

## SYNOPSIS

# Review of “Social Determinants of Health and Diabetes: A Scientific Review”

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## One-Minute Summary

- Racial and ethnic minorities and low-income adult communities are disproportionately at risk for diabetes, diabetes complications, and mortality. A scientific review was conducted by Hill Briggs et al. to identify associations between the social determinants of health (SDOH) and diabetes risk and outcomes in the United States (U.S.), and to assess the impact of interventions designed to mitigate the effects of the SDOH on diabetes outcomes.
- The authors analyzed several SDOH frameworks and grouped determinants into five categories:
  1. socioeconomic status (SES)
  2. neighbourhood and physical environments
  3. food environments
  4. health care
  5. social contexts
- Evidence relating to impacts and interventions were then analysed for each SDOH.
- The analyses supported associations between all five SDOH categories and diabetes-related outcomes. Inequities in living and working conditions and the environments in which people live directly impact the biological and behavioural outcomes that are associated with diabetes prevention and control. The length of time that one spends living in resource-deprived environments also significantly impacts disparities in diabetes risk, diagnosis, and outcomes.
- Intervention studies analysed in the review include those related to housing, the built and food environments, and health care. Reported gaps in the literature include interventions designed to positively impact education, income, occupational status, toxic environmental exposure, social cohesion, and social capital.

## Additional Information

There is no single authoritative set of SDOH: rather, there are many lists developed by a variety of organizations and jurisdictions. For that reason, the authors examined commonly referenced SDOH frameworks in order to identify the factors to use for their analysis. These frameworks included the World Health Organization's (WHO) Commission on Social Determinants of Health,<sup>1</sup> Healthy People 2020,<sup>2</sup> the County Health Rankings Model,<sup>3</sup> and the Kaiser Family Foundation SDOH factors.<sup>4</sup> Through the analysis, five groups of determinants were identified across these frameworks and were used for the review. These are: socioeconomic status (SES), neighbourhood and physical environments, food environment, health care, and social contexts. Many of these SDOH function on a gradient; the higher the SES the better the health outcomes, and the lower the SES, the poorer the health outcomes, for example.

### Socioeconomic Status

Socioeconomic status (SES) includes income, education and occupation and is a strong predictor of a variety of diseases, including diabetes. SES is connected to virtually all other determinants, as it dictates the extent to which people and communities can access other determinants. For example, income can dictate the level of education, quality of housing, quality of food, and access to health care. There is a graded association with both prevalence of diabetes and its complications across all levels of SES, often described using the analogy of a ladder. Those at the lowest rungs of the SES ladder are more likely to develop Type 2 diabetes, experience more complications, and die sooner than those higher on the ladder. Similarly, at the neighbourhood level, rates of Type 2 diabetes are higher in neighbourhoods with lower SES.<sup>5</sup>

The authors note that systematic investigation of the impact of change in SES on diabetes remains a gap in the literature. There is some evidence of the effectiveness of education and management tools adapted for lower literacy levels combined with comprehensive self-management interventions to achieve clinical improvements,<sup>6,7</sup> such as a decrease in hemoglobin A1c (HbA<sub>1c</sub>).<sup>8</sup>

### Neighbourhood and Physical Environment

This determinant of health includes housing, built environments, and toxic environmental exposures.

Housing instability refers to a spectrum of situations, ranging from living in one's car, to staying with relatives or friends, having difficulty in paying rent, frequently moving, and living in crowded conditions. Due to the relationship between housing and SES, it is not clear whether housing instability is causally related to developing diabetes. Individuals with unstable housing are more likely to report diabetes related emergency visits and hospitalizations as well as higher outpatient healthcare utilization. Qualitative research has found that people experiencing unstable housing also have more difficulty in engaging in self-care, following self-management routines, affording medications and supplies, and eating healthy foods. Though interventions targeting housing instability are challenging to implement due to costs, there is high-quality evidence for housing interventions.<sup>9-11</sup>

The built environment encompasses the physical space where individuals live and work, and includes the infrastructure, buildings, streets, and open spaces they access. Evidence shows associations between the built environment, particularly neighborhood walkability and access to green spaces, and diabetes risk and outcomes. While natural experiment designs have been used to assess the impact of policy and built environment changes on obesity-related outcomes, the literature does not directly address diabetes outcomes.

Toxic environmental exposures pose significant health risks, particularly for populations experiencing marginalization through factors including residential segregation, disparities in access to goods and services, and systemic racism. Underserved neighborhoods are often closer in proximity to pollution sources such as toxicants and ambient noise, experience inadequate regulation enforcement and insufficient responses to community complaints. Few studies have explored interventions related to environmental exposures and diabetes prevention or control, highlighting the need for population-level interventions through policy and regulations. The authors suggest further research and implementation of intermediate strategies at the clinical level, such as exposure screening and recommendations for reducing exposure sources, are also warranted.

## Food Environment

The authors define this SDOH as “the physical presence of food that affects a person’s diet.” It is also the physical, economic, policy, and sociocultural factors that influence food and beverage choices. This includes the proximity and distribution of food stores and food services, the availability and affordability of foods, and a connected (or disconnected) system that promotes access to food. There is an association between food access, availability, geographic characteristics and prevalence of Type 2 diabetes. Interventions to address food environments include food banks and food pantries,<sup>12-14</sup> adding supermarkets to neighbourhoods,<sup>15</sup> and providing diabetes appropriate food in conjunction with blood glucose monitoring, self-management support and primary care referrals.<sup>13</sup>

## Health Care

As a SDOH, health care includes access, affordability, and quality. The authors identified that people without health insurance have a higher likelihood of undiagnosed diabetes, have fewer office visits, are prescribed less medications, and have more emergency department visits. Having insurance is the strongest single predictor of quality measures in diabetes care. Income also impacted the ability of people to follow treatments such as medication regimens. Additionally, there were substantial geographical differences in access to endocrinologists by state and county in this US-based review. Interventions related to health care include trained lay Community Health Workers, in particular those representative of the communities they work with (i.e., Black and Hispanic),<sup>16-19</sup> self-management programs delivered to underserved patients in workplaces,<sup>20</sup> and policies related to affordable health insurance.<sup>21</sup>

## Social Context

Social context includes social capital, social cohesion, and social support. Social capital describes features of social structures, such as interpersonal trust, mutual aid, and reciprocity, which act as resources for collective action. Social cohesion refers to the level of connectedness and solidarity among groups in a community. It has two dimensions: reduction of inequalities and patterns of social exclusion; and strengthening of social relationships and interactions. Social support describes an individual’s experiences with and perception of formal and informal relationships. This can include emotional support, tangible support, informational support, and companionship. Increased social support is associated with better glycemic control and improved quality of life. Social cohesion, social capital, and social support may influence, and be influenced by, racism and discrimination. Exposure to racism, including everyday discrimination, is associated with increased prevalence of diabetes.

Social capital is positively associated with diabetes control among different populations. However, there is limited ability to determine associations between dimensions of social capital at the neighbourhood level. Higher social cohesion is associated with a lower incidence of Type 2 diabetes, and social supports are associated with better glycemic control and improved quality of life. Social support interventions include peer support groups, couples/spouse classes, or health worker support related to diet (i.e., meal preparation) and health behaviours.<sup>12</sup> The authors did not find empirical research on interventions related to social capital or social cohesion, however they did examine literature examining the effects of social support.

## PHO Reviewer's Comments

This literature review was conducted by an SDOH and diabetes writing group convened by the American Diabetes Association (ADA). The writing committee reviewed four commonly referenced SDOH frameworks for their respective classifications and terminology. Inclusion criteria were having representation in one or more existing SDOH frameworks, and having a sufficient body of underpinning literature to demonstrate influence of the determinant on diabetes. Beyond inclusion criteria, the committee's review process is not detailed.

This U.S. based review examines five of the twelve SDOH recognized by the Government of Canada.<sup>22</sup> Not reflected in the categories used by the authors are childhood experiences, healthy behaviours, biology and genetic endowment, gender, culture, and racism. It should be noted however that, just as the authors of the review found, there are multiple lists of SDOH used in Canada.

Like the U.S., populations facing systemic social and economic disadvantages are more likely to develop Type 2 diabetes in Canada.<sup>23</sup> There are also some differences between the two countries related to diabetes. For example, many of the SDOH explored in the literature review have roots in slavery, racial segregation, and socioeconomic and political contexts in the U.S. While Canada shares some of this history and present context, there are differences which may impact the SDOH and the populations most impacted by them in Canada. Additionally, the health care section of the literature review may be less relevant to the Ontario/Canada context due to the differences in health insurance between Ontario/Canada and the U.S. While Canada has universal health care, numerous individuals experience gaps in access and quality of care and many diabetes treatments are not subsidized by public drugs and devices coverage. People with diabetes can pay between 16 and 20 percent of a gross annual income of \$30,000 on medications and devices. Out of pocket costs as a share of family income are highest in Ontario.<sup>24</sup>

Authors outline the need to move beyond mediating the effects of the SDOH towards using structural and legal interventions/approaches in order to address the root causes of the SDOH. For example, addressing redlining (a discriminatory practice that denies financial services based on neighbourhood and race<sup>25</sup>) and zoning policies that create food deserts rather than providing boxes of healthy groceries, and moving beyond providing low-literacy materials by addressing the historical impacts of racism in educational systems.

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