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Improving Breastfeeding Rates by Using Glucose Gel to Treat Newborn Hypoglycemia

Madena Barak
University of San Francisco, madenabarak@gmail.com

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Clinical Leadership Theme

The Clinical Leadership theme that this project is associated with is clinical outcomes management, and the role is outcomes manager. The project's team will be using the latest evidence and research to improve newborn hypoglycemia outcomes and achieve increased breastfeeding rates. The aim is to improve the current protocol for treatment of newborn hypoglycemia by transitioning from supplemental formula feedings to oral glucose gel. The change will take place in a large community hospital in Southern California on the Maternal-Child Health units—Labor and Delivery, Mother/Baby, and NICU. The process begins with the bedside administration of oral dextrose gel to newborn infants experiencing hypoglycemia. The process ends with the infants' blood glucose levels after initiation of treatment.

By working on the process, the project's team expects to primarily increase breastfeeding rates. Secondary aspects that the team hopes to affect are (1) abiding by the hospital's Baby-Friendly initiatives, (2) decreasing infant admission rates to the NICU for IV dextrose therapy, and (3) promoting maternal-child bonding.

This project is timely because of the identified need to (1) initiate a treatment that is more cost effective, (2) reduce maternal-infant separation, and (3) improve patient satisfaction.

Statement of the Problem

Newborn hypoglycemia occurs in 5-15% of newborns during the postnatal period (Weston et al., 2016). Per hospital policy, newborns showing clinical signs of hypoglycemia or infants who have predisposing risk factors, get screened for hypoglycemia using a capillary heel-lance blood sample. This unit's specific target range is a blood glucose level greater than or equal to 40 mg/dL. Infants with numbers less than this receive supplemental infant formula and

in severe cases, closer monitoring or intravenous dextrose therapy, causing them to be transferred to the newborn nursery or NICU. Due to this, the hospital's breastfeeding rates have dropped, in turn affecting patient satisfaction. This transfer of care also delays the initiation of breastfeeding, interferes with mother/baby bonding, and leads to increased costs.

Project Overview

Through evidence based research, various literature reviews, and discussions with the Nurse Educator, oral/buccal dextrose gel was looked into as a form of treatment for infant hypoglycemia. With this intervention, the specific goal of the project is to increase the percentage of the hospital's breastfeeding rates by 20%. This aim statement relates to the global aim statement because it supports the primary goal of increasing breastfeeding rates while supporting the secondary effects of increased maternal-infant bonding, decreased admission rates to the NICU, and improved abidance to the hospital's Baby Friendly Initiative.

Rationale

Assessing a microsystem involves gathering specific information surrounding a possible concern. Using that information can often lead to a data driven solution (Harris, Roussel, & Thomas, 2014). When assessing this microsystem, a need was identified to improve treatment for newborn hypoglycemia to potentially improve breastfeeding rates, and to better coincide with Baby-Friendly Hospital Initiatives.

In an audit of the monthly breastfeeding rates for 2016, on average the unit had a 65% rate across the year. In addition, these rates also caused decreased patient satisfaction scores because patients who wished to breastfeed were disappointed when their infants had to be removed from them to formula feed. In severe cases, infants must be admitted to the NICU for intravenous (IV) dextrose therapy.

For the projected costs, the author will use the cost of her labor to the hospital as a Registered Nurse. As a current full-time employee, the hospital will spend an estimated $78,630 in employment and benefits for individual labor costs for the 2017 fiscal year (Hospital X, 2017). Comparisons will be made between these costs, the projected goal of increasing breastfeeding rates to 85%, and the cost of newborn hypoglycemia treatment with oral glucose gel.

In 2016 there were 6,699 births at this hospital. Of those infants, 4,354 (65%) were breastfed, 66 had to be admitted to the NICU for IV dextrose therapy, and 2,095 were formula fed, either by choice or due to infant hypoglycemia. According to Rawat et al. (2016), the cost of newborn admission to the NICU for the treatment of hypoglycemia with IV dextrose therapy is $31,820 per case, and the cost of successful treatment with oral glucose gel is $5,037 per case. Therefore, in 2016, the unit spent a total $2.1 million on NICU admission costs. The cost of formula feeding infants over a hospital stay of three days is about $6.30 per infant. If the intervention of oral glucose gel causes a 20% increase in breastfeeding rates, assuming that is 20% less infants formula feeding and maybe two less admissions to the NICU, then the hospital will save an estimated $2,649 on formula and $63,640 on NICU admission costs in the 2017 year.

Clearly, the implementation of this project provides a great economic benefit for the hospital and will lead to savings that can be used towards other projects within the hospital.

Methodology

In order to implement oral glucose gel as the first line of treatment for hypoglycemic newborns, the project will use Lewin's Theory of Planned Change. According to Shirey (2013), Lewin's Theory of Change includes three stages: unfreezing, moving or transitioning, and refreezing.

The first step would be to unfreeze the current protocol by displaying evidence of the need for change to all members of the multidisciplinary team. Since all members play a role in the implementation of this project, lateral integration will be used to bring together the physicians, nurses, pharmacists, and administrative staff to explain the evidence that was found with the new intervention. Data will be collected on the newborn breastfeeding rates before the new intervention and after the new intervention. This will be used to compare the success of the project. Once all stakeholders are on board with the project, the protocol will be rewritten to include the new intervention.

In the transitioning/moving stage, "super-users" will educate nurses on the administration of oral buccal gel for hypoglycemic infants. Pharmacy will add weight-based doses of glucose gel in their formulary for dispensing.

The refreezing stage will take place after the new protocol has been implemented. The goal during this stage will be to ensure that staff is following the new protocol and that the results are tracked and shared to promote compliance. By comparing data on the number of breastfeeding newborns after the implementation of oral glucose gel, the team will know whether they have reached the desired goal of an 80% breastfeeding rate.

Data Source/ Literature Review

The following PICO search was used to find research on the topic:

P: Newborn infants with hypoglycemia

I: Oral dextrose gel

C: Supplemented formula

O: Breastfeeding Rates

The CINAHL data base was used for the PICO search. An initial search on the subject of "oral dextrose gel" only yielded four results, of which three were relevant to my project. When the search was narrowed to include “infant hypoglycemia” and "oral dextrose gel for the treatment of hypoglycemia", it yielded many more results.

In an article by Bennett, Fagan, Chaharbakhshi, Zamfirova, and Flicker (2016), the authors developed a new algorithm for the treatment of infant hypoglycemia at Advocate Lutheran General Hospital in Park Ridge, IL. Due to the typical treatment of supplementing formula and IV dextrose therapy interrupting breastfeeding and maternal-infant bonding, Bennett’s et al. (2016) new algorithm called for the administration of 40% oral glucose gel. Data collection over a 14-month period showed that the new intervention reduced infant admission rates to the NICU for hypoglycemia by 73%. It also provided breastfeeding exclusivity rates. Forty-nine percent of the women with neonates at risk for hypoglycemia who wished to breast-feed were able to exclusively breastfeed (Bennett et al., 2016).

Harding et al. (2016) designed a randomized placebo-centered trial using 40% buccal dextrose gel. The aim of the trial was to determine if oral dextrose gel administered for treatment of newborn hypoglycemia would reduce admission to the NICU. Infants at risk for hypoglycemia, less than one hour old, and of mothers who intended to breastfeed were randomly placed in a dextrose gel group or placebo group. The study group received 0.5 ml/kg of dextrose gel while the placebo group received 2% hydroxymethylcellulose. Both interventions would be given alongside breast milk. Outcomes of the trial are to be evaluated through admission rates to the NICU and will be available at a future date (Harding et al., 2016).

Harris, Weston, Signal, Chase and Harding (2016) assessed the effects of oral dextrose gel on newborn hypoglycemia in a study named “The Sugar Babies Study.” Using a randomized,

double-blind placebo-controlled trial, the researchers incorporated newborn infants from 35-42 weeks gestation, less than 48 hours old, and having one or more risk factors for hypoglycemia. The trial was done at a tertiary hospital in New Zealand. Babies were randomly assigned to a placebo group or a 40% dextrose gel group receiving 200 mg/kg. Two hundred and thirty-seven of the 514 enrolled infants became hypoglycemic and were placed into the randomized groups. The results showed that dextrose gel babies had less failed glucose levels after two treatment attempts, showing that dextrose gel is a simple, inexpensive, and effective form of management for hypoglycemia.

Two years later, Harris et al. (2016) released a follow up trial to the Sugar Babies Study. According to the authors, the main purpose behind treating infant hypoglycemia is to prevent brain injury. Thus, they developed a two-year follow-up trial inviting the same children from the Sugar Babies study to participate, assessing the long term effects of dextrose gel compared with placebo gel on neurosensory impairment at 2 years of age. Assessments included neurologic function, general health, cognitive skills, behavior skills, language skills, motor skills, executive function, and vision. The results showed that of the children assessed, 38% of the dextrose gel group and 34% of the placebo group had neurosensory impairments. This indicated that dextrose gel is a safe treatment option for neonatal hypoglycemia, but neurosensory impairment is not decreased.

Hegarty et al. (2016) conducted a randomized controlled trial. Babies at risk for hypoglycemia, but without indications for NICU admission, were randomized into eight groups at two hospitals in New Zealand. There were four placebo groups, and four dextrose gel groups consisting of babies receiving dextrose gel at either 200 mg/kg one time at one hour of life, 400 mg/kg one time at one hour of life, 200 mg/kg for four doses, or 400 mg/kg one time followed by

200mg/kg doses for three additional doses. Between August 2013 and November 2014, 416 infants were placed into randomized groups. The results showed that dextrose gel infants were less likely to develop hypoglycemia than placebo infants. Admission rates to NICU for hypoglycemia were less common for infants in the dextrose gel group. Breastfeeding rates were similar in both groups. There were low adverse effects noted in either group. The overall conclusion was that a single dose of dextrose gel administered at 200 mg/kg reduced the incidence of neonatal hypoglycemia.

Rawat et al. (2016) studied the effect of dextrose gel therapy with feeds in asymptomatic hypoglycemic preterm and term infants. The authors' aim was to see its effects on reducing IV dextrose therapy. They performed a retrospective study before and after the dextrose gel use. Infants with blood glucose levels less than 45 mg/dL were given three doses of gel at 200 mg/kg in addition to their feeds. If the infants had to be transferred to the NICU, this was considered a failure. The results showed that dextrose gel in addition to feeds increased blood sugar in 74% of infants compared to 54% in infants who only received feedings. Transfers to the NICU decreased from 35/1,000 to 25/1,000.

Weston et al. (2016) reviewed the effectiveness of oral dextrose gel in treating newborn hypoglycemia and reducing long-term neurosensory impairment. Using various randomized and quasi-randomized studies, the investigators compared dextrose gel with placeboes, no treatment, or other methods of treatment. Two trials were done with 312 infants. The results showed that no evidence exists of a difference between a placebo and dextrose gel for long-term neurosensory impairment. Dextrose gel did not make a difference in the reduction of IV dextrose therapy in both trials. However, hypoglycemic infants who received dextrose gel therapy were less likely to

be separated from their mothers during treatment and had a higher chance of being exclusively breastfed after discharge.

Timeline

The project developed due to concerns raised over the unit's current breastfeeding rates between 2015-2016. New evidence was becoming available for the treatment of newborn hypoglycemia and it was being adopted successfully by surrounding hospitals in this particular community. In November 2016 the planning phase of the PDSA cycle began. An audit was done of the monthly breastfeeding rates over 2015 and 2016 to gain a baseline of the unit's current situation. The audit revealed lower rates than the unit's target range, which was primarily because the hospital's protocol for infant hypoglycemia called for formula feedings. This indicated a need for change in the department in order to increase breastfeeding rates. The oral dextrose gel intervention was further researched to see how it could benefit the hospital's breastfeeding rates. In December, plans were made to move forward with the process of getting it approved. The Nurse Educator and the head of the project, presented to members of the healthcare team. Before bringing the project up to other departments, the prospective project was presented to the labor and delivery and NICU nursing department directors in January. Once accepted by the directors, the proposed project was then presented to other departments, and then presented to the neonatologists. The neonatologists approved the idea of the project in February. In March of 2017, the proposed project was presented to the pharmacy and approved.

Pharmacy already had the glucose gel in their dispensing formulary because it is often used for adults. However, they needed to gain approval to use the buccal gel for an off-label purpose.

By mid- April, 2017 the goal was to have IT place the order set into the electronic medical record as a PRN order. This way the buccal gel can be signed off and scanned as a completed task every time it is administered. The plan is to have the project implemented by mid-May, 2017. Six months after implementation, the progress of the project will be checked and the intervention reevaluated. The timeline is displayed in Appendix C.

Expected Results

At the end of the six-month implementation phase of the project, it is projected that the unit's monthly breastfeeding rates will increase from the current average of 65%. It will never be at 100% because some parents choose not to breastfeed at all. However, a 20% increase is a realistic goal for this project. If the breastfeeding rates increase, patient satisfaction scores may also be positively affected. Mothers will have increased maternal-child bonding time and greater success initiating the breastfeeding process.

Nursing Relevance

Using oral glucose gel as a form of treatment for newborn hypoglycemia and to increase breastfeeding rates could potentially have a positive impact on the nursing profession. This could allow nurses to provide higher quality of care to newborns during the initial days of their life and better abide by the QSEN competencies of patient-centered care, quality improvement, and safety.

This project improves quality of care because using oral glucose gel at the bedside for infants with low blood sugars, allows for increased maternal-infant bonding time, which has had beneficial outcomes for mothers and infants. Skin-to-skin time will not be interrupted because glucose checks and buccal gel administration can be done while the infant is on the mother. Safety at the bedside is supported since bottle -feeding can have aspiration risks if not done

properly (Saint Luke's, 2015). The entire process of implementing this project also promotes dialogue and collaboration amongst multidisciplinary members, creating a stronger team that can better serve its patients.

Summary Report

The aim of this CNL project was to increase breastfeeding rates by transitioning from supplemental formula feedings to oral glucose gel for the treatment of newborn hypoglycemia. With this change, the goal is to increase breastfeeding rates by 20%. The project took place in a large community hospital in Southern California, targeting newborn infants on the labor and delivery, mother baby, and NICU units.

The unfreezing, transitioning, and refreezing stages of Lewin's Theory of Planned Change were used throughout the project. The unfreezing stage took place when a 2015-2016 audit was done of the microsystem's breastfeeding rates, revealing a 65% breastfeeding rate. A fishbone diagram (Appendix A) also identified the causes of the unit's decreased rates. With the help of the data from the hospital's tracking system, the project's team concluded that the current protocol in place for newborn hypoglycemia needed to be changed to remove supplemental formula as the treatment. Through collaboration with the unit's nurse educator and local hospitals in this particular area, the team collected articles revealing evidence-based success with the use of oral dextrose gel instead of formula. To resolve the issue, the project's team will change the current policy to oral dextrose gel in conjunction with breastfeeding as the treatment for newborn hypoglycemia. This will begin in mid-May, 2017 where super-users will train all bedside staff on the weight-based administration of the oral buccal gel.

Sustainability relies on five factors, modification of the program, having a champion, fits with the organization's mission/procedures, perceived benefits of the staff/clients, and support from stakeholders (Harris, Roussel, & Thomas, 2014). In order to maintain the sustainability of this project, the team has incorporates some of these factors into their plan. As a Baby-Friendly hospital, the project aligns well with the baby-friendly guidelines. The goal is that by using oral glucose gel on infants with low blood sugars, mothers can continue to breastfeed without having to supplement with infant formula. The mission of the organization is to provide the highest quality of care to the communities it serves (Hospital X, 2017). Quality of Care is a priority for this project and the stakeholders involved with it. Primary stakeholders such as the nursing directors, the nurse educator, Pediatricians, and Pharmacy are supportive in the progression of the project. This project is also sustainable because it will be standardized. There will be a written policy published and readily available on the hospital's Policies and Procedures site, including the changes and a process map to clearly display the steps that need to be taken when caring for a hypoglycemic infant.

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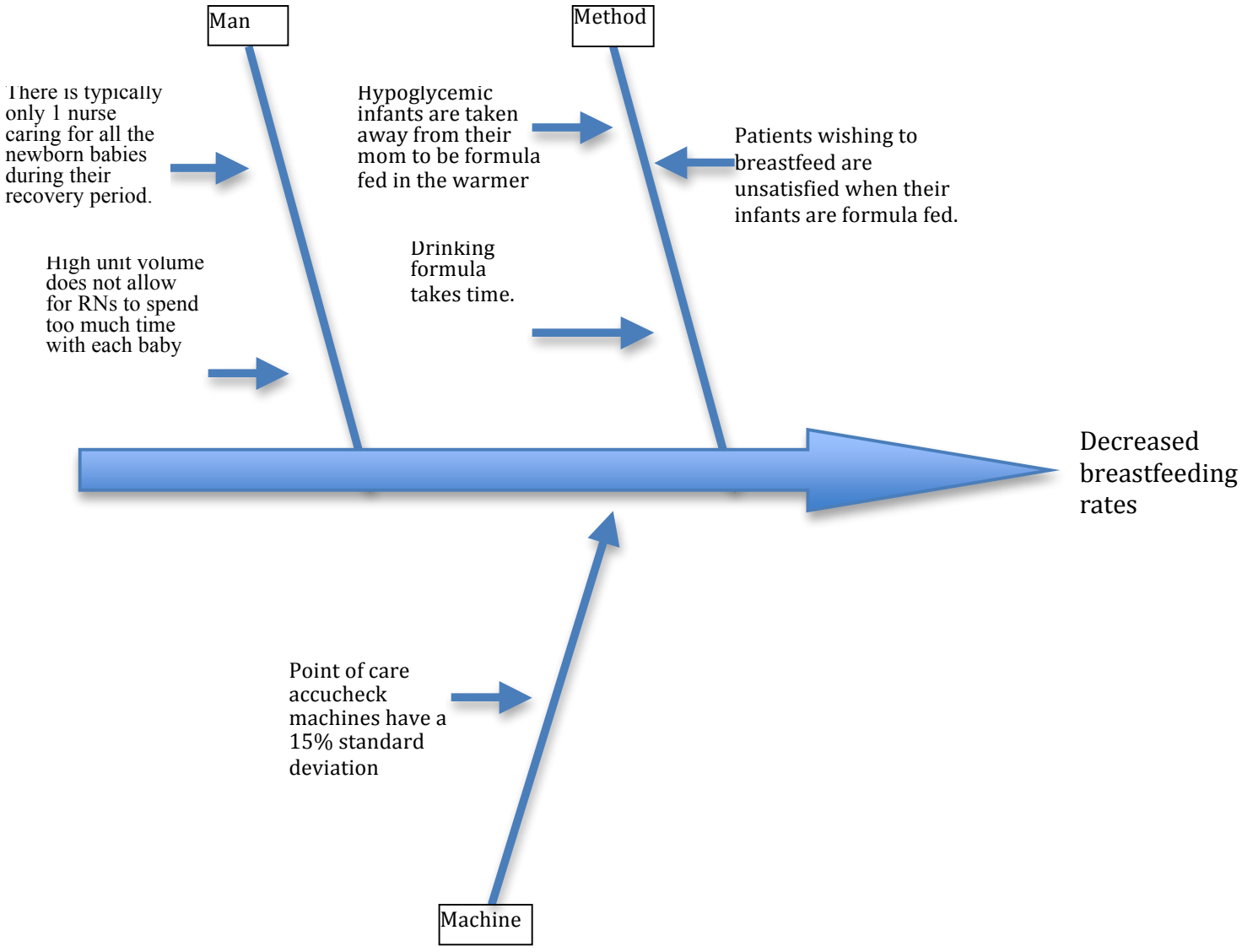
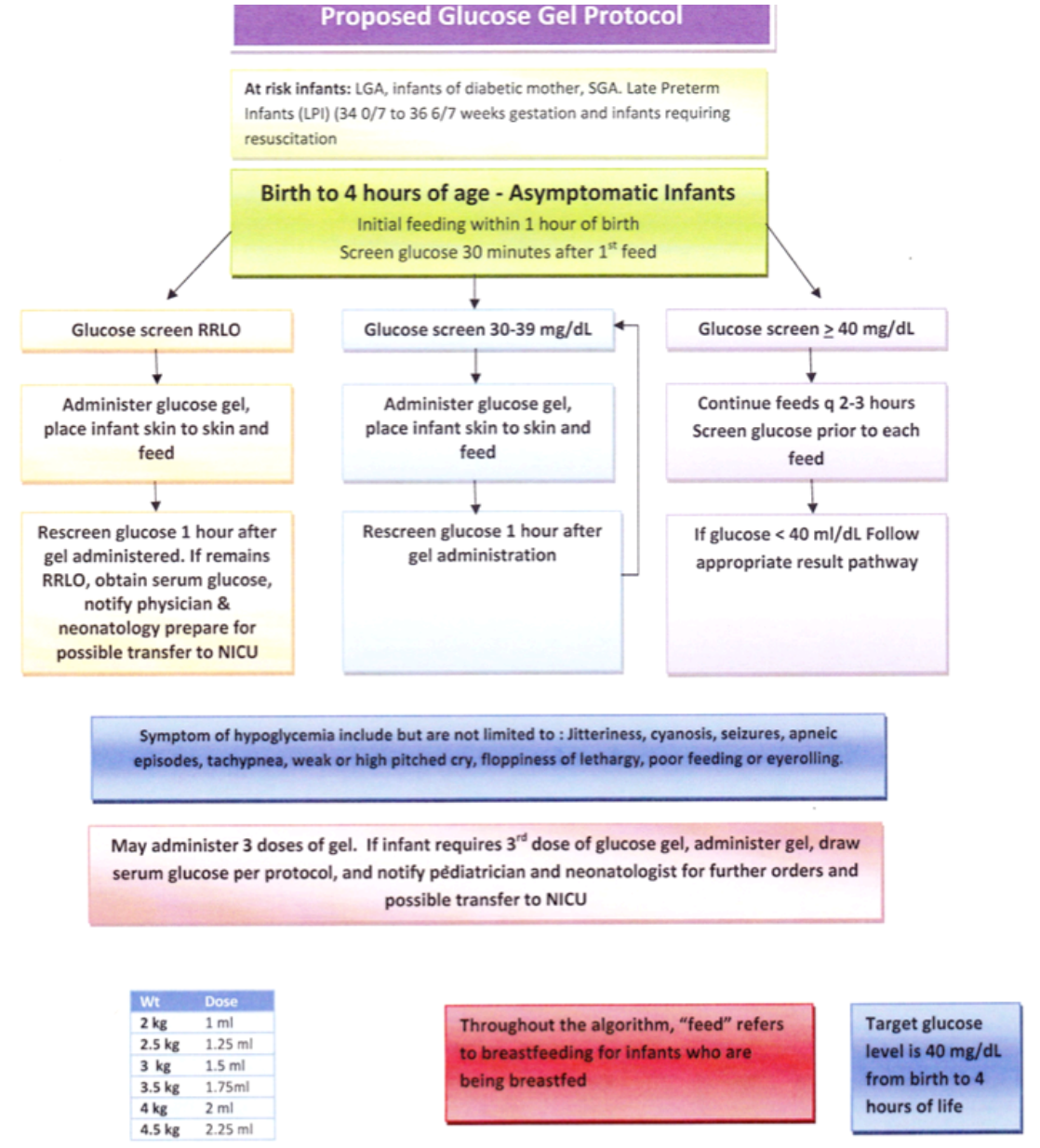
Appendix A

Root Cause Analysis Fishbone Diagram



Appendix B

Revised Hospital Policy Flow Chart



Appendix C

Timeline

November 2016	December 2016	January 2017	February 2017	March 2017	April 2017	May 2017	November 2017
Audit done of 2015-2016 breastfeeding rates. Oral glucose gel further researched.							
	Decision made to move forward with the project. .						
		Project presented to L&D and NICU nursing directors. Approved.					
			Project presented to Neonatologists. Approved.				
				Project presented to Pharmacy. Approved.			
					IT placed order set in EMR by April 15.	Project to go live May 15.	
							Project progress checked and reevaluated.