

# Improving Postpartum Depression Screening in the NICU: Partnering with Students to Improve Outreach

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## Abstract

**Introduction:** Infants born to mothers with postpartum depression (PPD) are at risk for adverse developmental outcomes. Mothers of premature infants are 40% more likely to develop PPD when compared with the general population. Current published studies on implementing PPD screening in the Neonatal Intensive Care Unit (NICU) do not comply with the American Academy of Pediatrics (AAP) guideline, which recommends multiple screening points in the first year postpartum and includes partner screening. Our team implemented PPD screening that follows the AAP guideline and includes partner screening for all parents of infants admitted to our NICU beyond 2 weeks of age. **Methods:** The Institute For Healthcare Improvement Model for Improvement was the framework for this project. Our initial intervention bundle included provider education, standardized identification of parents to be screened, and bedside screening performed by the nurse with social work follow-up. This intervention transitioned to weekly screening by phone by health professional students and the use of the electronic medical record for notification of team members of screening results. **Results:** Under the current process, 53% of qualifying parents are screened appropriately. Of the parents screened, 23% had a positive Patient Health Questionnaire-9 requiring referral for mental health services. **Conclusions:** Implementing a PPD screening program that complies with the AAP standard is feasible within a Level 4 NICU. Partnering with health professional students greatly improved our ability to screen parents consistently. Given the high percentage of parents with PPD uncovered with appropriate screening, this type of program has a clear need within the NICU. (*Pediatr Qual Saf* 2023;8:e674; doi: DOI: 10.1097/pq9.0000000000000674; Published online July 10, 2023.)

## INTRODUCTION

Infants born to mothers with postpartum depression (PPD) are at risk for adverse developmental outcomes.<sup>1</sup> Infants in the neonatal intensive care unit (NICU) are

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at higher risk for these outcomes due to their increased need for stimulation and decreased responsiveness at a baseline, which could be exacerbated by having a parent struggling with PPD.<sup>2</sup> NICU graduates of mothers struggling with PPD are at an increased likelihood of Emergency Department visits within the first 3 months after discharge.<sup>3</sup> Furthermore, mothers of infants admitted to the NICU are at greater risk for family and financial stress than mothers of healthy-term infants. They are 40% more likely to develop PPD than the general population.<sup>4,5</sup>

Many mothers are not being appropriately screened for PPD because of inadequate postpartum follow-up.<sup>6</sup> This gap in care motivated the American Academy of Pediatrics (AAP) to release clinical guidelines for the pediatrician to screen for maternal depression during every well-child visit within the first 6 months because mothers may develop PPD at any point during the first year postpartum.<sup>7,8</sup> Infants in the NICU often have prolonged admissions; therefore, well-child checks are missed, resulting in mothers not being screened appropriately. Additionally, though screening mothers postpartum has become the standard of care, partner screening is not a common practice, despite reports stating that up to 20% of partners can struggle with depression.<sup>9</sup>

Literature published about implementing a PPD screening program in the NICU is limited. The barriers identified in these studies included difficulties in contacting mothers, issues with screening mothers who did not speak English, and issues with referrals for mothers who were positive for PPD.<sup>10-12</sup> Our team addressed these barriers and others we identified locally to improve PPD screening in the NICU using quality improvement (QI) methodology. Given that neonates admitted to the NICU often had prolonged admissions, repeated screening for PPD was important when we designed our screening program. This aspect of our screening program aligns with AAP recommendations; it also sets it apart from other manuscripts published on PPD screening in the NICU, which screen only the mother when the infant is 2 weeks of age.<sup>10-13</sup> We aimed to screen all parents whose newborns were hospitalized in the NICU after 2 weeks of age, from an initial screening percentage of 0% to 100% by June 2022, through the implementation of a multidisciplinary PPD screening program.

## METHODS

### *Context and History*

The Morgan Stanley Children's Hospital of New York-Presbyterian NICU is a regional perinatal center with 75 beds. There are approximately 1,000 admissions per year, with 90% being inborn. At the start of this project, we had 3 full-time social workers in our NICU and a part-time NICU psychologist. Before our QI initiative to standardize PPD screening for all NICU parents, the Social Work team met with every family on admission. If either parent was experiencing PPD during this clinical evaluation, the Social Worker referred the parents to mental health services. However, this clinical evaluation did not include a formal screening, and a re-evaluation did not occur for all families during their child's NICU admission.

When we started our project in the NICU, our institution's Ambulatory Care Network (ACN) had a formal PPD screening program for 10 years. The ACN used the Patient Health Questionnaire (PHQ) due to its ease of administration and the highly sensitive initial PHQ-2 screener.<sup>14,15</sup> The PHQ-2 includes the first 2 questions of the PHQ-9 and inquires about the respondent's degree to which they have been experiencing a depressed mood or anhedonia during the past 2 weeks. A score of 3 or more on the PHQ-2 indicates the need to complete the PHQ-9, which includes an assessment of self-harm. The ACN follows the AAP guidelines, such that screening occurs at all well-child checks within the first 6 months.<sup>16</sup> We applied the same framework to design a process for the NICU setting.

### *QI Project Framework*

The implementation of the PPD screening program in our unit had 2 distinct phases due to the COVID-19 pandemic when data collection was interrupted for 1 year.

With the reinstatement of research activities, adding new members to the NICU family support team helped redesign the screening program. Thus, we describe the evolution of an approach to PPD screening in our NICU. We used the Institute for Healthcare Improvement Model for Improvement as a framework for this project.<sup>17</sup> This QI effort received a "Not Human Subjects Research" designation from our Institutional Review Board.

Our initial team included key stakeholders from social work, psychology, nursing, and NICU physicians; health professional students joined the team during the project's second phase. Our 4 major key drivers (Fig. 1) included spreading awareness of PPD in the NICU, standardizing a process for PPD screening using the PHQ, ensuring a standard referral process for positive screens, and standardizing follow-up and follow-through after referral. Before screening initiation, we ensured the availability of a referral network of mental health providers for parents who desired outpatient follow-up. We utilized our ACN clinic's curated list of mental health providers, which our NICU psychologist reviewed to help parents choose the option that would suit them best. Ethically, we felt it was important not to begin standardized screening for PPD without being able to provide services for a positive screen.

### *Screening Processes*

The first screening process (Fig. 2A) centered around the bedside nurse. This workflow incorporated the entire medical team destigmatizing mental health and making PPD screening part of our routine medical care. In addition, the decision to have the nurse perform only the PHQ-2 limited their workload. It eliminated the possibility of the parent endorsing suicidality on the PHQ-9 when mental health staff could not respond immediately. If the parent subsequently screened positive on the PHQ-9, the social worker referred the parent to our NICU psychologist or an outside provider, depending on parental preference.

Iterative tests of change included printing the PHQ-2 on bright colored article for ease of identification in the patient's chart, creating a nursing script, and QI team member attendance at shift huddles. Screening reminders were distributed in written form and discussed at our weekly interdisciplinary meetings. Laminated information cards were posted on every workstation, linking screening intervals to well-established NICU milestones (ie, iron supplementation initiation at 2 weeks, routine head ultrasound at 1 month, and routine vaccines at 2 and 4 months).

With the onset of the COVID-19 pandemic, NICU access was limited to those providing immediate medical care to patients, and our article screening results could not be tracked for 1 year. The COVID-19 pandemic also posed new challenges for NICU parents; due to hospital policy, only 1 parent was allowed at the bedside during hospitalization. Virtual visitation and telehealth became a part of our hospital's standard practice. At this time, medicine and public health students at our institution also formed the Columbia Student Service Corps<sup>18</sup> as a service-learning opportunity. With the added resource of

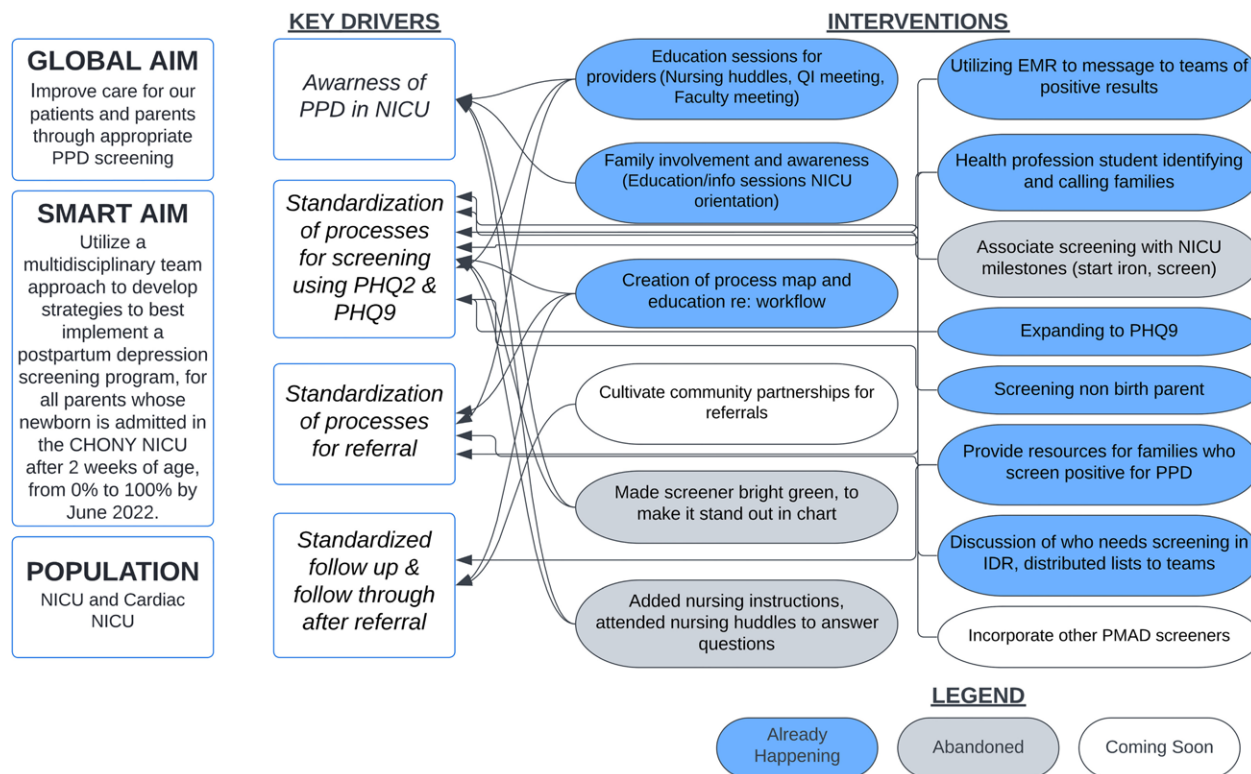


Fig. 1. Key driver diagram.

the health professional students, the team adjusted our screening program to meet the parents’ needs during this challenging time (Fig. 2B).

The NICU psychologist trained health professional students in public health and nursing schools on administering the PHQ and responding if a parent screened positive or endorsed suicidality. This training included shadowing, simulation of screening calls, and training on how to administer the Columbia-Suicide Severity Rating Scale.<sup>19</sup> The student screeners’ main function was to perform the screening and alert the social work staff and NICU psychologist of the results so that the expert clinicians could meet with the parents to determine the best course of treatment. In addition, the screeners provided parents who screened positive with online resources that they could access before the social worker and psychologist could meet with them.

Initially, the PHQ-9 was only administered with the new process if the PHQ-2 was positive. However, after a PHQ-9 was administered unintentionally to a parent with a negative initial screener and the PHQ-9 was positive, we decided to administer the full screener to all parents. Once this process was implemented, our dedicated screeners provided feedback that performing the entire PHQ-9 did not add too much of a burden to the screener or responder. A secure encrypted spreadsheet held documentation of parent contact within the screening window and their screening results. In the initial process, data collection occurred manually based on chart review. With the integration of the Columbia Student Service Corps, the

health professional students maintained the spreadsheet and communicated results with the QI team weekly. Under both processes, documentation of the screening results did not occur using the electronic medical record (EMR) (Epic Systems, Verona, Wis.)<sup>20</sup> because of concern about parental mental health results being available to anyone having access to the patient’s chart as part of the open note mandate of the Cures Act implemented in 2021.<sup>21</sup>

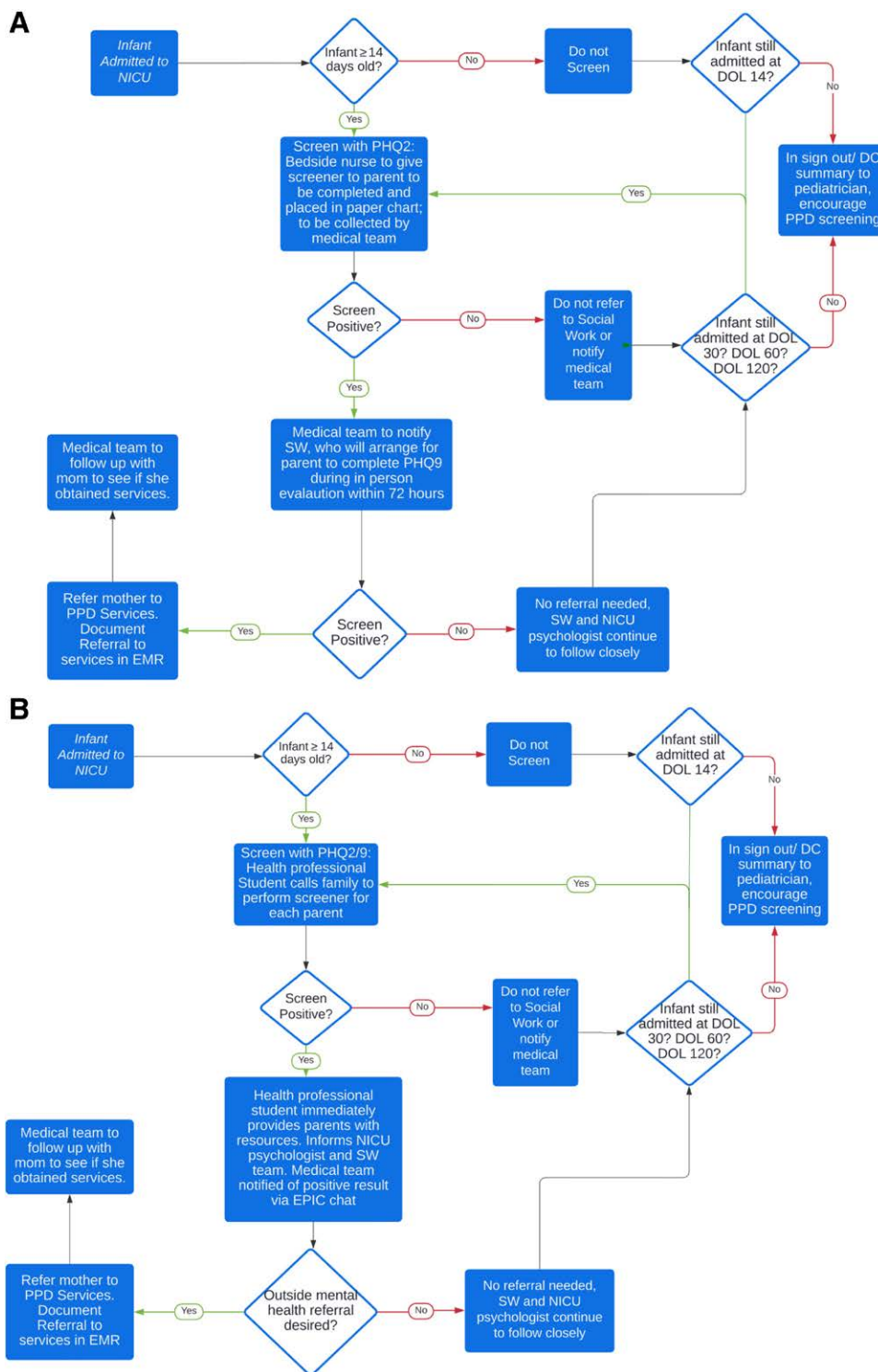
### Measures and Methodology

Our primary outcome measure was the PPD screening percentage in parents who qualify for screening based on their baby’s chronological age. Our screeners attempted to contact qualifying parents within 1 week of the identified screening period. We used statistical process control p-charts to monitor and display our weekly PPD screening of qualifying parents.<sup>22,23</sup> We analyzed for special cause variation for outliers near the control limits.<sup>24</sup>

In the first process, our balancing measure was the number of PHQ-9s the social workers needed to administer each week. Once we transitioned from bedside screening, the balancing measure became the time it takes for the health professional students to complete each call.

### RESULTS

Before initiating this project, there was no formal screening for PPD within our unit. With screening only mothers at the bedside, we established a screening percentage of

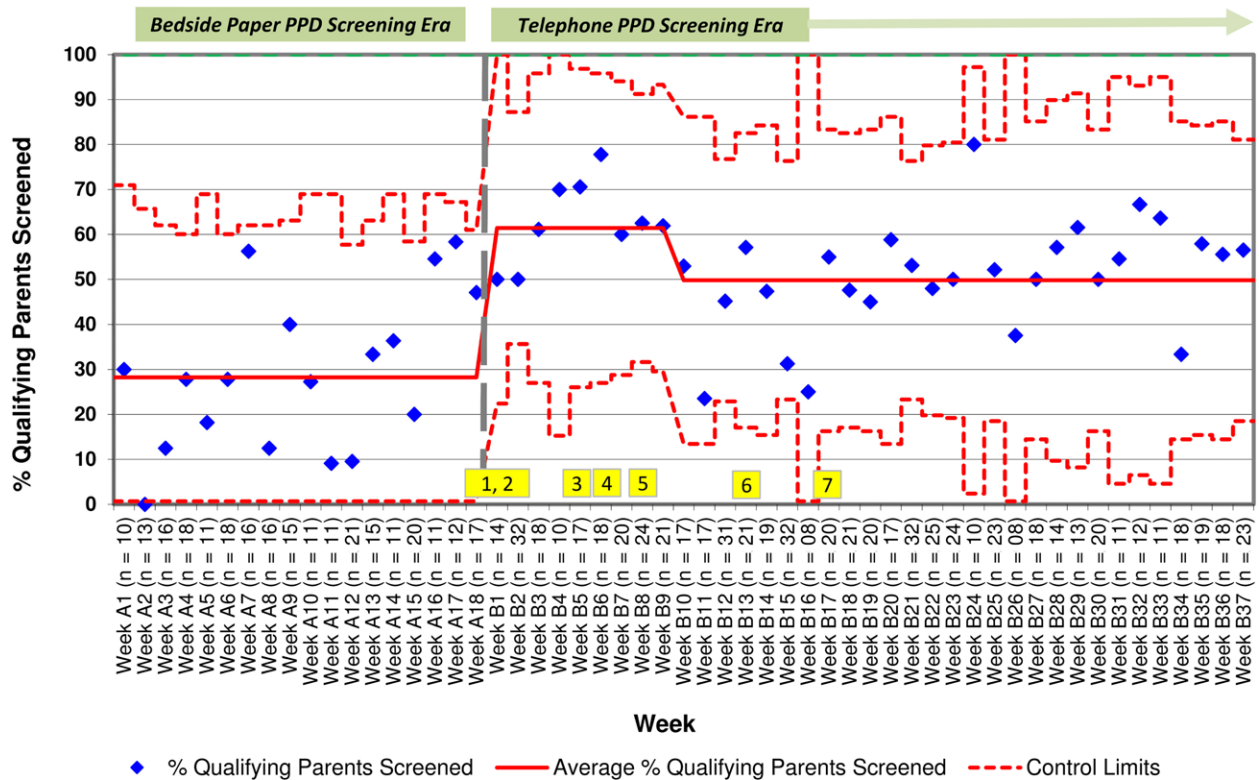


**Fig. 2.** Process maps for implementation of PPD screening in the NICU. A, Process map for the initial process, utilizing the bedside nurse. B, Process map for the current process, utilizing the health professional students.

28% (weeks A1-A18, Fig. 3). We used this as our baseline upon re-initiation of the project 1 year later, after the interruption due to the COVID-19 pandemic. As seen in the p-chart (Fig. 3), with the integration of students on the screening team, we demonstrated a shift, with 8 consecutive weeks of improved screening, to the current mean

screening percentage of 53%. We analyzed for special cause variation for outliers on the p-chart (Fig. 3, weeks B11, B15, B16); however, the number of parents needing screening, the percentage who required interpreter services, and the number of screeners performing the screening were consistent with the weeks before these points.

### Percent Qualifying Parents Screened for PPD By Week



**Fig. 3.** P-Chart: Legend: 1: Standardized tracking via shared spreadsheet; 2: Second parents assessed in addition to birth parent; 3: NICU Psychologist contact information given to all parents; 4: PHQ-9 screening for all qualifying families; 5: Back to 1 volunteer calling families; 6: Results of screen communicated via EMR 7: Screening calls timed to determine whether adding additional screens possible.

In addition to tracking the percentage of completed screens each week, we also tracked the percentage of positive screens overall. Of all parents screened in the NICU, 23% had a positive PHQ-9. We screened 55% of partners at least once during the admission; 26% had a positive PHQ-9. Of the parents screened, 46% were screened more than once. Among the parents screened more than once, 5 who screened negative on their first screen had a subsequent positive screen. Among the parents who screened positive for depression, 3 endorsed suicidal ideations.

Our balancing measure for both processes addressed the time burden of performing the PHQ-9. For the first process, the social work team needed to contact and screen 2 mothers on average weekly with a PHQ-9. In our current process, we contact 18 qualifying parents (mother and partner) weekly. In addition, screening using the entire PHQ-9 screener takes 5 minutes when performed in English and 10 minutes when performed using a telephone interpreter.

### DISCUSSION

Our QI intervention to improve PPD screening in the NICU targets the importance of repeat screening. It evolved into partnering with healthcare professional

students to create a sustainable screening process. Both processes successfully implemented a PPD screening program that complies with the AAP guideline, setting it apart from other screening programs described in the literature, which only screen mothers once during their child’s NICU admission.<sup>10-12</sup>

The first process, the bedside screening period, had strengths and weaknesses. One strength was the involvement of the multidisciplinary team. Given the entire team’s involvement, it helped foster a culture that promoted active discussion of the impact of PPD in the NICU, resulting in targeted parental support. Also, our balancing measure for the first process found that social workers only needed to complete 2 PHQ-9s each week. This low number of mothers needing follow-up with a PHQ-9 is likely due to the initial process only being able to screen 28% of mothers successfully. Tracking this balancing measure was important to understand the burden on the busy social work team.

On the other hand, there were several challenges the team faced in ensuring that bedside screening took place. Even with interventions like associating screening times to activities already being performed in the NICU, the frequency of discussion of PPD screening on rounds was

variable. Additionally, the information required handoff from shift to shift when the need for screening was discussed on rounds. In our large unit with a large nursing pool, many different nurses can take care of 1 patient over a week; thus, the need for PPD screening could be handed off multiple times between different nurses. Although this process had its weaknesses, it is a process that smaller units might be able to adapt to work for their unit.

The second process transformed screening for PPD in our NICU. Our screening percentage increased significantly with the partnership of health professional students. Originally there were 2 students performing screening; however, in August 2021 (Fig. 3, week B8), a student graduated, resulting in a drop in screening percentage from ~60% with 2 students to the sustained percentage of 53% with 1 student. The major strength of this process is that the screeners identify, screen, and track families. By focusing these tasks on 1 team, the need for screening is not transferred between multiple team members. This consistency in the screening team allowed our students to find areas for improvement. Most notably, after an unintentional initial screening with the PHQ-9, we observed that some of our parents screened negative on the PHQ-2 but positive on the PHQ-9. The PHQ-2 has been reported to be highly sensitive to detecting PPD, with 1 study reporting a sensitivity of 100%.<sup>25</sup> However, more recent literature questions the sensitivity of the PHQ-2 when utilizing a score of 3 or more as the cutoff and shows improved sensitivity when using a score of 2 or more.<sup>26</sup> Based on our team's observation, we changed the process to screen all parents with the PHQ-9 at every encounter; however, one could argue for continued use of the PHQ-2 utilizing a lower cutoff. Tracking the length of time for each screening call for this process has allowed the team to expand screening to include partners; it has also allowed the team to explore including other perinatal mood and anxiety (PMAD) screeners during the call. This report is the first published study that incorporates partners into routine screening for PPD in the NICU. Incorporating additional PMAD screeners is an important next step as we acknowledge the PHQ has not been normed to the NICU population and may not truly capture all parents struggling in the NICU.

Screening over the phone allows the team to provide more equitable care as we screen all families, including those unable to be on the unit regularly due to familial or professional commitments. Screening over the phone also allows the team to administer the screener in any language using interpreter services. Finally, given limited personnel, this process shifts the burden of work away from the nursing and social work teams, which was key to our process design. Other screening programs that rely heavily on the social work staff to perform screening and interventions have identified this as a process limitation.<sup>27</sup>

Though both processes have many strengths, there are also limitations. For example, due to the lack of documentation of screening results in the chart, there is no mention of PPD in the discharge summaries provided to the

families to bring to their pediatrician. The team relies on a verbal handoff to the pediatrician about parental mental health, which can be inconsistent. As our unit and other units become more experienced with the impact of the Cures Act on our practice, we hope to incorporate screening documentation into the EMR. Another limitation due to the lack of documentation in the chart is our inability to track the parental response to receiving interventions for their PPD. Though this process has successfully uncovered parents struggling with PPD, we have not shown that the interventions the parents receive improve overall clinical outcomes. We hope to address both areas once we can utilize the EMR for documentation. We may also be able to utilize the platform to help improve our screening percentage, as other screening programs have demonstrated.<sup>28</sup>

Another limitation is that the sustainability of the current process relies on having interested students join the team. As a large academic institution, we have been able to recruit students to join our team easily; however, even if this were not possible, our results support the need for personnel focused on universal PPD screening in the NICU. Finally, we could have applied an equity-focused QI approach from the initial design of the study and tracked our screening results by demographic factors such as race/ethnicity, ensuring that our screening efforts and targeted interventions were equitable.<sup>29</sup>

Our next steps include incorporating other PMAD screeners, particularly one focused on trauma. We have also expanded screening to our outpatient setting in our neonatal follow-up clinic. Despite these advances, we still cannot reach everyone. A more thoughtful equity-focused approach would help explore whether additional socio-demographic factors might impact the families who cannot be reached for screening.

## CONCLUSIONS

Screening for PPD in the NICU is essential to providing holistic care to our families. A key to incorporating screening for PPD in any unit is the importance of repeated screening at recommended time intervals, ensuring adequate follow-up, and the availability of referral services if the parents would like further treatment. Our experience mirrors the literature in that the percentage of parents struggling with PPD is higher in the NICU setting when compared with parents with healthy full-term children. Whatever the process, incorporating routine repeated screening for PPD in the NICU is imperative in delivering well-balanced and comprehensive care.

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## DISCLOSURE

The authors have no conflicts of interest to disclose.

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