September 21, 2021

Dear Members of the Congressional Social Determinants of Health Caucus:

On behalf of the 28 members of the Diabetes Advocacy Alliance (DAA), we are pleased to have the opportunity to share our thoughts on the epidemics of diabetes and obesity and how they relate to and are affected by social determinants of health (SDOH). The DAA is diverse in scope, with our members representing patient, professional and trade associations, other non-profit organizations, and corporations, all united to change the way diabetes is viewed and treated in America. Since 2010, the DAA has worked with legislators and policymakers to increase awareness of, and action on, the diabetes epidemic.

DAA members share a common goal of elevating diabetes on the national agenda so we may ultimately defeat this treatable, but also potentially deadly chronic disease. We are committed to advancing person-centered policies, practical models, and legislation that can improve the health and well-being of people with diabetes and prediabetes. An essential component to our goal is combatting health disparities and addressing social determinants of health. Our advocacy to policymakers highlights key strategies to prevent, detect and manage diabetes and care for those affected by it. Our educational outreach also illustrates the health equity implications of existing or new policies, regulations, and legislation, and provides alternatives to address the drivers of these inequities.

The DAA's comments to the Caucus are through the lens of diabetes, first, and obesity, which is related to the prevention of type 2 diabetes and treatment and care for all forms of diabetes. Unfortunately, the COVID-19 pandemic has shown a spotlight on diabetes and obesity due to the stark reality of disproportionate rates of severe disease, hospitalizations, and mortality for people with diabetes and obesity. While our nation could not have prevented the pandemic, addressing SDOH effectively prior to the pandemic could have prevented much of the disparities in outcomes that we are seeing today. The DAA believes it is more imperative than ever to address how SDOH affect healthy lifestyles and prevention and treatment of chronic diseases such as diabetes and obesity, and we are pleased that the Caucus has begun its important and vital work.

Overview

In considering how Congress could better address SDOH in America and the importance of doing so to improve health and wellness and address health inequities, it is helpful to use public

health nomenclature and think of SDOH as "upstream" factors that need to be addressed with policies and legislation that positively affect populations of people. For too long, our country has mainly addressed health at the "downstream" or individual level via clinical care, which focuses on identifying and treating diseases and conditions, rather than seeking to help populations of people prevent their onset.

The conclusions of one study by the University of Wisconsin Population Health Institute show the importance of SDOH, with half of health outcomes driven by a combination of upstream social and economic factors (40%) and the physical environment (10%). The study cited health behaviors as accounting for an additional 30% of health outcomes, with only 20% being driven by clinical care.[1] In an article this year in *Diabetes Care*, Johns Hopkins scientists cite another study that found only approximately 10-15% of individual and population level health outcomes are shaped by medical care.[2] These researchers frame the SDOH issues in diabetes succinctly: "Diabetes is a public health crisis that must be addressed by acknowledging and intervening on contextual factors outside of traditional medical care if we are to truly make an impact on improving outcomes, particularly for our most marginalized communities."[2]

In January 2021, the American Diabetes Association (ADA) published a scientific review of SDOH and diabetes, which identified these SDOH factors as most relevant to diabetes: 1.) **socioeconomic status** – which includes educational, economic, and occupational status – is described as a "consistently strong predictor of disease onset and progression;" 2.) **neighborhood and physical environment** – which includes housing, built environment, and environmental exposures, and the impact of racism and segregation on all three; 3.) **food environment** – which includes accessibility, availability, affordability, and quality; 4.) **health care** – which includes access, affordability, and quality of care, which are highly correlated with race/ethnicity, socioeconomic status, and place/geographic region; 5) **social context** – which includes social capital, social cohesion, and social support.[3] In referring to these domains, Hopkins researchers state that "structural or systems-level inequities, across all five domains of SDOH, are related to worsened diabetes prevalence, diabetes disease control, and diabetes-related deaths."[2]. In referring to the work of the ADA's scientific review committee, the Hopkins researchers cite examples of how these domains affect diabetes outcomes:

- "Across each of the five domains, SDOH arising from structural or systems-level root in-equities are related to worsened diabetes prevalence, diabetes disease control, and diabetes-related deaths. For example, the SDOH domain neighborhood and physical environment is influenced by racial residential segregation. Residential segregation is a structural or systems-level inequity that persists because of historically racist and exclusionary housing policies as well as discrimination in federal housing loans that did not end until the Civil Rights Act of 1968. Residential segregation is a powerful predictor of community investment and resource distribution in neighborhoods. Poorly resourced neighborhoods with lack of green spaces for physical activity, inadequate access to affordable and healthy food, and exposure to environmental chemicals tend to be associated with poorer diabetes-related outcomes."[2]

Evidence for How SDOH Affect Diabetes Prevention, Detection, Treatment, and Care

The ADA's scientific review committee's article points to evidence to support strong associations of SDOH and diabetes prevention, detection, treatment and care, health outcomes, and mortality. Although specific to diabetes, the DAA believes this evidence can be useful more broadly to the Caucus for insight into how SDOH affect chronic diseases and the people affected by them:

Socioeconomic Status and Diabetes. "Socioeconomic status (SES) is a consistently strong predictor of disease onset and progression at all levels of SES for many diseases, including diabetes. SES is linked to virtually all the established SDOH. It is associated with the extent to which individuals and communities can access material resources including health care, housing, transportation, and nutritious food and social resources such as political power, social engagement, and control."

. . . "Income, education, and occupation show a graded association with diabetes prevalence and complications across all levels of SES, up to the very top. Those lower on the SES ladder are more likely to develop type 2 diabetes, experience more complications, and die sooner than those higher up on the SES ladder. The higher a person's income, the greater their educational attainment, and the higher their occupational grade, the less likely they are to develop type 2 diabetes or to experience its complications."

. . . "Prevalence of diabetes increases on a gradient from highest to lowest income. . . At the neighborhood level, differences in diabetes prevalence by census track are attributable to SES. For example, in one study, the rate of type 2 diabetes was found to be significantly higher and concentrated in census tracts characterized by factors including lower incomes, lower high school graduation rates, more single-parent households, and crowded housing. (Another study showed that) living in neighborhood census tracts with lower educational attainment, lower annual income, and larger percentage of house-holds receiving Supplemental Nutrition Assistance Program benefits has been associated with higher risk of progression to type 2 diabetes among adults with prediabetes."

. . . "Adults with type 2 diabetes who have a family income below the federal poverty level have a twofold higher risk of diabetes-related mortality compared with their counterparts in the highest family income levels."

. . . "In the U.S., the age-adjusted prevalence of diagnosed diabetes is 12.6% for those with less than a high school education, 9.5% for those with a high school education, and 7.2% for those with more than a high school education. Having a college education or more is associated with the lowest odds of diabetes."

. . . "Compared with adults with a college degree or higher, having less than high school education is associated with a twofold higher mortality from diabetes."[3]

The ADA's scientific review committee pointed out a need for research: "To date, there is no body of literature describing impact of change in income, change to higher educational status, or different employment/occupational status on diabetes outcomes, although income and wage changes, and job changes and loss, do occur naturalistically. Similarly, no diabetes outcomes have been reported from interventions directly targeting living wages, early

childhood education, educational quality, or educational access for poor children and families."[3]

Neighborhood and Physical Environment and Diabetes. "There is some high-quality evidence for housing interventions. The Moving to Opportunity for Fair Housing Demonstration Project (MTO), a randomized social experiment conducted (1994-1998) through the Department of Housing and Urban Development, in partnership with behavioral scientists and other federal agencies, was designed to determine what impact moving from a high-poverty to a low-poverty census tract would have on multiple outcomes."

- . . . "Findings from the follow-up survey in 2008 through 2010 found a 21.6% relative reduction in prevalence of an elevated HbA1c (.6.5%) in the group that moved to low-poverty census tracts compared with the control group, with an absolute difference of 4.31 percentage points (95% CI 27.82 to 20.80). The low-poverty group also had relative reductions of 13.0% in prevalence of BMI ≥35 and relative reduction of 19.1% in BMI ≥40 kg/m2, with absolute differences of 4.61 percentage points (95% CI 28.54 to 20.69) and 3.38 percentage points (95% CI 26.39 to 20.36), respectively."

. . . "A robust literature has demonstrated associations of the built environment with obesity-related outcomes. However, a smaller body of research (in the U.S.) has examined associations of the built environment with diabetes specifically."
. . . "In countries outside of the U.S, neighborhood physical activity, environments, specifically better walkability of neighborhoods and access to greenspace, have been consistently associated with lower risk of T2DM and better outcomes."
. . . "Marginalized communities in the U.S. are disproportionately exposed to environmental agents that have evidence of an association with diabetes, including air pollution, environmental toxicants, and ambient noise, and subgroups that generate the least pollution have highest exposures."[3]

Food Environment and Diabetes. "Cross-sectional studies have shown associations between food access, availability, geographic characteristics, and type 2 diabetes prevalence."
. . . "Several observational, longitudinal studies report neighborhood resources in general, and access and availability of the food environment in particular, as associated with diabetes prevalence and incidence."
. . . "(One study) examined associations of residential socioeconomic, food, and built environments with glycemic control in adults with diabetes ascertained from the New York City A1C Registry from 2007 to 2013. Individuals who lived continuously in the most advantaged residential areas, including greater ratio of healthy food outlets to unhealthy food outlets and residential walkability, achieved increased glycemic control and took less time to achieve glycemic control compared with the individuals who lived continuously in the least advantaged residential areas."
. . . "Approximately 20% of diabetes patients report household food insecurity, and food insecurity is a risk factor for poor diabetes management."
. . . "In sum, food environment factors of food unavailability, inaccessibility, and insecurity each demonstrate associations with worse diabetes risk and outcomes, and interventions including diabetes-targeted food and self-management care at food banks and pantries and increasing

grocery store presence in low-income neighborhoods are few, but collectively they demonstrate the potential to impact diabetes risk, clinical outcomes, and psychosocial outcomes."[3]

Health Care and Diabetes. "In population-based studies, having health insurance is the strongest predictor of whether adults with diabetes have access to diabetes screenings and care. Uninsured adults in the U.S. population have a higher likelihood of having undiagnosed diabetes than adults with insurance. Compared with insured adults with diabetes, the uninsured have 60% fewer office visits with a physician, are prescribed 52% fewer medications, and have 168% more emergency department visits."
. . . "(One study) found that among adults with diabetes, having both insurance and a usual source of care, rather than one or the other, conferred the greatest odds of receiving at least minimum diabetes health care. Being uninsured and without a usual source of care was associated with three to five times lower odds of adults receiving an HbA1c screen, blood pressure check, or access to urgent care when needed."
. . . "On average, health care costs of people with diabetes are 2.3 times those of people without diabetes Approximately 14% to 20% of adults with diabetes report reducing or delaying medications due to cost. Among adults with diabetes who are prescribed insulin, rates may be >25%. Cost-related or cost-reducing nonadherence (CRN) is associated with income, insured status, and type of insurance."
. . . "Having insurance is the strongest single predictor of whether adults with diabetes are likely to meet individual quality measures of diabetes care."
. . . "Systematic reviews report improvements in quality of diabetes care among racial/ethnic minorities resulting from quality improvement employing health information technology (i.e., patient registries in the electronic health record, computerized decision support for providers, reminders, centralized outreach for diabetes patients overdue for specific services). There is also evidence of effectiveness of self-management interventions delivered directly to under-served patients with diabetes when interventions are designed to overcome barriers. In a series of studies, a problem-based self-management training addressing multiple life barriers to care in low-income and minority populations was adapted for low literacy and prevalent diabetes-related functional limitations (e.g., low vision, physical disability, and mild cognitive impairment) that impede self-management education. The approach has proven effective in improving clinical outcomes (HbA1c, blood pressure), self-care behaviors, and self-management knowledge and problem-solving skills in low-income, racial/ethnic minority, and rural populations."
. . . "Studies have examined the impact of the Affordable Care Act (ACA) on insurance coverage and health care access for patients with diabetes. Analyses of NHIS data from 2009 and 2016 found an increase nationwide of 770,000 more adults with diabetes aged 18 to 64 years with health insurance coverage in 2016, with a significant increase in coverage seen among Whites, Blacks, and Hispanics, people with family income <$35,000, and people across educational attainment strata (less than high school and more than high school. Among people with diabetes in the lowest income strata, the proportion of income spent on health costs decreased significantly from 6.3% to 4.8%. Other studies found increased access to care, diabetes management, and health status among people with diabetes in Medicaid expansion states as

compared with their counterparts in non–Medicaid expansion states; increased rates of diabetes detection and diagnosis among Medicaid patients with undiagnosed diabetes in states with Medicaid expansion; and reduction in cost-related medication nonadherence rates and uninsured rates among people with diabetes following ACA."[3]

Social Context and Diabetes. "To our knowledge, there is no empirical research on social capital or social cohesion interventions and impact on diabetes outcomes, but a body of literature has examined effects of social support. (One systematic review) of 18 observational studies of adults with type 2 diabetes found that higher levels of social support were associated with outcomes including better glycemic control, knowledge, treatment adherence, quality of life, diagnosis awareness and acceptance, and stress reduction. Lack of social support has been linked with increased mortality and diabetes-related complications in type 2 diabetes. (This) review of 16 social support intervention studies demonstrated improved diabetes-related outcomes (clinical, psychosocial, and/or self-management behavior change) in adults with type 2 diabetes, and improvements in clinical outcomes (HbA1c, blood pressure, lipids) appeared to be unrelated to the source or delivery (i.e., peer support, couples/spouse, or nurse manager)." . . . "With regard to preferences in a study conducted before the coronavirus disease 2019 pandemic, researchers found that, compared with White adults with diabetes, Hispanics with diabetes preferred telephone-based and group support (including promotoras), while African Americans demonstrated more variability in their preferences (i.e., telephone, group, internet). Reliance on support from family and community tended to be higher in minority populations, while Whites relied more on media and health care professionals."[3]

Example of a Novel Approach to Identifying Risk Factors for Type 2 Diabetes in a Major Urban Market in the U.S.

Stephen Linder, with the University of Texas Health Science Center at Houston, along with colleagues from Novo Nordisk Inc. (a DAA member), published data in 2018 from novel research methods used to identify populations at higher risk for diabetes in Houston, as part of a global public health intervention called Cities Changing Diabetes. The research concept was to identify who was most vulnerable to diabetes onset, and where they live, to guide the deployment of community-based resources in a quest to address rising rates of type 2 diabetes. The novel research approach combined medical measures of increased risk, including body mass index (BMI) and high blood pressure, with SDOH factors of neighborhood and social and economic disadvantage:

- "Because this study focuses on primary prevention, our strategy is to identify those on the path to diabetes, without being warned of it by conventional screening measures. In this sense, they are 'vulnerable but not yet identified as at risk. Second, each particular path to diabetes is one complicated by socioeconomic and cultural factors that are seldom admitted to biomedical explanations of type 2 etiology. Accommodating these factors expands the focus on prevention beyond behavior modification and lifestyles to include the complicated relationship between opportunities for and barriers to change that are context specific. This approach emphasizes the social determinants of health as

the key to reducing incidence rates beyond what current interventions have been able to produce."[4]

Real-World Insight from Members of the Diabetes Advocacy Alliance and Implications for Addressing SDOH

The Caucus has asked, in question 1A, "What specific SDOH challenges have you seen to have the most impact on health? What areas have changed most during the COVID-19 pandemic?" The five SDOH domains described above are relevant to preventing new cases of type 2 diabetes, screening for and detecting prediabetes and diabetes, and improving outcomes for people with diabetes. The DAA considers elements of these SDOH domains as factors in developing its strategic priorities:

Development and Prevention of Type 2 Diabetes. Poverty, unemployment, lack of access to fresh and healthy foods, lack of safe spaces to walk or exercise, and lack of health care are some of the SDOH factors that can contribute to increasing people's risk for becoming overweight or obese and developing type 2 diabetes. DAA members that are prevention program suppliers had found that enrolling and staying in diabetes prevention programs, such as the CDC's National Diabetes Prevention Program (National DPP) or the Medicare Diabetes Prevention Program (MDPP), can be affected by a variety of SDOH factors, such as lack of employment and insurance, absence of childcare, and lack of transportation and social support. During the COVID-19 pandemic, DAA members that are suppliers of in-person National DPP and/or MDPP programs found that lack of broadband capacity and adequate technology also have been impediments to many who could not make the switch to internet-based forms of these programs that became necessary forms of program delivery.

In just one instance related to diabetes prevention, we can see indirectly the impact of overall failures to address SDOH in data reported by CMS in an interim evaluation the MDPP, in which researchers reported that 75% of the participants to date were white, showing lack of reach to populations disproportionately affected by prediabetes and diabetes.[5]

Diabetes Screening and Detection. Lack of health care insurance and access to care, lower education, and lack of transportation are some of the ways that SDOH can affect whether individuals at risk for diabetes see a health care provider and learn they have prediabetes and get a referral to a diabetes prevention program, or learn they have diabetes, and can begin treatment and care. During some of the COVID-19 pandemic, medical practices and clinics were unavailable for routine health care that could include screening for diabetes.

Diabetes Care. Poverty, unemployment, lack of access to fresh and healthy foods, lack of safe spaces to walk or exercise, lack of health care insurance and access to care, and lack of transportation are some of the SDOH factors that contribute to the challenges that individuals face when self-managing their diabetes. Lack of health care insurance and access to care, lower education, and lack of transportation are factors that also contribute to accessing diabetes self-management education and support (DSMES) services. These services, covered by both public

and private payers, provide evidence-based support for people with diabetes to help prevent or delay diabetes complications. During the COVID-19 pandemic, providers and person with diabetes saw value in the availability of DSMES services provided via different delivery modes (telehealth, audio-only, virtual services, in-person, community-based, etc.). Telehealth options, including audio-only and virtual services, enable people experiencing a lack of access to transportation or lack of social support for medical visits, to still attend appointments. In-person services remain an option for many who reported limitations with broadband or access to technology. The DAA advocates for added flexibilities around services like DSMES that are known to improve outcomes yet remain vastly underutilized for many reasons including the impact of SDOH.

On behalf of the 28 members of the DAA, we thank you for the opportunity to share our thoughts on SDOH and their relationship to diabetes. If you have any questions or would like to meet to discuss any of our comments, please let us know.

Sincerely,

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References:

[1]University of Wisconsin Population Health Institute. "County Health Rankings Model." County Health Rankings & Roadmaps, 2014.

[2]Ogunwole SM and Golden SH. Social determinants of health and structural inequities – root causes of diabetes disparities. *Diabetes Care* 2021; 44:11–13. https://doi.org/10.2337/dci20-0060

3Hill-Briggs, F, Adler, NE, Berkowitz, et al. Social determinants of health and diabetes: a scientific review. *Diabetes Care* 2021; 44:258–279 | https://doi.org/10.2337/dci20-0053

[4]Linder, S, Marko, D, Tian, Y, and Wisniewski, T. A population-based approach to mapping vulnerability to diabetes. International Journal of Environmental Research and Public Health. October 2018: doi:10.3390/ijerph15102167.

[5]Centers for Medicare and Medicaid Services. Center for Medicare and Medicaid Innovation. Evaluation of the Medicare Diabetes Prevention Program. March 2021. Accessed September 17, 2021. https://innovation.cms.gov/data-and-reports/2021/mdpp-firstannevalrpt.