Implementation of timely administration of hepatitis B vaccine birth dose: single center experience

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Background: Hepatitis B infection is a major global health challenge. The hepatitis B vaccine (HBV) plays a critical role in eradication of this threat to public health. In 2017, the American Academy of Pediatrics (AAP) recommended administering the HBV birth dose within 24 hours for infants born at ≥ 2000 g to mothers who are HbsAg negative. Previous recommendations allowed the HBV birth dose to be given prior to discharge or at the first pediatric visit. At University of Washington – Valley Medical Center (VMC), we implemented a quality improvement (QI) project upon recognition that timely administration of the HBV birth dose was not the standard practice in our neonatal intensive care unit (NICU) and well-baby nursery (WBN).

Aim/Objective: Achieve timely HBV dose administration will for 100% of newborns whose parents desire vaccination by December 31, 2021.

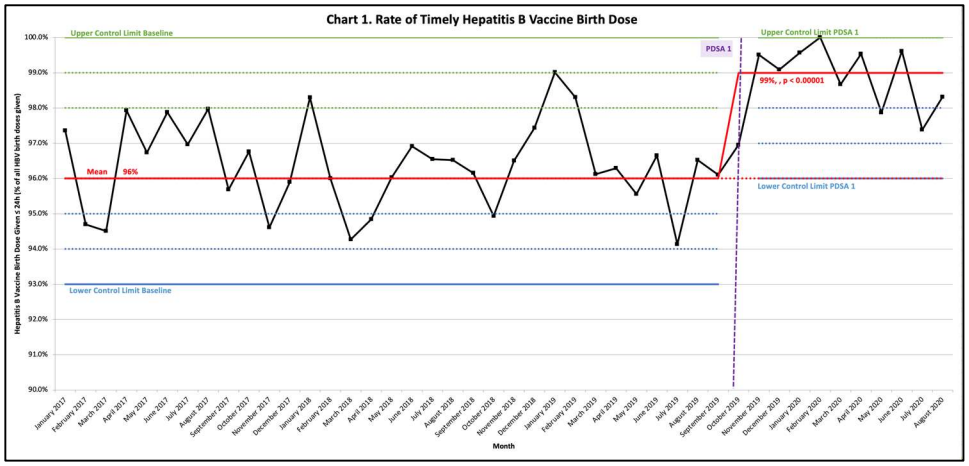
Planning/PDSA cycles: This QI project started in October 2019 and is ongoing. We reviewed babies born at ≥ 2000 g and at ≥ 35 weeks and ≥ 1800 g via an Epic chart review. Contraindications were coagulopathy at birth or secondary to therapeutic hypothermia. Babies with hypoxic ischemic encephalopathy could receive the HBV birth dose prior to the initiation of therapeutic hypothermia. Newborns whose parents refused the hepatitis B vaccine altogether were excluded from the study. Timely HBV birth dose was defined as administration at ≤ 24 hours of life. Baseline data (January 2017 to September 2019) – Analysis indicated NICU admission was a significant barrier to timely HBV birth dose due to the delay in obtaining consent. PDSA Cycle 1 – Interventions: NICU staff education; changing HBV permission from written consent to verbal assent; formal policy written; HBV order added to NICU admission order sets; and HBV administration monitoring by NICU pharmacists.

Measures: Primary outcome measure – Timely HBV birth dose administration as a percentage of all HBV birth doses given. Secondary outcome measures - All HBV birth doses administered prior to discharge as a percentage of live births; Reason for administration after 24 hours as a proportion of total late doses. Process measures – Location (NICU or WBN) of late administrations as percent of late doses.

Analysis/Outcomes/Results: Table 1 summarizes the data collected at baseline and in PDSA cycle 1. Our primary outcome of timely HBV birth dose administration significantly increased from 96% at baseline to 99% after PDSA cycle 1 interventions ($p < 0.00001$, Table 1). Chart 1 is a control chart showing the rates of timely HBV birth dose administration by month. The data shift occurs in October 2019, the month we started PDSA cycle 1. The overall rate of HBV birth dose administration also significantly increased from 87% at baseline to 88% after PDSA cycle 1 ($p = 0.02$, Table 1). Of the 31 HBV birth doses administered after 24 hours in PDSA cycle 1, six were delayed because parents were deciding if they desired vaccination, seven were deferred to discharge by parents, one was due to staff error, and 17 could not have a reason determined. Twenty-five of the 31 late doses were administered in the NICU (81%) while the remaining were administered in the WBN (19%).

Table 1. Hepatitis B Vaccine birth doses overall and on-time

	Dates	N	HBV doses	HBV dose ≤ 24h	HBV dose > 24h
Baseline	01/2017 – 09/2019	9475	8210 (87%)	7911 (96%)	299 (4%)
PDSA 1	10/2019 – 08/2020	2852	2518 (88%), p = 0.02	2487 (99%), p < 0.00001	31 (1%)



Summary/Discussion: Our study interventions significantly increased the timeliness of HBV birth dose administration at VMC. PDSA cycle 1 data revealed major barriers to timely HBV birth dose administration are still related to parental assent. Based on this, we are now focusing our efforts in the second PDSA cycle to providing improved and timelier parent education and streamlining the assent process. We conclude that staff education creates buy-in to our greater goal and enables advocacy for best practices. However, parent education is just as critical. This study highlights the urgent need for continued staff and parent education and for increased teamwork between newborn and obstetrics providers to deliver parental HBV education in the prenatal period.