

EDITORIAL COMMENT

Embracing the Power of the Polysocial Risk Score

The Path to Health Equity*

Khurram Nasir, MD, MPH, MSc, Zulqarnain Javed, PhD, MBBS, MPH, Sadeer Al-Kindi, MD



Cardiovascular disease (CVD) and cancer are the leading causes of morbidity and mortality globally. Patients with cancer have significantly increased cardiovascular risk because of shared risk factors and impact of cancer therapies on cardiovascular health. We have proudly witnessed remarkable advancements in medical science, public health, and technology, resulting in substantial reductions in CVD-related mortality in high-risk groups. Nevertheless, it is also sobering to realize that these gains have not been distributed uniformly among populations. Racial, ethnic, socioeconomic, and geographic disparities persist, casting a long shadow over the accomplishments in cardiovascular health. Although disparities have garnered well-deserved attention, there is an evolving paradigm that seeks not just to acknowledge these inequalities but to address their underlying causes comprehensively.¹ Health equity, the bedrock of this new perspective, transcends the mere recognition of disparities and aspires to create conditions that empower all individuals to attain their highest possible level of health.

Despite the increasing recognition, current knowledge of the role of social determinants of health (SDOH) is predominantly based on solitary factors, without due attention to the interlinked pathways

influencing outcomes. This shift urges us to aggregate social risks, unveiling a more comprehensive view of health inequalities. Whether in recognizing heart attack symptoms,² addressing vaccination coverage,³ or designing preventive strategies during the COVID-19 pandemic,⁴ aggregated social determinants emerge as pivotal influencers. The aggregation of social risks at the community and individual levels offers a panoramic view of factors contributing to health disparities. Rather than addressing individual risk factors in isolation, this method enables stakeholders to identify groups of vulnerabilities that have a significant impact on health outcomes.

THE POLYSOCIAL RISK SCORE: A TRANSFORMATIVE FRAMEWORK

Enter the polysocial risk score (PSRS)—analogous to polygenic risk scores, it presents a novel framework to assess an individual's cardiovascular disease risk by aggregating various SDOH factors. The polygenic risk score concept revolutionized our understanding of disease predisposition, acknowledging that multiple genetic factors contribute to complex health conditions. Similarly, the PSRS recognizes that health outcomes are shaped by a mosaic of social determinants, ranging from economic stability and neighborhood environment to health care access and educational attainment. Previously, our group created multiple factors across major domains of SDOH-based scores, providing a nuanced understanding of an individual's overall health risk; weaving together information from multiple domains, including socioeconomic status, education, housing, and food security; providing a holistic perspective; and enabling the identification of vulnerable populations and opportunity for targeted interventions. This PSRS in a nationally

*Editorials published in *JACC: CardioOncology* reflect the views of the authors and do not necessarily represent the views of *JACC: CardioOncology* or the American College of Cardiology.

From the Division of Cardiovascular Prevention and Wellness, Houston Methodist DeBakey Heart and Vascular Center, Houston, Texas, USA; and the Center for Cardiovascular Computational and Precision Health (C3-PH), Houston Methodist, Houston, Texas, USA.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

representative U.S. population echoed principles observed in polygenetic risk scores, confirming the power of aggregation in predicting health outcomes such as prevalent stroke,⁵ severe obesity,⁶ cardiovascular health (CVH) in pregnant women,⁷ as well as all-cause mortality⁸ with associations persisted across age, gender, and race/ethnic groups.

In this issue of *JACC: CardioOncology*, Satti et al⁹ report the associations between an aggregate SDOH score using the similar 38 individual factors used in prior studies across various SDOH domains and a composite measure of CVH status (based on not meeting the American Heart Association's Life's Essential 8 goals) in adult cancer survivors. The authors used data from the NHIS (National Health Interview Survey), a recurrent annual nationally representative health survey in the United States, for the years 2013 to 2017 and analyzed >8,200 respondents (representing a population of >10 million individuals). The authors reported a strong association between higher SDOH scores (indicating greater social disadvantage) and poor CVH, with a 30% higher risk for individuals experiencing the highest level of social disadvantage relative to those reporting the lowest social risk, with stronger relationships noted for women and younger individuals. Higher SDOH burden was also associated with each individual CVD risk factor. This study adds to the current literature linking SDOH with CVH as a pervasive issue that extends to cancer survivors, a population known to experience worse CVH, reinforcing the need for interventions that consider these determinants comprehensively.

As Satti et al⁹ further expand on the promising journey exploring future directions of the PSRS in diverse populations regarding risk assessment and management and to enhance equity in health care delivery, this path also poses key challenges that underscore the critical factors pivotal to their successful adoption, warranting further deliberations.

TIME FOR MORE ROBUST METHODOLOGIES

Creating an accurate PSRS is a challenging endeavor that requires constant refinement of methodologies. Individual SDOH are often interconnected, leading to collinearity issues that may affect stability and interpretability of risk scores. For instance, income instability and employment status might be strongly correlated, requiring advanced statistical approaches like principal component analysis or regularization methods to address multicollinearity. Addressing collinearity is crucial to avoid redundancy and ensure that the resultant scores

effectively capture the unique contribution of each determinant. Developing sophisticated statistical models that account for these nuances while avoiding multicollinearity is imperative to create a robust and meaningful PSRS.

STANDARDIZATION AND INTEGRATION IS KEY

As we endeavor to integrate aggregated social risks into health care practices, standardization becomes a pressing concern. Although we applaud the extensive assessment of SDOH variables in national studies such as the NHIS, most of the other national prospective cohorts often lack comprehensive questionnaires that capture the full spectrum of social determinants. Similarly, within the realm of electronic medical records, the focus often remains on clinical and demographic information, neglecting comprehensive data on social determinants. Addressing this gap requires the development of standardized questionnaires that encompass a wide range of determinants across diverse populations. Robust policies and incentives are needed to facilitate the integration of these questionnaires into existing national cohorts and health systems, enabling researchers and policymakers to generate a robust and representative PSRS adaptable to diverse populations.

DATA PRIVACY AND ETHICS CONCERNS ARE REAL

In the realm of clinical settings, as we collect and analyze sensitive social data to create a PSRS, ethical considerations must remain at the forefront. Striking the right balance between data utility and patient privacy is paramount. Ethical oversight is crucial in ensuring rigorous data security protocols, transparency in data handling, as well as preventing potential stigmatization arising from the collection and use of social determinants data.

NOT TO IGNORE COMMUNITY ENGAGEMENT AND PATIENT EMPOWERMENT

A key piece for success in the development and implementation of a PSRS cannot happen without the engagement of 2 key constituencies: patients and communities. Communities' input on the most pressing social determinants affecting local populations fosters a sense of ownership and accountability. Patient education and empowerment initiatives can help individuals better understand their PSRS and the implications for their health, and

allows them to codesign interventions that address their unique social challenges and improve outcomes.

KEEP AN EYE ON SCALING UP AND SUSTAINABILITY

The scalability and sustainability of polysocial risk interventions are central to their long-term impact. Although short-term interventions may yield immediate results, achieving enduring equity demands a commitment to systemic transformation. Demonstrating the positive outcomes and cost-effectiveness of interventions based on the PSRS can garner support from policymakers and funding agencies, fostering sustainability, and this remains a priority amid shifting health care landscapes and evolving priorities.

CONCLUSIONS

As we get drawn into these challenges, it is imperative to acknowledge that adoption of the PSRS will require a paradigm shift—departure from the status quo toward a more comprehensive, inclusive, and equitable approach in health care. To date, the journey aggregating social risks at the individual level mirrors the evolution from genetics to social determinants. Both fields acknowledge the complexity of health outcomes and the need to consider multiple factors that contribute to disparities.

By embracing the PSRS, we pave the way for a future where health care is not only comprehensive but also deeply personalized. As we navigate the multifaceted landscape of aggregated social risk scores, it is clear that refined methodologies, stan-

dardization, implementation, community engagement, data privacy, and scalability bring unique challenges and opportunities. By carefully leveraging the collaborative power of engaging stakeholders addressing these issues, we can accelerate this transformative change in health care.

In conclusion, although the road ahead may be fraught with challenges, the potential advantages of consolidating social risk are too substantial to overlook. As researchers, practitioners, policymakers, and advocates, we have the collective responsibility to forge ahead, ensuring that aggregated social risk becomes an integral tool in our ongoing pursuit of health equity. By navigating the intricacies of validation, adoption, and care process integration, we can harness the power of the PSRS to foster a more just and inclusive health care delivery.

FUNDING SUPPORT AND AUTHOR DISCLOSURES

Dr Nasir has served on the Advisory Board of Novo Nordisk, Novartis, Esperion; has served on the Speakers Bureau of Amgen; and research is partly supported by grants from National Institutes of Health, Novartis, Esperion, and Jerold B. Katz Academy of Translational Research. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

ADDRESS FOR CORRESPONDENCE: Dr Khurram Nasir, Division of Cardiovascular Prevention and Wellness, Houston Methodist DeBakey Heart and Vascular, Center for Cardiovascular Computational and Precision Health (C3-PH), Houston Methodist, 6550 Fannin Street, Suite 1801, Houston, Texas 77030, USA. E-mail: [@knasir@houstonmethodist.org](mailto:knasir@houstonmethodist.org), @khurramn1.

REFERENCES

1. Jilani MH, Javed Z, Yahya T, et al. Social determinants of health and cardiovascular disease: current state and future directions towards health-care equity. *Curr Atheroscler Rep*. 2021;23(9):55.
2. Mahajan S, Valero-Elizondo J, Khera R, et al. Variation and disparities in awareness of myocardial infarction symptoms among adults in the United States. *JAMA Netw Open*. 2019;2(12):e1917885.
3. Grandhi GR, Mszar R, Vahidy F, et al. Socio-demographic disparities in influenza vaccination among adults with atherosclerotic cardiovascular disease in the United States. *JAMA Cardiol*. 2021;6(1):87-91.
4. Hagan KK, Javed Z, Cainzos-Achirica M, et al. Social determinants of adherence to COVID-19 risk mitigation measures among adults with cardiovascular disease. *Circ Cardiovasc Qual Outcomes*. 2021;14(6):e008118.
5. Khan SU, Acquah I, Javed Z, et al. Social determinants of health among non-elderly adults with stroke in the United States. *Mayo Clin Proc*. 2022;97(2):238-249.
6. Javed Z, Valero-Elizondo J, Maqsood MH, et al. Social determinants of health and obesity: findings from a national study of US adults. *Obesity (Silver Spring)*. 2022;30(2):491-502.
7. Sharma G, Grandhi GR, Acquah I, et al. Social determinants of suboptimal cardiovascular health among pregnant women in the United States. *J Am Heart Assoc*. 2022;11(2):e022837.
8. Javed Z, Valero-Elizondo J, Cainzos-Achirica M, et al. Social determinants of health, and risk of all-cause and cardiovascular mortality in the United States. *J Racial Ethn Health Disparities*. 2024;11:853-864. <https://doi.org/10.1007/s40615-023-01567-9>
9. Itlaf Satti D, Shi Kai Chan J, Dee EC, et al. Associations between social determinants of health and cardiovascular health of US adult cancer survivors. *J Am Coll Cardiol CardioOnc*. 2023;6(3):439-450.

KEY WORDS cancer survivorship, behavioral risk factors, disparities, screening