



# Identifying and Reducing Disparities in Young Adults With Diabetes

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This article outlines how social and health care determinants can affect young adults with diabetes. The authors provide a detailed description of each determinant's influence on diabetes self-management and offer solutions to help mitigate these harmful effects.

Young adults (YAs) with type 1 diabetes from underserved minority groups have complex medical and social histories that complicate diabetes self-management and attaining glycemic goals. The following case study illustrates why it is important to obtain a thorough social history in addition to a medical history. Providing care plans that address social and psychological needs is crucial to the success of caring for underrepresented and vulnerable populations.

## Clinical Case Study: T.S.

### History

T.S. is a 21-year-old man of Hispanic ethnicity who was diagnosed with type 1 diabetes at 11 years of age. Significant additional medical history includes multiple emergency room visits in the past year for diabetic ketoacidosis (DKA) and severe hypoglycemic episodes. He was recently diagnosed with congestive heart failure (HF), thought to be secondary to uncontrolled diabetes, for which he is being evaluated for a heart transplant. His medications include basal-bolus insulin and the use of a glucose meter for type 1 diabetes management and oral medications for HF. His most recent A1C value was >14%, with a usual range between 10.1 and >14%. He has a significant psychological history of generalized anxiety disorder and panic attacks, which have worsened recently in the transition from pediatric to adult care and with his recent diagnosis of HF. He averages one to two diabetes medical visits per year and has been switched among several endocrinologists in the past few years.

A detailed examination of his social history reveals a lack of family or diabetes-specific support, with his parents and siblings living out of state. T.S. dropped out of college after two

semesters and has worked part-time in food delivery services ever since. He recently lost his job and was not able to maintain his rent payments. He now endorses recent housing insecurity and has been living temporarily among friends, in his car, and in shelters. He is unable to purchase groceries or make his own food given his lack of income and housing, and as a result he eats mostly fast food. He states that he has no stable place to store and keep track of his insulin and is not able to comply with diabetes treatment guidelines. He is not in psychological care and had been lost to endocrinology care for more than a year before a recent referral from the HF team last month.

### Assessment and Plan

T.S. has several medically complex diagnoses marked by type 1 diabetes with very high A1C levels, cardiac complications from uncontrolled diabetes, and frequent diabetes-related hospitalizations. Socially complex comorbidities accompany his medical history and may be the root cause of disease severity. These include financial, housing, and food insecurity; psychological disease; and low social support. His fragmented outpatient care exacerbates his issues, preventing both adequate treatment and prevention of poor medical and psychological outcomes. Glycemic goals are an urgent priority for T.S. given his new cardiac complications from diabetes. He would benefit from the use of continuous glucose monitoring (CGM) to aid in diabetes self-management, allow for closer monitoring of glycemic fluctuations, and possibly reduce diabetes-related distress. In addition, he requires immediate referral for social services and psychological support to improve his ability to self-manage diabetes and accept medical interventions.

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## YAs Development and Added Challenges for Underrepresented Racial and Ethnic Groups

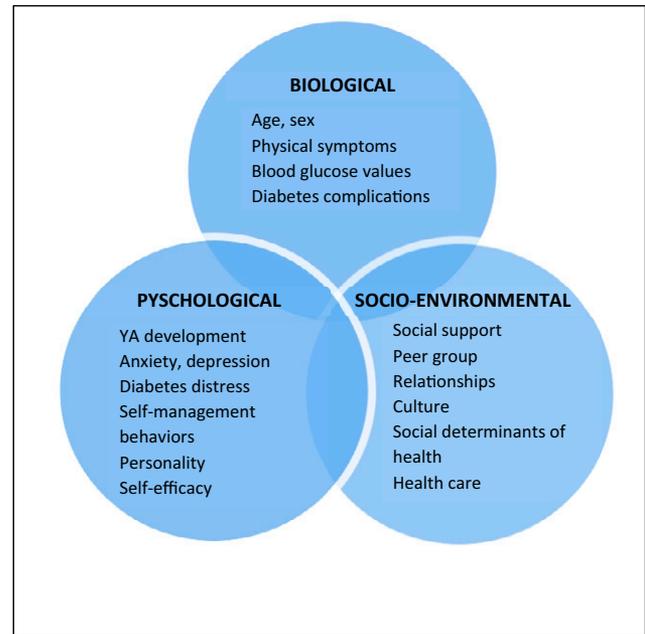
As noted in the preface to this *Diabetes Spectrum* From Research to Practice section (p. 324), diabetes self-management is complex and demanding and can become challenging for YAs to manage independently (1–3). Daily vigilance in medication administration, dietary restrictions, physical activity, weight management, and sleep maintenance while managing the rigors of daily life requires a high level of executive functioning that has not fully developed until the age of 25–26 years (3,4). Moreover, YAs with diabetes have to transition from pediatric to adult health care systems (1,5–8), a process that is fraught with a number of challenges. YAs may have difficulty advocating for themselves in a new care environment independent of their family units, and this difficulty may be associated with decreased engagement in care (9,10). The YA period is also marked by increasing emergence of psychiatric conditions, with higher prevalence rates of depression, anxiety, diabetes distress, disease burnout, suicidality, psychosis, and disordered eating behaviors (11–13). A population-based study in China found that 37% of hospital days for people with youth-onset diabetes (<40 years of age) were the result of mental illness (14).

For people from underrepresented racial and ethnic backgrounds and underserved status, competing priorities related to socioeconomic status (SES) and social environments makes young adulthood even more challenging. Mounting evidence from our group and others has highlighted that underserved YAs with type 1 diabetes exhibit 2.3% higher mean A1C levels, twice the rate of hospitalization, and 1.5 times the risk of mortality compared with White YAs (15–19). In type 2 diabetes, similar outcomes are found (8,20,21).

As depicted in Figure 1, underserved YAs with diabetes have unique biological, psychological, and socioenvironmental factors that interact to result in adverse outcomes. In a national survey of YAs with type 1 diabetes, social determinants of health (SDOH) accounted for 85% of the 2.3% A1C disparity between Black and White YAs (15). Often, these social needs are left unaddressed, posing significant barriers to clinical engagement and optimal diabetes care. Moreover, unaddressed barriers in underserved groups are associated with psychological distress and lower quality of life (22–24).

### SDOH and Potential Interventions

SDOH are factors beyond the personal choices and behaviors of individuals that are related to a person's SES, physical environment, and social relationships that greatly influence overall health status (Figure 2) (25,26). SDOH domains include economic stability, neighborhood and built environment,



**FIGURE 1** A biopsychosocial model of health in underserved YAs with diabetes.

education, social and community context, and health care. Underserved YAs with diabetes disproportionately experience negative effects of SDOH, which act as competing priorities to diabetes self-management and contribute to negative health outcomes (15,27). In the following sections, we outline the risk of each type of SDOH shown in Figure 2 to YAs with diabetes and offer potential interventions to address these challenges.

### *Economic Instability: Employment, Poverty, Housing, and Food*

Economic instability, as defined by the World Health Organization (WHO), includes under- or unemployment, poverty, housing instability, and food insecurity (25). It is well established that economic stability is associated with higher SES and better overall health outcomes compared with being at or below the poverty line (21). Higher SES is also directly linked to socioeconomic position (SEP), which refers to the social and economic factors that influence what positions individuals or groups hold within the structure of a society (28). SES and SEP are often associated with parental education status and average household income on an individual level and with neighborhood median household income on a population level (29). A recent study found that low SEP was associated with A1C levels above target in 56% of YAs with type 1 diabetes and 46% with type 2 diabetes (29).



FIGURE 2 SDOH framework.

### Employment

As YAs transition to independence, employment opportunities and vocational choices play central roles in financial stability and SEP (1,30). General trends over the past few decades have shown that YAs are taking longer to obtain gainful employment, often having to rely on family support for financial security well through their 20s (31). For underserved YAs, the proportion with full-time stable jobs is even lower, with the majority of employment from freelancing, part-time, or full-time temporary positions (31). These types of employment are highly associated with uninsurance, underinsurance, and frequent medical insurance changes, all of which can threaten a person's ability to access and maintain high-quality diabetes care (32). In addition, financial insecurity from inadequate employment forces YAs to make difficult decisions about how to spend their scant financial resources. Financial insecurity, especially among underserved populations with diabetes, has gained international recognition as being strongly associated with the inability to pay for insulin and/or rationing of insulin, leading to suboptimal diabetes management and diabetes complications (33,34).

### Housing Instability

Emerging evidence has highlighted the high prevalence of housing insecurity among people with diabetes and the foundational role housing plays in diabetes self-management and outcomes. Unstable housing is defined as not having enough money to pay rent or mortgage, having moved two or more times in the past 12 months, or staying at a place one does not own or rent. One study examining national data from the 2014 Health Center Patient Survey of more than 1,000 adults with diabetes revealed that 37% were unstably housed, with five

times greater odds of diabetes-related emergency department visits or hospitalizations for unstably versus stably housed (35,36).

Housing instability has negative impacts on a person's ability to store insulin and other medications, to cook and eat nutritious meals, and to get needed social support for diabetes management (35). In YAs, housing instability is likely underreported and highly influential in diabetes self-management. The Pew Research Center cites a marked increase in housing instability among YAs in the United States overall from 46 to 52% during 2019–2020. However, there are few data in underserved populations or in those with diabetes, given the dearth of YAs participation in research studies and inadequate methods of epidemiological surveillance that tend to overlook low-SES patients in safety-net health systems (36).

### Food Insecurity

Food insecurity occurs when a person's access to food is inconsistent or limited by unfavorable financial circumstances or residence in an area where healthy and safe food options are not readily available (25,35,37). Individuals of lower SES are at high risk of experiencing persistent food insecurity (35). This risk also increases for those living in densely populated, urban areas (38).

Food insecurity often results in unstable dietary consumption, iron deficiency and anemia, and insufficient intake of micronutrients (39). Over-consumption and bingeing are also associated with food insecurity depending on the availability of food (39). Aside from adversely affecting a person's dietary intake, food insecurity may increase overall stress and anxiety levels in those affected (38). Overall self-ratings of poor health and adverse outcomes are noted in food-insecure compared with food-secure individuals (38). In diabetes, food insecurity is strongly associated with suboptimal self-management behaviors, nutritional deficiencies, high A1C levels, and long-term diabetes complications (35,39). Moreover, food-insecure individuals have a 50% higher risk for developing prediabetes than those with higher accessibility to healthy options and abundant resources, showing persistent effects when controlling for other lifestyle and genetic factors (40). Coping strategies for food insecurity, such as reducing caloric intake, can increase the risk of hypoglycemia. In contrast, food insecurity may be associated with eating calorie-dense fast food in less frequent meals, leading to hyperglycemia and high A1C levels.

### Interventions to Address Economic Instability

The most important first intervention to address issues of economic stability is to establish screening programs that may uncover related issues. Screening for SDOH has

been recommended by multiple organizations, including the WHO, Centers for Disease Control and Prevention, and American Diabetes Association (ADA), in its *Standards of Medical Care in Diabetes—2021* (25,26,41). Several brief survey instruments are available and offer quick ways to screen for multiple domains of social needs (42,43). In the United States, recent billing changes in 2021 have made social needs screening a billable part of medical visits, underscoring the importance of screening processes. Insurance gaps, housing or food insecurity, or unemployment leading to inability to afford diabetes medications are all important barriers to diabetes self-management and can often be hidden. Because patients might be apprehensive about immediately sharing their socioeconomic and social barriers, health care providers (HCPs) must systematically search for such issues, which could have a major impact on treatment and outcomes.

Once a social need is identified, care plans must be adjusted to accommodate the need. Interventions can vary in scope depending on resources. At the very least, diabetes care management plans must incorporate social needs and restrictions. For example, the focus of diabetes visits should not be on attainment of glycemic targets when a patient is unable to afford adequate amounts of insulin or may be under-dosing insulin because of food scarcity. For resource-rich practices, multidisciplinary interventions and care coordination are crucial to success. When available, social workers or case managers within specialty clinics, in primary care, or in hospital settings should be leveraged as part of the care team to offer linkage to community resources and additional support to patients. In addition, family meetings and empowerment of support systems for YAs should remain crucial strategies to improve effectiveness of care plans. Additionally, HCPs need to be flexible and creative, pay attention to changing phone numbers to keep in close touch with YAs, allow YAs to discuss sensitive social needs, and support them using patient-centered care approaches.

National organizations and resources should be used to find community-based resources for patients. Free online social service search engines such as NowPow and FindHelp are available to connect people in need with programs and resources sorted by zip code (44,45). In addition, the 211 Helpline Center in the United States is another public resource that provide callers with information and referrals for social services in their area (46).

### *Education and Literacy*

Higher education levels are typically linked to higher social position, attainment of more skilled jobs, and greater financial

security, with ripple effects in health. Educational attainment is found to be an influential predictor of health behaviors such as smoking, binge drinking, and poor dietary habits (47). In addition, educational attainment is typically linked to health literacy, which is described by the U.S. Institute of Medicine as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (48).

Numerous studies have demonstrated that non-Whites have limited health literacy compared with Whites, which is associated with poorer health (49–51). Lower health literacy rates are typically associated with poorer usage of health care services (48,49), including lower rates of vaccinations and annual screenings, higher rates of missed appointments, more difficulty in interpreting and reading medical instructions, and lower accuracy in following medication recommendations (49). Because diabetes requires daily vigilance to complicated treatment regimens that include multiple medications, dietary guidelines, and physical activity instructions, self-management can often be challenging for people with low health literacy. Moreover, adequate levels of numeracy are needed to accommodate and manage diabetes treatment recommendations, and numeracy is also often lower among people with low health literacy, posing further challenges to disease self-management (52–54).

### **Interventions to Address Education and Health Literacy**

Providing health materials in different languages and improving communication between patients and HCPs are two feasible solutions to combating miscommunication that could occur with lower education and health literacy (50). Cultural sensitivity is often talked about but not consistently implemented (55,56). Cultural adaptation is a complex process and requires an understanding of the specific needs of people from each cultural background (50). It is common for HCPs to group every racial and ethnic group into one monolithic “minority group,” which limits the effectiveness of interventions (48). HCPs, practices, and diabetes education groups must allow their diverse patients to be their teachers and ask for constant feedback when trying to enact culturally sensitive approaches. In addition, health care teams must develop easy-to-understand materials with pictorial instructions and use repeat-back methods to confirm that patients understand the medical advice and information they are given. As diabetes therapy options become more complex and varied, health literacy-sensitive approaches can ensure that inadvertent health disparities do not arise (57).

*Neighborhood and Built Environment*

Neighborhood and built environmental factors are upstream from an individual's risk factors and greatly influence a wide range of health outcomes (25). The way neighborhoods are structured and the resources available within them often affect the amount of physical activity a person can take part in (i.e., the "walkability" of the neighborhood), quality of available food, safety and cohesion of the community, and available modes of transportation for people with diabetes (58). Moreover, underlying racial segregation and districting of neighborhoods continues to be a problem in urban areas, leading to discrimination and exacerbating institutional racism (59). Previous redlining of various communities led to disparities among neighborhoods that are still prevalent today (59).

Neighborhood-level factors are thought to underpin much of the disparities in health outcomes, especially in diabetes, and include economic instability, food and housing insecurity, lower social position, and unemployment (58). High-quality recreation centers, gyms, and parks tend to exist mainly in neighborhoods with higher safety ratings and overall higher economic status (58). Other built environment characteristics have been associated with higher stress and poorer sleep (e.g., greater residential noise from road or air traffic) (60).

**Interventions to Address Neighborhood and Built Environment**

Interventions to mitigate or prevent negative consequences of upstream neighborhood and environmental factors require collaboration of various city and other governmental agencies that may be outside of the scope of influence of individual HCPs or practices (61,62). However, having knowledge of these factors is vital to crafting care plans. Various community-based organizations are available to address some of the resource scarcity issues. In some urban areas, subsidized farmers' markets are available that take food assistance benefits as payment (63). In addition, school lunches offer a vital resource for food insecurity for YAs who may have delayed graduation from high school (64). Community walking programs are often available to support local residents in finding safe spaces for physical activity (65). HCPs should seek out local resources to mitigate the negative consequences of the built environment. When possible, HCP advocacy on the local or regional level can be helpful in garnering community resources to enhance medical care.

*Social and Community Context*

Overarching societal and social relationships are increasingly being recognized as important to health (66–69). Similar to

the influences of neighborhoods and the built environment, the shared values of a community as a whole can influence the ways in which its members view their own health (25,70). Relationships formed within a community, the degree of social cohesion, and the ability to access supportive community resources have complex and unique effects (69). Peer networks are an important social component of YA development and can greatly influence diabetes care at this life stage (71,72).

Nevertheless, the types of social networks and support available to underserved YAs differ greatly from those available to YAs from higher-income backgrounds (73), who have been found to have higher engagement in activities, extracurricular events, and after-school clubs (73). Higher-income YAs have also been found to have more opportunities for social support from parents, teachers, peers, and HCPs (71). Optimal glycemic control is more likely to occur when YAs are engaged in a dense social network that offers support from a number of sources (71,73). A recent study of ADA summer camps for youth noted stark racial and ethnic disparities in participation (74). Moreover, online community membership is higher among White versus racial and ethnic minority youth with diabetes (75). Lack of social networks, on and offline, and strong social ties can result in feelings of isolation, stigmatization, distress, and depression, greatly affecting outcomes in vulnerable YAs (69,71).

Adding to this social isolation, individuals living in redlined areas are more likely to report discrimination (76). Everyday discrimination is associated with social stress and declining mental health and has been found to facilitate pathways to developing chronic diseases such as diabetes and to difficulty attaining glycemic goals (58). One study of African American women with diabetes who reported some form of discrimination found that these women tended to internalize their anger and stress responses, which was associated with a lack of motivation in diabetes care and adoption of maladaptive coping mechanisms such as choosing unhealthy food options and overeating (77). Experiences of everyday discrimination are plentiful, insidious, and often under-recognized in YAs with diabetes. Nevertheless, they are likely to have a significant effect on self-perception, behaviors, and outcomes that needs to be further studied.

**Interventions to Address Social and Community Determinants**

Offering information and increasing opportunities for YAs to find social activities, support groups, and online communities may help with diabetes acceptance, mitigate stigmatization, and improve health behaviors (78,79). Although YAs are exploring their newfound independence, family members and loved

ones should still be encouraged to remain a part of their diabetes support systems. In addition, the sometimes uncomfortable but necessary acknowledgment of the effects of racism may help improve therapeutic alliances with YAs and facilitate necessary shared decision-making for diabetes care.

### Health Care

Given how pivotal health care relationships are during the YA period of transition between health care systems, care delivery and engagement are paramount to achieving positive outcomes in YAs. Health care determinants include overt HCP racism, implicit bias, and lack of shared decision-making, all of which have been associated with lower-quality visits (56,57,80–82). Specific to diabetes, few studies have examined racial and ethnic disparities in care delivery. One study of low-income African American youth with type 1 diabetes (8–17 years of age) found that they were less likely to have a regular HCP, which resulted in more frequent hospitalizations (18). Another study showed that Hispanic and African American youth with type 1 diabetes (10–18 years of age) reported more barriers to receipt of high-quality diabetes care, including lack of a patient-provider therapeutic relationship and culturally appropriate education (83). Studies in YAs and adults with type 2 diabetes (>18 years of age) have documented widespread discrepancies in care for low-income African American and Hispanic individuals, citing a lack of cultural competency as the main reason for disengagement and poor outcomes (84–86). Moreover, there is mounting evidence of wide racial and ethnic disparity in insulin pump and CGM use among underserved groups (15,19,87,88), as a result of a lack of information access, shared decision-making, and attention to patient concerns.

### Interventions to Address Health Care Determinants

The patient-provider relationship accounts significantly for patient motivation to self-manage diabetes (57). Successful communication between patients and HCPs exists when there is agreement on and acknowledgment of perceptions, experiences, and sociocultural factors (57,58). Patients' perceptions of HCPs have been found to be strong predictors of health outcomes and may be different from what HCPs perceive (58). Lack of HCP empathy has been associated with poorer glycemic control, diabetes burnout, and a higher incidence of diabetes-related complications (59–61). In contrast, when HCPs display empathetic and tolerant attitudes, patients are more likely to be open and honest about their diabetes management adherence and feel more comfortable discussing competing priorities and struggles (59,60).

Underserved YAs who have difficulty understanding and interpreting HCP instructions may feel hesitant to admit that they need more help because they fear being judged or stereotyped by HCPs (59,62). This lack of confidence in the relationship and lack of shared decision-making is ubiquitous in underserved populations (57,80,89) and may be particularly poignant for YAs, who often need more support for therapeutic decisions during this stage of new independence.

A lack of trust between YAs and HCPs can be hard to improve. Establishing an open and nonjudgmental environment during visits is crucial (66). Encouraging HCPs to obtain training in cultural recognition, implicit bias, and communication skills may be helpful (66). Accountability should not just apply to oneself, but rather should extend to everyone in a health care environment. HCPs should also hold each other accountable and practice open communication regarding potential discrimination. Being able to respectfully call attention to a colleague's decision that might be influenced by some sort of bias is essential in diminishing the underlying roots of racism in the health care system. Shared decision-making has been shown in multiple arenas to overcome disparities in health care and especially implicit biases (57,81). Finally, clinics should adopt culturally sensitive materials and employ staff from communities that are similar to those of their underrepresented patients, when possible (66,67).

Recent reviews have suggested that clinicians from particular disciplines might be more or less prone to implicit bias than others based on their training and education (81). Pediatrics is an example of a specialty that addresses attitudes more openly, whereas adult HCPs may be more reticent to discuss this topic (81). Implicit bias training should thus look different among various specialties. Moreover, training must be conducted across a broad range of care settings (inpatient and outpatient) in the health care system (81).

### Conclusion

The prevalence of type 1 and type 2 diabetes is increasing among YAs, especially in underserved racial and ethnic minority groups (90). Throughout this article, we have outlined various socioeconomic, cultural, and psychosocial determinants that create complex barriers to care in underserved YAs with diabetes, along with possible interventions to mitigate harmful effects.

Returning to the case study presented at the beginning of this article, we wanted to provide follow-up to demonstrate the power of addressing social and psychological needs to improve medical outcomes. After initial evaluation, we offered T.S. a social needs consultation, psychology referral, and access to CGM, offering flexibility in clinical scheduling

to prevent penalizing T.S. when he could not make appointments. As a result, we were able to help T.S. secure stable housing and obtain regular prescriptions for insulin and cardiac medications from our hospital pharmacy and to offer emotional and diabetes-specific support through psychology appointments and peers in the same clinic. His A1c decreased by 0.8% in 7 months.

In conclusion, to begin to reduce health inequities in underserved YAs with diabetes, we must be aware of the challenges and daily choices YAs face and change our care approaches to address their dual unmet social and medical needs. Such approaches in the long term should reduce gaps in care, improve engagement in diabetes self-management, and hopefully curb complications in adulthood.

#### DUALITY OF INTEREST

S.A. is a health care disparities advisory board member for Medtronic. No other potential conflicts of interest relevant to this article were reported.

#### AUTHOR CONTRIBUTIONS

Both authors researched the literature, contributed to discussion, and wrote and edited the manuscript. S.A. is the guarantor of this work and, as such, had full access to all the data included, and takes responsibility for the integrity and accuracy of the review.

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