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Developing a Guideline for Transferring Premature Infants from Incubator to Open Crib in the
NICU

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In the neonatal intensive care units (NICU) achieving stable temperature in an open crib is one of the criteria for discharging premature infants. This physiologic criterion is attained by the premature babies at varying post menstrual ages (PMA) of a stable preterm in the NICU. For a stable preterm infant, majority of the NICUs across the nation recommend maintenance of an axillary temperature between 36.5-37.2 as the normal skin temperature (Barone et al. 2014; Knobel, 2014; Schneiderman et al. 2009; Zecca et al. 2010). Due to concerns over the thermal instability and poor weight gain, the traditional incubator weaning protocols have mostly been depended upon individual physicians' preferences and standard infant weights between 1600-2000 gm.

There are very few studies done to examine the weaning process of a stable preterm infant and policies and procedures vary between institutions. A few studies examined the feasibility of transferring preterm infants at varying birth weights, as low as 1600 gm. (Barone et al., 2014; Schneiderman et al. 2009; Zecca et al., 2010). Barone et al, (2014) conducted a study on early weaning process of infants at 1600 gm weight and concluded that early weaning decreases length of stay and PMA at discharge. Their study also showed an increased growth velocity of these infants compared to those infants who were weaned at 1800 weight or higher. Yet, a standard protocol or guideline regarding the weight, PMA, and/or incubator temperature prior to transfer to an open crib has not been established in transferring stable preterm infants from an incubator to an open crib.

The purpose of the study is to identify criteria for successful transfer of stable preterm infants from an incubator to an open crib maintaining the thermoregulation within the acceptable range of axillary temperature between 36.5⁰-37.2⁰ C. All the infants will be diapered, dressed in a t-shirt, cap, and wrapped in blanket during the transfer process.

Research Questions:

1. What is the optimal weight to have a successful transfer from an incubator to an open crib for a medically stable growing premature infant from 23- 34 6/7 weeks gestational age?
2. What is the appropriate gestational age to have a successful transfer from an incubator to an open crib for a medically stable growing premature infant from 23- 34 6/7 weeks gestational age?
3. What is the optimal axillary temperature to have a successful transfer from an incubator to an open crib for a medically stable growing premature infant from 23- 34 6/7 weeks gestational age?

Definition of terminologies:

Medically stable – the infant will have no episodes of clinically significant apnea, bradycardia, or desaturation during the weaning period 24 hours prior to transfer and 24 hours post transfer.

Successful transfer- the infant will be able to maintain his/her axillary temperature within the range of 36.5-37.50 Celsius in the crib with standard swaddling (diaper, t-shirt, blanket, and hat) until discharge; able to take the entire feeding by mouth/tube and tolerate; and steadily gain weight daily without any lose.

All neonates admitted to the NICU at North Shore University Hospital (NSUH) from 1/1/2010 to 12/31/2015 between 23-34 6/7 weeks of gestational age will be eligible for the study. Other eligibility criteria include a minimum weight of 1500 gm, consistent weight gain for at least 5 days, and enteral nutrition prior to the transfer. Infants who were medically unstable such as ventilator assistance and apnea & bradycardia episodes at the time of transfer from incubator to crib will be excluded from the study.

A retrospective chart review will be conducted on all infants between 23-34 6/7 gestational ages at birth and who are medically stable at the time of transfer from an incubator to an open crib from January 2010- December 2015. These infants will be further stratified into 23-26 6/7 weeks, 27- 30 6/7 weeks and 31-34 6/7 weeks of gestational age. The data collection tool template is given in appendix I.

As the suggested study is a retrospective chart review, an informed consent is not sought for the study. No identifiable data will be extracted from the chart for study purposes. There will be no interventions or deviations from the current protocol. Currently the transfers are done based on individual attending physician's discretion.

This is a chart review, and the proposed sample size is based on feasibility and availability of resources, and not on a formal power calculation. The charts of all neonates meeting the inclusion/exclusion criteria from January 2010 to December 2015 will be reviewed. It is estimated that there are between 700 and 1000 such charts. Approximately 80% of such transfers are successful. Therefore, it is estimated that of the 700-1000 charts, between 700 and 800 will have been successfully transferred, and between 200 and 300 will have been unsuccessful. In order to obtain stable estimates when using logistic regression, approximately 10 events per variable are required. (ref: van Belle, Statistical Rules of Thumb, John Wiley & Sons, Inc, 2002). Therefore, the proposed sample size will be sufficient to examine models including 8 to 10 variables. (It should be noted that for purposes of this calculation, the "event" would be unsuccessful transfer, as that is the lower proportion).

The data collected will be based on the infants' PMA, weight at transfer, and the range of incubator temperatures. Then the data will be stratified based on the stratified age group of the study subjects-23-26 6/7 weeks, 27- 30 6/7 weeks and 31-34 6/7 weeks of gestational age. A normally distributed data will be analyzed as mean and standard deviation or as median and

interquartile range if the normal distribution is unacceptable. The baseline characteristics will be expressed as numbers and percentages.

References:

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