

Problem

- American Academy of Pediatrics recommends that all newborns be screened before discharge with a total serum bilirubin (TSB) or transcutaneous bilirubin (TcB) measurement.
- Non-invasive TcB measurement is quick and provides a reasonable estimate of bilirubin levels in healthy newborns ≥ 35 weeks gestational age (GA). However, this point of care practice was not adopted by our unit as a routine practice.
- Our goal is to establish a consistent practice of TcB monitoring for hyperbilirubinemia screening in infants ≥ 35 weeks GA admitted to the NICU to reduce the number of blood draws
- Our center is a Level III NICU located in the north suburbs of Chicago

Project Implementation

- Task group created "Transcutaneous bilirubin monitoring in the Neonatal ICU" guidelines and implemented in July 2021.
- Analysis of a retrospective cohort was done of a pre-intervention group (July 2020-June 2021) and post intervention group (July 2021-August 2021)
- The pre-intervention group only collected TSB while the post-intervention performed TcB routinely and TSB when thresholds for blood draws were met
- Neonates included if ≥ 35 weeks GA at admission
- First TcB is performed at 24 hours of life (HOL) and continued every 24 hours based on risk stratification determined by GA and presence of Bhutani risk factors- 3 occurrences for low risk (LR), 7 for medium risk (MR) and high risk (HR)
- Predetermined TcB thresholds trigger confirmation serum bilirubin levels prior to starting phototherapy

	Low Risk	Medium Risk	High risk
Occurrences (total)	3	7	7
Start point (HOL)	24HOL	24HOL	24HOL
Measurement periods (HOL)	24, 48, 72HOL	24, 48, 72HOL and 4, 5, 6, 7 DOL	24,48, 72HOL and 4, 5 6, 7 DOL

Results

- 206 patients were identified, 146 in pre-intervention and 60 in the post-intervention group
- 4 patients were excluded from the post intervention group as patients were on ECMO or therapeutic hypothermia protocols. TSB levels were monitored routinely for these patients based on guidelines for assessing liver function tests during these interventions.
- Average TSB blood draws were Pre- intervention -3.54 and post intervention 2.86
- 25% (15/60) post-intervention patients did not require TSB due to the TcB not triggering a TSB blood draw
- 61% (22/36) of post-intervention group patients who had TSB following TcB were found to have TSB correlating within two measures of TcB values

Table 1: Patient Demographics

	Pre Intervention	Post Intervention
GA	38.42 \pm 1.41 weeks	38.09 \pm 1.69 weeks
Birth Weight	3301 \pm 688 g	3096.56 \pm 665.5 g
Low Medium High Risk	45% 46% 10%	32% 59% 14%
Phototherapy	17/146 (12%)	9/56 (16%)
IVIG	1/146	1/146
Exchange Transfusion	0	0

Conclusions

- While total average number of TSB blood draws between groups weren't entirely different during the interim analysis, 25% post-intervention patients didn't require supplemental TSB following TcB.
- High risk patients in the post intervention group had fewer blood draws on average
- Only two-thirds of TSB and TcB values correlated within two levels. However, for values of greater differences, TcB were consistently higher for majority of patients. Thus, it may be safe to consider raising TcB thresholds for triggering blood draws, to further reduce lab procedures.

Figure 1: Average Serum Bilirubin Draws

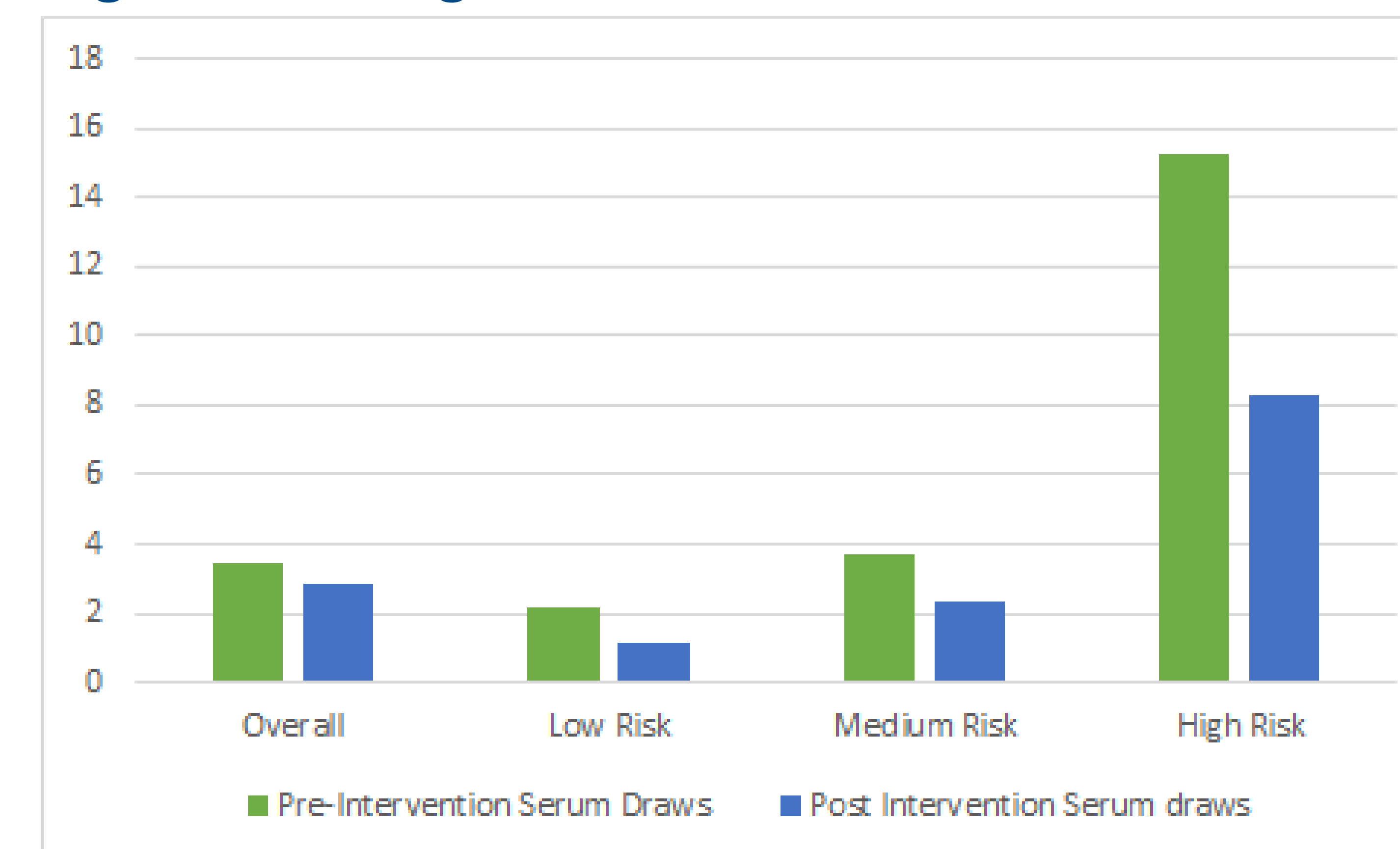


Table 2: Post Intervention Analysis

	Post Intervention
TSB and TcB correlation ≤ 2	22/36 (61%)
Patients requiring TCB only	15/56 (27%)

- Outstanding results are encouraging as post intervention results reflect most immediate outcomes following protocol implementation.
- Providers and nursing staff have reported positive feedback and satisfaction of protocol towards goal of reducing blood draws.
- Future directions include optimization of protocol implementation and compliance as well as implementation of this protocol in the NBN

Acknowledgements/Hospital Team

- Entire nursing staff of NICU, attending and resident physicians and nurse practitioners