See Article page 92.

Commentary: Regardless of how you divide it, socioeconomic status determines outcomes

J. Hunter Mehaffey, MD, MSc, and
Robert B. Hawkins, MD, MSc

Patrick and colleagues¹ present an analysis of socioeconomic status (SES) in patients undergoing coronary artery bypass grafting in this month's *Journal*. The authors employ the validated Area Deprivation Index (ADI), which is a block-level measure of SES based on 17 indicators from the US Census data. The ADI is assigned based on the 9-digit patient ZIP Code. The authors then converted ADI to neighborhood socioeconomic status (NSES) by subtracting from 1.0 so that low NSES correlated with low SES. The authors used the gold standard Society of Thoracic Surgeons risk model to compare risk-adjusted outcomes across all levels of NSES. These data demonstrate a clear relationship between NSES and treatment as well as outcomes and survival. The analysis would be strengthened by a formal analysis of improvement in area under curve or Net Reclassification Index.

Our group and others have previously used the Distressed Communities Index, a 5-digit ZIP Code based measure of SES to assess these relationships; however, there can be many heterogeneous "ecosystems" within 1 ZIP Code.^{2,3} The NSES employs block-level data for a more precise measure of neighborhood SES, as highlighted by several papers looking at the relationship between ADI and health-related outcomes.⁴ These results highlight the importance of both individual- and community-level inequalities as drivers of disparate outcomes. However, there are limitations to these block-level methodologies requiring 9-digit ZIP Code to assign the score. Most importantly, some

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CENTRAL MESSAGE

Socioeconomic factors contribute to disparities in cardiac surgical treatment, outcomes, and long-term survival. The NSES quantifies neighborhood-level socioeconomic status for risk adjustment and resource allocation.

individuals can be identified based on a 9-digit ZIP Code and age, given the small area, leading to Health Insurance Portability and Accountability Act compliance concerns.

Unfortunately, the authors are thin on proposals to ameliorate the disparities demonstrated in this study. We have previously proposed that measures such as Distressed Communities Index and NSES should be used to identify patients at greatest risk and then focus resource allocation on outreach clinics and close follow-up in these areas. These measures of SES serve as a heat map for low access to care and high-risk regions, which need further support. Furthermore, we advocate that partnerships with primary care physicians are critical to improve cardiovascular surgical disparities.

Finally, how should cardiac surgery as a field account for these and other health disparities? How do we deal with the complex interplay of race, income, insurance, and the multitude of other components that comprise SES? If we risk-adjust these disparities out of the rating systems, we eliminate a strong incentive for change. However, as surgeons we are not directly responsible for preventive and primary care. A comprehensive approach to health care reform is needed to address these issues, and it is critical for cardiothoracic surgeons to maintain a voice in the discussion.

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See Article page 92.

Commentary: Is experience judgment or bias?

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The study by Patrick and colleagues¹ suggests that with lower neighborhood socioeconomic status (NSES) comes increased risk of mortality and morbidity. It also seems that people living in less affluent neighborhoods receive fewer arterial grafts. The interplay of race and NSES is only addressed momentarily in the article by looking at median NSES for each racial group. African Americans and Hispanics had a lower NSES than Asians and Caucasians. Nevertheless, this is a timely article given the renewed public outcry against racial injustice. Racism and its historic effect on neighborhood makeup and wealth² are public health issues, and this article shines a light on a potential target for intervention from cardiac surgeons.

Although this racial disparity is not clearly spelled out in the article, the assumption is that more Hispanics and African Americans hold lower NSES and as such have a higher risk for stroke, renal failure, prolonged ventilation, and composite morbidity and mortality. This risk holds true even when adjusting for such variables as diabetes mellitus, cerebrovascular disease, and lung disease. So something about a lower NSES leads to higher complications that are not fully explained by

Thomas Vierhout, MS, third-year medical student (right), and Meghana R. K. Helder, MD (left)

CENTRAL MESSAGE

Use of multiple arterial grafts during CABG may not only improve surgical outcomes but also decrease health disparities between patients of different socioeconomic statuses.

comorbidities. The authors point to access to healthy food, lower use of beta-blockers, and increased stressors as potential issues. Another potential issue is lack of understanding of coronary disease in lower NSES populations. Perhaps a target for intervention is more outreach (even by surgeons and not just cardiologists) to poorer communities or more targeted marketing by our professional organizations.

Even more startling is that there is a 6.3% 10-year survival difference between the highest NSES quartile versus the lowest quartile. The authors also point out that there is a decreased use of multiple arterial conduits in lower NSES populations, which likely has a causal relationship given that previous studies have shown increased survival with use of multiple arterial conduits.^{3,4} So this becomes the factor that we can control as surgeons and a real

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