

Documented Newborn Hearing Screenings in Florida Administrative Hospital Data: State Policy Compliance by Hospital Types

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Abstract

Purpose: Florida policy mandates newborn hearing screenings (NBHS) in hospitals. United States inpatient administrative hospital data reflects low rates of documented screenings. This analysis investigates inconsistencies between Florida policy and administrative records.

Method: Analysis of Florida statutory language was completed. Florida hospital administrative data was retrospectively analyzed using various statistical methods to explore differences in proportions of documented NBHS among distinct hospital types based on profit and teaching statuses.

Results: Florida mandate requires NBHS completion in the hospital prior to discharge from the birth facility or within 21 days after birth and allows for billing a third-party payer. The median proportions of screenings in Florida hospitals were as follows: not-for-profit teaching hospitals: 0.35 (σ : 0.00–0.83), for-profit teaching hospitals: 0.00 (σ : 0.00–0.07), not-for-profit non-teaching hospitals: 0.08 (σ : 0.00–0.36), and for-profit non-teaching hospitals: 0.05 (σ : 0.00–0.27). Hospital types exhibit significantly different proportions of documented NBHS ($\chi^2 = 194,321.85$, $p < .0001$).

Conclusion: Improving administrative documentation practices to align with policy will enhance adherence to statutory regulations. Boosting volume of documented screenings could lead to increased hospital revenue and present opportunities to invest in infrastructure for the NBHS program.

Keywords: newborn hearing screening, hearing test, claims analyses, policy analysis

Acronyms: EHDI = early hearing detection and intervention; HL = hearing loss; NBHS = newborn hearing screening

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The federal Early Hearing Detection and Intervention (EHDI) program aims to identify risk of congenital hearing loss (HL) within the first month of life using mandated Newborn Hearing Screenings (NBHS; American Speech-Language-Hearing Association, n.d.; Joint Committee on Infant Hearing [JCIH], 2019). Florida statute requires NBHS for all newborns prior to discharge from a hospital or birth facility and within 21 days of birth (Florida Department of Health Newborn Screening Program, n.d.; “Newborn and Infant Hearing Screening,” 2023).

NBHS Identify At-Risk Newborns

Universal NBHS is a crucial first step in early identification of congenital HL (American Speech-Language-Hearing Association, n.d.). Children born with HL experience decreased language input secondary to HL (Tomblin et al., 2015). Undetected, untreated congenital HL leads to risk for significant delays in early childhood and poor academic outcomes (American Speech-Language-Hearing Association, n.d.; Khaimook et al., 2019; National Center on Birth Defects and Developmental Disabilities, 2022).

Identification of HL is crucial before children with HL can gain access to language input through use of hearing technology (e.g., hearing aids, cochlear implants). NBHS in the hospital meets the first EHDI aim and the Florida mandate. Despite mandates, analysis of U.S. claims data indicates lack of alignment between policy and record of documented NBHS for many states (Do et al., 2020).

Low Rates of Documented NBHS

Claims data reflect that low rates of documented NBHS are a problem in the United States. Findings from a study by Do and colleagues (2020) revealed 84.3% of infants born in the United States between 2013 and 2014 did not have a filed claim for NBHS ($n = 384,587$ among 456,407 private insurance reimbursement records). Lack of documented NBHS was likely due to a commonly used bundled claims approach (Do et al., 2020). There is a gap in understanding reasons for undocumented NBHS in administrative data. Mandates may provide clarity in understanding documentation practices. Clearly written, understandable mandates are key to provider and healthcare system compliance. A thorough review of Florida policy is necessary to understand policy-driven NBHS requirements, such as NBHS timing and location. This research will address gaps in understanding Florida state policy.

The Problem with Undocumented NBHS in Administrative Data

Florida EHDI staff report annual data to the Centers for Disease Control and Prevention (CDC; Florida Department of Health, 2021). Annual Florida CDC data reflects the percentage screened before the first month of age ranges from 95.1% to 98.2% which indicates most newborns in Florida receive a NBHS (*Annual Data: Early Hearing Detection and Intervention [EHDI] Program, 2011-2020*). Hospital factors account for 5% of late identifications of HL (Mercer et al., 2023). Screening documentation within administrative hospital records is important for patients, healthcare disciplines, and hospital systems. Lack of documented NBHS in hospital administrative records could interfere with surveillance efforts and recommended EHDI program timelines. NBHS in the hospital leads to earlier identification, diagnosis, and intervention, compared to timelines for children without a NBHS (Neumann et al., 2020; Sequi-Canet & Brines-Solanes, 2021). The average age of HL diagnosis is 4.6 months among children who received a NBHS and 34.9 months for children who do not receive a NBHS (Neumann et al., 2020). Missing documentation could delay necessary healthcare.

Policy Influences Practice

Identification of root causes for low rates of documented NBHS procedures can inform recommended approaches for improved documentation. State policy and procedures are a good source for initial understanding of expected practices. Florida policy and *Florida Department of Health (DOH) guidelines for Newborn Hearing Screening* show that Florida maintains multiple reporting systems for NBHS: the newborn's medical record, the newborn screening specimen card, the electronic state portal, and the Newborn Screening Web Order Application (Florida

Department of Health, 2021; Florida Department of Health Newborn Screening Program, n.d.; "Newborn and Infant Hearing Screening," 2023). Final NBHS results must be reported within seven to 10 days following birth of a well-baby using the specimen card, the electronic portal, or the Web Order Application (Florida Department of Health, 2021). This suggests potential for provider burden of duplicative record keeping across multiple systems. Accurate record keeping of NBHS may be a challenge in Florida due to multiple documentation systems. Multiple reporting systems could explain discrepancies across providers and hospitals and may lead to providers prioritizing one reporting system over the other. Statutory language in state policy could provide clarity that informs more efficient documentation practices.

Reimbursement Policy Allowances Influence Practice

State mandates might reflect specific reimbursement requirements which in turn might affect NBHS documentation practices. NBHS are frequently bundled into claims for delivery and newborn care in the United States (Do et al., 2020). In such cases, the NBHS may not be submitted as a claim separate from comprehensive newborn care and thus, documentation of NBHS may be omitted from administrative hospital records. Florida statutes reflect NBHS is billable to Medicaid and commercial insurance companies; however, statutes do not suggest providers or hospital systems are required to submit a claim for NBHS (Florida Department of Health Newborn Screening Program, n.d.; "Newborn and Infant Hearing Screening," 2023). However, third-party payers will not reimburse for a service without administrative documentation of a procedure. Reimbursement potential of documented NBHS should motivate providers and hospital systems to document NBHS in administrative hospital records.

Hospital Factors Influences Practice

Hospital teaching and profit statuses may be associated with practice and outcomes differences (Herrera et al., 2014; Shahian et al., 2012). Comparing the proportion of documented NBHS in administrative data across hospital types could reveal which hospitals document NBHS in administrative hospital records and which hospitals can improve administrative hospital documentation. This may also suggest that facilities that lack documentation of NBHS in their administrative hospital records may bundle NBHS in their comprehensive newborn care. This research will evaluate administrative data records to identify hospital types associated with a higher proportion of documented NBHS.

Although policies inform practice, patterns in documentation of service provision may reflect reimbursement and local facility policies. This study was designed to evaluate administrative hospital data in the context of Florida statutory language. This research will answer the following research questions: (a) What requirements are reflected in current Florida policy on NBHS? and (b) What hospital factors are associated with newborn encounters reflecting a documented NBHS prior to discharge from a Florida hospital? First, a statutory language text analysis will be applied to identify requirements reflected in Florida policy

(Clinton, 2017). Second, a retrospective administrative data analysis will be conducted with multiple group comparisons across hospital types to identify differences in proportion of documented NBHS (Elliott & Hynan, 2011). Four hospital types will be defined by profit and teaching statuses: not-for-profit teaching hospitals, for-profit teaching hospitals, not-for-profit non-teaching hospitals, and for-profit non-teaching hospitals.

Method

Statutory language text analysis of Florida policy was conducted to address three questions:

- 1) Does policy reflect required timing of NBHS completion?
- 2) Does policy require completion of NBHS in hospital of birth prior to discharge?
- 3) Does policy provide for payer reimbursement for NBHS?

This statutory language text analysis was conducted to identify Florida mandate specifics (Clinton, 2017). The Florida policy was reviewed and answers to the above questions were recorded to develop a more nuanced understanding of the policy.

Administrative Data Analysis

Data Sources

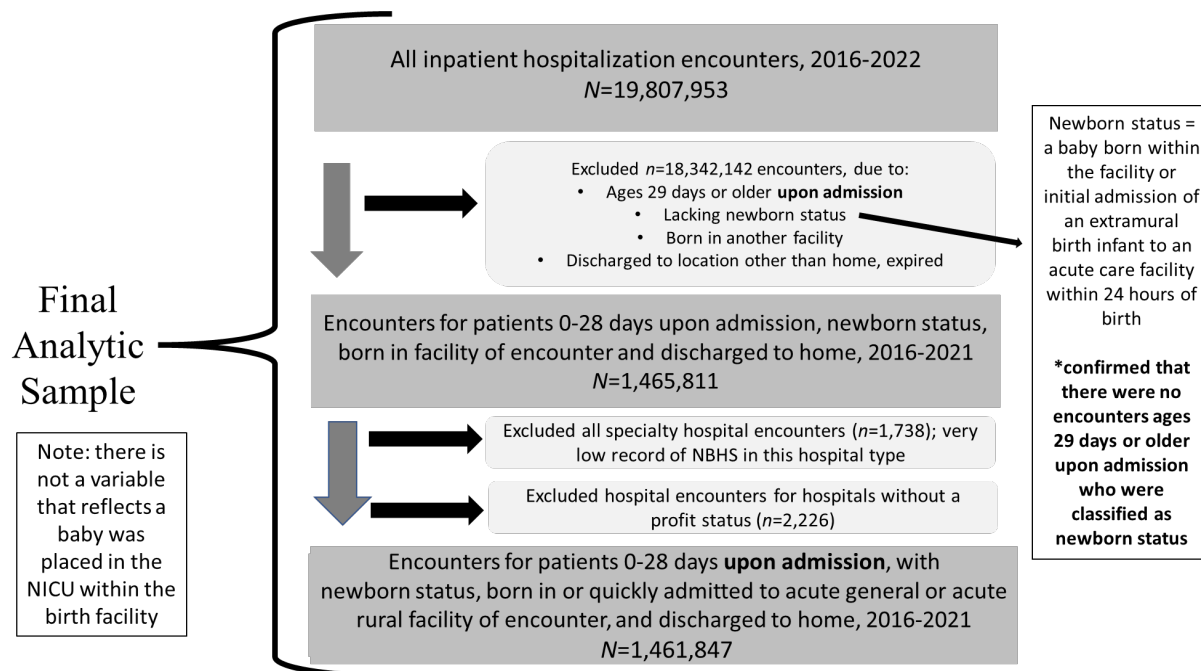
Three data sources were merged for this analysis: (a) patient care episode level, administrative hospital data from the Florida Agency for Healthcare Administration (AHCA) for inpatient hospitalizations from 2016–2022 (Agency for Health Care Administration [Florida], 2022); (b) 2023 teaching hospital records from the Centers for Medicare & Medicaid Services [CMS], 2023); and (c) 2017–2019 hospital profit status data from Florida Health

Finder (*Florida Health Finder Hospital Profit Status, 2023*). AHCA inpatient data includes Florida hospital inpatient, encounter-level, administrative data with variables including patient demographics, hospital data, patient healthcare data (e.g., diagnostic codes), and encounter data (e.g., length of stay). Similar to electronic health record data, administrative hospital data is associated with an encounter and provides details about the patient and the services rendered; however, administrative hospital data is different from medical records in that it does not reveal everything recorded in the medical record. Additionally, this data does not account for Florida babies with an extramural birth (i.e., born in birthing facilities or in the home) who are not admitted for an inpatient hospitalization within 24 hours of birth. CMS hospital records reflect hospital teaching or non-teaching statuses. Florida Health Finder hospital profit status data reflects hospitals as for-profit or not-for-profit.

Study Design and Hypothesis

This retrospective administrative data analysis examined the proportion of documented NBHS for newborns in administrative hospital records associated with hospital teaching or non-teaching status and profit or not-for-profit status. This analysis of Florida inpatient hospitalization encounters for 2016–2022 included administrative hospital records of encounters for patients with a newborn status who were zero to 28 days upon admission, born in the hospital of encounter, and discharged to home (Figure 1). AHCA data encounters reflecting newborn status include Florida babies born in birthing facilities or homes who were admitted for inpatient hospitalization within 24 hours of birth. The authors hypothesized that there would be differences in the proportion and odds of documented NBHS between teaching and non-teaching hospitals, as well as between for-profit and not-for-profit hospitals.

Figure 1
Exclusion Process to Reach Final Analytic Sample



Dependent Variable

Documented NBHS was identified in an encounter if any hearing screening code was present at least once in AHCA variables for principal procedure and/or other procedure codes 1–30. Eight hearing screening codes from the CMS valid ICD-10-PCS list were considered NBHS for this analysis (F13Z0ZZ, F13Z00Z, F13Z01Z, F13Z02Z, F13Z03Z, F13Z08Z, F13ZM6Z, F13ZMZZ). This comprehensive list for hearing screening codes includes some procedure codes not intended for NBHS. However, each hearing screening code was coded at least once in the total sample of encounters across 2016–2022 and indicated a documented hearing screening for the encounter (F13Z0ZZ: $n = 63,781$; F13Z00Z: $n = 7$; F13Z01Z: $n = 4,909$; F13Z02Z: $n = 6$; F13Z03Z: $n = 1$; F13Z08Z: $n = 33$; F13ZM6Z: $n = 141,189$; F13ZMZZ: $n = 7,190$). Thus, encounters reflecting any of the eight hearing screening codes was identified as a completed and documented NBHS for the analyses. Encounters reflecting more than one hearing screening code (i.e., for rescreening) were counted once as an encounter with a documented screening.

Independent Variables

Explanatory variables included hospital teaching and profit statuses. Hospital teaching status was described as teaching or non-teaching, as reflected in CMS 2023 teaching hospital records. Hospital profit type indicated a status of for-profit or not-for-profit for each hospital, reflected in Florida Health Finder records. Multi-factor hospital types were created by combining teaching and profit status to yield not-for-profit teaching, for-profit teaching, not-for-profit non-teaching, and for-profit non-teaching hospitals.

Exclusionary Criteria

As shown in Figure 1, this analysis of Florida inpatient hospitalization encounters from 2016 to 2022 excluded encounters for patients 29 days and older upon admission, those without newborn status, individuals born in another facility, those who expired, and babies who discharged to a location other than home ($n = 18,342,142$). Newborn status was not present on any encounters with an admission age of 29 days or older. Preliminary analysis revealed newborn encounters reflected three of eight hospital types: acute general, acute rural, and specialty. Encounters for newborns in specialty hospitals ($n = 1,738$) revealed zero documented NBHS and thus were excluded. The study sample was merged with Florida Health Finder hospital profit status data for 2017–2019. Encounters lacking hospital profit status were excluded ($n = 2,226, 0.15\%$). The final analytic sample included 1,461,847 encounters for newborns ages zero to 28 days upon admission, born at the acute general or rural facility of encounter, and discharged to home.

Statistical Analysis Methods

Explanatory variables were selected based on the notion that policy and hospital type influence practice. Analysis was conducted to identify proportions of NBHS among

multiple hospital types (teaching, non-teaching, for-profit, not-for-profit). Methods involved calculating annual rates of documented NBHS across all newborn encounters in Florida hospitals 2016–2022 and descriptive statistics of the study sample. Bivariate statistics were calculated using chi-square analyses to examine proportions of documented NBHS in the hospital types. The odds were calculated as the probability of documented screening divided by (1- the probability of documented screening). The proportion of documented NBHS across the hospital types (not-for-profit teaching, for-profit teaching, not-for-profit non-teaching, and for-profit non-teaching) was tested with the Shapiro-Wilk test to examine assumptions of normality. Across all hospital types, Shapiro-Wilk test results rejected assumptions of normality (p -values $< .05$) indicating a non-normal distribution and need for non-parametric alternatives. The Kruskal-Willis test, a non-parametric alternative to test for significant differences, was conducted to examine if mutually exclusive hospital groups (for-profit teaching, not-for-profit teaching, for-profit non-teaching, not-for-profit non-teaching) differed significantly by proportion of documented NBHS (Elliott & Hynan, 2011). SAS version 9.4 and Microsoft Excel version 2311 were used for these analyses.

Results

Florida Policy

Preliminary statutory language text analysis of Florida NBHS policy revealed three requirements that could influence documentation of NBHS (Clinton, 2017; “Newborn and Infant Hearing Screening,” 2023): (a) screening required within a few days of birth, (b) screening required in the birth facility, and (c) screening reimbursable by third party payer sources (“Newborn and Infant Hearing Screening,” 2023). Review of Florida policy revealed a requirement for completion of NBHS for all newborns prior to discharge from their birth facility or within 21 days after birth (Florida Department of Health Newborn Screening Program, n.d.; “Newborn and Infant Hearing Screening,” 2023). The mandate does not indicate Florida providers are required to charge for a NBHS; however, policy reflects the NBHS can be billed to Medicaid and commercial insurance (“Newborn and Infant Hearing Screening,” 2023). This indicates the procedure does not need to be bundled into newborn care.

Administrative Data Analysis

Descriptives

Florida hospital administrative data for newborn encounters reflect a low rate of documented NBHS procedures across years 2016–2022 (Table 1). Annual rates of documented NBHS ranged from 11.76% to 16.08% among 1,461,847 newborn encounters. The proportion of documented NBHS (Table 2) in teaching hospitals (29.20%) and in not-for-profit hospitals (18.52%) far exceeded that of non-teaching hospitals (7.44%) and for-profit hospitals (3.98%) across the study sample.

Odds

The odds of documented NBHS varied by hospital type (Table 3). The odds of a documented NBHS were higher

Table 1

NBHS Performed Prior to Discharge Among Babies Born in Florida Acute Rural and Acute General Hospitals by Year, 2016–2022

Year	Encounters for all newborns <i>N</i> = 1,461,847 (100%)	Encounters with hearing screenings <i>n</i> = 216,486 (14.81%)	Encounters without hearing screenings <i>n</i> = 1,245,361 (85.19%)
	<i>n</i>	<i>n</i> (%)	<i>n</i> (%)
2016	214,558	30,700 (14.31)	183,858 (85.69)
2017	212,490	32,246 (15.18)	180,244 (84.82)
2018	210,795	33,887 (16.08)	176,908 (83.92)
2019	209,566	32,427 (15.47)	177,139 (84.53)
2020	199,861	29,918 (14.97)	169,943 (85.03)
2021	204,254	32,596 (15.95)	171,758 (84.05)
2022	210,223	24,712 (11.76)	185,511 (88.24)

Note. NBHS = Newborn Hearing Screening.

Table 2

Bivariate Descriptive Statistics for Documented Newborn Hearing Screenings in Newborn Encounters in Florida Hospitals, 2016–2022

Hospital Types	Encounters for all newborns, total sample <i>N</i> = 1,461,847 (100%)	Encounters screened <i>n</i> = 216,486 (14.81%)		Encounters not screened <i>N</i> = 1,245,361 (85.19%)	Significance
	<i>n</i>	<i>n</i> (%)		<i>n</i> (%)	χ^2 (<i>DF</i> , <i>N</i>), <i>p</i> -value
Hospital Teaching Type					
Teaching	494,810	144,501 (29.20)		350,309 (70.80)	122,844.00 (1, 1,461,847)*
Non-teaching	967,037	71,985 (7.44)		895,052 (92.56)	
Hospital Profit Type					
For-profit	373,140	14,848 (3.98)		358,292 (96.02)	46,578.76 (1, 1,461,847)*
Not-for-profit	1,088,707	201,638 (18.52)		887,069 (81.48)	
	<i>n</i>	<i>n</i> (%)	Median (95% <i>CI</i>)	<i>n</i> (%)	χ^2 (<i>DF</i> , <i>N</i>)
Hospital Profit and Teaching Type					
Not-for-profit teaching hospital	407,164	144,078 (35.39)	0.35 (0.00–0.83)	263,086 (64.61)	194,321.85 (3, 1,461,847)*
For-profit teaching hospital	87,646	423 (0.48)	00.00 (0.00–0.07)	87,223 (99.52)	
Not-for-profit non-teaching hospital	681,543	57,560 (8.45)	0.08 (0.00–0.36)	632,983 (91.55)	
For-profit non-teaching hospital	285,494	14,425 (5.05)	0.05 (0.00–0.27)	271,069 (94.95)	

**p*-value < .001.

in teaching (.41) versus non-teaching hospitals (0.08) and in not-for-profit (.22) versus for-profit hospitals (.04). The odds of documented NBHS were highest in not-for-profit teaching hospitals (0.54) and lowest in for-profit teaching hospitals (0.00). All non-teaching hospitals presented with odds of less than 10% for documented NBHS. Not-for-profit non-teaching hospitals presented with higher odds of documented NBHS (0.09) than for-profit non-teaching

hospitals (0.05). Odds ratios revealed teaching (*OR* 5.12; 5.07–5.17) and not-for-profit (*OR* 5.48; 5.39–5.57) hospitals were more than 5 times more likely to document a NBHS than non-teaching and for-profit hospitals. Not-for-profit teaching (*OR* 112.92; 102.61–124.27) hospitals were 112 times more likely to document a NBHS than for-profit teaching hospitals.

Table 3*Odds of Documents Newborn Hearing Screening (NBHS) by Hospital Type, 2016–2022*

Factors	Encounters for all newborns, total sample <i>N</i> = 1,461,847 (100%)	Encounters screened <i>n</i> = 216,486 (14.81%)	Odds	Odds Ratio (95% CI)
Hospital Teaching Status				
Teaching	494,810	144,501 (29.20)	0.4125	Teaching v. Non-Teaching 5.1289 (5.0791, 5.1792)*
Non-teaching	967,037	71,985 (7.44)	0.0804	
Hospital Profit Status				
For-profit	373,140	14,848 (3.98)	0.0414	Not-for-profit v. For-profit 5.4851 (5.3920, 5.5797)*
Not-for-profit	1,088,707	201,638 (18.52)	0.2273	
Hospital Profit and Teaching Type				
Not-for-profit teaching hospital	407,164	144,078 (35.39)	0.5476	Not-for-profit teaching v. For-profit teaching 112.9251 (102.6145–124.2716)*
For-profit teaching hospital	87,646	423 (0.48)	0.0048	
Not-for-profit non-teaching hospital	681,543	57,560 (8.45)	0.0922	Not-for-profit non-teaching v. For-profit non-teaching 1.7335 (0.5501, 1.7663)
For-profit non-teaching hospital	285,494	14,425 (5.05)	0.0532	

Note. Wilcoxon two-sample test statistic, *p* value < .0001; **p* value < .05.

Bivariate Statistics

Chi-square tests of independence were performed to examine relationships between hospital teaching and profit statuses and proportion of documented NBHS. The relation between hospital teaching status and proportion of documented NBHS (teaching hospital: *n* = 144,501, 29%; non-teaching hospital: *n* = 71,985, 7%) was significant, $\chi^2(1, N = 1,461,847) = 122,844.01, p < .001$ (Table 2).

Teaching hospitals were more likely than non-teaching hospitals to document NBHS. The relation between hospital profit status and proportion of documented NBHS (for-profit hospital: *n* = 14,848, 3%; not-for-profit hospital: *n* = 201,638, 18%) was also significant, $\chi^2(1, N = 1,461,847) = 46,578.76, p < .001$ (Table 4). Not-for-profit hospitals were more likely than for-profit hospitals to document NBHS. Teaching hospitals presented with the highest rate of documented NBHS in the analysis.

Table 4*Post-hoc Analysis, Difference in Mean Documented Newborn Hearing Screenings by Hospital Type*

Hospital Types	For-profit teaching hospital ($\bar{x} \sim 0.00, \sigma: 0.00-0.07$)	Not-for-profit non-teaching hospital ($\bar{x} \sim 0.08, \sigma: 0.00-0.36$)	For-profit non-teaching hospital ($\bar{x} \sim 0.05, \sigma: 0.00-0.27$)
Not-for-profit teaching hospital ($\bar{x} \sim 0.35, \sigma: 0.00-0.83$)	0.35*	0.27*	0.30*
For-profit teaching hospital ($\bar{x} \sim 0.00, \sigma: 0.00-0.07$)	0.00	0.08*	0.05*
Not-for-profit non-teaching hospital ($\bar{x} \sim 0.08, \sigma: 0.00-0.36$)	0.08*	0.00	0.03*

**p*-value < .0001.

Kruskal-Willis test

There was a significant difference in the proportion of NBHS across all four hospital types (see Table 2). Not-for-profit teaching hospitals ($\chi^2 \sim 0.35$, $\sigma: 0.00-0.83$) presented with the highest median proportion of documented NBHS (see Table 2 and Figure 2b).

Post-hoc analysis (Table 4) revealed the greatest difference in proportion screened was between not-for-profit teaching ($\chi^2 \sim 0.35$, $\sigma: 0.00-0.83$) and for-profit teaching ($\chi^2 \sim 0.00$, $\sigma: 0.00-0.07$) hospitals.

Teaching Hospital Analysis

There were 20 teaching hospitals among 123 Florida hospitals included in this analysis. Of the 20 teaching hospitals, most were not-for-profit ($n = 14$, 70%) and some were for-profit ($n = 6$, 30%; Table 5, Figure 2a). Hospitals ($n = 6$, 30%) with the highest rates of documented NBHS were not-for-profit teaching hospitals, many associated with the same hospital system. Proportions of encounters with documented NBHS among not-for-profit teaching hospitals ranged from 0% to 93.76%. Some not-for-profit

Table 5

Bivariate Descriptive Statistics of Newborn Hearing Screening in Encounters Among Florida Teaching Hospitals, 2016-2022

Hospital	Encounters for all newborns $n = 494,810$ (100%)	Encounters Screened $n = 144,501$ (29.20%)	Encounters not screened $n = 350,309$ (70.80%)
For-profit hospitals (FP)	<i>n</i>	<i>n</i> (%)	<i>n</i> (%)
FP A*	11,085	12 (0.11)	11,097 (99.89)
FP B*	23,061	331 (1.44)	22,730 (98.56)
FP C*	13,207	20 (0.15)	13,187 (99.85)
FP D*	13,130	15 (0.11)	13,115 (99.89)
FP E*	19,488	31 (0.16)	19,457 (99.84)
FP F*	7,663	14 (0.18)	7,649 (99.82)
Not-for-profit hospitals (NFP)			
NFP G	19,192	40 (0.21)	19,152 (99.79)
NFP H	20,964	0 (0.00)	20,964 (100.00)
NFP I	4,316	0 (0.00)	4,316 (100.00)
NFP J	44,162	33,900 (76.76)	10,262 (23.24)
NFP K	23,155	21,710 (93.76)	1,445 (6.24)
NFP L	31,974	29,612 (92.61)	2,362 (7.39)
NFP M	15,839	14,851 (93.76)	988 (6.24)
NFP N	21,009	19,660 (93.58)	1,349 (6.42)
NFP O	97,580	1,034 (1.06)	96,546 (98.94)
NFP P	26,460	23,271 (87.95)	3,189 (12.05)
NFP Q	17,415	0 (0.00)	17,415 (100.00)
NFP R	34,877	0 (0.00)	34,877 (100.00)
NFP S	24,203	0 (0.00)	24,203 (100.00)
NFP T	26,018	0 (0.00)	26,018 (100.00)

Note. Significance of facility number by screened: 408,260 χ^2 , $p < .0001$.

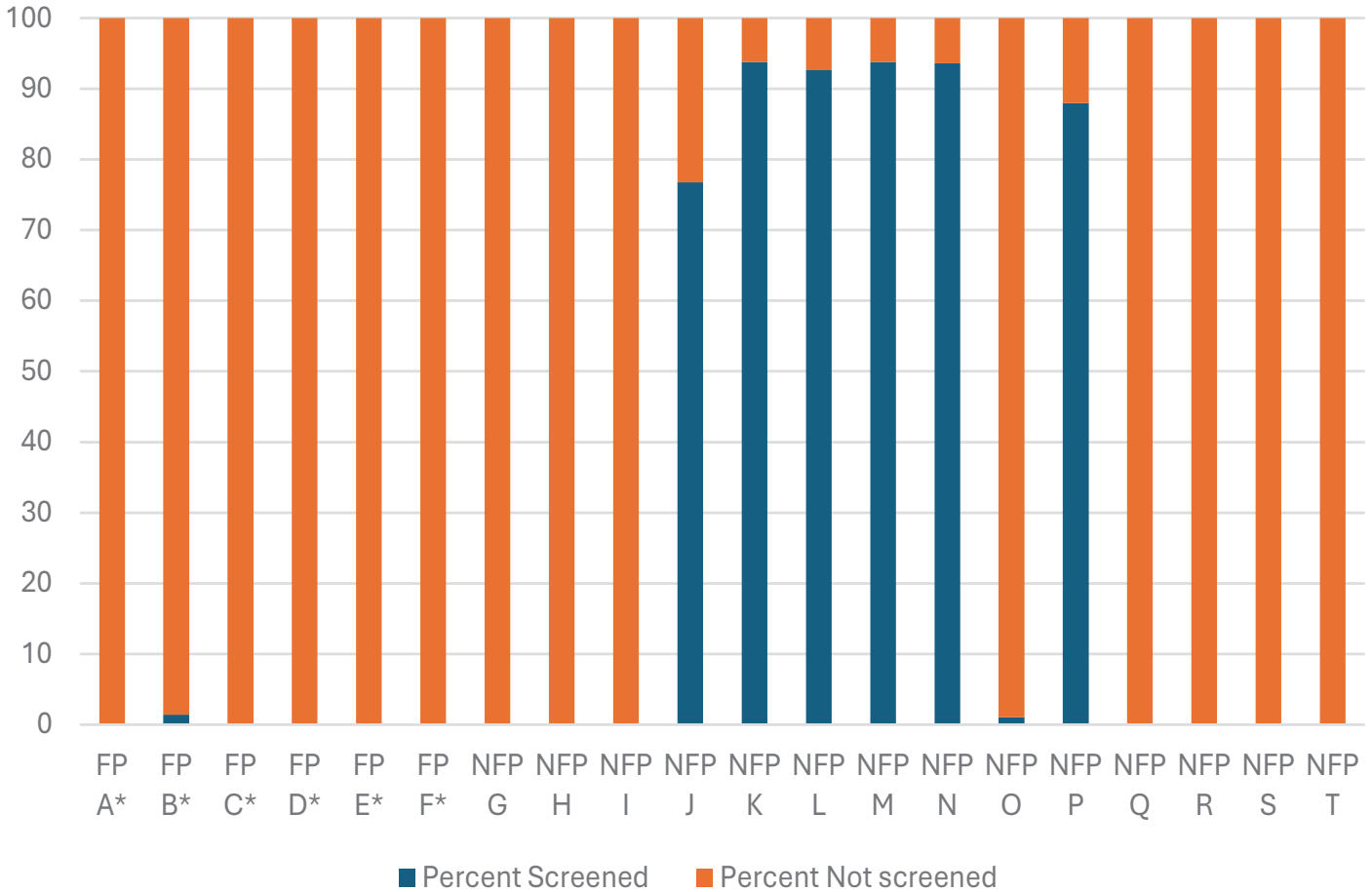
teaching hospitals ($n = 6$, 42.85%) reflected more than 75% of their encounters with documented NBHS. All for-profit teaching hospitals were in the same hospital system and presented with 0.11%–1.44% encounters with documented NBHS.

Discussion

This study addressed gaps in understanding the Florida NBHS state policy and identified hospital types associated with higher proportions of documented NBHS in Florida administrative data. Florida mandate requires that NBHS

Figure 2a

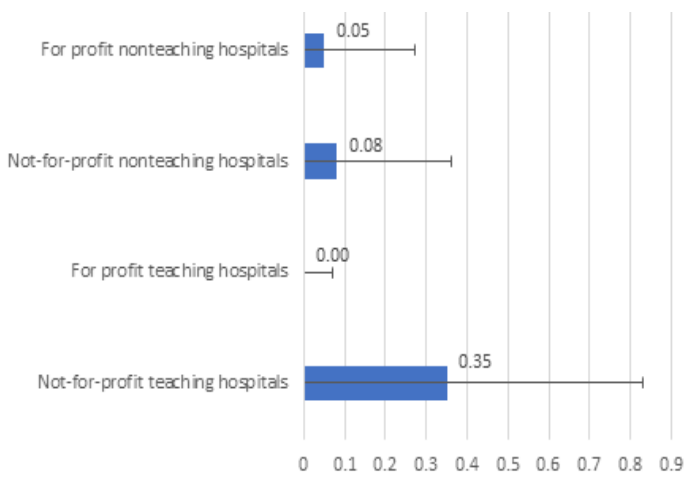
Proportion of Documented Newborn Hearing Screening Among Teaching Hospitals, For-Profit and Not-For-Profit



Note. Total newborns n = 494,810; total screened n = 144,501 (29.20); total not screened n = 350,309 (70.80); FP = For-profit; NFP = Not-for-profit; *same hospital system

Figure 2b

Median Proportion of Documented Newborn Hearing Screening by Hospital Group



are completed in the birth facility prior to discharge or within 21 days of birth and permits billing a third-party for the NBHS service. Florida administrative hospital records analysis revealed a low rate of documented NBHS. Proportions of documented NBHS were different across hospital types with the highest proportion in not-for-profit teaching hospitals and the lowest proportion in for-profit teaching hospitals.

Policy Informs Practice

NBHS policy differs across states relative to location of birth, timing of NBHS relative to newborn age, and/or Medicaid and commercial insurance reimbursement allowances (Early Hearing Detection and Intervention National Technical Resource Center, 2023). Not all mandates provide clear NBHS guidelines for location or timing of screening and if billing a third-party payer is permissible. When statutory language does not clearly describe the expectations or criteria, providers may not understand requirements and allowances which could lead to discrepancies in documentation (Clinton, 2017). To ensure provider and hospital system compliance, policy should be written clearly and understandably.

Need for Clearly Articulated Policy

Florida hospitals with documented NBHS prior to newborn discharge comply with mandates (Joint Committee on Infant Hearing, 2019; “Newborn and Infant Hearing Screening,” 2023). Florida mandate reflects hospitals can bill Medicaid and commercial insurance for the NBHS (“Newborn and Infant Hearing Screening,” 2023). Specific statutory language informs providers what is permissible in the context of documenting and billing for NBHS. Florida mandate does not require bundling NBHS into newborn care (“Newborn and Infant Hearing Screening,” 2023). This differs from other state mandates that reflect requirements to bundle NBHS into newborn care (Do et al., 2020; Early Hearing Detection and Intervention National Technical Resource Center, 2023). Clearly written policy should easily translate to practice.

Hospital Type Influences Practice

Typically, policy informs practice; however, there is a discrepancy between Florida policy and some Florida administrative hospital data. Although Florida policy reflects requirements of NBHS in the birth hospital, Florida AHCA administrative hospital data revealed that not-for-profit teaching hospitals are most likely to document NBHS. This is consistent with research that reflects differences in teaching and non-teaching hospitals and for-profit and not-for-profit hospitals (Herrera et al., 2014; Shahian et al., 2012). Teaching hospitals are known for advanced clinical capabilities and often serve as industry leaders in medical research and innovation (Shahian et al., 2012). Some research has indicated that for-profit hospitals have higher costs and mortality rates than not-for-profit hospitals (Herrera et al., 2014). Differences might extend to policy compliance, clinical documentation, and billing practices. National hospital networks with presence in multiple states may implement and enforce system-wide policies based on the strictest state mandates, to ensure compliance. Florida for-profit hospitals associated with a national network all demonstrated low rates of documented NBHS. In contrast, not-for-profit Florida hospitals associated with a different network all demonstrated higher rates of documented NBHS. Differences across state NBHS policies could explain the rate differences of documented NBHS in Florida hospital administrative data for hospitals in national networks.

Consequences for Documented NBHS

There is an opportunity to improve the proportion of documented NBHS in administrative hospital records across Florida hospitals. Improvement in the proportion of documented NBHS in administrative hospital records could have positive implications for patients, populations, clinicians, and healthcare systems. Accurate, documented NBHS are crucial for future diagnosis and treatment. Babies who do not pass the NBHS in the hospital could lack follow-up for recommended diagnostic appointments (Sequi-Canet & Brines-Solanes, 2021). Documented NBHS in administrative hospital records can contribute to surveillance efforts designed to prevent loss-to-follow-

up. Procedure records inform data-driven advocacy for clinical procedural terminology (CPT) code changes with the American Medical Association (AMA, n.d.). The AMA maintains a CPT advisory committee of providers nominated by national medical professional associations (AMA, n.d.). The committee advises the CPT Editorial Panel regarding procedure coding relevant to the associated discipline and provides documentation for codes under consideration (AMA, n.d.). Accurate administrative data informs this process. Further, reimbursement requires documentation of procedures. Improved documentation could yield increased revenue for Florida hospitals that currently do not document NBHS in their administrative hospital records. Increased revenue could fund new NBHS equipment and surveillance infrastructure.

Limitations and Future Research

This study is limited by reliance on accurate documentation in the administrative hospital records, lack of accounting for third-party screening vendors or outpatient screening, and the use of retrospective data. AHCA relies on accurate clinical documentation. The low rate of documented NBHS reflected in the AHCA administrative hospital data probably reflects lack of documentation as opposed to lack of service provision. This distinction is important to determine the best course of action. Additionally, this study did not account for documentation of other attempts at NBHS, such as outpatient re-screening, or outside screening vendor record keeping maintained outside of hospital records. Analysis of outpatient NBHS and outside NBHS vendor records may reveal more consistent documentation as these services may not be bundled in the care of a newborn. This study involved retrospective secondary data analysis and no causal inference can be concluded.

Many research opportunities could address gaps in understanding the reasons for discrepancy between Florida NBHS policy and administrative hospital records. First, mandates differ across states and there is opportunity to conduct a similar analysis with other states' administrative hospital data to determine if the difference in mandates and practice are common across states (Clinton, 2017). Second, future research could evaluate the effect of state mandate changes on the proportion of documented NBHS in administrative data. Third, researchers could evaluate single versus multiple documentation methods and processes to identify outcome differences. Fourth, additional research could identify provider and hospital administrator understanding of policy. Finally, research could also assess reimbursement outcomes following implementation of improved documentation practices.

Recommendations

State policies with clear statutory language could yield more consistent provider compliance in clinical documentation. The commonly used clinical training adage “if it was not documented, it did not happen” should be a consideration in the context of NBHS administrative hospital data. Policy should explicitly describe documentation and reimbursement requirements to ensure practice aligns with policy.

Providers, families, and healthcare systems would benefit from a universal policy with documentation requirements in one system that links to state and federal agencies. Single data entry linked to other systems reduces documentation burden, simplifies record access, increases likelihood of statutory compliance, and leads to potential increase in revenue. There is a complex intersection between policy, technology, and healthcare delivery, particularly with clinical documentation (Johnson et al., 2021). Electronic health records (EHR) provided solutions for communication and safety; however, clinicians are frustrated with EHRs (Johnson et al., 2021). Multiple reporting systems will only expound frustration. Multiple system data entry perpetuates the problem of fragmented medical information systems that disrupt workflows (Janett & Yeracaris, 2020). Complex records and access points cause concern among families about accessibility. Patients are concerned about poor usability of complex medical record systems (Zarcadoolas et al., 2013). Multiple systems could contribute to complexity. Simplifying and linking NBHS documentation could aid in accurate records and quality surveillance.

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