/22 described prioritizing which barriers to address	69% said very important) - Room for improvement as completion and confidence still low - Assess barriers and drivers (24% always do, 18% very confident) - Prioritize barriers and drivers (29% always do, 27% very confident)	- practitioners (Studies 1,2,3) - Few practitioners are using a systematic approach to assessing or prioritizing barriers and drivers (Studies 2,3) - Few practitioners systematically complete this step (Studies 1,2,3)	practitioners highlighted use of QI tools (Study 2)	- existing QI tools and concepts - Highlighted importance of not skipping this step and why it is essential for success - Provided templates to help users systematically walk through the assessment and prioritization process
Tailor implementation strategies	15/17 (88%) described this - Teams default to familiar strategies; need to showcase full range of strategies - Important to show how to map barriers to strategies; often using TMFs	- All described at least one strategy to implement practice changes - Only 5/22 (23%) described tailoring strategies to barriers and only 7/22 (32%) described tailoring strategies to context	- Selecting change strategies to address barriers in top quarter for importance (77% said very important) - Completion and confidence still low (42% always do, 32% very confident)	- Tailoring strategies is viewed as important from perspective of experts and practitioners (Studies 1,3) - Both experts and practitioners indicated strategies selected are familiar, rather than tailored to barriers and context (Studies 1,2)	More experts described tailoring strategies than practitioners (Studies 1,2,3)	- Included content on broad spectrum of implementation strategies (using established TMFs and taxonomies) - Introduced systematic process for selecting strategies based on barriers and context
Field-test/pilot	N/A	2/22 (9%) described piloting change	Field-test change strategies was rated	Practitioners in Studies 2 and 3 both	N/A	Reinforced value of field-testing and

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 (Mixed-methods) Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 (Secondary analysis) Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 (Provincial survey) Perspective = Healthcare professionals and leaders (n=73)			
		initiatives prior to full implementation	in bottom quarter for importance, completion, and confidence (44% very important, 18% always do, 20% very confident)	described low rates of completion for this step		why it is important for future success • Outlined steps and provided templates for how to pilot during implementation process
Monitor & evaluate	• 15/17 (88%) described this • Can be unfamiliar and intimidating to learners; focus on “nuts and bolts” • Reinforced importance of monitoring for course corrections • Use logic models and TMFs	• 0/22 described planning an evaluation plan before implementation • 18/22 (82%) described engaging in some form of monitoring • Key challenge is access to timely data • 1/22 (5%) said they do a formal evaluation (process/outcome)	• Compared to other steps, rates for planning and conducting evaluations were lower • Plan <i>process</i> evaluation (59% very important, 17% always do, 17% very confident) • Plan <i>outcome</i> evaluation (64% very important, 29% always do, 27% very confident) • Assess if practice is being used (70% very important, 21% always do, 25% very confident)	• Few practitioners are planning monitoring and evaluation activities before launch (Studies 2,3) • Both experts and practitioners indicated evaluation is unfamiliar to those in practice (as indicated by low confidence in Study 3) • Both experts and practitioners highlighted monitoring activities (Studies 1,2)	• Only the experts referred to logic models and TMFs for evaluations • More experts discussed evaluations than practitioners (Study 1 vs Study 2)	• Highlighted why monitoring and evaluation planning needs to be done <i>before</i> launch; provided templates to do so • Reinforced importance of monitoring for course corrections • Provided information on importance and “how to” for both process and outcome evaluations • Addressed issue of timely data and highlighted what data sources can be used for monitoring

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 (Mixed-methods) Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 (Secondary analysis) Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 (Provincial survey) Perspective = Healthcare professionals and leaders (n=73)			
			- Assess if desired outcomes achieved (64% very important, 24% always do, 24% very confident) - Use monitoring and evaluation to adjust strategies (62% very important, 21% always do, 22% very confident)			and evaluation activities
Sustain, spread, and scale	11/17 (65%) described this 1/17 (6%) mentioned spread and scale - Often introduced at end, but need to reinforce consideration throughout process	16/22 (73%) described taking steps to ensure sustainability - Some of the examples given are actions taken earlier in process, not just at end	- Create sustainability plan (63% very important, 18% always do, 18% very confident) - Use sustainability strategies (73% very important, 23% always do, 19% very confident) - Use data to assess sustainability strategies (48% very important, 10% always do, 20% very confident)	Both experts and practitioners indicated sustainability considerations start before launch (Studies 1,2)	- Differences in number of practitioners reporting sustainability (higher in Study 2 vs 3) - Only experts mentioned spread and scale (Study 1)	- Embedded sustainability considerations throughout toolkit - Provided example sustainability strategies from participants - Provided guidance on why and how to plan for sustainability

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 (Mixed-methods) Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 (Secondary analysis) Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 (Provincial survey) Perspective = Healthcare professionals and leaders (n=73)			
Other – Using a process and TMFs	• 12/17 (71%) described importance of taking a process approach to implementation • Importance of developing a comprehensive plan and not jumping in too quickly • 17/17 (100%) included 2+ implementation TMFs • Intimidating to practitioners; need to focus on application of TMFs	• 9/22 (41%) named a formal process or framework; many were based in QI	• 16/69 (23%) had a mandatory process; 18/69 (26%) had an optional process • Most common processes and TMFs were based in QI	• Similar proportions of practitioners in Studies 2 and 3 reported using formal frameworks or processes for practice changes	• Experts focused on TMFs from implementation and knowledge translation (KT) (Study 1); practitioners more commonly referred to tools from QI (Studies 2,3) • Experts more frequently highlighted the importance of using a process or TMF for implementation	• Structured toolkit to help users work through the iterative implementation process • Included information and template to make an implementation plan • Information on implementation TMFs focused on <i>how</i> to use them • Integrated QI concepts throughout toolkit where possible
Other - Dissemination	• 5/17 (29%) described content on disseminating project findings (e.g., how to disseminate project findings to interested and affected parties and decision-makers)	• N/A	• N/A	• N/A	• This was only mentioned by experts (Study 1); however, practitioners were not asked about dissemination (Studies 2,3)	• Included some content on how to craft and tailor key project findings and learnings
Other – Equity, Diversity, Inclusion (EDI) considerations	• Experts described taking an intersectionality lens, considerations	• N/A	• Consider EDI throughout implementation is	• Both experts and practitioners acknowledged importance of EDI	• N/A	• Embedded EDI and intersectionality considerations throughout toolkit

Implementation Roadmap Step	What we learned about this step in...			Key similarities across papers	Key differences across papers	How these findings informed the toolkit
	Study 1, Chapter 3 <i>(Mixed-methods)</i> Perspective = Implementation experts (n=33 people, 17 teams)	Study 2, Chapter 4 <i>(Secondary analysis)</i> Perspective = Nursing leaders (n=22)	Study 3, Chapter 5 <i>(Provincial survey)</i> Perspective = Healthcare professionals and leaders (n=73)			
	for EDI, and taking a principled approach to partnerships		important (71% very important) • However, only 33% always do, 25% very confident	considerations (Studies 1,3) • Experts identify need for teaching this content (Study 1), which aligns with low rates of completion and confidence in practitioners (Study 3)		

Abbreviations: **EDI** = Equity, Diversity, and Inclusion; **KT** = Knowledge Translation; **QI** = Quality Improvement; **TMF** = Theories, Models, and Frameworks

Between January to June 2024, I drafted the toolkit content, collaborating with my thesis supervisor on a weekly basis to discuss the evolving content and organization of the draft. In June 2024, the toolkit draft was shared with the full research team and two other people from BORN Ontario (the “reviewers”) and discussed at a Thesis Advisory Committee meeting. This ensured I had a variety of perspectives represented (e.g., health leaders, nurse educators, clinical nurses, implementation and knowledge translation scientists, hospital intermediaries, and people with lived experience). I provided the reviewers with guiding questions to consider as they read each step (chapter) in the toolkit draft, including:

- Did the chapter clearly describe what needs to be done in the step?
- Did the chapter clearly describe why the step needs to be done?
- Did the chapter provide sufficient guidance on how to complete the step?
- Will the templates support teams to complete the step?
- Is the information in this chapter relevant to maternal-newborn hospital teams?
- Is the information in this chapter easy to understand?
- Was the information in this chapter too short, too long, or just right? If too short, what was missing? If too long, what could be cut?

Between July and August 2024, I received feedback on the toolkit from all reviewers (n=11), which I then applied to the toolkit draft. Overall, the core toolkit content and structure were retained, but the reviewers’ recommendations resulted in many changes (over 1,800 additions, deletions, or movements). The key changes are summarized below.

Changes to language and style

- Corrections to spelling, grammar, and formatting errors.
- Wording and phrasing edits throughout to increase clarity and reduce repetition.
- Definitions added in text for key terms (e.g., learning health systems, evidence-informed).
- Improved unclear language and used terms more consistently (e.g., clarifying the difference between a “problem” and an “evidence-practice gap” and revising text for consistency).
- Language changes to replace terms with those more commonly used and understood by healthcare professionals.
- Some content re-arranged within steps to improve flow and/or decrease repetition (e.g., introduction section, step 1 re-ordered).

Changes to content and templates

- Added an introduction page with information about BORN Ontario to better connect the content of the toolkit to their mission.
- Added a table to the Appendix (adapted from Harrison & Graham Implementation Roadmap book) to illustrate how the steps in the toolkit align with quality improvement approaches.
- “Where do we start” table revised to more clearly align the toolkit steps with the different examples provided.
- Section on assessing team dynamics was moved from previous evaluation step up into forming the working group step.

- Replaced the original partnership assessment tool (which was developed for research purposes) with another designed for non-research partnerships.
- Built in content, tips, and considerations throughout based on the team’s experiential knowledge with implementation, for example:
 - highlighting key people and resources teams could consider for various steps and activities;
 - making connections to different quality improvement tools and approaches; and
 - emphasizing the importance of engaging leadership in the implementation process.
- Added content to strengthen equity, diversity, and inclusion considerations.
- Added tip boxes on:
 - the need to pay attention to power dynamics when assessing perceptions of partnerships;
 - dealing with outdated guidelines; and
 - different responses to evidence-practice gaps and how to manage those responses.
- Expanded on several “BORN tips” based on the knowledge and experience of BORN team members.
- Some examples re-worked based on feedback from clinical team members.
- Added content to better link steps to one another or highlight that key steps will be addressed in an upcoming section.
- Added further content to strengthen the rationale for why some steps are important to complete.
- Wove content throughout the toolkit on the iterative and contextual nature of implementing changes.

- Made changes to some templates to improve ease of completion and accuracy (e.g., adding tick boxes with more granular scales, building in eligibility considerations when calculating evidence-practice gap).
- “Monitoring and evaluation” section split into two separate steps: one on monitoring and one on evaluation.
- New monitoring section re-structured to show the distinction between monitoring for adherence and monitoring the implementation strategies, with new templates created to facilitate each monitoring component.
- Figures and examples in the final step were revised to reflect the new monitoring and evaluation content.

6.5 The toolkit draft

Upon integrating the reviewers’ feedback, we had a complete draft of the toolkit that was ready to be shared for external feedback (see Study 4, Chapter 7). The draft was approximately 150 pages and included 13 steps, 33 activities, and 26 templates (Appendix D). Note that Appendix D presents the version of the toolkit that was developed and evaluated within the context of this doctoral thesis to show the general structure and format of the toolkit; it does not represent a final product and is not intended for widespread use.

6.6 Describing the components of the toolkit as an implementation strategy

As described earlier in this chapter, we conceptualized the toolkit as an implementation strategy that teams can use to improve the quality of their processes when implementing an evidence-informed practice. This, in turn, should facilitate improved uptake of the evidence-informed practice. There has been a proliferation of literature on implementation strategies, but there remains limited conceptual clarity due to inconsistent use of terms and limited descriptions

(Powell et al., 2015, 2017). Given the importance of defining and operationalizing implementation strategies to ensure measurability and reproducibility (Proctor et al., 2013), I next describe the components of the implementation strategy (toolkit) in more detail.

Using the classification system of Leeman and colleagues (Leeman et al., 2017), the toolkit may be considered an “implementation process strategy,” as it is meant to be used by those in the healthcare delivery system and focuses on the process used to embed an evidence-informed recommendation in practice. While the toolkit is an implementation process strategy, the content of the toolkit also includes “integration strategies,” which are the strategies used to target determinants at the individual and organizational level related to the evidence-informed practice being implemented (Leeman et al., 2017). Specifically, Phase 2 of the toolkit guides users through the process of assessing the barriers and drivers in their context and designing implementation strategies that address the identified determinants. Finally, the toolkit includes elements of “capacity-building strategies” (Leeman et al., 2017) as it provides the background information to teach users about implementation as well as practical templates to help them action the information in their settings.

The components of the implementation strategy (toolkit) are described according to Proctor and colleagues’ framework in Table 6.3. It is important to note that these specifications are based on the toolkit’s potential or hypothetical application, and the specifications will likely change as the toolkit undergoes field-testing and continues to be refined.

Table 6.3 Specification domains for the toolkit as an implementation strategy^a

Domain	Implementation toolkit
Actor(s)	Any healthcare professional or leader (“lead”) who has been tasked with implementing an evidence-informed practice in their setting.
Action(s)	Lead reads the toolkit, collaborates with others to enact the toolkit process, adapts the toolkit steps and templates to the local context as needed, completes the templates as needed.
Target(s) of the action	Individuals using the toolkit in lead and support roles (increase in knowledge and skills) <i>which, in turn, targets</i> The implementation process itself (improved quality of implementation).
Temporality	Entire implementation process: toolkit to be used from problem identification through to sustainability.
Dose	Toolkit should be read in full before beginning efforts to implement an evidence-informed practice. Each step may be re-visited and tools completed in real-time throughout implementation process.
Implementation outcome(s) affected	Using the toolkit should result in improved acceptability, appropriateness, feasibility, adoption, and adherence to the evidence-informed practice being implemented.
Justification	The quality of the implementation process is a determinant of implementation success (Damschroder et al., 2022).

^aAs per Proctor et al., 2013

As presented in Table 6.3, using the toolkit to implement an evidence-informed practice is meant to result in improved implementation outcomes, such as the evidence-informed practice being more acceptable, appropriate, feasible, and used (adopted and adhered to). For example, Phase 1 of the toolkit walks teams through the process of understanding their context and selecting, assessing, and adapting an evidence-informed practice, which should enhance acceptability, appropriateness, and feasibility of the practice being implemented. In Phase 2 of

the toolkit, teams are guided to assess barriers and drivers to their selected evidence-informed practice and design implementation strategies to mitigate the barriers, which should again enhance acceptability, appropriateness, feasibility, and adoption of and adherence to the practice. Phases 2 and 3 focus on ongoing monitoring, evaluation, and sustainability efforts, which will help adjust and improve the implementation process over time and ultimately increase adherence and sustainability.

Finally, it is important to acknowledge that implementation strategies themselves need to be implemented. Implementing an implementation strategy requires an understanding of the innovation-, individual-, team-, and organization-level factors that may make the strategy easy or difficult to use. Understanding these factors can allow the implementation strategy (in this case, the toolkit) to be refined to best fit with user needs and contexts, and increase the acceptability, appropriateness, feasibility, and adoption of the implementation strategy itself (which is described next in Study 4, Chapter 7).

6.7 Conclusion

This chapter described the process used to develop the initial toolkit draft and how the toolkit can be conceptualized as an implementation strategy that aims to improve the process used to implement evidence-informed practices. With the toolkit drafted, the next step was to share it with a small group of potential users and collect their feedback to identify how the toolkit (an implementation strategy for implementing evidence-informed practices) could be improved. This is described next in Chapter 7 (Study 4).

6.8 References

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Chapter 7: User evaluation of an implementation toolkit for maternal-newborn settings

This chapter is provisionally accepted (revised manuscript under review) at *JBIEI Evidence Implementation* (manuscript ID: JBIEI-D-25-00059). In this study, I collaborated with a team of maternal-newborn healthcare providers, hospital intermediaries, a parent representative, and researchers to share the toolkit draft with potential users and obtain feedback on the acceptability, appropriateness, feasibility, and usability of the toolkit. Under the guidance of my Thesis Advisory Committee, I led the conceptualization and design of the study; collected, analyzed, and interpreted the survey and interview data; and wrote the first draft of the manuscript. The co-authors contributed to conceptualizing and designing the study, and/or analyzing data, and/or interpreting the findings. All co-authors made significant contributions to critically revising this manuscript and approved the final version.

Provisionally accepted: Reszel, J., Lavin Venegas, C., Dunn, S.I., Cassidy, C.E., Brownlee, J., Cloutier, M., Daub, O., Hafizi, K., Lightfoot, M., Pervez, D., Quosdorf, A., Wood, A., Graham, I.D. (2025). User evaluation of an implementation toolkit for maternal-newborn care settings. *JBIEI Evidence Implementation* [revisions submitted August 2025].

Abstract***Introduction and aims***

Applying knowledge generated from implementation science can improve the process teams use to move evidence into practice. To facilitate the use of implementation science knowledge in practice, training and resources for healthcare providers and leaders are needed. Our team developed a toolkit for maternal-newborn settings to provide guidance and tools on how to apply implementation science knowledge to their practice change initiatives. The aim of this study was to evaluate the toolkit for acceptability, appropriateness, feasibility, usability, and potential adoption.

Methods

We conducted a convergent mixed-methods study. Healthcare providers and leaders working in Ontario maternal-newborn care read the toolkit and completed a feedback survey and interview. The questionnaire included questions on toolkit content and format, and validated measures on acceptability, appropriateness, feasibility, and usability. The interviews explored questionnaire responses and application of the toolkit. Quantitative data were analyzed descriptively. Qualitative data were analyzed using directed content analysis.

Results

Participants (n=17) rated the toolkit as acceptable, appropriate, feasible, and usable, indicating the toolkit meets the need for practical resources to guide implementation. Most participants indicated their intention to use the toolkit and refer it to others. Several areas for improvement were identified, including simplifying language and content and improving the format. Participants highlighted the need to effectively disseminate the toolkit and offer training and support for its successful implementation.

Conclusions

The toolkit has the potential to improve maternal-newborn teams' implementation processes and outcomes; future work is needed to improve the toolkit and evaluate its use and impact in practice.

7.1 Background

As new evidence emerges, healthcare organizations must continually change to embed evidence-informed practices into routine practice. However, implementation is challenging with a high failure rate,¹ leading to wasted time and resources, discouragement for teams, and inappropriate care. There is growing scientific and experiential knowledge from the field of implementation science that can inform how to successfully move research evidence into practice.² However, the implementation science literature can be challenging to navigate, and training, supports, and resources are needed to facilitate the application of implementation science knowledge in practice-based settings.³

There are many strategies for building implementation capacity including in-person and online courses, workshops, webinars; mentorship and expert consultation; and fellowships and practice-based implementation activities.^{4,5} These capacity-building initiatives may have positive effects on knowledge, skills, self-efficacy, confidence, and are rated positively by participants,^{4,5} but there are challenges to developing, offering, and sustaining these more “active” training initiatives. For those developing and offering the training programs, these initiatives are often under-funded and under-resourced.⁶ From a participant perspective, the demand for training spots often exceeds capacity,^{5,7} and healthcare providers and leaders may have limited time and institutional support to complete training.^{5,8} Complementary approaches are therefore recommended to scale access to implementation training and resources including online resources, massive online open courses, social networks, discussion forums, and implementation guides and toolkits.^{5,7}

Toolkits are packages of educational materials such as literature, instructions, and templates,⁹ providing users with tools and strategies to guide implementation of practices or

programs. Toolkits can improve clinical outcomes¹⁰ and are increasingly cited in healthcare¹¹; however, they often focus on how to perform or deliver the clinical intervention, rather than on the implementation process and the “how to” derived from implementation science.

“Implementation toolkits” go beyond the clinical intervention and include information and resources on the implementation process (e.g., tools focused on defining and understanding the problem, assessing readiness, engagement and communication, evaluation, and project management).¹² An increasing number of implementation science informed toolkits are being used across diverse clinical settings. Although there is limited data on the uptake and effectiveness of toolkits,^{9,13} some are reported to be acceptable^{14,15} and feasible¹⁴; to improve users’ knowledge,¹⁵ confidence,^{15,16} and completion of implementation activities^{17,18}; as well as improve clinical practice^{13,19,20} and outcomes.^{13,19}

Given these potential benefits, and the advantage of toolkits as self-paced and broadly accessible, our team sought to develop a toolkit focused on increasing implementation capacity in Ontario maternal-newborn care settings. There are several existing toolkits in maternal-newborn care, for example, focused on midwives,¹⁶ neonatal pain management,^{14,19} safe use of oxytocin,²¹ the World Health Organization’s intrapartum and postnatal care guidelines,²² and the California Maternal Quality Care Collaborative toolkits.²³ However, none fit our setting or goals, as the existing toolkits were specific to particular clinical issues, guidelines, or professions, rather than providing a generic structure that could be applied to any evidence-informed practice change in an interdisciplinary setting. In addition, while some toolkits applied implementation theories, models, and frameworks in one or more steps and tools, none explicitly used an implementation process or planned-action model (which offer full spectrum guidance on how to plan and execute implementation projects)²⁴ as the underpinning structure. We therefore decided

to develop our own implementation science-informed toolkit that could be applicable to any clinical practice change initiative in Ontario maternal-newborn care settings. Below we briefly describe the toolkit development process.

Using an integrated knowledge translation approach, the toolkit was developed in partnership with the Better Outcomes Registry & Network (BORN), the province's perinatal, newborn, and child data registry that captures nearly all 140,000 births in Ontario annually across >90 birthing hospitals.²⁵ BORN collects, interprets, shares, and supports use of data and information on a wide range of clinical practices and outcomes, with the mission of improving and facilitating care.²⁵ In alignment with this mission and data partners' desire for implementation resources,²⁶ our team aimed to develop a resource to help Ontario maternal-newborn departments learn about and apply best practices from implementation science and leverage BORN data and information to identify and close evidence-practice gaps.

The quality of the implementation process is a determinant that influences the likelihood of an evidence-informed practice being adopted and sustained.²⁷ The toolkit is an *implementation strategy* that addresses this determinant. The toolkit is based on Harrison and Graham's Implementation Roadmap framework, a planned-action framework²⁴ that guides users through the steps to move evidence into practice.²⁸ To determine toolkit content, we conducted three studies. We surveyed and interviewed implementation experts to identify key content for teaching healthcare providers to apply implementation science knowledge in practice.²⁹ We also conducted a secondary qualitative analysis³⁰ and survey²⁶ to compare current implementation practices to the Implementation Roadmap²⁸ and identify where healthcare providers and leaders may need additional learning and support. These findings informed the toolkit draft (drafted by the first (JR) and senior author (IDG)), which was reviewed by our team with lived experience

and expertise in implementation science and practice, quality improvement, clinical practice, and BORN data and information. Upon integrating the team's feedback, the toolkit was ~150 pages organized in three phases with 13 steps, 33 activities, and 26 templates (Table 7.1). Each step included: educational content to explain what each step is and why it is important; considerations for equity, diversity, and inclusion; descriptions of recommended activities; templates to action the step; information on how BORN data and information can be leveraged; and summary checklists and a work plan to track progress. This version was reviewed by our target audience, which we report here.

Table 7.1 Organization and content of the implementation toolkit draft

Phase	Step	Activities	Tools/Templates
Phase 1	Step 1 Call to action	• Activity 1.1. Identify what “problem” to work on • Activity 1.2 Form the working group • Activity 1.3 Identify and engage other key partners • Activity 1.4 Consider how to assess team dynamics and perceptions of the partnership	• Template 1A Issue prioritization matrix • Template 1B Invitation for patient and family partners • Template 1C Questions to assess patient or family member preferences for involvement • Template 1D Mapping potential partners and levels of engagement
	Step 2 Understand the problem	• Activity 2.1 Understand the problem from different perspectives • Activity 2.2 Formulate the problem statement	• Template 2A Exploring the problem from different perspectives
	Step 3 Select an evidence-informed solution (guideline) to address the clinical problem	• Activity 3.1 Identify evidence-informed solutions • Activity 3.2 Assess the quality of the evidence-informed solution (guideline) • Activity 3.3 Prioritize recommendations • Activity 3.4 Select and assess the quality of the guideline recommendation(s)	• Template 3A Discussion questions to assess guideline quality • Template 3B Prioritizing what recommendation to work on • Template 3C Discussion questions to assess recommendation quality
	Step 4 Understand current practice and define your evidence-practice gap	• Activity 4.1 Understand current practice • Activity 4.2 Measure the evidence-practice gap	• Template 4A Exploring current practice related to the selected guideline recommendation(s) • Template 4B Assessment of guideline recommendation against SMART indicator criteria • Template 4C Tool for calculating baseline adherence rate and evidence-practice gap
	Step 5 Customize the best practice recommendation to the local context and identify goals	• Activity 5.1 Analyze the best practice – who needs to do what, when, to whom and under what circumstances • Activity 5.2 Clarify the outcomes that may be achieved by following the recommendation	• Template 5A Worksheet to clarify who needs to do what, when, to whom and under what circumstances • Template 5B Anticipated outcomes of following selected recommendation
	Step 6 Making the decision to proceed (or not)	• Activity 6.1 Assess the best practice for feasibility, applicability, acceptability, affordability, and equity • Activity 6.2 Develop your budget • Activity 6.3 Firm up the business case	• Template 6A Feasibility, Applicability, Acceptability, Equity, and Affordability (FAAEA) Check • Template 6B Business case template

Phase	Step	Activities	Tools/Templates
Phase 2	Step 7 Identify barriers and drivers	• Activity 7.1 Identify who to consult about barriers and drivers • Activity 7.2 Conduct a barriers and drivers assessment • Activity 7.3 Summarize and prioritize barriers to address	• Template 7A Who is directly and indirectly affected by the best practice recommendation? • Template 7B What is the influence and support level of the interested and affected parties? • Template 7C Discussion guide for learning about barriers and drivers to best practice implementation from different perspectives • Template 7D Which factors will be a barrier or a driver to your practice change initiative?
	Step 8 Select and refine implementation strategies	• Activity 8.1 Identify implementation strategies to address barriers • Activity 8.2 Refine the selected implementation strategies • Activity 8.3 Pilot the implementation strategies	• Template 8A Rating the proposed implementation strategies • Template 8B Breaking down implementation strategies by Aims, Ingredients, Mechanism, and Delivery • Template 8C Using Plan-Do-Study-Act (PDSA) to pilot implementation strategies
	Step 9 Develop a monitoring plan	• Activity 9.1 Explore how to monitor adherence to the best practice • Activity 9.2 Explore how to monitor the implementation strategies	• Template 9A Plan for monitoring adherence to the best practice • Template 9B Plan for monitoring
	Step 10 Develop an evaluation plan	• Activity 10.1 Develop an evaluation plan for your practice change initiative	• Template 10A Outcome evaluation planning matrix
	Step 11 Plan for sustainability	• Activity 11.1 Assess capacity for sustainability • Activity 11.2 Discuss strategies for sustainability	
Phase 3	Step 12 Implement	• Activity 12.1 Complete pre-launch checklist • Activity 12.2 Celebrate the launch	• Template 12A Pre-launch checklist
	Step 13 Monitor, evaluate, adjust, sustain	• Activity 13.1 Activate your monitoring and evaluation plans and use findings to adjust your approach • Activity 13.2 Share your monitoring and evaluation findings • Activity 13.3 Continue monitoring, evaluating, and adjusting into the sustainability period	

7.2 Study aim

In this study, we aimed to evaluate the initial toolkit draft to inform future improvements. Specifically, we aimed to understand perceptions of acceptability, appropriateness, feasibility, usability, and intention to use the toolkit in the future.

7.3 Methods

7.3.1 Study design

We used a convergent mixed-methods design³¹ that included a cross-sectional survey and qualitative descriptive interviews.³² The questionnaire enabled a systematic assessment of which toolkit sections required changes and measured user perceptions of key implementation constructs. The interviews explored the reasons behind questionnaire responses and examined if and how participants would use the toolkit in their settings. Both quantitative and qualitative data were weighted equally to provide a comprehensive understanding of participants' perceptions of the toolkit.

7.3.2 Participants and recruitment

We enrolled participants who represented intended users of the toolkit, namely, those responsible for leading or participating in practice change initiatives in maternal-newborn settings in Ontario hospitals. We had a target sample size of 10 to 15 people for feasibility and alignment with the recommended range of 6 to 20 users for usability testing.³³ Participants were required to read and communicate in English because the toolkit prototype was only available in English. Using convenience sampling, we recruited through two sources: individuals who provided their email for future contact in a survey study conducted by the research team,²⁶ and individuals who had consented to BORN contacting them for feedback on projects and

initiatives. Participants were invited by email, with one email reminder sent two weeks later to non-respondents.

7.3.3 Data collection tools and procedures

Participants were asked to complete three study activities: read the toolkit, complete an online questionnaire, and complete an interview, as described below. We used Proctor's Implementation Outcomes Framework to guide this study.³⁴ Implementation outcomes are markers of implementation effectiveness and are required preconditions to achieve the desired intervention outcomes.³⁴ While Proctor's implementation outcomes are most commonly applied to studying evidence-informed practices, they have also been used to study implementation strategies,³⁵ like the toolkit. We chose to focus on the implementation outcomes identified as most salient for the "early" stages of the implementation process (e.g., acceptability, appropriateness, feasibility, adoption) because our current study focused on the early developmental stages of the toolkit. We did not include fidelity or implementation cost since our study focused on exploring *hypothetical* use, rather than actual use. We also added "usability," which has more recently been identified as a distinct determinant of implementation.^{35,36} Additional File 7.1 describes these implementation constructs and the related questions in the study data collection tools. By exploring these early implementation constructs, we aimed to understand how "ready" the toolkit is for real-world application and identify areas for improvement.

7.3.3.1 Toolkit. Participants were emailed a PDF version of the toolkit prototype to read, which was anticipated to take at least three hours.

7.3.3.2 Online questionnaire. After reading the toolkit, participants completed an online questionnaire (Additional file 7.2) to document their feedback. The questionnaire, which was

developed in Research Electronic Data Capture (REDCap),³⁷ included a combination of validated scales and toolkit-specific questions developed by the study team.

The first section of the questionnaire included closed- and open-ended questions on each toolkit activity and template to indicate which should be “kept as is,” “modified,” or “removed” with space to describe the rationale for their ratings. The questionnaire included four validated scales: the 10-item Intervention Usability Scale (IUS),^{33,38} the 4-item Acceptability of Intervention Measure (AIM),³⁹ the 4-item Intervention Appropriateness Measure (IAM),³⁹ and the 4-item Feasibility of Intervention Measure (FIM).³⁹ The IUS, AIM, IAM, and FIM each use 5-point Likert scales ranging from strongly agree to strongly disagree. Additional questions covered the toolkit’s usefulness, format, and presentation, intention to use (adopt) the toolkit, and demographic information. The questionnaire was reviewed by the project team, piloted by two healthcare providers, and refined for better flow and functionality before being used with participants.

7.3.3.3 Interview. Upon completing the questionnaire, participants completed an individual interview (mean length=56.8 minutes, range=41-90 minutes). We used a semi-structured interview guide (Additional 7.3) with 12 questions to explore participants’ questionnaire responses and perceptions of the toolkit and its potential use in practice. All interviews were conducted by the study lead (JR), who identifies as a woman and is a masters-prepared registered nurse with previous qualitative experience. The interviewer was employed as a Knowledge Translation Specialist and was completing doctoral studies. Because participants were identified through participation in a previous study or their engagement with BORN, they were aware of the larger program of research in which this toolkit study was situated. All

interviews were completed by video-call, with participants joining from home or work. Interviews were audio-recorded and transcribed verbatim.

7.3.4 Data analysis

7.3.4.1 Questionnaire analysis. For closed-ended questions, we used descriptive analysis, presenting frequencies, percentages, and medians or means. The IUS was scored using published scoring procedures to obtain a value between 0 to 100 for each participant response; the mean of all participant IUS scores was calculated,³⁸ with a mean IUS score ≥ 70 indicating acceptable usability.⁴⁰ There was one missing value from one participant; this was managed by imputing the participant's mean score on the other responses in the scale, accounting for inverse scoring. To facilitate comparability, for each of the AIM, IAM, and FIM, we also calculated a 0-100 scaled score for each participant as follows: $[\text{obtained score} - \text{minimum possible score (4)}] / [\text{maximum possible score (20)} - \text{minimum possible score (4)}] \times 100$. We calculated the mean AIM, IAM, and FIM scores across all participants. While there are currently no cut-off scores for the three measures, higher scores suggest better acceptability, appropriateness, and feasibility.³⁹ To facilitate interpretation of where there was strong agreement versus divergence on questions, we applied a threshold of 75%, a common threshold for consensus.⁴¹ Finally, we conducted content analysis on open-ended questions.⁴²

7.3.4.2 Interview analysis. The interview transcripts were analyzed using directed content analysis.⁴³ We developed an initial coding scheme according to our selected implementation constructs, including acceptability, appropriateness, feasibility, usability, and intent to adopt the toolkit. All transcripts were coded by one team member (JR), with about 70% coded or verified by a second team member (CLV). For the first six transcripts, the two coders independently applied codes from the coding scheme, creating new codes when not captured by

the existing scheme. The coders met every 1 to 2 transcripts to compare codes and resolve discrepancies, consulting the senior researcher (IDG) as needed. The coders updated the coding scheme to include emergent codes and sub-codes. After six transcripts, the coders were consistent in their coding. The remaining transcripts were then coded by only one person, and a selection of transcripts were verified by the second person for accuracy and comprehensiveness. We reached inductive thematic saturation with no new codes emerging after the sixth transcript.⁴⁴ NVivo15 was used for qualitative data management.

7.3.4.3 Integration of quantitative and qualitative data. We used several strategies to integrate the quantitative and qualitative findings.³¹ At a methods level, we used “building,” whereby questionnaire findings were explored in the interviews. We used “merging” by bringing the quantitative and qualitative results together during the interpretive phase. This merging was facilitated by designing the questionnaire and interview guide to include questions on similar topics (e.g., acceptability, appropriateness, feasibility). At a reporting level, we used “weaving,” with the quantitative and qualitative findings presented together thematically to provide a comprehensive view of participants’ perceptions of the toolkit and implementation constructs.

7.3.5 Reporting Guidelines

We used Good Reporting of a Mixed Methods Study (GRAMMS)⁴⁵ to inform the reporting of this study (Additional file 7.4).

7.4 Results

Between September 2024 and January 2025, 17 participants reviewed the toolkit and completed the questionnaire and interview. Participants worked in diverse settings (e.g., labour and delivery, postpartum, neonatal intensive care, regional programs) across Ontario and were mostly in leadership or nursing roles. Participants had a median of 16 years’ experience in

maternal-newborn care and a median of 9 years' experience leading or participating in practice change projects. Participants most frequently rated themselves as moderately or very confident (15/17, 88.2%) and knowledgeable (13/17, 76.5%) related to using an evidence-informed implementation process (Table 7.2).

Table 7.2 Demographics (N=17)

Variable	
Gender identity - n (%)	
Woman	17 (100)
Man	0 (0)
Other gender identity	0 (0)
Type of setting participant works in – n (%)[†]	
Labour and delivery unit	9 (52.9)
Postpartum unit	7 (41.2)
Neonatal intensive care unit	3 (17.6)
Other clinical setting (e.g., pediatrics, prenatal clinic, medical-surgical)	4 (23.5)
Regional program (non-clinical setting)	4 (23.5)
Level of care – n (%)[‡]	
Low risk (level 1)	6 (35.3)
Moderate risk (level 2)	7 (41.2)
High risk (level 3)	0 (0)
Not applicable (participant in regional role)	4 (23.5)
Geographical region in Ontario – n (%)[§]	
Central	6 (35.3)
East	4 (23.5)
North East & North West	4 (23.5)
Toronto	2 (11.8)
West	1 (5.9)
Professional role – n (%)	
Manager	3 (17.6)
Program director	3 (17.6)
Nurse	5 (29.4)
Nurse educator	1 (5.9)
Advanced practice nurse or Clinical lead	3 (17.6)
Midwife	1 (5.9)
Quality improvement or implementation support	1 (5.9)
Number of years' experience in maternal-newborn care[¶]	
Median (IQR)	16 (13.1)

Variable	
Range	3-28
Number of years' experience leading or participating in practice change initiatives	
Median (IQR)	9 (12.5)
Range	2-25
Current confidence following an evidence-informed approach to changing clinical practice – n (%)	
Not at all confident	0 (0)
Slightly confident	2 (11.8)
Moderately confident	8 (47.1)
Very confident	7 (41.2)
Extremely confident	0 (0)
Current knowledge about using evidence-informed approaches to changing clinical practice – n (%)	
Not at all knowledgeable	0 (0)
Slightly knowledgeable	4 (23.5)
Moderately knowledgeable	10 (58.8)
Very knowledgeable	3 (17.6)
Extremely knowledgeable	0 (0)

†Participants could select more than one response option

‡As per the Provincial Council for Maternal and Child Health levels of care⁴⁶

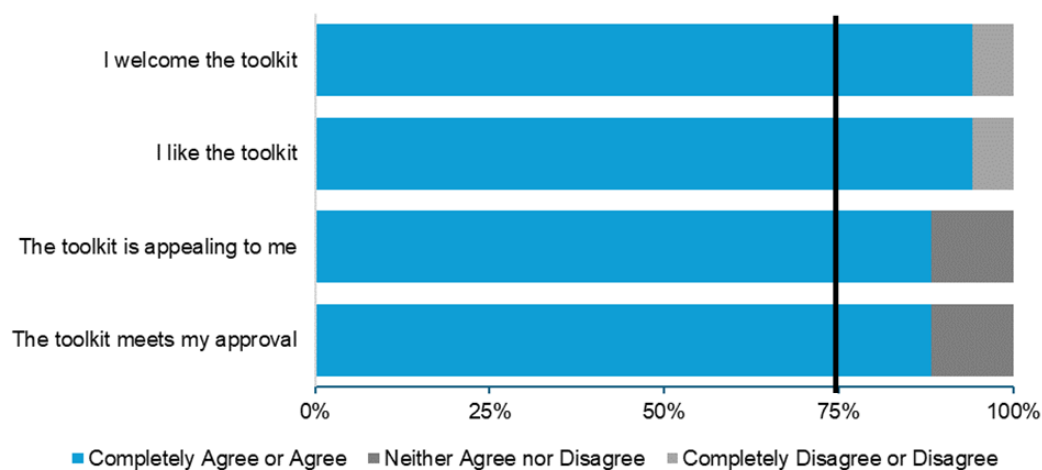
§As per Ontario Health Regions⁴⁷

¶One response missing (N=16)

After reading the toolkit, most participants (14/16, 87.5%) reported increased confidence, and all (16/16) reported improved knowledge of how to use an evidence-informed approach to change clinical practice. We present participants' feedback (obtained from the questionnaire and interview) according to the following implementation constructs: acceptability, appropriateness, feasibility, usability, and intention to adopt the toolkit. Additional illustrative quotes and questionnaire tables are presented in Additional files 7.5 and 7.6, respectively.

7.4.1 Acceptability

The mean Acceptability of Intervention Measure (AIM) score was 87.1 (standard deviation=18.0). Scores ranged from 37.5-100, and most completely agreed or agreed with the AIM statements (Figure 7.1).

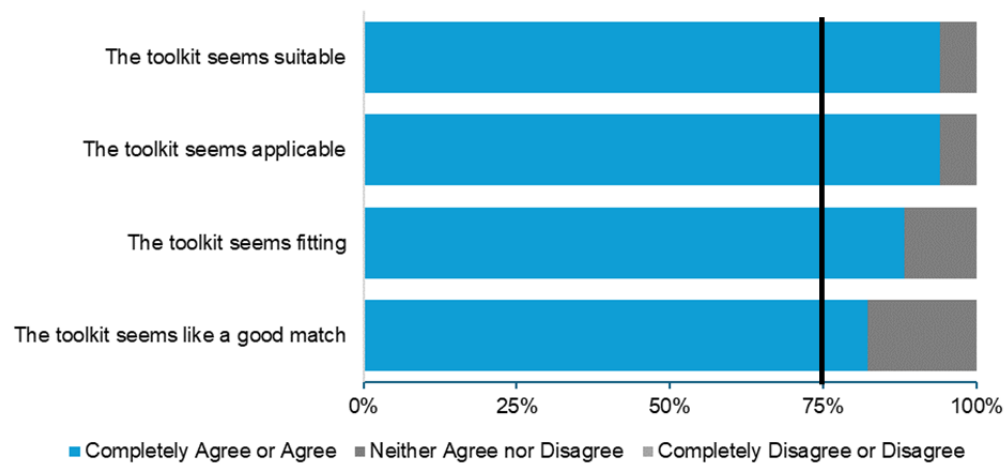
Figure 7.1 Participants' level of agreement with AIM (acceptability) statements

Participants described the toolkit positively, using terms like “fantastic,” “great,” “excellent,” “incredible,” “invaluable,” and “exciting.” Many participants were enthusiastic about the toolkit’s potential to improve implementation. Some participants who shared more negative initial impressions of the toolkit perceived its content and format as more aligned with that of a book or guide. The toolkit’s length and detail were viewed as daunting or overwhelming, depending on the user.

“I think the toolkit is great, my concern would be people new to implementation science are likely to find it overwhelming; people doing this type of work though will find it comprehensive and concise.” (Participant U)

7.4.2 Appropriateness

The mean Intervention Appropriateness Measure (IAM) score was 76.5 (standard deviation=11.8). Scores ranged from 50-100. Most participants completely agreed or agreed with the IAM statements, with no one disagreeing (Figure 7.2).

Figure 7.2 Participants' level of agreement with IAM (appropriateness) statements

Participants stated the toolkit fit with their current implementation processes and would strengthen implementation by providing structure and tools/templates. Although an identified strength of the toolkit was its tailoring to maternal-newborn settings, participants expressed it could easily be applied to other settings. Many participants identified that smaller or less-resourced centres could particularly benefit from the toolkit as they often lack dedicated quality improvement personnel and tools.

“It wasn’t like you were reading the toolkit and going ‘OK, now how do we translate that into our work?’ We were able to look at it [the toolkit] specifically in terms of our key performance indicators, in terms of BORN, in terms of all the different players, and so it is definitely something that would be easily understood and translatable to our unit.”

(Participant Q)

Most participants described the toolkit as a useful resource that addressed several needs, including educating clinicians and leaders about implementation and providing a one-stop-shop for information and tools/templates to start and manage implementation projects.

“I think that’s why change doesn’t happen very often; it’s because people just feel very lost and overwhelmed in terms of knowing how to do something. So, I think having something tangible that lays it out gives people a bit more support in terms of knowing how to start that.” (Participant O)

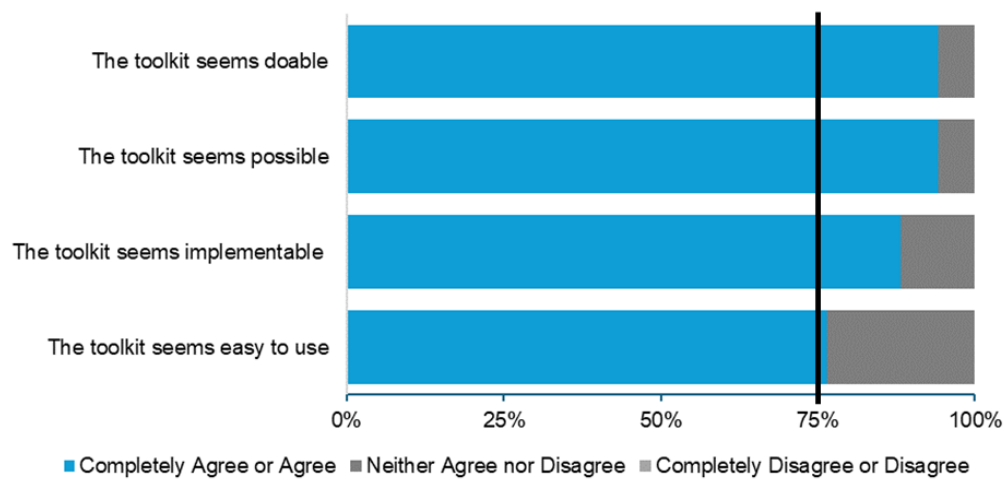
Participants suggested the toolkit could improve implementation by ensuring the team considers all steps; avoiding common pitfalls such as not engaging the right partners; better planning for monitoring, evaluation, and sustainability; and providing templates to document steps and decisions.

“I feel like if people were able to follow the steps, many more projects would be successful; unfortunately, most projects are poorly executed and therefore fail. I think this document [toolkit] makes you think and discuss everything, which then makes you address the things that may cause a project to fail.” (Participant C)

Participants indicated the most useful features of the toolkit were the planning templates, the summary checklists, and the boxes describing “what” each step involves and “why” it is important (Additional file 7.6).

7.4.3 Feasibility

The mean Feasibility of Intervention Measure (FIM) score was 78.7 (standard deviation=13.5). Scores ranged from 50-100. Most participants completely agreed or agreed with the FIM statements, with no one disagreeing (Figure 7.3).

Figure 7.3 Participants' level of agreement with FIM (feasibility) statements

Participants described the toolkit as potentially feasible to apply in real-world settings, stating it is “implementable” and “doable.” Participants felt that while there would be an initial learning curve, the toolkit would become quicker and easier to use over time. Participants offered insight into factors that would make the toolkit challenging to apply in practice including organizational factors (e.g., time and resource limitations, lack of leadership support for toolkit process); team factors (e.g., teams with limited collaboration and trust); and individual factors (e.g., resistance to change and low motivation to use evidence-informed implementation).

“I can’t imagine having the time or resources to use all of the tools exactly as they’re laid out, but I don’t think that lessened the value of it [the toolkit].” (Participant F)

Participants suggested improving the toolkit's feasibility by highlighting “essential” steps and activities for time and resource-constrained sites, providing guidance on potential timelines for the steps, and creating brief role-targeted summary documents that are quicker to navigate. Participants recommended developing training tools like webinars, video tutorials, online

modules, workshops, and having support personnel to help users (particularly those inexperienced in implementation) learn and apply the toolkit content.

“I think having a little 101 course or online video would be helpful before and then have the toolkit as the supplement. Because then you could take out some of the descriptor stuff to make it [the toolkit] tight and they would be more likely to engage [with the toolkit].” (Participant S)

A couple of participants described how point-of-care clinicians often engage in implementation work on their own time and proper compensation for reading and using the toolkit would increase feasibility.

7.4.4 Usability

The mean Intervention Usability Score (IUS) was 71.5 (standard deviation=12.5; range=42.5-90), indicating above average or “good” usability. Most participants indicated the toolkit was easy to use, well-integrated, and consistent. Fewer participants felt the toolkit could be learned quickly. There was a lack of consensus on whether the toolkit was too complex, too cumbersome, or usable without the support of an expert. Figures 7.4 and 7.5 present the distribution of participant ratings for the 10 IUS items.

Figure 7.4 Participants' level of agreement with “positive” statements from Intervention Usability Scale (IUS)

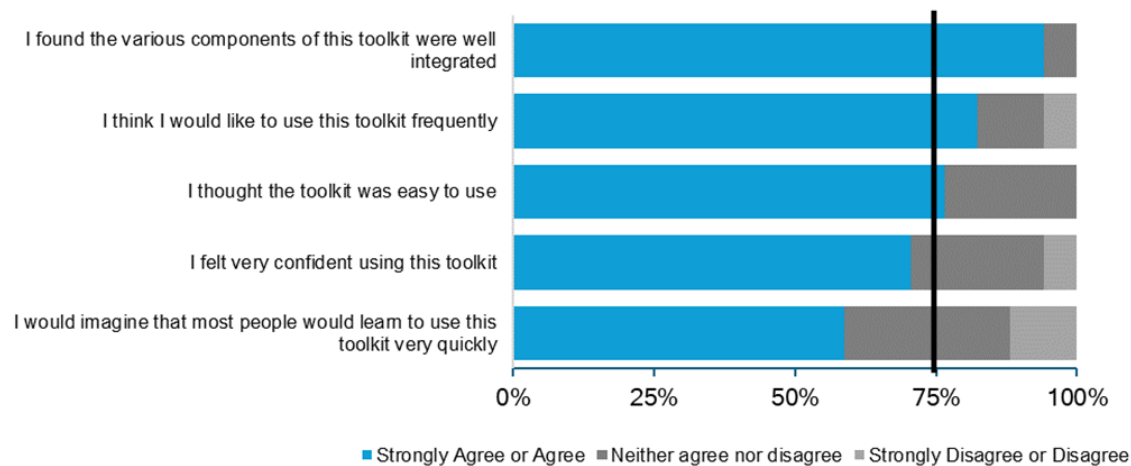
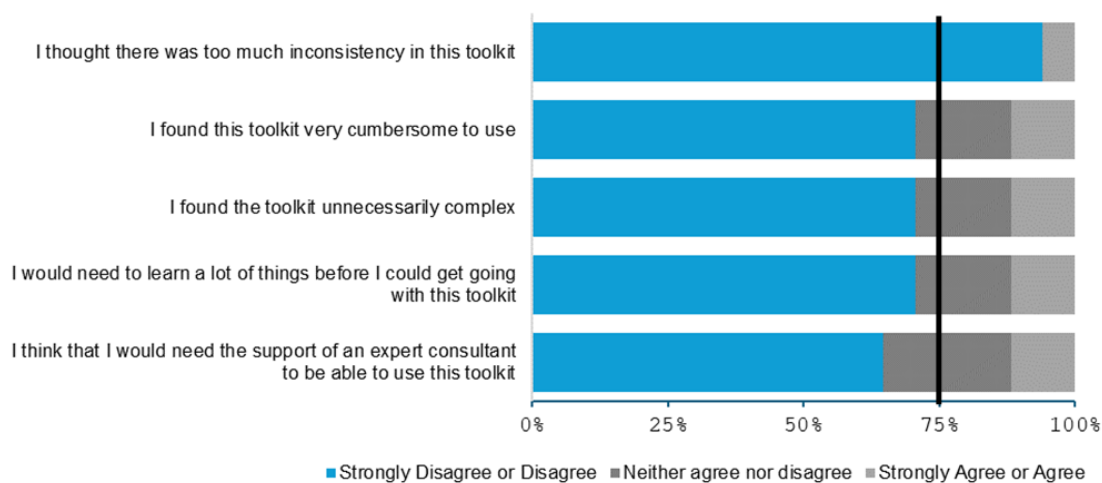


Figure 7.5 Participants' level of disagreement with “negative” statements from Intervention Usability Scale (IUS)



Nearly all participants agreed the toolkit was well organized, clearly presented the planning process, and was easy to navigate (16/17, 94.1%). Participants valued the toolkit's consistent format, especially the summary boxes and checklists in each step. Most participants

agreed the toolkit was written in plain language and easy to understand (14/17, 82.4%) and appreciated how “academic” information was presented in an accessible manner:

“When I’m reading other toolkits or watching webinars, I’m thinking ‘but how do I actually do that?’ Whereas I found this toolkit was written in a way I felt ‘oh, I understand this, this isn’t too high level for me.’” (Participant H)

Most participants (12/17, 70%) agreed the toolkit presented the “right” amount of information. However, several participants expressed the tension between including sufficient information to guide people without overwhelming users and recommended the toolkit be edited for conciseness and simplicity.

“I think there has to be more direct instruction in the toolkit because it’s very wordy, it’s academic, which is great, it should be, but sometimes those text boxes can be really like ‘hey did you remember to blah, blah, blah.’ And because it’s wordy, the plain language doesn’t come through; it’s not as plain language as it could be.” (Participant L)

The most frequently selected preferred toolkit format was an online interactive format with fillable tools/templates (13/17, 76.5%), which would improve navigation, break down the toolkit into manageable components, and allow users to edit and fill in templates. Over half of participants (10/17, 58.8%) emphasized the need for multiple toolkit formats (e.g., online and hardcopy).

Participants provided feedback on each activity and tool (61 items), suggesting modifications for better usability. Thirteen of the 61 items (21.3%) did not reach the consensus threshold, with less than 75% agreeing the content could remain as is; the majority of those 13 items (11/13) were in Phase 1 of the toolkit (Additional file 7.7). Examples of recommended changes included re-ordering or removing some steps, adding information or examples to better

explain activities, adding resources, better embedding sustainability considerations throughout the toolkit, adding information on regional-level applications, adding reminders to reflect on the process being used, and reducing redundancies across steps.

3.5 Intention to adopt the toolkit

Most participants indicated they were “very likely” or “likely” to use the toolkit (15/17, 88.2%) and described how they would apply the toolkit to their work. Nearly all participants would recommend the toolkit to others (16/17, 94.1%), citing benefits for roles like clinical educators and managers, clinical leads, advanced practice nurses, quality and safety teams, current and emerging leaders, nursing students, and health system leaders working at a provincial and regional level.

Several participants identified that effective dissemination of the toolkit will be critical for adoption and offered ideas such as: leveraging connections with credible organizations like BORN; collaborating with regional networks to share the toolkit with partner organizations; articulating the case for why implementation processes should be improved and how the toolkit supports this improvement; linking the toolkit to a priority clinical topic to demonstrate its potential application and impact; linking training on the toolkit to continuing education credits; and identifying champions to share their toolkit success stories.

7.5 Discussion

The implementation toolkit evaluated in this study responds to calls for research efforts to develop and evaluate tools to translate implementation science knowledge into practice.³ Our results indicate the implementation toolkit is an acceptable, appropriate, and potentially feasible resource to facilitate the implementation of evidence-informed practice changes in maternal-newborn care, and most participants expressed intent to use it. Participants identified ideas to

improve the toolkit's usability and feasibility, and highlighted the importance of effective dissemination efforts and supports to maximize its uptake and application. These findings provide a foundation for decisions on how to improve the usability and implementation of the toolkit going forward.

Overall, the acceptability and appropriateness of the toolkit were high, with participants expressing satisfaction and enthusiasm. Healthcare professionals are frequently responsible for implementing changes and improvements,⁴⁸ yet have reported low levels of knowledge,⁴⁹ skill,⁵⁰ and confidence^{26,51,52} in doing so. Given this gap and the interest in training and resources to support evidence-informed approaches to implementation,^{26,51} it is perhaps unsurprising that an implementation toolkit was generally welcomed and seen as valuable by participants. The feedback that the toolkit fills a need is reassuring and may enhance eventual adoption.¹¹ Conversely, some participants expressed lower levels of acceptability, which were linked with their perceptions of what a toolkit is and who it is for. In addition to practical tools and resources, the toolkit included theory-based content to help users learn about implementation science and the rationale for the steps and tools/templates. This content was perceived to add length and complexity, with some participants stating the toolkit was more like a “book”; this discordance between their views of what a toolkit should be and what they were reading likely affected their perceptions of acceptability. There is no universal definition for toolkits nor is there consensus on what they must include¹³; nonetheless, it will be important to consider how the label we assign to our resource aligns with user expectations.

Despite high feasibility ratings, participants identified barriers to applying the toolkit in practice, stemming from the toolkit itself and the contexts in which it would be used. Similar to other implementation toolkit evaluations, the length and time commitment to implement the

proposed process was of concern,^{15,53,54} although in our study, participants rarely indicated any steps or content could be removed. Participants also identified contextual barriers consistent with other toolkit studies and the implementation literature more broadly, including limited time to participate in implementation efforts, staff and funding needed for successful implementation, implementation leadership support, and resistance to change.^{16,55,56}

While a multi-pronged approach will be needed to address these barriers to using the toolkit, participants highlighted several potential strategies. First, they highlighted the need to build leadership implementation knowledge and buy-in for the toolkit process to ensure implementation teams have the required support and resources to execute the process, a recommendation aligned with others.^{4,57} Receiving training in implementation does not necessarily result in those learnings transferring to the workplace.⁵⁸ To facilitate transfer and sustainability of learning, efforts to enculturate implementation science in healthcare are needed, such as team-based training, adapting organizational policies and frameworks, and integrating implementation science competencies into professional development. Second, participants highlighted the importance of champions in using and promoting the toolkit with their organizations and networks. There is evidence that champions may increase the use of innovations by organizations⁵⁹ and champions have been identified as important to leading toolkit use specifically.^{16,60} Third, several users indicated there would be value in having support personnel to facilitate toolkit use. Implementation support practitioners help build implementation capacity and support others to implement evidence-informed practices;⁶¹ which has been shown to enhance implementation processes, outcomes^{62,63} and toolkit use.⁵⁶

Participants suggested content and format changes to improve usability, mostly from the toolkit's first phase. In our previous survey of maternal-newborn healthcare professionals and

leaders, respondents reported higher levels of experience and confidence with earlier steps in the implementation process,²⁶ a trend observed in other settings as well.^{51,52,64} It is possible that in this current study, participants had more experience to draw on for phase 1 of the implementation process and therefore offered a higher number of suggestions on this content. This highlights the importance of future field-testing, which would allow users to experience and provide feedback on all phases of the implementation process.

There is emerging guidance for creating toolkits, including recommendations for toolkit development, content and format, and evaluation.⁶⁰ While the processes we used in this study align with several of the recommendations (e.g., usability testing; assessing feasibility, facilitators, barriers), there remains a need to pilot the toolkit in real-world maternal-newborn care settings, and eventually study the uptake, use, and impact of the toolkit on implementation capacity and improvements in care and outcomes.

7.5.1 Next steps

The findings from this study will be used to improve the content and format of the toolkit to increase alignment with user needs and preferences. It will also be critical to plan how the toolkit can be disseminated and embedded in the existing Ontario maternal-newborn ecosystem. A key strength of the toolkit development process was the partnership with BORN Ontario. As a provincial program, BORN has strong relationships with provincial, regional, and local health-system partners. This broad reach and existing relationships uniquely position BORN to host, support, and facilitate the integration of the toolkit in the current maternal-newborn care infrastructure. For example, there are opportunities to offer training and ongoing support to toolkit users via webinars, educational videos and resources, communities of practice, and coaching. Discussions are underway at BORN, in collaboration with other partners, to explore

potential roles and strategies for supporting application of the toolkit in Ontario maternal-newborn settings.

7.5.2 Limitations and strengths of the study

A limitation is that our participants, by virtue of being interested in the study, likely represent early adopters and could have more positive views of the toolkit than others. Furthermore, study participants generally reported being confident following an evidence-informed approach to changing clinical practice. Their views may therefore not be representative of the broader group of potential users with less interest and confidence in implementation. However, identifying and leveraging early adopters is a known implementation strategy,⁶⁵ and this study provided an opportunity to learn about early adopter needs and ideas for toolkit improvement.

Most participants were nurses and identified as women, with minimal representation from other health professions. Despite this, we did have representation from diverse roles (e.g., clinicians, educators, managers) in diverse geographical areas working at different levels of the health system.

The feedback collected was based on participants reflecting on how the toolkit could be applied to potential practice change initiatives, rather than actual application. In addition, the toolkit version reviewed in this study was a static PDF document with limited formatting and functionality. We evaluated a low-fidelity draft with 17 potential users to generate feedback before investing resources to create a more functional version, which is in line with user-centered design recommendations.^{33,66} While this number of potential users may have limited the generalizability of the feedback, it allowed us to rapidly identify areas for improvement and integrate feedback into the next version.

A strength of our study was the use of an integrated knowledge approach and the engagement of target users, which provided insight into how the toolkit could meet their needs and how the toolkit could be improved. Our mixed-methods design facilitated an in-depth understanding of participants' feedback and perceptions. The questionnaire allowed quantification of selected implementation constructs and comprehensive input on each toolkit activity and tool. The interviews provided a rich forum for exploring the reasons behind questionnaire responses and offered insight into the settings where the toolkit may be used.

7.6 Conclusion

Building teams' knowledge about how to effectively implement evidence-informed practices has the potential to increase the success and sustainability of evidence-informed practice changes, and ultimately, improve care and outcomes for pregnant and birthing people and their infants. The implementation toolkit evaluated in this study shows promise as an acceptable, appropriate, feasible, and usable implementation strategy to help maternal-newborn teams learn about implementation science and improve their practice change processes. It will be critical to apply the study findings to improve the usability of the toolkit, plan for dissemination and application, and evaluate the uptake and impact of the toolkit on implementation, system, and health outcomes.

7.7 Declarations

7.7.1 Ethics approval and consent to participate

This study was approved by the Children's Hospital of Eastern Ontario (CHEO) Research Ethics Board (protocol #23/59X) and the University of Ottawa Research Ethics Board (H-12-23-9959). All participants provided written consent prior to starting study activities. Upon

completing the study, participants were given a \$200 CAD honorarium in recognition of their time.

7.7.2 Consent for publication

Not applicable.

7.7.3 Availability of data and materials

The interview transcripts analyzed in this study are not publicly available due to them containing information that could compromise research participant privacy/consent. The questionnaire data are available from the corresponding author on reasonable request.

7.7.4 Competing interests

IDG is a former Co-Editor-in-Chief of JBI Evidence Implementation but was not involved in handling the peer-review process of this manuscript.

7.7.5 Funding

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66. Dopp AR, Parisi KE, Munson SA, Lyon AR. A glossary of user-centered design strategies for implementation experts. *Transl Behav Med* 2019;9(6):1057-64.
doi:10.1093/tbm/iby119

7.9 Additional files

Additional File 7.1 Implementation constructs and related questionnaire and interview questions

Implementation construct	Definition <i>(as used in this study)</i>	Related questionnaire items	Related interview questions
Acceptability	• How agreeable or, palatable the toolkit is^a • How satisfied the participant is with the toolkit^a • Personal judgments based on their preferences and expectations of the toolkit^b	• Acceptability of Intervention Measure (AIM)	• (Q1) Could you start by telling me your initial reaction to the planning process described in the toolkit? Does it make sense to you? Are the steps the right steps? Are the activities the right activities?
Appropriateness	• How well the participant thinks the toolkit fits with their practice setting^a • How well the participant thinks the toolkit will address a specific issue^a • The extent to which the toolkit aligns with the participant's values, experiences, and needs^c • Technical judgments (do they think the toolkit will fix the issue?)^b • Social judgments (do they think the toolkit aligns with norms and values?)^b	• Part B: Usefulness of toolkit • Part D: Value & perceived fit of toolkit • Intervention Appropriateness Measure (IAM)	• (Q4) Thinking about your own experience implementing practice changes, how did the process you used compare to the steps described in the toolkit? • (Q5) If you had access to the toolkit before you implemented a practice change, would you have approached things differently? How? • (Q8) Although the toolkit may be used by an individual, the intention is that the implementation process outlined in the toolkit will be applied as a team. Do you think the toolkit provides the guidance and structure to bring an interdisciplinary implementation team together? Why or why not?
Adoption	• Whether the participant intends to try the toolkit^a	• Likelihood of using the toolkit	• (Q6) Would you use the toolkit in the future to facilitate implementation of practice changes? How come?

Implementation construct	Definition (as used in this study)	Related questionnaire items	Related interview questions
	• Other information on the people, settings, and types of changes that the toolkit could be used by and for	• Likelihood of referring others to the toolkit	• (Q7) Would you recommend the toolkit to others? To whom and how come?
Feasibility	• Extent to which the toolkit can be successfully used in a particular setting^a • Practical judgments (can the toolkit be applied easily and conveniently?)^b	• Feasibility of Intervention Measure (FIM) • Desired additional resources to support use	• (Q9) How feasible do you think the process in the toolkit would be for implementation teams to follow? What do you think would be the challenges for teams following the toolkit? How might teams overcome those challenges? • (Q10) If this toolkit was available to maternal-newborn teams, what type of educational support do you think would be needed to help people use it? (e.g., education sessions, user tip sheets, access to staff for toolkit support, etc.) • (Q11) If this toolkit was available to maternal-newborn teams, are there other supports that would help people use it? (e.g., time, resources, recognition, etc.)?
Usability	• Extent to which the toolkit can be used by specified individuals to achieve specified goals in a specified context^d • How difficult the toolkit is to understand or use^c • Focused on the characteristics of the toolkit product itself^e	• Part A: Toolkit content and tools • Part C: Usability of the toolkit (including the Intervention Usability Scale [IUS]) • Desired format of toolkit	• (Q2) In your questionnaire, you highlighted that you liked [summarize notable positive aspects from participant's questionnaire]. Could you tell me more about why you liked those elements of the toolkit? • (Q3) In your questionnaire, you highlighted that you disliked [summarize notable areas for improvement from participant's questionnaire]. Could you tell me more about those elements that could be improved?

^aProctor E, Silmere H, Raghavan R, et al. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health*. 2011;38(2):65-76. doi:10.1007/s10488-010-0319-7

^bWeiner BJ, Lewis CC, Stanick C, et al. Psychometric assessment of three newly developed implementation outcome measures. *Implement Sci.* 2017;12(1):108. doi:10.1186/s13012-017-0635-3

^cRogers, EM. (2003). *Diffusion of Innovations* (5th ed.). Free Press.

^dInternational Organization for Standardization. (2010). ISO 9241-210:2010(en), *Ergonomics of human-system interaction — Part 210: Human-centered design for interactive systems*. <https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-1:v1:en>

^eLyon AR, Coifman J, Cook H, et al. The Cognitive Walkthrough for Implementation Strategies (CWIS): a pragmatic method for assessing implementation strategy usability. *Implement Sci Commun.* 2021; 2:78. <https://doi.org/10.1186/s43058-021-00183-0>

Additional File 7.2 Study questionnaire**PART A: Toolkit content and tools**

Based on your review of the toolkit and the content and tools in each of the steps listed below, select one statement that best describes your impression. The three options are:

- Necessary: Keep as is - You think the information should be kept in the toolkit as written, and no changes are required.
- Necessary: Requires modification - You think the information should be kept in the toolkit but have recommended changes to increase clarity, relevance, accuracy, comprehensiveness, conciseness, etc.
- Not necessary: Remove - You think the information is not needed in the toolkit and recommend it be removed in the next version.

If you indicate that an activity or tool should be modified or removed, an open text box will appear so you may describe your suggested changes.

PHASE 1

	Please select one statement per row		
	Necessary: keep, as is	Necessary: needs modification <i>(please explain below)</i>	Not necessary: remove <i>(please explain below)</i>
Welcome & introduction	☐	☐	☐
Implementation work plan template	☐	☐	☐
Step 1 Call to action			
Activity 1.1 Identify what problem to work on	☐	☐	☐
Activity 1.2 Form the working group	☐	☐	☐
Activity 1.3 Identify and engage other partners	☐	☐	☐
Activity 1.4 Consider how to assess team dynamics and perceptions of the partnership	☐	☐	☐
Template 1A Issue prioritization matrix	☐	☐	☐
Template 1B Invitation for patient and family partners	☐	☐	☐
Template 1C Questions to assess patient or family member preferences for involvement	☐	☐	☐
Template 1D Mapping potential partners and levels of engagement	☐	☐	☐
Step 2 Understand your problem			

	Please select one statement per row		
	Necessary: keep, as is	Necessary: needs modification <i>(please explain below)</i>	Not necessary: remove <i>(please explain below)</i>
Activity 2.1 Understand the problem from different perspectives	☐	☐	☐
Activity 2.2 Formulate your problem statement	☐	☐	☐
Template 2A Exploring the problem from different perspectives	☐	☐	☐
Step 3 Select an evidence-informed solution to address the clinical problem			
3.1 Identify evidence-informed solutions	☐	☐	☐
Activity 3.2 Assess the quality of the evidence-informed solution	☐	☐	☐
Activity 3.3 Prioritize recommendations	☐	☐	☐
Activity 3.4 Select and assess the quality of the guideline recommendations	☐	☐	☐
Template 3A Discussion questions to assess guideline quality	☐	☐	☐
Template 3B Prioritizing what recommendation to work on	☐	☐	☐
Template 3C Discussion questions to assess recommendation quality	☐	☐	☐
Step 4 Understand current practice and define your evidence-practice gap			
Activity 4.1 Understand current practice	☐	☐	☐
Activity 4.2 Measure the evidence-practice gap	☐	☐	☐
Template 4A Exploring current practice related to the selected guideline recommendation(s)	☐	☐	☐
Template 4B Assessment of guideline recommendation against SMART indicator criteria	☐	☐	☐
Template 4C Tool for calculating baseline adherence rate and evidence-practice gap	☐	☐	☐
Step 5 Customize the best practice recommendation to local context and identify goals			
Activity 5.1 Analyze the best practice – who needs to do what, when, to whom and under what circumstances?	☐	☐	☐

	Please select one statement per row		
	Necessary: keep, as is	Necessary: needs modification <i>(please explain below)</i>	Not necessary: remove <i>(please explain below)</i>
Activity 5.2 Clarify the outcomes that may be achieved by following the recommendation	☐	☐	☐
Template 5A Worksheet to clarify who needs to do what, when, to whom and under what circumstances	☐	☐	☐
Template 5B Anticipated outcomes of following selected recommendation	☐	☐	☐
Step 6 Making the decision to proceed or not			
Activity 6.1 Assess the best practice for feasibility, applicability, acceptability, affordability, and equity	☐	☐	☐
Activity 6.2 Develop your budget	☐	☐	☐
Activity 6.3 Firm up the business case	☐	☐	☐
Template 6A Feasibility, Applicability, Acceptability, Equity, and Affordability (FAAEA) Check	☐	☐	☐
Template 6B Business case template	☐	☐	☐

If you indicated above that any of the Phase 1 activities and/or templates “need modification” or should be “removed”, please explain below.

Please provide any additional comments or suggestions for the Phase 1 toolkit content and/or templates.

PHASE 2

	Please select one statement per row		
	Necessary: keep, as is	Necessary: needs modification <i>(please explain below)</i>	Not necessary: remove <i>(please explain below)</i>
Step 7 Identify barriers and drivers			
Activity 7.1 Identify who to consult about barriers and drivers	☐	☐	☐
Activity 7.2 Conduct a barriers and drivers assessment	☐	☐	☐
Activity 7.3 Summarize and prioritize barriers to address	☐	☐	☐
Template 7A Who is directly and indirectly affected by the best practice recommendation?	☐	☐	☐
Template 7B What is the influence and support level of the interested and affected parties?	☐	☐	☐
Template 7C Discussion guide for learning about barriers and drivers to best practice implementation from different perspectives	☐	☐	☐
Template 7D Which factors will be a barrier or a driver to your practice change initiative?	☐	☐	☐
Step 8 Select and refine implementation strategies			
Activity 8.1 Identify implementation strategies to address barriers	☐	☐	☐
Activity 8.2 Refine the selected implementation strategies	☐	☐	☐
Activity 8.3 Pilot the implementation strategies	☐	☐	☐
Template 8A Rating the proposed implementation strategies	☐	☐	☐
Template 8B Breaking down implementation strategies by Aims, Ingredients, Mechanism, and Delivery	☐	☐	☐
Template 8C Using Plan-Do-Study-Act (PDSA) to pilot implementation strategies	☐	☐	☐
Step 9 Develop a monitoring plan			
Activity 9.1 Explore how to monitor adherence to the best practice change initiative	☐	☐	☐

	Please select one statement per row		
	Necessary: keep, as is	Necessary: needs modification <i>(please explain below)</i>	Not necessary: remove <i>(please explain below)</i>
Activity 9.2 Explore how to monitor the implementation strategies	☐	☐	☐
Template 9A Plan for monitoring adherence to the best practice	☐	☐	☐
Template 9B Plan for monitoring implementation strategies	☐	☐	☐
Step 10: Develop an evaluation plan			
Activity 10.1 Develop an evaluation plan for your practice change initiative	☐	☐	☐
Template 10A Outcome evaluation planning matrix	☐	☐	☐
Step 11 Plan for sustainability			
Activity 11.1 Assess capacity for sustainability	☐	☐	☐
Activity 11.2 Discussion strategies for sustainability	☐	☐	☐

If you indicated above that any of the Phase 2 activities and/or templates “need modification” or should be “removed”, please explain below.

Please provide any additional comments or suggestions for the Phase 2 toolkit content and/or templates.

PHASE 3

	Please select one statement per row		
	Necessary: keep, as is	Necessary: needs modification <i>(please explain below)</i>	Not necessary: remove <i>(please explain below)</i>
Step 12 Implement			
Activity 12.1 Complete prelaunch checklist	☐	☐	☐
Activity 11.2 Celebrate the launch	☐	☐	☐
Template 12A Pre-launch checklist	☐	☐	☐
Step 13 Monitor, evaluate, adjust, sustain			

	Please select one statement per row		
	Necessary: keep, as is	Necessary: needs modification <i>(please explain below)</i>	Not necessary: remove <i>(please explain below)</i>
Step 12 Implement			
Activity 13.1 Activate your monitoring and evaluation plans and use findings to adjust approach	☐	☐	☐
Activity 13.2 Share your monitoring and evaluation findings	☐	☐	☐
Activity 13.3 Continue monitoring, evaluating, and adjusting into the sustainability period	☐	☐	☐

If you indicated above that any of the Phase 3 activities and/or templates “need modification” or should be “removed”, please explain below.

Please provide any additional comments or suggestions for the Phase 3 toolkit content and/or templates.

PART B: Usefulness of toolkit

In this next set of questions, we are interested in learning about how "useful" you find different features of the toolkit. "Useful" refers to whether you think that feature would be helpful in your work to implement practice changes in your setting.

Please select one statement (on the scale between “Not at all useful” to “Very useful”) to rate your impression of the usefulness (helpfulness) of the toolkit.

How useful do you find the following toolkit features?	Please select one statement per row				
	Very useful	Useful	Moderately useful	Slightly useful	Not at all useful
The boxes describing “what” each step involves	☐	☐	☐	☐	☐
The boxes describing “why” each step is important	☐	☐	☐	☐	☐

The boxes providing considerations and guiding questions on equity, diversity, and inclusion (EDI)	☐	☐	☐	☐	☐
The boxes providing links to additional resources	☐	☐	☐	☐	☐
The boxes including general “tips” on different parts of the implementation process	☐	☐	☐	☐	☐
The boxes providing “BORN tips” on how BORN data, information, and resources can support the implementation process	☐	☐	☐	☐	☐
The planning templates throughout the toolkit	☐	☐	☐	☐	☐
The “Summary checklist” at the end of each of the 12 steps	☐	☐	☐	☐	☐
The “Progress checklists” at the end of each of the 3 phases	☐	☐	☐	☐	☐
Other features [please specify]	☐	☐	☐	☐	☐

Please provide any additional comments on the usefulness of the toolkit and its features.

PART C: Usability of the toolkit

In this next set of questions, we are interested in learning about how "useable" you think the toolkit is. "Usability" refers to whether you think the toolkit, in its current format, would be easy to use.

Please select one statement (on the scale between “Strongly Disagree” to “Strongly Agree”) to rate your impression of the usability (format and presentation) of the toolkit.

<i>The toolkit...</i>	Please select one statement per row				
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
is well organized	☐	☐	☐	☐	☐
is written in plain language	☐	☐	☐	☐	☐
is easy to understand	☐	☐	☐	☐	☐
clearly presents the planning process	☐	☐	☐	☐	☐
is easy to navigate	☐	☐	☐	☐	☐
presents the right amount of information	☐	☐	☐	☐	☐

Intervention Usability Scale (IUS)

	Strongly disagree				Strongly agree
I think I would like to use this toolkit frequently	○	○	○	○	○
	1	2	3	4	5
I found the toolkit unnecessarily complex	○	○	○	○	○
	1	2	3	4	5
I thought the toolkit was easy to use	○	○	○	○	○
	1	2	3	4	5
I think that I would need the support of an expert consultant to be able to use this toolkit	○	○	○	○	○
	1	2	3	4	5
I found the various components of this toolkit were well integrated	○	○	○	○	○
	1	2	3	4	5
I thought there was too much inconsistency in this toolkit	○	○	○	○	○
	1	2	3	4	5
I would imagine that most people would learn to use this toolkit very quickly	○	○	○	○	○
	1	2	3	4	5
I found this toolkit very cumbersome to use	○	○	○	○	○
	1	2	3	4	5
I felt very confident using this toolkit	○	○	○	○	○
	1	2	3	4	5
I needed to learn a lot of things before I could get going with this toolkit	○	○	○	○	○
	1	2	3	4	5

Feasibility of the toolkit

	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
The toolkit seems implementable	○	○	○	○	○
The toolkit seems possible	○	○	○	○	○
The toolkit seems doable	○	○	○	○	○
The toolkit seems easy to use	○	○	○	○	○

Please provide any additional comments on the usability, format, or presentation of the toolkit.

What is your desired format for the toolkit?

(select all that apply)

- ☐ An online document
- ☐ An online interactive format (i.e., webpages, fillable online forms)
- ☐ A paper-based hardcopy
- ☐ Another format (please specify): _____

When the toolkit becomes available, would any of the following resources be of interest to you and your content team?

(select all that apply)

- ☐ Webinar providing an overview of the toolkit's content and how to use it
- ☐ Ongoing support from a BORN staff to advise on using the toolkit
- ☐ Community of practice to connect with other maternal-newborn teams using the toolkit
- ☐ Tip sheets on how to use the toolkit
- ☐ A slide deck on the toolkit's content for teams to use
- ☐ Other resources (please specify): _____

PART D: Value and perceived fit of the toolkit

In this next set of questions, we are interested in learning about whether you perceive the toolkit to be a valuable resource and how well it may fit in maternal-newborn settings.

I think the toolkit...	Please select one statement per row				
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
addresses the key factors to consider when planning for practice change	○	○	○	○	○
uses a planning model supported by research	○	○	○	○	○
will help us make decisions informed by evidence	○	○	○	○	○
conflicts with our usual approach to planning for practice change	○	○	○	○	○

I think the toolkit...	Please select one statement per row				
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
is compatible with our usual approach to planning for practice change	☐	☐	☐	☐	☐
will improve our usual approach to planning for practice change	☐	☐	☐	☐	☐
will require changes to our usual approach to planning for practice change	☐	☐	☐	☐	☐
is suitable for most practice change scenarios	☐	☐	☐	☐	☐
will meet the needs of different maternal-newborn team members	☐	☐	☐	☐	☐
will improve the sustainability of our practice change	☐	☐	☐	☐	☐
will improve outcomes	☐	☐	☐	☐	☐

Appropriateness of the toolkit

	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
The toolkit seems fitting	☐	☐	☐	☐	☐
The toolkit seems suitable	☐	☐	☐	☐	☐
The toolkit seems applicable	☐	☐	☐	☐	☐
The toolkit seems like a good match	☐	☐	☐	☐	☐

Acceptability of the toolkit

	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
The toolkit meets my approval	☐	☐	☐	☐	☐
The toolkit is appealing to me	☐	☐	☐	☐	☐
I like the toolkit	☐	☐	☐	☐	☐
I welcome the toolkit	☐	☐	☐	☐	☐

Please provide any additional comments on the value of the toolkit and its potential fit with maternal-newborn settings.

PART E: General impressions

Please comment on the following:

What I like most about the toolkit:

What I like least about the toolkit:

Thinking about the current version of the toolkit you reviewed...

	Please select one statement per row				
	Very likely	Likely	Neutral	Unlikely	Very unlikely
How likely is it that you would use the toolkit in a future practice change initiative?	☐	☐	☐	☐	☐
How likely is it that you would refer a colleague to the toolkit?	☐	☐	☐	☐	☐

PART F: Demographics

What is your gender identity?

(Please check all that apply)

- ☐ Man
- ☐ Woman
- ☐ I identify my gender as (please specify): _____
- ☐ Prefer not to answer

What type of unit do you work in?

(select all that apply)

- ☐ Labour and delivery
- ☐ Postpartum
- ☐ Neonatal Intensive Care
- ☐ Other, please specify: _____

What level of care does your unit provide?

- ☐ Level I

- Level II
- Level III

What is your role?

- Manager
- Program director
- Nurse
- Nurse educator
- Advanced practice nurse
- Midwife
- Physician
- Decision support
- Quality improvement or implementation support
- Other, please specify: _____

How many years of experience do you have in maternal-newborn care?

_____ years

How many years of experience do you have leading, supervising, or participating in implementation projects, quality improvement projects, or practice change initiatives?

_____ years

Please rate your current confidence in following an evidence-informed approach to changing clinical practice (as outlined in the toolkit):

- Not at all confident
- Slightly confident
- Moderately confident
- Very confident
- Extremely confident

Has reading the toolkit had any effect on your confidence in your ability to use an evidence-informed approach to change clinical practice:

- Yes, reading the toolkit *increased* my confidence
- Yes, reading the toolkit *decreased* my confidence
- No, reading the toolkit had *no effect* on my confidence

Before reading the toolkit, how knowledgeable were you about using evidence-informed approaches to change clinical practice?

- Not at all knowledgeable
- Slightly knowledgeable
- Moderately knowledgeable
- Very knowledgeable
- Extremely knowledgeable

Has reading the toolkit improved your knowledge of how to use an evidence-informed approach to change clinical practice?

- Yes, reading the toolkit *increased* my knowledge
- No, reading the toolkit had *no effect* on my knowledge

Is there anything else you would like to share about the toolkit?

Additional File 7.3 Semi-structured interview guide

1. Could you start by telling me your initial reaction to the planning process described in the toolkit?
 - a) Does it make sense to you?
 - b) Are the steps the right steps?
 - c) Are the activities the right activities?
2. In your questionnaire, you highlighted that you liked [summarize notable positive aspects from participant's questionnaire]. Could you tell me more about why you liked those elements of the toolkit?
3. In your questionnaire, you highlighted that you disliked [summarize notable areas for improvement from participant's questionnaire]. Could you tell me more about those elements that could be improved?
4. (*For those with past implementation experience*): Thinking about your own experience implementing practice changes, how did the process you used compare to the steps described in the toolkit?
 - a) How close is the planning process described in the toolkit to what you actually did?
 - b) Were there steps in the toolkit you didn't take?
 - c) Did you take any steps not covered in the toolkit? Did we miss anything?
 - d) Are there any tools or resources you used that are not included in the toolkit that should be included?
5. (*For those with past implementation experience*): If you had access to the toolkit before you implemented a practice change, would you have approached things differently? How?
6. Would you use the toolkit in the future to facilitate implementation of practice changes? How come?
7. Would you recommend the toolkit to others? To whom and how come?
8. Although the toolkit may be used by an individual, the intention is that the implementation process outlined in the toolkit will be applied as a team. Do you think the toolkit provides the guidance and structure to bring an interdisciplinary implementation team together? Why or why not?
9. How feasible do you think the process in the toolkit would be for implementation teams to follow?
 - a) What do you think would be the challenges for teams following the toolkit?
 - b) How might teams overcome those challenges?
10. If this toolkit was available to maternal-newborn teams, what type of *educational support* do you think would be needed to help people use it? (e.g., education sessions, user tip sheets, access to staff for toolkit support, etc.)

11. If this toolkit was available to maternal-newborn teams, are there other supports that would help people use it? (e.g., time, resources, recognition, etc.)?
12. Do you have any other comments on the toolkit?

Additional File 7.4 Completed GRAMMS (Good Reporting of a Mixed Methods Study) reporting checklist^a

Item #	GRAMMS item description	Manuscript Section
1	Describe the justification for using a mixed methods approach to the research question.	Methods – Study design
2	Describe the design in terms of the purpose, priority and sequence of methods.	Methods – Study design Methods - Data collection Methods - Integration
3	Describe each method in terms of sampling, data collection and analysis.	Methods – Participants and recruitment Methods - Data collection tools and procedures Methods - Data analysis
4	Describe where integration has occurred, how it has occurred and who has participated in it.	Methods – Integration of quantitative and qualitative data
5	Describe any limitation of one method associated with the presence of the other method.	N/A
6	Describe any insights gained from mixing or integrating methods	Methods - Integration of quantitative and qualitative data Discussion – Limitations and strengths

^aO'Cathain A, Murphy E, Nicholl J. *The quality of mixed methods studies in health services research. J Health Serv Res Policy.* 2008;13: 92-98.

Additional File 7.5 Illustrative Quotes

Implementation constructs	Illustrative Quotes
Acceptability - Positive	“It was really, really well done. I wasn’t sure what to expect, but I really liked it. I thought it was fantastic. It was implementable.” (Participant F) “I thoroughly enjoyed this toolkit. I think this is exactly what we need, and I loved how all the examples were maternal-child examples.” (Participant H) “I think this toolkit is dreamy. If I could just use a little USB stick and stick it into everybody’s head!” (Participant L)
Acceptability - Negative	“If I was brand new to this, I might be overwhelmed by it at first, just based on the size of it, right? But if you just start on page 1 and work your way through, it makes sense.” (Participant D) “It [the toolkit] feels like a lot if you’re not familiar with BORN. If you were somebody just walking into it, I think you’d probably feel a little overwhelmed.” (Participant P)
Appropriate - Fit	“In the past when we did not have a toolkit to use to promote change, we would just do what we thought would work. It is interesting that many of the things I did to initiate change do fall into sections of this toolkit.” (Participant B) “I think it’s your [smaller hospitals] who are limited in [implementation] content ability for their program that are looking for ‘how can we make sure that this change sticks?’ They lap up tools and resources and they like this stuff; they just don’t have the time to go find it.” (Participant S)

Implementation constructs	Illustrative Quotes
Appropriate – Relevance/Meets a need	“I think it is almost a need that people don’t even know they have, if that makes sense. I think I can roll out a project, but this [toolkit] challenges you at every step to make sure...I think we do a lot of ‘try this, it fails; try this, fail; try this, fail’ when like there is stuff out there; like ‘guys like look at this [toolkit]!’” (Participant C) “There’s been toolkits for specific implementation projects and gap analysis and whatever, but they’re not prescriptive of why we do things, how we do things, and how to do it really well from a data point of view.” (Participant H) “Instead of having people sit in a room saying ‘OK, this is what we want to do, now where do we start?’ there’s something that’s already built, you know, the wheel has been formed.” (Participant I)
Feasibility - Positive	“I think it’s [the toolkit] super feasible. I just think it depends on how motivated the people are that are doing it, to actually dedicate the time to work through everything. I think if you have someone or a group of people similar to myself who are going into something and wanting resources and support and things laid out, I think it’s really feasible.” (Participant O) “I think the initial reaction would be like ‘ooph’ but then once they used it [the toolkit] a few times and got through and were more comfortable with the steps, I think it’s very feasible.” (Participant P)
Feasibility - Negative	“It’s such a high-pressure environment right now to make change that it’s hard to picture working through so many things [in the toolkit]; but it makes sense to take the time and do those things, so it’s kind of that back and forth.” (Participant A) “I think it [feasibility] has more to do with the team culture and team functioning than the ease of using the toolkit...I think if your team isn’t functioning it doesn’t matter what toolkit you use.” (Participant F) “Healthcare professionals are not 100% employed to initiate change, and most will have another job to fill beside heading an initiative, which may deter them from using it [the toolkit] in the first place. The long preparation phase might eat up the energy of the team before the launch, and at launch time some situational factors might have changed again.” (Participant R)

Implementation constructs	Illustrative Quotes
Feasibility – Strategies	“We’re not all going to be experts on using this toolkit, so if there was somebody who could even explain different steps; like we’ve got this scenario, how do I troubleshoot, and share different ideas. I think that would be like incredibly valuable.” (Participant B) “I’d like an online "course" for working group members to complete. Example if next meeting is on step 3, they would need to complete that module first, so they are prepared for the discussions and activities.” (Participant H) “You get stuck, and you just don’t know which avenue to go down, and then you lose momentum and that’s the end of it. But if we have the support out there from somebody else who has done that step and gotten through it and we can say ‘OK can we just pick your brains? What did you do? Can you help us?’ That would be amazing.” (Participant I)
Usability - Positive	“I think it [the toolkit] was laid out really well. I was quite surprised with it because sometimes when people throw things together, it’s people who don’t use it, they don’t navigate the tool, and they just go ‘here it is, here’s your manual, go to it.’ But it is super user-friendly and easy to follow.” (Participant P) “There’s nothing I would remove from the toolkit. I thought it was well thought out. I thought it was well organized, and all the tips, and it’s very much written for the average nurse. You don’t have to be an educator or PhD prepared person to understand this toolkit.” (Participant Q) “What I liked about this toolkit is it allows you a one-stop-shop to understand the process behind doing any type of initiative. Is it perhaps a bit too detailed at some points, maybe? But you need that level of detail to understand it first of all.” (Participant N)

Implementation constructs	Illustrative Quotes
Usability - Negative	“Even some of our seasoned leaders are like ‘give me the pieces’; they don’t want to learn it, they just want you to give it to them and then they’ll do it, right? I was keeping that in mind as I was reading this toolkit, and I’m like, OK, they’re not going to go through all this rationale; they’re just going to skip, skip, skip, skip, skip, and go right to the tool and then not know how to use it.” (Participant S) “I remember looking at that one [step] and I was having a hard time wrapping my head around it because it was very like theoretical. What does this look like in a concrete way, like if I was trying to roll out breastfeeding practices, what does this actually look like?” (Participant D) “It’s very detailed, it’s very complex, it’s very wordy, it’s got a lot of visuals, it’s got a lot of boxes. There’s a whole bunch that happens in this document [toolkit], which is great for some, but not great for others.” (Participant L)
Adoption	“This is an excellent roadmap, and I can’t wait to use it; it’s what I needed for the next step for my team.” (Participant T) “This is a good toolkit for people who are beginner level who are trying to find more resources on how to lead a project. When this is in the market, I will use it, definitely.” (Participant J) “For the processes to be most effective, managers, educators, clinical resource nurses, and charge nurses should all be required to read the toolkit. Everyone knowing the what, when, where, how, and why of the process is important.” (Participant Q)

Additional File 7.6 Additional questionnaire tablesData from questionnaire section B (usefulness)

Number of participants that indicated toolkit features were “very useful” or “useful” (N=17)

Toolkit feature	n (%)
The planning templates throughout the toolkit	17 (100)
The “Summary checklist” at the end of each of the 12 steps	17 (100)
The boxes describing “what” each step involves	16 (94.1)
The “Progress checklists” at the end of each of the 3 phases	16 (94.1)
The boxes describing “why” each step is important	15 (88.2)
The boxes providing links to additional resources	14 (82.4)
The boxes including general “tips” on different parts of the implementation process	14 (82.4)
The boxes providing “BORN tips” on how BORN data, information, and resources can support the implementation process	12 (70.6)
The boxes providing considerations and guiding questions on equity, diversity, and inclusion (EDI)	11 (64.7)

Data from questionnaire section C (usability)

Participants’ level of agreement with statements on the usability of the toolkit

The toolkit is....	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
is well organized	10 (58.8)	6 (35.3)	1 (5.9)	0 (0)	0 (0)
is written in plain language	11 (64.7)	3 (17.6)	2 (11.8)	1 (5.9)	0 (0)
is easy to understand	11 (64.7)	3 (17.6)	3 (17.6)	0 (0)	0 (0)
clearly presents the planning process	12 (70.6)	4 (23.5)	1 (5.9)	0 (0)	0 (0)
is easy to navigate	11 (64.7)	5 (29.4)	1 (5.9)	0 (0)	0 (0)
presents the right amount of information	7 (41.2)	5 (29.4)	3 (17.6)	2 (11.8)	0 (0)

IUS scores (N=17)

	Mean rating (range 1-5)	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Positively worded items (<i>higher score (“agreement”) indicates higher usability</i>)						
I think I would like to use this toolkit frequently	4.2	7 (41.2)	7 (41.2)	2 (11.8)	1 (5.9)	0 (0)
I thought the toolkit was easy to use	3.8	1 (5.9)	12 (70.6)	4 (23.5)	0 (0)	0 (0)
I found the various components of this toolkit were well integrated	4.2	5 (29.4)	11 (64.7)	1 (5.9)	0 (0)	0 (0)
I would imagine that most people would learn to use this toolkit very quickly	3.5	1 (5.9)	9 (52.9)	5 (29.4)	2 (11.8)	0 (0)
I felt very confident using this toolkit	3.8	3 (17.6)	9 (52.9)	4 (23.5)	1 (5.9)	0 (0)
Negatively worded item (<i>lower score (“disagreement”) indicates higher usability</i>)						
I found the toolkit unnecessarily complex	2.4	0 (0)	2 (11.8)	3 (17.6)	12 (70.6)	0 (0)
I think that I would need the support of an expert consultant to be able to use this toolkit	2.2	0 (0)	2 (11.8)	4 (23.5)	7 (41.2)	4 (23.5)
I thought there was too much inconsistency in this toolkit	1.8	1 (5.9)	0 (0)	0 (0)	9 (52.9)	7 (41.2)
I found this toolkit very cumbersome to use	2.4	0 (0)	2 (11.8)	3 (17.6)	11 (64.7)	1 (5.9)
I would need to learn a lot of things before I could get going with this toolkit	2.2	0 (0)	2 (11.8)	3 (17.6)	9 (52.9)	3 (17.6)

Participants' preferred format for the toolkit (N=17)^a

Format	n (%)
An online document	8 (47.1)
An online interactive format (i.e., webpages, fillable online forms)	13 (76.5)
A paper-based hardcopy	6 (35.3)
Another format – video instruction	1 (5.9)

^aRespondents could select more than one option

Desired toolkit supports (N=17)^a

Resources & supports	n (%)
Webinar providing an overview of the toolkit's content and how to use it	13 (76.5)
Ongoing support from a BORN staff to advise on using the toolkit	11 (64.7)
Community of practice to connect with other maternal-newborn teams using the toolkit	8 (47.1)
Tip sheets on how to use the toolkit	14 (82.4)
A slide deck on the toolkit's content for teams to use	11 (64.7)
Other resources – online training modules	1 (5.9)

^aRespondents could select more than one option

Data from questionnaire section D (value and fit)

Participants' perceptions of toolkit value and fit (N=17)

The toolkit...	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
addresses the key factors to consider when planning for practice change	10 (58.8)	7 (41.2)	0 (0)	0 (0)	0 (0)
uses a planning model supported by research	10 (58.8)	7 (41.2)	0 (0)	0 (0)	0 (0)
will help us make decisions informed by evidence	9 (52.9)	8 (47.1)	0 (0)	0 (0)	0 (0)
conflicts with our usual approach to planning for practice change	0 (0)	1 (5.9)	5 (29.4)	10 (58.8)	1 (5.9)
is compatible with our usual approach to planning for practice change	1 (5.9)	11 (64.7)	5 (29.4)	0 (0)	0 (0)
will improve our usual approach to planning for practice change	5 (29.4)	11 (64.7)	1 (5.9)	0 (0)	0 (0)
will require changes to our usual approach to planning for practice change	2 (11.8)	12 (70.6)	2 (11.8)	1 (5.9)	0 (0)
is suitable for most practice change scenarios	3 (17.6)	11 (64.7)	1 (5.9)	2 (11.8)	0 (0)
will meet the needs of different maternal-newborn team members	3 (17.6)	11 (64.7)	2 (11.8)	1 (5.9)	0 (0)
will improve the sustainability of our practice change	7 (41.2)	10 (58.8)	0 (0)	0 (0)	0 (0)
will improve outcomes	7 (41.2)	7 (41.2)	3 (17.6)	0 (0)	0 (0)

Additional File 7.7 Questionnaire respondents' perceptions of whether each toolkit section should be kept as is, modified, or removed (N=17)

Bold = less than 75% of people picked most positive response option

Section	Type of information	Toolkit content	Keep as is	Needs modification	Remove
			n (%)	n (%)	n (%)
Introduction	Content	Welcome and introduction	11 (64.7)	6 (35.3)	0 (0)
	Template	Implementation work plan	12 (70.6)	5 (29.4)	0 (0)
Step 1. Call to action	Activities	Identify what problem to work on	10 (58.8)	7 (41.2)	0 (0)
		Form the working group	12 (70.6)	5 (29.4)	0 (0)
		Identify and engage other partners ^a	11 (68.8)	5 (31.3)	0 (0)
		Consider how to assess team dynamics and perceptions of the partnership ^b	11 (73.3)	3 (20.0)	1 (6.7)
	Templates	Issue prioritization matrix	15 (88.2)	1 (5.9)	1 (5.9)
		Invitation for patient and family partners	16 (94.1)	1 (5.9)	0 (0)
		Questions to assess patient or family member preferences for involvement	15 (88.2)	2 (11.8)	0 (0)
		Mapping potential partners and levels of engagement	15 (88.2)	1 (5.9)	1 (5.9)
Step 2. Understand the problem	Activities	Understand the problem from different perspectives	16 (94.1)	1 (5.9)	0 (0)
		Formulate your problem statement	15 (88.2)	2 (11.8)	0 (0)
	Templates	Explore the problem from different perspectives	13 (76.5)	4 (23.5)	0 (0)
Step 3. Select an evidence-informed solution to address the clinical problem	Activities	Identify evidence-informed solutions	7 (41.2)	10 (58.8)	0 (0)
		Assess the quality of the evidence-informed solution	11 (64.7)	6 (35.3)	0 (0)
		Prioritize recommendations	14 (82.4)	3 (17.6)	0 (0)
		Select and assess the quality of the guideline recommendations	12 (70.6)	5 (29.4)	0 (0)
	Templates	Discussion questions to assess guideline quality ^b	13 (86.7)	2 (13.3)	0 (0)
		Prioritizing what recommendation to work on ^a	12 (75.0)	4 (25.0)	0 (0)
		Discussion questions to assess recommendation quality	12 (70.6)	5 (29.4)	0 (0)

Section	Type of information	Toolkit content	Keep as is	Needs modification	Remove
			n (%)	n (%)	n (%)
Step 4. Understand current practice and define your evidence-practice gap	Activities	Understand current practice	15 (88.2)	2 (11.8)	0 (0)
		Measure the evidence-practice gap ^a	14 (87.5)	2 (12.5)	0 (0)
	Templates	Exploring current practice related to the selected guideline recommendation(s)	16 (94.1)	1 (5.9)	0 (0)
		Assessment of guideline recommendation against SMART indicator criteria	15 (88.2)	2 (11.8)	0 (0)
		Tool for calculating baseline adherence rate and evidence-practice gap	16 (94.1)	1 (5.9)	0 (0)
Step 5. Customize the best practice recommendation to local context and identify goals	Activities	Analyze the best practice – who needs to do what, when, to whom and under what circumstances?	16 (94.1)	1 (5.9)	0 (0)
		Clarify the outcomes that may be achieved by following the recommendation	17 (100)	0 (0)	0 (0)
	Templates	Worksheet to clarify who needs to do what, when, to whom and under what circumstances	17 (100)	0 (0)	0 (0)
		Anticipated outcomes of following selected recommendation	16 (94.1)	1 (5.9)	0 (0)
Step 6. Making the decision to proceed or not	Activities	Assess the best practice for feasibility, applicability, acceptability, affordability, and equity	14 (82.4)	3 (17.6)	0 (0)
		Develop your budget	12 (70.6)	5 (29.4)	0 (0)
		Firm up the business case ^a	15 (93.8)	1 (6.3)	0 (0)
	Templates	Feasibility, Applicability, Acceptability, Equity, and Affordability (FAAEA) Check	16 (94.1)	0 (0)	1 (5.9)
		Business case template	14 (82.4)	3 (17.6)	0 (0)
Step 7. Identify barriers and drivers	Activities	Identify who to speak to about barriers and drivers	15 (88.2)	2 (11.8)	0 (0)
		Conduct a barriers and drivers assessment	14 (82.4)	2 (11.8)	1 (5.9)

Section	Type of information	Toolkit content	Keep as is	Needs modification	Remove
			n (%)	n (%)	n (%)
	Templates	Summarize and prioritize barriers to address	15 (88.2)	2 (11.8)	0 (0)
		Who is directly and indirectly affected by the best practice recommendation?	17 (100)	0 (0)	0 (0)
		What is the influence and support level of the interested and affected parties?	12 (70.6)	4 (23.5)	1 (5.9)
		Discussion guide for learning about barriers and drivers to best practice implementation from different perspectives	16 (94.1)	0 (0)	1 (5.9)
		Which factors will be a barrier or a driver to your practice change initiative?	16 (94.1)	1 (5.9)	0 (0)
Step 8. Select and refine implementation strategies	Activities	Identify implementation strategies to address barriers ^a	10 (62.5)	6 (37.5)	0 (0)
		Refine your selected implementation strategies	15 (88.2)	2 (11.8)	0 (0)
		Field-test (pilot) your implementation strategies	16 (94.1)	1 (5.9)	0 (0)
	Templates	Rating the proposed implementation strategies	13 (76.5)	4 (23.5)	0 (0)
		Breaking down implementation strategies by Aims, Ingredients, Mechanism, and Delivery	14 (82.4)	3 (17.6)	0 (0)
		Using Plan-Do-Study-Act (PDSA) to pilot implementation strategies	16 (94.1)	1 (5.9)	0 (0)
Step 9. Develop a monitoring plan	Activities	Explore how to monitor adherence to the best practice change initiative	13 (76.5)	4 (23.5)	0 (0)
		Explore how to monitor the implementation strategies	15 (88.2)	2 (11.8)	0 (0)
	Templates	Plan for monitoring adherence to the best practice	16 (94.1)	1 (5.9)	0 (0)
		Plan for monitoring implementation strategies	16 (94.1)	1 (5.9)	0 (0)
Step 10. Develop an evaluation plan	Activities	Develop an evaluation plan for your practice change initiative	16 (94.1)	1 (5.9)	0 (0)

Section	Type of information	Toolkit content	Keep as is	Needs modification	Remove
			n (%)	n (%)	n (%)
	Templates	Outcome evaluation planning matrix	16 (94.1)	1 (5.9)	0 (0)
Step 11. Plan for sustainability	Activities	Assess capacity for sustainability	17 (100)	0 (0)	0 (0)
		Discuss strategies for sustainability	16 (94.1)	1 (5.9)	0 (0)
Step 12. Implement	Activities	Complete pre-launch checklist	15 (88.2)	1 (5.9)	1 (5.9)
		Celebrate the launch	17 (100)	0 (0)	0 (0)
	Templates	Pre-launch checklist ^b	15 (100)	0 (0)	0 (0)
Step 13. Monitor, evaluate, adjust, sustain	Activities	Activate your monitoring and evaluation plans and use findings to adjust approach	15 (88.2)	2 (11.8)	0 (0)
		Share your monitoring and evaluation findings	16 (94.1)	1 (5.9)	0 (0)
		Continue monitoring, evaluating, and adjusting into the sustainability period	16 (94.1)	1 (5.9)	0 (0)

Bold = less than 75% of people picked most positive response option

^a1 missing; out of 16

^b2 missing; out of 15

Chapter 8: Integrated Discussion

The purpose of this chapter is to (1) summarize the four studies conducted to develop and evaluate the toolkit, (2) describe the impact of and learnings from using an integrated knowledge translation (IKT) approach; (3) situate the overarching findings of the thesis in the literature, and (4) identify implications and future directions. This chapter was written following the four-step approach outlined by Lewis et al. (2021) for writing an integrated discussion.

8.1 Summary of studies

The goal of this thesis was to build implementation capacity in maternal-newborn teams by developing and evaluating a toolkit to help them apply implementation science knowledge to their practice change initiatives. To achieve this goal, I led a series of four studies (Table 8.1), summarized below, to inform the need for and content of the toolkit (Studies 1, 2, 3) and identify how it could be improved to better meet user needs and preferences (Study 4).

Table 8.1 Summary of how four studies relate to one another

Thesis Goal: To build implementation capacity in maternal-newborn teams by developing and evaluating an implementation toolkit for the Ontario maternal-newborn context			
Study 1 (Chapter 3) Mixed-methods study with implementation experts	Study 2 (Chapter 4) Secondary qualitative analysis of interviews with nursing leaders	Study 3 (Chapter 5) Provincial survey of healthcare professionals and leaders	Study 4 (Chapter 7) Mixed-methods evaluation of toolkit by healthcare professionals and leaders
Study 1 and Studies 2/3 contributed information on important content to include in the toolkit but from two different populations : implementation experts (Study 1) and potential users (Studies 2,3).			
	Studies 2 and 3 addressed the same topic of implementation processes and capacity-building needs with a similar population (potential users), but they used two different methods to collect this information (Study 2: secondary qualitative analysis; Study 3: cross-sectional survey)		
Studies 1/2/3 → Study 4 are sequential : the first three studies informed toolkit development, which was then evaluated in Study 4.			

8.1.1 Study 1: Mixed-methods study of experts offering implementation practice capacity-building initiatives

Study 1 (Chapter 3; published in Implementation Science Communications) (Reszel, Daub, Leese, et al., 2023), was a mixed-methods study to learn what experienced capacity-building developers and deliverers identify as critical content for teaching healthcare professionals and leaders about implementation practice. The study included 33 people (17 teams) who collectively had offered 20 unique capacity-building initiatives focused on implementation practice. Across participants, common training content included how to use a process-oriented approach in implementation; how to select and apply implementation theories, models, frameworks, and approaches throughout the implementation process; the “what” and “how” of implementation steps and skills, from identifying a problem through to monitoring, evaluating, and sustaining; and the relational aspects of implementation, including partner engagement. Participants described the importance of making training content pragmatic for practitioners and the importance of introducing relevant tools and resources to facilitate application of course content in practice. Despite these commonalities, some content was included less frequently (e.g., sustainability and scaling, forming implementation teams, dissemination) and there was a lack of consensus around which tools and resources to use. There were common challenges participants faced when teaching practitioners about implementation and participants shared their advice for supporting learners through these more difficult elements. Study 1 provided important information on what experienced trainers perceived as essential content for teaching practitioners about implementation. This complemented information from maternal-newborn healthcare providers and leaders (the target audience for the toolkit) in Studies 2 and 3, which are summarized next.

8.1.2 Study 2: Secondary qualitative analysis of interviews with Ontario nursing leaders on their approaches to practice change

Study 2 (Chapter 4; published in BMC Pregnancy and Childbirth) (Reszel, Daub, Dunn, et al., 2023) was a secondary analysis of 22 interviews with nursing managers and leaders working in Ontario maternal-newborn hospitals to learn about their typical approaches to implementing practice changes. The data were collected as part of a previous study (Dunn et al., 2016) to explore why some teams engage with a dashboard to facilitate practice changes and others do not. I used directed content analysis to categorize the content according to the seven steps of the Implementation Roadmap framework (Harrison & Graham, 2021). Participants completed a median of 4.5 steps out of 7 (range=3-7 steps), with the most frequently described step being identifying a problem. The least frequently described steps included selecting and adapting evidence, field-testing, and evaluating the outcomes of the practice change. Some steps were described frequently (e.g., assessing barriers), but were not described as being conducted in an evidence-informed way. Less than half of the interviewees identified a formal process or framework they use to guide practice changes, with the most common being those from quality improvement approaches. Participants described who is engaged in the practice change process, with the most frequent being consultations and information sharing with point-of-care staff. There were fewer examples of point-of-care staff being full members of the working group or patient engagement throughout the practice change process. Overall, there was variability in the implementation processes being used across hospitals, and when compared to an implementation science framework, the Implementation Roadmap (Harrison & Graham, 2021), there are potential areas for improvement. These findings supported the need for tools and resources to build the implementation capacity of maternal-newborn teams. While the qualitative design of

Study 2 facilitated rich insight into teams' implementation processes, the use of secondary data posed some limitations, including the timeliness of the data and the specificity of the original interview questions. Building on this work, I conducted a provincial survey to collect more recent and detailed data from a wider sample of hospitals (Study 3), described next.

8.1.3 Study 3: Provincial survey of maternal-newborn healthcare professionals and leaders on implementation processes and capacity-building needs

Study 3 (Chapter 5, published in BMC Nursing) (Reszel et al., 2025) was a cross-sectional survey to assess the extent to which Ontario maternal-newborn teams' current implementation approaches align with the 28 activities in the Implementation Roadmap framework (Harrison & Graham, 2021), and perceptions of importance and confidence completing the implementation activities. In total, there were 73 responses from healthcare professionals and leaders at 57 Ontario maternal-newborn hospitals. About half of the respondents reported using a formal process or framework to facilitate practice changes, with the most common examples aligning with quality improvement. Nurses in clinical and leadership roles were the professionals most frequently involved in all phases of the change process. Nearly all respondents (>90%) agreed that each of the 28 activities were important. However, many respondents reported not always completing steps in the Implementation Roadmap (median of 8 out of 28 activities always completed, range = 0–28), with the number of activities always completed declining from phase 1 (identifying and clarifying issues) through to phase 2 (building solutions and field-testing) and phase 3 (implementing, evaluating, sustaining). Most respondents indicated they were somewhat confident completing the implementation activities. In addition, most respondents agreed their teams would benefit from increasing their knowledge and skills to use an evidence-informed approach to implementing practice changes and indicated they would

value resources to guide the implementation process. Overall, the lower levels of implementation activity completion and confidence, coupled with the high ratings of importance and desire for training and resources, reinforced the need for, and potential value of, implementation tools for this population.

8.1.4 Development of the implementation toolkit

Collectively, the findings from Studies 1, 2, and 3 affirmed the decision to proceed with drafting an implementation toolkit (Chapter 6; Appendix D) for maternal-newborn hospital teams and provided a foundation for what implementation science knowledge to include and how to present it. Upon finalizing the toolkit draft, I aimed to learn about the intended users' perceptions of the toolkit (Study 4), summarized next.

8.1.5 Study 4: Mixed-methods study to evaluate user perceptions of the toolkit

The fourth and final study of the thesis (Chapter 7; submitted to JBI Evidence Implementation) was a mixed-methods study to explore user perceptions of the toolkit's content, format, and potential applicability. The study included 17 healthcare professionals and leaders who read the toolkit and completed a detailed questionnaire and interview on specific implementation constructs: acceptability, appropriateness, feasibility, usability, and intention to adopt. The toolkit was viewed as acceptable and appropriate, being described as a welcomed resource that meets the needs of those responsible for implementing practice changes. Although feasibility ratings were generally high, there were several perceived barriers to using the toolkit in practice, including limited time and resources, lack of leadership support, and resistance to change. The toolkit's mean usability rating was acceptable ($\geq 70\%$), but some participants shared that the toolkit may be too detailed and complex. Most toolkit sections and templates were deemed necessary with no changes required by $\geq 75\%$ of participants (48/61 sections/templates);

the remaining 13 sections/templates were mainly in the first phase of the implementation process. Suggestions for improving the usability of the toolkit included changing it to an online format, simplifying language, reducing redundant content, and adding information and examples to select sections to better describe activities. Nearly all participants indicated they would use the toolkit themselves or refer it to others, and there were many examples of how the toolkit could be adopted at local, regional, and provincial levels. Participants emphasized the importance of effective dissemination methods to ensure the toolkit reaches the people who could benefit from using it and recommended additional supports such as training and support personnel. The findings of this study will inform future changes to the content and format of the toolkit and, eventually, the methods used to disseminate and implement it.

8.2 Use of an integrated knowledge translation (IKT) approach: Impact and learnings

As introduced in Chapter 2, this thesis used an IKT approach. There remains limited evidence on the experiences of trainees using partnered research approaches, the outcomes achieved, and the barriers and facilitators they encounter (Cassidy, Beck, et al., 2021; Cassidy, Shin, et al., 2021). To contribute to our understanding of the potential effects of an IKT approach in graduate training, I next describe the impact of the partnership on the study processes and outcomes and my professional development, as well as the lessons learned.

8.2.1 Impact of the partnership

Although I did not formally evaluate the impact of the partnership, knowledge user partners verbalized several personal and professional benefits of working collaboratively. These benefits included the fulfilment of providing mentorship and support to a student; the chance to engage in the research process and further develop research skills; the opportunity to be a named author on peer-reviewed publications and the implementation toolkit; and the satisfaction of

working on a project that explicitly meets a need they had experienced firsthand and contributes to improving maternal-newborn health care.

In addition, using an IKT approach resulted in clear benefits to the research process. While many of these research-related benefits are described in the methods and strengths sections of the study chapters, I briefly provide some examples here. First, the knowledge user partners greatly facilitated recruitment by leading activities such as compiling contact lists, sending out personal and targeted study invitations to potential participants, and sharing recruitment advertisements across their professional networks, which likely led to higher enrollment and engagement in study activities.

Second, through their involvement in analyzing and interpreting study data, the knowledge user partners contributed their experiential knowledge to shape the study findings. For instance, the knowledge users identified data that aligned with their professional and personal experiences (i.e., confirming findings), proposed alternate interpretations for what I initially identified in the analysis (i.e., challenged findings), and shared potential meanings and reasons for what we were seeing in the data (i.e., explaining findings). These activities led to a more fulsome exploration and contextualization of the data. Given that the goal of this thesis was to create a practical and useful resource for maternal-newborn hospital teams, this contextualization of the findings was essential to ensure that the study data meaningfully informed toolkit development.

Third, through their immersion in the study data, the knowledge user partners identified key areas for exploration in future study phases (e.g., the qualitative data in one phase led to knowledge users proposing topics to probe in a future questionnaire). This, in turn, contributed to increasing the comprehensiveness and relevance of future data collection processes.

There were also many personal benefits of using an IKT approach for me as a doctoral student. I quickly learned that completing a PhD is a “long game” that requires significant self-direction and self-motivation. Using an IKT approach helped me focus on the potential impact of my work—I was co-producing knowledge and resources that could have a tangible effect on real people. For me, knowing that each step of my PhD was responding to the needs of my team members (and beyond) contributed to my motivation. In addition, seeing how each person on my team was generously giving their time to support my doctoral studies made me feel more accountable for my work, encouraging me to keep progressing the study in a rigorous, collaborative, and efficient manner. Using an IKT approach also meant I had a built-in support network that included more people and deeper connections than I would have had otherwise. Beyond the formal exchanges on the research project, each team member was a source of emotional support throughout the thesis, whether it be checking in by email, offering words of encouragement, celebrating milestones, or impromptu conversations about my doctoral journey.

While completing the required components of my doctoral program developed my research and analytic skills, using an IKT approach provided opportunities to build additional professional skills such as leadership, negotiation, and networking skills. Table 8.2 highlights several professional skills I gained by using an IKT approach with supporting examples from my project, organized by the Canadian Institutes of Health Research (CIHR) Refreshed Enriched Core Competency Framework for Health Services and Policy Research (Canadian Institutes of Health Research, 2025).

Table 8.2 Examples of how using an IKT approach contributed to development or enhancement of professional skills

Domain ^a	Examples of how the IKT approach contributed to developing or enhancing this competency
Engagement, collaboration, and partnership	Using an IKT approach allowed me to develop mutually beneficial relationships with diverse knowledge users. I worked to align the study plan and outputs with knowledge user needs and preferences and ensured we were working towards a shared goal. As I formed relationships with the knowledge user partners, there were networking opportunities beyond the immediate team. For example, a knowledge user partner asked me to present our work to the Women and Children’s Health Network and facilitate a discussion on our work’s potential application to regional networks. This allowed me to engage with and learn from maternal-newborn healthcare providers and leaders I would not have met otherwise.
Knowledge mobilization	Using an IKT approach meant that knowledge mobilization was considered from the outset of the study. My doctoral work resulted in 4 publications (which were co-authored by knowledge users) to share our findings with the academic community, as well as the toolkit that synthesizes information from implementation science, adapted to reflect the thesis findings. The toolkit is a key knowledge mobilization tool that will support the use of research from implementation science in practice.
Health systems, policy processes, and systems science	Embedding my doctoral work at BORN meant I had increased opportunities to learn about the maternal-newborn eco-system and engage with different organizations that provide care, produce evidence and policy recommendations, and support implementation and system improvement. The knowledge users on the team supported me to develop toolkit content that accurately reflected how the Ontario maternal-newborn health system operates, and offered guidance on ways the toolkit could eventually be embedded and supported within this system.

Domain ^a	Examples of how the IKT approach contributed to developing or enhancing this competency
Innovation, implementation, and improvement	At the time of study initiation, the project topic went beyond BORN's current approach to knowledge translation. Securing their organizational support required me to clearly communicate a vision of what could be (i.e., taking a more active role in knowledge translation) and showing the alignment with current operational priorities. The toolkit (an innovation) was then developed using an IKT approach to maximize the fit for BORN and its hospital partners. Now that the toolkit is developed and I have secured employment at BORN, I am positioned to continue using implementation science to inform how the toolkit can be integrated in BORN's day-to-day work and embedded in the maternal-newborn health system more broadly.
Leadership and mentorship	During my PhD I led our IKT team of researchers and knowledge users. Some IKT team members were new to implementation science and/or research and leading the project was an opportunity to partner with knowledge users to build their knowledge and skills in these areas. The knowledge users brought their own areas of expertise where I needed additional learning, and I worked to maintain an openness to learning and improving my own knowledge and skills throughout the process.
Project management	My study was composed of five phases (Chapters 3-7), providing a rich opportunity to develop my project management skills. Using an IKT approach meant that I was responsible for managing the research process and doing so within the context of a non-academic organization (BORN) that has its own culture and priorities. For instance, during my study, BORN had an unanticipated event that required a significant shift in their operations. I had to revisit my plan with the knowledge users and organizational leaders and negotiate and execute a timely plan that was acceptable for all.
Communication	Working on an IKT team and with other system partners meant I needed to learn to adapt my communications to each audience. For example, I learned to tailor my language and messages when I presented at scientific conferences versus health system partner meetings. Developing the toolkit provided the opportunity to take the large, complex implementation science literature and make it more digestible and practical for healthcare providers and leaders.
Research and evaluation	My PhD thesis involved a series of four studies, which used different methods (e.g., mixed-methods, secondary analysis, survey, qualitative), building my capacity to conduct research using different approaches and integrate the findings across studies. Using an IKT approach ensured that each of the studies and the program of research as a whole were relevant to health system partners and patients.

Domain ^a	Examples of how the IKT approach contributed to developing or enhancing this competency
Data science	Partnering with BORN, a prescribed data registry, allowed me to learn about current processes for collecting, analyzing, and sharing data in maternal-newborn care. Working with knowledge user partners from BORN created an opportunity to reflect on when and how data can be better integrated throughout the implementation process and communicate these ideas throughout the toolkit.
Equity, Diversity, Inclusion, Accessibility (EDIA) and Anti-Oppression	Several members of the IKT project team brought experience in applying EDIA principles, including sex- and gender-based analysis, experience on organizational EDIA committees, and lived experience. This helped me to develop comprehensive and acceptable questions on how EDIA should be considered throughout the implementation process and build these considerations into the toolkit.
Indigenous cultural safety and humility	Because I was embedded at BORN Ontario, BORN supported my participation in the San'yas Anti-Racism Indigenous Cultural Safety Training Program (core and advanced training), which provided me with opportunities to learn about and critically reflect on what it means to be an effective ally.

^aAs per the Canadian Institutes of Health Research (CIHR)'s Refreshed Enriched Core

Competency Framework for Health Services and Policy Research (Canadian Institutes of Health Research, 2025)

Developing and enhancing these competencies likely improved my ability to secure employment as a Knowledge Translation Specialist at the knowledge user organization I was partnering with.

8.2.2 Lessons learned

This thesis resulted in several lessons learned about using an IKT approach in general, and specifically during doctoral training. These lessons, which I describe next, relate to the advantages and disadvantages of working virtually, the timing of partnership initiation, and the importance of IKT mentors and support.

8.2.2.1 Working virtually. All the modes of engagement during the study were virtual in nature, and we did not experience any significant challenges working this way. The project

largely occurred in the post-pandemic era where online work had been normalized, and team members felt familiar and comfortable working as a virtual team. Working primarily through email meant that people could share what they wanted, when they wanted—for example, sending their feedback to the whole group or just to me. Another advantage was that it allowed us to work as a team of people in different geographical areas (e.g., Ottawa, Ontario; London, Ontario; Orillia, Ontario; Cambridge, Ontario; Halifax, Nova Scotia). However, by using primarily asynchronous online communication, we had fewer opportunities to truly discuss and build off one another's ideas. Furthermore, although I developed positive and fulfilling working relationships with each team member, there were few opportunities for team members to develop relationships with one another. Working in-person may have provided more opportunities for new connections and exchanges between team members, rather than me being the main contact that the relationships existed through.

8.2.2.2 Timing of partnership initiation. Although IKT promotes partnering with knowledge users right from the outset (i.e., study conceptualization), this is difficult to achieve as a trainee. As a doctoral student, I was subject to the typical order and timelines of my university program. I developed my research ideas and methods during my coursework, comprehensive examination, and proposal development and began partnering with knowledge users after my proposal was approved. However, one advantage of bringing on knowledge user partners after the study proposal was developed was that I could clearly describe to them what I was hoping to achieve and give them concrete guidelines on the type of work and the anticipated number of hours. This allowed each person to determine how well the project aligned with their interests and perceived needs and likely helped them make an informed decision about partnering on the project.

Although knowledge users were not able to influence the *initial* direction of the project, this was mitigated by having committee members who are also embedded in practice (e.g., both Drs Dunn and Cassidy are nurses; Dr Dunn is a KT Specialist at BORN Ontario) and by grounding the study in results from previous practice-based research at the same organization (BORN Ontario) in the same settings (maternal-newborn hospitals). In addition, although the knowledge users came on board after the proposal was developed, because my study used a multi-stage approach, there were still opportunities for them to contribute to refining the methods and procedures, developing the data collection tools, and analyzing and interpreting data as we worked through each study stage together.

8.2.2.3 IKT mentors and networks. A key facilitator to learning to use an IKT approach was having research mentors that invested the time and effort to support me as I navigated using a partnered approach. All three of my Thesis Advisory Committee members had extensive experience leading IKT studies; this consistency in philosophy created an overwhelmingly supportive research environment for me to learn IKT. My primary supervisor (Dr Graham) met with me weekly to discuss my progress, where we would discuss “macro” issues such as planning the categories of knowledge users to have on the team, as well as day-to-day tasks such as guiding me as I prepared for an upcoming presentation to a knowledge user organization. Conducting an IKT study comes with additional expenses, and my supervisor provided me with the necessary financial resources, such as a parent advisor honorarium, to conduct my study using an IKT approach in accordance with current guidelines for patient engagement (SPOR Evidence Alliance, 2022).

I was also embedded in my supervisor’s CIHR-funded Integrated Knowledge Translation Research Network (IKTRN, 2025), which included approximately 25 masters, doctoral, and

post-doctoral research trainees applying and studying IKT. This network created a sense of community where I could learn from other trainees using a similar approach (e.g., through online seminar series and discussion groups) and provided funds for publishing IKT-related research.

8.3 Collective findings of the thesis and contextualization in literature

Collectively, the thesis findings indicated that healthcare professionals and leaders are not applying knowledge from implementation science to the fullest extent possible. There is an appetite for resources that facilitate the application of evidence-informed approaches to implementation, and the toolkit developed in this study may be an acceptable and feasible resource to meet this need. Next, I illustrate how the four studies integrate to contribute knowledge to four key areas. First, the thesis revealed that the implementation processes being used in practice are not aligned with recommendations from implementation science. Second, the thesis provides information on the importance of tailoring implementation science knowledge and resources to the unique needs and settings of practitioners. Third, the thesis findings indicate that an implementation toolkit alone may not be sufficient, and there is a need for more active forms of training and support. Fourth, the approach used in this thesis contributes to our knowledge of methods for developing implementation practice resources (e.g., tools, information, guides, supports). Each of these points is explored below and contextualized within the literature.

8.3.1 Differences between implementation science recommendations and implementation practice

Over the past 20 years, there has been a drastic increase in research to develop the field of implementation science (Wilson et al., 2024). However, there are concerns that this implementation science knowledge is primarily being generated and applied within scientific and

academic communities, and less so in practice-based settings (Beidas et al., 2022; Harvey et al., 2023; Westerlund et al., 2019). Undoubtedly, there are potential advantages to applying implementation science knowledge in practice-based settings, like maternal-newborn hospital units, including a more systematic approach, better understanding of the local context, and selection of appropriate implementation strategies (Lynch et al., 2018; Moullin et al., 2020).

To date, there has been limited information on the extent to which healthcare settings are applying implementation science; this thesis contributes to filling this gap by comparing the implementation approaches in maternal-newborn settings to an implementation science process framework, the Implementation Roadmap (Harrison & Graham, 2021). Overall, the implementation processes being used in Ontario maternal-newborn care settings are different from recommendations from implementation science. Study 2 (Chapter 4) and Study 3 (Chapter 5) suggested that teams are not completing many of the steps in the Implementation Roadmap. In Study 2 (Chapter 4), participants described a median of 4.5 out of 7 steps; similarly, in Study 3 (Chapter 5), participants reported always completing a median of only 8 out of 28 activities. These findings suggest that current implementation processes are not as comprehensive as approaches grounded in implementation science. Across Study 2 (Chapter 4) and Study 3 (Chapter 5) there was limited use of formal processes or frameworks to guide the implementation process, with less than half of participants indicating this is typical in their organization. Of the identified processes and frameworks, none of them were from knowledge translation or implementation science. The limited use of implementation frameworks in practice settings has been described elsewhere (Lynch et al., 2018). There are several potential explanations for implementation frameworks' infrequent application, including lack of knowledge about the available options, lack of training on how to apply them, poor design for practical application,

poor fit with the project, and limited support and resources (Beidas et al., 2022; Strifler et al., 2020).

In Study 3 (Chapter 5), participants' ratings of importance, completion, and confidence generally decreased from Phase 1 to Phase 3 of the implementation activities. Interestingly, Study 4 (Chapter 7) revealed a similar pattern, where participants offered more feedback on Phase 1 compared to Phases 2 and 3, potentially signaling they had more experience to draw from in the earlier phases of the implementation process. Other studies have reported similar trends. For instance, practitioners have reported lower levels of confidence, difficulty of completion, and lower levels of success in later phases of the implementation process (Barrimore et al., 2020; McNett et al., 2022; Young et al., 2020). These findings suggest that healthcare professionals and leaders do not have the same degree of confidence in their ability to undertake all phases and activities of the implementation process, and there is a need for capacity-building and supports across the full implementation process.

There are several possible explanations for this difference between implementation-science informed approaches and what is occurring in practice. At an individual level, healthcare professionals and leaders may have limited knowledge and skill in how to apply implementation science knowledge in their settings. This was supported by Study 1 (Chapter 3) findings, where implementation experts identified the need to teach practitioners about the different implementation steps and how to select and apply appropriate implementation science theories, models, and frameworks. Furthermore, in Study 3 (Chapter 5) nearly all participants indicated their teams could benefit from increasing both their knowledge and skills in applying evidence-informed implementation approaches. Similarly, other studies have reported that healthcare professionals have low baseline levels of knowledge, skill, and/or confidence in knowledge

translation, implementation, and quality improvement (Barrimore et al., 2020; Black et al., 2021; Prochnow et al., 2023; Tschannen et al., 2023; Young et al., 2020).

The finding that current implementation processes do not align with implementation science frameworks raises the question of whether increasing alignment would, in fact, be valuable. In Study 3 (Chapter 5) most people agreed that about one-third of care provided in maternal-newborn settings was inappropriate (underuse, overuse, or misuse). This means that evidence-practice gaps remain in Ontario maternal-newborn care settings, similar to other clinical and geographic settings more broadly (Harvey et al., 2023). This suggests that current implementation processes are not producing the desired outcomes. While there may be many contributing factors, improving the implementation process could help reduce these remaining evidence-practice gaps. For instance, application of implementation frameworks may lead to improvements in adherence to best practices and patient outcomes (Barnden et al., 2023), and adherence to an evidence-informed implementation process can improve the probability of launching and sustaining a new program or practice (Alley et al., 2023). The thesis findings indicate that maternal-newborn healthcare professionals and leaders see a need for a more evidence-informed implementation process (Study 3, Chapter 5), desire more concrete information on what steps to take during implementation and how to undertake them (Study 3, Chapter 5; Chapter 6), and believe that the implementation process in the toolkit would improve their current implementation approaches (Study 4, Chapter 7). These findings support the potential value and acceptability of a process framework, like the Implementation Roadmap, to enhance implementation efforts, which in turn, should lead to better implementation and sustainability of evidence-informed practices.

8.3.2 Tailoring implementation science knowledge and resources to practitioner needs

In implementation science, it is well established that one size does not fit all, and often the evidence being implemented and the implementation approach need to be adapted for the local context (Graham et al., 2006). This adaptation process is commonly called *tailoring*, which is “a means of improving the fit between an intervention and the context in which it is implemented” (Albers et al., 2023, p. 1). Findings from this thesis support the importance of considering how implementation capacity-building resources should be tailored to the contexts they will be applied in and the people who will be using them.

Many implementation experts in Study 1 (Chapter 3) described having core training content but highlighted the importance of tailoring the content to both the baseline knowledge and practice areas of learners. Tailoring content to the baseline knowledge of learners posed some challenges for a toolkit, which is an asynchronous resource meant for broad dissemination across diverse users with different knowledge levels. Findings from Study 3 (Chapter 5) suggested many healthcare professionals and leaders have had low exposure to implementation science; the toolkit was therefore written for an audience who have experience engaging in practice change initiatives but are new to implementation science. We also tailored the toolkit to the maternal-newborn clinical context by applying an implementation framework with core steps and incorporating clinical examples and tips specific to the Ontario maternal-newborn setting (Chapter 6). Healthcare professionals and leaders in Study 4 (Chapter 7) offered positive feedback on the use of maternal-newborn examples and information on BORN data as it helped them better understand the content and its application to their contexts. The clinical and contextual relevance likely contributed to the toolkit receiving high ratings of acceptability and appropriateness (relevance and fit) in Study 4 (Chapter 7). This is consistent with past research

that suggests nurses, the largest professional group in the thesis sample, are more often “sensing” learners rather than “intuitive” learners (Mangold et al., 2018; McCrow et al., 2014), which focuses on how the material connects to the real world and uses concrete examples (University of Waterloo, 2025).

There have been recent calls for clarification about when the tailoring process begins and ends (McHugh et al., 2022). Tailoring the toolkit content to maximize fit for the users’ clinical context and learning needs are examples that occur early during resource development; it is also important to consider how implementation resources may later be tailored as they are used in real-world settings. Findings from this thesis highlight considerations around how users may eventually tailor the process and tools in the toolkit to fit current implementation approaches and available resources. In Study 2 (Chapter 4) and Study 3 (Chapter 5), quality improvement approaches and tools were commonly identified as current methods for making practice changes. This aligns with the use of several quality improvement tools and resources in the implementation capacity-building initiatives included in Study 1 (Chapter 3). Participants in Study 4 (Chapter 7) generally indicated the toolkit process aligned with their current approaches but also offered examples of where they would consider integrating their current quality improvement tools into the process, an example of tailoring. This integration of quality improvement and implementation science aligns with current literature advocating for alignment between the two approaches and the benefits of drawing from each discipline for maximum impact (Harrison & Graham, 2021; Leeman et al., 2021; Tyler & Glasgow, 2021).

Study 4 (Chapter 7) participants also highlighted feasibility concerns around executing all steps and activities in the toolkit due to limited resources and quickly evolving environments, aligning with previous findings that the implementation context and resources are key factors

that can facilitate or hinder implementation success (Braithwaite et al., 2014; Rogers et al., 2021). This led to several participants reflecting on how application of the toolkit may differ depending on the nature of the change and the time and resources available to them. This raises considerations around the extent to which an evidence-informed implementation process can be tailored to make it feasible and acceptable in a particular context before the potential benefits are compromised. For example, at a process level, there is evidence that completing a higher proportion of implementation activities is predictive of successful implementation (Alley et al., 2023; Saldana et al., 2012). While intuitively it makes sense that a more systematic and comprehensive implementation process would improve outcomes, future work will be needed to assess how fidelity to the toolkit process affects implementation outcomes.

8.3.3 The need for active forms of training and support to build implementation capacity

There is growing recognition of the need to build the capacity of the healthcare workforce and health system to use more evidence-informed approaches to implementation (Albers et al., 2020). With most implementation capacity-building initiatives focused on professionals and trainees in research and academia (Davis & D’Lima, 2020; Proctor & Chambers, 2017), this thesis contributes to our understanding of *what* information is taught to practitioners (Study 1, Chapter 3), practitioners’ preferences for *how* it is taught (Study 3, Chapter 5), and potential supports needed to *apply* the learnings in practice (Study 4, Chapter 7).

In Study 1 (Chapter 3), the 20 included capacity-building initiatives were all facilitated to varying extents and this direct engagement between the implementation experts and the learners provided opportunities to work through challenging content and be responsive to learning needs. The appeal of facilitated learning was apparent in Study 3 (Chapter 5), with respondents most frequently indicating they preferred courses and workshops (online and/or in-person) that are

facilitated by an instructor. Participants in Study 4 (Chapter 7) expressed different opinions on whether the toolkit could be used as a standalone resource without additional guidance or would require additional support like training and facilitation. This diversity in the desire for self-directed versus facilitated learning may relate to the needs and preferences of the learners, as well as the subject matter (Mlambo et al., 2021). Indeed, there are an array of educational theories ranging from those asserting learners can be independent and self-directed to those asserting that learning requires instruction from a teacher (Hutchinson & Estabrooks, 2013). There is not one universally successful approach, and others have advocated for the use of multiple education strategies and learning pathways to meet diverse learning needs and contexts (Portela Dos Santos et al., 2022). The toolkit created in this thesis represents an asynchronous and unfacilitated learning resource. Although the thesis findings suggest this will not meet the needs of all learners, the toolkit in its current format offers two key strengths. First, with implementation training demand surpassing availability (Davis & D’Lima, 2020; Proctor & Chambers, 2017), the toolkit meets a need for freely available implementation resources with broad reach. Second, the toolkit is a starting point to develop the framework, content, and tools for more active forms of implementation training in Ontario maternal-newborn settings.

The Evidence-based System for Innovation Supports (EBSIS) (The Center for Implementation, 2023; Wandersman et al., 2012) provides a helpful framework to situate the toolkit in its current form and potential next steps beyond this thesis. EBSIS highlights four key strategies to build implementation capacity: tools, training, technical assistance, and implementation quality. The toolkit developed in this thesis is a “tool” based on the best available evidence in implementation science that users can apply to guide and facilitate implementation efforts. The next step will be to develop and offer “training,” which will provide

instruction to teams on how to complete the steps and activities described in the toolkit. This will help meet the needs of the healthcare providers and leaders in Study 4 (Chapter 7) who expressed interest in the toolkit content being converted into webinars and training modules. Ideally, this training would be team-based within existing workplaces (King et al., 2021). There is also the opportunity to develop a mechanism for “technical assistance,” which falls under the umbrella of implementation support (Albers et al., 2020), to provide ongoing support and guidance as teams work through the implementation process. This aligns with the preferences of participants in Study 4 (Chapter 7), where about two-thirds of respondents indicated they would value ongoing support from implementation support personnel to guide use of the toolkit. The addition of technical assistance has the potential to increase the adoption and implementation of evidence-informed practices compared to tools and training alone (Leeman et al., 2015). Lastly, “assessment of implementation quality” is needed to monitor fidelity to the implementation process and the quality of supports received (The Center for Implementation, 2023), which would inform future improvements to the toolkit and how it is supported. Collectively, these four components maximize the chance of improved implementation capacity over any one component alone (Wandersman et al., 2012).

Finally, it is important to recognize that even with robust implementation capacity-building resources and strategies in place (such as tools, training, technical assistance, and ongoing improvement), consideration must be given to the organizational context and how it may influence practitioners' ability to apply their implementation science learnings in practice. Although nearly all participants indicated reading the toolkit increased their knowledge and confidence (Study 4, Chapter 7), this does not guarantee application in practice. Participants in Study 4 (Chapter 7) highlighted potential barriers to applying the toolkit process in practice,

including resistance to change, lack of leadership support, and insufficient resources. Evaluations of implementation capacity-building initiatives have similarly identified challenges in transferring learning into the workplace during and after training (Mosson et al., 2019; Park et al., 2018). This may be partially explained by organizational contextual factors, such as resources, attitudes, and willingness, which have been shown to influence the effectiveness of implementation capacity-building strategies (Leeman et al., 2015). This highlights the potential challenges of transforming individual learning into organizational change without adequate organizational support and resources (King et al., 2021).

8.3.4 Methods for developing implementation practice resources

As implementation resources continue to be developed to support healthcare professionals and leaders to implement evidence into practice, it is essential to consider the methods being used. The methods used in this thesis provide an example of one approach to developing an implementation resource (a toolkit) and contribute learnings for other teams, including who to involve in the process and how users' knowledge and experience may influence their contributions, the benefits of coupling IKT and user-centered design, and the importance of adapting implementation theories, models, and frameworks for practical use.

8.3.4.1 Engaging users in the development process. This thesis engaged over 100 people reflective of the toolkit's intended users. Table 8.3 presents the completed UCD-11 measure, which is a validated measure of user-centered design (Witteman et al., 2021). Although developed in the context of personal health tools, the measure includes key features of the user-centered design process and facilitates reporting of when and how users were involved in tool development. We completed nearly all items in the UCD-11, scoring 10 out of a maximum of 11, illustrating a high level of user-centeredness in the toolkit design process. Item 6 was not

completed by virtue of the time limitations of a doctoral program, but the iterative development cycles will continue as the toolkit is refined and re-evaluated beyond this thesis.

Table 8.3 User-Centered Design 11-item measure (UCD-11) applied to thesis

UCD-11 Items	Completed in thesis?
1 Were potential end users (e.g., patients, caregivers, family and friends, surrogates) involved in any steps to help understand users (e.g., who they are, in what context might they use the tool) and their needs?	✓ IKT approach Study 2 Study 3
2 Were potential end users involved in any steps of designing, developing, and/or refining a prototype?	✓ IKT approach
3 Were potential end users involved in any steps intended to evaluate prototypes or a final version of the tool?	✓ Study 4
4 Were potential end users asked their opinions of the tool in any way?	✓ Study 4
5 Were potential end users observed using the tool in any way?	✓ Study 4
6 Did the development process have 3 or more iterative cycles?	✗ To continue beyond thesis
7 Were changes between iterative cycles explicitly reported in any way?	✓ Chapter 6
8 Were health professionals asked their opinion of the tool at any point?	✓ IKT approach Study 4
9 Were health professionals consulted before the first prototype was developed?	✓ IKT approach Study 2 Study 3
10 Were health professionals consulted between initial and final prototypes?	✓ Study 4
11 Was an expert panel involved?	✓ IKT approach

Most of the thesis was focused on the first user-centered design phase of understanding user needs and contexts (Vaisson et al., 2021), which was foundational to developing the content of the first toolkit draft: Study 1 (Chapter 3) provided insight into user needs from the perspective of implementation experts, and Study 2 (Chapter 4) and Study 3 (Chapter 5) facilitated understanding of potential gaps in current implementation processes and learning needs from the perspective of maternal-newborn healthcare professionals and leaders. While

user-centered design approaches typically define “users” as those who will interact with the product (Witteaman et al., 2015), the study team made the decision to also engage implementation experts around the toolkit content. While implementation experts were not expected to directly interact with the toolkit, this was a fruitful exercise that resulted in complementary information to what we heard from users. Given the novelty of implementation science to many healthcare providers and leaders, there was a risk that they “don’t know what they don’t know” or as one Study 4 participant said, it’s “a need that people don’t even know they have.” Engaging implementation experts allowed us to mitigate this risk and learn from their experiences teaching our intended users about implementation; this experience allowed them to reflect on what content areas and skills practitioners needed to learn, which users themselves may not have had sufficient experience to reflect on.

I also engaged many healthcare professionals and leaders to inform the initial toolkit content (Study 2, Chapter 4; Study 3, Chapter 5) and to guide recommended changes (Study 4, Chapter 7). This information highlighted how users’ knowledge and experiences influenced their feedback. For instance, participants in Study 4 (Chapter 7) offered mixed feedback on whether the toolkit content was appropriate for different audiences. Some participants with more implementation experience perceived the content as too complex and intimidating for clinicians with less implementation experience. However, nearly all clinical nurses rated the toolkit positively and commented on its ease of understanding. This discrepancy may not be surprising given that individuals’ own knowledge can make accurately predicting others’ knowledge difficult (Tullis & Feder, 2023). Similarly, another study evaluating an implementation resource (Reszel et al., 2022) found that individuals with prior implementation experience offered different types of feedback on the resource than those with less experience. These findings

highlight the importance of considering who is involved in the development process and how their experiences and assumptions about others' interests and abilities may influence their suggestions for designing and refining a resource. Implementation resource developers should carefully consider how they interpret and apply an individual's personal views about a resource versus their perceptions of others.

8.3.4.2 Coupling IKT and user-centered design. Although IKT and user-centered design both involve engagement with those affected by the project, there is no consensus around whether user-centered design requires IKT. For example, in developing a measure for user-centered design, the item “there were users who were formal members of the research team” was not retained (Witteman et al., 2021). Earlier in this chapter, I described the overall benefits of using IKT in this doctoral thesis. Here, I briefly highlight how the IKT approach facilitated and strengthened the user-centered design process. First, having diverse knowledge users directly on our IKT research team resulted in data collection tools that were easily understood by users (Study 3, Chapter 5; Study 4, Chapter 7), facilitating accurate and meaningful information gathering from users to inform toolkit development. Second, having knowledge users on the IKT research team helped us overcome challenges recruiting our target users (i.e., busy healthcare professionals and leaders) in Study 3 (Chapter 5) and Study 4 (Chapter 7), enabling sufficient user representation and input into the toolkit content and design. Third, using an IKT approach meant the researchers had easy and continual access to a small group of people representative of potential users, allowing ad hoc discussions about toolkit development apart from formalized data collection processes in the studies. These knowledge user partners will continue to be essential as the team considers if and how to make the >400 suggested changes from Study 4 (Chapter 7). Ultimately, combining IKT and user-centered design allowed engagement of users

at various levels, from consultation through to full collaboration (International Association for Public Participation, 2024), strengthening both the study processes and outputs.

8.4.3.3 Adapting implementation theories, models, and frameworks for practical use. Finally, this thesis makes contributions to how implementation theories, models, and frameworks can be transformed for use in practice. As the program of research in this thesis evolved, so did the application of the underpinning framework, resulting in a tailored version of the Implementation Roadmap in the toolkit (Chapter 6). With the proliferation of implementation theories, models, and frameworks, it is prudent to select from existing options and consider how they can be adapted for practical use (Lynch et al., 2018; Moullin et al., 2020). Study 1 (Chapter 3) demonstrated how implementation experts consider theories, models, and frameworks as an essential part of teaching practitioners how to apply implementation science knowledge in healthcare settings. They also highlighted the need to make content pragmatic and offer tools and resources that facilitate application of implementation science theory and knowledge in practice. In this thesis, the Implementation Roadmap was selected as the underpinning implementation framework because it was informed directly by the experiential knowledge of implementation practitioners. Still, across the thesis, the content of the framework evolved. For example, the team decided to alter the wording of some steps and activities to better align with current language in maternal-newborn care settings, and to split some steps for clarity, based on feedback from the knowledge users on the team. The team also developed companion tools and templates to support actioning the steps and activities. Tools and templates were identified as some of the most important features of a practice change toolkit in Study 3 (Chapter 5) and these tools were most frequently identified as useful features of the toolkit (Study 4, Chapter 7). This iterative process to evolve an implementation framework into an actionable toolkit is an example

of making implementation science practical and implementable. Implementation theories, models, and frameworks offer a rigorous starting point for implementation resources; however, given that practitioners encounter challenges using theories, models, and frameworks (Strifler et al., 2020), the process to make them actionable in practice settings should be a core component of the development of implementation resources.

8.4 Implications

Next, I discuss the implications of the thesis findings for nursing practice, nursing education, the health system, and future research.

8.4.1 Implications for nursing practice

This thesis included nurses working in point-of-care, educator, advanced practice, and leadership roles, all of whom shared their experiences implementing evidence-informed practices in their settings (Study 2, Chapter 4; Study 3, Chapter 5; Study 4, Chapter 7). Study 2 (Chapter 4) and Study 3 (Chapter 5) identified nurses as the most frequently involved profession in implementation projects. Whether being the designated lead for implementation projects or playing a supportive role, nurses at all levels are the backbone of many practice-change initiatives in maternal-newborn settings. Despite this critical role, this thesis showed that nurses face several barriers to engaging in this work, including lack of knowledge and skills (described below in education), lack of sufficient time, resources, and institutional support, as well as lack of proper recognition. With pressured health systems, nurses can be required to make changes quickly with insufficient resources, resulting in implementation projects that are unsuccessful or not sustained. Study 4 (Chapter 7) highlighted that many nurses saw the toolkit, which is informed by implementation science, as a potential strategy to advocate for the needed time and resources to do implementation well. While the toolkit may be a starting point, nurses should

continue to advocate for, and be supported to use, evidence-informed approaches to implementing practice changes to ensure that optimal outcomes are achieved and sustained.

Although nurses were frequently involved throughout the implementation process, there were varying levels of engagement with point-of-care staff. For example, in Study 2 (Chapter 4), the most frequent level of engagement was “consultation,” which suggests that point-of-care nurses are asked for their input on an ad hoc basis but not engaged as full partners contributing to implementation decision-making. Study 4 (Chapter 7) helped contextualize these findings as participants shared barriers to more fulsome engagement with point-of-care nurses including high staff turnover, no dedicated time (resulting in nurses doing the work unpaid in their personal time), and organizational and union rules. These barriers to engagement, although legitimate, are concerning, given the need for nursing engagement in implementation. A core component of clinical nursing practice is providing evidence-informed care (College of Nurses of Ontario, 2019). Given nurses’ in-depth knowledge of their clinical settings and patient populations, it is also necessary that nurses are directly involved in shaping what evidence-informed practices are implemented and the process used to embed these practices in their settings. There is a need for health-system and nursing leaders to create the infrastructure, and expectation, that the expertise of point-of-care clinicians is a core component of practice change initiatives, and that nurses be appropriately recognized through protected time and compensation for their implementation work.

8.4.2 Implications for nursing education

A key finding of this thesis was that there is a difference between recommendations from implementation science and implementation practice in maternal-newborn hospital settings. While there are several factors that may contribute to this discrepancy, the thesis findings

support that building the knowledge and skills of those implementing practice changes is both important and desired. Study 3 (Chapter 5) and Study 4 (Chapter 7) highlighted participants' interest in learning about and applying evidence-informed approaches to implementation. Only a small proportion of Study 3 (Chapter 5) respondents (14%) indicated they had received any training in implementation science. Upon reviewing the toolkit in Study 4 (Chapter 7), several nurses articulated they wished they had learned this content in their undergraduate education and saw value in nurses learning about implementation earlier in their training. There is a need to move beyond the assumption that implementation is “common sense” and recognize that it requires a unique set of knowledge and skills. Implementation science knowledge and skills can equip nurses to contribute to positive changes for patients and the health system (Boehm et al., 2020); however, without access to appropriate education and training, this will be difficult to achieve.

Although nurses are often exposed to best practice implementation in their graduate training, there are opportunities to also build this content into undergraduate nursing programs. This would have benefits on two levels. First, some of the participants in Study 4 (Chapter 7) shared that with recruitment and retention challenges in nursing, nurses are increasingly working in nurse educator and manager positions without graduate training. This means that those in the nursing roles most frequently responsible for leading practice change initiatives may not have had access to formal training in this area. Second, with the need for point-of-care nurses to contribute their expertise to the full implementation process, ensuring that implementation capacity is an expected outcome of undergraduate training could facilitate their meaningful participation in this work. Nursing schools and education leaders should consider how to embed implementation science into nursing programs. For example, undergraduate research methods

courses often focus on the process of conducting research, but there are opportunities to re-focus course content on how to implement research into practice settings (Melnik et al., 2018).

Similarly, undergraduate nursing theory courses could include more middle-range theories, like knowledge translation and implementation theories, to teach nurses how to apply them to guide evidence-informed improvements in practice. Another educational strategy is integrating the content within clinical practice placements (Fiset et al., 2017), whereby nursing students could be part of unit projects to identify and explore an evidence-practice gap, identify high-quality evidence, and plan how to implement the evidence into practice. Beyond formal nursing education, there is a need to expand access to professional development opportunities in implementation for nurses and for health organizations to support nurses to attend and apply their learnings.

8.4.3 Implications for health systems

Findings from this thesis also contribute to our understanding of how implementation occurs at multiple levels of the health system and the need for partnership and coordination. Findings from Study 2 (Chapter 4) and Study 4 (Chapter 7) provided examples of how hospitals may be formally connected to multiple maternal-newborn organizations at different points of the implementation process, as well as informal connections through personal connections and communities-of-practice. This reinforces that implementing practice changes, even at the most local level, does not occur in a vacuum, and there is a need to identify and leverage the connection points in these broader formal and informal networks.

The Ontario maternal-newborn care system is well-positioned to enhance the use of evidence-informed approaches to implementation. For example, at a national and provincial level there are organizations producing best practice guidelines for implementation in maternal-

newborn settings (e.g., Society of Obstetricians and Gynaecologists of Canada, Association of Ontario Midwives, Provincial Council for Maternal and Child Health (PCMCH)). There is BORN Ontario, the province's prescribed perinatal, newborn, and child registry that can identify practices and outcomes that require improvement and facilitate monitoring and evaluation at a local, regional, and provincial level. Ontario also has six regional networks that support regional planning and implementation of evidence-informed practices in maternal-child care settings. While not an exhaustive list, these examples illustrate the existing infrastructure that could support maternal-newborn organizations to apply the implementation process in the toolkit.

Indeed, participants in Study 4 (Chapter 7) highlighted the potential role of these partners in different implementation steps and activities. For example, although effective implementation typically requires tailoring both the evidence-informed practice and the implementation strategies to the local context, steps such as identifying and appraising the evidence to be implemented, developing materials for implementation strategies, and evaluation planning could be done collectively with regional and provincial health partners. This approach can mitigate the resource limitations of individual hospitals to engage in these implementation steps (e.g., no library access, limited skills in evidence appraisal or evaluation planning skills), prevent “re-creating the wheel” where each organization is independently working on the same activities (e.g., developing the same implementation strategies), and potentially facilitate spread and scale of evidence-informed practices and programs. Each organization needs to clearly identify their role and work together to define which implementation steps are the primary responsibility of each organization and which steps can be done at a system level versus at a local level. The toolkit provides a starting point by offering a standardized process and a common language for all health-system partners to work from.

This thesis was conducted in partnership with BORN Ontario. As a prescribed registry, BORN is responsible for collecting, protecting, analyzing, and sharing data and information, as appropriate, to improve the provision of care (BORN Ontario, 2025). While BORN has a strong history of meeting this purpose, the process of conducting this thesis and the results raise considerations around the potential opportunities for BORN to more actively support the application of their data. For instance, most participants in Study 3 (Chapter 5) and Study 4 (Chapter 7) indicated interest in attending implementation training and receiving ongoing implementation support from BORN. Participants also offered positive feedback on the “BORN tips” in the toolkit, which highlighted how sites can engage with BORN data and staff throughout the implementation process. As BORN continues to maximize the actionability of their data, it will be important to consider if and how implementation support is offered to data partners to facilitate integration of data and evidence throughout the practice change process, from problem identification through to evaluation and sustainability, spread, and scale.

8.4.4 Implications for research

The findings of this thesis also highlight several considerations for researchers in implementation science and implementation capacity building. First, with implementation science not being effectively translated into practice settings, it will be important to understand the root causes of this issue. Future research is needed to understand whether the paradoxical implementation science-practice gap is due to a knowledge creation problem (i.e., is the implementation science knowledge being created not perceived to be relevant or usable in practice settings?) or a knowledge dissemination problem (i.e., is implementation science knowledge not reaching the practitioners who could benefit from it?) or both. Implementation researchers should partner with practitioners to better understand the drivers of this gap and

develop strategies to improve the development and application of relevant implementation science knowledge in the health system. Second, implementation science is developing a robust body of evidence on determinants of implementation success as well as the effectiveness of different implementation strategies. However, there is less evidence on the application of implementation process frameworks (or planned action frameworks) in healthcare settings, including how frequently they are applied, in what contexts, and their contributions to improving implementation outcomes, and more research is needed in this area. Finally, although there is emerging evidence that implementation capacity-building initiatives result in positive outcomes, future research should focus on ascertaining the short- and long-term outcomes of implementation practice training and the factors that maximize training effectiveness.

8.5 Next steps and future research

Given the positive feedback on the toolkit, the team will continue work to revise, evaluate, and implement the toolkit beyond this thesis, with the next steps for toolkit revision and future research presented below.

8.5.1 Integrating user feedback

All feedback from Study 4 (Chapter 7) will be reviewed and decisions made about whether to make the suggested changes or not. These decisions will be made based on the alignment with the toolkit's guiding principles, alignment with evidence from implementation science, and the feasibility of making the change. The feedback from Study 4 (Chapter 7) will also inform how the toolkit is transformed from a static document into a more usable and accessible format (i.e., interactive and virtual). Following the user-centered design cycle, the team will conduct a subsequent round of user testing to collect feedback on the toolkit's revised content and format. As the toolkit is revised, we will follow recommendations for toolkit

development (Agency for Healthcare Research and Quality, 2013; Hempel et al., 2019) to ensure the toolkit content and format aligns with current best practices.

8.5.2 Planning for dissemination and implementation supports

Study 4 (Chapter 7) participants highlighted valuable considerations and ideas for how the toolkit could be shared, and the supports needed to apply it in practice. The team will use this feedback to co-produce a dissemination plan to ensure the toolkit reaches the right target audience via the most effective channels and methods, with appropriate messaging (McCutcheon et al., 2022). The findings of this thesis also reinforced the importance of creating additional materials and supports to facilitate use of the toolkit in clinical settings. We will work to develop companion materials (e.g., brief user guides, tip sheets) and training materials (e.g., webinar, training modules). As BORN Ontario explores its role in hosting and supporting toolkit use, I will conduct internal training sessions and exploratory interviews to determine how the toolkit can become embedded in the organization's work and identify potential barriers and facilitators to doing so.

8.5.3 Field-testing the toolkit

While this thesis provided information on prospective users' perceptions of the toolkit content, format, and potential application, the feedback was based on hypothetical use, rather than actual use. The team plans to identify maternal-newborn teams willing to apply the toolkit process and templates to a practice change initiative and study them prospectively to learn how the toolkit is applied, what adaptations are made, the experience of using it, and the potential effect on users, the implementation process, and implementation and care outcomes. Again, these learnings will feed into the iterative user-centered design cycle and inform improvements to the toolkit to better align with user needs.

8.5.4 Planning for a future randomized trial

Finally, there are opportunities to plan for a randomized trial, such as a type 3 hybrid implementation trial, which has the primary aim of testing an implementation strategy and the secondary aim of assessing effectiveness of the clinical practice being implemented (Curran et al., 2012). Type 3 trials are appropriate when there is evidence for the clinical practice being implemented (Curran et al., 2022). Given the toolkit focuses on the implementation of high-quality synthesized evidence only, a type 3 trial could be a suitable design. First, it would help ascertain whether the toolkit is an effective implementation strategy that increases adherence to the clinical practice being implemented (compared to standard implementation approaches) and ascertain if the toolkit increases healthcare professionals' implementation knowledge, skills, and confidence. Second, a type 3 hybrid implementation trial would contribute evidence on the effectiveness of the clinical practice being implemented on patient, provider, and health-system outcomes in diverse maternal-newborn care settings and populations.

8.6 Limitations and strengths of the thesis

While Chapters 3, 4, 5, and 7 describe the limitations and strengths of the individual studies comprising the thesis, I next present key limitations and strengths of the thesis as a whole.

8.6.1 Limitations of the thesis

A potential limitation of this thesis relates to selection bias. First, it is possible that the people who participated in the studies were those who are most interested and engaged in evidence-informed practice changes and implementation practice, and their needs and preferences may not be reflective of others. However, engaging these interested participants in the thesis studies remains a valuable approach that may inform future efforts to leverage early

adopters in applying the toolkit. Second, most participants were nurses, and we had less participation from other professional groups like midwifery or medicine. This is perhaps unsurprising given that nurses are the largest group of health professionals in Ontario and are frequently engaged in practice change initiatives. However, implementation requires strong interprofessional collaboration and future work is needed to understand the implementation learning and support needs of interdisciplinary team members.

There is also the possibility of response bias. Across the four studies, participants were asked to describe what they do, and it is possible that participants may have answered more positively so they appear more knowledgeable or skilled in implementation (i.e., social desirability bias). This means that the thesis findings may present the implementation processes used and confidence levels more favorably than reality and represent a “best-case scenario.” Even still, the collective findings of the thesis show clear gaps in current implementation practices and participants articulated a clear need for additional resources and support.

It is also important to acknowledge that this thesis was conducted during the COVID-19 pandemic and in the year that followed, a period during which health systems and professionals continued to experience significant strain (e.g., increased healthcare professional burnout, system backlogs, reduction in non-COVID-19 improvement initiatives) (Pratt, 2025; Registered Nurses’ Association of Ontario [RNAO], 2024). This means that in several of the thesis studies, participants’ reflections on implementation processes may have been coloured by the extreme challenges of the pandemic, and these experiences may not be reflective of the “typical” contexts in which implementation occurs.

Finally, three of the four studies in this thesis focused on Ontario maternal-newborn settings; this means that the findings from this thesis may not be transferable to other

geographical or healthcare settings. This limitation was mitigated in several ways. Although participants were from a similar practice area, we had strong representation from many different hospitals, acuity levels, and geographical areas, offering diversity in our sample. We provided comprehensive descriptions of our samples and contexts to allow others to assess the transferability of the thesis findings to other settings. In addition, the use of the same published implementation framework across the studies (Implementation Roadmap) facilitates replication and comparison in other settings.

8.6.2 Strengths of the thesis

A key strength of this thesis was the use of an IKT approach, with diverse knowledge users with expertise in nursing, health-system leadership, perinatal data, and lived experience directly shaping the research. This IKT approach increased the likelihood that the research outputs, including the toolkit, would be understandable and useful to healthcare professionals and leaders. Another strength was the extensive engagement of both implementation experts (>30 individuals) and healthcare professionals and leaders (>100 individuals) across the four studies, which provided valuable insights into implementation learning needs and preferences in healthcare settings. This allowed the research to be grounded in best practices from implementation science and practice as well as the immediate needs of healthcare providers and leaders and their settings.

Within partnered research approaches like IKT, positioning findings for use is a key indicator of quality (McLean et al., 2022, 2024), encompassing both relevance and actionability. This thesis was highly relevant to maternal-newborn healthcare providers and leaders, as it stemmed from an expressed need for implementation support in our previous work (Reszel et al., 2019), which was confirmed and further explored in the thesis studies. The thesis resulted in four

peer-reviewed publications, three of which have already undergone peer review, strengthening the presentation of the results. But perhaps more importantly, this thesis resulted in the development of the toolkit, which enhances the actionability of the findings. The toolkit synthesized and simplified information from implementation science and customized it to the target end-users by using the thesis findings and the expert guidance of the IKT team. This is a key strength, as the thesis contributed both new knowledge to the literature (evidenced by the four papers) and a high-quality knowledge product (the toolkit), which can support healthcare professionals and leaders in applying the thesis findings to enhance their implementation efforts.

This thesis used different methods to enhance the trustworthiness of the findings. For example, we used data triangulation by collecting information from different populations (e.g., exploring implementation learning needs from implementation experts in Study 1 (Chapter 3) and healthcare professionals and leaders in Study 2 (Chapter 4) and Study 3 (Chapter 5)). We used methods triangulation by collecting information via qualitative and quantitative methods across the studies (e.g., learning about usual implementation processes and gaps by analyzing interviews in Study 2 (Chapter 4) and conducting a survey in Study 3 (Chapter 5)). The knowledge user partners were also engaged in analyzing the findings in Study 2 (Chapter 4), Study 3 (Chapter 5), and Study 4 (Chapter 7), enhancing our ability to accurately interpret the results and contextualize them. Finally, across the four studies and the toolkit itself, we applied the same implementation process framework, the Implementation Roadmap (Harrison & Graham, 2021), which organized our findings into consistent categories and facilitated comparison and learnings across the thesis.

8.7 Conclusion

The goal of this thesis was to build implementation capacity in maternal-newborn teams by developing and evaluating an implementation toolkit for the Ontario maternal-newborn context. To achieve this, I used an integrated knowledge translation (IKT) approach and worked with a team of researchers, healthcare professionals and leaders, partners at BORN Ontario, and a parent to conduct a series of four studies. In Study 1 (Chapter 3) I surveyed and interviewed implementation experts to identify essential content for teaching implementation practice. In Study 2 (Chapter 4) and Study 3 (Chapter 5) I analyzed interviews and conducted a provincial survey to explore maternal-newborn healthcare professionals' and leaders' usual approaches to implementing practice changes and identified potential areas for improvement and learning preferences. The findings of these three studies informed the development of the toolkit prototype (Chapter 6), which was then reviewed by a sample of target users for feedback (Study 4, Chapter 7). Collectively, the findings of this thesis suggest that evidence from implementation science is not being fully applied in maternal-newborn settings in Ontario. Healthcare professionals and leaders are interested in capacity-building training and resources to improve their implementation processes; the toolkit developed in this thesis represents one such resource that may help meet this need.

This thesis contributes to both nursing and implementation science. Nurses are well-positioned and interested in using evidence-informed implementation approaches. The findings enhance our understanding of nurses' current implementation practices and learning needs and lay a foundation for supporting maternal-newborn nurses' efforts to move evidence into practice. Given the growing recognition that implementation science knowledge must be better translated into practice settings, this thesis is a timely contribution to the evidence base on how to

rigorously develop implementation resources. The approach and findings may be informative to others working to develop implementation capacity-building initiatives and resources. Future work is needed to refine the toolkit, evaluate its effect on individual users, implementation approaches and care processes and outcomes, and plan for appropriate dissemination and implementation.

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APPENDICES

List of Appendices:

- **Appendix A:** Research ethics board initial approval letters
- **Appendix B:** Contributions of research team members to each chapter of thesis
- **Appendix C:** Guidance for Reporting Involvement of Patients and the Public Short Form (GRIPP2-SF)
- **Appendix D:** Toolkit draft developed and evaluated in thesis

Appendix A: Research ethics board initial approval letters

Ottawa Health Science Network Research Ethics Board (OHSN-REB) Approval for Chapter 3 (Study 1)



Ottawa Health Science Network Research Ethics Board (OHSN-REB) / Conseil d'éthique de la recherche du réseau de science de la santé d'Ottawa (CÉR-RSSO)

Date: May 25, 2021
Principal Investigator: Dr. Ian Graham, TOH/OHRI
Protocol ID: 20210274-01H
Study Title: Exploring the experiential knowledge of those offering knowledge translation and implementation capacity building initiatives to practitioners: A mixed-methods study
Submission Type: Initial Application
Review Type: Delegated
Date of Approval: May 21, 2021
Approval Expiry Date: May 21, 2022

Dear Dr. Graham,

An **Institutional approval (OHRI) letter is required prior to the conduct of the study** at this site. The institutional approval letter is an indication that you have satisfied ethics, contracts, departmental notifications, as applicable.

Thank you for submitting the above referenced study. The Ottawa Health Science Network Research Ethics Board (OHSN-REB) has reviewed the application and granted approval for your study. This approval is granted until the expiration date noted above. This research study is to be conducted by the investigator noted above.

The **OHSN-REB ethics approval** is applicable only for The Ottawa Hospital.

Documents Approved:

Document Name	Document Version Date
English Informed Consent Form	April 20, 2021
English Interview Guide	February 8, 2021
English Recruitment Email for Investigators Identified through Networks	April 20, 2021
English Recruitment Email Reminder	April 20, 2021
English Recruitment Email Reminder for Investigators Identified through Systematic Review	April 20, 2021
English Survey Protocol	February 8, 2021
	April 20, 2021

No deviations from, or changes to, the protocol should be initiated without prior written approval of an appropriate amendment from the OHSN-REB, except when necessary to eliminate immediate hazard(s) to study participants.

REB members involved in the research project do not participate in the review, discussion or decision.

If the study is to continue beyond the expiry date noted above, a Continuing Review Form must be received by the OHSN-REB on or prior to the full board submission deadline date of the meeting scheduled to occur a minimum of 30 days prior to the study expiry date. If the study has been completed by the expiry noted above, a Study Closure Report must be received by the OHSN-REB.

The OHSN-REB operates in compliance with, and is constituted in accordance with, the requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use; Integrated Addendum to ICH E6 (R1): Guideline for Good Clinical Practice E6 (R2); Part C, Division 5 of the Food and Drug Regulations; or with the definition in the Interim Order Respecting Clinical Trials for Medical Devices and Drugs Relating to COVID-19; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations; and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. OHSN-REB is qualified through the CTO REB Qualification Program and is registered with the U.S. Department of Health and Human Services (DHHS) Office for Human Research Protection (OHRP).

Please do not hesitate to contact us if you have any questions.

Sincerely,



Raphael Saginur, M.D.
 Chairperson
 Ottawa Health Science Network Research Ethics Board

/kc

University of Ottawa Research Ethics Board Approval for Chapter 4 (Study 2)

08/12/2022

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL**Numéro du dossier / Ethics File Number**

H-11-22-8739

Titre du projet / Project TitlePlanning and implementing
practice changes in Ontario
maternal-newborn units: A
secondary qualitative analysis**Type de projet / Project Type**Thèse de doctorat / Doctoral
thesis**Statut du projet / Project Status**

Approuvé / Approved

Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)

08/12/2022

Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)

07/12/2023

Équipe de recherche / Research Team**Chercheur /
Researcher****Affiliation****Role**

Jessica RESZEL

École des sciences infirmières / School of Nursing

Chercheur Principal / Principal
Investigator

Ian GRAHAM

Département d'épidémiologie et santé publique / Department of
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Superviseur / Supervisor

Sandra DUNN

Co-superviseur / Co-supervisor

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08/12/2022

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

Le Comité d'éthique de la recherche (CÉR) de l'Université d'Ottawa, opérant conformément à l'*Énoncé de politique des Trois conseils* (2014) et toutes autres lois et tous règlements applicables, a examiné et approuvé la demande d'éthique du projet de recherche ci-nommé.

L'approbation est valide pour la durée indiquée plus haut et est sujette aux conditions énumérées dans la section intitulée "Conditions Spéciales ou Commentaires". Le formulaire « Renouvellement ou Fermeture de Projet » doit être complété quatre semaines avant la date d'échéance indiquée ci-haut afin de demander un renouvellement de cette approbation éthique ou afin de fermer le dossier.

Toutes modifications apportées au projet doivent être approuvées par le CER avant leur mise en place, sauf si le participant doit être retiré en raison d'un danger immédiat ou s'il s'agit d'un changement ayant trait à des éléments administratifs ou logistiques du projet. Les chercheurs doivent aviser le CER dans les plus brefs délais de tout changement pouvant augmenter le niveau de risque aux participants ou pouvant affecter considérablement le déroulement du projet, rapporter tout événement imprévu ou indésirable et soumettre toute nouvelle information pouvant nuire à la conduite du projet ou à la sécurité des participants.

The University of Ottawa Research Ethics Board, which operates in accordance with the *Tri-Council Policy Statement* (2014) and other applicable laws and regulations, has examined and approved the ethics application for the above-named research project.

Ethics approval is valid for the period indicated above and is subject to the conditions listed in the section entitled "Special Conditions or Comments". The "Renewal/Project Closure" form must be completed four weeks before the above-referenced expiry date to request a renewal of this ethics approval or closure of the file.

Any changes made to the project must be approved by the REB before being implemented, except when necessary to remove participants from immediate endangerment or when the modification(s) only pertain to administrative or logistical components of the project. Investigators must also promptly alert the REB of any changes that increase the risk to participant(s), any changes that considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project or the safety of the participant(s).

Germain ZONGO

Responsable d'éthique en recherche / Protocol Officer

Pour/For Daniel LAGAREC Président(e) du/ Chair of the Comité d'éthique de la recherche en sciences de la santé et sciences / Health Sciences and Sciences Research Ethics Board

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Children’s Hospital of Eastern Ontario (CHEO) Research Ethics Board Approval for Chapters 5 and 7 (Studies 3 and 4)



CHEO REB Letter of Approval

REB Protocol No: 23/59X

ROME File No: 20230197

Principal Investigator: Ms. Sandra Dunn

Protocol Title: CHEOREB# 23/59X - Developing and evaluating an implementation capacity-building toolkit for practitioners in Ontario maternal-newborn hospital settings: A mixed-methods study

Protocol Status: Active

Approval Date: June 07, 2023

Approval Expiry Date: May 15, 2024

The CHEO REB has conducted a delegated review and determined that the conditions of approval have been satisfied for the above-named study. Approval is valid for the period indicated above. This research study is to be conducted by the investigator noted above. Annual renewals or study closures must be completed before the expiry date noted above.

REB members involved in the study do not participate in the review, deliberations, or decision.

Documents Approved:

Document Name	Comments	Version Date
Recruitment Materials	Appendix 1 - Part 1_Email invitation and reminder text_June 2, 2023_Clean	2023/06/02
Questionnaire/Survey	Appendix 2 - Part 1_Information letter and questionnaire_June 2, 2023_Clean	2023/06/02
Recruitment Materials	Appendix 3 - Part 2_Email invitation and reminder text_Professionals_June 2, 2023_Clean	2023/06/02
Recruitment Materials	Appendix 4 - Part 2_Email invitation and reminder text_Parents_June 2, 2023_Clean	2023/06/02
Questionnaire/Survey	Appendix 5 - Part 2_Questionnaire_June 2, 2023_Clean	2023/06/02
Consent Form	Appendix 6 - Part 2_Consent Professionals_June 2, 2023_Clean	2023/06/02
Consent Form	Appendix 8 - Part 2_Consent Parents_June 2, 2023_Clean	2023/06/02
Recruitment Materials	Appendix 9 - Part 3_Email invitation and reminder text_June 2, 2023_Clean	2023/06/02
Consent Form	Appendix 10 - Part 3_Consent Professionals_June 2, 2023_Clean	2023/06/02
Questionnaire/Survey	Appendix 11 - Part 3_Questionnaire_June 2, 2023_Clean	2023/06/02
Recruitment Materials	Appendix 13 - Part 4_Email invitation and reminder text_June 2, 2023_Clean	2023/06/02

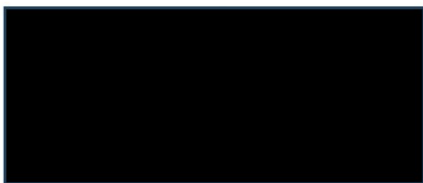
Consent Form	Appendix 14 - Part 4_Consent BORN_June 2, 2023_Clean	2023/06/02
Questionnaire/Survey	Appendix 15 - Part 4_Demographic form_BORN staff_June 2, 2023_Clean	2023/06/02
Protocol	Protocol 23 59X_June 2, 2023_Clean	2023/06/02
Other Document	Appendix 16 - Part 4_Semi-structured question guide_May 1, 2023	2023/05/01
Other Document	Appendix 12 - Part 3_Semi-structured question guide	2023/05/01
Other Document	Appendix 7 - Part 2_Guiding questions_Parents	2023/05/01

Any modifications made to the study must be reviewed and approved by the REB prior to implementation, except when necessary to eliminate immediate danger or hazard(s) to study participants or when the change(s) involves administrative aspects of the study. Investigators must promptly alert the REB of any changes that increase the risk to participants or affect the safety of participants, all unanticipated and harmful events that occur, and new information that significantly impact the conduct of the study.

The CHEO REB operates in compliance with, and is constituted in accordance with, the requirements of the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans (TCPS 2); the International Conference on Harmonization Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; and Part 3 of the Medical Devices Regulations and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The CHEO REB is registered with the U.S. Department of Health and Human Services (DHHS) Office for Human Research Protection (OHRP).

Please do not hesitate to contact the [Research Ethics Office](#) if you have any questions.

Best wishes for the successful conduct of your research.



Cécile Bensimon, MA, PhD
Chair, Research Ethics Board
Présidente, Comité d'éthique de la recherche

University of Ottawa Research Ethics Board Approval for Chapters 5 and 7 (Studies 3 and 4)

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

Lettre d'approbation administrative | Letter of administrative approval

Numéro de dossier / Ethics File Number

H-12-23-9959

Titre du projet / Project Title

Developing and evaluating an implementation capacity-building toolkit for practitioners in Ontario maternal-newborn hospital settings: A mixed-methods study

Type de projet / Project Type

Thèse de doctorat / Doctoral thesis

CÉR primaire / Primary REB

CHEO / CHEO

Statut du projet / Project Status

Approuvé / Approved

Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)

07/12/2023

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2) Une partie du projet est également réalisé sous l'autorité ou sous les auspices de l'Université d'Ottawa.

Cette lettre confirme que l'Université d'Ottawa a autorisé que le CÉR primaire soit le CÉR officiel pour l'évaluation et la supervision de ce projet de recherche. Ceci n'est pas une approbation éthique.

Afin de nous aider à garder votre dossier à jour, veuillez soumettre une copie de toutes demandes de modification, renouvellement d'approbation éthique etc. soumis à et approuvé par le CÉR primaire dès qu'elles sont disponibles.

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The University of Ottawa has signed an Agreement, compliant with current TCPS guidelines and any other applicable guidelines or legislation regarding multisite review, allowing the REB named above to serve as Board of Record (BoR) for research projects where

1) the main research activities are conducted within the auspices or jurisdiction of the BoR's institution and

2) parts of the project are also conducted under the jurisdiction or auspices of the University of Ottawa.

This letter confirms that the University of Ottawa has authorized the REB named above to serve as Board of Record for the review and oversight of this research project. This is not an REB approval.

In order to help us keep your file up to date, please submit a copy of all amendment requests, project renewals or any other changes submitted to and approved by the BoR, as they become available.

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Appendix B: Contributions of research team members to each chapter of thesis

Chapter 1. Introduction				
Contributions	JR	IG	CC	SD
Drafted chapter	●			
Critically reviewed and edited chapter	●	●	●	●
Approved final version of chapter		●	●	●

JR=Jessica Reszel; **IG**=Ian D Graham; **CC**=Christine E Cassidy; **SD**=Sandra I Dunn

Chapter 2. Description of integrated knowledge translation approach				
Contributions	JR	IG	CC	SD
Drafted chapter	●			
Critically reviewed and edited chapter	●	●	●	●
Approved final version of chapter		●	●	●

JR=Jessica Reszel; **IG**=Ian D Graham; **CC**=Christine E Cassidy; **SD**=Sandra I Dunn

Chapter 3 (Paper 1). Essential content for teaching implementation practice in healthcare: A mixed-methods study of teams offering capacity-building initiatives																		
Contributions	JR	OD	JL	HA	DB	CC	BC	SD	LG	AH	SH	EL	JM	MR	WR	DS	IG	CBI
Conceptualized and designed study	●											●	●			●	●	○
Collected data	●	●	●															
Analyzed data	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Interpreted data	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Drafted manuscript	●																	
Critically reviewed and edited manuscript	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Approved final version of manuscript	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Agreed to be accountable for all aspects of work	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

JR=Jessica Reszel; **OD**=Olivia Daub; **JL**=Jenny Leese; **HA**=Hanna Augustsson; **DB**=Danielle Moeske Bellows; **CC**=Christine E Cassidy; **BC**=Beth E Crowner; **SD**=Sandra I Dunn; **LG**=Lisa B Goodwin; **AH**=Alison M Hoens; **SH**=Sarah C Hunter; **EL**=Elizabeth A Lynch; **JM**=Jennifer L Moore; **MR**=Miriam R Rafferty; **WR**=Wendy Romney; **DS**=Dawn Stacey; **IG**=Ian D Graham; **CBI**=Implementation Practice Capacity-Building Initiative (CBI) Study team (Sally Bennett, Agnes T Black, Ashley E Cameron, Rachel Davis, Shauna Kingsnorth, Julia E Moore, Christine Provvidenza, Sharon E Straus, Ashleigh Townley); **○** Only some people on the CBI study team contributed to conceptualization (RD, JEM, SES)

Chapter 4 (Paper 2). Planning and implementing practice changes in Ontario maternal-newborn hospital units: A secondary qualitative analysis										
Contributions	JR	IG	CC	SD	OD	KH	ML	DP	AQ	AW
Conceptualized and designed study	●	●	●	●						
Analyzed data	●	●			●					
Interpreted data	●	●	●	●	●	●	●	●	●	●
Drafted manuscript	●									
Critically reviewed and edited manuscript	●	●	●	●	●	●	●	●	●	●
Approved final version of manuscript	●	●	●	●	●	●	●	●	●	●
Agreed to be accountable for all aspects of work	●	●	●	●	●	●	●	●	●	●

JR=Jessica Reszel; **IG**=Ian D Graham; **CC**=Christine E Cassidy; **SD**=Sandra I Dunn; **OD**=Olivia Daub; **KH**=Kaamel Hafizi; **ML**=Marnie Lightfoot; **DP**=Dahlia Pervez; **AQ**=Ashley Quosdorf; **AW**=Allison Wood

Chapter 5 (Paper 3). Implementation capacity-building needs in Ontario maternal-newborn care hospital settings: A cross-sectional survey										
Contributions	JR	IG	CC	SD	OD	KH	ML	DP	AQ	AW
Conceptualized study	●	●	●	●						
Designed study (including tools)	●	●	●	●	●	●	●	●	●	●
Collected data (including participant recruitment)	●					●	●			●
Analyzed data	●	●								
Interpreted data	●	●	●	●	●	●	●	●	●	●
Drafted manuscript	●									
Critically reviewed and edited manuscript	●	●	●	●	●	●	●	●	●	●
Approved final version of manuscript	●	●	●	●	●	●	●	●	●	●
Agreed to be accountable for all aspects of work	●	●	●	●	●	●	●	●	●	●

JR=Jessica Reszel; **IG**=Ian D Graham; **CC**=Christine E Cassidy; **SD**=Sandra I Dunn; **OD**=Olivia Daub; **KH**=Kaamel Hafizi; **ML**=Marnie Lightfoot; **DP**=Dahlia Pervez; **AQ**=Ashley Quosdorf; **AW**=Allison Wood

Chapter 6. Creating and situating the implementation toolkit				
Contributions	JR	IG	CC	SD
Drafted chapter	●			
Critically reviewed and edited chapter	●	●	●	●
Approved final version of chapter		●	●	●

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Chapter 7 (Paper 4). User evaluation of an implementation toolkit for maternal-newborn care													
Contributions	JR	IG	CC	SD	JB	MC	OD	KH	CLV	ML	DP	AQ	AW
Conceptualized study	●	●	●	●									
Designed study (including tools)	●	●	●	●	●	●	●	●	●	●	●	●	●
Collected data (including participant recruitment)	●									●			
Analyzed data	●	●							●				
Interpreted data	●	●	●	●	●	●	●	●	●	●	●	●	●
Drafted manuscript	●												
Critically reviewed and edited manuscript	●	●	●	●	●	●	●	●	●	●	●	●	●
Approved final version of manuscript	●	●	●	●	●	●	●	●	●	●	●	●	●
Agreed to be accountable for all aspects of work	●	●	●	●	●	●	●	●	●	●	●	●	●

JR=Jessica Reszel; **IG**=Ian D Graham; **CC**=Christine E Cassidy; **SD**=Sandra I Dunn; **JB**=Janet Brownlee; **MC**=Mireille Cloutier; **OD**=Olivia Daub; **KH**=Kaamel Hafizi; **CLV**=Carolina Lavin Venegas; **ML**=Marnie Lightfoot; **DP**=Dahlia Pervez; **AQ**=Ashley Quosdorf; **AW**=Allison Wood

Chapter 8. Integrated discussion				
Contributions	JR	IG	CC	SD
Drafted chapter	●			
Critically reviewed and edited chapter	●	●	●	●
Approved final version of chapter		●	●	●

JR=Jessica Reszel; **IG**=Ian D Graham; **CC**=Christine E Cassidy; **SD**=Sandra I Dunn

Appendix C: Guidance for Reporting Involvement of Patients and the Public

Short Form (GRIPP2-SF)

Section and topic	Item	Reported in
1. Aim	Report the aim of patient and public involvement (PPI) in the study	• Section 2.1.1 How I came to IKT
2. Methods	Provide a clear description of the methods used for PPI in the study	• Section 2.2.1 Deciding on the team composition • Section 2.2.2 Identifying and inviting team members • Table 2.1 The IKT team • Section 2.3.1 Level and modes of engagement • Section 2.3.2 Team member roles
3. Study results	Outcomes—Report the results of PPI in the study, including both positive and negative outcomes	• Section 8.2.1 Impact of the partnership
4. Discussion and conclusions	Outcomes—Comment on the extent to which PPI influenced the study overall. Describe positive and negative effects	• Section 8.2.1 Impact of the partnership • Table 8.2 Examples of how using an IKT approach contributed to development of professional skills
5. Reflections / critical perspective	Comment critically on the study, reflecting on the things that went well and those that did not, so others can learn from this experience	• Section 8.2.2 Lessons learned

^aStaniszewska, S., Brett, J., Simera, I., Seers, K., Mockford, C., Goodlad, S., Altman, D. G., Moher, D., Barber, R., Denegri, S., Entwistle, A., Littlejohns, P., Morris, C., Suleman, R., Thomas, V., & Tysall, C. (2017). GRIPP2 reporting checklists: Tools to improve reporting of patient and public involvement in research. *BMJ*, 358, j3453. <https://doi.org/10.1136/bmj.j3453>

Appendix D: Toolkit draft developed and evaluated in thesis

A roadmap for implementing evidence-informed practices in maternal-newborn care

Leveraging the science and practice of implementation and BORN resources to optimize success

(DRAFT)

Thank you so much for agreeing to review this toolkit draft! Before you get started, please note the following:

- The focus of this review is on the content of the toolkit. You will see that there is limited formatting and navigation capabilities right now. We do not expect that this current format will be used for the final version of the toolkit. Rather, once we obtain your feedback on the content and learn about your preferred format, we will then work towards a final version that is more visually appealing and easier to navigate.*
- To facilitate review, we have embedded the various templates within the body of the toolkit (rather than making a separate templates package or putting them in an appendix). Although this adds to the length of the toolkit body, we hope that seeing the content and the templates together helps you to consider whether the templates are a useful way to action the content you read about, or whether changes are needed.*
- Before reviewing the toolkit, we recommend thinking of a current or past practice change initiative in your setting. As you read the toolkit, consider how the toolkit steps and templates would work with the scenario you are thinking of. We hope this will help make the toolkit content more “real” and help you consider the fit of this toolkit with real-world projects and change initiatives.*
- You may choose to have the feedback questionnaire open as you read the toolkit. The first sections of the questionnaire go through each of the 13 Steps and ask you to indicate whether you think each activity and template should be “kept as is,” “modified”, or “removed”, with spaces to indicate your suggestions. You can choose to complete these questions during your initial reading of the toolkit, or you may read the toolkit first and then complete the questionnaire after (referring back to toolkit sections as needed).*
- We ask that you please do not share this toolkit draft with anyone outside of this study. This is a working draft for the purpose of collecting feedback only, and we ask that you please keep the draft materials confidential. Our study team will use the feedback to improve the content and format of the toolkit, and the revised version will eventually become publicly available for use.*

Thank you again for your willingness to review and provide feedback on this draft!



About the Better Outcomes Registry & Network (BORN Ontario)

BORN Ontario is Ontario's prescribed registry that collects information on nearly every birth in the province, with the goal of facilitating and improving the quality of care offered to pregnant and birthing people and their infants.¹

Each birthing hospital can see and use their own data, and in some cases, compare it to provincial averages, similar centers, and evidence-informed benchmarks. This makes BORN a rich source of data and information for planning, implementing, and evaluating practice change initiatives in maternal-newborn settings. However, BORN data partners may not always be aware of what data, information products, and resources BORN has to offer, and so throughout this toolkit we have highlighted where BORN may be able to support your implementation efforts. Of course, we also encourage you to leverage other data sources too, such as data from your health records or other administrative data such as ICES or CIHI.

We hope that this toolkit will not only equip you with information and tools to support your implementation planning but will also help your team consider how BORN data and resources can be actioned to contribute to improving care and outcomes for birthing people and their families.

Suggested citation: Please cite any use of information from this toolkit draft using the following citation. For permission to share, replicate, or adapt this resource, please contact the primary author.

Reszel J, Graham ID, Implementation Toolkit Writing Group.* *A roadmap for implementing evidence-informed practices in maternal-newborn care: Leveraging the science and practice of implementation and BORN resources to optimize success* [Toolkit developed for a PhD in Nursing at the University of Ottawa]. Ottawa; 2025.

*Toolkit writing group: Sandra I Dunn, Christine E Cassidy, Janet Brownlee, Mireille Cloutier, Olivia Daub, Kaamel Hafizi, Carolina Lavin Venegas, Marnie Lightfoot, Dahlia Pervez, Ashley Quosdorf, Allison Wood.

Disclaimer

The information contained in this toolkit is for general application and use in planning for the implementation of evidence-informed practices in maternal-newborn care settings. The application and use of this toolkit is the responsibility of the user. The individuals and institutions that developed, contributed to, funded, and otherwise were involved in the creation of the toolkit assume no liability for loss or damages of any kind resulting from or arising out of the application, use, misuse or reliance upon the toolkit or any related information or resources. While reasonable efforts are made to ensure the accuracy and completeness of information within the toolkit, we make no warranties, express or implied, regarding the fitness of the toolkit for your particular use nor any errors or omissions.

Acknowledgements

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In the development of this toolkit, we consulted an array of existing toolkits and implementation resources. Throughout the toolkit we have cited these resources wherever their materials have been included, adapted, or quoted; however, here we wanted to highlight these pre-existing toolkits that were particularly helpful in informing aspects of this current toolkit:

- World Health Organization. [Toolkit for implementation of the WHO intrapartum care and immediate postnatal care recommendations in health-care facilities](#). Geneva; 2023.²
- Graham ID, van den Hoek J, Reszel J, Nguyen T, Aravind G, Bayley MT, Bird ML, Edwards K, Eng JJ, Moore JL, Nelson MLA, Ploughman M, Richardson J, Salbach NM, Tang A. [Stroke Recovery in Motion: Community-Based Exercise Program Implementation Planner](#). Ottawa: Ottawa Hospital Research Institute; 2022.³
- Queensland Health. [Allied Health Translating Research into Practice \(AH-TRIP\) training and education](#). Queensland; 2020.⁴
- St. Michael's Hospital-Unity Health Toronto. [Practicing knowledge translation workbook](#). Toronto; 2020.⁵
- Ontario Centre of Excellence for Child and Youth Mental Health. [Implementing evidence-informed practice: A practical toolkit](#). Ottawa; 2013.⁶
- The GLOW trial: A practical implementation guide for teams. 2023.⁷
- Registered Nurses' Association of Ontario. [Toolkit: Implementation of best practice guidelines \(2nd ed.\)](#). Toronto; 2012.⁸
- Registered Nurses' Association of Ontario. [Leading change toolkit](#). Toronto; 2021.⁹

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Welcome & Introduction

You may have heard the statistic that it takes an average of 17 years to move evidence into practice.¹⁰ Changing practice is hard. Implementation efforts often fail and are not sustained, and this wastes time and resources and can be discouraging for teams. The good news is that there is a growing body of research and professional experience on how we can more effectively and efficiently move evidence-informed practices into clinical settings and get them to stick.

Often, we think about *what* we want to implement (e.g., a new way of practicing, a new program, a new innovation). However, it is equally important to take the time to focus on *how* implementation will occur. **Evidence-informed practice needs evidence-informed implementation.**^{11,12} Implementation science can improve our change efforts by directing us to the steps and strategies that are most likely to result in implementation success.

In this toolkit, we have aimed to make implementation planning practical and demonstrate when and how concepts, tools, and approaches from implementation science can inform how teams plan and implement practice changes. This may include implementing a new practice, or it may involve de-implementing a current low-value or harmful practice.¹³

What is the purpose of this toolkit?

The purpose of this toolkit is to present an evidence-informed approach to help maternal-newborn teams plan, implement, and sustain use of “best practices” in their settings. Specifically, this toolkit focuses on the implementation of *evidence-informed guideline recommendations*. However, if you are interested in implementing something other than guideline recommendation(s), many elements may still be informative to your planning and implementation efforts.

The *process* we use to implement evidence-informed clinical practices is a critical factor to success. For example, these factors are important dimensions of effective implementation:¹⁴

- Working as a team
- Engaging with the people who are affected by the practice change initiative early and often throughout the implementation planning process
- Understanding the priorities, preferences, and needs of the various people in your setting (e.g., patients, families, healthcare professionals, leaders, etc.)
- Understanding the setting you are working in
- Developing a comprehensive action plan to track implementation steps and progress
- Using implementation strategies that are tailored to the needs of your particular settings
- Implementing in small steps or piloting your change, before deciding to go full-scale
- Continually monitoring your change initiative and adapting as needed to ensure fit with your context
- Evaluating the success of your implementation process
- Evaluating the effect of your change initiative on care and outcomes

This toolkit will help you address each of the items above (and more) to optimize your chances of success.

Who may be interested in using this toolkit?

This toolkit was written for anyone tasked with leading a practice change initiative in maternal-newborn settings (for example, birthing units, mother-baby units, neonatal intensive care units, midwifery practice groups, etc.), including clinical managers and directors, nurse educators, clinical leads, quality improvement professionals, or other healthcare professionals.

This toolkit has been designed as a multi-functional, adaptable, educational resource to guide implementation planning. It can be used independently, or to facilitate group learning. We recommend that the person(s) leading the practice change initiative read this toolkit in its entirety to understand the full process before deciding which elements are most critical to their local context. Although the broader team may not need to read the entire toolkit, the lead can orient team members using the one-page summary of the implementation process (*to be developed once toolkit is reviewed/finalized*) and refer them to specific steps as needed. However, remember that there are benefits to including broader team members in planning discussions regardless of their roles—implementing practice changes requires a team effort.

Throughout this toolkit we use the terms “you” and “your” to refer to the *working group or team* (used interchangeably) that is working together throughout this planning and implementation process.

How does this toolkit fit with other existing toolkits and improvement approaches?

There are many toolkits available: some are specific to certain settings and/or specific to certain clinical practices or programs. You may be asking ***why do we need another toolkit?*** This toolkit may be helpful to those who:

- *Are working in maternal-newborn care settings.* This toolkit focuses on maternal-newborn care and was developed in collaboration with the Better Outcomes Registry & Network (BORN) Ontario.¹ In this toolkit, readers will find examples from maternal-newborn care settings and tips on how to use BORN Ontario data and information products throughout the implementation process.
- *Are interested in learning about how implementation science can be applied in maternal-newborn healthcare practice.* This toolkit is grounded in implementation science, and teams interested in learning how this approach can be applied to real-world practice change initiatives may use this toolkit as a general learning resource.
- *Are looking for a generic framework that is applicable to any practice change initiative.* This toolkit is based on one of the most widely cited and used implementation frameworks,¹⁵ and regardless of what new practice you are trying to implement, the overarching implementation process, steps, and activities can be used to guide your team’s efforts.
 - If there is a specific toolkit available for your selected practice-change initiative, your team may consider drawing from both this generic toolkit and the practice-specific toolkit.

You may also be wondering, ***how does an implementation science approach fit with quality improvement approaches*** used in many healthcare settings?

- Many teams will be familiar with applying quality improvement approaches in their settings. The implementation science approach in this toolkit is both compatible with and complementary to quality improvement approaches.
- Both implementation science and quality improvement share the same goal of improving care and outcomes. Although they approach this goal with different philosophies and methods, you

will see that many core elements are aligned (e.g., engaging with those doing the work, understanding the problem and its root causes, learning from changes, etc.). You will also see that an implementation science approach includes unique elements such as a focus on implementing evidence-informed practices specifically, systematic assessment of barriers and mapping of tailored implementation strategies, integration of evaluation methods, etc.

- In some sections of the toolkit, we have highlighted where different quality improvement tools can be integrated; we encourage teams to connect and partner with their quality improvement colleagues and consider how the strengths of their current approaches can be integrated with steps and activities in this toolkit to enhance how practice changes are implemented.
- Integrating implementation science with quality improvement can leverage the strengths of both approaches, leading to a comprehensive and systematic planning and implementation process. We have included a table that compares common quality improvement approaches to the toolkit steps¹⁶ in [Appendix 1](#), which helps illustrate where there are commonalities between the approaches and where there are differences. You may also use this table to consider where you can integrate your existing tools from specific quality improvement steps within the toolkit steps.

What are the potential benefits of using the toolkit?

Using a systematic, evidence-informed approach will optimize your chances of implementation success and sustainability. Although the approach described in this toolkit may be perceived to take longer, taking the time to work through the applicable steps will be worth it and may help your team achieve benefits such as:

- more consistent, evidence-informed implementation of clinical practices to improve care and outcomes;
- increased sustainability of practice changes that meet the needs of patients, families, healthcare teams, and organizations;
- increased team ownership of practice issues and solutions;
- clear and more transparent communications that build trust among partners and improve the likelihood of buy-in to the change;
- strengthened partnerships, team functioning, and interdisciplinary collaboration;
- enhanced capacity of team members through development of new planning and implementation skills; and
- improved satisfaction of those planning and implementing practice changes, as well as those affected by the practice change.

Many healthcare organizations are working to become Learning Health Systems, whereby “internal data and experience are systematically integrated with external evidence, and that knowledge is put into practice”¹⁷; the approach outlined in this toolkit can enhance your organization’s efforts to use a Learning Health System approach. For example, this toolkit provides guidance on:

- how to work in partnership with patients and families and other partners;
- how to select and apply forms of synthesized evidence (e.g., practice guidelines);
- when and how to collect local data from different sources (e.g., patients and families, medical charts, BORN);
- how to use data and information to inform decision-making;
- how to apply implementation science to ensure a systematic and evidence-informed change process; and

- how to develop robust monitoring and evaluation methods to facilitate ongoing learning and improvement.

All these components are core aspects of Learning Health Systems.¹⁸

How was the toolkit developed?

Our research team conducted a series of three studies to inform the toolkit content, all of which are open access and available online.^{19–21} We have structured the toolkit around the Implementation Roadmap,¹⁶ which provides a practical step-by-step approach to implementing evidence-informed practices. The Implementation Roadmap was informed by established knowledge translation and implementation frameworks (Knowledge-to-Action framework¹⁵ and CAN-IMPLEMENT^{22,23}) and integrates the experiential knowledge of implementation practitioners. The Implementation Roadmap has previously informed the creation of a toolkit in another clinical context³ and we have drawn from this previous work in developing this current toolkit.

In creating this toolkit, the development team centered the content on several ***guiding principles and assumptions*** about *what* should be implemented and *how* it should be implemented. Specifically, we believe that the implementation process requires:

- systematic planning to achieve successful practice changes that are sustained;
- integration of the best available evidence with the expertise of healthcare providers/staff and the needs and preferences of patients and families to inform what changes are implemented;
- use of evidence from implementation science and practice to inform the change process used;
- leadership and facilitation to drive and nurture implementation;
- engagement of partners and interested and affected parties throughout the process to ensure practice changes are patient and family centered and clinician friendly;
- an approach that is rigorous but pragmatic to optimize benefit and impact; and
- consideration of equity, diversity, and inclusion (EDI) in each phase and step of the process.

What is in the toolkit and how is it organized?

The implementation process and toolkit are divided into 3 Phases and 13 Steps:

- PHASE 1. Understand your problem and identify an evidence-informed solution
 - Step 1. The call to action
 - Step 2. Understand the problem
 - Step 3. Select an evidence-informed solution
 - Step 4. Understand current practice and define the evidence-practice gap
 - Step 5. Analyze and customize the best practice to the local context
 - Step 6. Make the decision to proceed or not
- PHASE 2. Plan how you will implement the evidence-informed solution
 - Step 7. Identify barriers and drivers
 - Step 8. Select implementation strategies
 - Step 9. Develop a monitoring plan
 - Step 10. Develop an evaluation plan
 - Step 11. Plan for sustainability
- PHASE 3. Implement, monitor, evaluate, and sustain
 - Step 12. Launch the practice change initiative

- Step 13. Monitor, evaluate, adjust, sustain

Throughout these steps you will find information such as:

- Descriptions of ***what the step involves***
- Explanations for ***why the step is important***
- ***Equity, diversity, and inclusion (EDI) considerations*** that highlight key reflection questions for the implementation working group to consider and discuss
- ***Activities*** that the implementation working group may work through to complete the step
- ***Templates and tools*** the implementation working group may complete as they work through the steps and activities
- Links to ***additional resources*** for readers to learn more about different topics and steps
- ***Tips*** based on best practices in implementation and personal experiences to highlight additional considerations and lessons learned for different steps and activities
- ***BORN tips*** that illustrate how BORN data, information, and resources can be used to support the steps throughout the implementation process
- ***Summary checklists*** at the end of each phase and step to help the team assess their progress achieved to date

At the end of the toolkit, you will find a reference list and appendices with additional information.

Where do we start?

There is a wealth of material in this toolkit as we attempted to provide enough information to help readers understand the steps (the “what”) and provide concrete activities and templates to support teams as they work through the process (the “how”). You may not require all the information, or you may choose to complete every activity. Think of this as a “toolbox” that provides a comprehensive set of tools for you to use; however, depending on your existing resources, your experience and skills, and the specific job at hand, you may select the tools that are most needed. While best practices in implementation science suggest these are all important steps for success, it is ultimately up to each team to explore what is in this “toolbox” and determine which tools you need in your setting for your project.

First, consider your starting point ([Table 1](#)). You will see that regardless of your starting point, the team is encouraged to work through each of the 13 steps, although the order and depth of work required may vary.

Table 1. Where do we start?

	Starting point	Examples	Toolkit steps
“We have a practice problem”	The team has identified a practice problem; however, they still need to identify an evidence-informed solution (i.e., guideline recommendation) to address the problem.	The team has identified a potential practice problem from the observations of healthcare providers, safety reporting systems, patient experiences and feedback, or clinical data.	• Work through the toolkit steps in order (1-13)
		The team has received a directive from their organization, region, or province that a specific clinical issue or problem needs to be improved.	• Start at Activity 1.2-1.4 to form a working group and identify partners • Work through the remaining steps in the toolkit
		The team has observed a red or yellow signal on their BORN dashboard, indicating an evidence-practice gap.	• Start at Step 4 to better understand and verify the evidence-practice gap. • Once gap is confirmed, go to Activity 1.2-1.4 to form a working group and identify partners • Then visit Activities 3.2- 3.4 to assess the evidence underlying the selected Key Performance Indicator (KPI) • Work through the remaining toolkit steps (5-13)
“We have a solution”	The team already has an idea of what they want (or need) to implement (i.e., guideline recommendation).	The team has become aware of a new evidence-informed guideline they believe is relevant to their setting and are potentially interested in implementing.	• Start at activity 1.2-1.4 to form a working group and identify partners • Then visit activities 3.2 to 3.4 to ensure the selected best practice guideline and/or recommendation is of sufficient quality
		The team has received a directive from their organization, region, or province that a certain evidence-informed best practice needs to be implemented.	• If sufficient quality, complete Steps 2 and 4 to determine that there is in fact a problem that needs to be solved by implementing the selected guideline recommendation • Work through the remaining toolkit steps (5-13)

While planning activities are presented in a logical sequence, the process is fluid, and the work is not meant to be carried out in a rigid or lockstep manner. Several tasks may be started at the same time and, as a team gathers information, it is common to reconsider early assumptions or decisions and to make changes to the plan.

A final word before getting started

Planning and implementation are a journey, and we hope that you find this toolkit to be a helpful map that facilitates navigation. As with all journeys, there may be alternative paths to your implementation destination; some roads are more straightforward; others are more scenic; and sometimes there are detours that must be negotiated and potholes to be avoided. While the course of planning rarely follows a straight line, this toolkit defines the basic steps and provides a logical progression of activity.

The toolkit is a free, publicly available resource, hosted by BORN Ontario. We wish you every success in planning and implementing your practice change initiative!

Introduction to the implementation work plan

As you begin your implementation planning, the working group should consider developing an implementation work plan, which is an important element of successful project management.

Preparing a detailed work plan will ensure that critical elements are identified, responsibilities assigned, and that the implementation planning process, including all decisions and actions taken, are documented and visible to everyone. Your implementation work plan should address the complete planning cycle from initial proposal through to final evaluation of the practice change initiative and patient outcomes and impact. It serves to anticipate requirements across the entire lifecycle of program planning and delivery.³

Your organization and team may have access to project management software; use it if it is available to you. A simple template based on the 3-phase planning model in this toolkit is included below. Continually refer back to this template, adapting it as needed and updating your progress.

Implementation work plan template*(Template adapted from ^{2,3,8})*

Step	Activity	Target date	Assigned to (most responsible person)	Milestone (what will be achieved when this step is complete?)	Progress (not started, in progress, completed)	Notes on decisions & actions
PHASE 1. Understand your problem and identify an evidence-informed solution						
Step 1. The call to action	1.1 Identify what “problem” to work on					
	1.2 Form the working group					
	1.3 Identify and engage other key partners					
	1.4 Consider how to assess team dynamics and perceptions of the partnership					
Step 2. Understand your problem	2.1 Understand the problem from different perspectives					
	2.2 Formulate your problem statement					
Step 3. Select an evidence-informed solution	3.1 Identify evidence-informed solutions					
	3.2 Assess the quality of the evidence-informed solution (guideline)					
	3.3 Prioritize and select recommendations					
	3.4 Assess the quality of the guideline recommendation(s)					
Step 4. Understand current practice and define the evidence-practice gap	4.1 Understand current practice					
	4.2 Measure the evidence-practice gap					
Step 5. Analyze and customize the best practice to the local context	5.1 Analyze the best practice – who needs to do what, when, to whom and under what circumstances?					
	5.2 Clarify the outcomes that may be achieved by following the recommendation					
Step 6. Make the decision to proceed or not	6.1 Assess the best practice feasibility, applicability, acceptability, equity, and affordability					
	6.2 Develop your budget					
	6.3 Firm up your business case					
[Add rows as needed]						

PHASE 2. Plan how you will implement the evidence-informed solution						
Step 7. Identify barriers and drivers	7.1 Identify who to speak to about barriers and drivers					
	7.2 Conduct a barriers and drivers assessment					
	7.3 Summarize and prioritize barriers to address					
Step 8. Select implementation strategies	8.1 Identify implementation strategies to address barriers					
	8.2 Refine your selected implementation strategies					
	8.3 Pilot your implementation strategies					
Step 9. Develop a monitoring plan	9.1 Explore how to monitor adherence to the best practice					
	9.2 Explore how to monitor the implementation strategies					
Step 10. Develop an evaluation plan	10.1 Develop an evaluation plan for your practice change initiative					
Step 11. Plan for sustainability	11.1 Assess capacity for sustainability					
	11.2 Discuss strategies for sustainability					
[Add rows as needed]						
PHASE 3. Implement, monitor, evaluate, and sustain						
Step 12. Launch the practice change initiative	12.1 Complete pre-launch checklist					
	12.2 Celebrate the launch					
Step 13. Monitor, evaluate, adjust, sustain	13.1 Activate your monitoring and evaluation plan and use findings to adjust your approach					
	13.2 Share your monitoring and evaluation findings					
	13.3 Continue monitoring, evaluating, and adjusting into the sustainability period					
[Add rows as needed]						

PHASE 1 UNDERSTAND OUR NEEDS, POPULATION, AND RESOURCES

Phase 1 is about forming the working group and engaging with key partners, identifying and understanding the problem to address, and working together to find an evidence-informed solution (i.e., a high-quality guideline recommendation) to address the problem. The team will also work to understand current practice and articulate the gap between current practice and best practice. This is an active period of organization and consultation that may proceed quickly or require several months depending on the local circumstances. By the end of this phase, the team will make a decision about whether they are positioned to continue forward with planning and implementing the practice change initiative.³

Step 1 Call to action

What is this step?

The **call to action** involves articulating what you want to work on and assembling a team to work together on it. The goal is to generate interest and support to solve the identified issue.

Why is this step important?

The **call to action** is important because it ensures that the team has identified an important issue to work on and assembled a committed working group who will drive the practice change initiative forward.

- Clearly articulating and understanding the issue to be addressed is foundational for every other step in the implementation process.
- Ensuring you have a committed team composed of not only the right knowledge and skills, but also diverse perspectives, is essential for moving the change initiative forward in an inclusive, acceptable, and effective way.

Considerations for equity, diversity, and inclusion

(questions adapted from ²⁴)

As you review and complete this step, keep these equity-focused questions in mind:

- What do health equity, diversity, and inclusion mean to each member of the working group?
- Which groups are affected by our project? How can we engage them? How will we collaborate with members from underserved communities on the working group?
- What are the real and perceived power differences on the team?
- Does our team reflect the make-up of patient, family, and healthcare professionals that experience the project topic?

Activity 1.1. Identify what “problem” to work on

The first step in the implementation process is to have an idea for what issue or problem to work on.

These issues may be identified through:

- BORN data and information
 - Seeing a yellow or red signal on your BORN dashboard (Maternal Newborn Dashboard or NICU Dashboard)

- Reviewing and discussing the information in your BORN reports
- “Top-down” priorities
 - Priorities declared by provincial organizations or your hospital
- New evidence-informed guidelines
 - Learning of a new evidence-informed guideline from a relevant and credible professional organization
- “Ground-up” priorities
 - Learning about issues that staff are encountering in their day-to-day work
 - Hearing feedback from patients and families
 - Safety incidents and adverse events

You may be coming to this implementation toolkit with a clear idea of what problem or issue your team wants to address. Or perhaps your team has several ideas about issues that could be addressed. Sometimes the choice is simple, because you are given a directive and you have no choice but to find a way to address it. Other times, the choice is less obvious, and your team will need to prioritize which issues to address and when.

One way to prioritize issues is to consider which issues are most *frequent* in your setting, and which have the largest *impact*.⁴ Plotting the different issues in [Template 1A](#) below can be helpful in deciding on priorities⁴; if there is an issue that occurs both frequently and has a high impact on care and outcomes, this may signal a priority area to focus on.

Template 1A Issue prioritization matrix

IMPACT	High		
	Low		
		Low	High
		FREQUENCY	

Additional resource:

The Registered Nurses’ Association of Ontario has a worksheet with nine guiding questions to help your team prioritize potential problems to address.

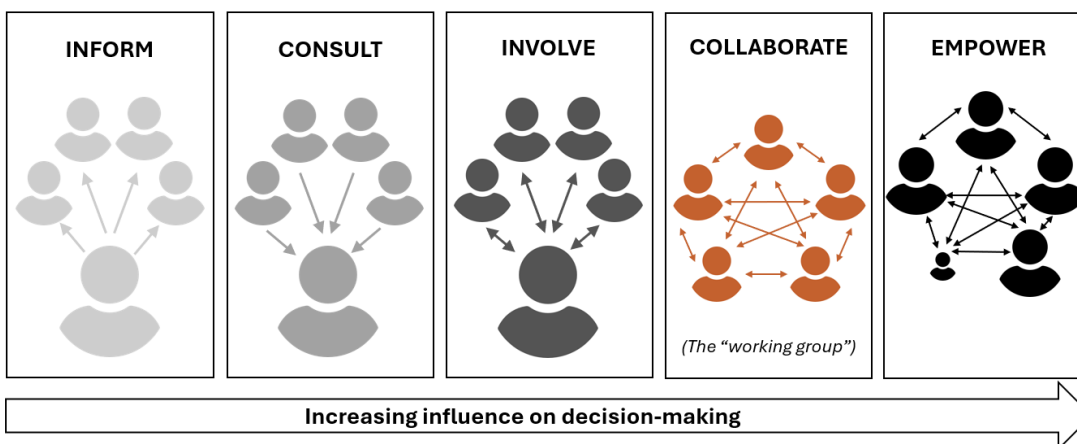
Download it [here](#).

Note that the source of your identified priority may determine which pathway you follow through this toolkit (see [Table 1](#) in introduction).

In the next activities ([1.2](#) and [1.3](#)), we will discuss how to form your core “working group” and engage other interested and affected parties (“partners”), with the goal of exploring and understanding your identified issue in more depth from different perspectives.

We will be referring to different “levels of engagement” as per the International Association for Public Participation. The IAP2 Spectrum of Public Participation defines 5 core levels, from lowest level of engagement through to highest: inform, consult, involve, collaborate, empower.²⁵ In [Figure 1](#) below, take note of the size of the different people (with increased size meaning more decision-making power), as well as the directionality and distribution of the arrows (one-way, two-way, or bi-directional, indicating the flow of information).

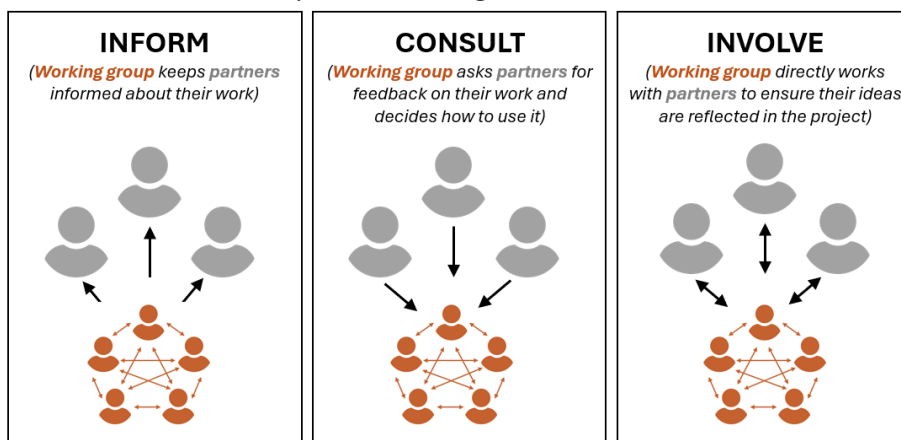
Figure 1. IAP2 Spectrum of Public Participation showing different levels of engagement
(figure inspired by ²⁶; icons: flaticon.com)



In this toolkit we do not focus on the “empower” level whereby the working group would be partnering with individuals and groups (e.g., patients and families) and placing the final decision-making power in their hands, as this is unlikely to occur during the implementation of an evidence-informed guideline recommendation in a clinical setting. In addition, the working group would be unlikely to become fully autonomous to make decisions about practice changes without organizational approvals. [Figure 2](#) presents the adapted Spectrum of Public Participation we use in this toolkit.

Figure 2. Different levels of engagement between the working group and key partners
(icons: flaticon.com)

How the **working group** can engage with **partners** throughout the practice-change initiative



Activity 1.2 Form the working group

What is the working group?

The working group is the driving force behind the proposed practice change initiative¹⁶; these are the people who are leading and doing the day-to-day work on the change initiative (note that throughout this toolkit we use the terms “working group” and “team” interchangeably). Looking at the engagement spectrum, your working group will likely be operating at the “collaborate” level, where all members are equal and share decision-making power during the project.

It is important that the working group include the right people with the expertise, decision-making authority, time, and commitment to move the project forward.¹⁶ [Table 2](#) summarizes different knowledge and skills to consider as you build your working group; not all of these categories will be relevant to every project. Keep in mind that some people may in fact bring knowledge and skills from multiple categories. It is also important to recognize that as the practice change initiative unfolds, there may be a need for members with new knowledge and skills, and the working group can add members as needed to address these emergent needs.

You will want to make your working group inclusive of the key players, while remaining small enough to make decisions and function effectively. Even if you do not have representation from each knowledge and skill category in [Table 2](#) on your core working group, remember that you can involve and consult with a broader network of people throughout your practice change initiative. It’s important to invest the time in this step as it can ultimately affect the acceptance and uptake of the practice change.

Table 2. Knowledge and skills to consider including in working group
(Table adapted from ¹⁶)

Type of knowledge and skills	Examples	Purpose
Clinical knowledge	Interprofessional team members: - Nurses - Midwives - Physicians	- To offer perspective on how the change affects local practice - To interpret the clinical research and evidence being used
Organizational and administrative expertise	- Nurse managers - Senior leadership (e.g., clinical director, program director, department heads)	- To offer perspective on how the change affects the organization and competing priorities - To anticipate resource requirements
Methodological expertise	- A team member who has expertise in measurement and data analysis - Health services researcher - Evaluator	- To support collection and analysis of data - To apply knowledge of evaluation designs - To support a rigorous and systematic process
Information retrieval expertise	A team member who has experience with searching databases	To support the retrieval and navigation of evidence

	• Librarian/information specialist (if available)	
Project management skills	• Project manager or coordinator • A team member with experience managing complex projects	• To manage tasks and timelines • To maintain and circulate documentation
Facilitation and leadership skills	• A team member with leadership and facilitation experience willing to take on the “chair” role for the working group	• To encourage constructive discussion • To manage the group process and decision-making • To maintain motivation and direction • To ensure all working group members contribute and work towards common goal
Implementation “know-how”	• Team members with training in implementation and improvement • Quality improvement specialists • Implementation support specialists	• To support development of an implementation plan • To lead implementation work
Personal experience with practice issue	• Patients • Families and caregivers • Community members from equity-deserving groups	• To ensure that issues relevant to patients and families are discussed • To ensure that outcomes important to patients and families are considered

Engaging with patients and families

TIP: Include patients and families in your working group when possible

While there have been growing efforts to include patients, families, and caregivers in healthcare, we know that their inclusion in the actual implementation of change initiatives is still limited.²¹

Why include patients and families in the working group?

- Provides an opportunity for patients and families to have their needs, goals, and expectations heard, understood, and respected.
- Helps ensure that the decisions you make are acceptable to the ultimate beneficiaries of care.
- It can be a powerful motivator and help the team stay focused on the long-term benefits of the project.

Where can we find patients and families?

Create a simple advertisement for expressions of interest to join the working group, which can be shared via existing groups, such as:

- Your organization’s family advisory committee, if you have one.
- Your regional network’s family advisory committee, if they have one.
- Hospital or community-based prenatal classes
- Hospital or community-based breastfeeding support groups

- Community-based support groups for new parents and families
- Patient and consumer advocacy groups
- Indigenous Councils
- Equity, Diversity, and Inclusion Committees
- Local groups and committees for underserved communities

As you look for patients and families to join the working group, be attentive to equity, diversity and inclusion considerations: who are the patient and family voices that are shaping the project? Whose voices are missing?

How do we promote meaningful engagement of patients and families in our working group?

There are several factors that promote meaningful engagement of patient partners on a team, such as²⁷:

- Optimizing convenience for the patient
- Being clear about roles and contributions
- Addressing support requirements, including the financial and non-financial support needed to fully participate
- Maintaining clear communication and positive interactions
- Building an inclusive team culture
- Recognizing contributions and showing appreciation

See [Template 1B](#) for a template to invite patient and family partners to join your working group, and [Template 1C](#) for key questions to facilitate your conversation with them about their needs and interests.

Template 1B Invitation for patient and family partners

(Template adapted from ³)

**Make edits as needed to fit with your specific topic, team, and organizational policies and resources*

Dear [Name],

Would you like to be part of an exciting opportunity to improve [insert a few words about the focus of your initiative]?

[Insert 1-2 simple sentences to describe the problem you are hoping to work on]. We are currently forming a team to plan and implement [insert brief description of practice change initiative]. Your lived experience as [a pregnant person, new parent, family member] is essential to informing this work. To ensure that the practice change meets the needs and preferences of pregnant and birthing people and their families, we need patients and families to contribute their knowledge and experience to the planning and implementation process.

We would like to invite you to be part of the working group. This letter provides some information about the working group, our approach, and what we hope to accomplish.

What is the “planning process” being used?

Together, the working group will work through several steps to plan and implement [insert what you are hoping to implement]. Not every team member needs to be involved in every step. You may

choose which parts of the planning and implementation process are most aligned with your interests, skills, and availability.

To summarize, we will:

- form a working group to collaboratively plan and implement the practice change initiative;
- explore the needs of different partners and interested and affected parties;
- select an evidence-informed solution to the practice problem;
- identify potential challenges and strengths for changing practice;
- develop strategies to address key challenges;
- decide how we will monitor and evaluate the success of the practice change;
- implement the practice change; and
- monitor and evaluate the practice change initiative and make adjustments to maintain the program over the long-term.

Who can join our planning team?

- Individuals who are currently or recently pregnant
- Partners of people who are currently or recently pregnant
- [Insert any other lived experiences or perspectives you are seeking for your project]

The planning team will also include [healthcare professionals, managers, etc.].

What will I do?

- Between [month, year] to [month, year], attend a [monthly, bi-monthly] meeting. These [X hour] meetings will be conducted [specify method – online, in-person]. At these meetings, we will work through the planning process described above.
- We will circulate materials prior to each meeting.

Based on your interest and availability, we can determine a time commitment that works for you. We will make every effort to accommodate your needs and preferences.

Will I be compensated? *(if applicable; while compensation of patient partners in some areas such as patient-oriented research is the norm, providing compensation may or may not be applicable depending on your organization's policies and resources)*

In appreciation of your time commitment, you will receive an honorarium of [specify amount and methods: \$X, gift card/cash].

If taking part in the working group results in any out-of-pocket expenses, you will be reimbursed. For example: [specify what will be reimbursed: parking, transportation, childcare costs].

Thank you for considering joining the working group. Your voice as [a pregnant person or partner] is essential in the planning and implementation of the practice change initiative.

If you would like more information or have any questions, or would like to participate, please contact me at [phone number] and/or [email address].

Sincerely,

[Add name and contact information]

Template 1C Questions to assess patient or family member preferences for involvement*(Questions adapted from ^{3,27})*

After you introduce the project to potential patient or family member partners, use the questions below to guide a more detailed discussion with them about their interests, availability, preferences, and needs. Adapt the questions and add more as needed. Be sure to check your organization's standard processes for onboarding new patient and family members (e.g., formal application forms, organizational code of conduct, confidentiality agreements, etc.).

Sample questions	Response
Do you have any questions about the planning process and the steps involved? Are there specific step(s) or aspects of the planning process that interest you most?	
What benefit(s) do you hope to get out of taking part in this project?	
How much time do you have to participate in planning?	
What days and times are most convenient for you?	
How would you like to take part in meetings? - In-person? By phone? Online? - In a group setting? Or 1:1?	
How would you like to be kept up to date on the project? Email updates? Brief phone call updates?	
Would it be helpful to receive materials in advance of meetings? How far in advance would you need them to allow sufficient time to review?	
Do you anticipate facing any barriers to participating in the working group? For example: - Needing to find childcare - Access to transportation - Language barriers (requirements for translation services) - Access to computer and internet - Other potential challenges to participating?	
Will taking part result in any out-of-pocket expenses for you? - Travel? - Parking? - Childcare?	
Is there anything else you would like to share with me?	
Do you have any questions?	

Defining how the working group will work together

An important part of forming your working group is to define how the group will work together. It is important to create a safe and respectful environment where all members of your working group feel welcome and able to meaningfully contribute. As you assemble your working group, think about these guiding questions^{3,27,28}:

- Does our team reflect the diversity of the population we work with and serve?
- What will be our ground rules for working together?
- How will we show mutual respect and encourage trust?
- How will we share decision-making power?
- What are working group members' preferences for the roles and responsibilities they will take on?
- How much time do working group members have to commit to this initiative?
- Do working group members have any special skills or expertise we can leverage?
- Do working group members require any orientation or training to enable them to participate on the team?
- Are there any cultural or historical issues to consider?
- Are there any language or other accessibility issues that may prevent a working group member from participating fully?
- How will we recognize the contributions of working group members?
- What measures can we put in place to create an environment where all working group members are valued?
- How will we address any practical considerations and financial constraints of working group members?

We recommend taking the time to develop a **terms of reference** for your working group, which is a working agreement that clarifies commitments, roles, and responsibilities; helps team members stay focused on goals; and assists the team to make and document critical planning decisions. Your organization may have an existing template. Key components of a terms of reference include³:

- The names of the working group chair (and co-chair, if applicable)
- The names of other working group members
- The roles and responsibilities of working group members
- The objectives and scope of the work to be completed
- Strategies to ensure equality of members and minimize power differences
- How decisions will be made and how consensus will be achieved
- Frequency, location, and method of meetings
- When it is being provided, compensation for patient and family partners (if possible in your setting)
- Term (duration) of membership

TIP: Be clear about your decision-making methods³

It is important to ensure the working group has a shared understanding of how planning decisions will be made. The difference between a decision made by unilateral executive authority and one made by achieving group consensus could affect the success of your project.

For example:

- Voting → a decision is reached based on achieving an agreed portion of votes from the group. Consider designation of majority, super majority (60%, two-thirds), or highest number of votes, and establishing a minimum number of votes
- Consensus → a majority agrees, and no one objects
- Unanimous → all agree
- Consultation with a principal decision-maker → the working group is consulted for information and advice, but one person consolidates and makes the final choice

Document your decision-making methods in your terms of reference so everyone in the working group has a common understanding of the approach to be used.

Activity 1.3 Identify and engage other key partners

In addition to your core working group that is doing the day-to-day work on the project, you will need to identify other key *partners* to work with throughout your project. For the purpose of this toolkit, we define “partners” as individuals and groups who are interested and/or affected by the change initiative your working group is undertaking. Although not members of your working group, this broader network of partners is essential for building buy-in and support and to inform your team’s decisions. Also, as your change initiative evolves, you may identify key partners to join your working group to fill arising gaps and needs.

As described in [Activity 1.2](#), we encourage the working group to operate at the “collaborate” level. Your partners are the key people and groups your working group will be *involving*, *consulting*, and *informing* (see [Figure 2](#) above):

- **Inform:** the working group will provide information to their partners at key milestones in the practice change initiative
- **Consult:** the working group will ask their partners for feedback at key points during the practice change initiative and let them know how their feedback was used or not
- **Involve:** the working group will work directly with their partners throughout the practice change initiative to ensure their ideas and concerns are reflected in the decision-making process

It is important to be explicit about the level of engagement with each person you work with so they are clear about what is expected of them and how their input will be used. This also helps the working group to remain accountable to the people they engage.

To identify these other partners, think about the following internal and external people and groups:

- Who will be *directly affected* by the change?
- Who will be expected to *help facilitate* the change?
- Who may be *interested* in the change but not personally affected by it?
- Who has the authority to *approve or endorse* the practice change and resource it?¹⁶

BORN Tip:

As you form your working group and identify who you will partner with, consider engaging your BORN Regional Coordinator. Your Regional Coordinator may bring many of the skills listed in Table 2 (e.g., data expertise, clinical knowledge, implementation support, project management, etc.) and has experience working with diverse teams throughout different stages of the practice change process. In addition, BORN staff like the Regional Coordinators and Clinical Content Specialists may be able to facilitate connections with others through their relationships with maternal-newborn organizations and their involvement in various internal, regional, and provincial initiatives.

Template 1D includes discussion questions and a space to document ideas as the working group explores which people, groups, and organizations should be engaged in the practice change initiative and at what level.

Template 1D Mapping potential partners and levels of engagement

	Levels at which the working group can engage interested and affected parties (partners)		
	Inform	Consult	Involve
Description	The working group will keep these people up to date on our change initiative.	The working group will reach out to these people for “one-off” questions and advice, as needed. The working group will ultimately decide if and how the feedback is used.	The working group will engage with these people regularly throughout the change initiative and aim to integrate their feedback where possible.
Discussion question for working group	Who do we need to keep <i>informed</i> about this change?	Who might we need to <i>consult</i> with during the change process?	Who might we need to have <i>discussions with</i> throughout the change process?
List of potential people, groups, and organizations*	•	•	•

**Some groups and organizations may cut across different categories of engagement.*

Additional resource:

The Intersectionality & Knowledge Translation Reflection Workbook²⁴ provides helpful information and reflection questions on equity, diversity, and inclusion for teams and individuals to consider at the start of an implementation project, including:

- A self-reflection on your own beliefs, behaviours, and unconscious biases
- A reflection and assessment exercise on who is being included during the implementation process and who is not
- Links to additional resources

You will see that we draw from this reflection workbook in many of our proposed considerations for equity, diversity, and inclusion at the start of each step, but we also encourage your team to access the full workbook to facilitate conversations about how your implementation project can contribute to advancing health equity. You may access the full workbook [here](#).

Activity 1.4 Consider how to assess team dynamics and perceptions of the partnership

The planning model in this toolkit places a high value on effective, collegial team functioning, and your team might benefit from understanding how the working group members perceived their experience working together.³

There are several existing tools that can be used to assess experiences working together; one example is the Partnership Self-Assessment Tool, which explores various elements of the partnership and can help the team see what is working well, what is challenging, and what could be improved.^{29,30} The self-assessment tool includes questions on 11 themes: synergy, leadership, efficiency, administration and management, non-financial resources, financial and other capital resources, decision making, benefits of participation, drawbacks of participation, comparing benefits and drawbacks of participating in the partnership, and satisfaction with participation. Some of these themes are more directly related to how the partnership functions (e.g., synergy, leadership, decision making, satisfaction) and others are more related to contextual factors (e.g., resources). The full Partnership Self-Assessment Tool can be accessed [here](#).²⁹ Note that the tool uses the terms “partnership” and “partners”, which equates to the terms “working group” and “working group members” we use in this toolkit.

If you choose to use this tool, wait until your working group has been together for at least 6 months and that you have at least five working group members complete it.³¹ Each working group member may complete the tool multiple times throughout the planning and implementation of the practice change initiative to review your working relationship and identify areas that might need to be addressed to improve team functioning. Alternately, you may choose to have each working group member complete the tool one time at the end of the practice change initiative, which would provide helpful information to guide future collaborations.³

Tip: Pay attention to power dynamics when exploring team members’ perceptions of the partnership

While reflecting on how well your working group is functioning can help to inform improvements, you will need to be aware of power dynamics between team members and how comfortable people are sharing their true feelings and experiences. For example, working group members may be hesitant to provide “critical” feedback about the working group leadership if the person leading the working group is in fact their employment supervisor.

Consider the following:

- Which member of the working group is leading the partnership assessment? How might this person's professional role influence how forthright people will be in their responses?
- How will we frame this partnership assessment to make working group members comfortable answering honestly?
- How will we ensure that responses are anonymous (not linked to the person answering)?
- How can we present the partnership assessment results back to the working group in a way that does not single anyone out or identify anyone's answers?
- How will we frame the results in a positive, productive way, even when there is "negative" feedback?

Step 1 Summary checklist

How do we know we have successfully completed this step?

- ☐ We have identified a priority issue we want to address
- ☐ We have formed a working group with representation from different groups, skillsets, and perspectives
- ☐ We have identified other key partners and the expected level of engagement
- ☐ We have started to generate interest in the issue in our setting
- ☐ Our working group is committed to understanding and integrating the needs and preferences of patients, staff, and other partners throughout the planning process
- ☐ We have considered if, when, and how we will evaluate our working group dynamics and partnership
- ☐ We have started to develop our implementation workplan
- ☐ We have documented our findings and decisions

Step 2 Understand the problem

What is this step?

This step involves exploring the identified problem in more depth and from different perspectives. By the end of this step, you will have information on what different people and groups in your setting think about the problem, potential things that are driving the problem, and the scope and magnitude of the problem. This is largely an exploratory phase; you will collect more concrete local data on the current practice state later in Step 4.

What is a “problem”?

Your identified “problem” may originate from different sources:

- Your problem may have originated from observing **variations in clinical practices**. For example, perhaps you have noticed that team members are all providing care in a different way. Or perhaps you are aware of what the evidence says about a particular clinical practice, and your sense is that current practice is not aligned with that evidence.
- Your problem could also originate from seeing **poor outcomes** in your setting. For example, perhaps you sense that certain patient populations are experiencing sub-optimal outcomes. Or perhaps you are aware of known benchmarks or standards for certain outcomes, and you have noticed your rates are falling short.

Regardless of whether your identified problem has come from observing practice variations or concerning outcomes, this step will help you better understand the issue of concern from different perspectives, get to the root cause, and articulate your problem statement.

Why is this step important?

We know from experience that teams do not always spend enough time on this step because they are eager to get to the solution phase of the project. However, understanding and defining your problem is critical—without a solid understanding and clear definition of your problem, you cannot identify and implement an appropriate solution to address it.

Considerations for equity, diversity, and inclusion

(questions adapted from ²⁴)

As you review and complete this step, keep these equity-focused questions in mind:

- Whose point of view is reflected when we define and explore the problem?
- Is the problem a priority for the groups that it affects?
- Who will gain if the problem is addressed?
- Who will lose if the problem is addressed?
- Have you spoken to people who have lived experience with the problem?

Activity 2.1 Understand the problem from different perspectives

Now that you have identified potential working group members and partners, it is time to learn about and formally document their perceptions of the problem. Documenting the varying perspectives for all to see serves several purposes¹⁶:

- When a partner sees their perspective accurately reflected in print it reaffirms to them that their voice is being heard by the group;

- When a partner reads the perspectives of others, it provides another opportunity to understand and appreciate the other perspectives. This can contribute to greater buy-in for the initiative; and
- Having all the perspectives described in one place may encourage the group to begin considering the issue from a systems perspective, rather than from the perspective of individual partners.

Revisit the mapping template you completed in Step 1 ([Template 1D](#)); this is a good start for considering whose perspective you may want to obtain on the problem. Be sure that your list includes those who are responsible for deciding whether to support and fund your change initiative (e.g., leadership), those whose roles would be directly affected by the change initiative (e.g., healthcare professionals, clinical nurse educators), and those who would be affected by the problem and potential change (e.g., patients and families). As you develop your list of who to talk to, you may need to think outside of your organization's walls, especially if the problem you are learning about cuts across multiple settings (e.g., primary care, community care).

There are several key questions your working group can use to guide your discussions as you explore and refine your problem^{4,32}:

1. **What is the problem?** What are people seeing happening in practice? What does the problem look like from different perspectives? (healthcare professionals, managers, patients, families, etc.)
2. **Who thinks it is a problem?** Does everyone think it is a problem? Or only some?
3. **When is it a problem?** How often does this problem occur? Is it a regular or rare occurrence?
4. **How big is the problem?** Are many people affected? What is the magnitude of the impact? How big is the difference between current practice and best practice?
5. **Who is the problem affecting?** How many people are affected in your setting? What is the profile of the people who are affected? Are some groups affected more than others?
6. **What harm is created?** What are the consequences of the problem? Are some groups harmed more than others? Is this an important problem to fix?
7. **Why is the problem there?** What might be causing the problem? (i.e., root cause analysis)

Also consider whether you have any local data (e.g., charts, BORN) that can shed light on the problem and contribute to answering the above questions.

Below we provide a template ([Template 2A](#)) you can use to discuss the problem with different roles. These discussions may occur informally on a one-to-one basis, included in existing meetings as an agenda item, or you may want to book separate meetings to discuss. Edit the number and types of roles in the template as needed but be sure to collect multiple perspectives. Everyone has a unique perspective on the local context and this activity is a great opportunity to connect members of the working group with broader partners. Listen to and accept all perspectives respectfully.

Template 2A Exploring the problem from different perspectives and using local data*(Guiding questions adapted from ^{4,32})*

Issue: [state the problem here]	
Guiding questions: • Describe this problem to me. What are you seeing in practice? • Is this a problem for everyone or just some? • How often is this problem occurring? Regularly? Rarely? • How big do you think this problem is? How large is the impact? How come? • Who is affected by this problem? How are they affected? • Are there harms? Who is harmed? • Why do you think this problem exists here? ○ Consider tools such as 5 Whys, Fishbone diagram • Do you think this is an important problem to fix? How come?	
Role	Findings (i.e., answers to questions above from different people and data sources)
Senior nursing leader (e.g., Chief Nursing Executive, nursing directors, etc.)	•
Nurse manager	•
Nurse educator	•
Point-of-care nurses	•
Midwives	•
Physicians	•
Patients and families	•
Information from local data (e.g., charts, BORN)	•
Others?	•

A key part of understanding your problem is identifying potential causes, or answering the question *why are we seeing this problem in our setting?* Your team may be familiar with different quality improvement tools that help you drill down to understand the potential causes of the problem you are seeing, such as asking 5 Whys or creating a fishbone diagram.

Additional resource:

The Institute for Healthcare Improvement has resources with QI essential tools,³³ including instructions and templates for how to complete a cause-and-effect diagram (Fishbone diagram) and the 5 Whys.

Download it here: [Fishbone diagram](#) and [5 Whys](#)

BORN Tip:

As you learn about the problem from different perspectives, check in with your BORN Regional Coordinator to see if they are aware of other hospitals, settings, or regions that are grappling with a similar problem. They may be able to facilitate connections between organizations and individuals with similar issues.

Your BORN Regional Coordinator can also direct you to BORN data and information that relate to your problem of interest; for example, through system-generated reports in the BORN Information System or custom data requests. These data can be another source of information to contribute to your understanding of the who, what, where, when, and why of your problem.

Activity 2.2 Formulate the problem statement

With the information you collected from different people in [Activity 2.1](#), you can work to concisely summarize what the problem is in your setting. By formulating a “problem statement” you can summarize the who, what, when, and why of the problem you are aiming to solve, which can be essential for keeping the team focused on the problem at hand and have a way to communicate it clearly and concisely to others. You will use your problem statement in future implementation steps, including when you may need to build your business case and advocate for additional resources as needed.

To formulate your problem statement, start by writing summary statements based on the information you collected above. Let’s say there is a NICU team that started noticing a trend of more infants being admitted to their unit for observation and respiratory support (the “problem”). The NICU team was wondering why this trend was happening and started doing some digging to collect more information on what they were seeing (i.e., [Activity 2.1](#)). Based on the information they collected by talking to team members and looking at patient charts, they identified something that many of these infants had in common—they were born by cesarean birth before 39 weeks’ gestation. The table below illustrates how this team could use their overall findings from Activity 2.1 to formulate a problem statement.

Question	Response <i>(that integrates information collected in Activity 2.1)</i>
What is the problem?	The NICU staff have noticed that there have been more infants being admitted that require observation and/or respiratory support in their unit.
When is it a problem?	Based on problem exploration work, the team has identified that many of these infants were electively delivered by cesarean birth prior to 39 weeks. The team noted that recently there have been an increasing number of elective cesarean births being done prior to 39 weeks compared to previous months.
Who does this affect?	• Infants and families • NICU staff • L&D staff
Why does this problem matter?	<u>Patient harm:</u> Infants are experiencing poor outcomes. <u>Resources:</u> Additional resources are needed to care for these infants in NICU.

Problem statement: There are a growing proportion of infants delivered by elective caesarean birth before 39 weeks' gestation that are requiring increased observation, and in some cases, additional respiratory support in the NICU. This results in unnecessary health complications for infants and additional use of healthcare resources.

(table adapted from HQO)

[Ontario Health](#)³² has some helpful tips to consider when writing your problem statement:

- Make sure your statement focuses on only one problem
- Keep your statement brief (only 1-2 sentences)
- Focus your statement on the problem itself (i.e., the root cause) and not the “symptoms” of the problem. Your efforts will be going towards addressing the *problem* (which in turn will reduce the symptoms), so this is what you want to articulate.
 - In the example above you will notice that the NICU is seeing the issue (the symptoms), but the problem statement gets at the upstream cause of the cesarean births in labour and delivery. Identifying and articulating the root cause is important as this needs to be the focus of your practice change initiative.
- Although it is tempting to start think about potential strategies to solve your problem, be patient and avoid jumping to a potential solution (finding a solution comes later!).

Now that you have a better understanding of your clinical problem (and the potential factors that may be causing it), it is time to start looking for a solution. In this toolkit, the type of “solution” we focus on are *best practice recommendations* from evidence-informed guidelines.

Step 2 Summary checklist

How do we know we have successfully completed this step?

- ☐ We better understand the issue from different perspectives
- ☐ We have started to consider what might be causing the problem we are seeing
- ☐ We have formulated our problem statement
- ☐ We have documented what we learned and our decision

Step 3 Select an evidence-informed solution to address the clinical problem

What is this step?

Now that you have put together a team and explored a clinical problem to work on, it is time to find an “evidence-informed solution” to help solve your problem. In this step, you will identify clinical practice guidelines (i.e., an evidence-informed solution) to address your problem, assess the quality of the guideline, and select the best practice recommendation(s) you will implement.

What is an “evidence-informed solution”?

Evidence-informed solutions can include results from individual studies, systematic reviews, or practice guidelines. In this toolkit, the type of evidence-informed solution we focus on are guideline recommendations (or best practice recommendations). Guidelines are a practical and synthesized form of evidence that are informed by a systematic review of the scientific evidence and clinical expertise and are typically developed by a reputable professional organization. Ideally, guideline recommendations will give you direction about what needs to be done to improve your identified problem, based on the best available evidence.

**Note that if you are implementing something other than a guideline, you may still use elements of this toolkit; however, the focus of this toolkit is on the implementation of evidence-informed recommendations from clinical practice guidelines.*

Why is this step important?

With your clinical problem identified, your team will be eager to start working towards solutions. However, teams may be drawn to “bright and shiny” solutions; but keep in mind that not all solutions are good solutions. This current step encourages the team to carefully consider what clinical practice guidelines are available and whether they are of sufficient quality to implement in your setting.

Working through this step will:

- ensure that your team selects a solution that is based on best available evidence, rather than something new and exciting that may not be evidence-informed or effective. Selecting a high-quality guideline informed by the best available evidence will maximize the chance of implementing solutions that are effective and safe.
- encourage your team to work together to learn about and discuss the current evidence-informed guideline recommendations in your selected area, consider if and how the guideline recommendations may help solve your identified problem, and start considering what practices are important and feasible in your setting.

Considerations for equity, diversity, and inclusion

(questions adapted from ^{24,34,35})

As you review and complete this step, keep these equity-focused questions in mind:

- Is the evidence underlying the best practice recommendation biased? (e.g., were certain groups excluded from the research that informed the recommendation?)
- If we implement the recommendation, who will benefit? Will some groups benefit more than others?
- Will following the recommendation advance health equity?

Where do we start?

If you have chosen one of the BORN dashboard key performance indicators (KPIs), you are in luck—this step has been done for you! BORN has already completed the work to review the scientific and clinical evidence and identify what the best practice is and the target benchmark. The KPI is worded as a measurement, but you can also determine the desired clinical practice to work on (i.e., the best practice recommendation). For example, the KPI may be worded as: “Proportion of pregnant people with a cesarean birth performed from ≥ 37 to < 39 weeks’ gestation among low-risk women having a repeat cesarean birth at term.” Essentially, what this KPI is conveying is that the recommendation is to not conduct repeat cesarean births in low-risk women prior to 39 weeks’ gestation. You can find evidence summaries that support the BORN dashboard KPIs and benchmarks in the BORN Information System.

If you are using a BORN dashboard KPI, you can still review [Activities 3.2](#), [3.3](#), and [3.4](#) below if you would like to assess the evidence underlying the KPIs. This can be a good activity to help the working group collectively understand the evidence and develop their own confidence in it.

If you are not working on a BORN dashboard indicator, you will need to work through the steps to identify potential guidelines, assess their quality, and decide on which recommendations you want to implement.

As mentioned above, in this toolkit we focus on a particular type of evidence-informed solutions: guidelines. There are three defining characteristics of a quality guideline to watch for¹⁶:

- A synthesis (summary) of the body of scientific/research evidence.
- A summary that interprets the evidence.
- Specific evidence-informed recommendations linked to the evidence.

Because guidelines are a form of “synthesized” knowledge, we can have a higher level of confidence that their findings are accurate compared to using the results from one single study. For instance, one single study may show an intervention is effective, but when you pool all the studies on that same topic, it shows the intervention is actually ineffective. Given the proliferation of guidelines, the chances are good that you will be able to find evidence in this form.¹⁶ The focus of this step is *identifying* a guideline recommendation you can potentially use to address your problem; [Steps 4](#) and [5](#) will then help the team adapt and customize the guideline recommendation to make it actionable and “fit” in your local context.

Activity 3.1 Identify evidence-informed solutions

Depending on your starting point, you may already have a guideline in mind. If so, you may skip this step and move to [Activity 3.2](#). If you have not selected a guideline yet, keep reading to learn about different sources to find one. By the end of this activity, you will have a list of current and relevant guidelines that you can consider implementing to address your identified issue.

Clarifying what you are looking for

First, it is important to re-visit your problem statement to help you stay focused on what you are looking for; you want to make sure the evidence-informed solution you find aligns with the problem you are trying to address. Start by going back to your problem statement you drafted in Step 2 ([Activity 2.2](#)). Now breakdown this problem into the components of “PIPOH”^{16,36} to help you stay focused on what you are looking for:

- **P**opulation: Who is your population of concern? Any specific characteristics of this population you are interested in?
- **I**ntervention: What intervention, test, procedure, or clinical practice are you interested in? (i.e., what do you want the guideline recommendation to address)
- **P**atients or professionals: Who is involved in delivering the intervention, test, procedure, or clinical practice in “I” above? Who will be the user of the guideline?
- **O**utcomes: What are the expected outcomes? What do you hope to improve?
- **H**ealthcare setting: Where is the intervention (“I”) occurring? Hospital, primary care, community, etc.?

For example, using our example from Step 2:

Problem statement: Infants delivered by elective caesarean birth before 39 weeks’ gestation are requiring increased observation, and in some cases, additional respiratory support in the NICU. This results in unnecessary health complications for infants and additional use of healthcare resources.	
P opulation	Low-risk infants born ≥37 weeks’ gestation but <39 weeks’ gestation
I ntervention (i.e., clinical intervention)	Caesarean births
P atients/professionals	Physicians
O utcomes	Reduced poor neonatal outcomes Reduced neonatal intensive care admissions
H ealthcare setting(s)	Hospital labour and delivery units

Where to look

There are many organizations that develop and/or compile guidelines, some of which are listed below. Think about other relevant professional associations and organizations and search their websites for guidelines.

- Society of Obstetricians and Gynaecologists of Canada (SOGC) - <https://www.jogc.com/current-guidelines-english>
- Provincial Council for Maternal and Child Health (PCMCH) - <https://www.pcmch.on.ca/reproductive-newborn-health/>
- Association of Ontario Midwives (AOM) - <https://www.ontariomidwives.ca/cpg>
- Canadian Association of Perinatal and Women's Health Nurses (CAPWHN) - <https://capwhn.ca/position-statements/>
- Canadian Pediatric Society (CPS): <https://cps.ca/documents>
- Registered Nurses’ Association of Ontario (RNAO) - <http://rnao.ca/bpg>
- Critical Care Services Ontario (CCSO): <https://criticalcareontario.ca/resources/?resource-type=guidelines-standards>
- Canadian Medical Association (CMA) Clinical Practice Guidelines CPG InfoBase- <https://joulecma.ca/cpg/homepage>
- American Medical Association (AMA) Guideline Central - <https://www.guidelinecentral.com>
- Health Quality Ontario (HQO): <https://www.hqontario.ca/Evidence-to-Improve-Care/Quality-Standards/View-All-Quality-Standards>
- Strategy for Patient Oriented Research (SPOR): Asset Map of Canadian Clinical Practice Guideline Developers - <https://sporevidencealliance.ca/cpg-asset-map/>

- The Cochrane library - <https://www.cochranelibrary.com>
- Guidelines International Network (G-I-N): International Guidelines Library - <http://www.g-i-n.net/library/international-guidelines-library/>
- The Joanna Briggs Institute - <https://joannabriggs.org/>
- National Health and Medical Research Council of Australia (NHMRC) Clinical Practice Guidelines Portal - www.clinicalguidelines.gov.au
- National Institute for Health and Care Excellence (NICE) - <http://www.nice.org.uk/about>
- National Health Service (NHS) Evidence - <https://www.evidence.nhs.uk/>
- World Health Organization (WHO) - <https://www.who.int/publications/i?publishingoffices=c09761c0-ab8e-4cfa-9744-99509c4d306b>

You may also search [PubMed](#) for guidelines, using your PIPOH break-down as a guide for potential search terms. There are two simple ways to limit your PubMed search to guidelines only; see this [resource](#) for guidance. Consult with an information specialist where possible.

Finally, we know that Google is a familiar way to find information, although we do not recommend relying on Google alone for finding guidelines. Google and Google Scholar function differently from library databases. They typically produce many more results compared to databases, and these extra results tend to be less relevant and potentially lower-quality (e.g., not peer-reviewed), creating more work for teams to sort through the “noise.”³⁷ Google and Google Scholar also offer less options for restricting and refining your searches.³⁷ With these limitations in mind, if you choose to use Google or Google Scholar, we recommend using it only as a potential starting point, and not as your only method of searching. Consider using the “Advanced search” (available in Google [here](#)) and focus on the first 5-10 pages of results. If you use Google Scholar (available [here](#)), use the menu on the left-hand side to limit your search to “Review articles” and click “Advanced search” for more options to enter your precise search terms. Again, use your PIPOH break-down as a guide for your search terms.

As you find potential guidelines, cross-check them against your PIPOH: Is it about the right population? The right intervention? The right patients or professionals? The right outcomes? The right setting?

What if we found multiple guidelines?

If you have found several guidelines relevant to your topic, before proceeding to the next activity, consider reducing the number to appraise by selecting those that are most recent and from recognized and reputable sources.¹⁶

What if we do not find any relevant guidelines?

If you cannot find a guideline through an existing public repository or database, you can consider searching other sources. However, searching for evidence can be complex and require a specialized skillset. We encourage your team to work with experienced partners like an information specialist (librarian) or researchers who have additional skills in developing and executing searches, and to consult additional resources as needed.

BORN Tip:

Consider reaching out to your BORN Regional Coordinator to talk about potential sources of guidelines—they often have knowledge of what guidelines are being implemented in their sites and regions. Your Regional Coordinator is also well-connected with BORN’s Perinatal and Neonatal Clinical Content Specialists who are knowledgeable on current evidence-informed guidelines and can facilitate connections as needed.

Activity 3.2 Assess the quality of the evidence-informed solution (guideline)

Now that you have found one or more guidelines (evidence-informed solution), it is time to assess the quality of both the guideline itself and the selected recommendations to ensure they are rigorous, current, and relevant to your setting. You may be inclined to think that because a guideline has been published, that it is high-quality and suitable for use. Unfortunately, this is not always the case.³⁸ Implementing a poor-quality guideline recommendation has the potential to cause harm and waste resources; it is therefore important to take the time to carefully assess the quality of the guideline so you can be confident about what you are choosing to implement.

Assessing the quality of the potential evidence-informed solutions you found requires team discussion and consideration of whether the guideline and its recommendations¹⁶:

- Are high quality (e.g., using AGREE-II, AGREE-REX)
- Are current (e.g., how recent is the evidence upon which the guideline recommendations are based?)
- Adequately address your issue of concern
- Are clinically useful
- Are supported by strong evidence
- Would be acceptable in your clinical setting
- Are implementable as is or require adaptation to your context
- Are sustainable

Before proceeding, let’s quickly clarify the difference between guidelines and recommendations.

A **guideline** is a comprehensive information document that contains recommendations.

Recommendations are statements that provide direction on what actions to take to improve practice (and longer term, improve health or health system outcomes). For example, the RNAO has a *guideline* entitled “[Breastfeeding - Promoting and Supporting the Initiation, Exclusivity, and Continuation of Breastfeeding in Newborns, Infants and Young Children](#).”³⁹ Within the guideline, there are 16 unique *recommendations*, such as “Facilitate skin-to-skin contact with the breastfeeding dyad immediately following childbirth or once clinically stable.”

First, your team should consider the quality of the *overall guideline*. Then, if your team deems the quality of the guideline as sufficient for use, you can select which recommendations you would like to implement and consider the quality of the *specific recommendation(s)* you are interested in.

TIP: Include the working group in the assessment process¹⁶

Assessing guidelines and their recommendations may be a new, and potentially daunting, activity for some teams and individuals. If you have people or teams (such as quality or education teams) in your organization who have experience assessing the quality of guidelines and recommendations, see if

they have capacity to support the working group through this process. You can also consider whether the local university might help, by getting student volunteers, for example.

Think of this process as a chance to really start looking into the different “solutions” to your identified problem and get the working group members thinking and discussing the potential strengths and weaknesses of each solution (i.e., guideline recommendation). Working together as a team to assess the guideline(s) and recommendation(s) has several benefits:

- It can help to build critical appraisal skills;
- It can challenge personal assumptions surrounding what constitutes a high-quality guideline; and
- It can build greater understanding of the recommendations, which will generate richer group discussions in future implementation steps.

Additional resource:

There are different tools you can use to appraise guidelines and recommendations, but the “gold standard” is the AGREE-II instrument⁴⁰ for assessing guidelines and the AGREE-REX tool⁴¹ for assessing the recommendations.¹⁶

These tools (and associated user manuals) are freely available online:

- [AGREE-II](#)⁴⁰
- [AGREE-REX](#)⁴¹

Use [Template 3A](#) to guide your team through key discussion questions to explore the quality of the *overall guideline*. Document your team’s discussions, your assessment of these domains, and your decision about whether each domain is adequately satisfied. Ideally, you will have one or more guidelines that are of sufficient quality.

Template 3A Discussion questions to assess guideline quality

(Table adapted from ¹⁶)

Name of guideline being assessed:			
Domain	Discussion questions for team	Notes on team assessment	Does guideline recommendation satisfy this domain?
Guideline quality	• What is the team’s perception of <i>guideline quality</i> based on the results of AGREE-II (or another assessment tool)? • If we didn’t use a formal assessment tool, are we confident the developer is credible and respected? Are we confident the guideline is evidence-informed?		☐ Yes ☐ No ☐ Unsure
Currency	• How recent is the evidence used in the guideline? • Is there new research that may have emerged since the guideline was published?		☐ Yes ☐ No ☐ Unsure

Name of guideline being assessed:			
Domain	Discussion questions for team	Notes on team assessment	Does guideline recommendation satisfy this domain?
Addresses issue of concern	How well does the guideline align with our PIPHO? (Population, Intervention, Patients/professionals, Outcomes, Healthcare setting)		☐ Yes ☐ No ☐ Unsure

TIP: Dealing with “outdated” guidelines

The currency of a guideline is a key domain to consider in your assessment. There are several reasons why the content of a published guideline may become outdated, including changes in⁴²:

- Evidence (e.g., new scientific evidence emerges that informs what best practice should be)
- Available interventions (e.g., new technologies and interventions have emerged)
- Resources (e.g., the cost of interventions has decreased over time and is more widely available)

But how will you know that a guideline is in fact outdated? There is no universal amount of time for when a guideline becomes out of date; however, guidelines may become outdated after only about 3 years.³⁸ Many reputable guideline developers state the frequency with which they review and update their guidelines. For example, the Registered Nurses Association of Ontario (RNAO) uses a cycle of 5 years for reviewing and updating their guidelines.⁴³

As you assess a guideline for currency, you may choose to look at literature that was published after the included evidence in the guideline you are considering. Be sure to start by looking for systematic reviews on the topic (rather than single primary studies). Consider the following questions as you look at any emergent literature⁴²:

- Have the interventions (i.e., preventive, diagnostic, or treatment) in the guideline been replaced by other interventions?
- Has new evidence shed light on the relationship between benefits and harms?
- Are there new important outcomes that were not considered in the guideline? Are outcomes in the guideline now not important?

Remember that as you look at newer literature it is usually unwise to make any conclusions based on small, single studies and safer to rely on information from well-conducted systematic reviews and meta-analyses.

Activity 3.3 Prioritize recommendations

If the team determines the guideline is of sufficient quality, is current, and adequately addresses the issue of interest, now you can move forward with selecting which *recommendation(s)* you are interested in implementing.

Guidelines often include many recommendations, and it may not be feasible to implement them all, especially at the same time. In fact, it can be strategic to implement one recommendation at a time to introduce change gradually. You may also consider selecting a recommendation that is a “low hanging fruit.” Targeting a potential quick win may build your team’s confidence and create momentum to then tackle recommendations that require larger, more complex changes.² Be mindful that sometimes recommendations are intended to be implemented as a “bundle.” It is usually unwise to break up

bundled recommendations, especially if the supporting evidence relates to the bundle versus the individual recommendations.¹⁶

Your team will need to decide which specific recommendation(s) from the guideline will be implemented (**Template 3B** can be used to guide and document your discussion). Consider the following criteria from the World Health Organization to help you prioritize the recommendations you are considering^{2,44}:

- To what extent is the practice recommendation currently done in your setting? (prioritize recommendations that have the largest gap between current and ideal practice)
- Will changing this practice make a difference? (prioritize recommendations that will have the largest impact)
- Will it be easy to change this practice? (prioritize recommendations that will be feasible to change)
- Will changing this practice affect other practices (spillover)? (prioritize recommendations that may have a positive spillover effect on other practices)
- Will it be easy to measure practice change? (prioritize recommendations that are feasible to measure and monitor change)

Template 3B Prioritizing what recommendation to work on

(This tool is from the WHO Toolkit for implementation of the WHO intrapartum care and immediate postnatal care recommendations in health-care facilities²)

Recommendation under consideration <i>[insert recommendations below]</i>	Practice gap	Likely impact	Ease of change	Spillover effect	Ease of measurement
	To what extent is this practice currently done?	Will changing this practice make a difference?	How easy will it be to change this practice?	Will changing this practice affect other practices?	How easy will it be to measure practice change?
	☐ Always ☐ A lot of the time ☐ Sometimes ☐ Rarely ☐ Never Why?	☐ Yes ☐ No Why?	☐ Very easy ☐ Easy ☐ Somewhat easy ☐ Difficult ☐ Very difficult Why?	☐ Yes ☐ No Why?	☐ Very easy ☐ Easy ☐ Somewhat easy ☐ Difficult ☐ Very difficult Why?
	☐ Always ☐ A lot of the time ☐ Sometimes ☐ Rarely ☐ Never Why?	☐ Yes ☐ No Why?	☐ Very easy ☐ Easy ☐ Somewhat easy ☐ Difficult ☐ Very difficult Why?	☐ Yes ☐ No Why?	☐ Very easy ☐ Easy ☐ Somewhat easy ☐ Difficult ☐ Very difficult Why?
	☐ Always ☐ A lot of the time ☐ Sometimes ☐ Rarely ☐ Never Why?	☐ Yes ☐ No Why?	☐ Very easy ☐ Easy ☐ Somewhat easy ☐ Difficult ☐ Very difficult Why?	☐ Yes ☐ No Why?	☐ Very easy ☐ Easy ☐ Somewhat easy ☐ Difficult ☐ Very difficult Why?

	Why?	Why?	Why?	Why?	Why?
[Add rows as needed]					

Activity 3.4 Select and assess the quality of the guideline recommendation(s)

Based on the prioritization exercise above, identify the potential recommendation(s) you would like to implement. [Template 3C](#) can then be used by the working group to guide your team through key discussion questions to explore the quality of *each* selected recommendation. Document your team's discussions, your assessment of these domains, and your decision about whether each domain is adequately satisfied.

Template 3C. Discussion questions to assess recommendation quality

(Table adapted from ¹⁶)

Recommendation being assessed: [complete for each recommendation being considered]			
Domain	Discussion questions for team	Notes on team assessment	Does recommendation satisfy this domain?
Recommendation quality	What is the team's perception of <i>recommendation quality</i> based on the results of AGREE-REX (or another assessment tool)?		☐ Yes ☐ No ☐ Unsure
If recommendation quality is assessed to be <i>insufficient</i> , no need to proceed further in this tool.			
Supported by strong evidence	- Is the strength of the evidence supporting the recommendation adequate for our local context? - To what extent is our patient population like those upon which the primary studies were conducted?		☐ Yes ☐ No ☐ Unsure
If recommendation is assessed to <i>not</i> be supported by strong evidence, no need to proceed further in this tool.			
Clinically useful	- Does the recommendation make clinical sense? - Is applying the recommendation possible in our setting (e.g. within our scope of practice)? - Is the recommendation clinically useful and does it address the issue of concern? - Is the recommendation stated in a manner that will be clearly understood?		☐ Yes ☐ No ☐ Unsure
If recommendation is assessed to <i>not</i> be clinically useful, no need to proceed further in this tool.			
Acceptable	Will this recommendation be acceptable to our healthcare providers? If not, why?		☐ Yes ☐ No ☐ Unsure

Recommendation being assessed: <i>[complete for each recommendation being considered]</i>			
Domain	Discussion questions for team	Notes on team assessment	Does recommendation satisfy this domain?
	- Will this recommendation be acceptable to our patients and families? If not, why? - Are there any equity or diversity aspects to the recommendation that may make it unacceptable in our context? - If not acceptable as is, what would it take to make it acceptable?		
Implementable	- Do we have the resources and clinical capacity to deliver the recommendation? - How difficult or feasible will it be to implement this recommendation? Why? - What factors or issues could hinder or facilitate implementing this recommendation? - How modifiable are these factors/issues? - If not implementable as is, what would it take to make it more implementable?		☐ Yes ☐ No ☐ Unsure
Sustainable	- After initial implementation, how likely is it that the best practice will be continued? - What would be the main reasons it might not be continued? - What might be the resource implications or costs of sustaining use of the best practices? - Are there organizational changes planned that would affect the continuation of the best practices? - Are there broader changes at the municipal, regional, provincial, or national level that will affect the organization's ability to implement best practice? - If not sustainable as is, what would it take to make it more sustainable?		☐ Yes ☐ No ☐ Unsure

Ideally, after this recommendation assessment exercise you will have one or more recommendations that your team has identified as a priority and are deemed of sufficient quality for implementation. Next, you will work to assess how current practice in your setting compares to your selected best

practice recommendation(s), and eventually, customize the recommendation to fit within your local context.

Step 3 Summary checklist**How do we know we have successfully completed this step?**

- ☐ We have identified one or more evidence-informed solutions (guidelines) that align with our problem
- ☐ We have assessed the guideline and determined it is of sufficient quality for implementation
- ☐ We have considered which recommendation(s) are the highest priority for implementation
- ☐ We have assessed the selected recommendation(s) and determined they are of sufficient quality for implementation
- ☐ We have included the working group (and other key partners, as needed) in the quality assessment and recommendation prioritization process
- ☐ We have selected which recommendation(s) to implement
- ☐ We have documented what we learned

Step 4 Understand current practice and define your evidence-practice gap

What is this step?

In this step, your team will work to understand how current practice compares to the best practice recommendation. The difference between what the recommendation says you should be doing (the evidence) and what people are actually doing (current practice) is called the “evidence-practice gap.” By the end of this step, you will have quantified this gap and understand how big it is.

Why is this step important?

This step is essential to:

- Understand baseline (current) practice. Your team will eventually want to know whether the implementation project resulted in better adherence to the best practice. Collecting local data on the current practice state will give your team a baseline to compare to.
- Advocate for support and resources. Having data to illustrate the magnitude of the problem will support your rationale for requesting additional resources to address the issue.
- Understand your context. Collecting information on how things are typically done will provide a foundation for future steps where you develop your plan for changing the “usual” way of practicing.

Considerations for equity, diversity, and inclusion

(some questions adapted from ²⁴)

As you review and complete this step, keep these equity-focused questions in mind:

- Whose behaviour does the evidence-practice gap reflect? (e.g., professionals, patients, communities, etc.?)
- Who thinks this evidence-practice gap is a priority to address? Who gains and who might lose if this gap is prioritized?
- Are data from any groups potentially missing from your denominator in your evidence-practice gap calculation?
- Looking at your local data, are some groups more affected by the gap than others?
- Are the rates of under-use or over-use different for some groups?
- How might the numbers you are seeing be driven by the size of different groups?

Activity 4.1 Understand current practice

Now the group must understand the current practice in relation to the selected best practice recommendation.

You can learn about current practices by^{8,16}:

- Using routinely collected data from your health record
- Conducting chart audits (which can be facilitated by the BORN Information System)
- Using data and reports from the BORN Information System
- Looking at your BORN dashboard (if applicable)
- Observing what clinicians do and say related to current practice
- Conducting formal or informal interviews with key individuals and groups (e.g., healthcare professionals, patients, leadership)

- Conducting surveys with key individuals and groups (e.g., healthcare professionals, patients, leadership)
- Reviewing current organizational and unit policies
- Discussing the topic at departmental and committee meetings

TIP: Check your data quality

When using existing data sources like your electronic health records, BORN data and reports, and the BORN dashboards, it is important to be confident that the data your team has entered is accurate and complete. Relying on data that is inaccurate and incomplete could result in misunderstanding the magnitude and scope of your problem and lead to an inaccurate baseline assessment.

Although tedious, putting in the time to ensure your data is complete and accurate will help your team to be confident that the issue at hand is indeed a practice issue, and not a data quality issue. The efforts you put in to ensure high-quality data will also pay off when you have a trustworthy source of data to use for monitoring and evaluation later in the implementation process.

BORN Tip:

Use the BORN Information System to help with your data quality. Your BORN reports highlight the specific charts that have missing data; use this information to review the charts and enter or correct the information.

Use [Template 4A](#) below to enter in your selected recommendation(s) or dashboard key performance indicator(s) and document perceptions of how often the recommendation is currently followed and how the practice is typically done. Just like previous steps, be sure to get input from diverse individuals and groups to get a fulsome understanding of how current practice compares to your selected recommendation.

Template 4A Exploring current practice related to the selected guideline recommendation(s)

(Template adapted from ⁷)

Desired future state	Current state					Difference between desired state and current state	
	Does this recommendation happen in our setting?					If responded anything other than “Always” ...	
Selected recommendation(s)	Always	A lot of the time	Sometimes	Rarely	Never	When, where, and how does this practice currently happen?	Key differences between best practice recommendation and current practice

BORN Tip:

Reach out to your BORN Regional Coordinator to see whether there are BORN reports that could help your team explore current practice related to your selected recommendation. Exploring your BORN data and reports may help populate Template 4A (above) and understand what current practice in your setting looks like.

If you are working on a BORN dashboard KPI, you can use the dashboard reports to dig deeper into your current state. For example, you can drill down and explore individual records to better understand what practices are happening to which patients and when.

Activity 4.2 Measure the evidence-practice gap

It is important to “quantify” your evidence-practice gap and establish how big the difference is between current practice and the best practice recommendation you will be implementing.

If you use a dashboard (like the Maternal-Newborn Dashboard or NICU dashboard) and are targeting one of the key performance indicators (KPIs), this step is done for you. A yellow or a red signal under the “status” column may mean that you have an evidence-practice gap (remember to check your data quality to verify accuracy of your signal!). You can determine how big this gap is by comparing the number you see under “rate” and to the number listed in the “target” column; the difference is your gap, which you will be working to close. However, you may want to consider completing the table in section C below to help your team understand whether your gap is related to overuse, underuse, or both.

If you are not using a dashboard, you will need to work through some steps manually to determine your gap. Ideally you have someone on your working group who has expertise in measurement and data analysis that can support this step. If not, consider finding someone with this expertise, such as your hospital’s decision support or quality improvement teams, or researchers or students at a local university.

- A. Create an indicator.** First, ensure that your recommendation is worded as an “indicator.” Indicators are observable, specific, and measurable statements that make clear what the goal is and can be used to show progress. A good indicator should meet “SMART” criteria: Specific, Measurable, Attainable, Relevant, and Time-bound.

Your selected recommendation(s) may already be worded as an indicator, or your selected guideline may provide various indicators for each recommendation. If this is the case, you can consider using those. If your recommendation is not worded as an indicator, your team should refine it, so all SMART criteria are met. Use [Template 4B](#) below to assess your recommendation against SMART criteria and identify areas for refinement.

Template 4B Assessment of guideline recommendation against SMART indicator criteria

Recommendation: <i>[insert]</i>		
SMART criterion	Description	Does our selected recommendation meet this criterion?
<u>S</u>pecific	Include just one thing that you want to measure in each indicator. Set parameters around what you are measuring, including the specific population you are interested in.	☐ Yes ☐ No
<u>M</u>easurable	Define exactly what you want to measure. Be clear about the type of measurement (e.g., number/frequency, percentage, proportion). Make sure the indicator is something that you have the ability to measure based on the data you have access to.	☐ Yes ☐ No
<u>A</u>ttainable	Ensure the indicator is a practice that can be achieved by your team.	☐ Yes ☐ No
<u>R</u>elevant	Make sure your indicator is directly grounded in the evidence-informed recommendation you are aiming to implement.	☐ Yes ☐ No
<u>T</u>ime-bound	Be sure to include a time frame for what you are measuring.	☐ Yes ☐ No

BORN Tip:

As you think about how *measurable* your recommendation is, consider which data elements are available to you in the BORN Information System and what metrics are available to you (e.g., median, frequency, etc.). If you are wondering where to start to learn about available BORN data, look at [BORN's Data Dictionary & Library](#), which allows you to browse and search the data elements in the BORN Information System.

As you think about how *attainable* the recommendation is, consider looking at relevant BORN reports to get a sense of what the average is in hospitals with a similar level of care and size or the province as a whole – where does your hospital sit in comparison? Is it likely you could attain or exceed a similar level?

For example, let's say your selected recommendation was [“Recommend induction of labour with oxytocin to GBS-positive clients with pre-labour rupture of membranes \(PROM\) ≥18 hours. Intrapartum antibiotic prophylaxis should be offered upon initiation of induction.”](#)⁴⁵

- **Specific:** The recommendation clearly defines the population of interest. However, the recommendation includes two potential things that could be measured—induction of labour AND antibiotic prophylaxis. This recommendation could be divided into two indicators.
- **Measurable:** As worded, the recommendation does not describe what you would be measuring. You could specify you would be measuring the percentage of clients receiving each of the two recommended interventions (i.e., induction and antibiotic prophylaxis).

- **Attainable:** Both induction of labour and intrapartum antibiotic prophylaxis are judged to be achievable practices in the setting.
- **Relevant:** When re-worded as an indicator, the “essence” of the recommendation will be retained.
- **Time-bound:** The recommendation specifies when induction of labour should be considered (PROM ≥ 18 hours) and when intrapartum antibiotic prophylaxis should be offered (initiation of induction).

With the above information, we can split the recommendation into two different indicators as follows:

1. The percentage of GBS-positive clients with pre-labour rupture of membranes (PROM) ≥ 18 hours who were induced with oxytocin.
2. The percentage of GBS-positive clients with pre-labour rupture of membranes (PROM) ≥ 18 hours who were offered antibiotic prophylaxis upon initiation of induction.

B. Plan for data collection. Now that you have your indicator(s) written, it is time to collect data on your indicator(s) to determine your “baseline” rate. Using our example above, let’s say we were trying to determine “the percentage of GBS-positive clients with pre-labour rupture of membranes (PROM) ≥ 18 hours who were induced with oxytocin.” To answer this question, the team would need to consider:

- Where can we find these data? (e.g., medical record, administrative data, BORN Information System, talking with healthcare professionals)
- What time period will be used? For example, last 3 months? 6 months? Year? Consider how common or rare your topic is and how many patients over what time period you need to get an accurate sense of typical practice.
- Which patients will be included in your counts? For example, are there any patient characteristics that should be excluded because the recommendation does not actually apply to them?

BORN Tip:

Think about how you can use the BORN Information System to collect the data you need for this step. One of the benefits of using your data from the BORN Information System is that many reports already filter out patients who should be excluded from the rate. You can also choose the specific time period that you want to run the data for (e.g., by quarter, fiscal year, etc.). Reach out to your BORN Regional Coordinator to discuss the available reports.

Once you have a plan in place, your team may decide to create a simple audit tool to compile the information. Remember this baseline work can be used again during your monitoring and evaluation activities to show whether there are any changes.

C. Collect data and calculate your baseline rate and evidence-practice gap. To calculate your baseline rate, you need to collect data for your numerator and your denominator. Let’s look at an example using the following indicator: “The proportion of infants born at ≥ 39 weeks that had skin-to-skin contact with the birthing person within one hour of birth.”

Let’s say you decide to look at the past 3 months, during which 150 infants ≥ 39 weeks were born at your hospital. Of those 150 infants, you would need to determine which received care that aligned with the recommendation (green cells in table below), and which infants received care that did NOT align with the recommendation (pink cells in [Table 3](#) below). Refer to your selected guideline and/or

your hospital policies to identify if there are any key criteria that would make patients ineligible to receive the best practice recommendation.

Table 3. Calculating and analyzing the evidence-practice gap

(Table adapted from ⁴⁶)

The proportion of infants born at ≥39 weeks that had skin-to-skin contact with the birthing person within one hour of birth				
- Define your sample and indicate total number of patients being included in this assessment: <i>Infants born ≥39 weeks in past 3 months; total of 150 infants</i> - Are there any criteria that would make patients in your sample ineligible to receive the best practice (as per the guideline and/or hospital policy)? If yes, specify: <i>Ineligibility criteria include (1) infant needs to be resuscitated, (2) infant becomes unstable, (3) birthing person becomes unstable</i>				
Care that follows recommendation	A. Recommendation was appropriately used (appropriate use)	B. Recommendation was appropriately NOT used (appropriate non-use)	TOTAL (A+B)	Baseline adherence rate
	<i>E.g., 75 infants (50%) were eligible for skin-to-skin care and actually received skin-to-skin care</i>	<i>E.g., 20 infants (13%) were ineligible for skin-to-skin care and did NOT receive skin-to-skin care</i>	<i>95 infants received care that followed recommendation</i>	$(A+B / \text{total}) \times 100$ 95/150 = 63%
Care that does not follow recommendation	C. Recommendation was used when it should not have been (overuse)	D. Recommendation was NOT used when it should have been (underuse)	TOTAL (C+D)	Evidence-practice gap
	<i>E.g., 5 infants (3%) were ineligible for skin-to-skin care received skin-to-skin care</i>	<i>E.g., 50 infants (33%) were eligible for skin-to-skin care did NOT receive skin-to-skin care</i>	<i>55 infants received care that did not follow recommendation</i>	$(C+D / \text{total}) \times 100$ 55/150 = 37%

In this example, your baseline adherence rate to the recommendation is 63% and your evidence-practice gap is 37%. The goal of your implementation project is to increase your adherence rate and decrease your evidence-practice gap.

BORN Tip:

Dissecting and interpreting data can be complex. Consider reaching out to your BORN Coordinator to discuss if and how you can break down your BORN data into the four core buckets in the grid above. Talking this through with your BORN Coordinator can help your team interpret the data and pinpoint where the biggest or highest priority gap lies.

While it is important to look at your overall adherence rate and evidence-practice gap, it is also helpful to look at the specific rates in each cell. In the example above, we can see that overall, 37% of care did not follow the guideline recommendation. However, when we break it down, we can see that underusing skin-to-skin care (D, 33%) is a much larger problem than overusing skin-to-skin care (C, 3%). With this information, we would likely decide that the focus of our implementation project would be on *increasing* use of skin-to-skin care in eligible infants. In other situations, teams may decide that overuse is the most pressing issue and decide to focus on *decreasing* use of a practice when not indicated. Or

perhaps a team would decide that overuse and underuse are equally important and decide to focus on both. [Template 4C](#) can be used to document the team’s findings related to the evidence-practice gap.

Tip: Pay attention to overuse and underuse now to benefit later steps

Paying attention to whether the evidence-practice gap is being driven by overuse or underuse or a combination of both will be an important distinction in future steps.

- Overusing a practice or underusing a practice have unique “drivers”—there may be different reasons why someone would underuse a practice versus overuse a practice. In [Step 7](#) you will need to assess determinants of the practice, and your assessment will be more accurate and informative if you understand whether you are exploring why people overuse a practice OR why people underuse a practice (OR both).
- Similarly, changing behaviour related to overusing a practice versus underusing a practice may require different implementation strategies. In [Step 8](#), you will start developing change strategies to mitigate identified barriers—your strategies will be most effective when you are clear about what your goal is (increasing use, decreasing use, or both).

In addition, look at the numbers in the appropriate use (A) and appropriate non-use (B) and share these positive findings with your team; celebrate the current behaviours and practices that are being done well. Despite there being room for improvement, the baseline adherence rate shows where care is in fact aligned with best evidence and provides a foundation to be built upon.

Template 4C Tool for calculating baseline adherence rate and evidence-practice gap*(Template adapted from ⁴⁶)*

Indicator: <i>[insert here]</i>				
- Define your sample and indicate total number of patients being included in this assessment: - Are there any criteria that would make patients in your sample ineligible to receive the best practice (as per the guideline and/or hospital policy)? If yes, specify:				
Care that follows recommendation	A. # of eligible cases where recommendation was appropriately used (appropriate use)	B. # of ineligible cases where recommendation was appropriately NOT used (appropriate non-use)	TOTAL (A+B)	Baseline adherence rate
	<i># eligible cases that received recommendation:</i>	<i># ineligible cases that did not receive recommendation:</i>		$(A+B / \text{TOTAL}) \times 100$ _____%
Care that does not follow recommendation	C. # of ineligible cases where recommendation was used when it should not have been (overuse)	D. # of eligible cases where recommendation was NOT used when it should have been (underuse)	TOTAL (C+D)	Evidence-practice gap
	<i># ineligible cases that received the recommendation:</i>	<i># eligible cases that did not receive the recommendation:</i>		$(C+D / \text{TOTAL}) \times 100$ _____%

Tip: Remember that it is normal for people to respond differently to seeing evidence-practice gaps

When healthcare providers are shown the difference between their actual practice and best practice, emotional reactions, both negative and positive, are common.⁴⁷ There can be a sense of pride when a healthcare provider sees that their practice is in alignment with best practice. But it can also be upsetting or confusing to find out that your practice isn't meeting standards. Different people deal with seeing the discrepancy in different ways, including⁴⁸:

- Questioning whether the data being presented is correct
- Questioning whether the target set for best practice is realistic
- Deciding to commit to making improvements to their practice

All these responses are normal, and the working group will need to consider how they can facilitate open discussions to address concerns and support their colleagues. The way the working group presents the information on the evidence-practice gap can have an influence on how it is received. Consider these ideas for delivering the information⁴⁷:

- Make the focus about working towards positive change and reinforce that this information is not meant to blame or punish anyone
- The person sharing the information should ideally be viewed as someone who is respected and credible in the topic or practice area

- Share the information with the team of people, rather than individually; encourage discussion and teamwork.

Now that you have calculated your evidence-practice gap, ask yourself: Is current practice entirely different than the recommended practice and does it require a significant improvement? Or is your practice a little bit different than the recommended practice and requires some smaller adjustments and improvements? The working group should ask themselves, is the evidence-practice gap clinically meaningful and important and needs to be improved?

Step 4 Summary checklist

How do we know we have successfully completed this step?

- ☐ We understand how our current practice is different from the best practice recommendation
- ☐ We have identified or developed an indicator for our selected recommendation(s)
- ☐ We have collected local data to calculate:
 - ☐ our baseline adherence rate to the recommendation
 - ☐ the evidence-practice gap
- ☐ We have determined whether the size of the evidence-practice gap is clinically meaningful and something that needs to be addressed
- ☐ We have decided whether we want to focus on increasing use, decreasing use, or both
- ☐ We have shared our findings with our partners and other interested and affected parties
- ☐ We have documented our findings and decisions

Step 5 Customize the best practice recommendation to the local context and identify goals

What is this step?

Now that you have selected your best practice recommendation and collected data to understand your baseline, it is time to start thinking about how you will “action” the recommendation in your setting. Specifically, your team will think about your unique context and “what will work here and how?” By the end of this step, you will have considered features of your context and have a clear plan for who needs to do what, when, to or for whom, and under what conditions. You will also consider the “so what” of implementing your best practice recommendation and articulate the anticipated short-, medium-, and long-term outcomes.

Why is this step important?

At first glance, the selected best practice recommendation(s) may appear to be quite straightforward. However, even seemingly simple changes often involve many actors and actions at different time points. The unique features of your context may also affect how easy or difficult it is to make the change and necessitate customization of the recommendation to increase the fit with your setting. Carefully considering what the best practice involves, how it can be operationalized in your setting, and the anticipated outcomes of following the best practice is essential to:

- Identify the different people, teams, and departments that may be affected by the practice change
- Clearly articulate what needs to change (who needs to do something differently and when?)
- Consider if implementing the best practice as written in the guideline is feasible in your unique context or if modifications need to be made to the recommendation for it to be followed in your setting.
- Articulate what outcomes you expect to see when the recommendation is consistently actioned, which can help build your business case and inform future monitoring and evaluation activities.

Considerations for equity, diversity, and inclusion

(questions adapted from ^{24,35})

As you review and complete this step, keep these equity-focused questions in mind:

- Thinking about the people expected to change their behaviour, what intersecting categories may they have that are relevant to the practice change? (e.g., sex, gender identity, gender role, gender relations, institutionalized gender, age, role or occupation, power, race, education, etc.)
- Thinking about the people who will be on the receiving end of the practice change, what intersecting categories may they have that are relevant? (e.g., sex and gender, age, role, power, race, religion, education, etc.)
- Are there any current or historical power dynamics between the people expected to do the practice and the people who will be on the receiving end of the practice?
- How will we work to understand the context the best practice will be occurring in from different perspectives?

Activity 5.1 Analyze the best practice – who needs to do what, when, to whom and under what circumstances?

Recommendations often tell us what needs to be done but can lack detail on the specific behaviours or actions that are needed to achieve the recommendation. In this activity you will focus on defining your recommendation in behavioural terms. Specifically, you will analyze your selected best practice and break it down to define who needs to do what, when, to whom and under what circumstances. This activity serves two purposes. First, your team will define *what* behaviours (and *whose* behaviours) need to change to achieve the guideline recommendation. Second, your team will think through whether the recommendation needs to be customized in any way to be feasible in your setting. A helpful framework to use is the AACTT, which stands for: Action, Actor, Context, Target, Time.⁴⁹

Let's take an example recommendation that a team may be looking to implement: "Provide breastfeeding education throughout the perinatal period and as long as breastfeeding continues."³⁹ To action this recommendation, you need to break it down and think about how it would be applied in your specific context:

AACTT	Description	Current recommendation from guideline (“Provide breastfeeding education throughout the perinatal period and as long as breastfeeding continues”)	Customization example
<u>A</u>ction	What needs to be done and how? (be specific)	Provide breastfeeding education	Provide breastfeeding education according to hospital guidelines
<u>A</u>ctor	Who needs to do it?	Not stated	Nurse
<u>C</u>ontext	Where does the action happen and under what conditions?	Not stated	Mother-baby unit
<u>T</u>arget	Who is the action targeted at?	Not stated	People who intend to breastfeed
<u>T</u>ime	When is the action done? (time, date, frequency)	Throughout the perinatal period and as long as breastfeeding continues	At least once; before discharge home
Re-written recommendation based on AACTT components in “customization” column: <i>Nurses provide at least one breastfeeding education session prior to discharge home according to hospital guidelines to all people in the mother-baby unit who intend to breastfeed.</i>			

With this breakdown in mind, we could re-write the recommendation as: *Nurses provide at least one breastfeeding education session prior to discharge home according to hospital guidelines to all people in the mother-baby unit who intend to breastfeed.* This simple re-wording draws attention to the “who, what, where, when” in your particular setting, which can help to make the recommendation more actionable.

Sometimes the recommendations actually require multiple actors and actions to accomplish, and so you may need to break down your recommendations even further. Presseau and colleagues provide a

helpful example of how getting clinicians to use hand sanitizer actually requires multiple people to do multiple actions differently—see the example [here](#).⁴⁹

As you break down your selected recommendation(s) into the AACTT components, consider whether you need to make any modifications to the recommendation. For example, perhaps your selected recommendation suggests that nurses should conduct a type of newborn blood draw, but when the group thinks about how this would work in their context, they realize that nurses may not have the time or capacity to do the blood draws, but this falls within the scope and expertise of the phlebotomists, so they modify the recommendation to state the phlebotomist will perform the blood draw as prescribed. If you make the decision to modify the recommendation, be sure to document what you are modifying and why.¹⁶

Use [Template 5A](#) below⁴⁹ to document the AACTT breakdown of your selected recommendation(s). Document what your team discusses in the space provided, including any modifications to the original recommendation.

Template 5A Worksheet to clarify who needs to do what, when, to whom and under what circumstances

(Template adapted from ⁴⁹)

AACTT	Description	Current recommendation from guideline: [copy and paste selected guideline here for easy reference]	Customization
<u>A</u> ction	What needs to be done and how? (be specific)		
<u>A</u> ctor	Who needs to do it?		
<u>C</u> ontext	Where does the action happen and under what conditions?		
<u>T</u> arget	Who is the action targeted at?		
<u>T</u> ime	When is the action done? (time, date, frequency)		
Re-written recommendation based on AACTT components in “customization” column: [Enter your re-written recommendation here based on the information in the last column]			

Now that you have completed this activity, you should have a clearer idea of what behaviour(s) you need to focus on in future steps.

Activity 5.2 Clarify the outcomes that may be achieved by following the recommendation

Now that you have a specific recommendation that is tailored to your setting, it is a good idea to consider what outcomes can be achieved by following the recommendation. While one of your aims to improve the evidence-practice gap you measured in [Activity 4.2](#), it is important to also think about the

specific outcomes that can be achieved by following the best practice and reducing the evidence-practice gap. Articulating these positive outcomes that may be achieved by following the recommendation will help to build buy-in and support for your practice change initiative (including building your business case in [Step 6](#)). Articulating your expected outcomes will also form the basis of your monitoring and evaluation plans in [Step 9](#) and [Step 10](#).

The working group may want to consider answering the questions:

If everyone followed this recommendation...

- What difference would it make to patients and families?
- What difference would it make to healthcare professionals and staff?
- What difference would it make to our unit and organization?
- What short-term outcomes would we expect to see?
- What medium- and long-term outcomes would we expect to see?

Often these short-, medium-, and long-term outcomes may be described in the guideline itself, so that can be a good place to start. Keep in mind that any practice change initiative may also lead to unintended (negative or positive) consequences; the working group should be open to watching for these unintended effects.

We have provided an example below using the recommendation “Nurses provide at least one breastfeeding education session prior to discharge home according to hospital guidelines to all people in the mother-baby unit who intend to breastfeed.”

Discussion question	Brainstorm outcomes and list
What short-term outcomes do we anticipate from our practice change initiative?	Outcomes at patient and family level • Increased number of patients who initiate breastfeeding while in hospital
	Outcomes at healthcare professionals and staff level • Increased confidence of nurses to provide breastfeeding education
	Outcomes at unit or organization level • Increased number of patients and families receiving at least one breastfeeding education session prior to going home
What medium and/or long-term outcomes do we anticipate from our practice change initiative?	Outcomes at patient and family level • Improved breastfeeding rates • Improved patient satisfaction • Improved health outcomes; e.g., Fewer cases of acute otitis media before 2 years of age^{39,50}
	Outcomes at healthcare professionals and staff level • Increased professional fulfillment of nurses related to supporting patients and families with breastfeeding
	Outcomes at unit or organization level • Reduced return hospital visits

Your team may use [Template 5B](#) to document the results of your brainstorming.

Template 5B Anticipated outcomes of following selected recommendation

Discussion question	Brainstorm outcomes and list
What short-term outcomes do we anticipate from our practice change initiative?	Outcomes at patient and family level •
	Outcomes at healthcare professionals and staff level •
	Outcomes at unit or organization level •
What medium and/or long-term outcomes do we anticipate from our practice change initiative?	Outcomes at patient and family level •
	Outcomes at healthcare professionals and staff level •
	Outcomes at unit or organization level •

BORN Tip:

As you start considering the different anticipated outcomes, reach out to your BORN Coordinator to brainstorm; they are especially familiar with outcome data that are readily available in the BORN Information System that could be used to measure the future outcomes and impact of your planned practice change initiative.

Step 5 Summary checklist**Summary – how do we know we have successfully completed this step?**

- ☐ We have analyzed our selected best practice recommendation(s) in terms of who needs to do what, when, to whom and under what circumstances
- ☐ We have defined our best recommendation(s) in clear and simple behavioral terms
- ☐ We have revised the recommendation with greater behavioral specificity/specification
- ☐ We have considered whether the recommendation(s) need to be adapted or customized to work in our setting
- ☐ We have identified the anticipated short-, medium-, and long-term outcomes of following the recommendation at the level of patients and families, healthcare professionals and staff, and the unit and organization
- ☐ We have documented our findings and decisions

Step 6 Making the decision to proceed (or not)

What is this step?

Up to this point, your team has done a lot of work to understand your problem, identify and select a high-quality evidence-informed solution (guideline recommendation), and to customize the recommendation into actionable parts.

Your team has now reached an important check point where you will need to make some practical considerations and decide whether to proceed with your implementation project or not. To do that, we encourage your team to use all the information collected to date to (1) confirm that your proposed change is feasible, applicable, acceptable, equitable, and affordable; (2) draft a budget; and (3) draft a business case.

Why is this step important?

While a new change initiative can generate a lot of excitement and a drive to push things forward, it is also important to pause, re-group, and carefully consider whether now is the right time with sufficient resources to continue. In the first five steps your team collected a wealth of information; it is now time to consider all that information together to make an informed decision about whether to continue with the practice change initiative.

Completing this step will give your team the rationale and confidence going forward to know that proceeding (or not proceeding) was the best decision at the time. If you decide to proceed, this step will also help you prepare the documentation to request the formal endorsement and resources needed to continue.

Considerations for equity, diversity, and inclusion

As you review and complete this step, keep these equity-focused questions in mind:

- Will implementing this best practice advance health equity in our setting?
- Is there risk that implementing the best practice could inadvertently contribute to health inequities in some groups?
- How will we build equity, diversity, and inclusion considerations into the business case and budget?

Activity 6.1 Assess the best practice for feasibility, applicability, acceptability, affordability, and equity

In this activity, you will confirm that your best practice recommendation is viewed as feasible, applicable, acceptable, affordable, and equitable at the current time in your setting.

Dimension	Definition
Feasible	Do we think the recommendation could successfully be actioned in our setting? ^{3,51}
Applicable	Do we think the recommendation is relevant to our setting? ³
Acceptable	Do we think the recommendation is palatable and satisfactory to the teams and individuals in our setting? ⁵¹
Affordable	Do we think that implementing this recommendation would be affordable in our setting? ³

Equitable	Do we think implementing this recommendation will advance health equity in our setting? ³

Using all the data you have collected in Steps 1-5, work as a team to consider the following questions in **Template 6A**. If you select “unsure,” consider how you can collect more information to confidently answer the statement. If you select “yes” for most, you are likely in a good position to proceed with planning for implementation of your selected best practice recommendation.

Template 6A Feasibility, Applicability, Acceptability, Affordability, and Equity (FAAAE) Check

(Template adapted from ³)

Based on the data collected, our assessment is that...	Yes	No	Unsure	N/A
Feasibility				
The recommendation can be successfully actioned in our setting.	☐	☐	☐	☐
If there are known factors that may make the recommendation difficult to action, we are confident we can mitigate them.	☐	☐	☐	☐
<i>Comments on feasibility:</i>				
Applicable				
The recommendation is relevant to the care we provide in our setting.	☐	☐	☐	☐
The recommendation is relevant to improving outcomes.	☐	☐	☐	☐
If elements are not applicable, we are confident we can customize the recommendation or use implementation strategies to increase applicability.	☐	☐	☐	☐
<i>Comments on applicability:</i>				
Acceptable				
The recommendation is acceptable (appealing) to the individuals and families we care for.	☐	☐	☐	☐
The recommendation is acceptable (appealing) to the healthcare professionals, leadership, and staff in our setting.	☐	☐	☐	☐
If elements are unacceptable, we are confident we can customize the recommendation or use implementation strategies to increase acceptability.	☐	☐	☐	☐
<i>Comments on acceptability:</i>				

Affordability				
We anticipate our setting has the resources to implement the recommendation.	☐	☐	☐	☐
We anticipate our setting has the resources to maintain use of the recommendation over time.	☐	☐	☐	☐
<i>Comments on affordability:</i>				
Equitable				
The recommendation will promote health equity.	☐	☐	☐	☐
The recommendation will not inadvertently contribute to health inequities in some groups.	☐	☐	☐	☐
<i>Comments on equity:</i>				

Activity 6.2 Develop your budget

Implementing a new practice change will inevitably require resources. It is essential to consider budget costs, both of the practice change itself and the cost of implementation. Without properly resourcing your initiative, you will not be able to move the project forward nor sustain it. Consider the potential costs associated with^{2,6}:

- Equipment and supplies
- Human resources, including the need to backfill
- Training
- Information and technology support
- Administrative costs
- Participation costs (reimbursement, parking, travel)
- Costs to conduct an evaluation

Locating funding sources can take effort and creativity. Tips include⁶:

- Ensure your implementation working group and members of leadership are involved in making the budget
- Connect with financial staff at your organization to talk about your resource needs
- Think about in-kind contributions (i.e., non-monetary contributions you can leverage)
- Talk with leadership about whether your implementation costs could be built into annual operational costs
- Consider if there are other initiatives at your organization where expenses could be combined to optimize impact
- Explore opportunities outside your organization, including local and regional initiatives that may have funding, with whom you could partner
- Consider whether there are sponsorship opportunities (e.g., from private sector, charitable foundations, philanthropic organizations) that are providing funding for your topic area
- Connect with others outside your working group to review the budget for comprehensiveness and clarity
- Connect with other staff and similar organizations who have experience implementing similar practice change initiatives to learn about their costs

BORN Tip:

Your BORN Coordinator may be able to help you connect with other organizations and/or Regional Networks who can share their experiences on similar practice change initiatives that could be informative to your budget planning.

What are the costs of not making the change?

An equally important question for planning teams to consider is: what is the cost of *not* making the practice change? Think about how many patients and families may experience poor care and outcomes; think about system inefficiencies and longer-term operating costs to continuing with the status quo.³ Articulating how an initial investment of resources may result in longer-term savings can help you build your business case (more on that below).

Remember to re-visit and update your budget as you work through the upcoming steps. For example, once you select your implementation strategies in [Step 8](#) and draft your monitoring and evaluation plan in [Step 9](#) and [Step 10](#), you will have a more precise idea of the costs.

Additional resources:

The Registered Nurses' Association of Ontario has a budget planning table with helpful activities and questions to consider as you plan your budget. See Table 5 on page 52, available [here](#).

The Ontario Centre of Excellence for Child and Youth Mental Health has a budget planning template you can customize for your practice change initiative. Download it [here](#).

Decision point

Your team has worked through several key steps, including identifying a problem and understanding it from different perspectives, identifying a potential best practice to implement to improve the problem, considering how the practice change would be customized to your unique setting, and starting to build an understanding of the resources needed to move forward with the change. Ideally, the working group has been consulting with management/leadership throughout these earlier steps and keeping them abreast of working group activities and progress. This ongoing involvement and communication will serve to keep management/leadership informed and promote awareness of the proposed change, leading to less surprises at this current step.

With all this information in mind, your implementation working group now needs to seek formal approval from management/leadership to move forward with developing and “pitching” the business case.

- If management/leadership is receptive and approves, continue with the next steps in this toolkit.
- If management is receptive but cannot approve at this time (perhaps because they require more information or the budget allocation for the upcoming year has already been finalized), listen to their concerns and information needs and develop a plan to address them. For instance, you may be asked to re-visit elements of your plan such as your proposed approach, the budget, or timelines and be given another opportunity to do an updated “pitch.”

- Although not getting an immediate approval can feel discouraging, do not give up. Change is an iterative process, and any initial resistance or hesitation is a chance to keep building your case and refine your plans.
- If management/leadership is not receptive and you choose not to move forward with planning, make sure you document the rationale for your decision, the people involved, and the concerns.
 - Deciding not to move forward can feel disappointing. Your team may have been building momentum and were motivated to start tackling this change. However, maybe the timing is not right or the needed resources are not available. Although disappointing, the work your team has invested up to this point is not wasted and can certainly be used to inform future plans.

Activity 6.3 Firm up the business case

Now that you have made the decision to proceed, it is time to formally seek endorsement for the proposed change initiative. Creating a business case may be a standard procedure at your organization, or it may be a step you are unfamiliar with. Sometimes teams feel preparing a business case is an unnecessary step, but we encourage you to consider this step to ensure you have the necessary data (and confidence) to convince others of the need and value of your proposal.

*Why is a business case important?*²³

You may need to persuade different people within your organization and potential partners to view your proposed change as a priority worthy of funding and resources. A strong business case will help you justify expenditures, obtain administrative approval, and negotiate the necessary support from within and beyond your organization.

A typical proposal:

- provides an executive summary
- includes background on the current situation
- uses local data to identify the problem and the proposed solution
- conveys how the solution matches organizational aims, including impact to patient care and outcomes
- presents a number of options with supporting evidence for each option
- recommends a preferred solution including a brief description of the requirements and implementation approach
- outlines a budget
- clearly states the requested support

Write your business case in language familiar to the intended readers. Use the information you have gathered and documented in the steps above to write your business case. There are many standard templates for writing a business case, and your organization may already have a preferred format. A simple template is provided below ([Template 6B](#)).

Template 6B Business case template*(Template adapted from ³)*

Cover page
Table of contents
Executive Summary
• Brief description of problem that the proposed change initiative is intended to solve • Brief description of organization missions and goals and how the change initiative relates to organizational mandate • Brief description of each solution considered • Brief explanation of which solution is recommended and why • Description of resources and timeframe required to deliver solution • Value statement: predicted benefit (return on investment) and when this will be achieved • Statement outlining request (e.g., action, support, funding)
The Problem Statement (the “evidence-practice” gap)
• Simple statement outlining the issue that the change initiative is meant to address and why this is important
The Business Objective Statement
• Simple statement defining how the proposed change initiative aims to address the identified problem
Analysis of the Situation
• Background information: ○ Describe scope, urgency, and impact of the problem ○ Help the reader understand the motives and objectives for introducing the change initiative • Environmental scan: ○ Explain the methods you used to collect and interpret data in steps 1 and 2 ○ Present the data and information you collected in steps 1 and 2 (e.g., on your target population, the extent of the problem, etc.) • Financial analysis: ○ Include figures on program investment and operating costs, ○ If possible, provide the return on investment, cost-benefit analysis and financial sustainability assessment
Alternative Solutions (if there is more than one solution)
• For each potential solution identified, describe the benefits (with supporting evidence), costs, feasibility, applicability, risk assessment, barriers and facilitators • Also consider the implications of not taking any action; the ‘do nothing’ option
Recommended Solution
• Rank the alternatives: develop/use criteria, voting or scoring mechanisms; document decision process in the business case • Provide rationale for the solution choice – focus on value and benefits; best fit within local context; impact on care and outcomes for patients; advancement of equity, diversity, and inclusion
The Implementation Approach*
Provide a general outline of the work needed to deliver the change initiative, including: • Scope (who/what is included, not included)

• Main activities and deliverables • Budget and overall timeframe • Roles and responsibilities - project team and partners • Project governance and decision-making structure • Any regulations or standards that need to be considered • How project performance will be measured and reported
Required Funding and Support
• Clear statement of what is being asked
Appendix
• Any relevant supporting documentation

**Implementation planning is an iterative, non-linear process. The implementation approach will be further explored, refined, and finalized in Steps 7-13. For this provisional business case, you can outline the process to be used (refer to the Implementation Work Plan Template for a summary) and provide your best prediction of what the change initiative may involve, knowing tasks can evolve as you proceed.*

Step 6 Summary checklist

How do we know we have successfully completed this step?

- ☐ We have assessed the selected best practice for feasibility, applicability, acceptability, equity, and affordability
- ☐ We have drafted a provisional budget for our proposed change initiatives
- ☐ We have received endorsement from management/leadership
- ☐ We have used the information we collected in steps 1-5 to draft a provisional business case
- ☐ We have received endorsement to move forward with planning for implementation of the best practice recommendation
- ☐ We have documented our findings and decisions

Phase 1 Progress Checklist

By the end of Phase 1, your working group will have achieved agreement to proceed with the implementation of an evidence-informed best practice recommendation to address a relevant problem. Use this checklist to gauge your progress and consider what remains to be done. Keep in mind at the outset and throughout planning how planning decisions and actions might influence sustainability of the proposed practice change over time.

Step		Was this completed?	
		Yes	No
1 Call to action	We have identified a priority issue we want to address		
	We have formed a working group with representation from different groups, skillsets, and perspectives		
	We have identified relevant partners and the expected level of engagement		
	We have started to generate interest in the issue in our setting		
	Our working group is committed to understanding and integrating the needs and preferences of patients, staff, and other partners throughout the planning process		
	We have considered if, when, and how we will evaluate our working group dynamics and partnership		
	We have started to develop our implementation workplan		
2 Understand problem	We understand the issue from different perspectives		
	We have started to consider what might be causing the problem we are seeing		
	We have formulated our problem statement		
3 Select evidence-informed solution	We have identified one or more evidence-informed solutions (guidelines) that align with our problem		
	We have assessed the guideline and determined it is of sufficient quality for implementation		
	We have considered which recommendation(s) are the highest priority for implementation		
	We have assessed the selected recommendation(s) and determined they are of sufficient quality for implementation		
	We have included the working group (and other key partners, as needed) throughout the process		
	We have selected which recommendation(s) to implement		
4 Understand current practice and define evidence-practice gap	We understand how our current practice is different from the best practice recommendation		
	We have identified or developed an indicator for our selected recommendation(s)		
	We have collected local data to calculate: • our baseline adherence rate to the recommendation • the evidence-practice gap		

	We have determined whether the size of the evidence-practice gap is clinically meaningful and something that needs to be addressed		
	We have decided whether we want to focus on increasing use, decreasing use, or both		
	We have shared our findings with our partners and other interested and affected parties		
	We understand how our current practice is different from the best practice recommendation		
5 Customize best practice recommendation and identify goals	We have analyzed our selected best practice recommendation(s) in terms of who needs to do what, when, to whom and under what circumstances		
	We have defined our best recommendation(s) in clear and simple behavioral terms		
	We have revised the recommendation with greater behavioral specificity/specification		
	We have considered whether the recommendation(s) need to be adapted or customized to work in our setting		
	We have identified the anticipated short-, medium-, and long-term outcomes of following the recommendation at the level of patients and families, healthcare professionals and staff, and the unit and organization		
6 Make decision to proceed or not	We have assessed the selected best practice for feasibility, applicability, acceptability, equity, and affordability		
	We have drafted a provisional budget for our proposed change initiatives		
	We have received endorsement from management/leadership		
	We have used the information we collected in steps 1-5 to draft a provisional business case		
	We have received endorsement to move forward with planning for implementation of the best practice recommendation		
	We have documented our findings, learnings, and decisions from Phase 1		

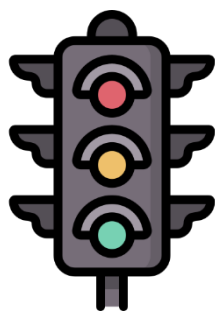


Image from [FlatIcon](#)

STOP: We have not addressed most of these implementation planning factors; we are missing critical information, key resources, and/or sufficient level of support to continue.

CAUTION: We have addressed some but not all these implementation planning factors. We can proceed cautiously pending further efforts to complete outstanding planning elements.

GO: We have sufficiently addressed most of these implementation planning factors and are confident with proceeding to the next Phase.

List of Phase 1 planning templates

- [Template 1A Issue prioritization matrix](#)
- [Template 1B Invitation for patient and family partners](#)
- [Template 1C Questions to assess patient or family member preferences for involvement](#)
- [Template 1D Mapping potential partners and levels of engagement](#)
- [Template 2A Exploring the problem from different perspectives](#)
- [Template 3A Discussion questions to assess guideline quality](#)
- [Template 3B Prioritizing what recommendation to work on](#)
- [Template 3C Discussion questions to assess recommendation quality](#)
- [Template 4A Exploring current practice related to the selected guideline recommendation\(s\)](#)
- [Template 4B Assessment of guideline recommendation against SMART indicator criteria](#)
- [Template 4C Tool for calculating baseline adherence rate and evidence-practice gap](#)
- [Template 5A Worksheet to clarify who needs to do what, when, to whom and under what circumstances](#)
- [Template 5B Anticipated outcomes of following selected recommendation](#)
- [Template 6A Feasibility, Applicability, Acceptability, Equity, and Affordability \(FAAEA\) Check](#)
- [Template 6B Business case template](#)

PHASE 2 PLAN HOW YOU WILL IMPLEMENT THE SOLUTION

The working group has now agreed to move forward with the implementation of a best practice recommendation to address an identified practice need and has secured the required organizational support. In Phase 2, the team will systematically explore potential barriers and drivers associated with implementing the selected recommendation and identify which evidence-informed implementation strategies to use to minimize the identified barriers. The team will then develop an evaluation strategy for assessing the implementation process, the project's impact, and implications for sustaining the change over the long term. If the working group has completed the assessments outlined in Phase 1, you will have most of the information you need to proceed. If you're starting with limited data, your team will have more work to do in this phase.³

Step 7 Identify barriers and drivers

What is this step?

In this step, the team will work to identify potential barriers (challenges) and drivers (facilitators) to implementing the best practice recommendation. This will involve working with different partners to systematically discuss the potential barriers and drivers. By the end of this step, the working group will have a list of priority barriers that you will work to mitigate.

Why is this step important?

We know that simply telling people to make a change is not enough. Changing practice is complex and there are many reasons why a seemingly simple change is not adopted or sustained. **Identifying barriers and drivers** will help your team to identify the factors that may make it difficult for teams and individuals to start using the selected best practice recommendation. Although this step takes some effort, the benefits will pay off in the long run. For example:

- The process of conducting a barriers assessment provides opportunities for the working group to connect with a broad range of people and understand potential roadblocks to implementing the proposed best practice; this can prevent surprises and allow the team to proactively mitigate these challenges.
- The process of asking people about their views and concerns is an important part of the working group's change management process; eliciting this type of feedback can make interested and affected parties feel heard and included in the process.

Ultimately, once your team knows what the potential barriers are, you will be well-positioned to select tailored implementation strategies (in [Step 8](#)) to address these barriers, and consider how you can leverage drivers, to maximize the success of your implementation project.

Considerations for equity, diversity, and inclusion

(some questions adapted from ³⁵)

As you review and complete this step, keep these equity-focused questions in mind:

- Who has been included in the barriers and drivers assessment? Whose voices are not reflected?
- Are identified barriers ones that everyone experiences? Or do the barriers apply more to some groups than others? Why?
- What is behind the barriers and drivers? Why do they exist?

- What intersectionality factors come into play? (sex and gender, age, role, power, race, education, etc.)
- Have we included equity considerations in the prioritization of barriers to address (i.e., not just addressing the most frequent barriers, but also those that are of importance to equity-deserving groups)

TIP: Do not assume that you already know what the barriers are and jump to solutions

Some teams feel that a barriers assessment is not needed because projects encounter the same “typical” or “usual” barriers to change. Teams may therefore be tempted to skip the barriers assessment and jump to ideas for how to implement their best practice recommendation based on familiarity or their best guess.^{19,20}

While it is true that there are common barriers we see again and again, each practice change initiative and setting will have unique barriers that we will not know about until we do some digging. Learning about the barriers that are unique to your current change initiative is essential—if you are not aware of the specific barriers, how can you address them? And if you don’t address them, your implementation project is much less likely to succeed.

Activity 7.1 Identify who to consult about barriers and drivers

As we introduced in Step 1, there are different “[levels](#)” of partners the working group needs to consider, ranging from those who will be expected to use the best practice, to those who will be facilitating and endorsing the best practice, to those who are interested and affected by the best practice. Because each of these levels can influence the implementation and uptake of your change, it is important to think broadly about who to include in your assessment of barriers and drivers to capture diverse perspectives and obtain a comprehensive understanding of what may impede and facilitate implementation.

Re-visit the work the team did in Step 1 to identify the different partners and interested and affected parties ([Template 1D](#)). Also re-visit your work from Step 5 ([Template 5A](#)) when you broke down the recommendation into the AACTT components⁴⁹; this can help to focus the team on the particular people and groups that will be responsible for delivering or facilitating the best practice and those affected as recipients of the best practice. For example:

- Who was identified as the **A**ctor that needs to do the best practice?
- Think about the identified **C**ontext—who are the other people and groups in that setting that may be involved in or affected by the best practice?
- Who was identified as the **T**arget that will be receiving the best practice?

These will be key people and groups to consult in this step to understand their perceptions of the potential barriers and drivers to implementing the best practice recommendation. [Template 7A](#) may help the working group to discuss and document the different people and groups to consult with.

Template 7A Who is directly and indirectly affected by the best practice recommendation?

Discussion question	List of individuals and/or groups
Who will be <i>directly affected</i> by the change? (refer back to the T arget)	•
Who will be expected to <i>use</i> the best practice? (refer back to the A ctor)	•

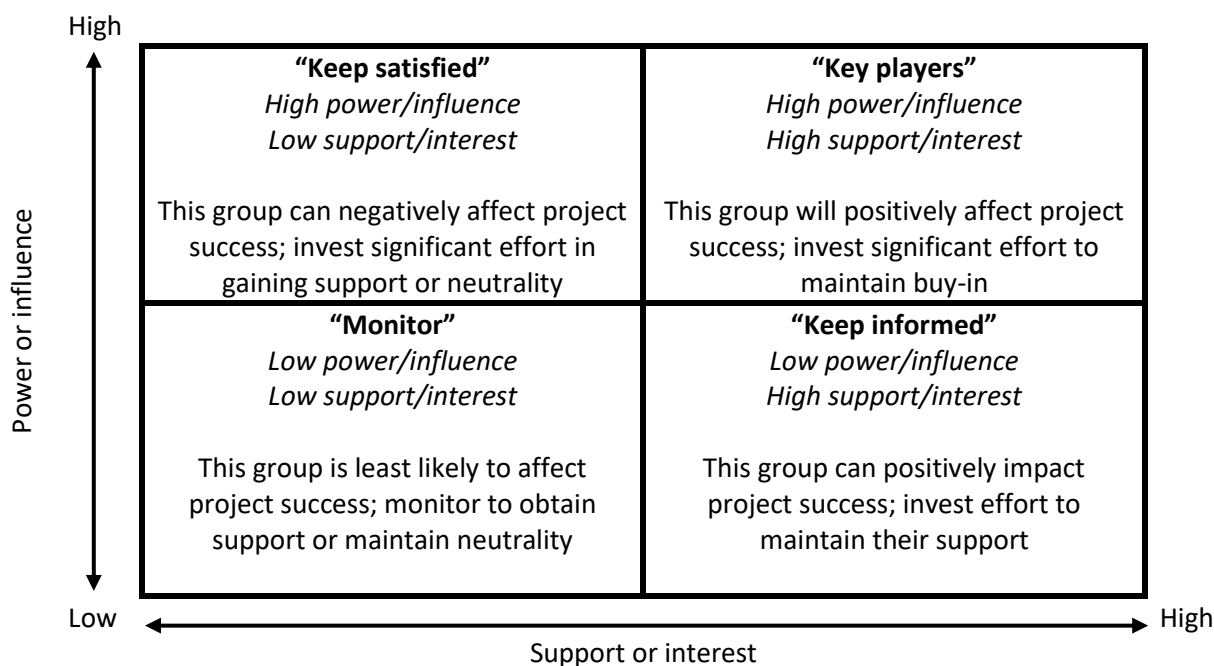
Discussion question	List of individuals and/or groups
Who will be expected to <i>help facilitate</i> the change? (refer back to the A ctor and C ontext)	•
Who may be <i>interested</i> in the change? (refer back to the C ontext)	•
Who has the authority to <i>approve or endorse</i> the practice change and resource it? (refer back to the C ontext)	•

As you think about the different people and groups to consult with, it can be helpful to consider the level of power or influence they have over the practice change as well as their current level of support or interest in the practice change. Consider creating a “grid” to map out which people and groups are supportive versus unsupportive, and which have high versus low influence on your practice change initiative ([Figure 3](#)).^{8,52,53} Where people and groups fall on this grid can provide a guide for the effort you should invest and help you prioritize who to speak to during your barriers assessment.

Keep in mind that “power and influence” do not only refer to formal positions of power (e.g., formal organizational leaders). For example, perhaps your team is working to decrease formula usage without a medical indication but there is the perception that patient and family demand for infant formula is highly influential. Although patients and families are not formal leaders in your organization, consumer preference and choice may be identified as highly influential in the grid.

Figure 3. Mapping interested and affected parties

(Figure adapted from ^{8,52,53})



Consider using [Template 7B](#) below to plot the individuals and groups that the working group listed in [Template 7A](#) according to the dimensions of influence and support.

Template 7B What is the influence and support level of the interested and affected parties?*(Template adapted from ^{8,52,53})*

“Keep satisfied” <i>High power/influence</i> <i>Low support/interest</i>	“Key players” <i>High power/influence</i> <i>High support/interest</i>
Examples of individuals and groups in our setting: •	Examples of individuals and groups in our setting: •
“Monitor” <i>Low power/influence</i> <i>Low support/interest</i>	“Keep informed” <i>Low power/influence</i> <i>High support/interest</i>
Examples of individuals and groups in our setting: •	Examples of individuals and groups in our setting: •

Now that you have identified whose perspectives should be considered in your barriers and drivers assessment, consider *how* you will collect the information, depending on your time, resources, and skills on the working group. We encourage you to use one or more of the examples below² to talk with your identified individuals and groups:

- **Brainstorming and informal conversations:** less structured discussions with partners to generate ideas for potential barriers and drivers
- **Interviews:** semi-structured one-to-one discussions with partners using a pre-defined question guide to elicit perceptions on barriers and drivers
- **Focus groups:** semi-structured group discussions with up to 10 people using a pre-defined question guide to elicit perceptions on barriers and drivers
- **Questionnaires:** distribute an online or paper-based questionnaire to ask people about potential barriers and drivers

Regardless of which method you select, be ready to encourage an open dialogue about user knowledge, attitudes, and expectations. It is important that everyone has adequate and safe opportunities to express their views and concerns.

TIP: Consider other sources to learn about barriers and facilitators^{2,5}

While it is essential to ask people directly about the perceived barriers and facilitators, there are other ways to learn about them too. For example, your working group could consider:

- **Searching the literature:** search the scientific or grey literature (e.g., non-academic literature such as reports or government publications) for information on the types of barriers and drivers that have been encountered in similar practice change initiatives.
 - This could be helpful in developing questions to guide your discussions or questionnaires with teams and individuals.

- However, remember that your setting may be different from the settings reported in the literature and the barriers and drivers may not directly apply to your own context.
- **Conducting observations:** observe individuals in your setting to identify potential barriers and drivers. This may involve informally observing peoples' behaviours and practices and documenting your learnings in notes or a checklist.
 - This allows you see what is happening in the real-world setting. However, it can be time consuming, and people may change their behaviours when being observed.
- **Reviewing documents:** review policies, procedures, guidelines, and charting at your organization to look for potential barriers and drivers to change
 - This can help you identify different organizational factors that may be influencing care and learn about the documented care provided by different healthcare professionals.
 - However, what is written in policies, procedures, guidelines, and patient charts may not be an accurate or comprehensive reflection of actual practice.

Remember these ideas do not replace talking to people but can enhance and complement the information you gain from your key partners and interested and affected parties.

Activity 7.2 Conduct a barriers and drivers assessment

In Step 6, the working group broadly considered the feasibility, applicability, acceptability, equity, and affordability of the proposed best practice recommendation ([Template 6A](#)). While this brainstorming may have generated some initial ideas of barriers and drivers, in this activity, your team will take a more in-depth approach to systematically identify factors that may influence best practice implementation. Consider whether you have staff and resources at your organization that could support the working group to complete this barriers and drivers assessment, such as staff from quality improvement, organizational development and learning, or a researcher or student from an affiliated research institute or university.

Using a structured approach to guide your exploration of potential barriers and drivers will reduce the risk of overlooking critical challenges and spending your time on less important issues. A useful framework is to group potential issues into three categories,⁵⁴ those related to:

- 1) the best practice **recommendation** you are implementing
- 2) the **users** (the people who need to do or use the best practice recommendation)
- 3) the **setting** (the place where you are implementing the best recommendation).

Below we briefly review each of these three categories.

Additional resource:

There are many different “determinant frameworks” that help practitioners and researchers to identify and assess barriers and drivers to implementing new practices, programs, and innovations. In the toolkit we have drawn from several different well-known frameworks to create the list of potential factors and the guiding questions. However, your team may choose to learn more about implementation science determinant frameworks and select one that resonates with your team and project. We have provided examples and links to some common frameworks for further exploration:

- [Theoretical Domains Framework \(TDF\)](#)⁵⁵

- [Consolidated Framework for Implementation Research \(CFIR\)](#)^{14,56}
- [integrated Promoting Action on Research Implementation in Health Services \(i-PARIHS\)](#)⁵⁷

*Factors related to the best practice **recommendation**:*

There are several characteristics of what you are implementing that may influence implementation success, such as whether the best practice recommendation is perceived to^{3,14}:

- be from a reputable, credible, and trustworthy source;
- be based on best evidence;
- present clear benefits over other options;
- be a good fit with the target population (e.g., staff, patients, families)
- be adaptable to the local context;
- be pilotable before full roll-out;
- not be overly complicated;
- be designed and bundled in an appealing way;
- be affordable (i.e., purchasing and ongoing costs are feasible for your organization); and
- be feasible to implement

*Factors related to the **users**:*

The characteristics of the people who will be doing or using the practice will also influence implementation success. Often when we implement a change initiative, we are asking people to change their existing behaviours. Behaviour change is complex and is affected by many different factors such as users⁵⁸:

- **Knowledge** (are they aware of what they need to do differently?)
- **Skills** (do they have the necessary skills to do the thing differently?)
- **Social or professional role and identity** (do they see this new way of doing things as part of their role?)
- **Beliefs about capabilities** (do they believe they are equipped to do the thing in the new way? Do they believe it is within their control?)
- **Optimism** (do they believe that doing things in a new way will lead to positive outcomes and benefits?)
- **Beliefs about consequences** (do they believe that there will be consequences if things are not done in the new way?)
- **Reinforcement** (are there rewards, recognition, or incentives for doing the thing in a new way?)
- **Intentions** (do they plan to make a conscious decision to do the thing in the new way?)
- **Goals** (do they have a plan to help them achieve the new way to doing things? Is the new way of doing things a priority to them?)
- **Memory, attention, and decision processes** (how easily can they remember to do the new thing? How well can they focus when doing the new thing?)
- **Environmental context and resources** (do they feel that they have a supportive environment/culture with sufficient resources to do the thing differently?)
- **Social influences** (are they influenced by their relationships with others to do things differently? Do they have a team they can rely on to help them do the new thing?)
- **Emotion** (are their emotional reactions [e.g., fear, anxiety, burn-out] influencing their willingness to do things differently?)
- **Behavioural regulation** (are they aware of what they are doing? do they have a plan for monitoring their progress on doing the new thing?)

*Factors related to the **setting** (i.e., context):*

Finally, your team needs to consider the setting, often referred to as the “context,” which includes the characteristics of the place where you are implementing the best practice recommendation. There are several characteristics of the setting that may influence implementation success, such as the¹⁴:

- **Physical infrastructure** (features of your physical space and what is available)
- **Information technology (IT) infrastructure** (the availability and features of IT systems in your setting such as telecommunications, electronic health records, access to computers, etc.)
- **Work infrastructure** (your organization’s staffing levels and how responsibilities are distributed across teams and people)
- **Relational connections** (the quality of the connections and relationships, both formal and informal, across teams and people)
- **Communications** (the way that information is shared horizontally and vertically, both formally and informally, in your organization)
- **Culture** (the shared values, beliefs, and norms at your organization, including a culture of continuous learning and improvement)
- **Tension for change** (whether there is a feeling that change is urgently needed)
- **Relative priority** (whether the change priority is considered a priority compared to other organizational initiatives)
- **Mission alignment** (does the change initiative align with your organization’s mission?)
- **Available resources** (is there sufficient funding, space, materials, and equipment to support your change initiative?)
- **Access to knowledge and information** (does your organization have access to guidance or training on what you are implementing and how to implement it?)
- **Leadership support** (includes commitment and support from senior and mid-level leadership to the implementation project)

BORN Tip:

As you assess barriers and drivers, consider any challenges related to BORN data entry, data quality, and data use, specifically if your practice change initiative is going to rely on using BORN data for monitoring and evaluation. For example, you may identify data entry barriers such as having *insufficient time* to enter BORN data, which could lead to incomplete and/or delayed data. Or you may identify data use barriers such as *limited access to analytic support* at your site, which could lead to challenges with interpreting BORN data and reports.

These barriers can often be overcome; the first step is identifying them and then working with your team and BORN Regional Coordinator to develop feasible strategies to address them.

As mentioned in [Activity 7.1](#), these potential barriers and drivers should be explored from different perspectives; this exploration can be done in various ways via informal or formal discussions or questionnaires.

As you explore barriers and drivers related to your best practice recommendation, think back to [Step 5](#) and your AACTT breakdown.⁴⁹ The more specific you can be about the particular behaviour (i.e., Action) you are trying to change, the more accurate and informative your barriers and drivers assessment will be. For example, using our example from Step 5, the specific recommendation we ended up with after using AACTT was: *Nurses provide at least one breastfeeding education session prior to discharge home according to hospital guidelines to all people in the mother-baby unit who intend to breastfeed*. In the barriers and drivers assessment, we would therefore focus on the behaviour of **mother-baby unit**

nurses offering breastfeeding education. Note that we are focusing on the specific behaviour specified in the re-worded recommendation, and not the barriers and drivers to breastfeeding in general.

In addition, be specific regarding whether you are aiming to increase use of the practice, decrease use of the practice, or both, as your team identified in Step 4. Using our example from Step 4 with skin-to-skin care, we identified that the most pressing problem was under-use of the practice. This means that the barriers and drivers assessment would be framed around understanding what may prevent or encourage the offering and facilitating skin-to-skin care.

Template 7C provides guiding questions to help your team explore barriers and drivers related to the best practice recommendation, the users, and the setting; adapt this template as needed to work with your selected approach for collecting information and document the feedback you received.

Template 7C Discussion guide for learning about barriers and drivers to best practice implementation from different perspectives

(Template informed by ^{2,3,14,55,59,60})

Opening text to use for discussions to orient people to project and activity.

Our project team has identified that [*briefly describe your evidence-practice gap or issue*]. To address this issue, we are planning to implement [*specify what best practice recommendation your team has selected*]. To inform how we will implement the best practice recommendation, we first want to learn about different people's perceptions of what would make it difficult or easy to make this practice change. We will use this information to decide what resources and strategies are needed to implement this change.

Recommendation (use specific wording from Step 5 after customizing with AACTT): [enter here]			
Sample questions (add or delete as needed)	Group (specify, examples provided)	Summary of information learned	
		Barriers	Drivers
Questions focused on the best practice recommendation to be implemented			
Do you think the best practice recommendation we are planning to implement is ¹⁴ : • Credible? • Supported by evidence? • Offers an advantage over other options? • Is a good fit with our organization? • Pilotable? • Complicated? • Well-designed and packaged? • Costly? • Difficult to implement?	Nurses	•	•
	Physicians	•	•
	Midwives	•	•
	Leadership	•	•
	Patients	•	•

Recommendation (use specific wording from Step 5 after customizing with AACTT): <i>[enter here]</i>			
Sample questions <i>(add or delete as needed)</i>	Group <i>(specify, examples provided)</i>	Summary of information learned	
		Barriers	Drivers
Other comments on the thing to be implemented?	<i>[add others as needed]</i>	•	•
Questions focused on the users (the people who are expected to change their behaviours when the best practice recommendation is implemented)			
Thinking about this best practice recommendation ^{2,55,59} : - How familiar are you with it? Do you need more information on it? - How easy or difficult would it be for you to do it? Are there specific skills needed? - Is it part of your job to do this? - How confident are you that you could do it? How can we increase confidence? - What do you think the benefits of doing this are? Downsides? Do the benefits outweigh the downsides? - How much do you want to do this? What are the incentives for doing this? - Is this something you usually do? Would you remember to do it in the future? - What environmental factors or resources would help or hinder doing this? - Do people you work with do this? Would they support you to do it? - How do you feel (what emotions) about doing this? - Are there things that need to be in place before you can do this? Are there prompts or reminders that could help you do it?	Nurses	•	•
	Physicians	•	•
	Midwives	•	•
	Leadership	•	•
	Patients	•	•
	<i>[add others as needed]</i>	•	•

Recommendation (use specific wording from Step 5 after customizing with AACTT): <i>[enter here]</i>			
Sample questions <i>(add or delete as needed)</i>	Group <i>(specify, examples provided)</i>	Summary of information learned	
		Barriers	Drivers
Questions related to the setting (context) where the best practice recommendation is being implemented.			
Think about the features of our organization, team, and context ^{14,60} : • Is there a strong need for this change here? Does the change align with the organization's mission, vision, values? • How important is this change compared to others changes our organization is dealing with? • Is the physical layout and infrastructure sufficient? What changes would we need? • Is our information technology (IT) infrastructure sufficient? What changes would we need? • Do we have enough staff? Do we have the right type of specialized staff? • Do we have enough time to do it? • Do we have the financial resources to do it? • Do we have the material resources and equipment? • How well does the team work together? Could there be challenges working together to do this? • How do we share information in our organization? Could there be challenges to sharing information on this? • What level of support and endorsement do we have from senior and mid-level leadership? • What is our learning climate like? Would there be an openness to trying to do this in a new way? • Are there any medico-legal considerations?	Nurses	•	•
	Physicians	•	•
	Midwives	•	•
	Leadership	•	•
	Patients	•	•
	<i>[add others as needed]</i>	•	•

Additional resource: Tools for developing questions about barriers and facilitators

There are other tools available to help you develop questions for asking about potential barriers and drivers to the best practice. For example:

- The Consolidated Framework for Implementation Research (CFIR) Guide has an [Interview Guide Tool](#)⁶⁰ that allows you to select the domains and constructs of interest. The tool then provides interview (discussion) questions and probes on the different topics.
- There is a [questionnaire template](#)⁶¹ based on the 14 domains in the Theoretical Domains Framework. Users can adapt the questionnaire by inserting their specific AACTT dimensions (as you did in Step 5).
- The Implementation in Context ([ICON](#)) [Qualitative Screening Tool](#)⁶² has seven core questions that can be used to explore attributes and features of your context that may influence implementation of the best practice.

Activity 7.3 Summarize and prioritize barriers to address

Depending on how many people you talk to and how many other sources you consult (e.g., literature, observations, charting), your team may have a lot of information on barriers and drivers to make sense of. The next step is to compile the information and start prioritizing which barriers you will address in [Step 8](#).

[Template 7D](#) provides a checklist your working group may use to document your overall impressions of the barriers and drivers as you reflect on the information you have collected. Again, this template is broken down into the three categories of the recommendation, the users, and the setting.

The final column in [Template 7D](#) includes a space to rank how high of a priority each factor will be to address. Your team will have identified many different barriers and drivers that are more or less important to different roles; however, the working group will have a finite number of resources (human and financial) and will not be able to address every identified barrier. Therefore, your team must decide which barriers need to be addressed for the most impact, working within the resources you have.

To decide which barriers are the highest priority, think about the following²:

- Which barriers were identified by multiple people or groups?
 - Prioritize barriers identified by many people and groups
 - However, a word of caution—sometimes there may be barriers that do not come up as frequently, but are very important to marginalized groups
- Are there any barriers that are “critical” obstacles?
 - Prioritize barriers that must be addressed for successful implementation
- Which barriers are feasible to address?
 - Prioritize barriers that are in fact modifiable

Template 7D Which factors will be a barrier or a driver to your practice change initiative?*(Template informed by ^{2,3,14,55,59,60})****Refer back to all the information you documented in Activity 7.2 to inform this template**

Attributes of the best practice recommendation					
Based on our assessment, overall....	Potential barrier X		Potential driver ✓		Priority (rank)
Is the best practice recommendation perceived to be from a reputable, credible source?		Not perceived to be credible		Perceived to be credible	
Is the best practice recommendation perceived to be supported by evidence?		Not perceived to be supported by evidence		Perceived to be supported by evidence	
Is the best practice recommendation perceived to offer a clear advantage and benefits over other options?		Not perceived to offer benefits		Perceived to offer benefits	
Is there a good fit between the best practice recommendation and the target population (e.g., staff, patients, families)?		Poor fit		Good fit	
Can the best practice recommendation be modified or tailored to your setting?		Not modifiable		Modifiable	
Can the best practice recommendation be piloted or trialed before full roll-out?		Cannot be piloted		Can be piloted	
Is the best practice recommendation perceived to be complicated?		Perceived to be complicated		Perceived to be simple	
Is the best practice recommendation well designed and packaged?		Not well-designed		Well-designed	
Does the best practice recommendation require purchasing and ongoing costs?		Costly		Not costly	
What is the degree of difficulty to implement the best practice recommendation?		Difficult to implement		Easy to implement	
Other attributes of the best practice recommendation? [add]					

Attributes of the users (people expected to change their behaviours to use or do the best practice recommendation)					
Based on our assessment, overall....	Potential barrier X		Potential driver ✓		Priority (rank)
Are users aware or knowledgeable of what they will need to do differently?		Not aware		Very aware	
Do users have the necessary skills to do the thing differently?		Do not have skills		Do have skills	
Do users see this new way of doing things as part of their professional role ?		Not viewed as part of role		Viewed as part of role	
Do users believe they are capable of doing the thing in the new way? Do they believe it is within their control?		Do not believe they are capable		Do believe they are capable	

Attributes of the users (people expected to change their behaviours to use or do the best practice recommendation)					
Based on our assessment, overall....	Potential barrier X	Potential driver ✓	Not sure (explore further)	Priority (rank)	
Are users optimistic that doing things in a new way will lead to positive outcomes and benefits?	Not optimistic	Optimistic			
Do users believe there will be consequences if things are done in the new way? Do the benefits outweigh the downsides?	Perception that downsides outweigh benefits	Perception that benefits outweigh downsides			
Do users perceive there are reinforcements (rewards, recognition, incentives) for doing the thing in a new way?	No reinforcements	Reinforcements			
Do users intend to make a conscious decision to do the thing in the new way?	No intention	Intention			
Do users have goals to achieve the new way of doing things? Is the new way of doing things a priority to them?	No goals	Goals			
How easily can users remember to do the new thing? How well can they focus when doing the new thing?	Not easy to remember or focus	Easy to remember or focus			
Do users feel they have a supportive environment/culture with sufficient resources to do the thing differently?	Unsupportive and lack of resources	Supportive with resources			
Are users influenced by their relationships with others to do things differently? Do they have a team they can rely on to help them do the new thing?	No social influences (or negative social influences)	Positive social influences			
Are users' emotional reactions (e.g., fear, anxiety, burn-out) influencing their willingness to do things differently?	Negative emotional reactions	Positive emotional reactions			
Are users aware of their practice behaviours ? Do they have a plan for monitoring their progress on doing the new thing?	Not aware; no monitoring	Aware; plan for monitoring			
Other attributes of users? [add]					

Attributes of the setting (the place where you are implementing the best practice recommendation)					
Based on our assessment, overall....	Potential barrier X	Potential driver ✓	Not sure (explore further)	Priority (rank)	
Do we have the necessary physical infrastructure (e.g., layout, required space, equipment)?	Lacking physical infrastructure	Have required physical infrastructure			
Do we have the necessary information technology (IT) infrastructure (e.g., telecommunications, electronic health record)?	Lacking IT infrastructure	Have required IT infrastructure			

Attributes of the setting (the place where you are implementing the best practice recommendation)					
Based on our assessment, overall....	Potential barrier X	Potential driver ✓	Not sure (explore further)	Priority (rank)	
Do we have the necessary work infrastructure (e.g., necessary staffing, the right responsibilities with the right roles)?	Lacking work infrastructure	Have required work infrastructure			
Do we have sufficient relational connections (e.g., quality connections between staff, teams, patient and community partners, and with leadership)?	Lacking relational connections	Sufficient relational connections			
Do we have sufficient communication channels to share information informally and formally?	Lacking communication	Sufficient communication			
Do we have a supportive organizational culture , including a culture of continuous learning and improvement?	Unsupportive organizational culture	Supportive organizational culture			
Is there a feeling that there is “ tension for change ” and this proposed change is urgently needed?	Change not felt to be needed	Change felt to be urgently needed			
Is the change considered a high priority compared to other organizational initiatives?	Low priority	High priority			
Does the change align with the organization’s mission ?	Not aligned with mission	Aligned with mission			
Are there sufficient resources (e.g., funding, space, materials, equipment) to support the change?	Limited resources	Sufficient resources			
Does our organization have sufficient access to knowledge and information on the change (e.g., the mechanics, how to do it)?	Insufficient information	Sufficient information			
Do we have leadership support and endorsement for the change?	Limited leadership support	Leadership support			
Can we accommodate medico-legal requirements?	Difficult to accommodate	Easy to accommodate			
Other attributes of setting? [add]					

TIP: Assessing barriers and drivers is not a one-time activity¹⁶

Remember that the barriers and drivers assessment is not a one-time activity. Your team should be ready to revisit this throughout your practice change initiative. For example, sometimes unanticipated barriers come up post-implementation. Conversely, sometimes anticipated barriers are not an issue at all. Revisiting your barriers and drivers (even informally) will best position your team to continue adapting and tailoring your implementation strategies. Even once your practice change is well-established and the team enters the sustainability phase, it remains important to continue monitoring and responding to emergent barriers over time.

Step 7 Summary checklist**Summary – how do we know we have successfully completed this step?**

- ☐ We have considered the different individuals and groups interested and affected by the practice change and considered their roles, influence, and support levels
- ☐ We have consulted with key individuals and groups to explore potential barriers and drivers to the selected best practice recommendation
- ☐ We understand factors related to the best practice recommendation that may hinder or support use
- ☐ We understand factors related to the users (people who will use or do the best practice recommendation) that may hinder or support use
- ☐ We understand factors related to the setting (the place where the best practice will occur) that may hinder or support use
- ☐ We have considered the different perspectives and judged whether different factors will be a barrier or a driver to the practice change initiative
- ☐ We have ranked the identified barriers and identified the highest priorities to address
- ☐ We have documented our findings and decisions

Step 8 Select and refine implementation strategies

What is this step?

Now that the working group has identified and prioritized barriers at the level of the recommendation, the users, and the setting, it is time to start developing “implementation strategies” to address those barriers. “Implementation strategies” are the approaches we use to encourage use of the best practice.¹⁶ This is the ‘*exactly what will it take to get it done?*’ step. By the end of this step, you will have developed a plan for what specific strategies the team will use to roll-out the best practice recommendation.

Why is this step important?

When we are planning for a practice change, we need to select evidence-informed implementation strategies to support the roll out of that change. Strategies might include training and education, rewards and incentives, reminders, audit and feedback, leveraging champions, etc. There is not one implementation strategy or set of strategies that are universally effective across practice change initiatives and settings. Instead, the strategies that will be most effective are those that are designed to address the specific barriers you identified in the last step.

Systematically identifying strategies is essential for:

- Enhancing the chances of implementation success by using evidence-informed strategies that directly target known barriers (and leverage drivers)
- Helping the team focus their efforts and limited resources on the strategies that will have the highest chance of impact

Ultimately, this step will help your team avoid the ISLAGIATT approach (“It seemed like a good idea at the time”).⁶³ By taking a thoughtful approach to implementation strategy selection, you can reduce the chances of using trial and error and select strategies that are most likely to lead to implementation success.

Considerations for equity, diversity, and inclusion

(questions adapted from ^{35,64})

As you review and complete this step, keep these equity-focused questions in mind:

- Who has been included in selecting the implementation strategies? Whose voices are not reflected?
- Are the implementation strategies acceptable, feasible, and safe for everyone?
- Have we considered the systems and structures of power in which our implementation strategies will be used?
- Have we included equity considerations in the selection of implementation strategies?

Tip: Managing non-modifiable barriers to implementing your best practice recommendation

What should you do about non-modifiable barriers? Some barriers may be out of the working group’s control or require the team to move mountains to overcome. However, there may still be “workarounds” you can use. For example, perhaps the identified problem is that cesarean births are being done too early. An identified barrier is that the obstetrics team has set operating room days, which leads to physicians scheduling the cesarean birth prior to the recommended 39 weeks’

gestation. While it is not possible for your team to build new operating rooms, perhaps your team can explore other options such as alternate scheduling options or changing operating room time.

Or perhaps your barriers assessment revealed that people are unsure about the credibility of the thing you are implementing. While you cannot change the source, you can help increase users' knowledge and understanding of what you are implementing, how it was developed, and increase their buy-in through different implementation strategies.

Approaches to selecting implementation strategies

There are different approaches to selecting implementation strategies, ranging from highly systematic approaches to more simplified and pragmatic approaches. In this toolkit, we have opted for the more pragmatic approach; we provide a general structure, ideas, and resources for selecting and refining implementation strategies that are informed by best practices in implementation science. This approach should help your team to explore the different implementation strategy options and pick the ones that align best with your needs, while hopefully, remaining feasible in an applied healthcare setting.

Additional resource: Theory-based approaches to strategy selection

It is important to know that there are other approaches to selecting implementation strategies that are more systematic and “theory-based” than the approach presented in this toolkit. Your team may wish to consider these more systematic approaches depending on your time, interest, and resources. Generally, these theory-based approaches require teams to assess barriers and drivers according to a particular framework, followed by mapping the results from the barriers and drivers assessment to an implementation strategy framework. Here are some common examples:

CFIR-ERIC

- Use the [Consolidated Framework for Implementation Research \(CFIR\)](#)¹⁴ to assess barriers and drivers
- Use the [Expert Recommendations for Implementing Change \(ERIC\)](#)⁶⁵ tool to map your identified barriers and facilitators from CFIR to implementation strategies

TDF-BCW

- Use the [Theoretical Domains Framework \(TDF\)](#)⁵⁵ to assess barriers and drivers
- Use the [Behaviour Change Wheel](#)⁶⁶ to map your identified barriers and facilitators from TDF to intervention functions
 - The [Select Tool](#)⁶⁷ can help map the findings from TDF to BCW

Activity 8.1 Identify implementation strategies to address barriers

Different implementation strategies accomplish different things. For example, putting up a poster in your unit may increase awareness, but it will not teach people the skills they need to do a new practice. Offering training in-services may increase healthcare professional knowledge and skills about a new practice, but it will not address a lack of equipment needed for the new practice. This is why the barriers assessment you conducted in [Step 7](#) is so critical, as it now allows you to select your implementation strategies based on the actual barriers, rather than a best guess of what is needed.

Teams sometimes default to using the implementation strategies they are most familiar and comfortable with, such as awareness-raising activities and education. However, there are *many* implementation strategies to pick from. In this activity, the working group will brainstorm potential

implementation strategies that may address the priority barriers from the previous step. We encourage the team to (1) think broadly and be open to the full spectrum of implementation strategies and (2) stay focused on selecting implementation strategies that directly address the identified barriers (more on both these points below).

Additional resource: Taxonomies of implementation strategies

There are dozens of different implementation strategies, and there are many taxonomies that categorize the different strategies. Below we have listed some common ones.

The [Effective Practice and Organisation of Care \(EPOC\)](#) Taxonomy⁶⁸

- This taxonomy includes over 100 strategies grouped into 4 overarching topics: delivery arrangements, financial arrangements, governance arrangements, and implementation strategies.

The [Expert Recommendations for Implementing Change \(ERIC\)](#) compilation⁶⁵

- This includes 73 different implementation strategies and their definitions, which can be grouped into 9 core categories: use evaluative and iterative strategies, provide interactive assistance, adapt and tailor to context, develop stakeholder interrelationships, train and educate stakeholders, support clinicians, engage consumers, utilize financial strategies, change infrastructure.⁶⁹

The [Behaviour Change Technique \(BCT\)](#) Taxonomy⁷⁰

- This includes 93 different techniques that can be used in behaviour change interventions, organized into 16 groups: goals and planning, feedback and monitoring, social support, shaping knowledge, natural consequences, comparison of behaviour, associations, repetition and substitution, comparison of outcomes, reward and threat, regulation, antecedents, identity, scheduled consequences, self-belief, and covert learning.

Use the taxonomies above (or others) to refer to as you brainstorm potential implementation strategies to address your identified barriers.

Concept mapping – Working together to explore implementation strategies to address identified barriers *(process adapted from ^{9,71})*

Here we describe a modified approach based on “concept mapping,” which is a participatory approach to identifying and selecting implementation strategies for your change initiative.^{9,71}

Start by booking time (in-person or virtual) for the working group, and other key partners as needed, to brainstorm potential implementation strategies to roll out your change.

Before the meeting, the working group should:

- Compile the short-list of barriers you have identified as priorities to address (re-visit your documentation from [Step 7](#))
- Select which list(s) of implementation strategies could be used, ideally using an existing taxonomy (see list above in “Additional Resources” box for examples of taxonomies you can use)
- Consider sending this information to meeting participants beforehand to allow them to review the results of the barriers assessment and read the full list of potential implementation strategies

At the meeting:

Step A – Brainstorm implementation strategies to address identified barriers

- Using the list of implementation strategies, ask meeting participants to think about which strategies may address each of the barriers. Do not limit yourself to the list only; it is a starting point, but if people have ideas not on the list, be sure to include them.
- The focus is on brainstorming and idea generation—this means that all ideas should be considered; do not rule out ideas at this point. Think big and outside the box and do not worry about resources or feasibility at this point.
- The first column of [Template 8A](#) provides a place to list the priority barriers from [Step 7](#). The second column provides a space to document implementation strategy ideas for each barrier.

Step B – Rate the potential implementation strategies

- The next step is to rate the different implementation strategies you are considering. This will help the group to refine the list of ideas down to those that are likely to be the most successful and feasible.
- Rate each strategy on how likely it is to address the barrier (and consider which strategies address multiple barriers), how feasible the strategy would be in your context, and how resource intensive the strategy is.
 - Explore whether there is in fact evidence to support the strategy the group is considering. Consider consulting the [Cochrane Effective Practice and Organization of Care \(EPOC\) reviews](#)⁷² or searching for another systematic review on implementation strategies.
- Consider using columns 3-6 in [Template 8A](#), which includes suggested questions and 5-point rating scales, to document the group's ratings. Add or delete rows as necessary.

Template 8A Rating the proposed implementation strategies

(Table adapted from ^{7,16})

Priority barriers (from step 7)	Potential implementation strategies to address barrier (from group brainstorming)	How likely is it that the strategy will successfully address the barrier? (is there any external evidence that it works?)	How feasible is it to use the strategy in our context?	How resource intensive is the strategy?	Does the strategy address <i>multiple</i> identified barriers?
		Rate from 0-5 (0=not at all likely, 5=very likely)	Rate from 0-5 (0=not at all feasible, 5=very feasible)	Rate from 0-5 (0=resource intensive, 5=not resource intensive)	Y/N
Barrier 1 [specify]	Option 1 [specify]				
	Option 2 [specify]				
	Option 3 [specify]				
Barrier 2 [specify]	Option 1 [specify]				
	Option 2 [specify]				
	Option 3 [specify]				
Barrier 3 [specify]	Option 1 [specify]				
	Option 2 [specify]				

	Option 3 [specify]				
Barrier 4 [specify]	Option 1 [specify]				
	Option 2 [specify]				
	Option 3 [specify]				
Barrier 5 [specify]	Option 1 [specify]				
	Option 2 [specify]				
	Option 3 [specify]				

Step C – Select and summarize implementation strategies

- Review your ratings from [Template 8A](#).
- Highlight the implementation strategies that scored a 4 or 5 on each of the three criteria (likelihood of addressing barrier, feasibility, resource intensiveness).
 - These scores can help you prioritize which implementation strategies your team may want to select.
 - Also consider which strategies may address more than one barrier, as this may be an efficient and cost-effective way to tackle multiple barriers with one strategy.
- Document your selected implementation strategies.

TIPS for selecting implementation strategies⁹

Involve your partners. Your implementation strategies must be acceptable to the intended audience and be feasible in your setting—involving your partners is the best way to learn about the “fit” between the potential strategies and your setting.

Implementation strategies are not one-size fits all. Strategies should be selected and tailored based on two things: (1) the barrier you are targeting, and (2) the setting where you will be using the implementation strategy.

Think broadly. Be sure to consider the full range of implementation strategies, and not just the ones you have used previously. Don’t be afraid to try something new.

More does not necessarily mean better. It is okay to be selective about which implementation strategies you move forward with. Doing them all at once is likely not feasible, and it may not be more successful. It can be more efficient and effective to use fewer strategies that target your most significant barrier(s).

*If available to you, consider consulting with a student or professional with knowledge translation or implementation science expertise as you develop and refine your implementation strategies.

BORN Tip:

Audit and feedback is a common implementation strategy that can be used to give teams and individuals information on their performance related to a certain behaviour or practice recommendation. If your team chooses audit and feedback as an implementation strategy to address one or more of your barriers, BORN data and information can help you with this.

If you are working on a BORN dashboard key performance indicator, use the dashboard and associated reports to show the team how their practices are measuring up. If you are working on a different clinical practice, check whether there are any BORN data and/or clinical reports you can run on a regular basis to show team members where gaps remain.

Activity 8.2 Refine the selected implementation strategies

Now that you have identified some priority implementation strategies that will target your barriers in [Activity 8.1](#), it's time to think about how you will *action* these strategies in your setting and add them to your implementation work plan. To plan how each selected implementation strategy will actually happen, you can break each strategy down according to AIMD: Aims, Ingredients, Mechanism, Delivery.⁷³ By discussing these four elements, the working group can gain a clearer picture of what the implementation strategy will involve and how it will work in your setting.

[Template 8B](#) includes guiding questions for your working group to discuss and a place to document ideas for how implementation strategies will work and be executed.

Template 8B Breaking down implementation strategies by Aims, Ingredients, Mechanism, and Delivery

(Template informed by ^{16,73})

	Aims	Ingredients	Mechanism	Delivery
	<i>What do we want the implementation strategy to achieve? For whom? (link back to the identified barrier being addressed)</i>	<i>What comprises the implementation strategy?</i>	<i>How do we propose the implementation strategy works? (how will this strategy support people to do the new thing?)</i>	<i>How will we deliver the implementation strategy? (what format will be used, who is delivering it, to whom, when, and how?)</i>
Example implementation strategy – Audit and feedback	To increase physician awareness of caesarean birth rates as per KPI 4	Each month we will run the KPI 4 dashboard report and present it at team rounds	Increased awareness of poor KPI 4 rates → increased motivation to address	Nurse educator to run report and send to Chief of OB; Chief of OB to send to physicians using secure information transfer channels.
Selected implementation strategy 1				
Selected implementation strategy 2				
Selected implementation strategy 3				

[add rows as needed]				

Don't forget to add these activities to your implementation work plan! Be sure to document²:

- WHO: Determine which team members will be involved in developing the materials for each strategy and delivering each strategy
- WHAT: Determine what tasks and activities need to be completed to develop and deliver each implementation strategy. Ensure you secure the necessary resources for each strategy.
- WHEN: Determine how much time you need to develop each of the implementation strategies. Set target dates for rolling them out.

In the “Delivery” column of [Template 8B](#), the working group identified the particular format or mode that will be used. The working group will need to develop the materials and content for each strategy, which can take some time and will require a team effort. As you develop your implementation strategy materials, it is important to involve the end-users the strategies are targeting. For example:

- If you are developing **educational in-services** for nurses, work with nurses to develop the content and format of the in-service (or to adapt existing materials from reputable sources).
- If you are planning to have nurses **remind** physicians that inductions are typically not scheduled prior to 41 weeks without specific indications, work with both nurses and physicians to outline the steps and script to be used.
- If you are developing new **patient materials** on breastfeeding and supplementation, consult patients and families and ask them to review your drafts for feedback.

Involving end-users in co-developing the implementation strategies will increase the chances that they are acceptable, understandable, and feasible to use in your setting.

Tip: Consider consulting practice-specific toolkits for implementation strategy templates

Depending on the specific practice change you are targeting, there may be existing toolkits that provide templates for different implementation strategies. For example, The Provincial Council for Maternal and Child Health (PCMCH) has a [toolkit for the safe administration of oxytocin](#),⁷⁴ which includes templates for patient resources (e.g., pamphlet, handout), tools to enhance interprofessional team communication, a decision tree for healthcare professionals, safety checklists, and order sets and medication label templates. Such pre-existing templates can give the team a helpful starting point in developing the implementation strategy materials and content.

Although some practice-specific toolkits provide an array of templates for implementation strategies, we encourage you to stay focused on your selected implementation strategies that directly address your identified barriers (i.e., all the work you have done in Steps 7 and 8).

Tip: Learn from other sites

A lot can be learned from other sites. Throughout the implementation process, we encourage you to connect with other teams and sites who have already achieved the practice you are aiming for and/or have successfully implemented changes. You can learn a lot from the successes and challenges of other teams, and it can be helpful to build your support network of other organizations and individuals dealing with similar issues. Connecting with other organizations may also prevent you from re-creating the wheel.

A word of caution!

Each team and setting is unique and will have their own barriers and drivers to implementing a best practice. What worked for one organization will not necessarily work in your organization. Conversely, what *didn't* work for one organization may in fact be an effective approach in yours. As you have seen in this chapter, there is no such thing as a universally successful implementation strategy or a one-size-fits-all solution. What works best will depend on the specific change you are trying to make, the characteristics of the people who need to make the change, and the features of the setting where you are making the change.

As you talk to other teams and organizations about their similar organizations, compile the list of things they tried (both those that worked and those that did not work). Use those ideas in [Activity 8.1](#) and consider how the implementation strategies from other organizations could work in your setting to address your specific barriers. If your team decides to move forward with one of the ideas, talk to the other organization to see if they will share the materials they used so you aren't "re-creating the implementation wheel." Be sure to adapt as needed to best fit with your setting.

Regardless of which implementation strategies you end up choosing, there are general tips for maximizing their effectiveness. When possible, ensure your strategies are⁹:

- interactive for participants
- delivered synchronously
- customized to meet end-user needs
- customized to your identified barriers
- led by well-respected and credible individuals and groups
- accessible
- offered and used repeatedly, rather than "one-off" solutions

Activity 8.3 Pilot the implementation strategies

While your team may be eager to officially launch your change initiative, it is a good idea to consider "piloting" your implementation strategies before going full-scale. While it may not always be possible or feasible, it is especially important for change initiatives that are large-scale (e.g., changes that involve different teams and disciplines, changes that affect multiple units or teams across the organization).

Although your team has made efforts to be systematic and thorough in your planning, you cannot predict everything; despite best efforts, sometimes you don't know how well something works until you actually do it. A pilot can allow you to¹⁶:

- test out your procedures and processes
- see how your strategies are received by users
- identify challenges with rolling out your strategies
- modify and optimize your strategies before go-live

Although an extra step, in the long run, a pilot can save you time and resources, prevent reputational damage, and help prevent ineffective or failed implementation. It is a safe way to test out your team's ideas and plans when the stakes are lower.¹⁶ Piloting is also an important part of change management as it provides the affected groups and individuals with another opportunity to learn about and have a voice in the change process.

Many teams may be familiar with continuous improvement cycles, like Plan-Do-Study-Act (PDSA) cycles. Following PDSA is a great approach for testing out your implementation strategies as it allows you to test out part of your change initiative on a time-limited, smaller scale with select groups or people.

Template 8C below may be used to plan and document your PDSA cycle(s) and decisions. Remember that you may need to go through multiple PDSA cycles to test different implementation strategies or different adaptations of implementation strategies as you learn.

Template 8C Using Plan-Do-Study-Act (PDSA) to pilot implementation strategies

(Template informed by ^{7,75,76})

Implementation strategy (strategies) being pilot tested: _____			
Phase	Summary	Key questions	Document responses to questions
PLAN	Plan out your implementation strategy pilot	Who will deliver it?	
		Who will it be delivered to? (which groups, how many people?)	
		When will we deliver it? For how long?	
		What do we hope happens when we use this implementation strategy?	
		How will we know if the implementation strategy was successful? What are our “success criteria” we will measure? (e.g., # reached, satisfaction, acceptability, etc.)	
		How will we collect data to measure success? (e.g., chart audits, talking to people, attendance, etc.)	
DO	Put your pilot plan into action	What did we observe while piloting the implementation strategy?	
		Did everything go according to plan?	
STUDY	Synthesize and reflect on what you learned	How does what we observed compare to what we predicted?	
		What did we learn? (e.g., successes, challenges, unintended consequences)	

		Did we meet our success criteria? Why or why not?	
ACT	Decide if and how to refine the implementation strategy based on learnings	Will we adopt the implementation strategy as is? (i.e., no changes needed based on pilot results)	
		Do we need to adapt the implementation strategy? (i.e., make changes to refine it before full roll-out)	
		Should we abandon the implementation strategy (i.e., change the approach completely)	

Step 8 Summary checklist

Summary – how do we know we have successfully completed this step?

- ☐ We have reviewed at least one taxonomy of implementation strategies
- ☐ We have worked with key partners to:
 - ☐ Brainstorm implementation strategies for each priority barrier
 - ☐ Rated the proposed implementation strategies to identify which ones are likely to be successful and feasible
- ☐ We have selected which implementation strategies to use
- ☐ We have operationalized each implementation strategy by considering AIMD: aims, ingredients, mechanisms, and delivery
- ☐ We have added the implementation strategies (development and delivery) to the implementation work plan
- ☐ We have pilot tested the implementation strategies
- ☐ We have documented our findings and decisions

Step 9 Develop a monitoring plan

What is this step?

By this point, your working group has selected the change initiative it intends to implement, determined barriers and drivers to implementation, and developed and tested implementation strategies to overcome priority roadblocks. In this step, the team will create a monitoring plan that identifies how the working group will track (1) uptake of the best practice, and (2) delivery and usefulness of the implementation strategies. **Monitoring** involves collecting information while your change initiative is happening (i.e., starting right after launch), which allows you to continuously track adherence to the new practice and make course corrections to your implementation strategies as needed. By the end of this step, your team will have a concrete plan for monitoring the change process.

Note that while this section focuses on monitoring adherence to the best practice and your implementation strategies, longer-term *evaluation* of the outcomes of your practice change initiative will be covered in [Step 10](#).

Why is this step important?

Monitoring is essential for:

- Understanding whether (and how well) people are doing the best practice
- Understanding whether your implementation strategies were delivered as planned and are working well (or not)
- Identifying emergent (new) barriers that need to be addressed
- Informing tailored course corrections

The information you collect in your monitoring activities can be used to improve implementation processes in your current change initiative and inform future change initiatives too.

Considerations for equity, diversity, and inclusion

(some questions adapted from ³⁵)

As you review and complete this step, keep these equity-focused questions in mind:

- Who was involved in developing the monitoring plan?
- Did we use an inclusive process to define measures of success?
- Do our monitoring questions reflect equity considerations?
- Will we explore if and how different groups experience and are affected by the practice change initiative? Do we need different monitoring questions for different groups?
- Will we collect any information on socio-demographic factors and/or disaggregate the data when analyzed? If so, how will we collect this information safely and present it in a way that does not cause harm?
- How can we use the findings from our monitoring activities to take steps to counter any identified inequities?

Monitoring involves collecting information while your change initiative is happening, which allows you to track whether people are using the best practice (and how well), assess if and how your implementation strategies are working, learn about emergent barriers that were not previously

identified in [Step 7](#), and make course corrections as needed. It is important to monitor two different things:

1. The adherence or “uptake” of the change (i.e., are people following the best practice recommendation? To what extent?)
2. The implementation strategies (i.e., are they being executed and working as planned? Are changes needed?)

Activities [9.1](#) and [9.2](#) will help the working group discuss how these two aspects will be monitored and develop a plan to do so. Note that although we are presenting “monitoring adherence to the best practice” first and “monitoring implementation strategies” second, these activities could be reversed or done simultaneously. This will be a decision for the working group to make once the monitoring plans are developed, depending on the timelines for data collection.

Activity 9.1 Explore how to monitor adherence to the best practice

Once you launch your practice change initiative, the working group will need to be monitoring whether people are in fact using the best practice. While the working group may be tempted to think this is a simple assessment (i.e., people are doing the best practice or people are not doing the best practice), in reality, the working group will need to take a much more nuanced approach in this activity.

In most cases, it will be unrealistic to expect 100% adherence to the best practice. You may see “partial” adherence where healthcare providers follow some elements of the best practice but not all, or perhaps they follow the best practice perfectly but only with some patients. Partial adherence is often legitimate (e.g., due to patient preferences or contextual factors); however, the working group will need to decide on a reasonable “threshold” of adherence and be attentive to the reasons why best practice is not being followed.¹⁶ Keep in mind there is no universal threshold for adherence; this will depend on your specific best practice, your starting point, and your context.

Furthermore, the working group needs to consider different “aspects” of adherence to the best practice. One way to break down the different aspects of adherence is to use AACTT (**A**ctor, **A**ction, **C**ontext, **T**ime, and **T**arget),⁴⁹ which was introduced in [Step 5](#). Monitoring for use of the best practice essentially means collecting information to determine whether the right “Actors” are doing the right “Action” in the right “Context” at the right “Time” to the right “Target.” [Table 4](#) uses the example from Step 5 to illustrate how adherence can be broken down by AACTT and key questions for the working group to consider when determining their thresholds for success.

Table 4. How to monitor adherence to the best practice (components of adherence and key questions to consider)

Guideline recommendation being implemented (as written in Activity 5.1): Nurses provide a minimum of one breastfeeding education session prior to discharge home according to hospital guidelines to all people in the mother-baby unit who intend to breastfeed			
AACTT components and example from 5.1		Description	How will we monitor whether this is happening?
Action (the “what” and the “how”)	Provide breastfeeding education according to hospital guidelines	Were all the components of the best practice delivered?	- Think about what proportion of the best practice “ingredients” need to be delivered for the team to feel the best practice recommendation was in fact used. - Example: What specific content needs to be delivered to patients for the team to be satisfied that “breastfeeding education” was in fact delivered? If the hospital guidelines outline 10 key topics to include, how many must be delivered to the patient?
Actor (the “who does it”)	Nurse	Are the people who were supposed to “do” the best practice doing it?	- Think about how many nurses need to be following the best practice for the team to feel the best practice is being adhered to. - Example: If 60% of the nurses on the mother-baby unit are following the recommendation, would the team feel the best practice is being adhered to?
Context (the “where” and “under what conditions”)	Mother-baby unit	Is the best practice being done in the right setting and under the right conditions?	- Think about the physical location and/or the social settings under which the best practice should be done. - Example: In this case, we are interested in people who intend to breastfeed who are in the mother-baby unit, but are there specific conditions or situations that apply to using the best practice? For example, if the hospital policy indicates that breastfeeding education should be delivered with the birthing person’s partner or support person present, would the team still be adhering to the best practice if education was offered without supports present?
Target (the “who receives it”)	People who intend to breastfeed	Did the people who were eligible to receive the best practice receive it?	- Think about what proportion of your target population you need to receive the best practice for the team to feel there was sufficient adherence. - Example: If 75% of people who intended to breastfeed were provided with a breastfeeding education session, would that be considered sufficient adherence to the best practice?
Time (the “when” and “how often”)	At least once; before discharge home	- Was the best practice done at the right time? - Was the best practice delivered as many times as recommended?	- Think about when the best practice is being completed and if the timing is closely aligned with the recommended timing. If the best practice needs to be done at multiple time points, think about how well the desired frequency needs to align with the actual frequency for the team to feel the best practice is being adhered to. - Example: If 80% of people who intend to breastfeed are receiving breastfeeding education prior to discharge, is that sufficient for the team to say the best practice is being adhered to?

As the working group discusses the different adherence components (AACTT), you will also need to consider how you can actually measure it. This includes formulating an indicator (re-visit [Activity 4.2](#) for reminder on “SMART” criteria), your target threshold for success, and your data sources and collection methods. Sometimes collecting data to measure adherence will be quite straightforward (e.g., looking in a chart to see if a simple intervention was done – yes or no), whereas others will require more thinking (e.g., determining whether all or some components of an intervention were delivered if they are not routinely documented in detail in the patient chart).

There are several data sources and methods your team can use to monitor adherence to the best practice over time, for example:

- **Consult with people expected to use the best practice.** Make it a regular huddle topic, make it an agenda item at a team meeting, or book a time to meet 1:1 with different people. Ask them about their current practice and if they are doing things differently. Be sure to also talk to patients and families to ask what they are experiencing to see if the new practice is being done.
- **Observe what is happening in practice.** Observe the practice occurring in your setting and listen to how people describe current practices in team meetings and at huddles and consider how this aligns with the change you are implementing.
- **Use clinical data and chart audits.** Depending on the type of change initiative, it may be helpful to look at clinical data at regular intervals to get a sense of whether you are seeing an uptake in the new practice. Consider developing a simple form to document your findings from the chart audit to capture essential information in a standardized way.
 - **Audit and feedback:** Share this information with specific teams and individuals to highlight successes and areas for improvement. If you are using a BORN dashboard, you can simply use the red-yellow-green visual to show your team’s adherence to the best practice over time. If you are not using the dashboard, you may choose to manually create a simple table or visual to demonstrate adherence rates. Regularly feeding back this information to the team is in fact another implementation strategy that may promote uptake of the best practice.

BORN Tip:

The BORN Information System contains the BORN dashboards and numerous reports that can be used for monitoring different clinical practices and outcomes, as well as for audit and feedback. There are many BORN clinical reports that look at specific indicators and easily allow you to see where you are excelling as well as areas for improvement. BORN reports can also be used to identify missing data; this can help your team improve data capture and give you more complete and accurate information for your monitoring efforts.

Use [Template 9A](#) to document your plan for monitoring adherence to the best practice. As you plan your timelines, consider how much time needs to pass before you would have sufficient data to assess adherence. The template includes an example to illustrate sample questions, indicators, success criteria, and measurement plans for each AACTT dimensions.

Template 9A Plan for monitoring adherence to the best practice

Example: Nurses provide a minimum of one breastfeeding education session prior to discharge home according to hospital guidelines to all people in the mother-baby unit who intend to breastfeed							
AACTT component	Questions about adherence to the best practice	Indicator(s)	What is our “success” criteria?	Data sources and collection methods	Responsible	Timeline	
	What do we want to know about if/how people are adhering to the best practice?	Write a statement that could measure this outcome	What is our target?	How can we collect data on this? From whom or where will we find this data?	Who is responsible for collecting this data?	When will this data be collected?	Is there a need to collect baseline data?
Action	Did the nurses deliver all the breastfeeding education content as described in hospital guidelines?	Proportion of required content (as per hospital guidelines) covered in breastfeeding education sessions.	100% of breastfeeding education sessions cover >9/10 topics (90%)	A sample of 10% of breastfeeding education sessions will be observed. Checklist to be used to document the number of topics covered.	Nurse educator to conduct observations.	Data to be collected quarterly – every 3 months after launch.	Yes – collect baseline data 2 weeks before launching implementation strategies.
Actor	How many nurses (what proportion) are following the best practice?	Proportion of nurses that are delivering breastfeeding education to their eligible patients.	>90% of nurses are delivering breastfeeding education to >90% of their eligible patients.	Eligible patient charts will be reviewed to identify who received breastfeeding education.	Nurse on working group to review eligible patient charts.	Data to be collected quarterly – every 3 months after launch.	Yes – collect baseline data 2 weeks before launching implementation strategies.
Context	Is breastfeeding education being offered with partners or key supports present? (as per hospital policy)	Proportion of breastfeeding education sessions that are delivered with the partner or key support present.	>75% of breastfeeding education sessions are done with the birthing person’s partner or key support present (if desired).	Eligible patient charts will be reviewed to identify who received breastfeeding education.	Nurse on working group to review eligible patient charts.	Data to be collected quarterly – every 3 months after launch.	Yes – collect baseline data 2 weeks before launching implementation strategies.
Target	How many people who intended to breastfeed (what proportion) received breastfeeding education?	Proportion of people who intend to breastfeed that received ≥1 breastfeeding education session before discharge.	>90% of people who intend to breastfeed received ≥1 breastfeeding education session before discharge.	Eligible patient charts will be reviewed to identify who received breastfeeding education.	Nurse on working group to review eligible patient charts.	Data to be collected quarterly – every 3 months after launch.	Yes – collect baseline data 2 weeks before launching implementation strategies.
Time	How many people who intended to breastfeed (what proportion) received at least 1 breastfeeding education session before discharge?						
[Insert best practice recommendation being implemented, as per Template 5A]							
Action							
Actor							
Context							
Target							
Time							

It is important to keep “use” at top of mind; the data you collect on adherence will provide critical guidance on if and how to intervene to improve use of the best practice. For example:

- If **A**ction is low (e.g., only 50% of the required intervention elements are being delivered) → What is preventing healthcare providers from delivering all intervention elements? Could it be related to failures/limitations in the implementation strategies? What other factors might be involved? What can be done to help providers deliver the best practice as intended?
- If **A**ctor is low (e.g., only 40% of healthcare providers are using the best practice) → What is preventing the other providers from using the best practice? Could it be related to failures/limitations in the implementation strategies? What other factors might be involved? What can be done to help them start doing it?
- If **T**ime is off (e.g., the best practice is being done at the right time only 25% of the time) → What is preventing healthcare providers from completing the best practice at the recommended time? Could it be related to failures/limitations in the implementation strategies? What other factors might be involved? Is it something that can be adjusted?

Essentially, the findings from adherence monitoring can be the trigger for the working group to engage in root cause analyses (i.e., what is the issue that is causing these findings?), which may ultimately lead to adjustments to your implementation strategies (covered in [Activity 9.2](#)).

The working group should also plan to use the adherence monitoring findings to acknowledge challenges and celebrate improvements and successes with the larger team. Seeing progress and being acknowledged for hard work can be a motivator to keep moving forward.

Activity 9.2 Explore how to monitor the implementation strategies

In addition to how you will monitor uptake of the best practice (described above), the working group should also plan for how to monitor your implementation strategies from [Step 8](#). For example, let’s say to address a barrier of lack of knowledge, the team is using *educational in-services* as an implementation strategy. Monitoring this implementation strategy would mean that the team is continually assessing things like: Are the right people attending the in-services? How many people have been reached? Is the curriculum being delivered as planned? Are staff acquiring the required knowledge from the in-service?

Monitoring your implementation strategies is important for several reasons:

- Uptake of the best practice may be lower than you expected. In this case, it will be important to understand if uptake may be low due to:
 - The implementation strategies being delivered poorly (in this case, the team will need to improve implementation strategy delivery); or
 - The implementation strategies are ineffective (in this case, the team will need to learn whether there are new barriers that were not previously identified; the team will then need to develop new implementation strategies to target these emergent barriers).
- Assessing how your implementation strategies are being used and whether they are achieving the desired outcomes can inform tweaks to your approach, which can help with sustaining your change over time.
- Learning what worked well and what did not work well with implementation can be helpful as you plan for future practice change initiatives.

One approach to develop your plan for monitoring your implementation strategies is to start by going back to your planned list of strategies from [Step 8](#). For each implementation strategy, consider the following factors: content, frequency, duration, coverage, quality of delivery, participant responsiveness,

and outcomes of the implementation strategy.⁷⁷ If any of these factors are sub-optimal, it may ultimately affect the effectiveness of your implementation strategy to promote uptake of the best practice recommendation. Or conversely, if you confirm that the implementation strategy was delivered optimally and as planned, but you still see poor uptake of the best practice recommendation, then it may be a signal that the implementation strategy is not working as planned. [Table 5](#) provides a brief description, guiding questions, and considerations for each of these factors, and provides examples based on an implementation strategy of audit and feedback using the BORN dashboard.

Table 5. Factors to consider when monitoring implementation strategies

Factor (related to implementation strategy)		Description	Considerations
Adherence to the implementation strategy	Content	Did you deliver the components of your implementation strategy that you planned to deliver?	- Think about what proportion of implementation strategy “ingredients” need to be delivered for the team to feel the strategy was delivered effectively. - Example: If you planned to show physicians the full dashboard report, but due to time limitations, they only saw the colored signal, would that content be considered sufficient to bring about the desired practice change?
	Frequency	Did you deliver the implementation strategy as many times as you planned?	- Think about how closely your actual frequency needs to align with your planned frequency for the team to feel the strategy was delivered effectively. - Example: If you planned to show the physicians the dashboard report quarterly, but it was only shown semi-annually, would the frequency be considered sufficient to bring about the desired practice change?
	Duration	Did you deliver the implementation strategy for as long as you planned?	- Think about how closely the actual duration needs to align with your planned duration for the team to feel the strategy was delivered effectively. - Example: If you planned to spend 30 minutes reviewing the dashboard information with physicians, but you only had 15 minutes, would that duration be considered sufficient to bring about the desired practice change?
	Coverage	Did the implementation strategy reach the people who planned to reach?	- Think about what proportion of your target population your implementation strategy needs to reach for the team to feel there was sufficient coverage. - Example: If you planned to reach all physicians but only 75% attended the meeting, would that be considered sufficient coverage to bring about the desired practice change?
Factors that may influence adherence to the implementation strategy	Quality of delivery	Was the implementation strategy delivered in a high-quality way?	- Think about the features that would make your team feel that the implementation strategy was delivered in a high-quality (versus low-quality) way. - Example: High-quality delivery of sharing the dashboard reports with physicians may mean having someone respected deliver the information, having them clearly explain what the information is saying, and having effective facilitation skills to prompt and manage discussion.
	Participant responsiveness	Were the participants on the receiving end of the implementation strategy interested in and responsive to it?	- Think about how you would know that participants were engaged in the implementation strategy. - Example: When sharing the dashboard reports, you may be looking to see how many people are asking questions and contributing to the discussion as an indicator of engagement in the session.
Results achieved by using the implementation strategy	Outcome(s) of the implementation strategy	Did the implementation strategy achieve what it was meant to achieve?	- Think about what you were hoping this implementation strategy would achieve; refer back to Template 8B where you identified the “mechanism,” or how the strategy would help people to do the new practice. - Example: Sharing the dashboard reports was meant to increase awareness of poor rates, which in turn would increase physicians’ <i>motivation</i> to improve their practice. Consider how and when you would measure the concept of “motivation” to determine whether your strategy is in fact increasing motivation as planned.

Similar to what you did in [Activity 9.1](#), the working group needs to create a plan for what will be measured (and how) for each implementation strategy. Again, this will involve writing indicators following SMART criteria (see [Activity 4.2](#)), setting a target threshold for success, and identifying what data you will collect from where or whom and when. Several of the data sources and methods described in Activity 9.1 may also apply to monitoring your implementation strategies as well. Examples include:

- **Consult with people on the receiving end of the implementation strategy.** Make it a regular huddle topic, make it an agenda item at a team meeting, or book a time to meet 1:1 with different people. Ask them about their experience with the implementation strategy and what they think is working well or not.
 - **Questionnaires.** Consider administering paper-based or online questionnaires to people on the receiving end of the implementation strategy to assess satisfaction or anticipated outcomes such as changes in knowledge, attitudes, or motivation. Use existing validated tools and questions where possible.
- **Observe what is happening during use of the implementation strategy.** As the implementation strategy is being delivered, observe what is happening. Are people interested and responsive? Are all components of the strategy being delivered as planned and in a high-quality way?
- **Document the implementation strategies used and their reach and uptake.** The project team should keep track of what implementation strategies were used, how many people were reached by those activities, and whether the intended target audience was reached. Document when the strategies were used, how long they lasted, and how often they were offered. Document any feedback you received on the implementation strategies (e.g., related to satisfaction, acceptability, feasibility, etc.).

Use [Template 9B](#) to document your plan for monitoring the implementation strategies you identified in Step 8. As you complete this template, it may be helpful to re-visit [Activity 8.2](#) where you started to break down your selected implementation strategies. As you plan your timelines, consider that it is typically best to monitor your implementation strategies in real-time (i.e., as close to when they are used as possible). The template includes an example to illustrate sample questions, indicators, success criteria, and measurement plans for each of the described factors. This will be a living document that can evolve post-launch as you engage in monitoring activities and identify new ways to watch for progress.

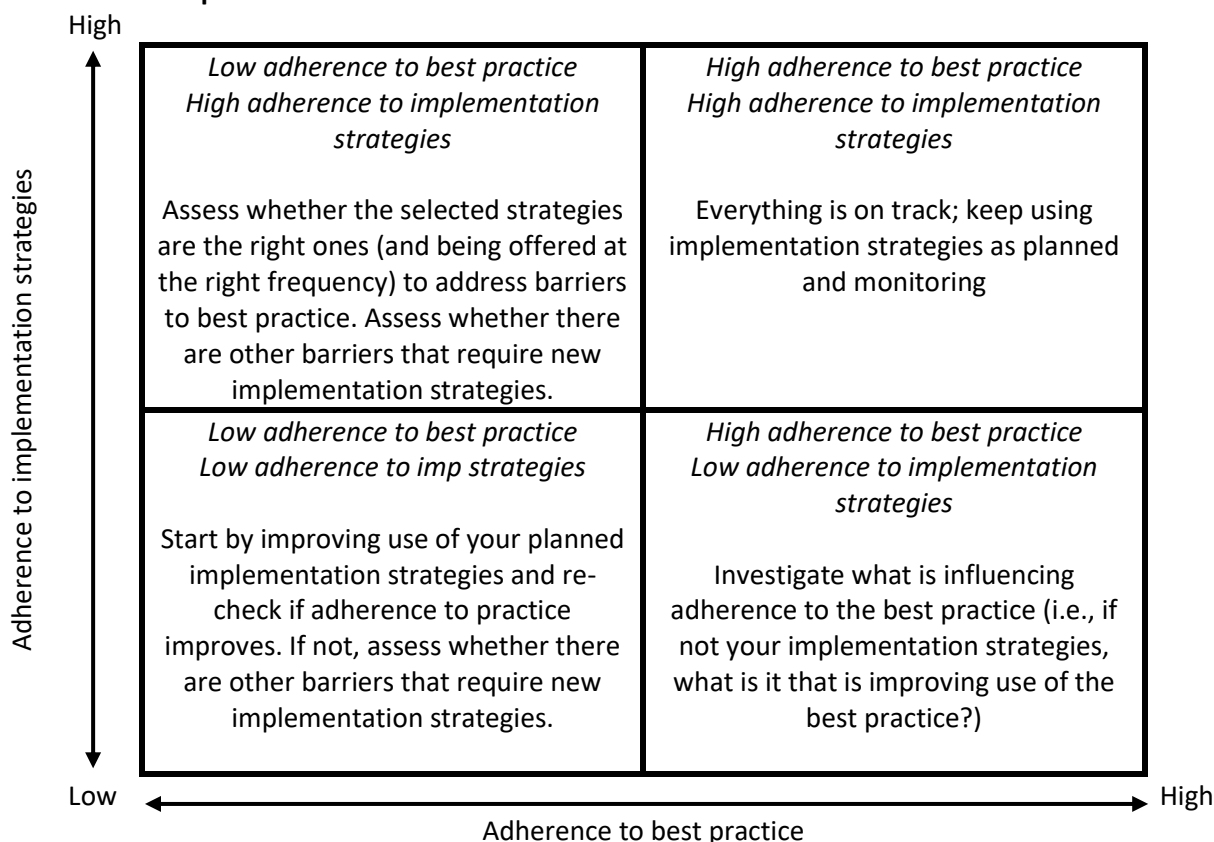
Template 9B Plan for monitoring implementation strategies

Factor	Implementation monitoring questions	Indicator(s)	Success criteria	Data sources and collection methods	Responsible	Timeline		Resources
<i>Related to implementation strategy</i>	<i>What do we want to know about our implementation strategy?</i>	<i>Write a statement that could measure this outcome</i>	<i>What is our target?</i>	<i>How can we collect data on this? From whom or where will we find this data?</i>	<i>Who is responsible for collecting this data?</i>	<i>When will this data be collected?</i>	<i>Do we need to collect baseline data?</i>	<i>What additional resources do we need?</i>
<i>Example: Train nurses on optimal techniques for newborn blood spot screening (with an initial training session and a 6-month refresher session)</i>								
Content	Did the trainers deliver the training content and activities as planned?	Proportion of training sessions that cover the planned training content.	>90% of training sessions cover 100% (5/5 topics) of the planned training content.	Observations during training sessions that are documented on a checklist with the 5 core topics.	Working group member	During each training session	No	None
Frequency	How many training sessions were offered?	Proportion of planned training sessions that were delivered.	100% of planned sessions offered.	Date of all planned and delivered sessions to be documented in project logs.	Nurse educator leading training sessions	At time of booking training and after each session offered.	No	No
Duration	Did each training session last for as long as planned?	Proportion of training sessions that lasted between 1.5-2 hours (required time to deliver content)	100% of training sessions offered last between 1.5-2 hours.	Nurse educator offering session to document the start and end time for each session in the project log.	Nurse educator leading training sessions	At end of each training session.	No	None
Coverage	What proportion of the nurses attended the training sessions?	Proportion of nurses that attended 1 session.	>90% of nurses attend the initial training and	Attendance logs	Nurse educator conducting training sessions	At time of each training session	No	None
	Did the nurses receive as many training sessions as planned?	Proportion of nurses that attended 2 sessions.	>80% of nurses attend the refresher training					
Quality of delivery	Was the training delivered in a clear and engaging way?	Proportion of training sessions delivered in an interactive format with a minimum of 3 hands-on activities per session.	>95% of training sessions delivered with a minimum of 3 hands-on activities per session.	Observations during training sessions that are documented on a checklist.	Working group member	During each training session	No	None
		Proportion of nurses reporting they were	>75% of nurses report they were satisfied or very	A paper-based questionnaire will be developed and	Nurse educator offering	At the end of each training session.	No	None

Factor	Implementation monitoring questions	Indicator(s)	Success criteria	Data sources and collection methods	Responsible	Timeline		Resources
<i>Related to implementation strategy</i>	<i>What do we want to know about our implementation strategy?</i>	<i>Write a statement that could measure this outcome</i>	<i>What is our target?</i>	<i>How can we collect data on this? From whom or where will we find this data?</i>	<i>Who is responsible for collecting this data?</i>	<i>When will this data be collected?</i>	<i>Do we need to collect baseline data?</i>	<i>What additional resources do we need?</i>
		satisfied with training.	satisfied with training.	distributed to participating nurses.	training sessions.			
Participant responsiveness	Were training participants actively participating in the sessions?	Proportion of participants that asked a question or contributed to the discussion.	>50% of training participants asked a question or contributed to discussion.	Observations during training sessions, with number of contributing participants documented in project log.	Working group member	During each training session	No	None
	Were training participants satisfied with the training?	Proportion of nurses reporting they were satisfied with training.	>75% report being satisfied on post-training feedback form	A paper-based questionnaire will be developed and distributed to participating nurses.	Nurse educator offering training sessions.	At the end of each training session.	No	None
Outcome(s) of the implementation strategy	Did training participants demonstrate increased knowledge of how to obtain blood spot?	Proportion of training participants who achieve a score of at least 80% on post-training knowledge quiz	100% of training participants achieve a score of at least 80% on post-training knowledge quiz	A paper-based knowledge quiz will be developed and distributed to participating nurses.	Nurse educator offering training sessions.	At the end of each training session.	Yes – pre-test to be administered 2 weeks prior to training launch	None
	Did training participants demonstrate increased proficiency in obtaining blood spot?	Proportion of training participants that demonstrate increased proficiency obtaining newborn blood spot.	>90% of trained nurses demonstrate the taught techniques.	A sample of 25% of trained nurses will be observed obtaining a newborn blood spot within 2-weeks of training. Checklist to be used to document observations.	Nurse educator	Within 2 weeks of training	Yes - sample of 25% of nurses will be observed obtaining a newborn blood spot 2-weeks prior to training launch. Checklist to be used to document observations.	None
Implementation strategy (list from step 8): [insert]								
Content								
Frequency								
Duration								
Coverage								
Quality of delivery								
Participant responsiveness								
Outcome(s) of the								

As the working group collects information on the implementation strategies, it should be interpreted alongside the monitoring data related to adherence in [Activity 9.1](#), since the findings are interrelated and both inform next steps. [Figure 4](#) shows the potential intersections of your monitoring findings related to adherence to the best practice and implementation strategies, and potential next steps.

Figure 4. Relationships between adherence to best practice and implementation strategies and potential next steps



More information and examples are provided in [Step 13](#) on how to use your monitoring findings to inform changes as needed and contribute to sustainability of your practice change initiative.

Step 9 Summary checklist

Summary – how do we know we have successfully completed this step?

- ☐ We have worked with key partners to develop our monitoring plans
- ☐ We have considered how we will monitor for uptake of the best practice recommendation, including adherence according to our AACTT breakdown (Action, Actor, Context, Target, Time)
- ☐ We have considered how we will monitor our implementation strategies, including content, frequency, duration, coverage, quality of delivery, participant responsiveness, and outcome(s) of the implementation strategy
- ☐ We have identified when, where, and how we will collect the information for each monitoring indicator
- ☐ We have identified our “success” thresholds for each monitoring indicator
- ☐ We have documented our plan for monitoring adherence to the best practice
- ☐ We have documented our plan for monitoring our implementation strategies

Step 10 Develop an evaluation plan

What is this step?

In the previous step, your working group developed a plan for *monitoring* (1) whether people are adhering to the best practice and (2) whether your implementation strategies are being used and working as planned. In this step, the team will now start planning how to **evaluate** the effects of your practice change. Evaluation involves collecting, analyzing, and synthesizing data to make conclusions about the *outcomes* of your change initiative. By the end of this step, your team will have a concrete plan for how you will determine whether the implementation of your best practice recommendation has actually made a difference in outcomes for patients and families, healthcare professionals, and your organization.

Why is this step important?

Evaluation can be overwhelming and new for some teams. Teams often have the best of intentions to evaluate, but without a solid evaluation plan developed *before* implementation, this step can easily be overlooked.

Evaluation is essential for:

- Understanding whether you achieved the outcomes you planned for
- Judging whether the practice change is providing sufficient benefit to keep practicing this way
- Providing justification for maintaining momentum and resource investment

Considerations for equity, diversity, and inclusion

(some questions adapted from ³⁵)

As you review and complete this step, keep these equity-focused questions in mind:

- Who was involved in developing the evaluation plan?
- Did we use an inclusive process to define measures of success?
- Do our evaluation questions reflect equity considerations?
- Will we explore if and how different groups experience and are affected by the practice change initiative? Do we need different evaluation questions for different groups?
- Will we collect any information on socio-demographic factors and/or disaggregate the data when analyzed? If so, how will we collect this information safely and present it in a way that does not cause harm?
- How can we use the findings from our evaluation activities to take steps to counter any identified inequities?

While the monitoring plans you developed in [Step 9](#) will allow you to assess the uptake of your change and implementation strategies in “real time”, your team should also plan for an outcome evaluation to make conclusions about the impact of your practice change initiative. This evaluation is typically done when your project has been fully implemented and sufficient time has passed to allow for short-, medium-, and long-term outcomes to be observed. An outcome evaluation helps you answer the question, “What happened (resulted/changed), if anything, because of this practice change initiative?” This information allows you to make judgements about the value of your practice change initiative and can tell you whether the practice change is providing sufficient benefit to justify continuing practicing this way.

In general, conducting an outcome evaluation typically involves asking questions such as^{78,79}:

- To what extent did the program achieve its short-term outcomes?
- To what extent did the program achieve its medium-term and long-term outcomes?
- Who is experiencing positive outcomes from the change, in what ways, and in what circumstances?
- Were there any unintended outcomes? (positive or negative)
- To what extent can we attribute outcomes to the change initiative?
- What other factors may have influenced the outcomes we saw?

What outcomes can we evaluate?

Outcomes can be measured at multiple levels including for patients and families, healthcare professionals and staff, and the unit or organization. You can start by thinking about what outcomes you wanted to achieve when you started this process (like you did in [Activity 5.2](#)), and then work backwards.⁴ Example outcomes include^{7,9}:

For patients and families

- Changes in health status (e.g., mortality, level of acuity, infant health outcomes such as hyperbilirubinemia or weight gain, maternal outcomes such as postpartum hemorrhage or infection)
- Quality of life
- Satisfaction with care

For healthcare professionals

- Workplace satisfaction
- Improved interdisciplinary team functioning
- Staff retention
- Decreased burnout

For the organization

- Admissions/readmissions
- Adverse events
- Length of stay
- Wait times
- Hospital costs
- Access to care
- Organizational culture

As you select outcomes to assess, consider selecting indicators at multiple levels where possible to understand the impact of your change initiative on different groups.

Tips for developing your evaluation plan³

(*These tips may also apply to developing your monitoring plans in [Step 9](#)!)

- **Be clear about the purpose.*** Consider what is critical to know about the practice change initiative within your time and resources.
- **Involve potential users of the findings and identify what they want to learn.*** Consider what evaluation questions are most important to your key partners and other interested and affected parties. Also consider information you may want to include in interim or final reports to the team, leadership, and/or funders.

- **Identify who is responsible for what.*** Consider what evaluation activities will be done by the working group and what activities could benefit from involving others with evaluation experience and skills (e.g., evaluation consultants, researchers, students).
- **Establish a timeline in advance.*** Consider what baseline and post-implementation data need to be collected and when it will be collected. Carefully planned timelines will ensure you collect the right data at the right time and not overburden healthcare professionals, patients, and families.
- **Ensure your data sources and collection methods are feasible.*** Consider what data are available to your team or is easy to collect, the skillset of your team to collect, analyze, and interpret data, and the time and resources you have. Make use of your team’s skillset and any existing data infrastructure you have (e.g., BORN data and reports, chart data, existing patient satisfaction questionnaires).
- **Ensure compliance with privacy regulations.*** Consider how data will be kept or shared to ensure confidentiality. Ensure that all data collected comply with privacy guidelines or regulations in your organization and jurisdiction.
- **Document your plan.*** A carefully documented plan will facilitate activation of the evaluation post-launch and provide a record describing why and how the evaluation was designed.
- **Consider whether additional approvals are necessary.*** Most evaluations of practice change initiatives will be considered “quality improvement” because they are being conducted to inform local decision-making. However, if the working group is aiming to produce knowledge to generalize to other settings, consider consulting with your organization’s research ethics board and ensure you have appropriate approvals in place.¹⁶

Activity 10.1 Develop an evaluation plan for your practice change initiative

Creating an evaluation plan requires consideration of the evaluation questions, indicators that can measure your evaluation questions, your data sources, and collection methods for each indicator, which we briefly describe below.

A) Develop your evaluation questions.

- Your evaluation questions should directly reflect the goals and objectives of your practice change initiative. Go back to your brainstorming in [Activity 5.2](#) where you identified the anticipated short-, medium-, and long-term goals of your practice change initiative; take these statements and transform them into the questions you hope your evaluation will answer.
- Your working group may also want to answer the following question together to generate other evaluation questions: “What do we hope to know at the end of this evaluation that we don't know now?”⁷⁸
- Depending on the number of questions, you may need to prioritize which are the most important, yet feasible to answer. It’s common to have anywhere from 3 to 10 evaluation questions.⁸⁰

B) Transform your evaluation questions into indicators.

- While your evaluation questions illustrate *what* you want to know, you now need to transform them into statements that are measurable. In [Activity 4.2](#), we discussed how a good indicator needs to follow “SMART” criteria: Specific, Measurable, Attainable, Relevant, and Time-bound.
- For each evaluation question, draft one or more indicators (following SMART criteria) that could be used to answer the evaluation question.

C) Identify the data sources and data collection methods for each indicator.

- Just like the “M” for measurable in SMART, you now need to identify your data sources (*where* you will get the information from) and data collection methods (*how* you will collect the information).
- The Ontario Centre of Excellence for Child and Youth Mental Health has a helpful [summary of common data collection methods](#)⁸¹ and the pros and cons of each.
- Common data sources and data collection methods include⁸²:

Example data sources		Example data collection methods
Categories	Examples	
Existing information	• Project team documents (e.g., planning documents, meeting minutes, attendance logs, project records, emails, etc.) • Clinical and administrative databases (e.g., BORN Ontario) • Patient health records	• Chart audits • Checklists • Reports and extracts from datasets • Document review
People	• Individuals expected to use the best practice • Working group members • Key partners (i.e., those supporting the project team to implement the change initiative) • Patients and families whose care is affected by the change initiative • Leadership • Funders	• Interviews • Focus groups • Questionnaires • Meetings • Observations • Checklists

BORN Tip:

As you work on your evaluation plan and consider which outcomes you will assess, connect with your BORN Regional Coordinator to discuss what BORN data is available to help you assess what difference your practice change initiative has made.

[Template 10A](#) provides a space to document your evaluation questions, indicators, data sources, and methods. Also consider documenting who is responsible for data collection, when the data needs to be collected, and any additional resources you need.

Template 10A Outcome evaluation planning matrix*(Template adapted from ^{3,6)})*

OUTCOME EVALUATION PLANNING MATRIX								
<i>*Consider short-, medium-, and long-term outcomes at the level of patient/family, healthcare professionals/staff, unit, and organization</i>								
Evaluation question	Indicator(s)	Success criteria	Data collection methods	Data sources	Responsible	Timeline		Resources
<i>What do we want to know?</i>	<i>Write a statement that could measure this outcome</i>	<i>What is our target?</i>	<i>How can we collect data on this?</i>	<i>From whom or where will we find this data?</i>	<i>Who is responsible for collecting this data?</i>	<i>When will this data be collected?</i>	<i>Is there a need to collect baseline data?</i>	<i>What additional resources do we need?</i>
Patient & family outcomes								
Are more patients exclusively breastfeeding their infants upon discharge?	Proportion (%) of patients who leave the hospital exclusively breastfeeding (excluding those with a medical indication for formula supplementation) in last quarter.	≥75% of patients leave the hospital exclusively breastfeeding (excluding those with medical indication for supplementation)	BORN dashboard	We will access the BORN dashboard reports for KPI 3	Nurse manager to retrieve dashboard reports on quarterly basis	Baseline Then quarterly	Yes (to compare pre- and post- change in rates)	None – using existing dashboard system
Healthcare professional outcomes								
Are nurses feeling more confident offering breastfeeding education to patients and families?	Proportion (%) of postpartum unit nurses who state they are “confident” or “very confident” offering breastfeeding education in past 6 months.	≥80% of nurses state they are confident or very confident	Survey	We will develop and send a brief electronic survey to all postpartum unit nurses. We will use a scale to assess confidence.	The nurse educator will develop, pilot test, and send the survey.	Baseline 6 months and again at 12 months	Yes (compare to baseline data collected pre-implementation to assess whether confidence has increased since starting the change initiative)	Access to a survey platform
Organization (health system) outcomes								
Are fewer patients returning to the hospital for breastfeeding support?	Proportion (%) of patients who return to the hospital for breastfeeding support in last 6 months.	<10% of patients returning to hospital for breastfeeding support	Document review	Breastfeeding clinic administrative data	Nurse manager to review clinic data	Baseline Then 6 months and 12 months	Yes (to compare pre- and post- change in rates)	None – using existing documentation systems
<i>[add rows as needed]</i>								

More information and examples are provided in [Step 13](#) on how to use your evaluation findings to inform changes as needed and contribute to sustainability of your practice change initiative.

Step 10 Summary checklist**Summary – how do we know we have successfully completed this step?**

- ☐ We have worked with key partners to develop our evaluation plan
- ☐ We have considered short-, medium-, and long-term outcomes at the levels of patients and families, healthcare professionals and staff, and the unit and organization
- ☐ We have identified the priority evaluation questions we need to answer to understand if our practice change initiative made an impact.
- ☐ We have formulated indicators and identified when, where, and how we will collect the information for each indicator
- ☐ We have documented our evaluation plan

Step 11 Plan for sustainability

What is this step?

Sustainability is the degree to which a practice change continues to be used and where the benefits of the change to patients, families, staff, and the organization continue to be realized after the change has been implemented for some period of time.³ Although your team has not yet launched your practice change initiative, it is never too early to start planning for sustainability. In this step, your team will learn about the different factors that may influence the sustainability of the best practice recommendation over time and assess which factors may help or hinder the sustainability of your practice change.

*Sustainability is inter-connected with many of the other steps your team has already worked on. For example, the work your team has done to involve key partners, to select and adapt a best practice that fits with your setting, to learn about barriers and drivers, to develop tailored implementation strategies, and to plan how you will monitor and evaluate adherence best practice, are all critical components to maintaining the success and impact of your practice change over time.³ This current step is about making explicit the broad array of factors that influence sustainability and planning for how the team will monitor and adjust its activities over time to maximize chances of sustainability.

Why is this step important?

Often, discussions about sustainability only start once a practice change has been launched. However, planning for sustainability should actually start early in the implementation process, well before the launch of the practice change initiative.³

Embedding a new practice into teams and organizations is complex and will take continued effort beyond the initial launch. It is necessary to understand the factors that contribute to stability of the change. Additional strategies may be needed over time to respond to changing conditions such as emerging evidence, changing organizational priorities, healthcare professional turnover, and changes in leadership.³ Planning for sustainability early will maximize the chances of the best practice recommendation becoming embedded and “routinized” into your setting, both now and in the future.

Without sufficient planning for sustainability, there is the possibility that practice change will erode, resources will be wasted, confidence and morale may decrease in future change initiatives, and patients will not experience improved care and outcomes.⁹

Considerations for equity, diversity, and inclusion

As you review and complete this step, keep these equity-focused questions in mind:

- Have our sustainability strategies incorporated equity considerations?
- How will we consider whether use of the best practice is or isn't being sustained for all groups of patients and/or staff?

What is sustainability?

Moore and colleagues (2017)⁸³ define sustainability as: “After a defined period of time, the program, clinical intervention, and/or implementation strategies continue to be delivered and/or individual behavior change (i.e., clinician, patient) is maintained; the program and individual behavior change may evolve or adapt while continuing to produce benefits for individuals/systems.”

One important thing to note is the last part of this definition—that the practice and behaviours may evolve and adapt, so long as the intended benefits are still being observed. This means that “sustainability” does not require that everything stays exactly as it was at the launch of the change. In fact, a key component of sustainability is how the organization and practice mutually adapt to ensure continued fit and alignment.⁸⁴

It is also important to remember that sustainability is not an “all-or-nothing” phenomenon; there are degrees of sustainability³:

- 1) absence of sustainability
- 2) precarious sustainability: the change is implemented but its survival is uncertain,
- 3) weak sustainability: the change is implemented but not completely entrenched in practice
- 4) sustainability through routinization: the change is implemented, well embedded in routine practice, and its survival is not in question.

While the implementation working group will be striving to reach the highest level (sustainability through routinization), the degree of sustainability can vary over time and needs to be continually monitored.

As you plan for sustainability, think about sustainability activities as an opportunity for⁸⁵:

- ongoing adaptation and evolution of the best practice to optimize the fit between the change and the context;
- continued learning and problem solving; and
- ongoing improvement.

Activity 11.1 Assess capacity for sustainability

As you are planning your practice change initiative, it can be helpful for the working group to complete an assessment to determine capacity for sustainability. The Clinical Sustainability Assessment Tool (CSAT)⁸⁶ is a helpful tool to get your team thinking broadly about all the different factors that may influence the success of your practice change initiative over time. The CSAT has 35 questions across 7 domains that are known to be important for sustainability:

- Engaged staff and leadership
- Engaged stakeholders
- Organizational readiness
- Workflow integration
- Implementation and training
- Monitoring and evaluation
- Outcomes and effectiveness

The tool, which takes only 10-15 minutes to complete, can be accessed here:

<https://www.sustaintool.org/csat/assess/>

Ideally, multiple members of your working group should answer the questions to capture different perspectives. The last page of the assessment tool includes a scoring table, which will allow you to identify domains with lower scores. Use the results to inform your sustainability planning, focusing your planning efforts on those domains with the lowest scores.

Tip: Assess sustainability on an ongoing basis

Sustainability is something that needs to be assessed on an ongoing basis. Your findings from the sustainability capacity assessment in this “pre-implementation” phase will alert your team to potential strengths and challenges and position you to proactively manage potential challenges to sustainability. However, the team should consider repeating the sustainability capacity assessment post-implementation to monitor changes and target your sustainability strategies.

Additional resource

The NHS Institute for Innovation and Improvement has a Sustainability Model⁸⁷ with 10 factors across three core domains (process, staff, and organization) that can also be used as a sustainability assessment. The [Model and Guide](#) provides information and advice to enhance each of the 10 factors.

Activity 11.2 Discuss strategies for sustainability

Now that the team has conducted a sustainability capacity assessment, it is a good idea to consider different strategies for optimizing sustainability.

Some examples of strategies for sustaining the practice change include^{84,88,89}:

- Ensuring ongoing funding to support the change
- Maintaining the skills of staff through education, training, supervision, audit and feedback
- Adapting the practice change to fit with the organization
- Aligning the organizations’ policies and procedures with the practice change
- Maintaining the support and buy-in of organizational leaders
- Maintaining the support and buy-in of staff
- Continually monitoring the effectiveness of the practice change
- Using champions
- Engaging a multi-disciplinary team
- Using reminders
- Sharing your monitoring and evaluation findings to demonstrate improvements in practices and outcomes
- Ensuring the change continues to have direct oversight from dedicated staff

You may notice that many “sustainability strategies” are similar to the “implementation strategies” discussed in [Step 8](#). While in Step 8 we explored different implementation strategies to address current barriers your team is working to address, sustainability strategies are used to address ongoing “threats” to sustainability. Regardless of the term used, both are essentially “change strategies”; some will be used during your initial implementation, some will be used longer term to keep the practice change alive, and some will be used during both phases.

Tip: Document your team’s work throughout the planning process and post-implementation

Throughout this toolkit we provide many different templates and include “document your findings” as an item in each end-of-step checklist. Although documentation can be time consuming, it is in fact important for sustainability. Your team has put in a lot of thought and work to identify a problem and develop a plan for how the problem can be solved with an evidence-informed practice change. Documenting the rationale for your change (and the supporting data you collected) as well as how your team arrived at key decisions serves as a reminder for why this change was needed in the first

place. In addition, inevitably, there will be staff turnover and you don't want your team's process and learnings to be lost.⁸⁹

BORN Tip:

Part of planning for sustainability is maintaining the skills of current staff and training new staff—while training to maintain the best practice may be at the top of your mind, don't forget to also maintain your staff's data entry and interpretation skills. If you have any turnover of BORN local administrative staff or have existing staff who need a refresher or advanced training, work with your Regional Coordinator to arrange training. Ensuring you have team members who are skilled at entering data, running reports, and interpreting data and information will facilitate your monitoring and evaluation efforts, which will in turn support your sustainability efforts.

Reflecting on “unsuccessful” past practice change initiatives can also be helpful for the group to identify potential reasons why a practice change did not last and what could have been done earlier or what strategies may have helped. Consider having the working group complete the following reflection exercise, which is taken from [AH-TRIP](#)⁴:

- Have each person think of an example from their current or past setting of a change that did not “stick” or a change that “fizzled out” over time. What happened?
- What factors do you think led to the change not sticking or fizzling out?
- Could something have been done differently?
 - Was the change doomed from the start?
 - How could the project team have known there were issues earlier?
 - What support systems could have helped?
 - Was the implementation approach too directive?
 - Did people not agree with the evidence (best practice recommendation)?
- Based on this reflection exercise, what are some ideas and strategies that could have helped the change to stick and/or not fizzle out?

Your team may choose to prepare a structured sustainability plan and there are existing templates and resources for guidance (see for example Appendix 6.2 of the [RNAO's Toolkit: Implementation of Best Practice Guidelines](#)⁸ for a Sustainability Action Plan example). Or your team may choose to take a less structured approach, and simply discuss potential sustainability issues and brainstorm potential strategies to sustain the practice change over time. Regardless of which approach you take, if you have completed Steps 1 to 10 in this toolkit, this work will greatly inform and enhance your sustainability planning.

As part of your sustainability planning, consider having the working group discuss the following questions,^{7,8,90} and document your ideas and potential approaches:

- What were the main risks to sustainability we identified through the sustainability capacity assessment? What strategies could we consider to mitigate those risks?
- How will we develop and maintain formal and informal champions for this practice change?
- How will we counteract the effects of staff turnover and ensure that new staff are trained and supported to use the best practice recommendation?
- Who will be responsible for leading the practice change initiative in the short-, medium-, and long-term?
- How will we as an implementation working group maintain our momentum, especially when setbacks are encountered?

- How will we work to create an environment where all staff feel safe to express their concerns and feedback on the practice change?
- How will we know when new barriers or risks to sustainability arise?
- Will our monitoring and evaluation plan enable us to measure the success of the practice change initiative over time?
- How well does the best practice recommendation fit in existing unit and organizational policies? Will anything need to change to formally embed the practice in organizational policies and systems?
- How will we maintain the required funding? How can we maximize the cost-effectiveness or synergize with other initiatives?
- How will we share achievements, stories, and experiences about the practice initiative? (including sharing monitoring and evaluation findings)? Who should we share this with?
- How will we celebrate big and small successes throughout the process to maintain engagement and momentum?

Step 11 Summary checklist**Summary – how do we know we have successfully completed this step?**

- ☐ We have conducted a sustainability capacity assessment and identified potential risks to sustaining the best practice over time
- ☐ We have consulted key individuals and groups to explore potential sustainability issues
- ☐ We have reflected on our past experiences with practice change initiatives and considered why some changes did not stick and what could have been done differently
- ☐ We have discussed sustainability considerations and strategies
- ☐ We have documented our findings and decisions

Phase 2 Progress Checklist

By the end of Phase 2, the working group will have examined potential barriers and drivers to using the selected best practice recommendation and selected and developed implementation strategies tailored to each barrier. The team has also created a plan for monitoring both adherence to the best practice and the implementation strategies, planned to evaluate the outcomes, and considered capacity and strategies for sustainability. Use this checklist to gauge your progress and consider what remains to be done. Keep in mind how planning decisions and actions might influence program sustainability over time.

Step		Was this completed?	
		Yes	No
7 Identify barriers and drivers	We have considered the different individuals and groups interested and affected by the practice change and considered their roles, influence, and support levels		
	We have consulted with key individuals and groups to explore potential barriers and drivers to the selected best practice recommendation		
	We understand factors related to the best practice recommendation that may hinder or support use		
	We understand factors related to the users (people who will use or do the best practice recommendation) that may hinder or support use		
	We understand factors related to the setting (the place where the best practice will occur) that may hinder or support use		
	We have considered the different perspectives and judged whether different factors will be a barrier or a driver to the practice change initiative		
	We have ranked the identified barriers and identified the highest priorities to address		
8 Select and refine implementation strategies	We have reviewed at least one taxonomy of implementation strategies		
	We have worked with key partners to: - Brainstorm implementation strategies for each priority barrier - Rated the proposed implementation strategies to identify which ones are likely to be successful and feasible		
	We have selected which implementation strategies to use		
	We have operationalized each implementation strategy by considering AIMD: aims, ingredients, mechanisms, and delivery		
	We have added the implementation strategies (development and delivery) to the implementation work plan		
	We have piloted tested the implementation strategies		
9 Plan for monitoring	We have worked with key partners to develop our monitoring plans		

	We have considered how we will monitor for uptake of the best practice recommendation, including adherence according to our AACTT breakdown (Action, Actor, Context, Target, Time)		
	We have considered how we will monitor our implementation strategies, including content, frequency, duration, coverage, quality of delivery, participant responsiveness, and outcome(s) of the implementation strategy		
	We have identified when, where, and how we will collect the information for each monitoring indicator		
	We have identified our “success” thresholds for each monitoring indicator		
	We have documented our plan for monitoring adherence to the best practice		
	We have documented our plan for monitoring our implementation strategies		
10 Plan for evaluation	We have worked with key partners to develop our evaluation plan		
	We have considered short-, medium-, and long-term outcomes at the levels of patients and families, healthcare professionals and staff, and the unit and organization		
	We have identified the priority evaluation questions we need to answer to understand if our practice change initiative made an impact.		
	We have formulated indicators and identified when, where, and how we will collect the information for each indicator		
	We have documented our evaluation plan		
11 Plan for sustainability	We have conducted a sustainability capacity assessment and identified potential risks to sustaining the best practice over time		
	We have consulted key individuals and groups to explore potential sustainability issues		
	We have reflected on our past experiences with practice change initiatives and considered why some changes did not stick and what could have been done differently		
	We have discussed sustainability considerations and strategies		
	We have documented our findings, learnings, and decisions from Phase 2		

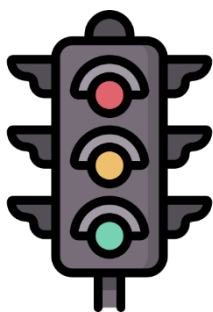


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STOP: We have not addressed most of these implementation planning factors; we are missing critical information, key resources, and/or sufficient level of support to continue.

CAUTION: We have addressed some but not all these implementation planning factors. We can proceed cautiously pending further efforts to complete outstanding planning elements.

GO: We have sufficiently addressed most of these implementation planning factors and are confident with proceeding to the next Phase.

List of Phase 2 planning templates

- [Template 7A Who is directly and indirectly affected by the best practice recommendation?](#)
- [Template 7B What is the influence and support level of the interested and affected parties?](#)
- [Template 7C Discussion guide for learning about barriers and drivers to best practice implementation from different perspectives](#)
- [Template 7D Which factors will be a barrier or a driver to your practice change initiative?](#)
- [Template 8A Rating the proposed implementation strategies](#)
- [Template 8B Breaking down implementation strategies by Aims, Ingredients, Mechanism, and Delivery](#)
- [Template 8C Using Plan-Do-Study-Act \(PDSA\) to pilot implementation strategies](#)
- [Template 9A Plan for monitoring adherence to the best practice](#)
- [Template 9B Plan for monitoring implementation strategies](#)
- [Template 10AC Outcome evaluation planning matrix](#)

PHASE 3 Implement, monitor, evaluate, and sustain

In Phase 3, the team will officially launch the practice change initiative and activate the monitoring, evaluation, and sustainability plans.

Step 12 Implement

What is this step?

Your working group has now identified potential barriers and developed implementation strategies to address them, as well as developed plans for how the practice change will be monitored, evaluated, and sustained. Your team is now ready to formally launch your practice change initiative. By the end of this step, you will have conducted a final launch readiness check and have entered the “implementation” phase of your project.

Why is this step important?

After months of preparation, your planning team will be eager to launch your practice change initiative. However, it is prudent to complete a launch readiness check to ensure that the working group is confident that everything is in place for a successful start. Your team can think of this step like the final check an aircrew would complete before takeoff.¹⁶ Any identified gaps can then be reviewed and addressed prior to “go live.”

Activity 12.1 Complete pre-launch checklist

As your team has been working through the previous steps, you may have been assessing your progress by using the summary checklists. You have also been building your [implementation work plan](#). Now is a good time to make sure that your working group has finished any outstanding tasks (refer back to [Phase 1 checklist](#) and [Phase 2 checklist](#) as needed). [Template 12A](#) also provides a sample checklist with some factors your team should ensure are in place prior to launch. Consider customizing this template to address the needs of your unique practice change initiative.

Template 12A Pre-launch checklist

(Template adapted from ¹⁶)

	YES	NO
Are the required resources and supports in place?		
Managers and leaders are on board and committed to the best practice and the implementation plan	☐	☐
Partners are on board (staff, patients, partners have endorsed the best practice)	☐	☐
Necessary resources have been acquired to deliver the best practice	☐	☐
Necessary space/infrastructure/equipment have been acquired	☐	☐
Monitoring and evaluation plan has been signed off on	☐	☐
Communications with all staff, patients, partners about the implementation have been approved and disseminated (e.g. all members of interdisciplinary teams have been made aware of the best practice and its potential impact on the team/their discipline)	☐	☐
Are our implementation strategies ready to go?		

The piloting of implementation strategies was successful	☐	☐
Modifications to the implementation strategies or their delivery have been complete	☐	☐
Implementation strategies are ready	☐	☐
Staff delivering the implementation strategies are prepared to deliver them	☐	☐
Have we positioned ourselves for success beyond the immediate launch? (i.e., sustainability)		
A process and resources are in place to update the best practice as new evidence evolves	☐	☐
A data collection process to monitor uptake and evaluate outcomes is in place and operational	☐	☐
Contingency plans are ready if key champions leave or retire	☐	☐
A process and resources are in place to continue delivering the implementation strategies beyond the initial launch	☐	☐
Other items		
[Add rows as needed]	☐	☐

Activity 12.2 Celebrate the launch

Be sure to acknowledge and celebrate the launch of your practice change initiative. This is a valuable opportunity for you to formally recognize and thank all those who contributed time, effort, and resources towards this initiative. Acknowledging everyone's efforts in getting to this point shows the team and your partners that their contributions are important and appreciated. This is a major milestone to be applauded!³

Step 12 Summary checklist

How do we know we have completed this step?

- ☐ We assessed our readiness to formally launch the practice change initiative
- ☐ We launched the practice change initiative
- ☐ We acknowledged the working group and partners who helped get the team to this point and celebrated the launch

Step 13 Monitor, evaluate, adjust, sustain

What is this step?

Now that your practice change initiative has officially launched, your team will begin a cycle of monitoring and evaluating the change and responding to the findings to improve implementation. Essentially, you will be activating your monitoring, evaluation, and sustainability plans that you developed in Steps 9-11, communicating this information with your partners, and using it to inform decisions and adjustments.

Why is this step important?

Now that your practice change initiative is implemented, you need to assess how well your implementation process is working and the outcomes you are seeing to determine if any improvements are needed. Activating your monitoring, evaluation, and sustainability plans are essential to inform both short-term course corrections and longer-term sustainability of the change.

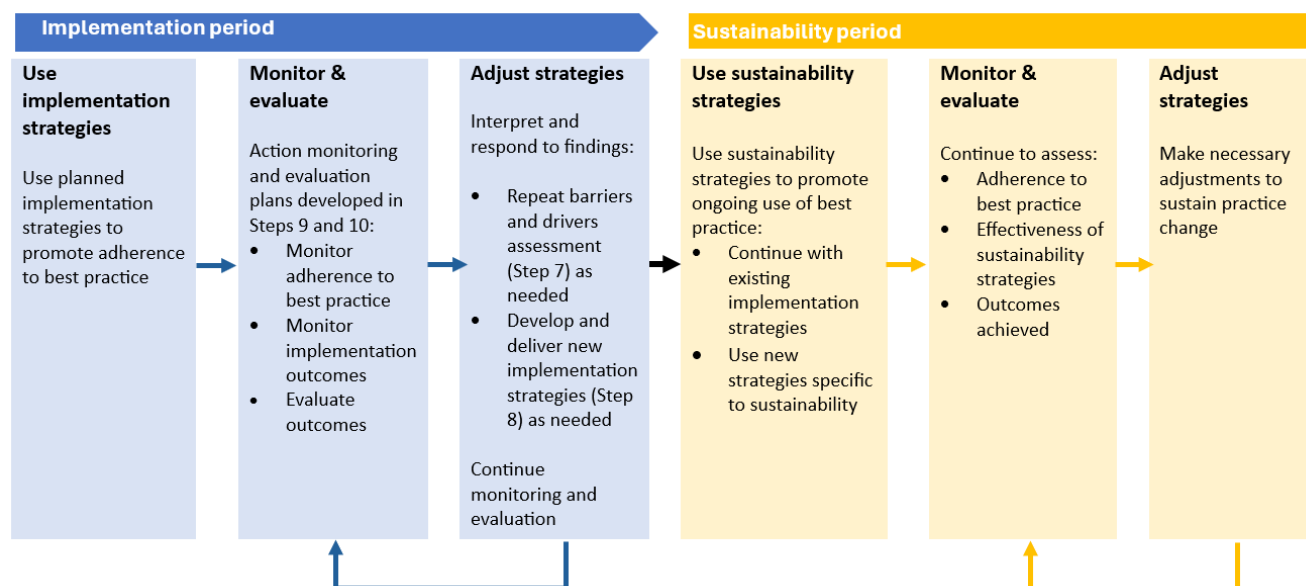
Considerations for equity, diversity, and inclusion

As you review and complete this step, keep these equity-focused questions in mind:

- Is adherence to the best practice similar for all groups?
- Are the implementation strategies having a differential effect for different groups?
- Do the implementation strategies need adjusting to better meet the needs of different people and groups?
- Are outcomes from using the best practice distributed equitably? If not, how come?
- How will we ensure inclusive access to monitoring and evaluation findings?

In this step you will move through iterative cycles of monitoring and evaluation and use that information to adjust your approach in the immediate “implementation period” and eventually in the “sustainability period” (Figure 5). The term “implementation period” typically refers to the timeframe involving the initial launch and early delivery of the practice change initiative. While there are no widely accepted criteria for when the implementation period turns into the sustainability period, two years post-implementation is a common benchmark used in healthcare interventions.³ Your working group may want to consider defining what you consider a reasonable implementation period for your practice change initiative and at what point your team and organization will consider the best practice as embedded, viable, and sustainable in your setting.³

Figure 5. Iterative cycles of monitoring, evaluating, and adjusting during implementation and sustainability periods
(Figure adapted from ³)



Activity 13.1 Activate your monitoring and evaluation plans and use findings to adjust your approach

Re-visit the templates you completed in [Steps 9](#) and [10](#) and begin collecting the data according to your plan. If your monitoring and evaluation plans have changed since your initial planning, be sure to update them to reflect the current plan for what information will be collected, when, from where, and by whom.

Your team may want to go back to review Steps 9 and 10 as a refresher on monitoring and evaluation. But briefly, as described in [Step 9](#), your **monitoring plan** will allow you to understand what is happening in real-time: Are people using the best practice? Are your implementation strategies being delivered and used as planned? Are new barriers emerging that may need new implementation strategies to address? As described in [Step 10](#), your **evaluation plan** will allow you to capture the longer-term outcomes and impact of your practice change initiative: Did implementation of the best practice result in the desired outcomes?

While monitoring and evaluation are distinct activities that each have their own purpose, they are also closely connected; the data you collect through monitoring can help you understand the outcomes you see in your evaluation. As shown in [Figure 6](#), the quality of your implementation will influence whether people use the best practice. The extent to which people are adhering to the best practice will ultimately influence whether you achieve the positive outcomes at a patient, healthcare provider, and system level. It is essential to collect data on all three components to ensure you have a comprehensive picture of what events and conditions produced the outcomes you observed; this can help explain your findings and provide guidance on where to focus your efforts.

Figure 6. Connections between implementation, adherence to best practice, and outcomes

As you collect your monitoring and evaluation data, you will need to interpret it and use it to adjust your implementation plan (as per [Figure 5](#) above). Analyzing the data in real time enables the working group to swiftly respond to any pressing needs for change. As you analyze the data, consider when you can and should consult your partners to aid in interpretation of your findings; this can help with contextualizing the findings, assessing the implications, setting priorities, and making decisions about how issues will be addressed.

Responding to monitoring findings

Both positive and negative monitoring findings are constructive and can be used to improve the practice change initiative. If you see positive results, be sure to share these findings with the working group and key partners; seeing their efforts lead to a positive change can help maintain momentum. Acknowledge and celebrate what has been accomplished together and encourage everyone to continue their work to implement and adhere to the new way of practicing.

If your monitoring findings indicate that implementation is not going as planned and/or not resulting in the use of the best practice as anticipated, your team may feel frustrated and disappointed. Remember that it is actually positive to pick up on these challenges early, and this is a signal that your monitoring efforts will be worthwhile as they direct your attention towards specific challenges.

Consider these points for how to manage “negative” monitoring findings:

- Explore potential explanations for the findings. The first step is to distinguish if the root cause of the findings is due to the best practice itself not working as planned, or if the implementation strategies were not rolled out and used, or are not working as planned. Understanding the root cause of the findings can prevent teams from prematurely abandoning practice change initiatives *or* implementation strategies that may in fact simply require adjustments.

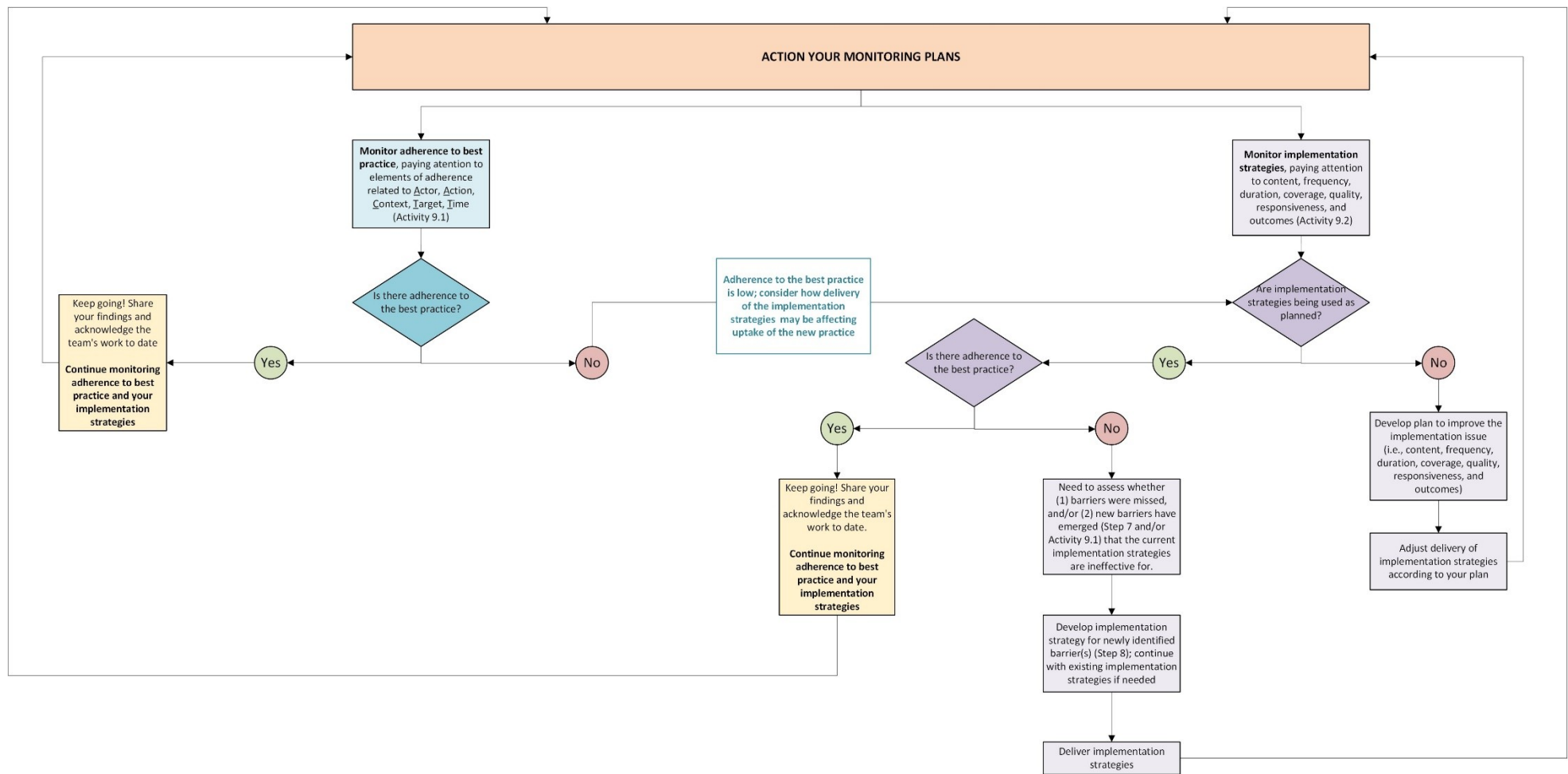
Think about the following questions:

- Has enough time passed where we would expect to see improvements in adherence to the best practice?
- Was adherence to the best practice poor? Which elements of adherence were low? (see AACTT components in [Activity 9.1](#))
- Were the implementation strategies delivered and used as planned? (see components in [Activity 9.2](#)). Are they working effectively to target the identified barriers?
- Were the implementation strategies ineffective because new or unanticipated barriers have emerged?

- Depending on the explanations for your findings, consider how you will address the identified challenges. For example:
 - *If adherence to the best practice is poor:* what strategies can you use to target the reasons for low adherence? Consider repeating a barriers assessment to understand what is preventing the team from practicing in the new way. Re-visit [Step 7](#) or [Activity 9.1](#) for more information on how to do this.
 - *If the implementation strategies are not being used as planned:* have the working group discuss why the strategies are not being executed as planned in [Step 8](#), paying attention to the content, frequency, duration, coverage, quality, responsiveness, and outcomes ([Activity 9.2](#)). Are the working group and key partners experiencing challenges in rolling out the implementation strategies? Has there been poor uptake and engagement with the implementation strategies? Consider what changes could be made to enhance the fidelity of your selected implementation strategies.
 - *If the implementation strategies are ineffective because new barriers have been identified or emerged:* if the team has identified new barriers to using the best practice that were not previously identified, consider what implementation strategies could be used to mitigate these barriers. Re-visit [Step 8](#) and discuss what new implementation strategies could be introduced in response to the challenges you have identified.

Refer to the flow diagram below ([Figure 7](#)) to help your team explore the underlying reasons for the monitoring findings and what steps to take next.

Figure 7. Questions and actions to take when using monitoring findings



Below we provide a simple case example to illustrate how a team may work through the [Figure 7](#) flow diagram to adjust their implementation plan in response to their monitoring findings.

CASE EXAMPLE

Best practice being implemented:

Nurses provide at least one breastfeeding education session prior to discharge according to hospital guidelines to all people in the mother-baby unit who intend to breastfeed.

Identified barrier ([Step 7](#)) and selected implementation strategy from mapping exercise ([Step 8](#)):

Barrier	Implementation strategy selected to address barrier
<i>Nurses perceive they do not have enough knowledge and skills to provide breastfeeding education</i>	In-services to build knowledge and skills of mother-baby unit nurses on how to provide breastfeeding education to patients and families

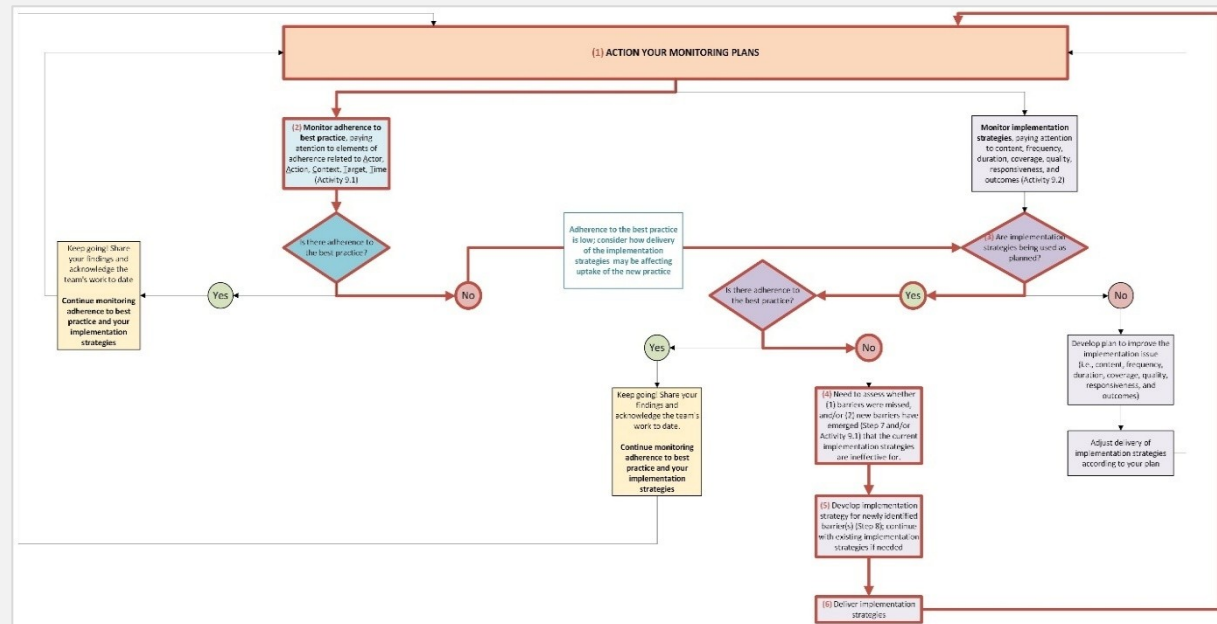
**For the purpose of the example, we have selected one barrier and one strategy; in reality, your team may be addressing more barriers with multiple strategies.*

Key elements of monitoring plan:

- The team set the following success criteria to monitor **adherence to the best practice**:
 - 100% of breastfeeding education sessions cover >9/10 topics (90%)
 - >90% of nurses are delivering breastfeeding education to >90% of their eligible patients.
 - >75% of breastfeeding education sessions are done with the birthing person's partner or key support present (if desired).
- The team set the following success criteria to **monitor their implementation strategy**:
 - >90% of in-services cover 100% of the planned training content
 - >90% of nurses attend the in-service
 - >75% of nurses report they were satisfied with in-service
 - 100% of training participants achieve a score of at least 80% on post-training knowledge quiz

Example of how team uses monitoring data to make adjustments

(see modification of Figure 7 below that includes red boxes, arrows, and numbers that correspond with the pathway described in the example)



- (1) The team starts by actioning their plans to monitor adherence to the best practice and the selected implementation strategy.
- (2) Three months after formally launching the practice change initiative, the team determines that adherence to the best practice (i.e., offering breastfeeding education) is lower than their success criteria. Specifically, using their AACTT breakdown, they note that although >90% of nurses are delivering breastfeeding education to >90% of their patients (with partners or key supports present >75% of the time), adherence to the planned content of education is low, with only 6/10 topics being delivered on average. This means their adherence issue relates to the “Action” in their AACTT breakdown from [Activity 9.1](#).
- (3) This prompts the team to do some digging into whether their implementation strategies are being used as planned and may explain the low adherence.
 - Upon examining their implementation monitoring data, the team determines that they are meeting or surpassing all of their success criteria (i.e., in-services are covering the planned content, are being offered as frequently as planned, have reached nearly all nurses, and nearly all nurses are satisfied with training and achieved an acceptable score on the knowledge test). The team concludes their implementation strategy is being used as planned.
- (4) These findings lead the team to consider if there are other barriers that were not identified initially or new barriers that have emerged that are preventing nurses from delivering all components of the breastfeeding education as planned.

- The team decides to repeat a barriers assessment ([Step 7](#)). Through this process they learn that due to increasing staff shortages and changes in nurse-to-patient ratios, nurses now feel they do not have sufficient time to spend with patients to provide the full content of the breastfeeding education.
- (5) The team works to brainstorm potential new implementation strategies to address this barrier ([Step 8](#)). They decide to create some asynchronous breastfeeding education materials for patients to cover several of the required topics and reduce the amount of synchronous time nurses need to spend per patient.
- (6) This new implementation strategy is added to the monitoring plan ([Step 9](#)). The team continues delivering the pre-existing and new implementation strategies and monitoring adherence and implementation.

As illustrated in [Figures 5](#) and [7](#) (above), implementation is an iterative process. Despite your best planning efforts, new surprises and challenges will arise and it is normal to need to adjust and further tailor your implementation efforts as you go.

Interpreting evaluation findings

The team will also need to be collecting and interpreting evaluation data (as planned in [Step 10](#)), which will show the longer-term effect that the practice change initiative has had on patients, families, healthcare providers, and the organization. Ideally, the practice change initiative will lead to positive changes; however, if your evaluation findings are “negative”, consider the following:

- Double-check your findings to ensure there are no errors in data collection or interpretation. Consider whether you have allowed enough time to pass to see the anticipated outcomes: some outcomes require a certain volume of patients that experience an event or care, or a certain amount of time before outcomes become observable.
- Explore potential explanations for the findings. Your monitoring results will be essential contextual information here!
 - If your evaluation shows that you did not achieve the anticipated outcomes, consider whether this may be explained by poor adherence (as per your monitoring results).
 - For example, if you evaluated outcomes at 12 months and did not see any improvements in your selected health outcomes, it would be important to know that clinicians were not fully adhering to the best practice until 10 months into the implementation period. Clinicians not actually using the best practice would explain why you are not seeing any improved outcomes. In this case, the team would likely decide to keep monitoring adherence and re-assess the selected outcomes at a later date, when enough time has passed with clinicians consistently using the best practice.
 - Alternately, if you are not seeing the expected outcomes in your evaluation, yet you have determined that adherence to the best practice was sufficiently high (as per your monitoring results), the team will need to do some digging to understand why the selected best practice being implemented is not producing the intended effects.

Activity 13.2 Share your monitoring and evaluation findings

How and when the monitoring and evaluation results are presented to key partners and leadership should be spelled out in advance, as should the mechanism to respond to any disputed findings. For instance, your team may plan to develop an interim and final report and deliver the information in written form and/or through presentations. The working group should also consider how it will share evaluation findings more broadly. The healthcare professionals and other staff involved in delivering or facilitating the practice will be interested to know the impact their efforts and behaviours are having; management will be interested in knowing whether the practice change initiative should continue to be supported. Sharing monitoring and evaluation data can also serve to promote awareness and maintain momentum for the new way of practicing. Finally, using your monitoring and evaluation findings as one source of evidence to inform current and future work is an essential component of a learning health system.

BORN Tip:

As you prepare your monitoring and evaluation findings to be shared with others, connect with your BORN Coordinator who can assist with interpreting your BORN data. They can also support brainstorming around ways to present your monitoring and evaluation data in tables and figures to effectively communicate your findings to your partners.

Activity 13.3 Continue monitoring, evaluating, and adjusting into the sustainability period

Eventually, your practice change initiative will transition from the implementation period into the sustainability period. Your sustainability strategies, which you began exploring in [Step 11](#), focus on maintaining gains by addressing both the previously identified barriers and new barriers as they arise. Although the intensity of the implementation period will be behind you, the sustainability period will still require steady monitoring, and potentially ongoing tweaks and adjustments to ensure your organization continues to benefit from the best practice.

As you enter the sustainability period, consider these guiding questions:

- Is use of the best practice still meeting a need in our setting? How will we know?
- Has new evidence emerged that has resulted in the guideline (and its recommendation) changing?
- What indicators will the team use to assess whether use of the best practice and favourable outcomes are being sustained over time? How often will the team assess this?
- How will the team ensure that the people who are monitoring sustainability (e.g., working group) are in communication with those responsible for making decisions about the practice (e.g., leaders) to discuss emerging sustainability data as it becomes available?
- If the best practice is still needed:
 - How can support from the original partners and interested and affected parties be maintained and leveraged over the long term?
 - Have any new partners or parties emerged since implementation of the practice change initiative that now need to be involved or consulted?
 - Is there a plan to reassess barriers and develop additional strategies to overcome identified barriers to sustainability?
 - What adjustments can we make to optimize adherence to the best practice?
 - Is information about the best practice and any sustainability issues being effectively communicated to healthcare professionals, staff, leadership, patients, and families?

Consider revisiting [Step 11](#) for additional information on sustainability.

BORN Tip:

BORN data can provide a longitudinal view of practices and outcomes. As you enter the sustainability period, consider how you could use BORN data and clinical reports to look for trends over time.

Step 13 Summary checklist

How do we know we have completed this step?

- ☐ We have decided on what length of time constitutes our implementation period versus our sustainability period
- ☐ We have activated our monitoring and evaluation plan
- ☐ We are regularly interpreting the results of our monitoring and evaluation activities
- ☐ We are communicating the findings from our monitoring and evaluation activities to key partners
- ☐ We are using (or intend to use) the findings from our monitoring and evaluation activities to adjust our approach
- ☐ We are re-visiting (or intend to re-visit) our barriers assessment as needed to identify new barriers
- ☐ We are developing (or intend to develop) new implementation and/or sustainability strategies as needed to mitigate emerging barriers
- ☐ We continue to monitor whether the best practice is resulting in positive outcomes (and are attentive to possible unintended effects)
- ☐ We have activated (or intend to activate) our sustainability strategies and continue to monitor adherence to the best practice

Phase 3 Progress Checklist

By the end of Phase 3, the working group has conducted a launch-readiness check and implemented the practice change initiative. The team is continually assessing the implementation process, monitoring adherence to the best practice, and evaluating outcomes. Using the results of these assessments, the team will respond to emerging barriers and challenges and work towards sustainability. Use this checklist to gauge your progress and consider what remains to be done.

Step		Was this completed?	
		Yes	No
<u>12</u> <u>Implement</u>	We assessed our readiness to formally launch the practice change initiative		
	We launched the practice change initiative		
	We acknowledged the working group and partners who helped get the team to this point and celebrated the launch		
<u>13</u> <u>Monitor,</u> <u>evaluate,</u> <u>adjust,</u> <u>sustain</u>	We have decided on what length of time constitutes our implementation period versus our sustainability period		
	We have activated our monitoring and evaluation plan		
	We are regularly interpreting the results of our monitoring and evaluation activities		
	We are communicating the findings from our monitoring and evaluation activities to key partners		
	We are using (or intend to use) the findings from our monitoring and evaluation activities to adjust our approach		
	We are re-visiting (or intend to re-visit) our barriers assessment as needed to identify new barriers		
	We are developing (or intend to develop) new implementation strategies as needed to mitigate emerging barriers		
	We continue to monitor whether the best practice is resulting in positive outcomes (and are attentive to possible unintended effects)		
	We have activated (or intend to activate) our sustainability strategies and continue to monitor adherence to the best practice		
	We have documented our findings, learnings, and decisions from Phase 3		

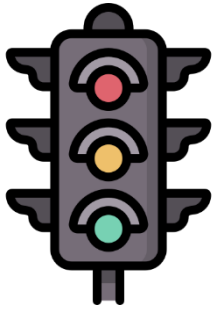


Image from [FlatIcon](#)

STOP: We have not addressed most of these implementation planning factors; we are missing critical information, key resources, and/or sufficient level of support to continue.

CAUTION: We have addressed some but not all these implementation planning factors. We can proceed cautiously pending further efforts to complete outstanding planning elements.

GO: We have sufficiently addressed most of these implementation planning factors.

List of Phase 3 planning templates

- [Template 12A Pre-launch checklist](#)

Conclusion

We hope the process, information, and templates presented in this toolkit will help you successfully implement and maintain your practice change initiative. The information in this toolkit is based on best implementation planning practices accompanied by the experiences and wisdom contributed by all our study team and nurses, managers, directors, and pregnant people who reviewed versions of this resource.

The implementation process described in this toolkit is intended to be used by teams as they see fit, according to their goals, individual experiences with best practice implementation, access to resources, and the unique context where implementation is occurring. In some cases, this will mean following each phase, step, and activity closely, while for others, it may be to select the elements that most support their needs.

You should also anticipate there may be a learning curve when using the toolkit for the first time. However, much like the iterative learning health system approach, each time you work through the implementation process and the different activities (including collecting and analyzing local data), the team will gain valuable experiential knowledge that will make future practice change initiatives that much easier and more evidence-informed. As your team gains experience using this implementation process, you may also find preferred ways to adapt the steps and activities to work for your team and setting. However you choose to use the information and resources in this toolkit, remember that, as with most travels, how you get to your destination can be as important and rewarding an experience as the actual destination.

This toolkit is meant to evolve over time as users share their experiences with it. Your continued feedback is welcome. Please provide comments to: [email address to be added]

Good luck with your planning and implementation!

A final BORN tip:

Consider sharing your practice change initiative story with BORN—we love hearing how [BORN data](#) and information products are used to create real-world improvements in practices and outcomes. We also appreciate learning about how BORN data and information products can better support your team on your implementation journey!

[email address to be added]

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Appendix 1. Comparison of implementation process to commonly used quality improvement frameworks (from ¹⁶)

QI approach	Toolkit Step							
	Form team, Understand problem (Steps 1 & 2)	Find evidence-informed solution (Step 3)	Define evidence-practice gap (Step 4)	Customize best practice (Step 5)	Assess barriers and drivers (Step 7)	Develop implementation strategies (Step 8)	Implement, monitor and evaluate (Steps 9, 10, 12)	Adjust and Sustain (Steps 11, 13)
Model for improvement ^{91,92}	What are we trying to accomplish?		- How will we know that a change is an improvement? - Outcomes, process, balance			- What changes can we make that could result in improvement? - Gather ideas of how improvement can be driven - What are the possible solutions?	How do we test the solutions?	- How do we sustain and standardize what we have achieved? - What changes need to be made next?
	- Forming the team - Setting aims		Establishing measures			Selecting changes	- Establishing measures - Testing changes - Implementing changes	Spreading changes
Six Sigma (DMAIC) ⁹³	<u>D</u>efine the problem and objective	<u>I</u>mprove. Determine potential solutions	<u>M</u>easure what we need to improve and what we can measure <u>A</u>nalyze gaps between actual and goal performance		<u>A</u>nalyze the process, define the factors of influence. Find root cause of business inefficiencies.	<u>I</u>mprove. Determine potential solutions, ways to implement them, test and implement them for improvement. <u>C</u>ontrol. Post implementation results are evaluated. Progress ascertained.		<u>C</u>ontrol. Assure that improvements will sustain by generating a solution monitoring plan.
Lean (5 principles) ^{94,95}	(1) Identify customers and what they value.	(3) Create flow	(2) Map steps in value stream	(2) Map value stream	(3) Create flow. Eliminate waste and variation at the root cause.	(4) Establish pull. Transform approach	(5) Seek perfection. Standardize flow, sustain, continuously improve	
PDSA cycle ^{96,97}	Plan						Do-Study	Study-Act