



### R<sup>3</sup>: Research, Read & Review

*Literature dissemination by the NIDCAP and Science Sub-Committee*

**June 2022**

<b>Title</b>	<b>An Initiative to Decrease Laboratory Testing in a NICU</b>
<b>Reference</b>	Klunk CJ, Barrett RE, Peterec SM, Blythe E, Brockett R, et al. Pediatrics. 2021;148(1):e2020000570. doi:10.1542/peds.2020-000570
<b>What is known about this topic?</b>	<ul style="list-style-type: none"> <li>• It is well established that painful stimuli in the neonatal period are associated with adverse neurodevelopmental outcomes.</li> <li>• Studies show that neonates in the Neonatal Intensive Care Unit (NICU) undergo 7.5 to 17.4 painful procedures per day, with a significant burden of painful procedures experienced by infants born early.</li> <li>• Interventions such as Kangaroo Care, breastfeeding and oral sucrose can all be used to reduce procedural pain in neonates.</li> <li>• Many existing studies focus on pain reduction strategies employed during invasive procedures in the NICU, yet relatively few address reducing the total number of phlebotomy procedures as a system-level strategy.</li> <li>• Reduction of unnecessary testing in adults has been well studied and implemented by means of practice guidelines to reduce cost, shorten wait times, and ultimately improve patient experiences.</li> </ul>
<b>What does this paper add?</b>	This paper outlines system-level changes implemented to decrease the number of invasive laboratory tests, utilizing electronic medical records, educational sessions, improved testing modalities and feedback from a parent advisory council to set a new standard for invasive testing.
<b>A summary</b>	The aim of this single center, multifaceted, quality improvement project was to reduce the total number of painful laboratory blood draws over a 2-year period. A multidisciplinary team in collaboration with information technology quantified individual lab

	<p>test data through the hospital’s electronic medical record (EMR). Blood glucose screening made up 43.7% of all blood draws.</p> <p>To reduce the amount of unnecessary blood draws, interventions included modifying the EMR so that glucose results would be displayed prior to initiation of new orders; in addition, a hard stop protocol was implemented where a reason had to be documented for daily glucose screening. Furthermore, an order set for glucose testing was established and electronic reminders were created to test glucose from existing blood samples if previous lab testing was ordered and glucose had not yet been measured. A monthly electronic report detailing total NICU lab orders and associated ordering provider data was available to all staff. To reduce painful interventions further, transcutaneous bilirubin and CO2 monitors were used, in addition to advanced point of care testing which requires less blood volume for common lab work such as glucose, blood gas, bilirubin, hemoglobin and electrolytes.</p> <p>The primary outcome was total number of laboratory tests (including point of care testing and central lab testing) per 1000 patient days (PD). Secondary outcomes included blood glucose and serum bilirubin tests per 1000 PD.</p> <p>Statistical analysis of primary and secondary outcomes demonstrated a total of 179,113 lab tests performed on 2532 infants over the two-year project period, which included 78,237 glucose levels and 27,355 bilirubin levels that required 33.4 L of blood to process. The results of the project’s interventions demonstrated a 26.85% reduction of total lab results per 1000 PD, reduction of 37.9% glucose level testing per 1000 PD, and a reduction of 32.9% per 1000 PD of bilirubin testing. Further reduction of electrolytes, complete blood counts, and blood gas testing were observed (20%, 29% and 32.6% per 1000 PD, respectively). The authors did not identify a relationship between the reduction of laboratory testing and perceived harm.</p> <p>Overall, the results demonstrate how interventions at an organizational, electronic, and practitioner level contributed to significant reduction of painful laboratory testing for infants cared for in the NICU.</p>
<p><b>What is the relevance to NIDCAP?</b></p>	<ul style="list-style-type: none"> <li>• NIDCAP care has been shown to reduce infant distress during painful procedures and provides a way for healthcare professionals to respond individually to unique infant cues</li> <li>• This quality improvement project demonstrates how painful, and often unnecessary procedures, can be reduced</li> </ul>

at an organizational, electronic, and individual level in the NICU

- This quality improvement project outlines steps and guidelines that can be adapted by other NICUs to reduce the burden and number of painful procedures
- As this paper demonstrates, prevention of painful medical procedures not only spares the neonate unnecessary pain but also the parents unnecessary stress