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

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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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have described the influence of SES on hospital LOS in both medical and surgical patients, as well as in trauma patients.⁵⁻⁸

The proposal of LOS as a component of the quality metric is based on the assumption that LOS is a measure of morbidity that may capture the influence of other complications aside from the major measured complications. However, a study utilizing American College of Surgeons National Surgeons Quality Improvement Program Registry data found that 42.8% of patients with an extended LOS did not have a documented inpatient complication, suggesting nonclinical reasons for the prolonged LOS.⁹ And as Spiegel and colleagues² appropriately note, parents in a low SES may not have the necessary resources to allow for a safe discharge, and LOS stay is prolonged while resources are obtained. This lack of resources likely contributes to longer LOS even in less complex cardiac operations—consider patients with feeding difficulties who may need long-term feeding access.

Although complications and clinical factors lead to prolonged intensive care unit and hospital stays, there are numerous factors that influence these numbers, and many of them are not modifiable.¹⁰ Some of these are patient-related factors (eg, prematurity, low birth-weight, genetic syndromes, and extracardiac anomalies), and some are social (eg, SES, distance to hospital, insurance, marital status and family support, and language barrier).^{11,12} Although length of intensive care unit stay might be a better measure of clinical factors, including complications, than total hospital LOS, even intensive care unit stay might be influenced by hospital resources and approach to children with complex congenital heart disease. In a fair number of hospitals that deliver excellent outcomes, the design of care involves home discharge from the intensive care unit. Therefore, we argue that LOS may be better viewed as a process measure than a quality, which can then allow hospital systems to build processes to address the underlying nonclinical contributions of prolonged LOS. A lot has been discussed about

public reporting of outcomes and star rating of congenital programs and their influence on risk-aversion and clinical care delivery. Associating LOS and quality could disadvantage programs taking care of higher proportion of patients with low SES, those traveling from long distances, and those with other nonclinical patient- and social-related factors. This can in turn lead, consciously or unconsciously, to further alternations in patient care delivery that might not be to the best interest of patients or their families.

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