

The University of San Francisco  
**USF Scholarship: a digital repository @ Gleeson Library |  
Geschke Center**

---

Master's Projects and Capstones

Theses, Dissertations, Capstones and Projects

---

Spring 5-19-2017

# Gavage Program for the Preterm Infant

Amanda K. Guina

University of San Francisco, [akguina@dons.usfca.edu](mailto:akguina@dons.usfca.edu)

Follow this and additional works at: <https://repository.usfca.edu/capstone>

 Part of the [Maternal, Child Health and Neonatal Nursing Commons](#)

---

## Recommended Citation

Guina, Amanda K., "Gavage Program for the Preterm Infant" (2017). *Master's Projects and Capstones*. 519.  
<https://repository.usfca.edu/capstone/519>

This Project/Capstone is brought to you for free and open access by the Theses, Dissertations, Capstones and Projects at USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. It has been accepted for inclusion in Master's Projects and Capstones by an authorized administrator of USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. For more information, please contact [repository@usfca.edu](mailto:repository@usfca.edu).

Gavage Program for the Preterm Infant

Amanda Guina, RN, BSN, MSN

University San Francisco

School of Nursing and Health Professions

### **Clinical Leadership Theme**

This project focuses on the Clinical Nurse Leader (CNL) curriculum element quality improvement and Safety. The CNL role function is the ability to “implement quality improvement strategies based on current evidence, analytics, and risk anticipation” (AACN,2013). As the CNL, I will be utilizing unit resources as well as being a point of contact for the education and implementation of this project.

### **Statement of the Problem**

Preterm infants in the Neonatal Intensive Care Unit (NICU) are susceptible to nosocomial infections due to their immature immune systems. Many in this population nearing the completion of their stay; remain hospitalized to work on full nipple feeds. Which can greatly increase their chances of acquiring an infection. The course of full nipple feeds is individualized, and could take several months for the infant to master. During the process of mastering full feeds, the patient may acquire an infection, thus, requiring additional days in the hospital to be treated. This occurrence will set the infant back and the process of establishing full feeds is lengthened. The purpose of this project is to prevent nosocomial infections in our patients by discharging them home with a nasogastric (NG) tube to work on full feeds.

### **Project Overview**

This project will be implemented in a Level III NICU in Southern California. The unit can house approximately 87 patients at a given time. The acuity of the patient’s range drastically from micro-preemies to grower feeders. The staff consists of neonatologists, nurse practitioners, specialty physicians and surgeons, registered nurses, respiratory therapists, occupational and physical therapist, child life specialists, case managers, social workers and unit secretaries

All members of the interdisciplinary work together to give our patients and their families quality care. The population that this project will be focusing on is the preterm infant working on full nipple feeds. The patients in this group set are healthy, but, remain in the hospital to be monitored while working on feeds. Although, the infants are healthy they are still susceptible to acquiring an infection due to their immature immune system.

To help prevent infection in this this population a home gavage program is needed. For a patient to be considered for this program a physician must determine whether the infant is a good candidate. The criteria that must be met include: the patient must nipping 50% of intake, have consistent weight gain, tolerate bolus feeds, have caregivers that can proficiently care for the infant (Appendix A). Once the infant is considered, all members of the interdisciplinary team are notified and caregiver education is begun. Bedside nurses will work closely with caregivers to ensure that they are competent in sending home the infant with a nasogastric tube. It is imperative the caregivers understand how to maintain the NG tube and what to do in case of emergencies.

When the caregivers are comfortable with maintaining the NG Tube and can proficiently demonstrate care, the parents must make an appointment to have a rooming-in day/night. During rooming-in the caregivers must remain with the infant in a room and care for the patient as if at home. This allows for the caregivers to demonstrate their abilities, and still can have the safety net of the hospital in case of an emergency. If the caregivers can care for the infant, discharge will be set up within a few days to ensure that case managers can set up any home health agencies or durable medical equipment (DME) that is needed.

On the day of discharge the caregivers will be given a 2-week post discharge appointment to follow up with a gastrointestinal doctor to ensure that the NG tube is still intact and the patient can handle gavage feeds and is thriving. The bedside nurse will also ensure that the caregivers know to call the NICU in any cases of emergency. The aim of this project is to prevent infection in the preterm infant working on full feeds. This aim statement relates to the global aim statement by addressing the need to discharge preterm infants home on a home gavage program rather than keeping them in the NICU, where they can potentially obtain an infection.

### **Rationale**

To identify the need for a home gavage program, a root cause analysis was utilized (Appendix B). Chart audits were reviewed as well as national ranking and ratings were analyzed. The U.S. News and World Reports (2017) compiled data on 30-day readmissions, incidence of infections and patient volume and compared the data to the national standard. The hospital that I am implementing this new program ranked average in prevention of infections.

This prevention looks at the ability to prevent infections, success in minimizing infections through hand hygiene, vaccination and other proven measures (U.S. News & World Reports, 2017). The hospital also ranked average in their ability to prevent NICU infections. This prevention reviews the NICU's success in minimizing central-line bloodstream infections in neonatal ICU patients (U. S News & World Reports, 2017). Although the data used shows that we are on average compared with other facilities, there is always room for improvement. Prevention is a key component in this success of this project. It is of utmost importance that we strive in the prevention of unnecessary infections.

Per Austria-Cantimbuhan, Santos & Villanueva (2014), the cost of hospitalization is twice more expensive for NICU patients with hospital acquired infections (HAI) than those without. For the purpose of this paper my cost analysis will cover an average NICU stay compared to additional length of stay due to hospital acquired infections (Appendix C). The cost of one day of hospitalization in the NICU is approximately \$10,000 per day (Park, 2009). On average, we have 70 patients on the unit, which would require 40 nurses. The nursing staff consists of ADN registered nurse and BSN registered nurses, and the average hourly rate for a bedside nurse is \$ 55.00. Respiratory therapists are also incorporated into our care, and their average hourly rate is approximately \$40.00. The average length of stay (LOS) for a premature infant is approximately 4 months, this is not taking into consideration extra ordinary circumstances that would prevent discharge at this four-month mark. The entire cost of a four-month hospital stay in our NICU is \$1,200,000. If the infant acquires and infection during their stay the cost of the hospitalization increases do to the additional resources that will need to be utilized to take care of the patient. This stay could reach approximately \$3,000,000. This program is seeking to shorten length of stay by several weeks. This cost of savings will be approximately \$210,000.

### **Methodology**

The program that I am implementing is the early discharge of infants with gavage tubes, to work on full feeds at home. This program will allow infants to go home with nasogastric tubes (NG) to work on feeds, rather than having the patient remain on unit to work on full nipping. The purpose of this program is to cut the cost of length of stay (LOS), which will in turn lead to a decrease in potential nosocomial infections. It is the hope of this program that once the patient can nipple 50% of their feeds and is stable, they will begin the process of being sent home early.

Patient participation is considered on an individual basis. Once a patient is recognized as a potential candidate, physicians will begin the process of closely monitoring the infant.

The change theory that will be used for this project is Lewin's change theory. The theory incorporates three elements to help guide the change needed within a system. The first stage of this theory is unfreezing. In this stage an agent such as a nurse leader recognizes a need within the facility. For my project the unfreezing phase is the implementation of a home gavage program that will entail early discharge of preterm infants working on full feeds. The necessity of this project is to prevent unnecessary longer lengths of stay due to infection. The second stage in this theory is the moving or transitioning phase. In this phase the lead in this project will begin to work on a detailed plan as to how this project will work. The leader will also need to begin engaging key stakeholders in this process, to have all involved buy into the new change. "The transition stage involves coaching to overcome fears and clear communication to avoid losing sight of the desired target, which is a new and improved reality" (Shirey, 2013).

All stakeholders in the gavage program are on board and know exactly what is expected of them. Several meetings have taken place and details of this program have been determined and all involved agree on the implementation of this program. The third stage of this theory is refreezing. This phase "demands stabilizing the change so that it becomes embedded into existing systems such as culture, policies, and practices" (Shirey, 2013). In this phase leaders look at any driving forces that are working against implementation of the change and find ways to fix these driving forces so full emersion into this change is taken. "This third stage is important because locking in or institutionalizing change will be crucial to its sustainability over time" (Shirey, 2013).

Once this project is implemented it will be my responsibility to be a resource if there are any questions or concerns. I will continuously review this new program to ensure that all phases of this program are working appropriately. I will continuously educate staff members on this process and welcome any feedback. To check whether our program is effective I will conduct chart audits to gather information on the prevalence of nosocomial infections in our preterm infants working on full feeds. Reviewing these charts will give me the vital information I need to gauge whether this program is effective, it will also give me the opportunity to see if there are any areas of the program that may need further review. I predict that our home gavage program will greatly reduce in the incidence of nosocomial infections in our preterm population. I can check these predictions by reviewing further the charts of the population we are focusing on.

### **Literature Review**

The literature regarding a gavage program for preterm infants working on feeds supports the concept that early discharge in this population will decrease the incidence of nosocomial infections. According to Strum (2005), a gavage feeding program is not only safe but cost effective. Strum (2005), also noted that results were overwhelmingly positive, with an average daily weight gain of 31 g/day, no programmatic related hospital readmissions, parental reports of many program benefits, and an average cost savings for third party payers of \$12,428 per infant.

The American Academy of Pediatrics (2008) noted that shortening the length of a hospital stay may benefit the infant by shortening its exposure to the risks of hospital-acquired morbidity. Furthermore, gavage feeding has been used safely in the home setting for infants who are not able to feed well enough by breast or bottle and this practice has a limited role and should be considered only when feeding is the last issue requiring continued hospitalization (American



Academy of Pediatrics, 2008). To test the effectiveness of a home gavage program Collins, Makrides & McPhee (2015) conducted a quasi-randomized study that looked at a set group of infants who were discharged early with an NG tube. The results of this test had proven to be successful. Authors found that early discharge with home support of gavage feeding for stable preterm infants resulted in a reduction in length of hospital stay and a decrease in the proportion of infants with clinically diagnosed infection (Collins, Makrides & McPhee, 2015).

To further back the claims of early discharge and prevention of infection, Wright & Bogaert (2009) found that there was decreased risk of infection in incidences of respiratory infections in the group of infants discharged early, compared with those who remained in hospital until establishment of full sucking feeds. Authors also found that “infants on the home gavage feed program went home an average eight days earlier than the infants discharged on oral feeds” (Wright & Bogaert, 2009). Bissell, Wood, Peak, Woodward, Towers, Nettleton & Miall (2009) conducted a pilot home gavage program at the end of this program authors found that there was a reduction of 105 hospitalized NICU days stay, there were no re-admissions to the hospital with feeding-related problems and parents responded favorably to the experience. Ahnfeldt, Stanchev, Jorgensen & Greisen (2015) conducted a home gavage program over an 11-year period and followed each patient during this time to determine whether this program was successful in achieving positive outcomes. In this study 500 infants participated in the program and they constituted the early discharge group and were compared with 400 infants discharged from a nearby hospital. The early discharge group’s length of hospitalization was only three days shorter than the comparison group. The above literature substantiates the need for a home gavage program in the NICU with which I am concentrating. It has been found that a program of this nature will greatly benefit the patients that we serve.

### **Timeline**

The project started in late January of 2017 and is still ongoing. Refer to Appendix C for Gantt Chart Timeline. This project has come with many challenges, since I am in a student role I did not have full access to information. I had to rely heavily on my preceptor and unit CNS to give obtain the information that I need to complete this project. Another challenge were the applications to get approval from the state. The application process was foreign to me and it took me quite some time to gather all that I needed to turn in our application.

### **Expected Results**

The expected results of this program are that preterm infants will be able to be discharged home with an NG tube so they can work on full feeds. It is expected that the interdisciplinary team will work together to fully execute this project. I would like to see a decrease in nosocomial infections in the population that I am concentrating on and an increase in early discharge gavage program participants. One conclusion I would like to get out of this project is that we will see an increase in patient/family satisfaction.

### **Nursing Relevance**

We as nurses seek to improve patient outcomes, by any means possible. Our patients are our top priority and it is important that they thrive in the best environment possible. What better way than to be at home with their families where they can bond. The hospital environment is the least ideal place for a patient to thrive.

### Summary Report

Education and coordination will be the main methods used to implement this project. There will be education opportunities during morning and evening huddles to ensure that the staff nurses as well as the team leaders, charge nurse and managers get the information they need to fully execute this process. During these huddles, there will be a brief power point presentation presented to give an overview of this new process as well as how the staff will be incorporated into this project. After the presentation, there will be a question and answer opportunity so any questions or concerns can be dealt with accordingly.

The baseline data of this unit showed that approximately eighteen patients acquired bloodstream infections, one acquired an indwelling catheter infection and two patients contracted MRSA infection. Although the data presented may seem to be low, this is only a conservative estimation from the data collected. This unit strives to eradicate infections caused by prolonged hospital stays, and with this new program we are hoping the will assist in our pursuits. To best help implement this program the *sending infant home with Corpak feedings* (Appendix A) will be utilized to guide me in educating our staff. This sheet lays out the step by step patient experience that will direct all involved to understand the process and can be fully executed at any point. Power Point Presentations will also be used during education session, to ensure full understanding is obtained. I will also be a point of contact if there any problems that may arise.

This gavage program is a work in progress and has not been fully implemented by this unit. The data collected prior to this project showed that there is a need to help decrease the incidence of nosocomial infections. Sending preterm infants home to work on feeds, will greatly decrease the incidence of infection in this population.

To help the sustainability of this project it is important to remain open to the possibilities of changing aspects of this project as needed. This will allow for this process to mold into the inner workings of the unit. This program will also allow for easy transitioning into the discharge curriculum. As our patient's near discharge this will be an additional education tool that can easily fit into discharge teaching. To ensure our programs sustainability the lead neonatologist will act as the unit champion of this project. She will be able encourage all members of the interdisciplinary team on the benefits of this program. To further assist in the sustainability of this program, it is of utmost importance to have the support of the key stakeholders in the program. This support will ensure that this program will have the longevity to incorporate itself into the culture of our unit.

## Reference

- Ahnfeldt, A. M., Stanchev, H., Jørgensen, H. L., & Greisen, G. (2015). Age and weight at final discharge from an early discharge programme for stable but tube-fed preterm infants. *Acta Paediatrica*, *104*(4), 377-383. doi:10.1111/apa.12917
- American Academy of Pediatrics. (2008). Hospital Discharge of the High-Risk Neonate. Retrieved from <http://pediatrics.aappublications.org/content/pediatrics/122/5/1119.full.pdf>
- American Association of Colleges of Nursing. (2013). *Competencies and curricular expectations for clinical nurse leader education and practice*. Retrieved from <http://www.aacn.nche.edu/cnl/CNL-Competencies-October-2013.pdf>.
- Austria-Cantimbuhan, Santos, & Santos. (2014). Impact of hospital acquired infection on the cost and duration of hospitalization in the neonatal intensive care unit. *Pediatric Infectious Diseases Society of the Philippines Journal*, *15*(1), 40-49. Retrieved from [http://www.pidsphil.org/pdf/Journal\\_08312014/jo46\\_ja05.pdf](http://www.pidsphil.org/pdf/Journal_08312014/jo46_ja05.pdf)
- Bissell G., Wood A., Peak S., Woodward D., Towers A., Nettleton L., Miall, L. (2009). Changing practice by the earlier introduction of tube feeding at home. *Infant*; *5*(5): 150-54.
- Collins, C., Makrides, M., & McPhee, A. (2003). Early discharge with home support of gavage feeding for stable preterm infants who have not established full oral feeds. *Cochrane Database of Systematic Reviews*, N.PAG.

- Park, J. (2009). No More Million Dollar Babies. *Healthcare Costs*. Retrieved from <http://www.tc.umn.edu/~parkx032/CY-NICU.html>
- Shirey, M. R. (2013). Strategic Leadership for Organizational Change. Lewin's Theory of Planned Change as a Strategic Resource. *Journal of Nursing Administration*, 43(2), 69-72. doi:10.1097/NNA.0b013e31827f20a9
- Sturm, L. (2005). Implementation and evaluation of a home gavage program for preterm infants. *Neonatal Network*, 24(4), 21-25.
- U.S. News & World Report. (2017). Loma Linda University Children's Hospital, Loma Linda, California: Rankings & Ratings. Retrieved March, 2017, from <http://health.usnews.com/best-hospitals/area/ca/loma-linda-university-childrens-hospital-loma-linda-calif-PA6930053/pediatric-rankings/neonatal-care>.
- Wright, L., & Bogaert, A. (2009, December). Early Discharge of Preterm Babies: Gavage feeding in the home. Retrieved from [http://www.slhd.nsw.gov.au/rpa/neonatal%5Ccontent/pdf/guidelines/home\\_gavage.pdf](http://www.slhd.nsw.gov.au/rpa/neonatal%5Ccontent/pdf/guidelines/home_gavage.pdf).

## Appendix A

**SENDING INFANT HOME WITH CORPAK FEEDINGS****Part of the LLUCH NICU Improving Nippling. QI project****2/23/17**

- I. **Patient criteria:**
  - a. Stable infant nippling at least 50% of intake.
    - i. Exclusion criteria: tachypnea, absent gag reflex, facial dysmorphism with possible abnormal airway
  - b. Consistent weight gain
  - c. Weight >2.0kg
  - d. Tolerating bolus feeds per gravity
  - e. Family vetted for appropriateness as determined by medical, nursing and SW teams
  - f. Anticipated need for gavage support at least 1 week
- II. **Obtain GI consult prior to discharge**
- III. **Parent teaching:**
  - a. How to check proper NG tube location prior to feeding
  - b. How to give feedings via NG tube (teach parents to flush the NG post feeds with 2-3 mL tap water)
  - c. How to keep the NG tube securely taped
  - d. Infant to wear mitten,
  - e. keep infant's bed head elevated.
  - f. If patient has an episode of emesis or retching, he needs to come to the hospital for assessment of proper NG position.
  - g. When to seek medical attention, or call the doctor and which doctor to call
- IV. **Home feeding supplies, and documents to be delivered to patient's bedside on day of discharge:**
  - a. Syringes for feeding/medications
  - b. Stethoscope
  - c. Formula as appropriate
  - d. Letter that parents may carry, signed by discharging attending, with statement that Corpak is to be kept until full nippling achieved for >48 hours and should be replaced by experienced medical staff if dislodged.
  - e. Complete discharge summary with all instructions and appointments.
- V. **Replacement process:**
  - a. **Case manager to obtain preauthorization for the replacements** (at least for 5?) before discharge

- b. Following NICU discharge:** Upon dislodgment of the Corpak tube it will be replaced through 3800, Using it as outpatient observation area. Using the process below:

Parents call NICU secretary

NICU Secretary calls admitting and alerts of incoming patient and notifies MD of the need for the replacement order

Parent goes to Admitting

Admitting calls NICU Secretary and has parent come up

NICU secretary notifies Charge nurse that baby has arrived for tube replacement

CN assigns resource to replace tube

RN and family go to procedure room that is available for procedure

Tube is replaced

Parent is released

Nurse completes charting and closes the encounter (for billing)

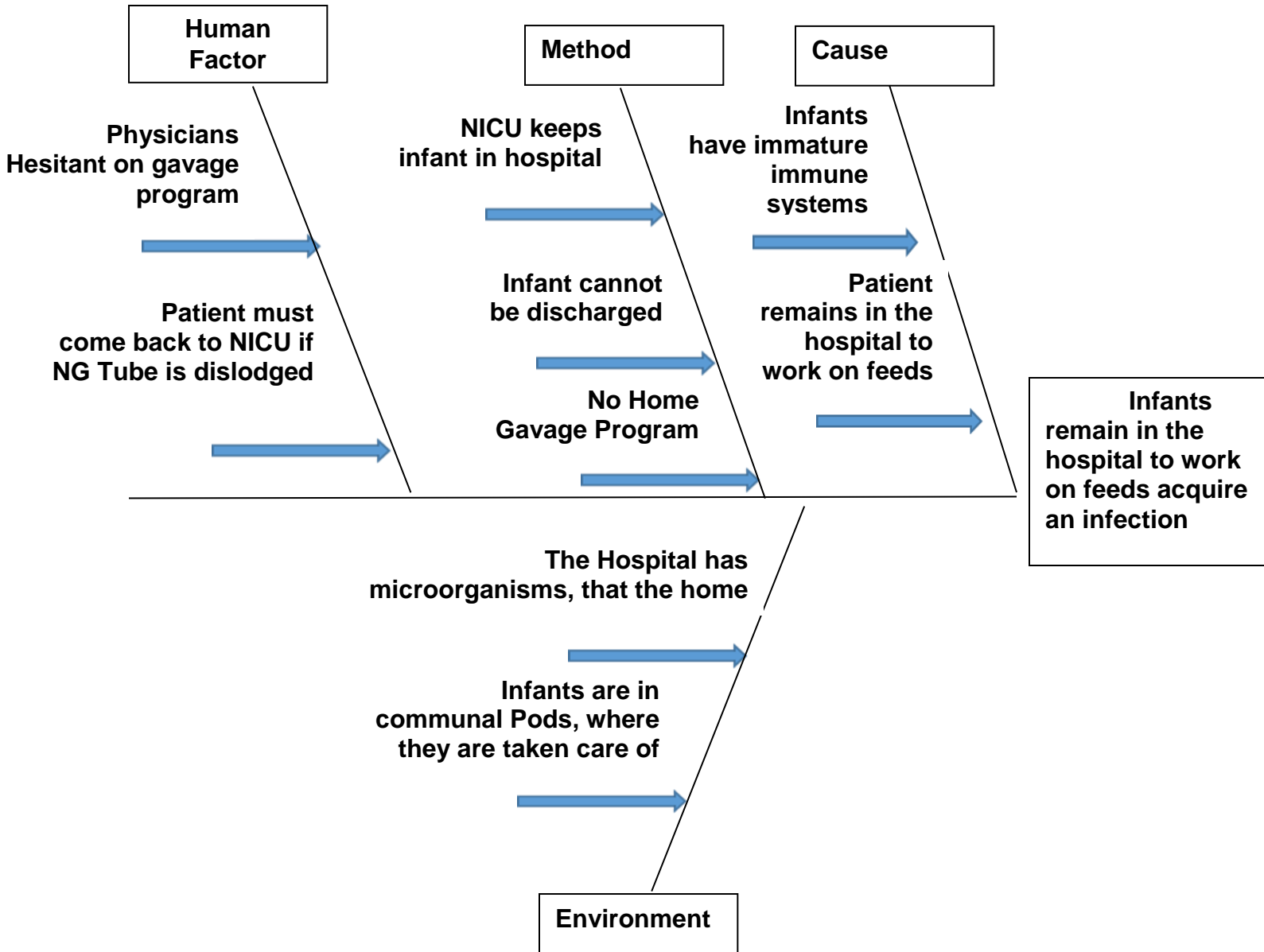
- c. After GI, has seen the patient as outpatient in their clinic and is established and GI patient:** they may be able to go to 2800, through GI clinic, during their service hours (7:30 am until 6pm). If the tube comes out at night and patient is nipping >50% of intake, NG does not need immediate replacement, parents will go to 2800 first thing in am to have it replaced.

#### VI. Follow-ups:

- a. PMD 1-3 days' post-discharge** – appointment to be scheduled prior to discharge
- b. Communication of discharging MD/NNP with follow up physician prior to discharge**
- c. GI post-hospital outpatient visit 2 weeks** – appointment to be scheduled prior to discharge. Insurance verified prior to discharge, request for urgent GI referral as needed
- d. NICU personal F/U: Daily phone calls** from unit (charge RN) for 2 weeks following discharge. Charge nurse keeps log with calls and records progress/issues. This information is passed at the end of the 2 weeks to discharge coordinator to keep in file and enter final data (communication with Hanny Oey/GI) when patient achieved full nipping or had GTT placed.
- e. Skilled home nursing visits** – arranged by case manager prior to discharge
- f. OT/SLP Outpatient Rehab visits** – arranged by case managers and OP Rehab once authorization is obtained
- g. 24-hour emergency contact telephone number - NICU**



Appendix B  
Root Cause Analysis  
Fishbone Diagram



Appendix C  
**Cost Analysis**

Nosocomial Infection	With Nosocomial Infection	Without
Hospitalization Costs (Room and Board, interdisciplinary team, laboratory procedures...):	600,000 per month	300,000 per month
Length of Stay:	5 months	4 months
<b>TOTAL:</b>	<b>3,000,000</b>	<b>1,200,000</b>

Appendix D

**Gantt Chart**

