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Commentary: Mitigating cardiac surgical operative risk for the most vulnerable

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As the body of literature continues to grow regarding racial disparities in congenital heart surgery outcomes, it is challenging to find a common thread that explains either the cause of the inequality or how providers are responding to it. Most studies end up raising more questions than providing understanding. It has been shown, for example, that African American infants have an approximately 2-fold increased risk of in-hospital mortality after correction of congenital heart defects.¹ Despite a lack of uniform agreement, we are gradually beginning to see literature emerge that provides clarity. Tjoeng and colleagues² demonstrated that the higher postoperative mortality (40% higher than in White patients) seen in African American children undergoing cardiac surgery was mediated by worse severity of illness on admission to the hospital. They hypothesized this may be the result of unequal access to care such as subspecialty services and perhaps a delay in diagnosis.

We are also gaining insight into how providers are attempting to mitigate operative risk in vulnerable patients by clinical pathway development. This is evident in the study by Spigel and colleagues³ in this issue of the *Journal*. The authors used the Area Deprivation Index (ADI) to assess the impact of socioeconomic position on length of stay after the Norwood procedure. The ADI incorporates data on income, housing, education, and employment when constructing a neighborhood

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Pediatric Heart Centers are developing care pathways to mitigate operative risk in vulnerable patient populations.

socioeconomic profile. It is a more complete picture than income alone. They found a 4% increase in length of stay for every 10% increase in the ADI. For populations with limited resources and access to care, these findings suggest centers are keeping patients in the hospital to mitigate risk.³ But do we know if this strategy is achieving its intended purpose? There are data to suggest this may be the case. Karamlou and colleagues⁴ used the Pediatric Health Information System database to assess the relationship between socioeconomic and racial disparities on the outcome of congenital heart disease interventions. The authors went one step further and looked at the interactions among factors that might mitigate postoperative risk. Although Black race was associated with higher overall mortality, that risk was mitigated in Black neonates by a significantly longer length of hospital stay. Black neonates also had a higher prevalence of noncardiac procedures such as feeding tubes and Nissen fundoplication.⁴ With these data we are beginning to see the impact of clinical pathway development designed to improve outcomes for vulnerable patients. Spigel and colleagues³ made a valid argument that length of stay, as a quality metric, should not be used to punish centers that care for at-risk patients. In the bigger picture, their data, along with other emerging literature, demonstrate that clinicians are responding to the needs of at-risk patients. It gives us hope that one day racial and socioeconomic disparities in medicine and society as a whole will be things of the past.

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Commentary: Length of stay as measure of quality: A misty strategy that might backfire

Deborah Kozik, DO, and Bahaaldin Alsoufi, MD

What defines quality in surgery? The most widely used outcome metric is mortality, which is clearly important, but is also one dimensional and does not address long-term results, including functional status and quality of life. In an effort to define more comprehensive measures of outcomes, a working group that is developing a composite quality metric for congenital heart surgery proposed including hospital length of stay (LOS) in the morbidity domain for quality.¹ In view of this proposal, Spiegel and colleagues² chose to look specifically at the influence of parental socioeconomic status (SES) on LOS following the Norwood operation.² The authors examined hospital LOS in all Norwood hospital survivors who were discharged home between 2008 and 2018. They developed 37 measurable variables that influenced postoperative LOS, including socioeconomic factors, intraoperative factors, and postoperative factors. Utilizing the Area Deprivation Index as a measure of SES (a higher

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The association of hospital length of stay and many nonclinical patient and socioeconomic factors limits its utility as a measure of quality.

number correlates with a lower SES), they demonstrated a 4% increase in LOS for every 10% increase in Area Deprivation Index, suggesting a significant relationship between SES and LOS.²

The authors' findings are in line with other reports that demonstrated an association between SES and various outcomes in pediatric cardiac surgery. Utilizing Single Ventricle Reconstruction Trial data, an evaluation of SES and outcomes following the Norwood procedure found a linear relationship between SES and 1-year mortality or transplant with the lowest rate of mortality or transplantation observed in patients with the highest SES.³ A systematic review of the social determinants of health and outcomes for children and adults with congenital heart disease found that poverty and low SES were consistently associated with adverse postoperative outcomes, including unplanned readmission, longer LOS, higher resource utilization, and lower school functioning.⁴ The correlation between SES and LOS is also not isolated to congenital heart surgery. Multiple studies

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