

# Improving Admission Temperature in Babies $\geq 34^0$ weeks' Gestation: A Quality Improvement Project

Lawrence S, Nguyen L, Sucha E, Lemyre B, Mitsakakis N. on behalf of the TOH NICU thermoregulation working group

## Background/Introduction

Hypothermia in preterm and term babies has been associated with increased mortality, short and long-term morbidity, such as late-onset sepsis, respiratory disease, hypoglycemia, and intraventricular hemorrhage. Hypothermia is one criterion for Neonatal Intensive Care Unit (NICU) admission, leading to separation of families, prolonged hospital stay and financial costs.

Rates of normal admission temperatures (36.5-37.5°C inclusive) at our hospital in the  $>34^0$  weeks' GA population was ~60% in each of our NICUs over the 3 years prior to the initiation of this project. **Much lower than the provincial benchmark of 73%.**

## Objectives

To improve the rates of normothermia of inborn newborns  $\geq 34^0$  weeks' GA on primary admission to the NICU from 60% to 85% within 2 years, and in doing so, to improve pre-specified short-term neonatal outcome measures.

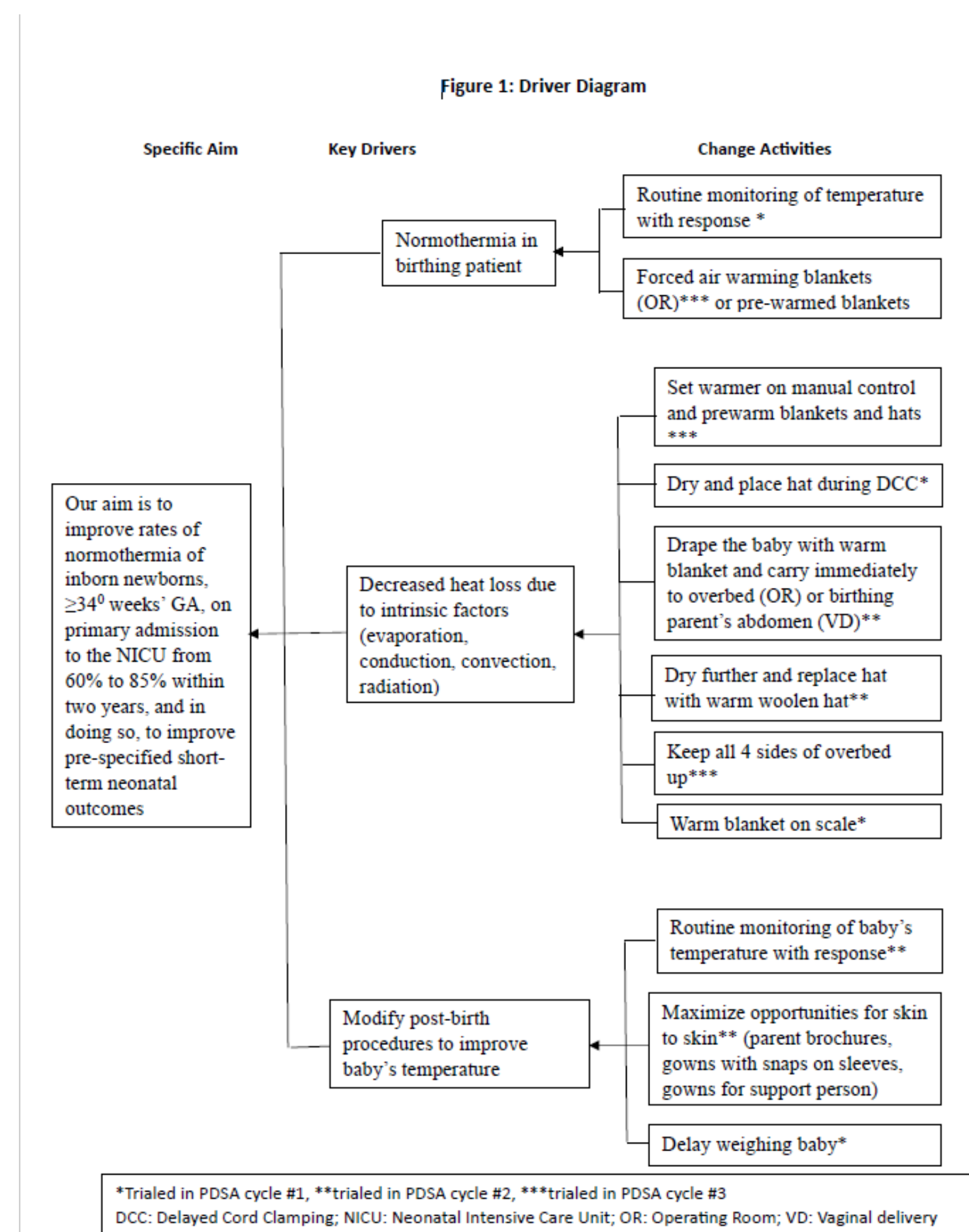
## Analysis of the Problem

A multidisciplinary working group was assembled, consisting of front-line nurses; nurse educators and managers; neonatal, obstetrical, and anaesthesia physicians; respiratory therapists; parent members; and a biomedical technologist.

A root cause analysis was performed, using fish bone and process mapping methods.

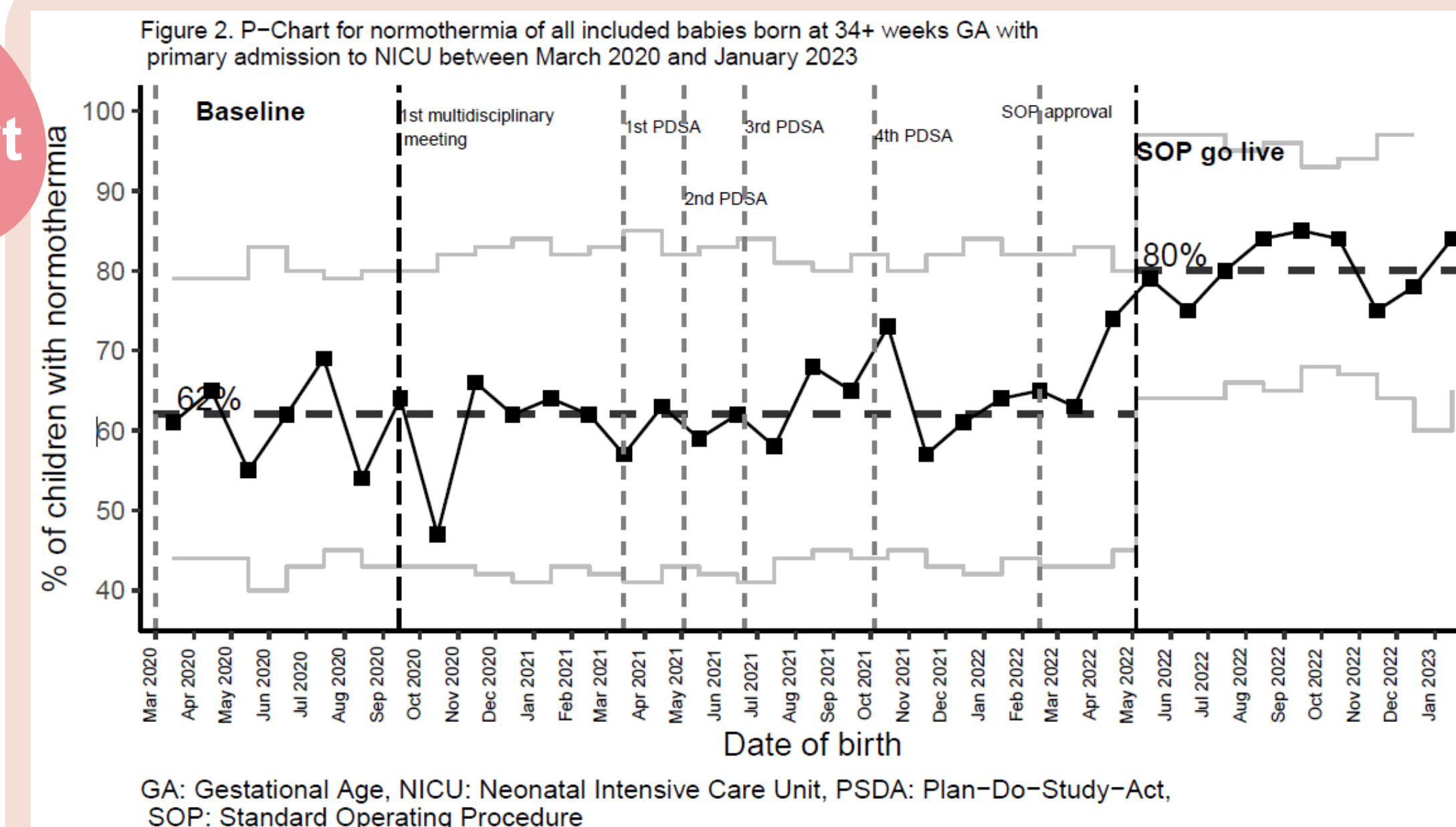
Targeting babies born  $\geq 34^0$  weeks' GA, we developed a list of changes spanning from admission of the birthing parent to transfer of the neonate to the NICU postulated to, either alone or in combination, improve normothermia.

## Driver Diagram



## Results

### P-chart



P-chart shows the proportion of babies admitted to the NICU with normothermia between March 2020 and January 2023. The proportion of babies with normothermia increased from 62% to 80% without increasing our rates of hyperthermia (balancing measure)

Admission temperature of all included babies born at  $\geq 34$  weeks' GA with primary admission to NICU in the pre- and post-intervention sample groups

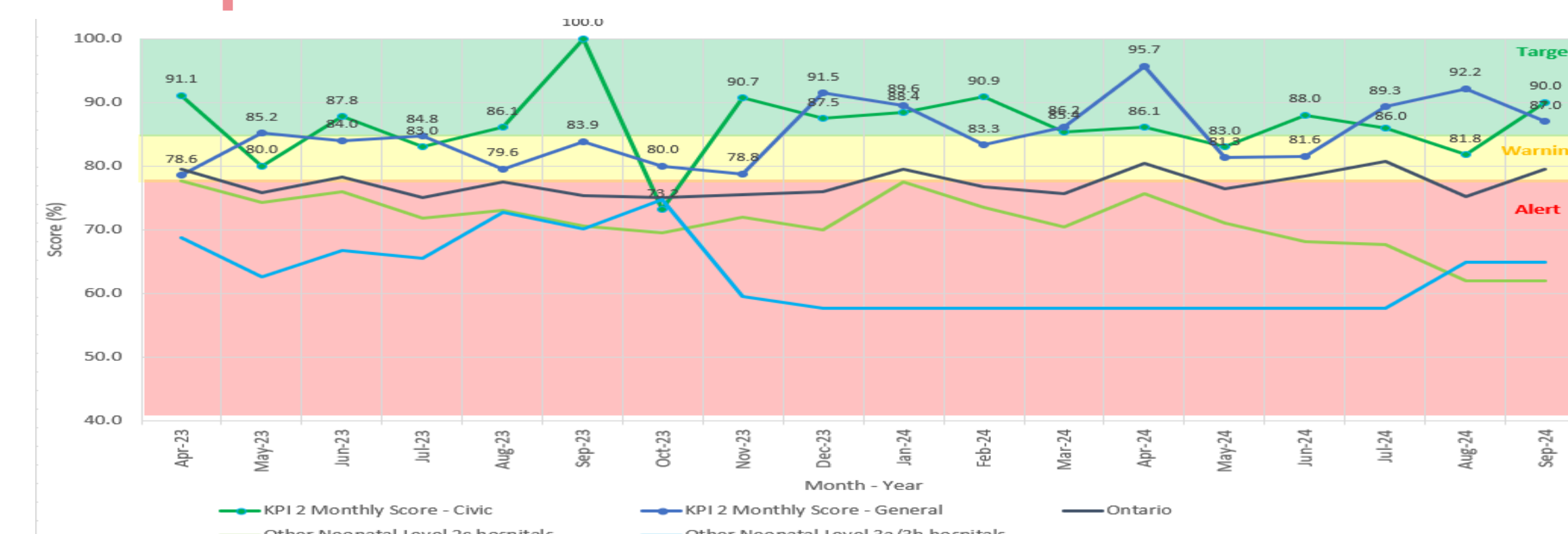
	Pre- (Mar1 2020-Aug30 2020) (N=384)	Post- (Aug1 2022-Jan31 2023) (N=359)	P-value <sup>1</sup>
<b>Hypothermia (&lt;36.5°C)</b>	122 (32.4%)	37 (10.4%)	<0.001
<b>Normothermia (36.5-37.5°C)</b>	231 (61.3%)	301 (84.6%)	<0.001
<b>Hyperthermia (&gt;37.5°C)</b>	24 (6.4%)	18 (5.1%)	0.55

<sup>1</sup>P-value based on Chi-square test  
°C: Degree Centigrade

### Table

**We also showed a significant decrease in the need for intravenous treatment of hypoglycemia from 19.8 to 9.5% (P<0.001) and in metabolic acidosis from 14.1% to 3.6% (P<0.001) in post-intervention group**

## Improvements locked in...



Four Plan-Do-Study-Act cycles were conducted on 239 deliveries. Each PDSA introduced several changes, each of which had previously been identified at preventing hypothermia in the delivery room.

**The purpose of the PDSA cycles was to study the feasibility of the trialed changes within the established workflow, as well as parent and nursing satisfaction!**

