

UCSF

UC San Francisco Previously Published Works

Title

Admission and Care Practices in United States Well Newborn Nurseries.

Permalink

<https://escholarship.org/uc/item/571445zx>

Journal

Hospital Pediatrics, 13(3)

ISSN

2154-1663

Authors

Joshi, Neha S

Flaherman, Valerie J

Halpern-Felsher, Bonnie

et al.

Publication Date

2023-03-01

DOI

10.1542/hpeds.2022-006882

Peer reviewed

RESEARCH ARTICLE

Admission and Care Practices in United States Well Newborn Nurseries

Neha S. Joshi, MD, MS,^a Valerie J. Flaherman, MD, MPH,^b Bonnie Halpern-Felsher, PhD,^a Esther K. Chung, MD, MPH,^c Jayme L. Congdon, MD, MS,^b Henry C. Lee, MD, MS^a

OBJECTIVES: Late preterm and term infants comprise 97.3% of annual births in the United States. Admission criteria and the availability of medical interventions in well newborn nurseries are key determinants of these infants remaining within a mother–infant dyad or requiring a NICU admission and resultant separation of the dyad. The objective of this study was to identify national patterns for well newborn nursery care practices.

METHODS: We surveyed a physician representative from each nursery in the Better Outcomes through Research for Newborns Network. We described the admission criteria and clinical management of common newborn morbidities and analyzed associations with nursery demographics.

RESULTS: Of 96 eligible nursery representatives, 69 (72%) completed surveys. Among respondents, 59 (86%) used a minimal birth weight criterion for admission to their well newborn nursery. The most commonly used criteria were 2000 g ($n = 29$, 49%) and 1800 g ($n = 19$, 32%), with a range between 1750 and 2500 g. All nurseries used a minimal gestational age criterion for admission; the most commonly used criterion was 35 weeks ($n = 55$, 80%). Eleven percent of sites required transfer to the NICU for phototherapy. Common interventions in the mother's room included dextrose gel ($n = 56$, 81%), intravenous antibiotics ($n = 35$, 51%), opiates for neonatal abstinence syndrome ($n = 15$, 22%), and an incubator for thermoregulation ($n = 14$, 20%).

CONCLUSIONS: Wide variation in admission criteria and medical interventions exists in well newborn nurseries. Further studies may help identify evidence-based optimal admission criteria to maximize care within the mother–infant dyad.

www.hospitalpediatrics.org

DOI:<https://doi.org/10.1542/hpeds.2022-006882>

Copyright © 2023 by the American Academy of Pediatrics

Address correspondence to Dr. Neha S. Joshi, Department of Pediatrics, Stanford University, Center for Academic Medicine Mail Code: 5660, 453 Quarry Rd, Stanford CA 94305. E-mail: nsjoshi@stanford.edu

HOSPITAL PEDIATRICS (ISSN Numbers: Print, 2154-1663; Online, 2154-1671).



^aDepartment of Pediatrics, Stanford University, Stanford, California; ^bDepartment of Pediatrics, University of California San Francisco, San Francisco, California; and ^cDepartment of Pediatrics, University of Washington and Seattle Children's Hospital, Seattle, Washington

FUNDING: Funded by the National Institutes of Health (NIH). The work in this manuscript was supported by the Stanford Maternal and Child Health Research Institute (Joshi), National Institute for Child Health and Human Development (1F32HD106763-01A1, Joshi), Gerber Foundation (Joshi), and the National Center for Advancing Translational Sciences (UCSF-CTSI UL1 TR001872, Congdon). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH, the Gerber Foundation, or Stanford University. Sponsors were not involved in the study design, data collection, data analysis, interpretation of data, writing of the report, or the decision to submit the article for publication.

CONFLICT OF INTEREST DISCLOSURES: The authors have indicated they have no potential conflicts of interest relevant to this article to disclose.

COMPANION PAPER: A companion to this article can be found online at www.hosppeds.org/cgi/doi/10.1542/hpeds.2022-007044.

Dr Lee's current affiliation is Department of Pediatrics, University of California San Diego, San Diego, CA.

Dr Joshi conceptualized the study, designed the survey instrument, collected data, performed initial analyses, and drafted the initial manuscript; Drs Flaherman, Halpern-Felsher, Chung, Congdon, and Lee helped conceptualize and design the study, evaluated

Late preterm (34–36 weeks' gestational age [GA]) and term infants (≥ 37 weeks' GA) account for 97.3% of all live births, or >3.5 million infants, in the United States yearly.¹ Although most late preterm and term infants are routinely admitted to a well newborn nursery for the duration of the birth hospitalization, some require higher levels of medical support in the NICU. Compared with term infants, late preterm infants are at increased risk of morbidity from outcomes such as hypoglycemia, temperature instability, hyperbilirubinemia, and respiratory insufficiency and, thus, are more likely to require medical interventions such as glycemic support, thermal support, phototherapy, respiratory support, and NICU admission.^{2,3}

In a well newborn nursery, care is provided within a mother–infant or parent–infant dyad in the 1 hospital room. Comparatively, admission to the NICU usually introduces separation of the mother/parent–infant dyad, which can hamper the establishment of successful breastfeeding, disrupt the mother/parent–infant bonding process, negatively impact maternal and paternal mental health, increase parental stress, and increase medical intervention.^{4–8} Among hospitals, there is known variability in the proportion of infants requiring NICU-level care, that has not been explained by patient-level factors surrounding illness severity.^{9–11}

Understanding the magnitude of variability in current institutional admission criteria and potential associations with available medical interventions in well newborn nurseries are important steps toward reducing variability and developing evidence-based criteria for well newborn admissions. In this study, we identified current care practices in US well newborn nurseries.

METHODS

In this cross-sectional study, we surveyed a national sample of physician site representatives to the Academic Pediatric Association's Better Outcomes through Research for Newborns (BORN) Network.¹²

The BORN Network was founded in 2010 to increase the evidence base for the care of late preterm and term infants through collaborative research projects; it includes providers of varying backgrounds who care for newborns during birth hospitalization. One-third of BORN nurseries are located within community or military hospitals, whereas two-thirds are based in university settings. At the time of the survey administration, BORN Network nurseries cared for 436 400 annual deliveries, or $\sim 12\%$ of all live births in the United States. Participants completed the survey between June and November 2021.

We developed a 48-question, mixed-format, web-based survey on institutional admission criteria, including birth weight and gestational age thresholds, interventions offered in the mother's room in the well newborn nursery, and the management of common morbidities (early-onset sepsis, hypoglycemia, hyperbilirubinemia, neonatal abstinence syndrome, feeding supplementation practices) for late preterm and term infants admitted to a well newborn nursery. The survey was piloted with 11 physicians, representing 10 institutions, who provided feedback on content and face validity and underwent iterative feedback revisions after pilot testing. Well newborn nursery was defined as providing level I care by using the American Academy of Pediatrics Neonatal Levels of Care guidelines.¹³ NICU-level care refers to level II (special care nursery), level III, or level IV care. The Academic Pediatric Association Regions were used to describe the geographic spread of respondent institutions. Hospital types included nursery within a university-based hospital (with or without pediatric acute care), community hospital, and freestanding children's hospital. Delivery volumes were grouped as <2000, 2000–3999, 4000–5999, and ≥ 6000 deliveries per year. Potential interventions in the mother's room included continuous cardiorespiratory monitoring, continuous positive airway pressure (CPAP), dextrose gel, intravenous antibiotics, intravenous fluids, incubator for thermoregulation, nasogastric/orogastric feeding, opiates for neonatal

abstinence syndrome, phototherapy, sepsis laboratory testing, and supplemental oxygen. The survey instrument is enclosed in the Supplemental Information.

Study analysis included descriptive statistics and examination of associations. Frequencies and proportions were used to describe nursery admission criteria, interventions available in the mother's room, and management of common newborn morbidities. Associations between hospital characteristics (geographic region, hospital type, delivery volume) and admission criteria (gestational age, birth weight) were examined by using Fisher's exact test because of the small sizes in some cells. Additionally, associations between hospital characteristics and ability to provide phototherapy or dextrose gel in the well newborn nursery were examined.

Participants directly entered survey responses using the Research Electronic Data Capture platform at Stanford University. We completed the statistical analysis using SAS on Demand for Academics (SAS, Cary, NC). The need for informed consent was exempted by the Institutional Review Board at Stanford University.

Of note, our survey instrument and previous literature reference the "mother–infant dyad." However, it would also be appropriate to refer to "birthing parent–infant dyad" or "parent–infant dyad" in those instances.

RESULTS

Participating Nursery Characteristics

Sixty-nine (72%) of 96 nurseries responded across 29 states and the District of Columbia. The characteristics of respondent nurseries are listed in Table 1. The highest level of nursery care offered at each participating site was well newborn or level I at 2 sites (3%), level II at 7 sites (10%), and level III or IV at 60 sites (87%).

Admission Criteria for Well Newborn Nurseries

Of the respondents, 59 (86%) nurseries used a minimum birth weight criterion to

TABLE 1 Characteristics of Respondent Nurseries (*n* = 69)

Characteristic	<i>n</i> (%)
Region	
Northeast	20 (29)
South	18 (26)
Midwest	16 (23)
West	12 (17)
Missing	3 (4)
Annual deliveries	
<2000	10 (14)
2000–3999	35 (51)
4000–5999	16 (23)
≥6000	8 (12)
Hospital type	
Nursery within university-based adult hospital ^a	44 (64)
Community hospital	17 (25)
Freestanding children's hospital	8 (12)
Staffing provider types ^b	
General pediatricians	55 (80)
Pediatric hospitalists	40 (58)
Neonatal hospitalists	14 (20)
Family medicine physicians	41 (45)
Neonatologists	11 (16)
Resident physicians	51 (74)
Advanced practice providers	32 (46)

^a Denotes that the respondent nursery is located within a university-based adult hospital. Some of these institutions included only newborn care, whereas others additionally had pediatric inpatient beds.

^b More than 1 staffing provider type may be selected per nursery. Staffing provider types were self-identified.

determine which infants were eligible to stay with their mothers in the well newborn nursery. The 2 most common birth weight criteria, 1800 g (*n* = 19) and 2000 g (*n* = 29), represented 81% of the nurseries that employ a birth weight criterion (Fig 1). The range of birth weight criteria was 1750 g to 2500 g. Birth weight criterion was not associated with region (*P* = .66), hospital type (*P* = .82), or delivery volume (*P* = .37).

All 69 nurseries used a minimum gestational age criterion for well newborn nursery admission, ranging from 34 to 37 weeks' completed gestation (Fig 2). The most frequently used gestational age criteria was 35 weeks' completed gestation, which accounted for 79.7%

(*n* = 55) of nurseries. Gestational age cutoff was not associated with region (*P* = .53), hospital type (*P* = .54), or delivery volume (*P* = .09). Fifty-nine nurseries used both birth weight and gestational age criteria; 53 of these nurseries (90%) required infants to meet both criteria. In the 6 nurseries requiring infants to meet either criterion, the criteria included 34 weeks or 1800 g (*n* = 1), 35 weeks or 1800 g (*n* = 3), and 35 weeks or 2000 g (*n* = 2).

Interventions in the Mother's Room

All participating institutions practiced rooming of infants within the mother's room. Respondents were surveyed about their nursery's ability to provide 11 medical interventions within the mother's postpartum room in the well newborn nursery (Fig 3). Phototherapy (*n* = 62, 90%) and dextrose gel (*n* = 56, 81%) were the most commonly offered interventions in the mother's room; neither of these interventions was associated with gestational age or birth weight thresholds used for admission (*P* > .05; Supplemental Table 2). Two of the 11 interventions (continuous cardiorespiratory monitoring and CPAP) were not offered in the mother's room in any of the surveyed nurseries. Approximately one-half of nurseries (*n* = 36, 52%) had an area outside of the mother's room to assess and/or treat mildly symptomatic infants admitted to the well newborn nursery, without requiring transfer to the NICU. Ten of these separate nursery areas within the well newborn nursery allowed for the use of CPAP for an infant in respiratory distress.

Nursery Management

Respondents were queried regarding their nursery's practice patterns for the management of common newborn morbidities including early-onset sepsis, hypoglycemia, hyperbilirubinemia, neonatal abstinence syndrome, and nutritional supplementation.

Early-Onset Sepsis

Responses indicated that the most frequently used method of assessing infants at risk for early-onset sepsis was a

multivariable risk assessment approach, such as the Kaiser Permanente's Neonatal Early-Onset Sepsis Calculator (*n* = 53, 77%).¹⁴ A serial clinical examination-based approach was used by 6 nurseries (9%), whereas 4 nurseries (6%) used the Center for Disease Control and Prevention's categorical risk assessment approach.^{15–17} The remaining nurseries either had no site-specific protocol with management per individual clinician or had other methods of evaluating for early-onset sepsis.

Hypoglycemia

Initiating hypoglycemia screening because of 4 common risk factors for hypoglycemia was nearly universal across surveyed nurseries. These risk factors were small for gestational age (*n* = 67, 97%), large for gestational age (*n* = 65, 94%), infants of diabetic mothers (*n* = 66, 96%), and late preterm infants (34 to <37 weeks; *n* = 66, 96%). Hypoglycemia screening was also frequently initiated because of antenatally administered maternal medications, including β blockers (*n* = 21, 30%), betamethasone (*n* = 9, 13%), and β agonists (*n* = 6, 9%). Twenty-two nurseries (32%) screened all infants with low Apgar scores for hypoglycemia; the definition of what constituted a low Apgar score was defined per nursery. Seven nurseries (10%) employed screening for hypoglycemia in all postterm (>42 weeks' GA) infants. When hypoglycemia was noted, 56 nurseries (81%) were able to administer dextrose gel.

Hyperbilirubinemia

To screen for hyperbilirubinemia, 52 nurseries (77%) obtained a transcutaneous bilirubin measurement with a serum bilirubin level obtained as needed. A smaller percentage of nurseries (*n* = 11, 16%) obtained a serum bilirubin level for all infants. Five nurseries (7%) stratified infants by hyperbilirubinemia risk factors to decide whether a transcutaneous or serum bilirubin level was obtained for initial screening. One respondent did not answer this question. The treatment thresholds recommended by the AAP remained the most common criteria for initiation of phototherapy

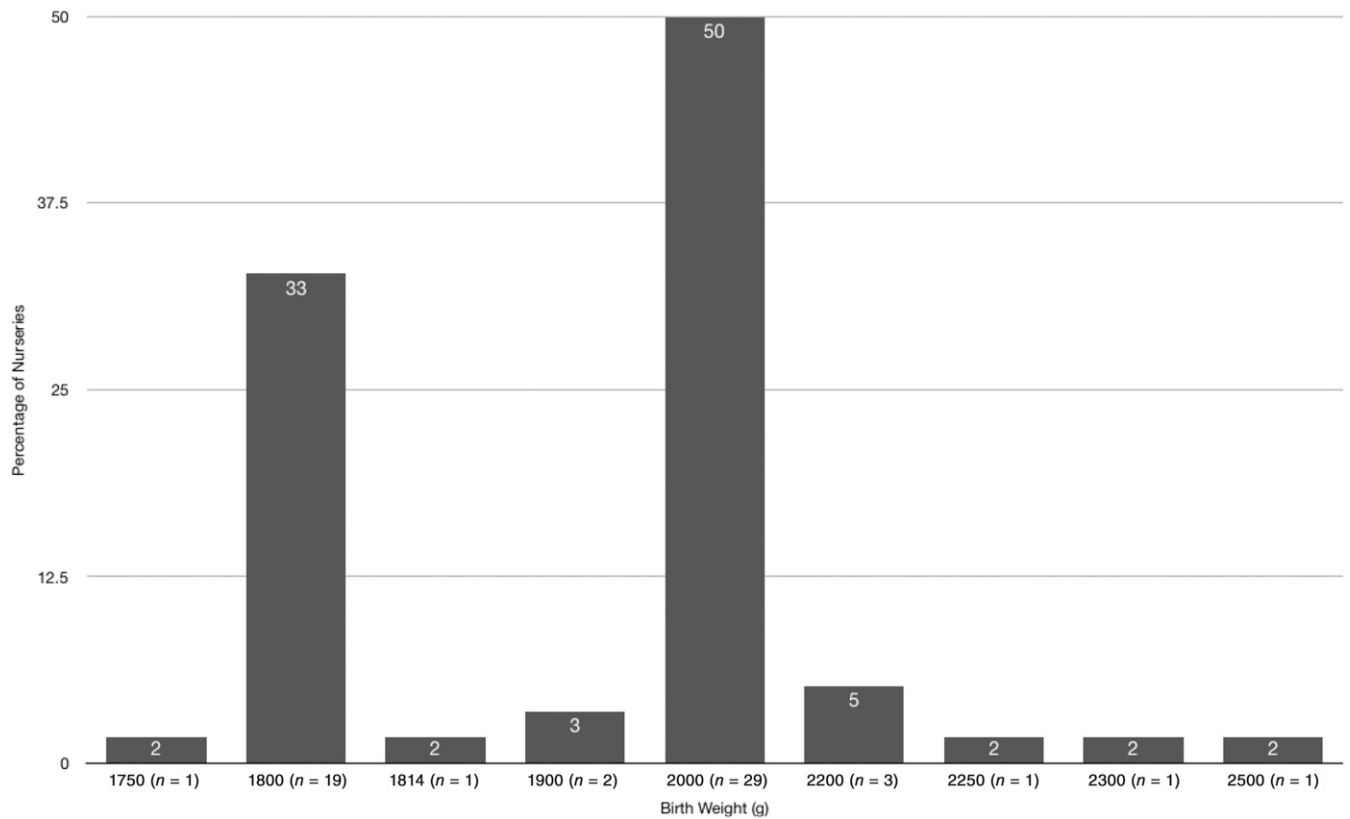


FIGURE 1 Distribution of minimum birth weight criteria used for level I nursery admission ($n = 59$, 10 nurseries did not use a birth weight criterion).

($n = 59$, 87%); other sites used the University of California San Francisco Northern California Neonatal Consortium guidelines,¹⁸ or had institution or provider-specific protocols.¹⁹ Most nurseries ($n = 58$, 85%) did not offer home phototherapy after hospital discharge.

Neonatal Abstinence Syndrome

Assessment methods for neonatal abstinence syndrome were nearly evenly split; 33 nurseries (49%) used the newer Eat Sleep Console model whereas the remaining 35 nurseries (52%) used the Finnegan Neonatal Abstinence Scoring System.²⁰

Feeding Supplementation Practices

Banked breast milk was available to infants of all gestational ages in 25 nurseries (36%), and not available to infants of any gestational age in the well newborn nursery in 37 nurseries (54%).

Seven nurseries (10%) offered banked breast milk to a subset of infants with risk factors for poor feeding, such as hypoglycemia or weight loss. Of these, 4 nurseries offered banked breast milk to all infants with risk factors, whereas, in 2 nurseries, it was available to only late preterm infants with risk factors. Lastly, 1 nursery offered banked breast milk to term infants with risk factors as well as all late preterm infants.

Length of Stay

The length of stay for an uncomplicated birth hospitalization for term infants born via vaginal delivery was 24 to 36 hours in the majority of nurseries ($n = 47$, 69%); a smaller subset of nurseries ($n = 20$, 30%) opted for discharge when the infant was 36 to 48 hours old. Late preterm infants routinely had longer lengths of stay than term infants born via vaginal delivery, with nurseries nearly evenly split between

discharge at 36 to 48 hours ($n = 28$, 41%) and 48 to 72 hours ($n = 29$, 43%). For both term and late preterm infants born via Caesarean delivery, the most common timeframe for discharge was 48 to 72 hours (term: $n = 44$, 65%, late preterm: $n = 43$, 63%). Length of stay durations are shown in Supplemental Tables 3 and 4.

DISCUSSION

The vast majority of infants born in the United States annually are admitted to well newborn nurseries during birth hospitalization; our study helps identify the current state of admission practices and available medical interventions in these nurseries. We found that significant variability exists in terms of admission criteria used to determine which infants are able to stay within a mother/parent–infant dyad in the well newborn nursery. Variations in admission criteria did not differ by region, hospital type, or

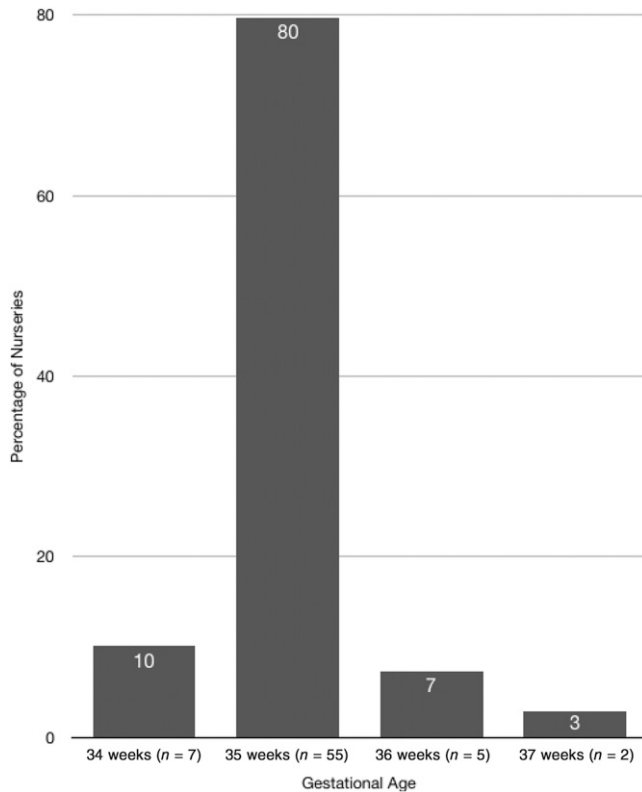


FIGURE 2 Distribution of minimum gestational age criteria used for level I nursery admission ($n = 69$).

delivery volume. Over time, newborns in the United States across all birth weights have had an increased likelihood of being admitted to a NICU, raising concerns regarding potential ICU overuse.²¹ Knowing that practice variability can signal overuse in health care, the variation found in our study further raises questions surrounding whether levels of neonatal care are currently optimized.^{22,23}

Most nurseries used a minimum birth weight criterion for admission to the well newborn nursery; a bimodal pattern was present, with 1800 g and 2000 g as the most common thresholds used. All nurseries surveyed used a gestational age criterion for well newborn admission, with the majority using 35 weeks' completed gestation. Despite this relative consensus, it is important to remember that even small percentages in newborn medicine denote large populations of infants. Accordingly, although only 7% of nurseries use a 36 weeks' completed gestation threshold, this choice of admission

criterion represents ~10 235 infants annually who required an automatic NICU admission; these infants may have been eligible to remain within well newborn care if born at one of the 80% of nurseries utilizing a 35 weeks' completed gestation cutoff.^{1,24} Although the majority of nurseries employed both gestational age and birth weight criteria, it is unclear whether 1 or both, and in what permutations, represent ideal thresholds to safely maximize the number of infants remaining within a mother/parent–infant dyad.

Although the current variability in admission criteria across well newborn nurseries may not represent an ideal state, it is likely that there is no 1 set of admission criteria that will be optimal across all nurseries. Ideal admission criteria for each nursery should, therefore, be nested in the context of both provider and nursing staffing ratios, the ability to rapidly assess infants to develop signs of illness, and processes to transfer to a higher level of care if required.

The majority of surveyed nurseries provide phototherapy in the mother's room; however, 10% were unable to offer this intervention. Although infants born at earlier gestational ages and lower birth weights are more likely to require phototherapy, this intervention was not correlated to either the gestational age or birth weight thresholds used for nursery admission. Clinical guidelines for the management of hyperbilirubinemia recommend a family-centered approach to treatment, allowing for phototherapy, bonding, and breastfeeding to occur concurrently in the mother's room. In nurseries in which this is not available, this represents an area of evaluation for appropriate NICU utilization.

Phototherapy and dextrose gel were the most commonly offered interventions in the mother's room; both were offered in more than three-quarters of surveyed nurseries. Although infants born at earlier gestational ages and lower birth weights are more likely to require phototherapy and dextrose gel, neither of these interventions was correlated to the gestational age and birth weight admission cutoffs used by nurseries. Significant variation among hospitals exists regarding the proportion of infants cared for within a mother/parent–infant dyad compared with a NICU; this variation has not been explained by patient-level factors surrounding illness severity.^{9,10} In conjunction with our findings, this suggests a need to further evaluate both why current interventions and admission criteria are used, and whether these represent optimal health care utilization of both well newborn and NICU resources.

We found that, although nearly all nurseries screened infants for hypoglycemia who were small for gestational age, large for gestational age, late preterm gestation, and born to diabetic mothers, there was considerable variability in supplemental criteria used for hypoglycemia screening. Variability additionally exists among the recommendations by the American Academy of Pediatrics, the Pediatric Endocrine Society, and the Academy of

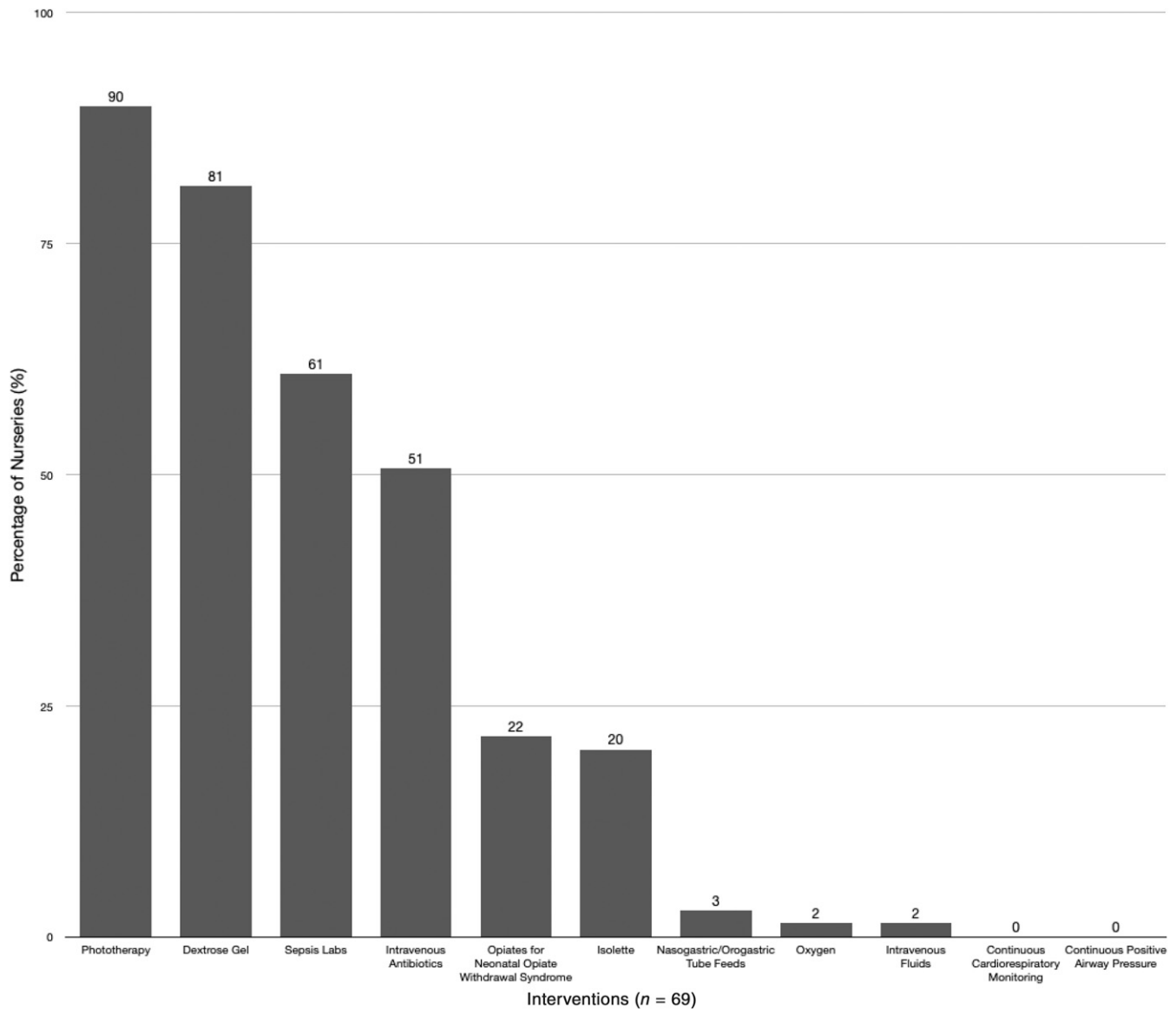


FIGURE 3 Frequency of nurseries offering medical interventions within the mother's room in the level I nursery.

Breastfeeding Medicine for the screening and treatment of neonatal hypoglycemia.^{26–28} There remain substantial gaps in our care practices: a consensus definition of hypoglycemia and the levels requiring intervention, definitions of small for gestational age and large for gestational age, and which infants outside of the most common risk factors benefit from screening. Closing these gaps will be critical to providing high-value care in the well newborn nursery.

Although our study poses questions regarding high-value care practices for late

preterm and term newborns in a well newborn nursery, it is additionally reflective of the recent rapid knowledge acquisition, dissemination, and implementation that we have seen in this population. In the evaluation of infants at risk for early-onset sepsis, seminal work for the Neonatal Sepsis Calculator was published between 2011 and 2017, and that for serial clinical examinations between 2013 and 2018.^{14,29–34} The Sugar Babies Study for the use of dextrose gel in neonatal hypoglycemia for late preterm and term infants was published in 2013.³⁵ The Eat, Sleep, Console

model for neonatal abstinence syndrome was described in 2017.²⁰ In our study, the majority of nurseries had already adopted these models into clinical practice by 2021. This is in sharp contrast to the often-cited statistic that it takes 17 years for only 14% of new knowledge to become incorporated into daily clinical practice.³⁶ Optimistically, an efficient uptake in newborn medicine highlights the potential for rigorous evaluation of current care practices and the ability for quality improvement efforts to change the landscape of well newborn care. Given that late preterm and term infants

represent >97% of the >3.6 million births in the United States annually, any change in care practices can have large impacts on patient care and health care resource utilization.¹

A strength of this study is the inclusion of a diverse sample of nurseries in terms of geographic distribution and patient volume. The results may be limited in generalizability because of selection bias given all respondents are part of a research network focused on improving the care of late preterm and term newborns. The sample size did include a smaller percentage of community hospital nurseries and likely a larger percentage of nurseries with a level III/IV NICU on site than are reflective of the US health care system.³⁷ Although our sample size was geographically diverse and with varying delivery volumes, the overrepresentation of tertiary care centers may indicate a more homogenous sample than

representative of all nurseries. However, given that such variability was already seen among the surveyed nurseries, it is likely that these results are an underestimation of the true variability across US nurseries. The current rates of transfer from the well newborn nursery to the NICU at each institution were not collected in this survey; this information may add context to the variability in admission practices noted. Future studies can include qualitative analyses with multidisciplinary stakeholders in the newborn nursery to better understand the development of current admission practices and the expansion of current survey questions to a population-based sample.

CONCLUSIONS

In this national survey of well newborn nursery providers at largely academic hospitals, notable variation exists in admission criteria, available medical

interventions within the mother's room, screening and management approaches for common newborn morbidities, and length of stay for late preterm and term infants. Identification of evidence-based criteria for well newborn nursery admission may maximize the number of infants able to safely remain within a mother/parent–infant dyad and avoid NICU admission.

Acknowledgments

The work described in this manuscript was supported by the Stanford Maternal and Child Health Research Institute. At the time of the study, Dr Joshi was an Ernest and Amelia Gallo Endowed Postdoctoral Fellow of the Stanford Maternal and Child Health Research Institute. The authors thank the Better Outcomes through Research for Newborn members for their participation in this study. The authors would like to thank David X. Braun, MD, for his help in conceptualizing the survey questions.

the survey instrument, provided interpretation of the data, and critically reviewed the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

REFERENCES

1. Osterman M, Hamilton B, Martin J, et al. Births: final data for 2020. *Nat Vital Stats Reports*. 2022;70(17):1–50
2. Adamkin DH. Feeding problems in the late preterm infant. *Clin Perinatol*. 2006;33(4):831–837, abstract ix
3. Engle WA, Tomashek KM, Wallman C; Committee on Fetus and Newborn, American Academy of Pediatrics. “Late-preterm” infants: a population at risk. *Pediatrics*. 2007;120(6):1390–1401
4. Polin RA; Committee on Fetus and Newborn. Management of neonates with suspected or proven early-onset bacterial sepsis. *Pediatrics*. 2012;129(5):1006–1015
5. Sekar KC. Iatrogenic complications in the neonatal intensive care unit. *J Perinatol*. 2010;30(Suppl):S51–S56
6. Testoni D, Hayashi M, Cohen-Wolkowicz M, et al. Late-onset bloodstream infections in hospitalized term infants. *Pediatr Infect Dis J*. 2014;33(9):920–923
7. Hynan MT, Mounts KO, Vanderbilt DL. Screening parents of high-risk infants for emotional distress: rationale and recommendations. *J Perinatol*. 2013;33(10):748–753
8. Hannan KE, Juhl AL, Hwang SS. Impact of NICU admission on Colorado-born late preterm infants: breastfeeding initiation, continuation and in-hospital breastfeeding practices. *J Perinatol*. 2018;38(5):557–566
9. Edwards EM, Horbar JD. Variation in Use by NICU Types in the United States. *Pediatrics*. 2018;142(5):e20180457
10. Schulman J, Dimand RJ, Lee HC, et al. Neonatal intensive care unit antibiotic use. *Pediatrics*. 2015;135(5):826–833
11. Braun D, Edwards EM, Schulman J, et al. Choosing wisely for the other 80%: what we need to know about the more mature newborn and NICU care. *Semin Perinatol*. 2021;45(3):151395
12. Simpson E, Goyal NK, Dhepyasuwan N, et al. Prioritizing a research agenda: a Delphi study of the better outcomes through research for newborns (BORN) network. *Hosp Pediatr*. 2014;4(4):195–202
13. American Academy of Pediatrics Committee on Fetus and Newborn. Levels of neonatal care. *Pediatrics*. 2012;130(3):587–597
14. Kuzniewicz MW, Puopolo KM, Fischer A, et al. A quantitative, risk-based approach to the management of neonatal early-onset sepsis. *JAMA Pediatr*. 2017;171(4):365–371

15. Joshi NS, Gupta A, Allan JM, et al. Management of chorioamnionitis-exposed infants in the newborn nursery using a clinical examination-based approach. *Hosp Pediatr*. 2019;9(4):227–233
16. Verani JR, McGee L, Schrag SJ; Division of Bacterial Diseases, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention (CDC). Prevention of perinatal group B streptococcal disease—revised guidelines from CDC, 2010. *MMWR Recomm Rep*. 2010;59(RR-10):1–36
17. Puopolo KM, Benitz WE, Zaoutis TE; Committee on Fetus and Newborn; Committee on Infectious Diseases. Management of neonates born at ≥ 35 0/7 weeks' gestation with suspected or proven early-onset bacterial sepsis. *Pediatrics*. 2018;142(6):e20182894
18. Hoffman K, Landman G, Clyman R, et al. NCNC hyperbilirubinemia treatment guideline. Available at: <https://phototherapyguidelines.com>. Accessed July 5, 2022
19. American Academy of Pediatrics Subcommittee on Hyperbilirubinemia. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. *Pediatrics*. 2004;114(1):297–316
20. Grossman MR, Berkowitz AK, Osborn RR, et al. An initiative to improve the quality of care of infants with neonatal abstinence syndrome. *Pediatrics*. 2017;139(6):e20163360
21. Harrison W, Goodman D. Epidemiologic trends in neonatal intensive care, 2007–2012. *JAMA Pediatr*. 2015;169(9):855–862
22. Nassery N, Segal JB, Chang E, Bridges JFP. Systematic overuse of healthcare services: a conceptual model. *Appl Health Econ Health Policy*. 2015;13(1):1–6
23. Morgan DJ, Brownlee S, Leppin AL, et al. Setting a research agenda for medical overuse. *BMJ*. 2015;351:h4534
24. Davidoff MJ, Dias T, Damus K, et al. Changes in the gestational age distribution among U.S. singleton births: impact on rates of late preterm birth, 1992 to 2002. *Semin Perinatol*. 2006;30(1):8–15
25. Kemper AR, Newman TB, Slaughter JL, et al. Clinical practice guideline revision: management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. *Pediatrics*. 2022;150(3):e2022058859
26. Wight NE; Academy of Breastfeeding Medicine. ABM clinical protocol #1: guidelines for glucose monitoring and treatment of hypoglycemia in term and late preterm neonates, revised 2021. *Breastfeed Med*. 2021;16(5):353–365
27. Thornton PS, Stanley CA, De Leon DD, et al; Pediatric Endocrine Society. Recommendations from the pediatric endocrine society for evaluation and management of persistent hypoglycemia in neonates, infants, and children. *J Pediatr*. 2015;167(2):238–245
28. Adamkin DH; Committee on Fetus and Newborn. Postnatal glucose homeostasis in late-preterm and term infants. *Pediatrics*. 2011;127(3):575–579
29. Puopolo KM, Draper D, Wi S, et al. Estimating the probability of neonatal early-onset infection on the basis of maternal risk factors. *Pediatrics*. 2011;128(5):e1155–e1163
30. Escobar GJ, Puopolo KM, Wi S, et al. Stratification of risk of early-onset sepsis in newborns ≥ 34 weeks' gestation. *Pediatrics*. 2014;133(1):30–36
31. Kuzniewicz MW, Walsh EM, Li S, et al. Development and implementation of an early-onset sepsis calculator to guide antibiotic management in late preterm and term neonates. *Jt Comm J Qual Patient Saf*. 2016;42(5):232–239
32. Cantoni L, Ronfani L, Da Riolo R, Demarini S; Perinatal Study Group of the Region Friuli-Venezia Giulia. Physical examination instead of laboratory tests for most infants born to mothers colonized with group B Streptococcus: support for the Centers for Disease Control and Prevention's 2010 recommendations. *J Pediatr*. 2013;163(2):568–573
33. Berardi A, Fornaciari S, Rossi C, et al. Safety of physical examination alone for managing well-appearing neonates ≥ 35 weeks' gestation at risk for early-onset sepsis. *J Matern Fetal Neonatal Med*. 2015;28(10):1123–1127
34. Joshi NS, Gupta A, Allan JM, et al. Clinical monitoring of well-appearing infants born to mothers with chorioamnionitis. *Pediatrics*. 2018;141(4):e20172056
35. Harris DL, Weston PJ, Signal M, et al. Dextrose gel for neonatal hypoglycaemia (the Sugar Babies Study): a randomised, double-blind, placebo-controlled trial. *Lancet*. 2013;382(9910):2077–2083
36. Balas EA, Boren SA. Managing clinical knowledge for health care improvement. *Yearb Med Inform*. 2000;(1):65–70
37. Leyenaar JK, Ralston SL, Shieh MS, et al. Epidemiology of pediatric hospitalizations at general hospitals and freestanding children's hospitals in the United States. *J Hosp Med*. 2016;11(11):743–749