Implementation of the Infant Pain Practice Change (ImPaC) Resource: Facilitators and Barriers for Implementation in Neonatal Intensive Care Units

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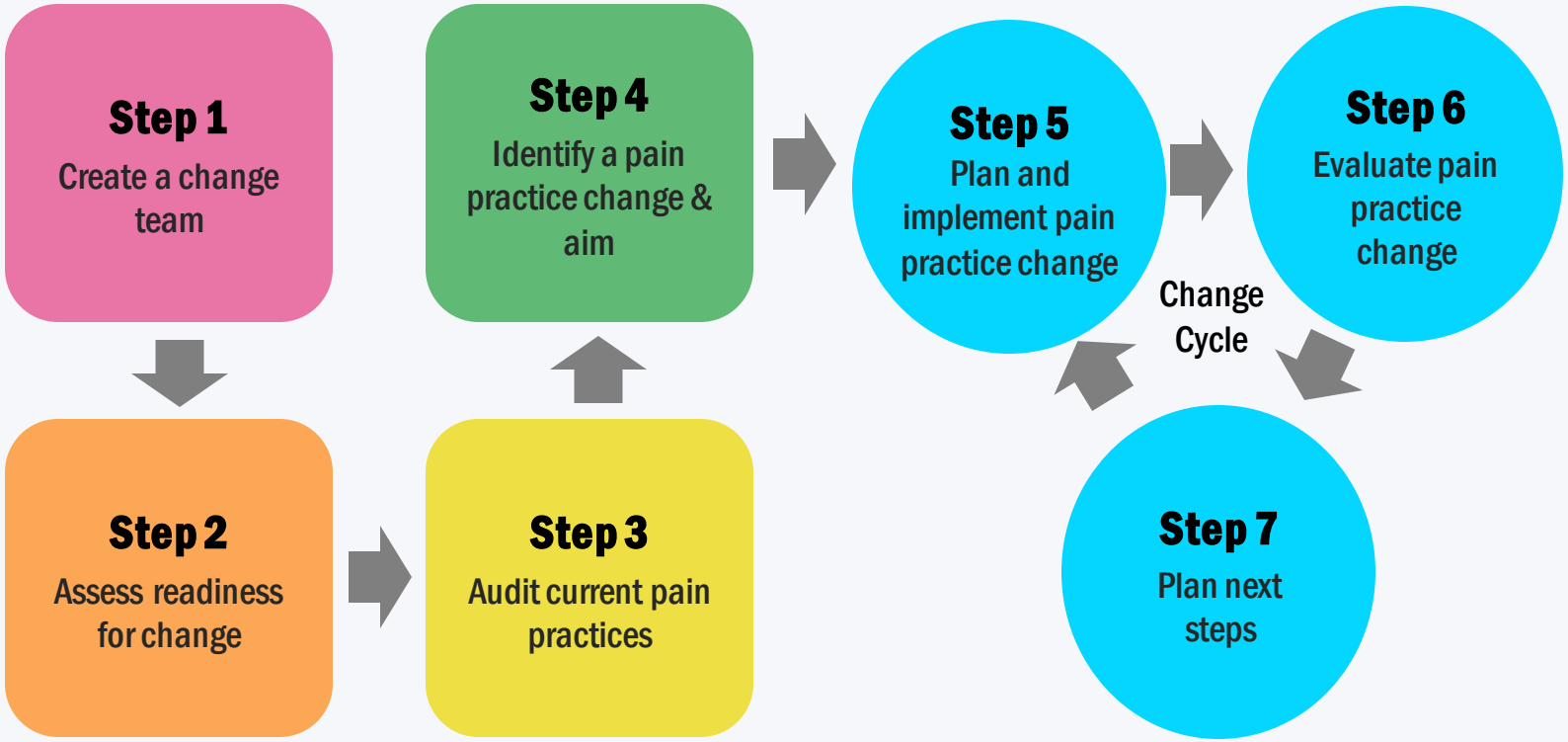
Knowledge to Practice Gap

- Despite almost 40 years of generating research evidence, infants still experience procedural pain while hospitalized
- Pain treatment is frequently inadequate
- Untreated pain can have negative effects that are immediate or last a lifetime
- The issue is not the shortage of new evidence but rather successfully implementing evidence into practice

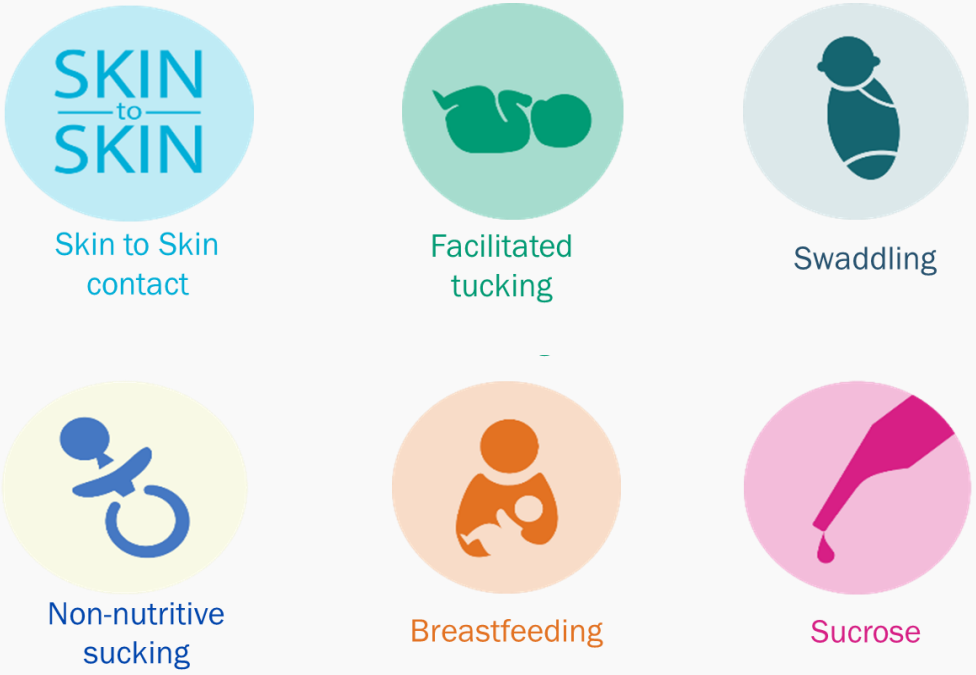
The ImPaC Resource

The Implementation of Infant Pain Practice Change (ImPaC) Resource is a 7-step, multifaceted, online implementation strategy to improve pain assessment and management in Neonatal Intensive Care Units (NICUs)



SOURCE: Stevens et al., 2023

Pain Management Tools

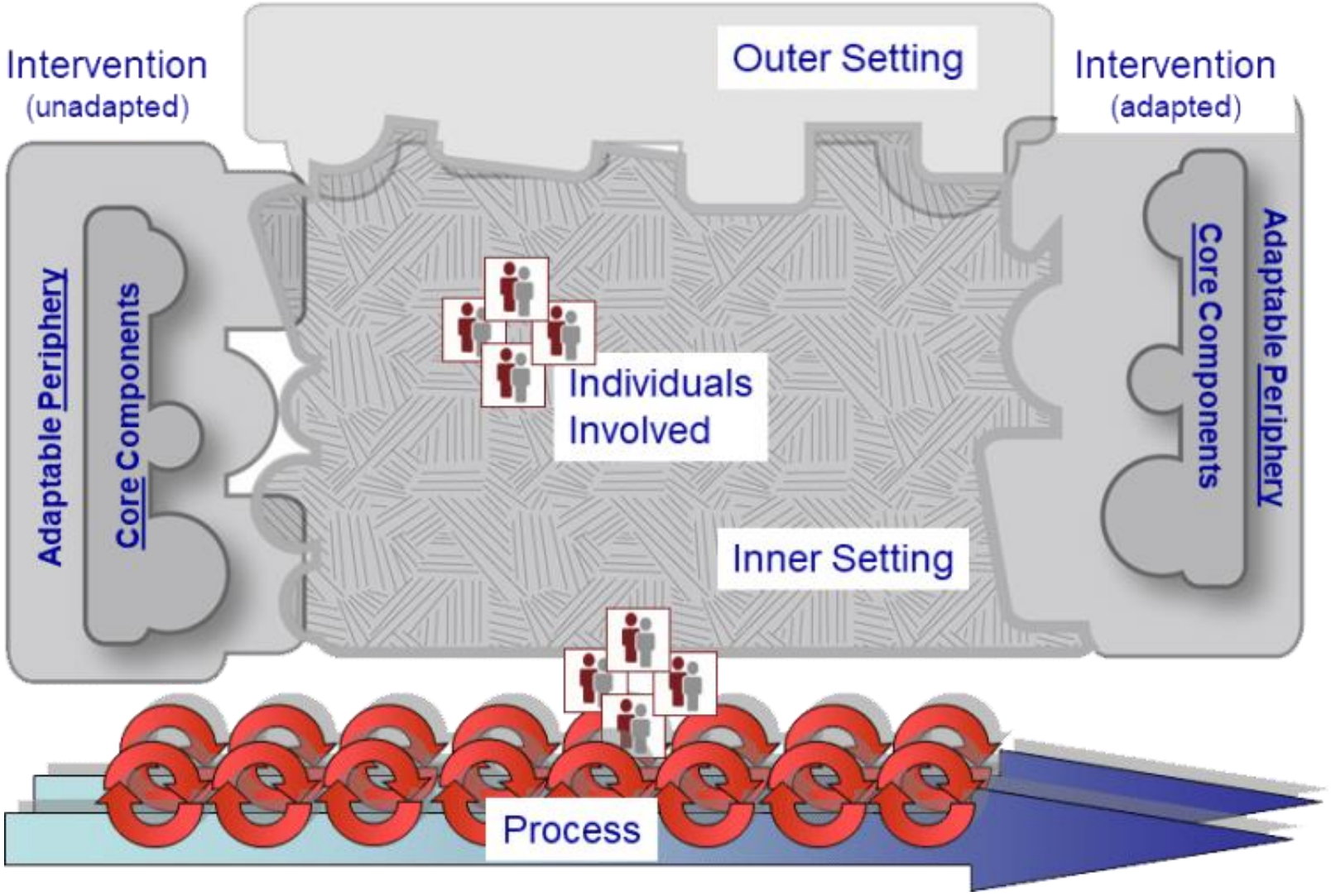


Pain Assessment Tools

BIIP
FLACC
MBPS
NIPS
N-PASS
PIPP-R

SOURCE: Stevens et al., 2023

Consolidated Framework for Implementation Research (CFIR)

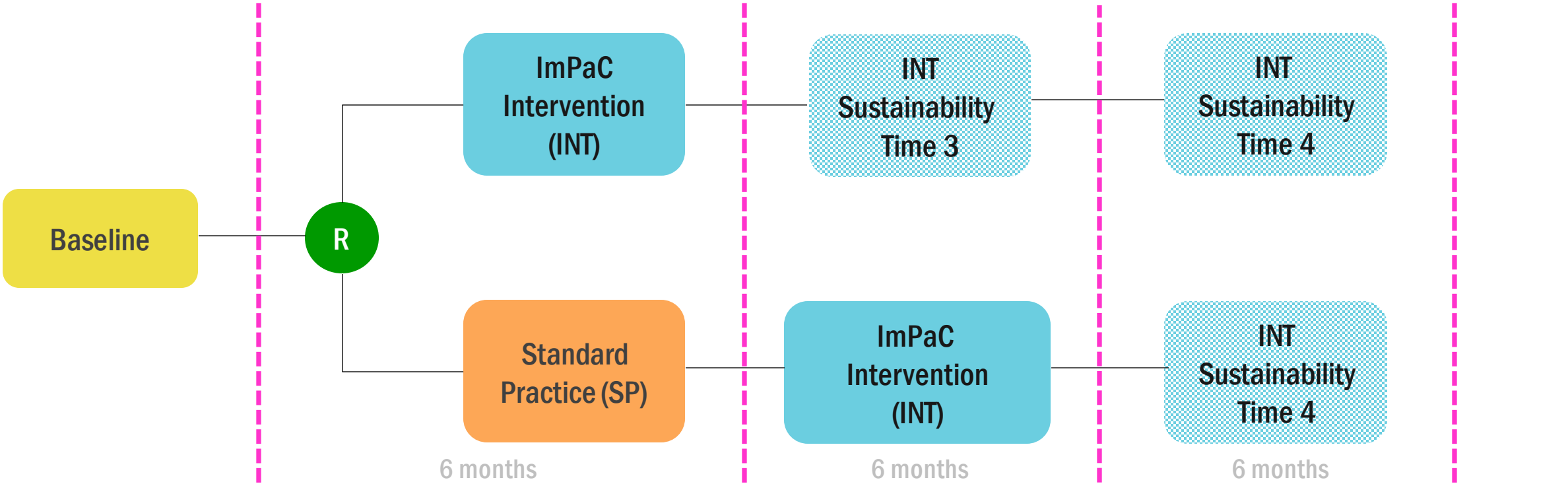


SOURCE: Damschroder et al, 2009

Study Design & Eligibility

- A Hybrid type 1 implementation science study design was utilized and included
  - a cluster RCT wait list design (intervention effectiveness)
  - descriptive qualitative design with directed content analysis (implementation effectiveness)
- Canadian level 2 and Level 3 NICUs with >15 beds were invited to participate

Study Design, Outcomes and Analysis



T1	T2	T3	T4
Outcomes	Intervention and Implementation Outcomes	Intervention and Implementation Outcomes	Intervention and Implementation Outcomes
Analysis	Intention to Treat, Qualitative Descriptive	Per Protocol, Qualitative Descriptive	Qualitative Descriptive

Study Aim

- Identify facilitators and barriers for successfully implementing the ImPaC Resource in practice settings

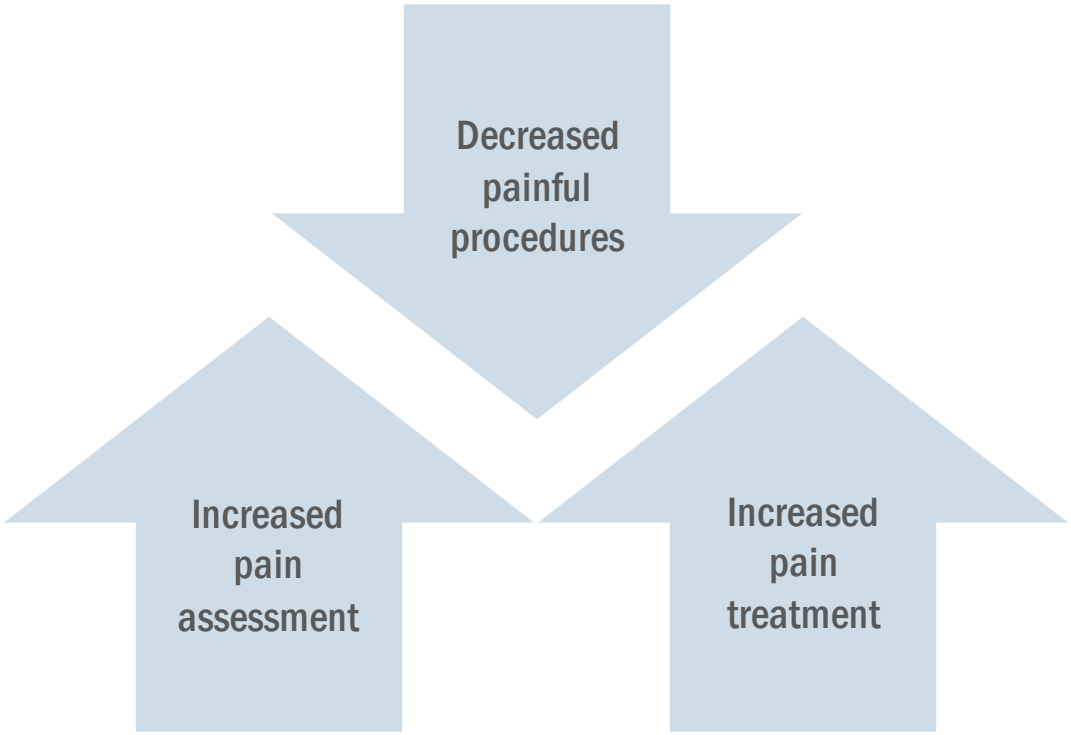
Cluster RCT

- NICUs randomized to the Intervention Group (INT) recruited a Change Team (CT) whose members were trained and given access to the ImPaC Resource for 6 months
- NICUs randomized to the Standard Practice (SP) group were waitlisted for 6 months and then offered access to the Resource
- All sites eventually received the Resource intervention

Research Supporting The ImPaC Resource Intervention

How the Resource improves clinical practice

In research comparing NICUs that implemented the Resource versus continuing with standard practice, we found the following:



Qualitative Descriptive Study

- Focus groups (FG) were conducted virtually with all CTs by trained interviewers following 6-months of Resource use to discuss implementation determinants
- FG questions and data analyses were guided by the Consolidated Framework for Implementation Research (CFIR 1.0)
- All interview data were professionally transcribed in preparation for data analyses

Data Coding and Analysis

- A codebook was developed in MAXQDA software using CFIR domains and constructs. Code memos were added detailing definition of domains and constructs and operationalized to the study context
- Three trained analysts were responsible for coding all the transcripts line by line
- Analysts coded transcripts independently and then came together using a consensus approach to generate the final coded transcripts
- Inductive codes were identified from codes that did not fit into the CFIR framework

Results: Participating NICUs

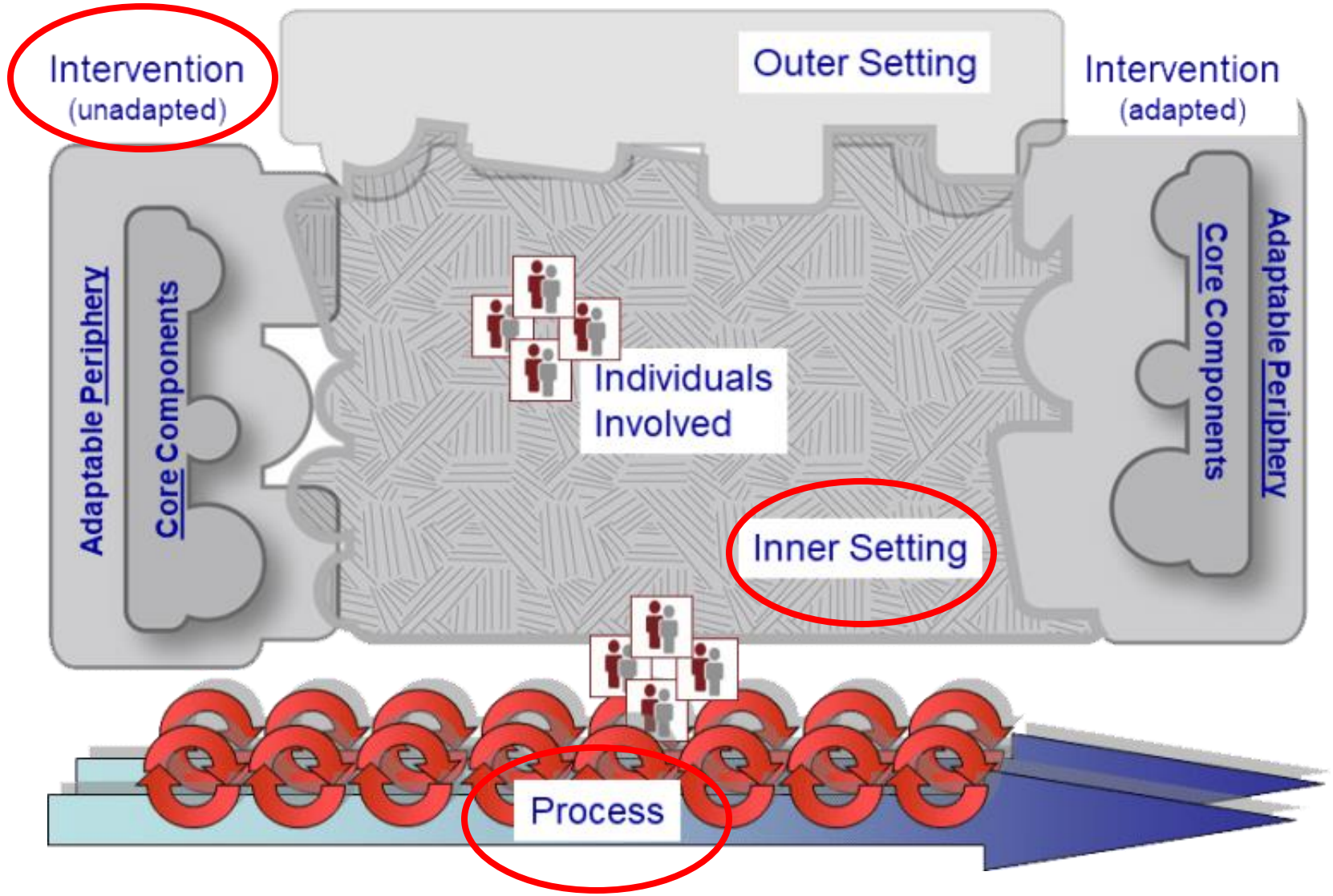
23 NICUs, comprising 21 study sites, from 6 provinces from across Canada

- 6 sites, AB
- 1 site, SK
- 1 site, MB
- 11 sites, ON
- 1 site, NB
- 1 site, NS

FG Participants and Interviews

- 23 FG interviews were conducted from January 2021 to December 2022
- FGs included 83 CT participants (median 4 participants/ site, range 1 to 7)
- Interviews lasted between 25-60 minutes

Results within CFIR Domains



SOURCE: Damschroder et al, 2009

Facilitators

1105 discrete codes were identified in 31 CFIR constructs/subconstructs

Innovation characteristics were the most salient implementation facilitators

21/23

Design and quality packaging

15/19

Evidence strength

Facilitators

Inner Setting & Process facilitators related to enabling users

13/22

Engage key stakeholders (i.e., clinicians)

12/21

Reflect and evaluate their implementation

18/23

Compatibility with local practices

Barriers

Inner Setting Barriers

15/22

Available resources, (e.g., lack of time)

14/16

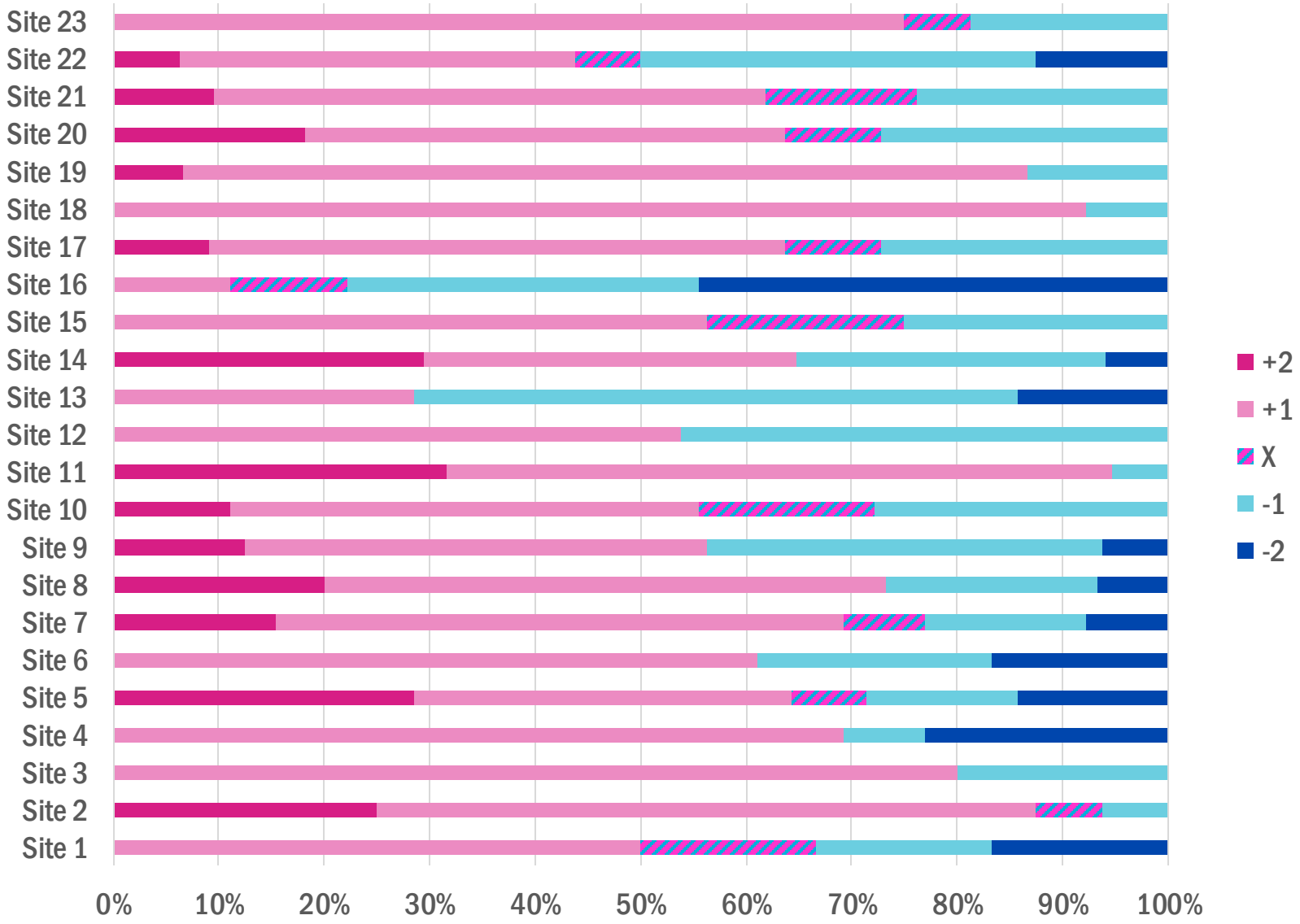
Relative priority

The COVID-19 pandemic hindered implementation (**15**/**17**); this inductive code fits the critical incident construct introduced in CFIR 2.0

Valence Ratings

- Valence ratings based on direction (+/-) and strength (–2, –1, +1, +2) were assigned to each CFIR construct. We used X when overall the constructs had mixed valence and strength that balance each other.
- The most salient construct/subconstruct facilitators (rated as +1 or +2) and barriers (rated as -1 or -2) were described as the frequency of transcripts where they were coded.

Valences: Strength of Barriers and Facilitators by Site



Research Supporting The ImPaC Resource Implementation

What users say about implementing the ImPaC Resource

"The tools created a discussion point [...] you know all the guidelines. It was not only education .... we were able to talk about the purposes to the staff"

"I knew where we were at and okay this is what we've done here. Now we go to step number two or whatever step we're at....it was easy to follow that way"

"They had all the evidence and research to back it up. It was very thorough and it provided many different options which was good"

"the resources ...they were incredible. Very easy to access....exactly what we needed [...] simple, concise, easy to follow and not another level of information overload"

Discussion

- Implementation facilitators comprised ≥60% of the coded segments in the majority of sites
- Innovation Characteristics were the most salient implementation facilitators across NICUs
- Inner Setting factors facilitated and hindered the implementation process
- The pandemic hindered implementation

Implications for Practice and Research

- Careful consideration of innovation and inner setting constructs will contribute to implementation of the ImPaC Resource
- Site specific actions are needed to mitigate barriers and their influence on implementation
- Adapting and tailoring the ImPaC Resource to different languages and contexts (e.g., low- and middle-income countries) may contribute to minimizing the knowledge to practice gap
- CFIR 2.0 should be considered in future evaluations of implementation determinants of ImPaC (e.g., the pandemic was inductively coded as an external factor that hindered the implementation)

Conclusion

- Future implementation of the Resource should focus on enhancing facilitators and mitigating barriers identified as salient
- This focus will promote better understanding of determinant factors of infant pain practice change, and potential mechanisms for implementation success.

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For additional information

- This research is led by Dr. Bonnie Stevens and the CIHR ImPaC Resource Trial Team
- For more information about the ImPaC Resource:
- Email bonnie.stevens@sickkids.ca or impac.resource@sickkids.ca or scan the QR code

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