



Reference: Hannan, K. E., S. S. Hwang, and S. L. Bourque. 2020. 'Readmissions among NICU graduates: Who, when and why?', *Semin Perinatol*, 44: 151245.

url: <https://pubmed.ncbi.nlm.nih.gov/32253024/>

Welcome to the October 2022 Research Round-up. This month we will look at an article entitled "Readmissions among NICU graduates: Who, when and why?" This article was published in 2020 in *Seminars in Perinatology*, but I just found it as I was putting together a new talk. I picked this because I am always talking about post-discharge problems. Click on the URL above to go to the full text. Remember to download the handouts "Critical Review of the Literature" and the Research Roundups definitions file if you need information on any of the abbreviations used. We will go through this article to better understand what was done and what we can draw from this article.

Title: The title accurately describes the review of literature.

Abstract: The abstract summarizes the purpose of the review, but there is little information there. You really need to pull the entire article to know what they found. This is not a systematic review – they did not share any search information.

Background or Introduction: We once again start with looking at the references, with <2012, or published ≥ 2012 as our separation window. For the entire article, there are 61 references; of these, 28 references were published prior to 2012 and 33 published in 2012 or later. In the background section, of the 8 articles cited, 4 were published prior to 2012.

The authors begin with a statement about the increased risk of readmission for preterm infants (3-4 times higher). And for extremely preterm infants, almost 50% are re-hospitalized within the first 2 years of life. They discuss the costs associated, and the challenges of looking at factors related to readmissions. These factors include infants are often transferred (rather than discharged and readmitted – which would overestimate the percent). Additionally, this is a heterogeneous population (they differ in reasons for original admission to the NICU). They then finish with a statement that the review will show which infants are at highest risk of readmission, when and why the readmissions occur, and will explore strategies to decrease rehospitalization.

Study Population: There is no study population per se. The authors looked at studies of readmissions and separated the population into 5 ranges of ages (4 preterm).

Methodology: There was no method per se either. This article is a review of previously published studies, but there was no statistical analysis and no systematic literature review that was described.

Statistical Analysis: N/A

Outcomes/Results: Three-to-seven percent of the very preterm infants (<29 weeks) and the late preterm infants were the groups most likely to be readmitted within two weeks of discharge. Feeding difficulties and

GERD were two of the four main reasons for readmission – each with about 15% of the infants hospitalized for these conditions. They also looked at readmissions across the first two years. Rates increased to 15-16% of extremely preterm infants readmitted within the first year, and 45% of these infants readmitted within the first 18-22 months. Respiratory illness was the number one cause of readmission in these time periods. Not surprisingly, they report that infants who were hospitalized longer initially were more likely to be readmitted. This makes sense because their first medical comorbidities are likely the underlying reason. Nearly 50% of infants were readmitted, compared to 23% of infants of similar gestational ages without BPD. Medical comorbidities that increased risk included NEC, severe IVH, PVL, BPD or ROP. In fact, in one study of children now 15-18 years old, children with three or more of these comorbidities were 5.5 times more likely to be readmitted. Feeding difficulties again show up as a common reason for readmission within the first year of discharge.

Maternal/social determinants were next examined. The authors discuss the recent advancements to improved BPD outcomes but offer no citations. They then highlight that maternal smoking is a modifiable risk that contributes significantly to BPD. The rate of preterm birth is 48% higher for non-Hispanic Black women than non-Hispanic white women. The authors remind us of racial disparities that influence infant outcomes have been well documented. But readmission rates have not been as closely examined. The odds of readmission were not different between white and Black infants. The authors discuss the fact that infants covered by Medicaid are more likely to be readmitted. I was reading to see if they mentioned the fact that some infants are automatically covered by Medicaid as a “stop gap” when they are born extremely low birth weight or extremely premature. I know in Colorado where I live, any infant born under 1200 grams will automatically be covered by Medicaid in addition to any other insurance.

The authors go on to discuss possible ways to reduce readmissions and improve the transition to home. They mention several studies have generally looked at providing more education to families re: medical equipment and providing peer and other support systems. But they do not cite any articles. They do highlight as one way of reducing length of stay and readmission rates a program called COPE© (Creating Opportunities for Parent Empowerment), published by Gonya and colleagues in 2014.[1] I have to say, the reason I read review articles is because I often find articles I am interested in that I had not previously found. This is a great example. By promoting parenting activities while in the NICU, neonates had a shorter LOS and fewer readmissions. They also highlight a program from Boston, published by Gupta and colleagues in 2019. [2] This program showed improved family physical and emotional readiness as well as technical discharge readiness. However, this program did not assess readmission rates. As a teaser – in looking for the article by Gupta I found next month’s research article. 😊 And no – it is not the Gupta article. But I digress.... The authors also highlight the FICare study, which we discussed last month.

The authors next discuss peer-to-peer support for families discharging from the NICU. I did not know that the Agency for Healthcare Research and Quality (AHRQ) has a toolkit centered on coaching. This toolkit is called the “Transitioning newborns from NICU to home.” They also highlight other programs to improve discharge. Hannan and the other authors conclude with a discussion of home visitation. I have personal experience with the first program that is covered – the Nurse Family Partnership. The Durham Connect program supports families with 4-7 scripted telephone calls or in-person visits.

Discussion/Conclusions: The authors begin by reminding the reader that psychosocial characteristics of the family and the significant racial/ethnic disparities in health that are seen in the U.S. are the next areas of research. Some of the areas of improvement include reducing language barriers, improving provision of human milk, and improving prenatal services. Then the discussion moves to the lack of federally mandated

paid parental leave. I thought this surprising – usually authors seem to shy away from politics. But certainly, the lack of parental leave is influencing outcomes and it is nice to see it in print. And then they walk it back a bit and say, even without this mandated leave, several states are showing improvements in the equitable treatment of families and included in this list is my state, Colorado. They conclude by saying that the factors that contribute to preterm birth are also the ones associated with LOS and readmission rates. And that any single intervention will likely not be as successful as looking at the systems issues that are in play.

Does this fit with your experience: Absolutely! I have long known that feeding challenges are a significant factor in post-discharge struggles. I must say, however, that this article was lacking for me. I would have liked to have known how they found the articles they used. This seemed a bit thrown-together sometimes. But of course the reason I read it was to see how many babies are readmitted for feeding problems. The articles they cited were of interest. And as I said.... Next month will feature an article I found while digging. See you next month!

Other: The authors disclose there was no funding and there are no conflicts of interest.

References used in this review:

1. Gonya, J., et al., *Empowerment programme for parents of extremely premature infants significantly reduced length of stay and readmission rates*. Acta Paediatr, 2014. **103**(7): p. 727-31.
2. Gupta, M., D.M. Pursley, and V.C. Smith, *Preparing for Discharge From the Neonatal Intensive Care Unit*. Pediatrics, 2019. **143**(6).