

Fellow Column: Quality Improvement Initiative: Reducing the Interval from Birth to NICU Admission and Initial Blood Glucose Determination in Very Low Birth Weight (VLBW) Infants

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At the John H. Stroger Hospital's NICU and Perinatal Center, Very Low Birth (VLBW) infants are at risk for hypoglycemia for various reasons including decreased glycogen stores owing to prematurity or being small for gestational age at birth. One of the goals of the "Golden Hour" is to decrease the occurrence of hypoglycemia (Accucheck of 40 mg/dL or 2.0mM) by the prompt institution of intravenous glucose and fluid supplementation within the first hour of life. The admission of an infant to the NICU is a complex procedure affected by the duration of resuscitation, comorbidities of the infants requiring procedures soon after birth, the distance of the delivery site from the NICU, and mode of transfer. It was observed previously that any delay in the time of admission to the NICU appeared to increase the likelihood of an infant experiencing hypoglycemia.

We sought to document the relationship between the time of delivery and admission time and its relation to the occurrence of hypoglycemia in VLBW infants. We conducted a retrospective review of time of delivery to time of admission (in minutes) and the occurrence of hypoglycemia in our high-risk population. We analyzed data for the 12 months of 2018 in terms of the time of admission and occurrence of hypoglycemia. Our goal of an admission time of <30 minutes from birth and initiation of initial Accucheck determination and institution of intravenous dextrose in water fluids is 30 minutes or less for 2019 and 2020. To assist in achieving this goal, we implemented a 20 minute after birth alert (or warning)

"It is critical that neonatologists, and those in training to become neonatologists, realize the impact that a NICU experience can have on a family—both the infant, the infant's parents individually and as a couple, and the entire family—and that the potential adverse developmental outcomes for the infant and adverse mental health outcomes for parents are well-described and documented"

to encourage prompt the admission process. This Quality Assurance program has the approval of the Neonatology faculty and key nursing leaders to achieve this quality improvement.

Our average admission time from birth to NICU in VLBW infants in the last year is 29 min. The distance between most deliveries

• Table 1. Time between birth and admission to NICU in VLBW from January 2018 to December 2018 per quarters.

	Average time to NICU admission
2018q1	28 min
2018q2	26 min
2018q3	32 min
2018q4	37 min

- **Table 2. Comparison between glucose level and IVF initiation to time of admission to NICU.**

	Average time to NICU arrival	Average time to IVF initiation
Infants with low glucose <40 (n= 11)	33.6 minutes	56 minutes
Infants with normal glucose (n=29)	27.7 minutes	55 minutes

and the NICU is approximately 100 meters and did not change during the study period. Data from 2018 identified that all infants with an initial Accucheck of <20 mg/dL; 1 mM) had an admission time of >30 minutes after birth. Fifty percent of these infants have Apgars < or equal to 5 at 5 minutes, and 75% had intravenous access delayed >60 minutes. Among all infants with an initial Accucheck of <40 mg/dL the mean time to NICU arrival was 33.6 ± 10.9 minutes; those with normal glucose were admitted after 27.7 ± 8.9 minutes. (P = 0.17) (See Table 2). Figure 1 illustrates 2018 data by quarter, of the relationship between average times of admission, time of initial IV fluid initiation and percent of infants with hypoglycemia.

NICU admission time and, more specifically, that if this takes more than 30 min, there is increased risk for severe hypoglycemia.

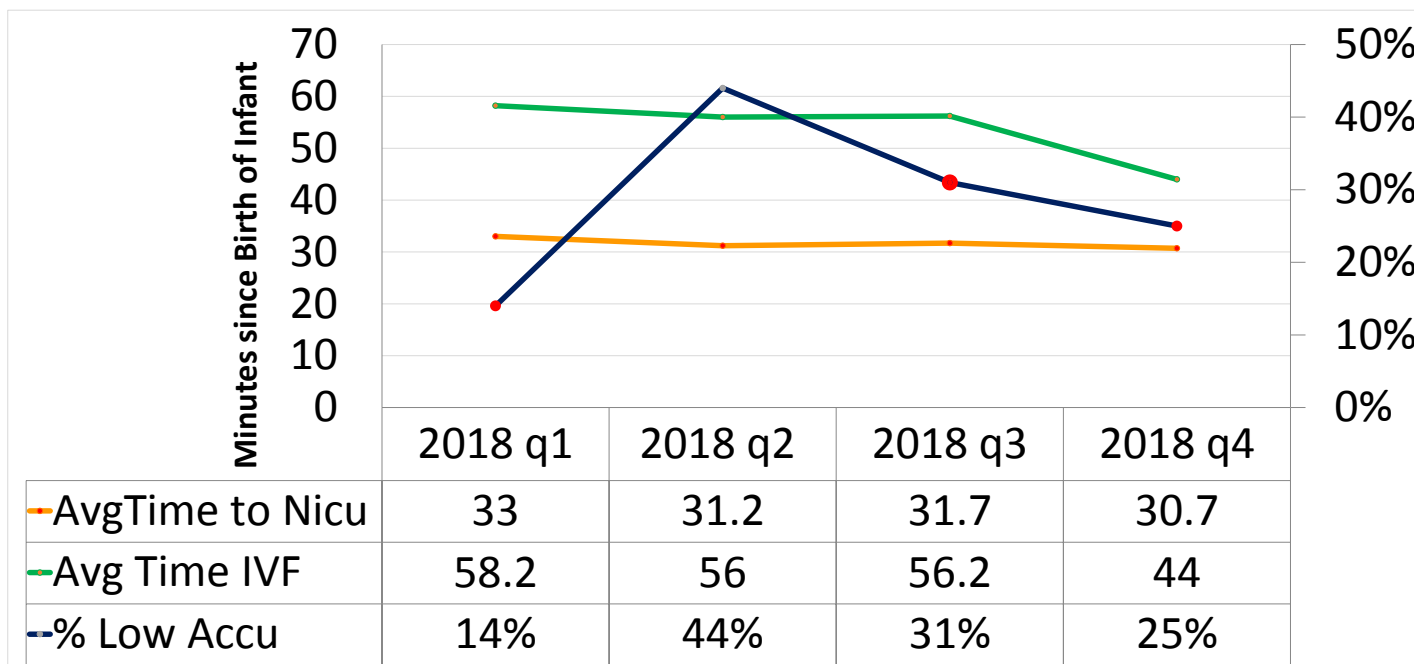
Other factors contribute to delay in NICU admission, including needing respiratory support, delays in achieving oxygen saturation levels of >85-90%, procedures required during resuscitation

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In 2019 our QA project is focused on reducing the NICU admission time and the institution of IV fluids as the highest priority on NICU admission. Possible factors that affect this time is the complexity of the resuscitation (50% has APGAR < 5 at 5 min) and the time needed to insert a PIV after admission to the NICU (75% have PIV/ IVF started after one hour of life). Although one case had an IVF started before one hour after birth, it was close to one hour (54 min of life). Although statistical significance was not achieved, we are reporting a trend towards a correlation between birth time to



• **Figure 1. Graph showing average NICU admission time per quarter and average IVF time and % low Accu-check.**



and stabilization for transport, and distance from the birth site and the NICU. A warning or alert at 20 minutes after birth will permit delivery room insertion of intravenous lines for fluids and dextrose prior to transport if admission time is projected to be >30 minutes. We are currently analyzing the impact of this QA project on admission times, and initial Accucheck for 2019, and will continue this project through 2020 until our goals are achieved.



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