

## Does Weekend or Location of Admission Affect Resource Utilization in Neonatal Cardiac Surgery? A Multi-Center Study

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**Introduction:** Neonatal cardiac surgeries are resource intensive with high costs and significant hospital lengths of stay (LOS). The day and location of admission may affect the delivery of specialty services and impact resource use; understanding this relationship may allow modifications to improve efficiency.

**Hypothesis:** We evaluated the hypothesis that for neonatal cardiac surgeries, admissions on weekends and/or to a non-cardiac intensive care unit (ICU) are associated with increased hospital resource use.

**Methods:** We collected retrospective data from the Pediatric Health Information Systems database on infants discharged after neonatal (age < 30 days) cardiac surgery from 2004-13. We analyzed the impact of weekend (Sat-Sun) admission and admission unit on total hospital costs and LOS using multivariate linear mixed effects models adjusting for disease severity (RACHS-1 score), prematurity, genetic syndrome, prostaglandin use, low birth weight, payer, race, and center characteristics. Costs were adjusted by region to 2013 dollars.

**Results:** Study criteria were met in 21,303 patients (59.7% male, 9.4% low birth weight, 11% premature). Mean age was  $3.1 \pm 5.5$  days at admission and  $7.8 \pm 6.6$  days at surgery. Weekend admission occurred in 20% and admission location was neonatal ICU (NICU) 44.7%, cardiac ICU (CICU) 37.6%, pediatric ICU/other 17.7%. Hospital mortality was 8.1% with no difference by ICU of admission ( $p=0.3$ ). Overall median hospital cost was \$108,035 (interquartile range (IQR) \$66,620-186,030) and median LOS was 21 (IQR 13-36) days. On multivariate analysis, there was no difference in cost or LOS for weekend vs weekday admission. Compared to CICU, NICU admission was independently associated with higher hospital costs (115%,  $p < 0.0001$ ) and longer LOS (130%,  $p < 0.0001$ ).

**Conclusions:** In this study, after controlling for severity of disease, demographic and institutional factors, initial admission of neonates undergoing cardiac surgery to NICU is associated with greater hospital costs and LOS than admission to the CICU. ICU specialization may result in more efficient resource use. Identifying care models that can reduce resource use in NICU admissions without compromising outcomes may result in significant cost savings and reduced LOS.

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