Standardized Approach to the Golden Hour: A Program Evaluation

Kristin Trawinski
University of Alabama
Capstone College of Nursing
Dr. Staci Simmons
Michelle Patchett MSN, RN
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Abstract

Introduction

Premature, low birthweight infants are at increased risk of complications. Hypothermia upon admission to the Neonatal Intensive Care Unit (NICU) after delivery increases morbidity and mortality in this population. The Golden Hour is defined as the first 60 minutes of life, during which interventions and staff behaviors impact neonatal outcomes. This program evaluation assessed the effectiveness of a standardized Golden Hour process program change in a level III NICU.

Methods

The gap analysis performed by the multidisciplinary team identified a need to address role clarification to improve hypothermia. A job instruction breakdown tool (JIBT) was created to guide the multidisciplinary team to provide a standardized approach. The admission body temperatures of low birth weight (LBW) infants were measured before and after a program change. Participants were organized into three groups: infants born in the seven-month period before the program change, infants born in the first six months after the program change, and infants born during months 7-12 after the program change. Data was analyzed using ANOVA repeated measures test.

Results

90 infants were included in the retrospective chart reviewed. Results showed an improvement of euthermia upon NICU admission from a baseline of 63% (n=35) during the 7 months prior to the program change to 82% (n=33) during months 1-6 months after the change and 77% (n=22) during months 7-12. While results were not statistically significant, there was
an improvement towards euthermia in the post-program change group, a clinically significant finding.

Discussion

Hypothermia in the Golden Hour among infants weighing ≤1500 grams places them at greater risk for morbidity and mortality as compared to euthermic counterparts. Utilizing an evidenced-based process improvement measure to clarify standardized roles improves admission temperatures from delivery to the NICU. Stakeholder buy-in was a key step in garnering staff engagement.

Keywords: hypothermia, Golden Hour, prematurity, low birthweight, prevention.
Standardized Approach to the Golden Hour: A Program Evaluation

Neonatology practitioners have been studying the implications of body temperature variability for low birthweight (LBW) and premature infants for years. While many institutions have implemented a standardized approach to achieving euthermia, defined as a body temperature of 36.5 to 37.5 degrees Celsius (97.7–99.5 degrees Fahrenheit), team members lack clarity about individual responsibilities surrounding how to achieve euthermia in the Golden Hour. The Golden Hour occurs during the first 60 minutes of life after birth. Increased morbidity and mortality have been linked to LBW infants admitted to neonatal intensive care units (NICUs) with temperatures below 36.5° Celsius (Lee et al., 2019). Hypothermia is associated with hypoglycemia, metabolic acidosis, hypoxia, respiratory distress, chronic lung disease, coagulation defects, intraventricular hemorrhage, sepsis, and increased insensible water loss leading to dehydration, fluid and electrolyte imbalances, and hypotension (Demtse et al., 2020). This program evaluation examines the effectiveness of a standardized approach to optimizing admission body temperatures of LBW infants in the level III NICU of a community hospital in Maryland.

Background

Infants born with LBW can experience a multitude of complications, including hypothermia. Infants in this population lack brown fat, which typically develops in the third trimester of pregnancy. Brown fat is metabolized to produce heat. LBW infants have a high surface area-to-mass ratio and lack the ability to shiver (Mohamed et al., 2021). Healthcare providers must understand the critical steps that must be taken in the first 60 minutes of life for high-risk infants to achieve optimal outcomes.
Hypothermia on admission in LBW infants is a global issue (Demtse et al., 2020). While many of these issues occur in third-world countries, the preterm birth rate in the United States is 9.8%, which is among the worst of high-resource nations (March of Dimes, n.d.). The LBW rate in Maryland is 8.9%, on par with the U.S. national rate (CDC, 2022). LBW is one of the leading causes of infant death worldwide (CDC). Preventing hypothermia in the first sixty minutes of life is critical to optimizing outcomes for this population.

Multidisciplinary teams in labor and delivery (L&D) and NICU must understand the factors that impact admission body temperatures. Providing care through an efficient, standardized method is key to successful teamwork (Croop et al., 2020). Teamwork within any high-stakes healthcare situation requires closed-loop communication, stakeholder input, and a thorough understanding of barriers. Understanding the necessary steps and roles that each member performs can lead to improved processes and quality of care delivered.

**Problem Statement**

The Golden Hour period is a critical time for LBW infants. Optimal conditions and high-quality communication among team members are key for achieving euthermia in this population. When a standardized approach to the Golden Hour process is absent, LBW infants are at risk of hypothermia and poor outcomes.

**Gap Analysis of Clinical Site**

Current state analysis revealed a lack of standardization of multiple aspects of the NICU admission process. The first inconsistency identified was communication. Notification to the NICU team from L&D for deliveries occurred as a phone call from the L&D registered nurse (RN) to the NICU charge nurse. Communication errors included delays in relaying information to the team and delays in gathering necessary personnel in the right place at the right time. The
second inconsistency involved equipment. Upon inspection, the admission room in NICU was not stocked with the equipment required to adequately keep a LBW infant warm. Equipment for resuscitation, thermal hats, warming pads, and plastic wraps were not kept in standardized code carts in the delivery rooms or operating rooms. Furthermore, knowledge deficits were observed. The elements of thermoregulation (convection, conduction, evaporation, and radiation) were not addressed in the delivery process. Delineation of the responsibilities of team members indicated overlapping of roles, confusion, and missed care opportunities.

In 1999, the Institute of Medicine released “To Err is Human” (Wakefield, 2000). This report outlined improvements staff and healthcare providers can make to ensure quality care, changing how we view healthcare. Healthcare teams often work in fragmented ways, leading to undesired outcomes (Rosen et al., 2018). Inconsistencies identified in the NICU included poor communication between healthcare teams and improper transitions from one environment of care to another, such as lack of warmed air in the transport isolette. Healthcare is a complex system, and failure to communicate as a team creates roadblocks in the care delivery processes. A process redesign that includes stakeholders can provide evidence-based strategies to achieve a shared goal through education, interventions, and an understanding of equipment needs and barriers (Rosen et al., 2018).

**Review of the Literature**

A literature review was conducted to assess the evidence regarding thermoregulation protocols in low birthweight infants upon admission to the NICU. CINAHL, PubMed, and MEDLINE-Ovid were searched with a combination of keywords: hypothermia, Golden Hour, low birthweight, and prevention. Filters for “scholarly peer-reviewed articles,” “full text,” “English only,” and the years 2017-2022 yielded 156 articles. Articles were excluded if they
discussed adult trauma or measures outside of hypothermia and if they lacked prevention measures or took place in poor resource countries. The remaining 17 articles had two key similarities: improving thermoregulation for low birthweight infants after delivery and the importance of teamwork in high-risk deliveries.

**Improving Thermoregulation for Low Birthweight Infants After Delivery**

Hypothermia in low birthweight infants has been studied and discussed in many articles for many years, yet it continues to be a primary clinical concern (Bhatt et al., 2020). All articles in this review discuss the high incidence of morbidity and mortality among infants that experience hypothermia within the first 60 minutes of life. Infants that fall into this category cannot shiver, lack brown fat, have thin membranes, and possess a large surface area-to-body-mass ratio. Heat, in this population, is lost by convection, evaporation, and radiation, all of which can quickly decrease the low birthweight infant’s temperature by 2-3° C in the first half hour of life if necessary interventions are not performed (Soares et al., 2020). The Neonatal Resuscitation Program (NRP) is the gold standard for resuscitation in neonatology. The American Academy of Pediatrics is the driving force for this program. NRP recommends use of a thermal mattress, application of a hat, and placement of a polyethylene wrap on premature infants < 32 weeks gestation (Harriman et al., 2018). A common theme among the reviewed articles involves implementing quality improvement initiatives with checklists, protocols, simulations, and education. These implementations improve the overall percentage of infants admitted with euthermic admission temperature above 36.5° C. Quality improvement initiatives have been shown to improve admission temperatures in low birthweight infants (Peleg et al., 2019).
The sustainability of Golden Hour protocols is only discussed in two articles. Harriman et al. note that, while turnover in healthcare can be a barrier to sustaining desired outcomes, creating a standardized protocol is recommended (2018). All disciplines involved in the resuscitation and delivery of low birthweight infants should be reeducated and coached, and inexperienced team members should receive baseline education (Vinci et al., 2018). None of the reviewed articles discuss standardized equipment in code carts or communication between the delivery and neonatal teams for high-risk deliveries.

Teamwork in High-Risk Deliveries

High-quality teams deliver high-quality care. Eighty percent of medical errors result from communication errors among the team (Panagos & Pearlman, 2017). Four articles discuss the importance of teamwork in the delivery of LBW infants. Assessment of team dynamics between the multidisciplinary team members attending high-risk deliveries is crucial. One shared recommendation from the literature is to involve stakeholders from the beginning stages of assessment to ensure buy-in and understand the needs of each team member’s role. The patient safety framework from the Institute of Healthcare Improvement notes that a culture of safety relies on transparency, reliability, improvement, and measurement (Panagos & Pearlman, 2017). Every minute that occurs during the high-risk delivery of a low birthweight infant is critical. An increase in morbidity and mortality is likely if the team is inefficient, incompetent, and/or lacks standardization (Doak & Waskosky, 2021). Delineation of roles and responsibilities guides the team toward a common goal. Assuring coordination of care is the next step (Rosen et al., 2018). Establishing a standardized process improves efficiency, cohesiveness, and organization as well as team dynamics and job satisfaction (Doak & Waskosky, 2021). According to Costar and Hall (2020), teamwork can be improved by utilizing team training and performance support tools that
allow for sustainability. Simulation and protocols are beneficial tools to improve processes and patient outcomes.

**Evidence-based Practice: Verification of Chosen Option**

Utilization of a multidisciplinary team and standardized approach for providing high-risk care is prominent throughout the evidence. Creating a systematic JIBT to delegate role-specific tasks and identify team member responsibilities in the delivery of low birthweight infants promotes high-quality teamwork to achieve thermoregulation in this population. Using a Plan-Do-Study-Act (PDSA) method while incorporating lean management tools is an evidence-based approach for improving care quality improvement.

**PICO(T)**

For the multidisciplinary high-risk delivery team, does implementation of a standardized process aimed at improving team dynamics result in an increased rate of euthermia upon admission to the NICU among LBW infants (≤ 1500 grams) after a Golden Hours process program change when compared to pre-program change findings?

**Evidence-Based Practice Model**

The framework used to evaluate this program is the Centers for Disease Control Framework for Program Evaluation (CDC, 2023) (Figure 1). This framework is a systematic way to evaluate the effectiveness of a public health systems program. This tool is a practical guide to organizing the essentials of program evaluation in six steps (CDC, 2023).

Step one involves engaging all stakeholders involved in the program. Stakeholders included hospital administrators, patients, families, and multidisciplinary team members from both L&D and NICU who attend high-risk deliveries. Monthly engagement of stakeholders in the evaluation process to discuss and address barriers ensures sustainability (CDC, 2023). The
stakeholders involved in the care provided to infants during Golden Hour were engaged from the start of this quality improvement project. Obstetricians (OB), L&D advanced practice nurses, L&D nurses, operating room scrub technicians, delivery room assessment nurses, neonatologists, NICU advanced practice nurses, NICU nurses, respiratory therapists, electronic medical record personnel (EPIC), information technology (IT) personnel, distribution personnel, and supply chain leaders were involved in program design, education, and implementation.

The second step of the CDC framework is to describe the program. The process redesign was a quality improvement program aimed at improving admission body temperatures of babies born weighing \( \leq 1500 \) grams. NICU leaders assessed admission temperature data for babies weighing \( \leq 1500 \) grams in 2020 and found that only 66\% were euthermic upon arrival to the NICU. Stakeholders met to assess gaps in care and knowledge to create a systematic process to address this problem. The team set a goal to improve admission euthermia rates from 66\% to 90\% following implementation of the new process. Technology, time, and equipment were utilized to assess the existing program’s effectiveness. As a result, individual team member JIBTs were developed as a method to ensure systematic communication and equipment availability. Team members were educated, and the program change was implemented.

The third step of the CDC framework is to focus on the evaluation design. Stakeholders met to discuss the initial focus of this quality improvement program. Evaluation of the process for achieving euthermia was the impetus for this redesign. The following questions were identified: Is the goal currently being met? Is the process redesign clarifying roles, standardizing equipment, and allowing closed-loop communication? Does the JIBT provide clear instructions, or does it require revision? Is the purpose of the practice change to improve outcomes? Is education meeting learners’ needs?
The fourth step of the CDC framework is to gather credible evidence valued by stakeholders. Process confirmation is assessed with each delivery in real-time to assess for barriers, setbacks, and individual knowledge levels (CDC, 2023). Multidisciplinary team members provided feedback to leadership in debriefings held after each infant delivery. This information was relayed to stakeholders during monthly meetings. Stakeholders also reviewed admission temperature data and discussed team members’ concerns. This allowed leaders to address barriers and assess processes that warranted revision. Leaders shared names of new employees who required training and designated which staff would provide the training.

The fifth step for the CDC framework is justifying conclusions. Agreed-upon values and conclusions are analyzed using reliable information so that stakeholders feel confident in the results of the program (CDC, 2023). Aligning the multidisciplinary team’s work with the organization’s strategic plan for improving patient outcomes in the community builds a connection to the mission. During stakeholder meetings, the team discerned that the practice change was supported by evidence from the literature and aligned with the strategic goals of the healthcare facility and the NICU.

Finally, step six of the CDC framework is ensuring use and sharing lessons learned. Process confirmation, assessment of accountability, and discussion of barriers is an ongoing process that occurs with each admission (CDC, 2023). A monthly collection of barriers and feedback is shared with stakeholders. Outcome data is shared with the executive team to ensure leadership engagement in process improvement. Engagement with frontline staff allows leaders to anticipate when the process warrants revision to allow for the evolving nature of healthcare. Discussions included the following questions: What went well when we achieved euthermonic temperatures? Considering instances when we did not achieve euthermia, how can we adapt the
process to improve the outcome? An important lesson learned through discussions with families was the importance of educating both parents (or the mother and her care partner) instead of informing the mother exclusively.

**Theoretical Framework**

Lewin’s model for change was chosen for this program evaluation (Lewin Change model template, n.d.) (Figure 2). Kurt Lewin outlined his model for change as a behavioral scientist in the 1940s (Adelman-Mullall et al., 2023). This change theory describes the dynamic process of staff as they are put through a change in an organization (Wojciechowski et al., 2016). This model is depicted through three stages: unfreezing, changing, and refreezing. Stakeholders in the NICU assessed the current state to define gaps that needed to be stopped, or unfrozen. The process redesign involved stakeholders assessing evidence-based practices to mitigate gaps; this allowed the staff to identify what made this change important for them and to understand the “why” behind the change. Education was rolled out to the multidisciplinary team using simulation, huddles, staff meetings, and videos. Team members received education regarding the process redesign and standard of work involving roles, communication, and equipment. Executive and nursing leadership as well as provider involvement in the change were crucial during implementation. Refreezing involved accepting the new process design and execution of the new process.

**Evidence-Based Practice Model**

The Johns Hopkins Evidence-Based Practice Model is a three-phased approach to practice inquiry (Dang et al., 2022) (Figure 3). The first step is to ask a practice question. The multidisciplinary team developed a PICOT question to ask why this NICU’s admission temperatures of LBW infants were below accepted standards. The second phase is to complete a
literature review that appraises evidence for strength and quality. The third phase is to develop recommendations. In this case, the recommendation was to implement an evidence-based practice change regarding the Golden Hour process.

**Goals and Objectives**

The goal of the project was to evaluate the efficacy and sustainability of a Golden Hour program change. The aim was to reduce hypothermia rates among LBW infants admitted to the NICU. The expected outcome was achievement of euthermia for $\geq 90\%$ of all LBW admissions to the NICU.

**Methods**

**Process Redesign**

Stakeholders gathered to discuss the rate of hypothermia among LBW infants. Evidence-based research queries and benchmarking of nearby NICUs were performed. Simulation in situ was accomplished with all stakeholders to identify gaps in the process utilizing step-by-step assessment and timing of each step for the 60-minute Golden Hour process. Engagement with EPIC personnel to standardize the communication from L&D to NICU using the program’s urgent chat feature to alert all team members to an impending delivery, location of the delivery, and patient demographics was created and tested using the PDSA model. Closed-loop communication utilizing urgent chat improved communication and gathered essential staff members in a timely fashion. Distribution and pharmacy personnel were engaged to standardize neonatal code carts throughout the maternal newborn division with essential supplies for warming infants upon delivery. Stocked supplies included thermal hats, plastic wraps, and warming devices for use during infant transport. A team member JIBT featuring color-coded step-by-step instructions was created to provide education about each team member’s
responsibilities during a delivery (Appendix A). The JIBT also provided details about NICU admission room preparation with standardization of the room setup. Multiple PDSAs were completed before the design was finalized among stakeholders. Facilitation of quality improvement and sustainability was supported by executives using the lean management system and performance improvement team support.

**Process Education**

The education of the multidisciplinary staff was led by leaders of each discipline. The JIBT was discussed with the staff and teach-back was completed. Staff received education via multiple methods, including videos and interactive simulations, which were completed during staff meetings and scheduled sessions.

**Process Confirmation and Accountability**

The program change was implemented in February 2022. Process confirmation for each newborn delivery took place with key champions and included process redesign involvement to assess for barriers and setbacks. Accountability was ensured with process confirmation and data collection using checklists in the electronic medical record (EMR) and feedback from process confirmations. Each month data was shared with stakeholders to discuss concerns or barriers to the new process. Education was provided to new employees during orientation through video recordings, interactive simulations, and dissemination of team member JIBTs. Tracking of new employees’ education was kept in program files and updated by leaders of each discipline.

**Project Site and Population**

The clinical project site is a community hospital with 250 licensed beds in Maryland. The L&D unit contains 18 beds and 3 operating rooms. The level III NICU is comprised of 22 beds. The facility experiences approximately 4000 deliveries resulting in 400 admissions to the
NICU each year. LBW infants constitute approximately 10% of all NICU admissions. Therefore, LBW NICU admissions are high-risk situations that do not occur often.

The L&D unit is staffed around the clock by a designated OB, as well as private OBs who care for their patients. The NICU is always staffed by a neonatologist. Each attending neonatologist provides coverage for one week and then hands off care to another physician the following week. Advanced neonatal nurse practitioners also provide around the clock coverage, and there is a designated respiratory therapist for each shift. Nursing is comprised of registered nurses in L&D and NICU, delivery room assessment nurses, and nursing support technicians.

**Measurement Instruments**

EPIC health records were accessed to collect data regarding infants born weighing ≤1500 grams. Axillary temperatures are measured in the delivery room before transport and upon arrival at the NICU before removing the infant from the transport isolette. All measured temperatures are documented in EPIC. Additional data regarding date of birth, gestational age in weeks, weight, sex, and type of delivery (vaginal or Cesarean section) was collected for this program evaluation by the primary investigator (PI).

**Data Analysis**

IBM Statistics Package for Social Sciences (SPSS), v29, was used for statistical analysis. ANOVA Repeated Measures was utilized to compare means across three periods of the project evaluation based on repeated observations. Three data points (7 months pre-program change, 6 months post-program change, and 12 months post-program change) were analyzed. The level of significance was set at p=0.05.

**Cost-Benefit Analysis/Budget**
This program evaluation incurred no costs. The principal investigator was not compensated for time spent collecting data from electronic medical records or performing statistical analyses.

**Timeline**

Baseline data (pre-intervention) was retrospectively collected in January 2022, including admission body temperatures for LBW infants born in-house and admitted to NICU in the latter seven months of 2021 (Appendix B). All staff received a team member JIBT and education, including simulation and learning modules, in January 2022. Post-intervention data was retrospectively collected in August 2023.

**Ethical Considerations/Protection of Human Subjects**

The healthcare system’s Institutional Review Board (IRB) approved the project in May 2023. University of Alabama (UA) IRB approval was obtained on August 7, 2023. All queried data was housed in a password protected UA Box drive accessible by the PI and faculty advisor. Because this was a retrospective chart review, consent to participate was waived.

**Results**

The number of infants admitted to the NICU from August 2021 through February 2023 weighing ≤1500 grams totaled 90. 50% were female, and 50% were male. 77% were born via cesarean section, and 23% were born vaginally. 64% of these infants weighed between 1000 – 1500 grams, and 36% weighed less than 1000 grams. The gestational ages ranged from 23 to 35 weeks. Data was extracted and organized into three groups: A) infants admitted during the seven-month period prior to program change, B) infants admitted in the first six months after the program change, and C) infants admitted seven to twelve months after the program change. A repeated measures ANOVA was performed to compare pre- and post-program change admission
body temperatures. While there was not a statistically significant difference ($p=0.364$), incidence of eutheremia did improve. Overall, eutheremia was observed in 63% of infants in the pre-program change group as compared to 88% in the post-program change group. Specifically, among the post-program change groups, eutheremia was observed in 82% of infants during the first six months and 77% of those in the last six months. Mean admission temperatures with standard deviations were 36.77±0.151 °C (group A), 37.08°C±0.144 °C (group B), and 36.92±0.141°C (group C).

Mauchly’s test of sphericity indicated that the assumption was met, (0.538), $X^2 (2) = 1.239$, $p=0.538$, and therefore degrees of freedom were corrected using Greenhouse-Geisser/HuynFeldt estimates of sphericity ($\varepsilon=0.943$). The effect of admission temperature on infants admitted to the NICU weighing ≤1500 grams was not significant at the level of 0.05, $F_{\text{independent variable}} (1.887)$, $df_{\text{error}} (39.62) = F_{\text{value}} (1.025)$, $p= 0.364$.

**Discussion**

This quality improvement project aimed to improve the admission temperatures of infants weighing ≤1500 grams by standardizing communication and equipment and creating a team member JIBT for role clarification. Using a control chart of the data, process improvement was improved in the first 6 months post-program change. However, results indicated that, although body temperatures were improved over pre-program change measurements, the Golden Hour process did not remain as consistent over time. Several circumstances must be considered as possible contributing factors.

In October 2022, a major healthcare insurance provider ended their contract with the organization, resulting in fewer overall infant deliveries in the facility, and thus fewer babies being born weighing ≤ 1500 grams. Therefore, the number of patients included in the last 6
months of evaluation was fewer than the two other individual time intervals sampled. A larger sample size may have provided more conclusive data with a smaller margin of error.

Another limitation of the study involves an inherent facility barrier. Due to the age of the hospital, humidity cannot be controlled in the L&D area, which impedes the ability to adequately control the room temperature. Equipment and supply limitations could have impacted the results as well. The facility has a limited number of isolettes, and when all are in use, a LBW infant must be transported in an open crib without temperature and humidity control. Furthermore, during the study, sterile plastic wraps, thermal hats, and thermal mattresses were limited due to backorder. All these circumstances place LBW infants at increased risk of hypothermia.

Although the program change did not result in the desired rate of euthermia, several areas for process improvement were identified through this program evaluation. Ongoing extraction of data, reassessment of the process with a control chart for improvement, and education of newly hired staff are all critical for sustaining a desired change in practice and culture. Although family presence during all aspects of care is supported in the literature, some staff provided feedback indicating a discomfort with parental presence during a neonate’s admission to the NICU. This feedback could lead to incorporating caregiver education into ongoing educational modules.

Components of the standardized Golden Hour process identified in this program evaluation could be translated to other hospital areas where fragile infants receive care. One example includes supplying the emergency department with thermal hats, plastic wraps, and thermal mattresses. Providing Golden Hour education to local emergency medical service and emergency department providers could improve outcomes for LBW infants born outside of L&D facilities. Future quality improvement projects that could complement the Golden Hour process include initiation of hypoglycemia management, antibiotic initiation, neuroprotection, and family
involvement during the admission process to the NICU. These initiatives have great potential to improve outcomes for LBW infants.

**Conclusion**

Low birthweight is the leading cause of infant deaths worldwide and continues to be a problem in the United States. LBW infants are unable to maintain thermoregulation due to multiple physiologic and developmental factors. Healthcare professionals who provide care to LBW infants play pivotal roles in keeping this high-risk population safe. Euthermic temperatures correlate with better outcomes and improved morbidity and mortality. Implementing a quality improvement project to improve the Golden Hour process by standardizing communication, equipment, and role clarification has been shown to be effective. The CDC framework for program evaluation is a resourceful tool for evaluating a quality improvement project's effectiveness. Checklists, guidelines, and simulation activities are evidence-based tools that can improve high quality teamwork in the care of LBW infants. This program evaluation revealed that, while the facility’s goal of achieving euthermia in \( \geq 90\% \) of LBW infants was not achieved, the program change was successful. For future LBW infants to achieve optimal outcomes, ongoing staff education, stakeholder engagement, and evaluation of Golden Hour processes must continue.
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Figure 1

*CDC Framework*

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https://www.cdc.gov/evaluation/index.htm
Figure 2

Lewin’s Change Model

From: Lewin Change Model Template. For more information visit: https://online.visual-paradigm.com/diagrams/templates/lewins-change-model/Lewin-change-model-template/
Figure 3

*Johns Hopkins Evidence-Based Practice Model*

From: Dang, D., Dearholt, S., Bissett, K., Ascenzi, J., & Whalen, M. *Johns Hopkins evidence-based practice for nurses and healthcare professionals: Model and guidelines.*
### Important Steps / By WHAT / WHO

**A logical segment of the operation when something happens to advance the work.**

1. **Make or break the job**
2. **Injure the worker**

Make the work easier to do. i.e., "break"; "tweak"; special timing; bit of special information.

<table>
<thead>
<tr>
<th>Important Steps / By WHAT / WHO</th>
<th>Key Points HOW</th>
<th>Reasons WHY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preparation Period</strong>&lt;br&gt;Stock delivery rooms and operating rooms&lt;br&gt;<strong>DRAN duties are performed by L&amp;D RN at this phase</strong></td>
<td>- Check L&amp;D OR Boxes&lt;br&gt;- Daily cart checks</td>
<td>To improve outcomes</td>
</tr>
<tr>
<td><strong>Small baby room set up in NICU</strong></td>
<td>- Pop top isolette set at 39°&lt;br&gt;- Admission kit&lt;br&gt;- Sterile Water&lt;br&gt;- 3 IV pumps&lt;br&gt;- Emergency Equipment&lt;br&gt;- Place two blankets and a burp cloth in heated isolette&lt;br&gt;- Ventilator&lt;br&gt;- Bubble C-Pap</td>
<td>Small baby room is always prepared for urgent deliveries</td>
</tr>
<tr>
<td><strong>Pre-Delivery Period</strong>&lt;br&gt;Communications&lt;br&gt;Notify NICU team of impending delivery of &lt;32-week gestation infant</td>
<td>- Call NICU Charge&lt;br&gt;- NICU charge to notify NICU team (MD, AP, RT, NICU RN) of impending delivery</td>
<td>Effective communication improves outcomes&lt;br&gt;Team Readiness</td>
</tr>
<tr>
<td><strong>Preparation for Delivery</strong>&lt;br&gt;Team and Family Communication</td>
<td>- Obtain OB history&lt;br&gt;- Discuss plan with team for cord clamping&lt;br&gt;- Introduce team to family</td>
<td>Communication with family reduces anxiety and builds trust</td>
</tr>
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*From: Trawinski, K. *Job instruction breakdown sheet: Greater Baltimore Medical Center*
### Job Instruction Breakdown Sheet (JIBS)

**Process:**

**Revision date:**

**Revised by:**

**Patient Requirements:**

**Equipment/Supplies/Technology Needed:**

| Supply/Equipment set up period for Delivery Room or Operating Room (DRAN & NICU RN) | Turn on warmer | Set up DR/OR warmer bed according to the Neonatal Resuscitation Quick Equipment Checklist (see attachment) | Sterile wrap provided to OB | Get code cart and OB monitor | Avoids delays in care | Prevents heat loss |
|NICU Small baby room | Pop top of incubator when team is called for delivery | Turn heat to maximum | Set up suction | Transport bed is on and warming in L&D, check air and O2 tanks | Supply/equipment preparation avoids delays in supply needs during resuscitation |
|Call for Delivery | Urgent Chat NICU DR Team | Perform a 2nd bedside check of DR/OR warmer set up | Activate transport | Place plastic wrap on sterile table | Give risk factors to NICU team | Communication improves outcomes |
|NICU Team | Arrive in DR/OR | Review risk factors | Check supplies/equipment for readiness | Assign roles | Initiate Golden Hour | |
|Delivery | Wrap infant in plastic wrap upon delivery | Perform timed cord clamping as planned | Pulse ox is placed on right wrist | Decreased risk of hypothermia | Prevent ROP |

**From:** Trawinski, K. *Job instruction breakdown sheet: Greater Baltimore Medical Center*
### Job Instruction Breakdown Sheet (JIBS)

**Process:**

**Revision date:**

**Revised by:**

**Patient Requirements:**

**Equipment/Supplies/Technology Needed:**

**Key:** MD/AP, DRAN, NICU RN, NICU Charge, L&D Charge, NICU NST, RT, OB

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<thead>
<tr>
<th>Task</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Temperature probe is placed on infant</td>
<td></td>
</tr>
<tr>
<td>- Bed on servo control</td>
<td></td>
</tr>
<tr>
<td>- EKG leads on</td>
<td></td>
</tr>
<tr>
<td>- Assist with resuscitation according to role</td>
<td></td>
</tr>
<tr>
<td>- Call out times to facilitate cord clamping... 30 seconds, 1 minute, clamp cord</td>
<td></td>
</tr>
<tr>
<td>- Provide chest compressions as needed</td>
<td></td>
</tr>
<tr>
<td>- Start Apgar timer</td>
<td></td>
</tr>
<tr>
<td>- Keep baby midline</td>
<td></td>
</tr>
<tr>
<td>- Place hat on baby</td>
<td></td>
</tr>
<tr>
<td>- Resuscitation lead</td>
<td></td>
</tr>
<tr>
<td>- Provide early CPAP, PPB, or intubate as needed</td>
<td></td>
</tr>
<tr>
<td>- Place emergent UVL as needed</td>
<td></td>
</tr>
<tr>
<td>- Administer meds through UVL as needed and call out time/medication for recorder</td>
<td></td>
</tr>
<tr>
<td>- MD/AP to assume head of bed position for code situation</td>
<td></td>
</tr>
<tr>
<td>- Assist with resuscitation according to role</td>
<td></td>
</tr>
<tr>
<td>- Titrate FiO2 for targeted SpO2 range per NRP</td>
<td></td>
</tr>
<tr>
<td>- Secure ETI</td>
<td></td>
</tr>
</tbody>
</table>

**Transport to NICU**

**DRAN duties are performed by NICU RN in the absence of DRAN in this phase**

<table>
<thead>
<tr>
<th>Task</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Invite father or significant other to accompany infant to NICU</td>
<td>Provides a collaborative, trusting relationship with family</td>
</tr>
<tr>
<td>- Obtain axillary temperature in L&amp;D prior to transitioning to transporter, avoid transferring infant to transporter until temperature has reached 36.5°C</td>
<td>Maintains thermoregulation during transport</td>
</tr>
</tbody>
</table>

*From: Trawinski, K. Job instruction breakdown sheet: Greater Baltimore Medical Center*
### Job Instruction Breakdown Sheet (JIBS)

**Process:**  
**Revision date:**  
**Revised by:**

**Patient Requirements:**

**Equipment/Supplies/Technology Needed:**

<table>
<thead>
<tr>
<th>Key: MD/AP, DRAN, NICU RN, NICU Charge, L&amp;D Charge, NICU NST, RT, OB</th>
</tr>
</thead>
</table>

- Place infant in warmed transporter with transport wrap, plastic wrap, swaddled in warm blanket and thermal hat
- Help with delivering respiratory support during transport

### Arrival to NICU

- Take axillary temperature in transporter with infant still swaddled
- Transfer baby with thermal hat, transport wrap, plastic wrap and swaddled to pre-warmed pop up isolette
- Maintain plastic wrap ideally for 1st hour or until temperature is 36.5°C
- Once infant is on warmer, place temperature probe on abdomen and set Servo control to 36.5°C
- Monitor on, pulse ox connected, and EKG leads connected
- Check VS
- Obtain glucose via heel stick – discuss with MD/AP for need for PVY
- Place O2 tube
- Secure infant for central line placement
- Assist Neonatologist or advanced practitioner with central line placement including timeout and CUP forms
- Start fluids and antibiotics as ordered
- Close top of isolette and initiate humidity with axillary current temperature of 36.5°C

### Decreased morbidity and mortality

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*From: Trawinski, K. Job instruction breakdown sheet: Greater Baltimore Medical Center*
Appendix A (page 5)

From: Trawinski, K. Job instruction breakdown sheet: Greater Baltimore Medical Center
Appendix B

Project Timeline

<table>
<thead>
<tr>
<th>January 2022- assess data from 2021</th>
<th>January 2022- Educate staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2022- complete JIBs and Urgent chat</td>
<td>February 2022- February 2023 data evaluation</td>
</tr>
</tbody>
</table>
Table 1 - Mean Admission Body Temperatures

<table>
<thead>
<tr>
<th>Intervention Period</th>
<th>Mean</th>
<th>Std Error</th>
<th>Lower Bound Temperature</th>
<th>Upper Bound Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-7 months Pre</td>
<td>36.777°C</td>
<td>.151</td>
<td>36.463°C</td>
<td>37.091°C</td>
</tr>
<tr>
<td>0-6 months Post</td>
<td>37.082°C</td>
<td>.144</td>
<td>36.783°C</td>
<td>37.381°C</td>
</tr>
<tr>
<td>7-12 months Post</td>
<td>36.92°C</td>
<td>.141</td>
<td>36.269°C</td>
<td>37.217°C</td>
</tr>
</tbody>
</table>

Data Analysis with 95% Confidence Interval
Table 2 – Percentages of Infants with Admission Body Temperatures > 36.5°C

![Bar chart showing percentages of infants with body temperatures above 36.5°C across three phases of the process.]

Phases of the Process:
1. 63%
2. 82%
3. 77%