

Social Determinants of Health Screening in Type 1 Diabetes Management

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KEYWORDS

- Social determinants of health • Disparities • Health equity • Type 1 diabetes
- Screening

KEY POINTS

- Socioeconomic factors influence access and care: Social determinants of health, including socioeconomic status, education level, and income, significantly impact the management and outcomes of type 1 diabetes.

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Continued

- Health disparities and vulnerable populations: Disadvantaged populations, such as racial and ethnic minorities, may experience higher rates of type 1 diabetes and related complications due to unequal access to health care resources, cultural barriers, and systemic biases.
- Social determinants of health screening: Screening for social determinants of health is paramount to reduce disparities and improve overall health outcomes.

INTRODUCTION

Social determinants of health (SDOH), often referred to as social influences of health, are those nonmedical factors that impact health outcomes. Factors such as access to food, clothing, shelter, and transportation play a mitigating role in both acute and chronic disease management. Protective factors are highly influenced by where we are born, live, learn, work, eat, and play. As such, many health care disparities arise from SDOH; less social risk factors correlate to less disease burden and more protection against disease onset and exacerbation. It has been widely observed that health inequities, fueled by SDOH, are divided by race, class, and income; disproportionately affecting minority races, the working class and those with no to low income.¹

Diabetes is one of the most common chronic diseases, impacting millions of lives worldwide, and thus is most affected by health inequities.² Children are no strangers to health inequities, and this was made more evident by the COVID-19 pandemic. Although the greatest rise in diabetes among children is type 2 diabetes,³ type 1 diabetes (T1D) is more prevalent among pediatric patients.⁴ Despite minority races, working class and low-income families being least likely to have T1D, they are the most likely to experience negative social influences of health; especially with T1D prevalence rising within these populations.⁴ As such the American Diabetes Association, the nation's leading establishment for all people living with diabetes, published a scientific review relating to SDOH and diabetes.¹

Here, we aim to

1. provide a succinct review of history, context, and impact of SDOH and
2. share practice implementation guidelines to effectively screen for SDOH for those caring for patients with T1D, although practices can be spread to all populations with chronic disease.

DEFINITIONS

SDOH, health disparities, and health equity are closely related. Incongruities in disease burden based on environmental factors must be identified and targeted to deliver and receive diabetes treatments equitably. Once care is equitably distributed, disease outcomes improve. The World Health Organization has clearly defined the terminology used to focus on the social influences of health.⁵

Social Determinants of Health

SDOH are the nonmedical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live, and age and the wider set of forces and systems shaping the conditions of daily life. As defined by the World Health

Organization, these forces include racism, climate economic policies and systems, development agendas, social norms, and policies, as well as political systems.

Health Disparities

Health disparities are preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health, which are experienced by socially disadvantaged populations.

Health Equity

Health equity is the state in which everyone has a fair and just opportunity to attain their highest level of health.

HISTORICAL PERSPECTIVES

To understand how risk factors negatively affect health outcomes, one needs to be aware of the historical context in which these disparities arose. Decades of research demonstrate the legacy of slavery, and colonialism imparts its most negative effect on the Black race, although continued discrimination, prejudice, and bias plague all minoritized persons.⁶⁻⁹ As participants in the cultural constructs of the United States, one must understand how slavery, social injustice, and racism play a leading role in reinforcing SDOH.

Slavery

The legal institution of human bondage, primarily of Africans, prevailed in the United States for nearly four centuries starting in the 1700s as the 13 colonies, which would form the United States was established.¹⁰ Currently, the way in which social risk factors are tied to race, particularly the Black race, has been largely influenced by US enslavement, institutionalizing the racial caste system. Ancestors of African descent were matriculated into a social stratification system of servitude. Just as health behaviors inform health outcomes, past systemic structures (behaviors) foundational to modern day living (outcomes) inform much of our class system today. Higher rates of poverty, disease, employment instability, food insecurity, and housing destabilization are all indicators of poor health or negative SDOH and more greatly affect African Americans and marginalized communities. The economic gap created by slavery and perpetuated today cannot be understated and reinforces the segregation of the have and have nots—similar to those who are more likely to achieve diabetes glycemic targets versus those who are more likely to suffer diabetes complications.^{11,12}

Social Justice

The attrition of wealth, economic opportunity, and societal privilege is also tied to the historical context in which good health has been unequally distributed in the United States. Social justice includes the opportunity for everyone to achieve good health.¹³ Systems that reinforce health inequities are a manifestation of social injustice. These inequities are the result of government policies and practices that unfairly disadvantage some people but not others, often most negatively impacting disadvantaged communities and their youth. The mechanisms linking social injustice to wealth gap creation and socioeconomic status (SES) is well understood.

Racism

Prejudice and discrimination based on race (racism) further misalign attainment of good health.¹⁴ Across all genres of racism, including internalized, interpersonal, structural, and systemic, racism's significant effects on health outcomes, especially in diabetes

care, cannot be understated. In a large cross-sectional study across 52 institutions, non-Hispanic (NH) Black patients with T1D were more likely to present in diabetic ketoacidosis (DKA) compared with NH White patients with T1D. Black patients with T1D faced a significantly higher frequency of DKA during the pandemic, particularly during surges of COVID-19. However, a higher proportion of NH Black patients experienced DKA versus White patients *pre*-COVID-19 pandemic as well.¹⁵ Even before the pandemic crisis, evidence highlights that racial inequities in diabetes care were present, raising concern that factors based on race likely affect access to health care, trust in the health care system, and reduced recognition of disease, especially because T1D has higher prevalence in the majority population.¹⁶ Environmental determinants have long been proposed as a trigger for autoimmunity in T1D.¹⁷ The racist institution of redlining, a discriminatory practice in which suburban homeownership was withheld from people of color, places racial and ethnic minorities at greater exposure to urban areas and environmental hazards, such as polluted air and water, which can increase the risk of diabetes and other chronic diseases. Communities of color are more likely to be located near industrial sites, waste facilities, and areas with poor environmental quality, a probable theory on the rising incidence of T1D in Black children.¹⁸

Social Determinants of Health in Health Care

SDOH are key contributors to the unjust and avoidable differences in health outcomes between different population groups. These influences affect all components of health care and all SDOHs infer an impact on diabetes in one way or another. Studies have consistently proven that diabetes affects racial and ethnic minorities, low-income adults and their children, and the public and underinsured populations more negatively when compared with others.^{1,19,20} From socioeconomic position to food and environment, T1D outcomes are worse for those suffering from the social influences of health.²¹

Access

More than 78 million Americans do not have adequate health insurance, and millions more are at risk of losing coverage. The 24% of Americans who do not have adequate insurance include individuals who are entirely uninsured and those for whom out-of-pocket costs and deductibles are disproportionately high relative to their incomes. Those uninsured and underinsured are less likely to seek preventable health care and more likely to present in worse stages of disease.^{22,23} Youth with T1D living in high-poverty areas and on public insurance are significantly more likely to be admitted for DKA, and adults with T1D are more likely to ration insulin and avoid preventative health maintenance.²⁴ Preventative health care mitigates the severity of many diseases, especially diabetes. Accessibility of medical services deters most common T1D complications such as retinopathy, neuropathy, nephropathy, and especially cardiovascular disease, the number one cause of mortality in patients living with T1D.²⁵ Access is not only limited to preventative medicine but also relates to other social factors such as food environment (access to food = food security), access to safe neighborhoods, and access to education. In addition to reduced access to preventive care, limited access to diabetes technology for un-/underinsured further narrows the benefits of these devices to the privileged-widening disparity gaps in diabetes outcomes even more.²⁶

Education

Higher educational attainment of caregivers of youth with T1D correlates to better glycemic control.²⁷ In fact, no matter the type of diabetes, diabetes-related complications

demonstrate a linear relationship from highest to lowest education level. Compared with adults with college degrees, attaining less than a high school education infers a twofold risk of mortality from diabetes, and if you are a person living with T1D, not going to college is associated with a threefold risk of mortality.¹ A linear relationship between educational level and hemoglobin A1c (HgbA1c), the primary outcome of interest in diabetes management exists; lower educational level pairing with higher HbA1c. In fact, in a meta-analysis by Bijlsma-Rutte, the pooled mean difference in A1c was 0.26% (95% CI 0.09–0.43) between people with low and high educational levels.²⁸ Studies show that reducing the HbA1c level by 0.2% could lower the mortality by 10%.²⁹ Although HbA1c has its limitations, and in the landscape of T1D, time in range is becoming a more valuable marker of glycemic control, it remains clinically significant that HbA1c levels are an independent prognostic marker of both short- and long-term complications.²⁵ Educational status is directly linked to SES and economic mobility.² Patients living with diabetes who attain higher educational degrees are more likely to be healthier by the sheer fact that knowledge infers improved self-management, and highly educated T1D patients are more likely to be economically stable.

Economic Stability

Inequalities in health are almost always to the disadvantage of the poor. The poor tends to die earlier and to have higher levels of morbidity than those who have wealth.³⁰ Also, inequalities tend to be more pronounced for objective indicators of diabetes, such as HgbA1c, hypoglycemia, microvascular, and macrovascular complications. It has been consistently reported that SES is a stronger determinant of diabetes status and outcomes than race/ethnicity.^{21,31} After adjusting for age and gender, Black and Hispanic patients have statistically significantly increased odds of having diabetes, but when adjusted for SES, these odds are reduced in both races. Adjusting for age, gender, weight, blood pressure, physical activity, financial strain, insurance, and family history of diabetes, SES plays a more significant role in diabetes prevalence than race/ethnicity. SES is multifaceted in its ability to class an individual or group. It is not just measured by income but also by education and occupation.³² In the SEARCH Food Insecurity Study in South Carolina and Washington between the years 2013 and 2015, optimal glycemic control, as categorized by HbA1c, was associated with parental education, household income, health insurance status, food assistance, and household food insecurity status. Most of these patients belonged to a demographic designated to higher household income/parental education class. Suboptimal glycemic control was more likely to be experienced by those who received government-funded health insurance or food assistance and those who were food insecure.³³

Implicit Bias (Provider-Specific)

The wealth gap, disparities in access to care, and failures in the school system to equitably educate citizens are often deemed non-modifiable. However, provider bias is a modifiable factor known to impact health outcomes. Implicit bias is a form of bias occurring subconsciously and unintentionally, which affects judgments, decisions, and behaviors.³⁴ Provider bias explicitly targets health care providers' automatic assumptions about patients and their families. The inherent danger in provider bias is its implication on health outcomes.⁸ Prescriptions for diabetes technology are an exemplar of the inherent dangers of provider bias. Diabetes technology, including continuous glucose monitors (CGMs) and insulin pumps, is known to improve glucose time in range.³⁵ Provider implicit bias to recommend diabetes technology has been observed based on insurance and race/ethnicity in both pediatric and adult diabetes

provider cohorts. In fact, despite having the same disease, White patients with T1D are more likely to be offered insulin pumps and be started on CGMs than non-White patients.²⁶ The attitudes and perceptions of providers play a significant role in the promotion of technology utilization. In fact, providers who were “tech savvy” or had personality characteristics lending toward a more positive attitude about innovative technology, offered it more. These factors readily lead to provider-driven barriers in access to improved glycemic outcomes when provider personas are more cautious or “not yet ready” to tailor their care toward pump or CGM technology.³⁶

IMPACT OF SOCIAL DETERMINANTS OF HEALTH: COST BURDEN

Not only does diabetes disproportionately burden patients in low-poverty quintiles, leading to insulin rationing and delays in seeking medical care, diabetes is one of the costliest diagnoses, and in fact, diabetes is the most expensive chronic condition in the United States. A quarter of the nation’s wealth is spent on caring for people with diabetes: \$237 billion in direct medical costs and another \$90 billion on reduced productivity.³⁷ It becomes a national imperative to address the SDOH not just to do no harm but also to maintain economic stability. Significant correlations have been found between hospitalizations and deprivation indices. Patients living in deprived areas are more likely to use the emergency department and be admitted for diabetes complications, driving up health care costs. The movement toward value-based payment models is structured around health outcomes rather than processes.³⁸ Under these models, providers are compensated based on those health outcomes. Providers must assess SDOH to provide a framework to discuss behaviors and social factors that influence those health outcomes. SDOH often acts upstream of an individual’s health over time. By identifying social needs early, health care providers can intervene proactively, providing preventive care and appropriate support services. Addressing these determinants before they escalate can help prevent the development or exacerbation of chronic conditions and reduce health care costs in the long run.

SOCIAL DETERMINANTS OF HEALTH SCREENING: IMPLEMENTATION

As noted by the Institute for Healthcare Improvement, “the Model for Improvement, developed by Associates in Process Improvement, is a simple, yet powerful tool for accelerating improvement.” The Chronic Care Model identifies the essential elements of a health care system that encourage high-quality chronic disease care.³⁹ Pairing the two models is an effective methodology for implementing SDOH screening at health care institutions.⁴⁰

Social Determinants of Health Screening

Implementation of SDOH screening in diabetes clinics can be standardized and effective in identifying barriers to health care needs of patients with diabetes.⁴¹ Effectively implementing screening to identify and mediate these social factors depends on the specific needs of a clinic’s patient population, ability of the center to assess these needs, breadth of clinic, as well as community resources. This section describes strategies for effective SDOH screening and response in the clinic setting.

At a minimum, we recommend screening for food security, financial resources, caregiver mental health, housing, and transportation. Others to consider are caregiver health literacy, given how relevant health literacy is in diabetes care and education. The SDOH screener is intended to be administered universally to minimize potential for bias and should be completed by pediatric patients’ parent/caregiver or patients

18 years and older. In pediatric T1D settings, the first question should ask for the responder to indicate their relationship to the patient.

Social Determinants of Health Screening Implementation Strategy

Clinical centers diagnosing, treating, and managing patients with diabetes should choose an SDOH screening tool that is most readily available in their electronic health record and most amenable to clinical processes. If no screening tool is accessible, electronic versions can be adapted to paper or self-administration or via an in-person interview during routine check in. Several validated SDOH screening tools exist, which can be used on their own or customized for the organization.

Social Determinants of Health Interventions

No health care organization need reinvent interventions for positive screens. Determine resources available in the office, hospital, and within the community. Facilitate referral to community resources based on patient needs and, if available, optimize care management or care coordination between patient encounters. For smaller centers with little resources, reallocate existing workforces to (1) choose an SDOH screen, (2) implement said screen into existing workflows, (3) address as many screens as feasible for the practice, and (4) render available facility and community resources. Many state Medicaid programs provide an array of services to address SDOH. In fact, in January 2021, the Centers for Medicare & Medicaid Services, released guidelines for states to use detailing opportunities in Medicaid and Children's Health Insurance Plan to address SDOH.⁴² Private health insurers are also investing in social programs that better address root causes. It has been purported that private payors have spent close to \$2B on housing, food security, employment, education, social and community context, transportation, and general SDOH. Screener completion should be acknowledged, even if no needs were identified. Acknowledgment builds trust with patients and families.

Of note, it is clearly recognized to truly eliminate SDOH disparities in health care requires systemic change, policy initiatives, and governance¹⁷; however, such change is macroeconomic and beyond scope here.

Proposed scripting

Below is a recommended scripting for discussion of SDOH screener results.

If no social needs are identified through SDOH screener:

I really appreciate you filling out the screener that helps us understand more about your current circumstances. If anything changes, please know we are here to listen, help, and connect you and your family to resources and support.

**Important reminder: Many families have social needs and screen negatively. It is recommended to still ask about concerns and normalize social supports.

If social needs are identified through social determinants of health screener

I noticed you checked some of the items that tell us you may need some support and resources. Thank you for sharing this with me today and I would love to help in any way I can. I would like to ask you some more questions.

In addition to the scripting presented above, some best practices for discussion of social needs include.

- Use normalizing statements.
- Frame questions so caregivers can respond in the positive.
- Determine interventions which have already been implemented.

Clinicians can use framing statements and/or next best questions to facilitate social needs discussions. Examples include.

- Framing statement: Many of my patients are experiencing [insert need].
- Next best question: What supports are you using, or have you used in the past to help you with this?

Screening Frequency

There are no industry standards on screening frequency, and thus, the following recommendations are expert opinion ([Fig. 1](#)).

Standard minimum screening frequency recommendations include recognizing some primary care practice care for patients living with T1D.

- At all* well visits in primary settings (*not to be administered more frequently than every 55 days)
- Every 6 months regardless of visit type in primary care settings
- Every 6 months in ambulatory specialty settings
- On every admission to the hospital
- At the first ambulatory encounter after admission to the hospital

Introduction of Screener

It is important that patients and families feel safe, empowered, and supported through the screening process. Patients and families must know that they have a right not to complete the SDOH screener.

The following verbiage is recommended as part of the SDOH screener:

We care about our patients. We want to be sure that we support all parts of our patients' lives. This tool helps us address both medical and nonmedical needs of your family. If you would like help with any of these topics, we can talk about resources available. Please answer these questions. It is your choice if you answer them. Filling out this form is not needed to continue your visit.

This verbiage is also recommended for staff when introducing the SDOH screener to patients and families. A warm introduction of the screener is important for patients and families to feel safe, empowered, and supported.

Administration Methods

It is recommended that the SDOH screener is administered automatically via tablet technology.⁴¹ Tablet administration promotes reliability of screening, whereas balancing evidence-based recommendations that SDOH screeners should be administered and completed privately (vs verbal administration).

If administration via tablet is not feasible, administration of the SDOH screener via paper is a recommended alternative. The paper screener should be translated into different languages when possible. Results from the completed paper screener should be transcribed into the medical record, and the paper screener should be submitted to be scanned in the medical record or sent to facilities' comparable health information systems.

For instances in which the parent/caregiver or adult patient would prefer verbal administration, the screener can be verbally administered with results transcribed into the patient's medical record by a clinical staff member. This should be rare.

Recommended Administration Workflow

Below are recommended workflows for screener administration. These are high-level recommendations that can and should be adapted to an individual's organization ([Fig. 2](#)).

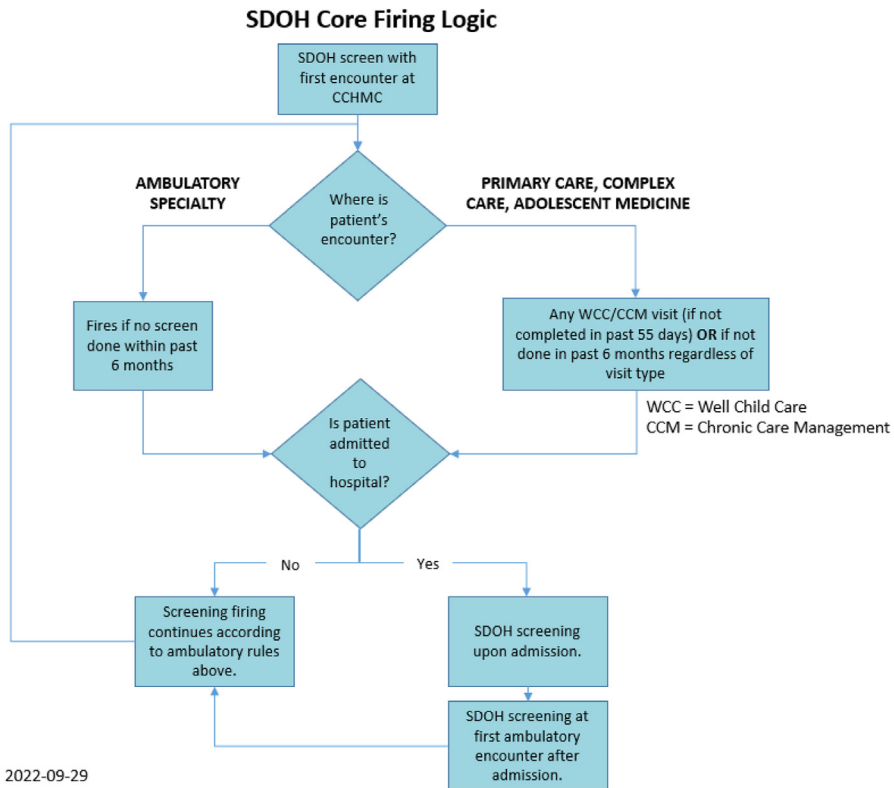


Fig. 1. Example of SDOH screening frequency at a large pediatric academic health system. CCM, chronic care management; WCC, well-child care.

READINESS TOOL KIT

The readiness tool kit is a high-level instrument used to support the development of processes at health care institutions seeking to address SDOH in patients with T1D. To help ensure that all staff members involved in the screening are prepared for

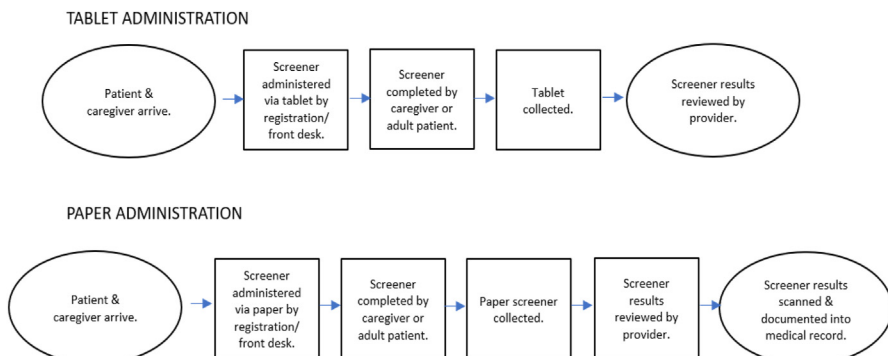


Fig. 2. Example of SDOH process map to deliver screening via electronic tablet or paper.

Planning		
<input type="checkbox"/>	Establish your improvement team.	Possible participants of your improvement team may include physician/provider, nursing/patient services, registration, social work, additional roles included in workflow, QI
<input type="checkbox"/>	Identify unit champions.	Identify unit champions to facilitate testing, implementation, and education.
<input type="checkbox"/>	Obtain tablets & associated equipment.	Ensure you have a sufficient amount of tablets & associated supplies for screening demand. Consider storage and maintenance logistics.
<input type="checkbox"/>	Evaluate screeners currently in use.	Evaluate which screeners are currently in use in your care area. Identify & remove areas of duplication.
<input type="checkbox"/>	Establish measures.	Build process measures (completion & positivity rates). Determine outcome measures that are relevant to your team/care area.
Screener Administration & Completion Workflow		
<input type="checkbox"/>	Identify intended population.	Determine the intended population of screeners in your care setting.
<input type="checkbox"/>	Review SDOH Core Screener firing frequency.	Review screener firing logic. Consider interactions/parameters for other screeners if there are multiple due in the same visit (i.e., max # screeners per visit, prioritization of screeners, etc.)
<input type="checkbox"/>	Establish process for administering screener.	Map out screener administration process. Identify who will administer the screener. When in the workflow is it best to administer screener?
<input type="checkbox"/>	Identify scripting for introduction of screener.	Establish scripting for how screener will be introduced to respondent.
<input type="checkbox"/>	Additional process considerations	Establish back-up processes for when tablet administration is not appropriate. i.e., English is not preferred language
Screener Response Workflow		
<input type="checkbox"/>	Establish process for review of screener.	Determine who will review the screener & who will discuss positive AND negative screener results with respondent.
<input type="checkbox"/>	Identify scripting for screener discussion w/ respondent.	Establish scripting for positive AND negative social risk screens.
<input type="checkbox"/>	Review & complete response tool with team.	Determine how your team will respond to positive screens. Identify on-site responses for judicious utilization of social work team.
<input type="checkbox"/>	Establish process for response.	Determine who will carry out response interventions. i.e., Who will facilitate referrals? Who will provide information and/or carry out onsite responses?
<input type="checkbox"/>	Ensure the team has all necessary resources for onsite responses.	Determine if additional materials or resources are needed for improved onsite response. i.e., up-to-date resource lists, transportation resources, etc.
<input type="checkbox"/>	Established standard documentation practices.	Determine how screener results, response discussion, interventions, and referrals will be documented in medical record. Who will document?
Training		
<input type="checkbox"/>	Identify audience for education.	Review roles affected by screening to ensure all are included in education.
<input type="checkbox"/>	Educate identified roles.	Ensure all necessary roles are educated on why SDOH screening is important and the processes for screening & response, prior to implementation of screening.
<input type="checkbox"/>	Utilize unit champions for just-in-time training.	Utilize unit champions as frontline experts on the process. Can be used to role model screener discussions & responses, answer questions, & promote successful implementation.
Testing & Learning		
<input type="checkbox"/>	Review data	Review data (process & outcome measures) at regular cadence to learn & make adjustments.
<input type="checkbox"/>	Observe screening & collect feedback from staff & patients/families.	Observe screening process & collect feedback to learn. What is going well? What needs improvement?
<input type="checkbox"/>	Run multiple PDSA cycles.	Make adaptations based on learnings through multiple PDSA cycles.

Fig. 3. Readiness tool kit checklist to be used by personnel to implement SDOH screening.

success, the following checklist (Fig. 3) helps teams review their current workflows and initiate thought processes helpful in determining screening, response, training, and testing procedures.

SUMMARY

Screening for SDOH in health care settings is crucial for several reasons, including identification of underlying health risks, instituting preventive care and early intervention, tailoring treatment plans to improve outcomes, and most importantly reducing

health disparities. Institutions who care for persons living with T1D cannot improve the lives of their patients without first identifying those health risks, which most impact health outcomes and behaviors. Not addressing the social influences of health likely correlates with an inability to reach glycemic targets. Standard practices to implement SDOH screening in any health care organization are now considered standard of care. All institutions should screen and intervene appropriately.

CLINICS CARE POINTS

Implementing SDOH screening in pediatric diabetes clinics is an important step to ensure comprehensive care for young patients. Here is a list of clinic care points to consider when implementing SDOH screening in such clinics:

- **Screening Tools Selection:** Choose validated SDOH screening tools suitable for pediatric patients.
- **Patient Privacy and Comfort:** Ensure a private and comfortable setting for screening to encourage open and honest responses from patients and caregivers.
- **Training Staff:** Train clinic staff on the importance of SDOH screening, how to administer the screening tools, and how to interpret the results.
- **Routine Screening:** Incorporate SDOH screening into the routine clinic visits for pediatric patients, such as during annual check-ups or follow-up appointments in specialty clinics such as diabetes clinics.
- **Culturally Competent Approach:** Be sensitive to the cultural and linguistic backgrounds of patients and their families. Offer screening materials in multiple languages and ensure staff are culturally competent.
- **Assessment of Basic Needs:** Screen for essential needs like food security, housing stability, and access to utilities. Address any immediate needs through referrals to community resources or social services.
- **Education and Resources:** Provide families with information about available community resources and support services, such as food banks, housing assistance, and transportation assistance.
- **Mental Health Screening:** Include questions related to emotional and mental well-being, as mental health can significantly impact diabetes management. Provide referrals to mental health services when needed.
- **Education on SDOH Impact:** Educate patients and families on how SDOH can affect diabetes management and overall health, emphasizing the importance of addressing these factors.
- **Care Coordination:** Establish clear protocols for sharing SDOH screening results with the diabetes care team. Encourage collaboration between healthcare providers and social workers or case managers.
- **Follow-Up and Tracking:** Schedule follow-up appointments to monitor changes in SDOH needs and provide ongoing support. Use electronic health records (EHRs) or tracking systems to document and monitor SDOH data.
- **Community Partnerships:** Collaborate with local community organizations, schools, and social service agencies to strengthen the network of support available to pediatric diabetes patients.
- **Quality Improvement:** Continuously assess and improve your SDOH screening processes based on feedback from patients, families, and clinic staff.
- **Advocacy:** Advocate for policies and programs that address SDOH on a broader scale, as this can have a positive impact on the well-being of your patients.

- Research and Evaluation: Consider conducting research or evaluations to measure the effectiveness of your SDOH screening program in improving diabetes management and overall health outcomes.

CONFLICT OF INTEREST

None.

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