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Applying a Population Health Equity Framework in the Clinical Setting-Incorporating Social and Behavioral Determinants of Health Into Estimations of Risk

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Nationally, there is increasing recognition to shift away from a paradigm of reducing health disparities in vulnerable populations to one of advancing population health equity for all (Trinh-Shevrin et al., 2015). This framework is founded on a social determinants of health (SDH) approach, which emphasizes the critical impact of the conditions in which people are born, grow, work, live and age and the broader range of forces and systems that shape daily life, health, and well-being (Marmot, 2008). Individual behavioral factors also are recognized as inextricably linked to SDH, simultaneously representing a major, independent determinant of health and a consequence of an individual's social environment and structural conditions. In clinical settings, a comprehensive assessment of SDH can potentially yield more contextualized information on targeted strategies for patient populations living with complex health and social conditions.

Despite broad consensus that social and behavioral factors impact clinical outcomes, surprisingly few studies have identified direct associations between patient-level SDH and negative health outcomes. To address this critical lack of evidence, Zulman and colleagues undertook innovative research to identify discrete SDH factors, including behavioral factors at the individual level,, that could improve the modeling algorithm used by the US Veterans Administration (VA) electronic health record (EHR) to estimate risk of hospitalization among high-risk patients across the VA health system. As one of the largest integrated health systems nationwide, the VA is uniquely positioned to test practice-based innovation. The VA benefits from a systemwide EHR that has been used successfully for patient management and analytics for more than 20 years and serves a high proportion of complex patients. By committing substantial financial and human resources to the development and delivery of data-driven best practices, the VA has tested, implemented, and evaluated patient-centered medical home models for high-risk and vulnerable patients, including veterans who are homeless or have a mental illness, that have provided the blueprint for successful interventions in health systems nationwide (Hatef et al., 2020).

Presently, the VA health system uses a Care Needs Assessment (CAN) score to identify patients at high risk of hospitalization or death within one year. The CAN incorporates SDH, including age, race/ethnicity, Medicaid eligibility, nursing home residence, urban vs rural residence, census tract-level socioeconomic status and 1 behavioral factor (alcohol use) (Nelson et al, 2011). From the sampling frame of patients identified as high-risk by their CAN score, Zulman and colleagues conducted a voluntary, mail-in survey to establish additional SDH factors that could improve the model for 90-day and 180-day all-cause

hospitalizations. Their results showed that 3 patient-reported factors improved estimates of both 90-day and 180-day all-cause admission risk (marital or partner status, resilience, and powerful others health-related locus of control). Five additional factors improved the 90-day model (smoking status, medication security status, global health status, depression symptoms, health literacy), and 2 additional factors improved only the 180-day model (activities of daily living, chaotic lifestyle).

The Zulman et al study is important for several reasons. First, the authors identified the clinical utility of expanding an EHR-based algorithm with patient-reported SDH with greater emphasis on behavioral determinants. Using the Cycle of Complexity model to guide their selection of SDH survey measures, the authors found that behavioral determinants, such as resilience and health locus of control, provided added value in understanding the risk for poor hospitalization outcomes. These findings highlight the need for more expansive definitions of factors impacting patient complexity and underscore the relevance of domains that span social, physical and mental health. Taken together, by identifying associations between resilience, locus of control, depression, activities of daily living, and global health status and hospitalization, Zulman et al. illustrated the importance of considering broader features of patients' lives within a standardized predictive algorithm for predicting risk, reflecting work being implemented nationwide to identify domains of patient complexity that could both improve clinical outcomes and reduce costs (Seidman et al., 2020).

Second, the authors used an iterative approach to developing a SDH survey to enhance measures already available via administrative data sets or through the existing VA EHR-based intake form. This approach prioritized the development of a feasible and sustainable measurement strategy to identify a minimal number of additional measures that could improve the accuracy of the model. Future studies will need to address this question more fully by assessing how best to integrate this collection of SDH measures from patients as they are admitted to the hospital and how that integration will inform tailored strategies before and after discharge. Zulman et al. offer an important starting point by identifying 8 additional behavioral factors that reflect larger SDH measures and yet are associated with readmission before or at 90 days. These factors may be impacted by care management and supportive services, including evidence-based tobacco cessation programs, depression prevention and management, medication coverage, and community health worker intervention strategies.

Third, the authors prioritized a patient-centered approach to defining SDH through self-report data, offering an intriguing lens into patient perceptions and needs. Overlaying available administrative datasets could offer further insights into the relationship between structural determinants at the neighborhood level, such as poverty, household density, and crime rates, and patient reported social and behavioral determinants, such as resilience and locus of control (Hatef et al., 2019). Despite National Academy of Medicine (formerly, the Institute of Medicine) recommendations for 11 SDH domains to be included in routine EHR data collection (e.g., census tract median income and patient-reported social connections or isolation), integration of these indicators has been slow (DeVoe et al., 2016). Establishing new methods to achieve routine analysis of patient-level factors within the context of

community-level determinants could further advance a population health equity framework within the clinical setting.

A striking feature of the Zulman et al.'s sample is its lack of racial/ethnic or sex diversity in the VA health system data despite the shifting demographic profile of the active duty military population toward increasing diversity. Exploring SDH among women and in specific racial/ethnic populations would contribute to developing better predictive models that account for differences by sex, race, and ethnicity for complex medical conditions, as well as emerging crises. For example, the novel coronavirus disease 2019 (COVID-19) pandemic has illustrated stark differences in morbidity and mortality rates by race/ethnicity, including Black, Latinx, Asian American, and tribal communities, as well as among people with lower socioeconomic status (Millett et al., 2020; Yan et al., 2020). Within the VA, emerging data similarly show that Black and Latinx individuals are experiencing an excess burden of COVID-19 that cannot be fully explained by underlying medical conditions or where they live or receive care, while potential disparities in outcomes for Asian American individuals and for racial/ethnic groups classified and collapsed as "other" have yet to be explored (Rentsch et al., 2020). Behavioral determinants may play a substantial role and SDH data collected and disaggregated for analysis and reporting by racial/ethnic groups, including emerging and smaller subpopulations, and by sex are key to informing a population health equity agenda for the VA.

Zulman and colleagues have added to the literature by identifying discrete and relevant patient-level SDH measures that can be feasibly integrated in the VA system and improve the accuracy of their current data-driven model for estimating risk among vulnerable groups. These results should instruct tailored approaches to engaging racial/ethnic minorities and women in studies across institution types to inform relevant risk prediction models for diverse populations and subgroups.

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