Aggregating patients for discharge readiness in the neonatal intensive care unit: impact on length of stay

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Background: In the past 30 years, neonatal intensive care unit (NICU) layout in the United States has steadily shifted from open bay wards to single family room models. There is currently no published standardized approach for care team assignment in a NICU. Medical centers have decreased emergency department (ED) door-to-discharge time using acuity aggregation methods. We hypothesized aggregating NICU patients by acuity level would be associated with shorter length of stay (LOS).

Methods: We conducted a retrospective, cross-sectional, pre-post study of 1,118 infants admitted and discharged from a level III NICU in an urban setting in the United States between July 2016 and March 2018 (pre-aggregation) *vs.* April 2018 and December 2019 (post-aggregation). Generalized linear regression was used to evaluate care team assignment and NICU LOS.

Results: For infants ≥37 weeks gestational age (GA), NICU LOS decreased significantly after aggregating patients by acuity level, after controlling for infant and maternal characteristics. Average marginal effect for NICU LOS in infants ≥37 weeks GA was −3.5 days [95% confidence interval (CI), −6.8 to −0.1] after aggregating patients by acuity level, translating into 599 fewer NICU days during the post-aggregation period. NICU LOS for infants with GA <37 weeks did not significantly differ between aggregation periods.

Conclusions: The 3.5-day reduction in LOS for infants 37 weeks GA and greater is clinically important, as infants benefit from going home sooner to bond and grow with their guardians. The accumulation of reduced days across hundreds of patients has the potential to reduce costs for both families and the hospital.

Keywords: Length of stay (LOS); discharge; acuity level; neonatology

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Introduction

In 2021, 1 in 10 infants in the United States were born preterm [less than 37 weeks' gestational age (GA)] (1). A retrospective study of infants in California from 2009–2011 reported premature infants incurred 61% of all newborn hospital costs (2). The estimated cost of preterm infants in economic terms, including medical, educational, and lost productivity, amounted to over $25 billion in 2016 (3). The mean hospital-related cost for a full-term infant is $2,433 with an average length of stay (LOS) of about 3 days. The average LOS for an infant less than 37 weeks' gestation was 15 days and a mean cost of $48,036. Compared to an infant born less than 32 weeks' gestation who had an average LOS of 58 days and cost of $223,931 (2).

In the past 30 years, neonatal intensive care unit (NICU) layout in the United States has steadily shifted from open bay wards to single family room models due to an association between single family room NICUs and a decrease in both LOS and duration of ventilator support (4). However, there is no consensus on a regulated national standard for the layout and flow of a NICU. Considering that lower acuity infants may be negatively impacted in open bay ward NICUs due to increased exposure to noise and potential stressful interruptions in sleep and growth likely contributing to increased LOS, NICU design may be more impactful than previously understood. Historically, open bay NICUs might have had one bay dedicated as a step-down unit for convalescing infants for discharge readiness. The concept of acuity-based team assignments in single room NICUs with the goal of optimizing LOS has not been previously reported in the literature.

Noise pollution is a factor in infant development that is significantly impacted by the design and layout of a unit. The American Academy of Pediatrics recommends the threshold for continuous noise levels in a NICU should not exceed the 45-decibel range (5). Evidence provided by a French academic medical center showed that the sound levels in sampled NICUs had exceeded that threshold, particularly within an incubator, potentially negatively impacting neonatal sensory development (6). Infants' high acuity status is accentuated with the requirement of additional equipment such as ventilators and multiple medication pumps. Clustering infants by acuity level might lead to infants with lower acuity status achieving more restful states to feed and grow when physically moved away from higher acuity areas.

An emergency department (ED) model where patients are aggregated by acuity level has shown a decrease in door-to-discharge time for five of the top 12 most common complaints within EDs, including a 5.4% reduction for all patients (7). Per review of available literature, no prior studies have examined acuity level aggregation for infants in the NICU. We hypothesized that aggregating patients by acuity level for discharge readiness in the NICU would be associated with shorter LOS. We present this article in accordance with the STROBE reporting checklist (available at https://jhmhp.amegroups.com/article/view/10.21037/jhmhp-23-71/rc).

Highlight box

Key findings

- This study highlights a new team structure model to aid in more efficient length of stay (LOS) in the neonatal intensive care unit (NICU).

What is known and what is new?

- Studies from the emergency department have shown decreased LOS when patients are aggregated by acuity level, however, this is lacking in the field of neonatology.
- This study adds new team structures to promote more efficient LOS in the NICU.

What is the implication, and what should change now?

- This study provides a team design to optimize LOS for infants with efficient discharge planning, ultimately leading to decreased health care cost and resource utilization.

Methods

Study design

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Rush University Institutional Review Board (ORA No. 20102202-IRB01) and individual consent for this retrospective analysis was waived.

This retrospective, pre-post study evaluating LOS included 1,118 infants who were admitted and discharged from the NICU between July 1, 2016 and December 31, 2019. The NICU is a level III 60-bed, single family room, unit within a large academic medical center in an urban setting, located in the Midwest region of the United States. Infants were excluded from the study if they had a NICU stay less than 5 days, died before discharge, were transferred to another facility, or received extracorporeal membrane oxygenation (ECMO) or tracheostomy.

Additionally, patients were excluded if there was any missing information for key variables. Data were collected from the organization's electronic data warehouse, a repository for electronic medical record data, and the organization's financial data mart.

NICU team structure

Prior to this study's intervention, patients in the NICU were assigned a care team without regard to acuity level, and the team assignment did not change during the NICU stay. In April 2018 the NICU implemented an acuity-based model for assigning patients to care teams for the duration of their NICU stay. A three-team system was created with two higher acuity level teams and one lower acuity level team. This model of clustering infants by their acuity level was implemented to ensure lower acuity infants received dedicated preparation for discharge readiness. In general, patients on the lower acuity team were geographically in close proximity to each other in the NICU. This new team structure dynamic mimics staffing models in hospitals with a dedicated step-down unit in a separate area of the hospital, with specific staff dedicated to lower acuity infants and discharge preparation. The goal of the new team structure was to minimize time and attention likely taken away from lower acuity infants when intermixed on the same team with higher acuity infants to eliminate workflow-related delays in the discharge preparation process.

Each infant who was admitted to the NICU was individually evaluated by the care team who reviewed the infant's GA by week, birth weight, morbidities, and clinical factors, and the NICU's current staffing when determining the care team assignment for the patient during the stay. Two teams were characterized by their mix of high-acuity patients, while a third team was primarily for lower-acuity patients, such as convalescing premature infants and those preparing for discharge. The majority of infants from the higher acuity teams transition to the lower acuity team when their acuity was reduced in preparation for discharge, such as a very low birth weight infant or very preterm infant would transition to the lower acuity team when advanced to feeder—grower status.

Definition of measures

The dependent variable of interest in the study was infant NICU LOS. The primary independent variable of interest was time period, indicating whether the infant was admitted prior to aggregating patients by acuity level for discharge readiness (pre-aggregation period, July 1, 2016–March 31, 2018) or after implementation of the aggregation design (post-aggregation period, April 1, 2018–December 31, 2019). Other covariates included infant and maternal characteristics.

Infant characteristics were demographic characteristics, clinical factors and acuity. Infant demographic characteristics included sex and race/ethnicity (non-Hispanic Black, Hispanic, non-Hispanic White, and other racial/ethnic groups). Infant clinical factors included infant GA either a continuous variable in weeks or categorical variable (<28, 28–31, 32–33, 34–36, 37 weeks and older), and small for GA at birth, defined as less than the 10th percentile of weight for GA (8). Acuity was measured by GA <33 weeks, as those infants typically require respiratory support at birth ranging from continuous positive airway pressure to intubation; other high acuity diagnosis at birth (e.g., respiratory failure of newborn, hypotension of newborn, pneumothorax); presence of any complication of prematurity that occurred during the NICU hospitalization [bronchopulmonary dysplasia, necrotizing enterocolitis, retinopathy of prematurity or intraventricular hemorrhage, based on International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10) diagnosis codes]; and diagnosis of patent ductus arteriosus (PDA), which can cause hemodynamic instability. Infant acuity at birth was measured using a set of inclusion and exclusion guidelines determined by the neonatologists on clinical service using diagnoses present at or near the time of birth and based on clinical judgement. This list of included diagnoses for high acuity was selected by a group of neonatologists who reviewed ICD-10 diagnosis codes available for neonatology, which were limited to those codes that were in these data for the study period (Table S1).

Maternal characteristics included age at time of delivery (years), primary payer (Medicaid and commercial insurance), gravida (1, 2–4, 5 or more), average family visits per week, and median neighborhood household income. The number of family visits per week was collected through the electronic medical record patient's flowsheet, and the average number of family visits per week was calculated based on visitation during the entire NICU stay. Average weekly family visits were categorized as 2 or fewer, >2–4, >4–6, >6. Median neighborhood household income was based on zip code of home residence using data from the United States Census Bureau.

Statistical analysis

Variables were described using median [interquartile range (IQR)] and frequency distributions, depending on the type of variable. Differences in independent variables were compared between time periods using Mann-Whitney *U* tests and chi-square tests. Generalized linear regression was used with a negative binomial distribution and log link function to test whether NICU LOS differed between time periods. The first model was an unadjusted model, including only time period as an independent variable. The second model adjusted for infant and maternal characteristics. Average marginal effects for time period were computed by first calculating the predicted NICU LOS (predicted margin) for all infants in the sample as if they were hospitalized in the pre-aggregation period, then calculating the predicted NICU LOS for all infants as if they were hospitalized in the post-aggregation period. The average marginal effect was the difference between the predicted NICU LOS in the two time periods. The 95% confidence intervals (CIs) were calculated for the predicted margin and average marginal effects. Additionally, similar regression models were constructed, stratifying by GA (<28, 28–31, 32–33, 34–36, 37 weeks and older), using the same procedures. Statistical analyses were performed using SAS version 9.4 (Cary, NC, USA) and Stata version 17.0 (College Station, TX, USA).

Results

The study included 1,118 infants who were admitted to and discharged from the NICU between July 1, 2016 and December 31, 2019. Overall, the median GA was 34 weeks (IQR, 31–37 weeks), 43.5% non-Hispanic Black and 29.3% Hispanic, and 63.8% were insured by Medicaid (*Table 1*). There were no differences in infant or maternal demographic characteristics, family visitation, or infant severity of illness, as measured by high acuity diagnosis at birth, any complications or PDA (*Table 1*).

The average unadjusted NICU LOS for infants in the pre-aggregation period was 35.7 days (95% CI, 32.7, 38.7) compared to 33.1 days for infants in the post-aggregation period (95% CI, 30.4, 35.8), and the difference was not statistically significant (*Table 2*). After adjusting for infant and maternal demographic characteristics, the average marginal effect for the post-aggregation period was −2.7 fewer NICU days (95% CI, −7.2, 1.7) (*Figure 1*, *Table 2*; description of sample of infants with GA at birth 37 weeks and older results provided in Table S2). There was no significant different in LOS between aggregation periods for infants born <37 weeks GA, however, LOS significantly decreased for infants born 37 weeks GA or older in the post-aggregation period, with −3.5 fewer NICU days (95% CI, −6.8, −0.1).

Discussion

The purpose of this study was to evaluate the association of grouping patients by acuity level for discharge readiness in the NICU while controlling for additional variables. These variables included infant: sex, race/ethnicity, GA, small for GA, high acuity diagnosis at birth, complications, PDA; and maternal: age, primary insurance payer, gravida, median neighborhood household income, and average family visits per week. We found that all independent variables controlled for, with the exclusion of median household income, had a significant association with LOS. The importance here is not held within the geographic space of clustering each team together but in the formation of care teams that are dedicated to each acuity level that can tailor the level of care required by the patients. The way in which this reduction in LOS was achieved might have been due to several factors including optimizing time infants transition to oral feedings, weaning from respiratory support, and enhancing discharge planning with families.

Infants born 37 weeks GA or older had a significantly shorter LOS in the post-aggregation period compared to infant in the pre-aggregation period, translating to an average reduction of 3.5 days per infant, after adjusting for infant and maternal characteristics. This reduction in LOS also translates into more time for the infant to bond with guardian(s) in a home environment, minimize hospital-based environmental exposures, and likely minimize additional stress and financial impact for guardians maintaining employment and/or caring for additional family members while juggling visiting infants the in NICU (9-12).

This reduction in average LOS spread over hundreds of patients represents a significant amount of cost savings. These cost savings would be the result of a reduction in labor hours, supplies, and the decreased utilization of resources. Hospitals are challenged by the effects of the great resignation as labor expenses are increasing at a higher trend than normal. Additionally, staffing vacancies have required the use of agency/travelers and retention programs which come at a premium. While no one knows if the

Table 1 Description of the sample of infants

Characteristics	Total (n=1,118)	Pre-aggregation (n=543)	Post-aggregation (n=575)	P value
Infant characteristics				
Male sex	628 (56.2)	302 (55.6)	326 (56.7)	0.716
Race/ethnicity				0.420
Non-Hispanic Black	486 (43.5)	241 (44.4)	245 (42.6)	
Hispanic	327 (29.3)	149 (27.4)	178 (31.0)	
Non-Hispanic White	206 (18.4)	99 (18.2)	107 (18.6)	
Other	99 (8.9)	54 (9.9)	45 (7.8)	
GA (weeks)	34 [31, 37]	34 [31, 38]	34 [31.5, 37.0]	0.852
GA category				0.148
<28 weeks	120 (10.7)	62 (11.4)	58 (10.1)	
28–31 weeks	181 (16.2)	95 (17.5)	86 (15.0)	
32–33 weeks	177 (15.8)	81 (14.9)	96 (16.7)	
34–36 weeks	288 (25.8)	124 (22.8)	164 (28.5)	
37 weeks and older	352 (31.5)	181 (33.3)	171 (29.7)	
Small for GA at birth	180 (16.1)	93 (17.1)	87 (15.1)	0.364
High acuity diagnosis at birth	979 (87.6)	468 (86.2)	511 (88.9)	0.174
Any complication	166 (14.9)	83 (15.3)	83 (14.4)	0.689
PDA	202 (18.1)	99 (18.2)	103 (17.9)	0.890
Maternal characteristics				
Maternal age (years)	30 [25, 35]	30 [25, 34]	30 [26, 35]	0.220
Primary payer				0.247
Medicaid	713 (63.8)	337 (62.1)	376 (65.4)	
Commercial insurance	405 (36.2)	206 (37.9)	199 (34.6)	
Gravida				0.223
1	344 (30.8)	167 (30.8)	177 (30.8)	
2–4	586 (52.4)	295 (54.3)	291 (50.6)	
5 or more	188 (16.8)	81 (14.9)	107 (18.6)	
Family visitation, average number per week				0.442
0–2	79 (7.1)	45 (8.3)	34 (5.9)	
>2–4	228 (20.4)	108 (19.9)	120 (20.9)	
>4–6	473 (2.3)	231 (42.5)	242 (42.1)	
>6	338 (30.2)	159 (29.3)	179 (31.1)	
Median neighborhood income				0.159
<$30k	95 (8.5)	47 (8.7)	48 (8.4)	
$30k–<$50k	407 (36.4)	185 (34.1)	222 (38.6)	
$50k–<$70k	305 (27.3)	145 (26.7)	160 (27.8)	
$70k–<$90k	157 (14.0)	90 (16.6)	67 (11.7)	
$90k+	154 (13.8)	76 (14.0)	78 (13.6)	

Data are presented as n (%) or median [IQR]. GA, gestational age; PDA, patent ductus arteriosus; IQR, interquartile range.

Table 2 Predicted NICU LOS by aggregation time period and average marginal effect of post-aggregation time period

Gestational age	N	Predicted NICU LOS (95% CI) (days)		Average marginal effect (difference) (95% CI)
		Pre-aggregation	Post-aggregation	
All infants	1,118			
Unadjusted model		35.7 (32.7, 38.7)	33.1 (30.4, 35.8)	−2.6 (−6.7, 1.5)
Adjusted model†		37.3 (33.3, 41.4)	34.6 (30.8, 38.4)	−2.7 (−7.2, 1.7)
<32 weeks GA	301			
Unadjusted model		73.9 (62.3, 85.6)	81.2 (67.8, 94.5)	7.2 (−10.5, 24.9)
Adjusted model†		74.8 (62.1, 87.5)	80.4 (66.2, 94.5)	5.6 (−12.9, 24.0)
32–33 weeks GA	177			
Unadjusted model		28.5 (22.3, 34.8)	26.4 (21.0, 31.8)	−2.1 (−10.4, 6.1)
Adjusted model†		28.2 (21.3, 35.1)	27.0 (20.9, 33.1)	−1.2 (−10.6, 8.2)
34–36 weeks GA	288			
Unadjusted model		18.1 (14.8, 21.3)	17.3 (14.6, 20.1)	−0.7 (−5.0, 3.5)
Adjusted model†		17.0 (13.3, 20.6)	17.9 (14.4, 21.4)	−0.9 (−3.5, 5.4)
37 weeks GA and older	352			
Unadjusted model		18.0 (15.3, 20.6)	11.6 (9.8, 13.5)	−6.3 (−9.6, −3.1)
Adjusted model†		16.3 (13.5, 19.1)	12.9 (10.4, 15.3)	−3.5 (−6.8, −0.1)

†, adjusted model includes the following covariates: infant characteristics (sex, race/ethnicity, GA in weeks, small for GA at birth, high acuity diagnosis at birth, any complication, PDA, and GA <33 weeks), maternal characteristics (age, primary payer, gravida, average number of family visits per week, median neighborhood household income). NICU, neonatal intensive care unit; LOS, length of stay; CI, confidence interval; GA, gestational age; PDA, patent ductus arteriosus.

current trends are here to stay, the ability to manage LOS is helpful in balancing the challenges in the labor market.

Team configurations based on acuity level enable the lower acuity team to prioritize discharge planning and enhance family awareness and participation of infant's discharge preparation needs. This team structure could potentially be generalizable to other units based on staffing models and team design. A separate physical geographical area for the team is not necessary, as our model demonstrated the effect with team coverage delineation.

There were several limitations to this study. The first limitation being the length of time of the study. Advancements in medicine have the ability to shift best practices and methods over time potentially affecting patient care and LOS. Another limitation was this was a single-center study. Additionally, the patients in this study were receiving care at a medical center in the Midwest, USA that mainly serves Medicare and Medicaid populations. The errors in the model may have introduced prediction error which could have under or over-predicted the treatment effect. The use of historical controls might have been a confounding factor. Finally, the physical movement of patients throughout the NICU hospitalization to different rooms or locations in the unit was not studied, only the team assignments, however nursing assignments were clustered based on acuity level, with the majority of low-acuity patients in physical proximity to one another.

Conclusions

This study demonstrated that the implementation of the acuity grouping model resulted in a significant reduction in NICU LOS. Clustering infants by acuity level might lead to infants with lower acuity status achieving more restful states to feed and grow, optimizing discharge readiness, when physically moved away from higher acuity areas. Additionally, having dedicated staffing assignments for lower acuity patients clustered together, similar to step-down rooms historically used in open bay NICUs, enhances discharge preparation as the staff has more time to focus

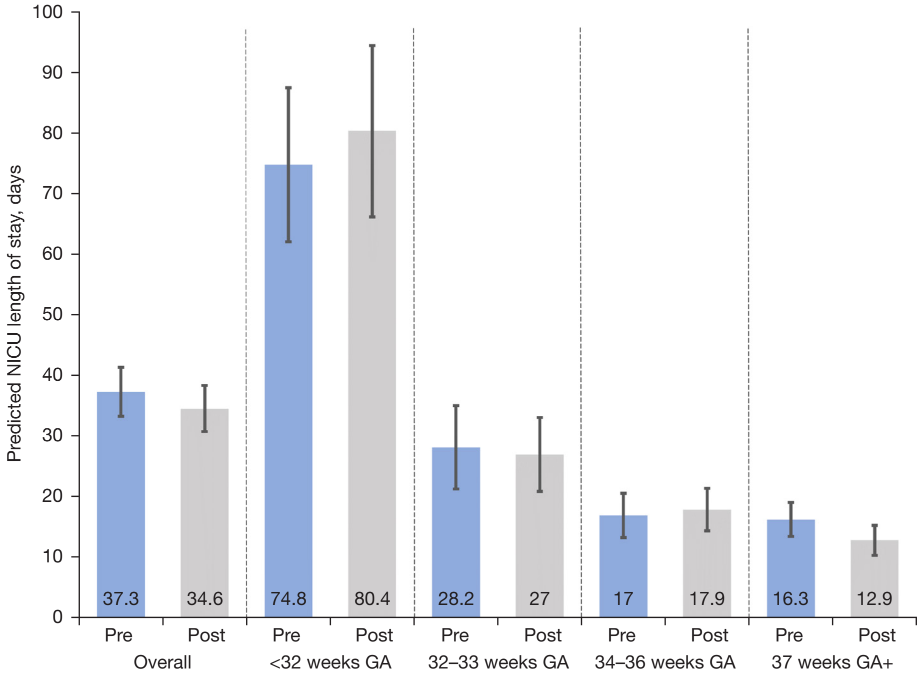

Figure 1 Predicted NICU LOS (predicted margin) by aggregation period. NICU, neonatal intensive care unit; LOS, length of stay; pre, pre-aggregation period; post, post-aggregation period; GA, gestational age.

on completion of discharge tasks and teaching for families. The time to complete discharge tasks and provide education and teaching for families would otherwise be limited if nursing assignments included mixed high and low acuity patients as more time is spent at the bedside of a high acuity infant. This was a single center study and further research is needed to evaluate multiple hospitals to limit the threat to validity. Further research is also needed to optimize NICU layouts. The accumulation of reduced days across hundreds of patients has the potential to reduce costs for both families and the hospital. The importance of such efforts has only been further emphasized by the recent coronavirus disease 2019 (COVID-19) pandemic, which has brought to light the need for resource optimization and efficient LOS.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://jhmhp.amegroups.com/article/view/10.21037/jhmhp-23-71/rc

Data Sharing Statement: Available at https://jhmhp.amegroups.com/article/view/10.21037/jhmhp-23-71/dss

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://jhmhp.amegroups.com/article/view/10.21037/jhmhp-23-71/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Rush University Institutional Review Board (ORA No. 20102202-IRB01) and individual consent for this retrospective analysis was waived.

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Supplementary

Table S1 List of high acuity diagnoses based on the ICD-10 codes and descriptions

ICD-10 diagnosis code	Description
q913	Trisomy 18, unspecified
q793	Gastroschisis
q790	Congenital diaphragmatic hernia
q642	Congenital posterior urethral valves
q620	Congenital hydronephrosis
q6119	Other polycystic kidney, infantile type
q431	Hirschsprung's disease
q212	Atrioventricular septal defect
q211	Atrial septal defect
q210	Ventricular septal defect
p922	Slow feeding of newborn
p819	Disturbance of temperature regulation of newborn, unspecified
p818	Other specified disturbances of temperature regulation of newborn
p760	Meconium plug syndrome
p7422	Hyponatremia of newborn
p711	Other neonatal hypocalcemia
p704	Other neonatal hypoglycemia
p614	Other congenital anemias, not elsewhere classified
p613	Congenital anemia from fetal blood loss
p610	Transient neonatal thrombocytopenia
p551	Abo isoimmunization of newborn
p399	Infection specific to the perinatal period, unspecified
p398	Other specified infections specific to the perinatal period
p352	Congenital herpesviral (herpes simplex) infection
p351	Congenital cytomegalovirus infection
p2930	Pulmonary hypertension of newborn
p28.5	Respiratory failure of newborn
p284	Other apnea of newborn
p251	Pneumothorax originating in the perinatal period
p2401	Meconium aspiration with respiratory symptoms
p239	Congenital pneumonia, unspecified
p238	Congenital pneumonia due to other organisms
p236	Congenital pneumonia due to other bacterial agents
p234	Congenital pneumonia due to Escherichia coli
p233	Congenital pneumonia due to streptococcus, group b
p229	Respiratory distress of newborn, unspecified
p228	Other respiratory distress of newborn
p221	Transient tachypnea of newborn
p220	Respiratory distress syndrome of newborn
p0718	Other low birth weight newborn, 2,000–2,499 grams
p0717	Other low birth weight newborn, 1,750–1,999 grams
p0716	Other low birth weight newborn, 1,500–1,749 grams
p0715	Other low birth weight newborn, 1,250–1,499 grams
p0714	Other low birth weight newborn, 1,000–1,249 grams
p0703	Extremely low birth weight newborn, 750–999 grams
p0702	Extremely low birth weight newborn, 500–749 grams
p0701	Extremely low birth weight newborn, less than 500 grams
p059	Newborn affected by slow intrauterine growth, unspecified
p0519	Newborn small for GA, other
p0518	Newborn small for GA, 2,000–2,499 grams
p0517	Newborn small for GA, 1,750–1,999 grams
p0516	Newborn small for GA, 1,500–1,749 grams
p0515	Newborn small for GA, 1,250–1,499 grams
p0514	Newborn small for GA, 1,000–1,249 grams
p0513	Newborn small for GA, 750–999 grams
p0512	Newborn small for GA, 500–749 grams
p0510	Newborn small for GA, unspecified weight
n1330	Unspecified hydronephrosis
j9690	Respiratory failure, unspecified, unspecified whether with hypoxia or hypercapnia
j9602	Acute respiratory failure with hypercapnia
j9601	Acute respiratory failure with hypoxia
j939	Pneumothorax, unspecified
j930	Spontaneous tension pneumothorax
j3801	Paralysis of vocal cords and larynx, unilateral
i959	Hypotension, unspecified
i270	Primary pulmonary hypertension
e8351	Hypocalcemia
e162	Hypoglycemia, unspecified
d696	Thrombocytopenia, unspecified
d6959	Other secondary thrombocytopenia
d6942	Congenital and hereditary thrombocytopenia purpura
d589	Hereditary hemolytic anemia, unspecified

ICD-10, International Classification of Diseases, 10th Revision, Clinical Modification; GA, gestational age.

Table S2 Description of the sample of infants with GA at birth 37 weeks and older (n=352)

Characteristics	Pre-aggregation (n=181)	Post-aggregation (n=171)	P value
Infant characteristics			
Male sex	108 (59.7)	106 (62.0)	0.656
Race/ethnicity[†]			0.735
Non-Hispanic Black	68 (37.6)	61 (35.7)	
Hispanic	53 (29.3)	58 (33.9)	
Non-Hispanic White	37 (20.4)	35 (20.5)	
Other	23 (12.7)	17 (9.9)	
GA (weeks)	39 [38, 39]	39 [38, 39]	0.402
Small for GA at birth	49 (27.1)	39 (22.8)	0.356
High acuity diagnosis at birth	145 (80.1)	148 (86.6)	0.106
Any complication[†]	5 (2.8)	1 (0.6)	0.216
PDA	30 (16.6)	30 (17.5)	0.809
Maternal characteristics			
Maternal age (years)	29 [25, 35]	29 [24.5, 34.5]	0.957
Primary payer			0.400
Medicaid	101 (55.8)	103 (60.2)	
Commercial insurance	80 (44.2)	68 (39.8)	
Gravida			0.976
1	66 (36.5)	64 (37.4)	
2–4	91 (50.3)	84 (49.1)	
5 or more	24 (13.3)	23 (13.5)	
Family visitation, average number per week			0.370
0–2	11 (6.1)	7 (4.1)	
>2–4	24 (13.3)	18 (10.5)	
>4–6	87 (48.1)	76 (44.4)	
>6	59 (32.6)	70 (40.9)	
Median neighborhood income			0.506
<$30k	15 (8.3)	18 (10.5)	
$30k–<$50k	68 (37.6)	72 (42.1)	
$50k–<$70k	43 (23.8)	39 (22.8)	
$70k–<$90k	30 (16.6)	18 (10.5)	
$90k+	25 (13.8)	24 (14.0)	

Data are presented as n (%) or median [IQR]. [†], Fisher's exact test. GA, gestational age; PDA, patent ductus arteriosus; IQR, interquartile range.

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