Characterizing Inpatient Electronic Health Records (EHR) from a Large Hospital Network for Use in Neonatal Pharmacoepidemiology Studies in the United States

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BACKGROUND

- The Sentinel System—U.S. Food and Drug Administration's active surveillance system—includes inpatient electronic health record (EHR) data from HCA Healthcare (HCA)
- This study characterized the availability of data typically required in neonatal pharmacoepidemiology studies

OBJECTIVES

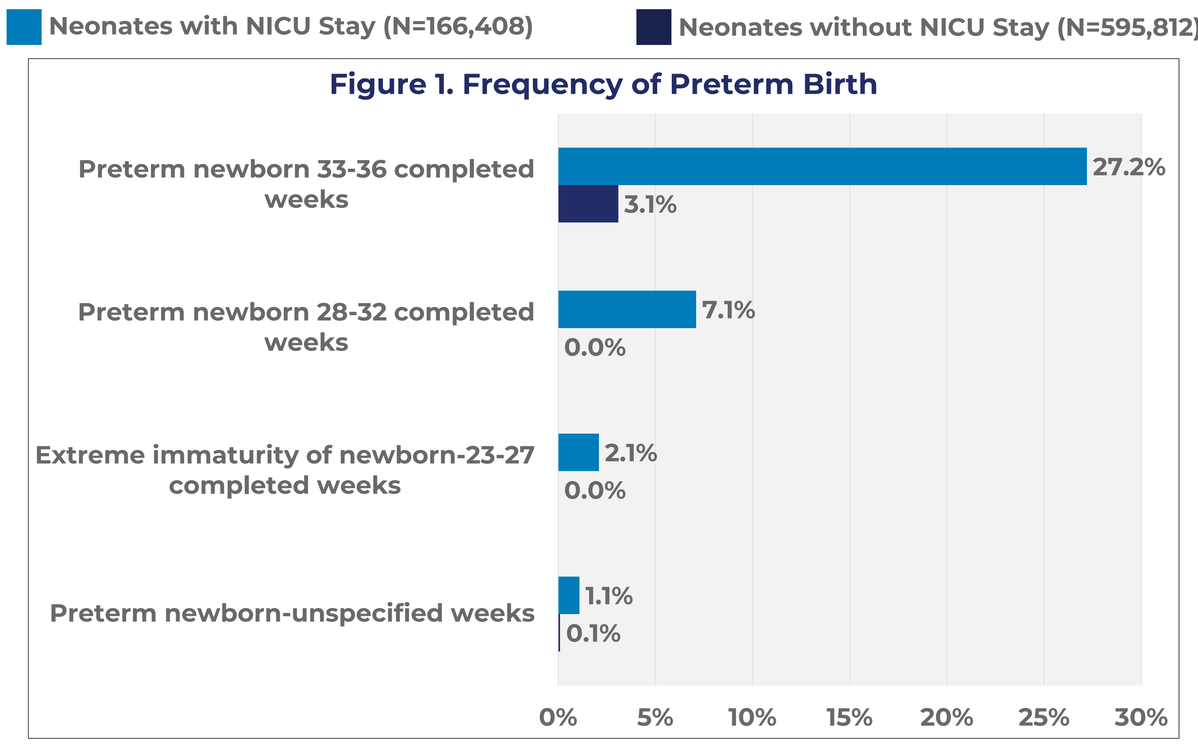
- **Describe** characteristics, high-risk conditions, treatments, length of stay, and other care provided to neonates with and without a neonatal intensive care unit (NICU) stay within a large inpatient EHR data source

METHODS

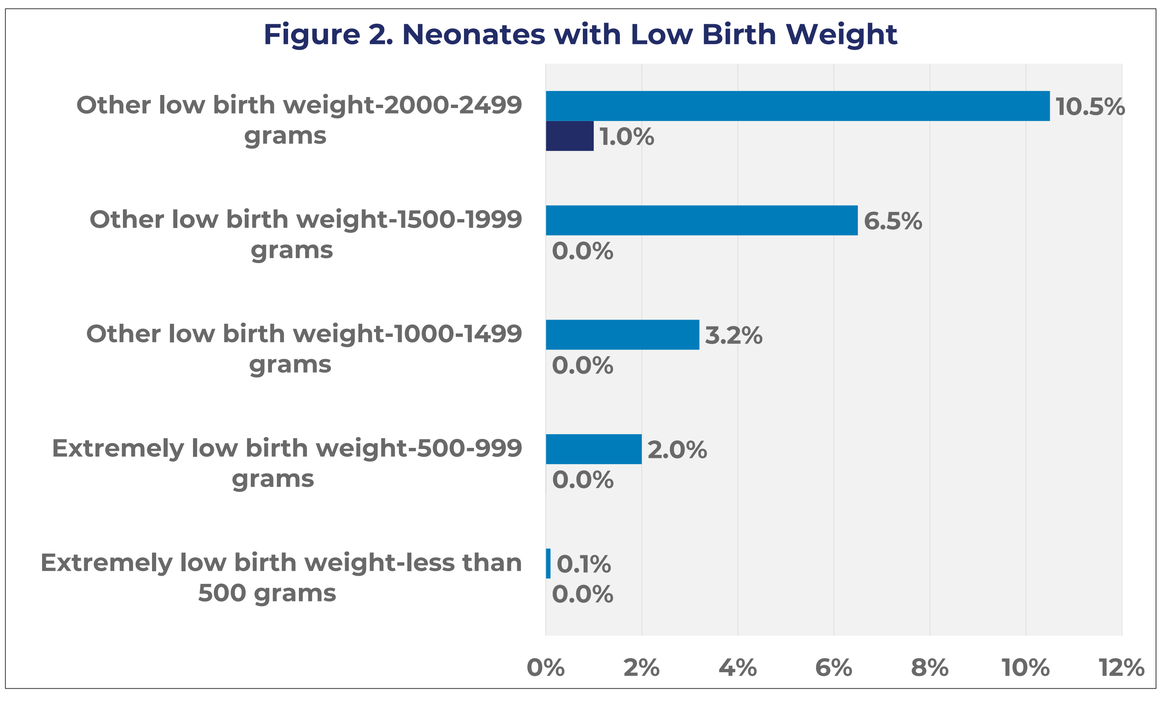
- **Study Type:** Retrospective descriptive analysis
- **Study Period:** January 2020 - October 2023
- **Data Source:** Structured inpatient EHR, including coded diagnoses and procedures, inpatient pharmacy administrations, and some vital signs data, from 144 HCA hospitals
- **Description of characteristics, high-risk conditions, treatments, length of stay, and other care provided to neonates with and without a NICU stay**
  - NICU stays identified with revenue codes
  - Assessment of preterm birth and low birth weight (LBW) with diagnosis codes and investigation of birth weight data availability
  - Assessment of high-risk conditions with diagnosis codes
  - Assessment of surgeries with procedure codes, and medications/vaccinations frequently administered to neonates with national drug codes and generic/brand names text search

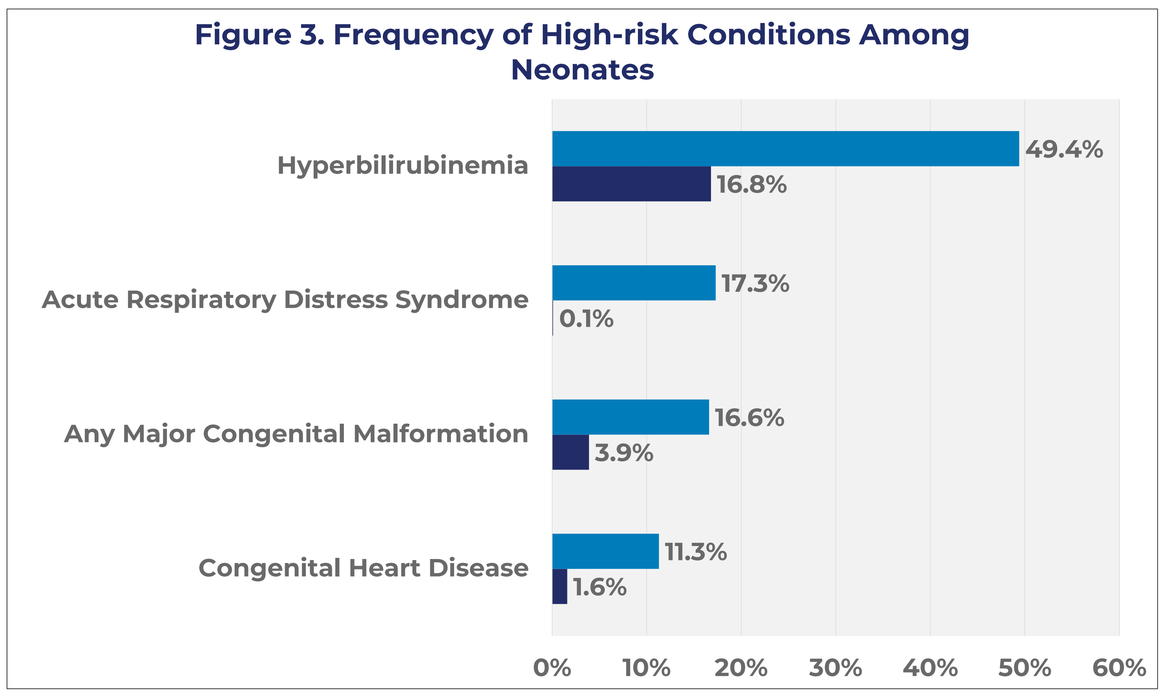
RESULTS

- Among **762,220** neonates, **166,408 (22%)** had evidence of a NICU stay and **595,812 (78%)** had no evidence of a NICU stay
- Demographics were similar among neonates with and without a NICU stay (**>50%** were male and **>55%** were White)
- **>99%** of neonates had at least one weight entry in recent vitals data (2021 onward)

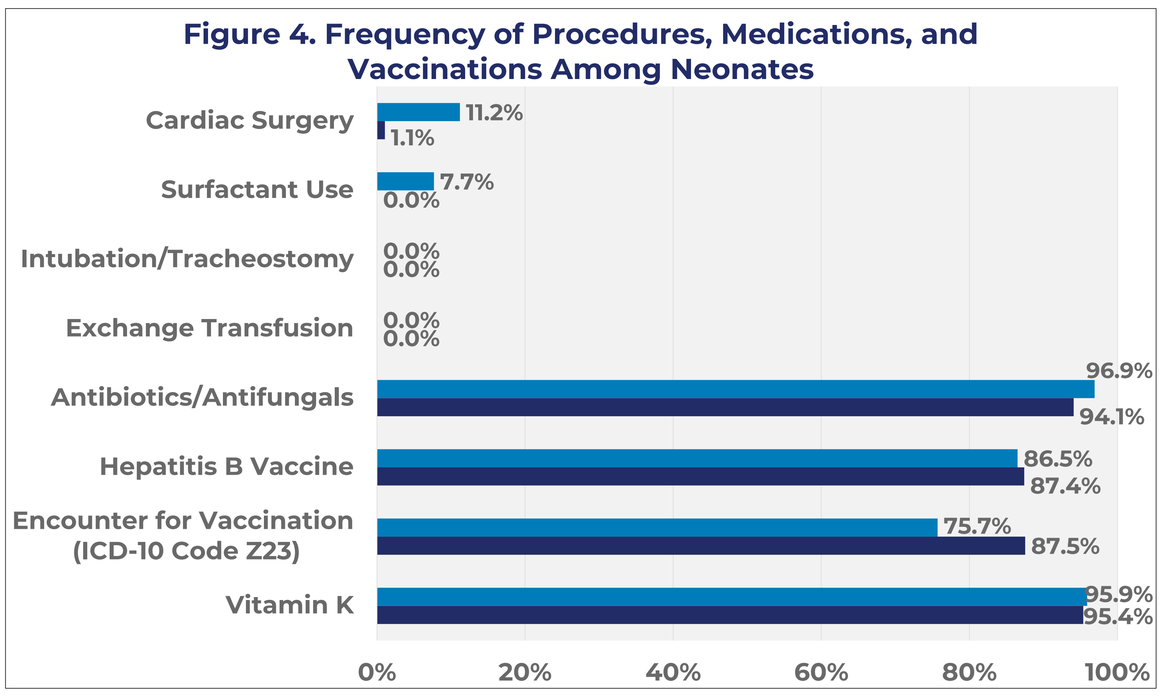


- Higher proportions of neonates with a NICU stay were preterm compared to those without a NICU stay (**37.6%** vs. **3.2%**) and had low birth weight (**22.3%** vs. **1.0%**)

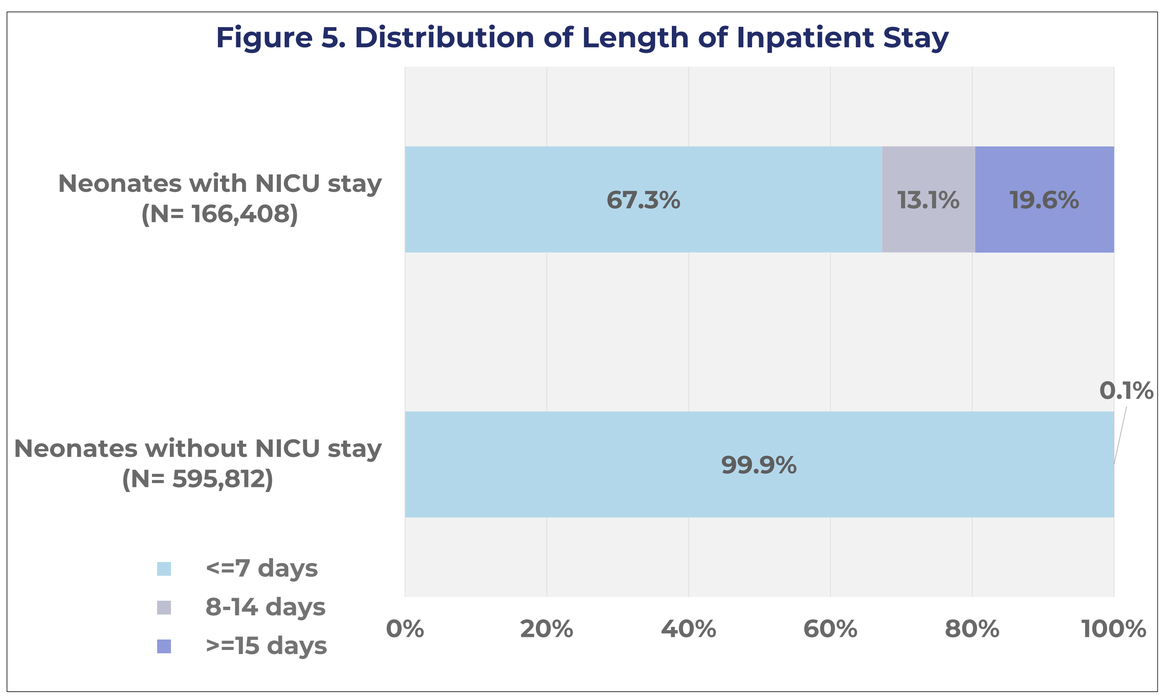




- Neonates with a NICU stay had more high-risk conditions than those without a NICU stay, including hyperbilirubinemia (**49.4%** vs. **16.8%**), acute respiratory distress syndrome (**17.3%** vs. **0.1%**), and any major congenital malformation (**16.6%** vs. **3.9%)**



- Endotracheal intubation and exchange transfusion were not frequently observed; surfactant use was observed in **7.7%** of those with a NICU stay



- Neonates with a NICU stay had longer lengths of stay than those without a NICU stay (average **11.4** days vs. **3.0** days)

CONCLUSIONS

- Data typically required for neonatal pharmacoepidemiology studies were frequently recorded within inpatient EHR data.
- Neonates admitted to the NICU had more high-risk conditions and treatments than the general neonatal population. However, procedures such as endotracheal intubation may be under-captured.
- Future studies could consider augmenting these data with clinical notes and investigating additional components of the EHR specific to newborns.

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