Improving Immunization Practices Among Neonates in a Level IV Neonatal ICU

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Patient Safety & Quality

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Problem/Background

The Advisory Committee on Immunization Practices and the Committee on Infectious diseases of the American Academy of Pediatrics (AAP) recommend that with the exception of Hepatitis B immunization, both preterm and term infants should be vaccinated at the same chronological age, according to the same schedule and the same precautions, regardless of gestational age and birth weight. Despite this recommendation, immunization variability among preterm infants in the NICU is a common concern. It is well established that preterm infants have a higher risk of morbidity and mortality due to vaccine preventable diseases. Postponement of immunizations in the NICU causes a delay in subsequent vaccination and places this high-risk population at even higher risk for vaccine preventable diseases. Yet a recent survey study among Neonatologists who were members of the section of Neonatal and Perinatal medicine of the AAP demonstrated that 55% of the providers administer the first vaccine at >2 months chronological age and 83% delayed vaccines in the setting of clinical illness. The most common cause cited for delaying/splitting the vaccines over 2-3 days was provider/nursing preference. Other causes include lower gestational age, lower birth weight, clinical instability, and parental apprehension.

Current Situation

We are implementing a quality improvement (QI) initiative to improve immunization rates in our level IV NICU, which has an average census of 52 patients per day and 800 admissions per year. We looked at 238 neonates admitted to the NICU at Erlanger Baroness Hospital on or after October 1, 2020 *and* discharged by March 31, 2021. During this period 262 vaccines were administered. Four patients did not receive vaccines due to parental refusal. Vaccine was considered 'on-time' if administered within 4 days of due date. 215 vaccines (82%) were given on-time while 47 vaccines (18%) were *not* given on-time. The most common reasons for delayed administration were clinical illness, lack of parental consent, lack of physician order, and nurse not administering in a timely manner. Currently vaccines are located in the pharmacy, requiring nurses to leave to NICU and walk to the pharmacy to pick the up.

This project will improve the knowledge and understanding of the risks and benefits of these vaccines, their contraindications, and AAP guidelines on immunizing pre-term and term neonates among NICU providers, staff, and families. By promoting a culture of timely vaccinations in our NICU we will decrease the risk of vaccine preventable illness in our population of high-risk infants. We also hope to reduce the burden on parents and community pediatricians by reducing the number of visits to pediatricians' office for vaccine catch-up.

AIM and Measures

AIM: (1) To improve the rate of timely administration of birth dose of hepatitis B and 2-, 4- and 6-month vaccines among neonates admitted to the Neonatal Intensive Care Unit from 82% to ≥ 95%. (2) To create an immunization administration program in which the timing of immunization administration corresponds with the AAP guidelines. (3) Enhance provider, nursing, and parental education regarding immunizations.

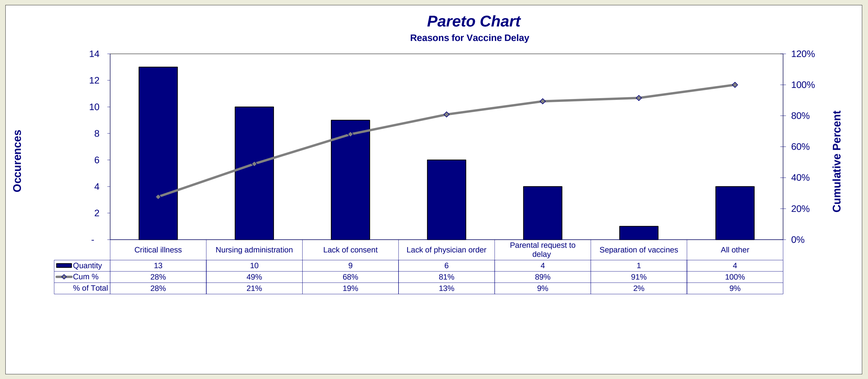
Outcome measures:

- **Primary: Percentage of neonates with timely immunizations**
- **Secondary: Immunization rate per six months**

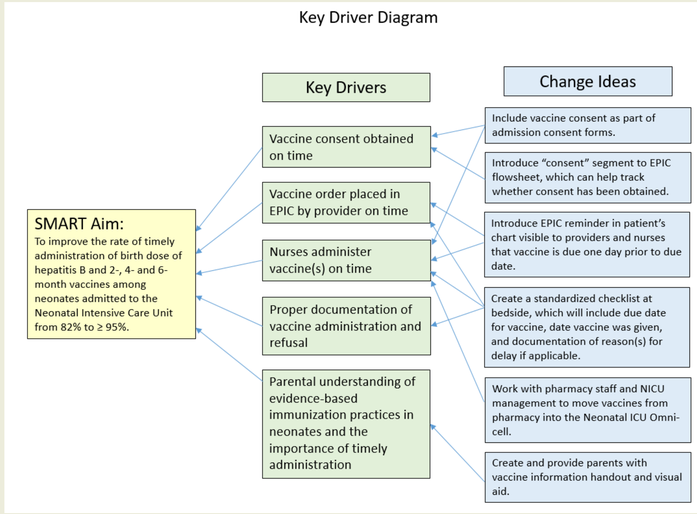
Process measures:

- **PDSA 1: Percentage of vaccine consents obtained prior to vaccine due date**
- **PDSA 2: Percentage of timely administration of vaccine(s) when vaccine is located in Neonatal ICU Omni-cell**
- **PDSA 3: Percentage of patients with standardized checklist at bedside**

Cause Analysis



Change Ideas



Proposed PDSA Cycles

PDSA cycle 1: Improving consent process and ordering of vaccines

- **Plan - Introducing strategies to obtain early consent for vaccines and educating parents on evidence-based immunization practices in the NICU using handouts**
- **Do - Including vaccine consent and vaccine information handout as part of admission consent forms and information packet**
- **Study - Percentage of timely consents**
- **Act - Introducing "consent" segment to flowsheet in EPIC, which can help track this during the course of the project, and reminder in patient's chart visible to providers and nurses of vaccine due date one day prior.**

PDSA cycle 2: Improving logistical process for nurses to obtain vaccines

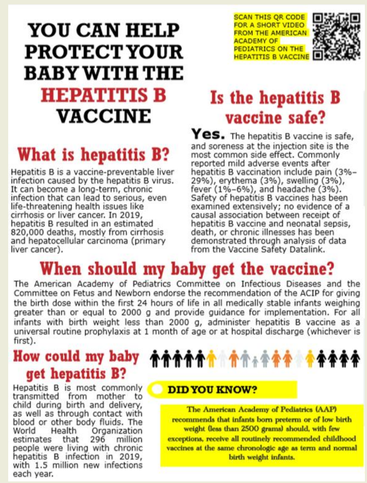
- **Plan - Facilitating the ease of obtaining the vaccine(s) for nurses**
- **Do - Work with pharmacy staff and NICU management to move vaccines from pharmacy into the Neonatal ICU Omni-cell**
- **Study - Percentage of timely administration of vaccine(s) when vaccine is located in Neonatal ICU Omni-cell**
- **Act - Continuing education and awareness about evidence-based immunization practices in the NICU and importance of timely administration using visual aids and posters**

PDSA cycle 3: Improving documentation of vaccine administration and refusal

- **Plan - Introducing standardized checklist for immunizations at bedside**
- **Do - Creating a standardized checklist at bedside to include due date for vaccines, date the vaccine was given, and documentation of reason(s) for any delays**
- **Study - Percentage of patients who have the bedside checklist in place**
- **Act - Education and awareness among parents about evidence-based immunization practices in the NICU using handouts and empowering them in the decision-making process by involving them in filling out and understanding the bedside checklist**

Next Steps

- **Currently working with NICU management to add Hepatitis B vaccine consent forms to the NICU admission packet**
- **Hepatitis B vaccine information handout created (right) and plan to include in NICU admission packet**
- **We are working with pharmacy and NICU management to move storage of vaccines from pharmacy into NICU Omni-Cell where it was previously located, however this is challenging due to specific temperature requirements of vaccine storage**
- **We will review data every two weeks to monitor progress**



YOU CAN HELP PROTECT YOUR BABY WITH THE HEPATITIS B VACCINE

SCAN THIS QR CODE FOR A SHORT VIDEO FROM THE AMERICAN ACADEMY OF PEDIATRICS ON THE HEPATITIS B VACCINE

What is hepatitis B?

Hepatitis B is a vaccine-preventable liver infection caused by the hepatitis B virus. It can become a long-term, chronic infection that can lead to serious, even life-threatening health issues like cirrhosis or liver cancer. In 2019, hepatitis B resulted in an estimated 820,000 deaths, mostly from cirrhosis and hepatocellular carcinoma (primary liver cancer).

Is the hepatitis B vaccine safe?

Yes. The hepatitis B vaccine is safe, and soreness at the injection site is the most common side effect. Commonly reported mild adverse events after hepatitis B vaccination include pain (3%–29%), erythema (3%), swelling (3%), fever (1%–6%), and headache (3%). Safety of hepatitis B vaccines has been examined extensively; no evidence of a causal association between receipt of hepatitis B vaccine and neonatal sepsis, death, or chronic illnesses has been demonstrated through analysis of data from the Vaccine Safety Datalink.

When should my baby get the vaccine?

The American Academy of Pediatrics Committee on Infectious Diseases and the Committee on Fetus and Newborn endorse the recommendation of the ACIP for giving the birth dose within the first 24 hours of life in all medically stable infants weighing greater than or equal to 2000 g and provide guidance for implementation. For all infants with birth weight less than 2000 g, administer hepatitis B vaccine as a universal routine prophylaxis at 1 month of age or at hospital discharge (whichever is first).

How could my baby get hepatitis B?

Hepatitis B is most commonly transmitted from mother to child during birth and delivery, as well as through contact with blood or other body fluids. The World Health Organization estimates that 296 million people were living with chronic hepatitis B infection in 2019, with 1.5 million new infections each year.

DID YOU KNOW?

The American Academy of Pediatrics (AAP) recommends that infants born preterm or of low birth weight (less than 2500 grams) should, with few exceptions, receive all routinely recommended childhood vaccines at the same chronologic age as term and normal birth weight infants.