



1. Improving Care and Promoting Health in Populations: Standards of Care in Diabetes—2025

American Diabetes Association
Professional Practice Committee*

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DIABETES AND POPULATION HEALTH

Recommendations

1.1 Ensure treatment decisions are timely, rely on evidence-based guidelines, capture key elements within the social determinants of health, and are made collaboratively with people with or at risk for diabetes and caregivers based on individual preferences, prognoses, comorbidities, and informed financial considerations. **B**

1.2 Align approaches to diabetes management with evidence-based care models. These models emphasize person-centered team care, integrated long-term treatment approaches to diabetes and comorbidities, and ongoing collaborative communication and goal setting between all team members and with people with diabetes. **A**

1.3 Care systems should facilitate in-person and virtual team-based care, include those knowledgeable and experienced in diabetes management as part of the team, and utilize patient registries, decision support tools, proactive care planning, and community involvement to meet needs of individuals with diabetes. **B**

1.4 Assess diabetes management, risk factors, and complications (**Table 4.1**) using reliable and relevant data metrics to improve processes of care and health outcomes, with attention to care costs, individual preferences and goals for care, and treatment burden. **B**

1.5 Health systems should adopt a culture of quality improvement, implement benchmarking programs, and engage interprofessional teams to support sustainable and scalable process changes to improve quality of care and health outcomes. **A**

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Population health is defined as “the health outcomes of a group of individuals, including the distribution of health outcomes within the group” (1). These outcomes can be measured in terms of health indicators (mortality, morbidity, and functional status), disease epidemiology (incidence and prevalence), and behavioral and metabolic factors (physical activity, nutrition, A1C, time in range, etc.) (1). Clinical practice recommendations are tools for health care professionals who seek to improve health across populations; however, for optimal outcomes, diabetes care must also be individualized for each person with diabetes and for each person’s context, as well as across the life span. Thus, efforts to improve population health will require a combination of policy-level, system-level, and person-level approaches. With such an integrated approach in mind, the American Diabetes Association (ADA) highlights the importance of person-centered care, defined as care that considers an individual’s comorbidities and prognoses; is respectful of and responsive to individual preferences, needs, and values; and ensures that the individual’s values guide all clinical decisions (2). Social determinants of health (SDOH)—factors often beyond an individual’s direct control and potentially representing lifelong risks—play a significant role in both clinical and psychosocial outcomes. To improve health, support overall well-being, and eliminate disparities, it is crucial to address these determinants, particularly for individuals from racial and ethnic minority communities, underserved geographic areas (rural or urban), and those facing socioeconomic barriers to care and health (3). This section discusses the current state of diabetes and diabetes care in the U.S. and provides guidance for health care professionals as well as health systems, community partners, payors, and policymakers on improving the delivery of diabetes care to improve the health of all people at risk for or living with diabetes.

To provide actionable guidance for improving the care for and health outcomes of people with and at risk for diabetes, this section examines care delivery and payment models demonstrated to support high-quality, evidence-based care; offers guidance on practical strategies for system-level improvement; and discusses opportunities to expand access to health care and diabetes self-management

education and support (DSMES) through telehealth, mobile platforms, interprofessional team care, and engagement of community-based care partners and resources. As SDOH have a central role in diabetes burden, management, and outcomes, the subsection TAILORING TREATMENT FOR SOCIAL CONTEXT discusses the importance of screening individuals for SDOH, advises on strategies to identify disparities in diabetes management and outcomes experienced by at-risk populations, and offers actionable guidance for addressing SDOH and health disparities at the individual and population levels.

State of Diabetes Care

The proportion of people with diabetes who achieve recommended A1C, blood pressure, and LDL cholesterol levels has fluctuated over the years, with some improvement over time (4,5). In 2015–2018 (the most recent time period with population-level data available), just 50.5% of U.S. community-dwelling adults with diabetes achieved A1C <7% and 75.4% achieved A1C <8% (5). The goal blood pressure of <130/80 mmHg was achieved by just 47.7% of adults with diabetes, while 70.4% achieved blood pressure <140/90 mmHg (5). Lipid goals, defined in these studies as non-HDL cholesterol <130 mg/dL, was achieved by 55.7% of adults with diabetes, and all three risk factors were treated to goal in just 22.2% (5). Importantly, many people who did not attain A1C, blood pressure, and lipid goals were not receiving any or adequate pharmacotherapy for glycemic, hypertension, and dyslipidemia management, respectively, which underscores the urgent need for care delivery systems and structural facilitators (i.e., health and public health policies and payment models) that enable timely and equitable delivery of evidence-based care and address diabetes prevention and treatment in communities (5). Many segments of the population, such as children, young adults, and individuals with complex health needs, financial or other social hardships, and/or limited English proficiency, as well as individuals in groups that have been historically marginalized, face particular challenges to diabetes management (6–8). A U.S. population-based study based on National Health and Nutrition Examination Survey (NHANES) data showed that younger people with diabetes, Mexican American people, non-Hispanic

Black people, those with a lower level of educational attainment, and those who are underinsured are most likely to be undertreated, particularly for glycemic management (5).

Gaps and disparities in diabetes management and outcomes are also prevalent among youth with diabetes in the U.S. Data from SEARCH for Diabetes in Youth (SEARCH), a population-based registry network of five centers across five U.S. states, showed that in 2014–2019, mean A1C was 9.1% (SD 2.0) among youth and young adults with type 1 diabetes and 8.9% (SD 2.9) in youth and young adults with type 2 diabetes; these values increased from 8.5% (SD 1.5) and 8.4% (SD 2.8), respectively, in 2002–2007 (9). In youth and young adults with type 1 diabetes, identifying as a non-Hispanic Black person or a Native American person (compared with identifying as a non-Hispanic White person), being younger, not being treated with insulin pump therapy, and having low annual household income were associated with a higher A1C level (9). Data from the T1D Exchange Quality Improvement Collaborative (T1DX-QI), a learning health network of pediatric and adult centers across the U.S., revealed that between 2016 and 2018, mean A1C was 8.1% (65 mmol/mol) among children with type 1 diabetes 5 years of age and 9.3% (78 mmol/mol) among children 15–18 years of age. Only 17% of youth under 18 years of age with type 1 diabetes achieved the recommended A1C goal of <7.5% (<58 mmol/mol), and A1C levels for non-Hispanic Black youth were higher than those for non-Hispanic or Hispanic White youth—a disparity that persisted after adjustment for socioeconomic status (10).

Diabetes and its associated health complications pose a significant financial hardship to individuals and society. It is estimated that the annual cost of diagnosed diabetes in the U.S. in 2022 was \$413 billion, including \$307 billion in direct health care costs and \$106 billion in reduced productivity (11). After adjusting for inflation, the economic costs of diabetes increased by 7% between 2017 and 2022 and by 35% between 2012 and 2022 (11). This is attributed to both the increased prevalence of diabetes and the higher cost per person with diabetes. People living with diabetes also face financial hardship, which is correlated

with higher A1C, diabetes distress, and depressive symptoms (12).

The growing gaps in diabetes care quality and outcomes, the high and rising costs of diabetes care across the U.S., and the disparities experienced by individuals from racial and ethnic minoritized backgrounds and those facing socioeconomic barriers to care call for urgent, substantial, and multisectoral system-level improvements to care delivery (13).

Evidence-Based Care Models to Improve Population Health

A major barrier to optimal and comprehensive diabetes care is a delivery system that is often fragmented, lacks clinical information capabilities, is not appropriately incentivized and funded, does not adequately engage people with diabetes and the communities where they live, and is poorly designed for the coordinated and longitudinal delivery of chronic care (14). Several models have been demonstrated to improve aspects of diabetes care delivery and health outcomes.

The Chronic Care Model (CCM) is a commonly used framework for describing diabetes care programs (15). It includes six core elements to optimize the care of people with chronic disease:

1. Delivery system design (moving from a reactive to a proactive care delivery system where planned visits are coordinated through a team-based approach)
2. Self-management support
3. Decision support, particularly at the point of care during a clinical encounter (basing care on evidence-based, effective care guidelines)
4. Clinical information systems (using registries that can provide person-specific and population-based support to the care team)
5. Community resources and policies (identifying or developing resources to support healthy lifestyles)
6. Health systems (to create a quality-oriented culture)

Randomized controlled trials of CCM interventions have shown that while interventions vary, programs that include core components of the CCM decrease A1C (mean difference -0.21% [95% CI -0.30 to -0.13], $P <0.001$ compared with usual care), with greater improvements seen among adults with higher baseline A1C and with interventions that

include four or more CCM elements (16). CCM-aligned programs also improved blood pressure levels and processes of diabetes care (e.g., screening for complications of diabetes), though there was no impact on cholesterol levels, tobacco use, or weight (17). Multiple studies have examined individual components of the CCM with respect to diabetes management and have found inconsistent levels of benefit with case management, team-based care, use of electronic patient registries, clinician education, clinician and patient reminders, and patient education and promotion of individual self-management (18). The inconsistencies in findings may be driven by heterogeneity of interventions, settings, and evaluation strategies.

Collaborative, interprofessional teams, which can bring together multiple disciplines within the health care system, payors, and community partners, are best suited to provide care for people with chronic conditions such as diabetes and to facilitate individuals' self-management (**Table 1.1**) (19–25). The care team, which centers around the person with diabetes, should avoid therapeutic inertia and prioritize timely and appropriate intensification of behavior change (nutrition and physical activity), pharmacologic therapy, and/or social and financial support systems for individuals who have not achieved recommended metabolic goals or are experiencing high burden of treatment.

Initiatives such as the Patient-Centered Medical Home (PCMH) model can improve health outcomes by fostering comprehensive primary care and offering new opportunities for team-based chronic disease management (26–28). Accountable Care Organizations (ACOs), a primary care-centered delivery and payment model, can support the implementation of the CCM and ultimately improve diabetes-related metrics in participating organizations (29). The Accountable Health Communities Model was introduced to support identifying and addressing health-related social needs to improve disease management and health outcomes (30); early evidence showed reduction in emergency department use among Medicare and Medicaid beneficiaries, but diabetes-specific metrics were not examined, and program effectiveness has been limited by scarcity of resources to meet identified health-related social needs (31). Alternative Payment Models (APMs) have had mixed effects on diabetes care delivery and

outcomes, with higher-risk APMs (i.e., models with greater financial risk assumed by the provider, such as capitated payment models) generally associated with greater improvements in diabetes care processes than lower-risk APMs (32). Value-based payment models are hypothesized to better support the implementation and sustainability of innovative care delivery models seeking to improve population health (26,33), though evidence for currently available value-based insurance designs is limited (32).

Telehealth

Telehealth uses digital tools like video conferencing, mobile apps, and remote monitoring to deliver a range of health services remotely, including clinical care, education, and administrative support. Telemedicine, a subset of telehealth, focuses specifically on remote clinical care, such as diagnosis, treatment, and consultations through real-time communication. Increased access to and effective use of telehealth services, alongside in-person care, can enhance timely access to diabetes care and DSMES services for individuals with diabetes (34–38).

Telehealth should be used to complement but not replace in-person visits for optimal glycemic management (39,40). Increasingly, evidence suggests that various telehealth modalities may facilitate reducing A1C in people with type 2 diabetes compared with usual care or in addition to usual care (41), and findings suggest that telemedicine is a safe method of delivering care for people with type 1 diabetes in rural areas (42). For rural populations or those with limited physical access to health care, telehealth has a growing body of evidence for its effectiveness, particularly with regard to glycemic management as measured by A1C (43–46). In addition, evidence supports the effectiveness of telehealth in hypertension and dyslipidemia interventions (47). Interactive strategies that facilitate communication between health care professionals and people with diabetes, including the use of web-based portals or text messaging and those that incorporate medication adjustment, appear to be effective in improving outcomes (44,48). Telehealth and other virtual environments can be used to offer diabetes self-management education and clinical support and remove geographic and transportation barriers for individuals living in underresourced

Table 1.1—Considerations for engaging interprofessional members of a comprehensive, person-centered diabetes care team to identify and meet the needs of people with diabetes across the life span

Subpopulation of a person with diabetes	Team members to engage in care	Unique care considerations
All adults with diabetes	Primary care clinician, CDCES, RDN, and other specialists as available and appropriate to treat comorbidities (Table 4.1)	Assess for and address social determinants of health.
Adults treated with intensive insulin therapy, including multiple daily injections of insulin and insulin pump therapy	Clinicians and other health care team members experienced in advanced diabetes management, including technology use	
All youth with diabetes	Primary care clinician, pediatric endocrinologist, CDCES, RDN, other specialists as available and appropriate to treat comorbidities (Table 14.1), daycare or school nurse or other professional, behavioral health professional (as needed), and parent(s) or caregiver(s)	Assess for and address social determinants of health and barriers to safety, well-being, and academic performance in school. Engage professionals within the school and extracurricular/after-school activities to ensure safe diabetes management. An individualized diabetes medical management plan should be developed in collaboration with school professionals and parent(s) or caregiver(s). Support gradual developmentally appropriate transfer of self-management from caregivers to the youth with diabetes.
Individuals with diabetes and diabetes-related complications or comorbidities	Specialist referrals as appropriate and available (e.g., behavioral health professional, cardiologist, eye specialist, gastroenterologist or hepatologist, neurologist, nephrologist, obesity medicine specialist, or podiatrist), care coordinator/navigator or case manager, and clinical pharmacist (for those with polypharmacy or complex medication plans)	Screen for functional, cognitive, financial, and logistical barriers to self-management and evidence that self-care demands exceed capacity and available resources and support systems.
Individuals with social and/or structural barriers to care	Care coordinator/navigator, social services professional, insurance specialist/navigator, peer-to-peer support (as available), community health worker and/or community paramedic (as available), public health professional, and interpreter (as applicable)	Consider each person's psychosocial needs, available resources, and support systems.
Older adults	Geriatric medicine specialist, social services professional, case manager, community services provider, and physical and/or occupational therapist as available and appropriate based on functional status and independence	Consider the older adult's nutritional status, including ability to afford (financial barriers), acquire (accessibility), prepare (cooking), and consume (oral health) nutritious food. Assess for and address needs related to vision, hearing, dexterity, cognition, mobility, and other challenges.
Individuals in long-term care settings	Long-term care facility clinicians, nurses, other health care professionals, physical and occupational therapists, and RDN	Engage professionals within the long-term care facility to ensure safe and appropriate diabetes management.
Pregnant individuals with diabetes	Maternal-fetal medicine specialist or obstetrician experienced in the care of pregnant individuals with diabetes (particularly for individuals with type 1 diabetes or requiring intensive insulin therapy), CDCES, RDN, eye specialist (particularly for individuals with preexisting type 1 or type 2 diabetes), other specialists as appropriate, and lactation consultant as appropriate	Ensure appropriate postpartum follow-up and care, including transition from obstetric care to established primary care.
Individuals with behavioral health conditions	Behavioral health professional, care coordinator/navigator, and social services professional as age and situation appropriate	Use age- and situation-appropriate screening protocols for general and diabetes-related psychosocial concerns.

CDCES, certified diabetes care and education specialist; RDN, registered dietitian nutritionist.

areas or with disabilities (49). Telehealth resources can also have a role in improving diabetes management in children and adolescents with type 1 diabetes (50) and addressing SDOH in young adults with diabetes (51). Optimally leveraging telehealth to improve diabetes management requires anticipating and addressing barriers posed by cost, capacity, and resources (including broadband internet access) of people with diabetes and the existing clinical infrastructure into which telehealth approaches are being integrated (52).

Strategies for System-Level Improvement

Optimal diabetes management requires a systematic approach and coordinated team of health care professionals working in an environment where person-centered, high-quality care is a priority (8,17,53,54). While many diabetes care processes and access to technologies have improved nationally in the past decade, the overall quality of care for people with diabetes remains suboptimal (5). Efforts to increase the quality of diabetes care include providing care that is concordant with evidence-based guidelines (54), expanding the role of teams to implement more intensive disease management strategies (19), tracking medication-taking behavior (55), redesigning care processes (56), implementing electronic health record (EHR) population health tools (57), empowering and educating people with diabetes (58), reducing financial barriers (59), leveraging telehealth to improve access to care (43), assessing and addressing psychosocial issues (60,61), and engaging community resources and public policies that support healthy lifestyles (62). The National Diabetes Education Program maintains an online resource (cdc.gov/diabetes/php/toolkits/index.html) to help health care professionals design and implement more effective health care delivery systems for people with diabetes. Given the pluralistic needs of people with diabetes and that the challenges they experience (complex insulin treatment plans, new technologies, changes in capacity for self-management, etc.) vary over the course of disease management and life span, engagement of an interprofessional team with complementary expertise is essential (20).

Behaviors and Well-being

Successful diabetes care also requires a systematic approach to supporting the

behavior-change efforts of people with diabetes. High-quality DSMES has been shown to improve a person's self-management, satisfaction, and glycemic outcomes (see Section 5, "Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes," for a detailed review of the evidence supporting DSMES). National DSMES standards call for an integrated approach that includes clinical content and skills, behavioral strategies (goal setting, problem-solving, etc.), and engagement with psychosocial concerns (61). Increasingly, such support is available through online or mobile platforms that can support user access and effectiveness. These curricula should be tailored to the needs of their intended populations, including addressing the "digital divide," i.e., access to the technology required for implementation (46,63).

Cost Considerations for Medication-Taking Behaviors

The cost of diabetes medications and devices is an ongoing barrier to achieving glycemic goals. Based on a national survey conducted in 2021, 18.6% of U.S. adults with type 1 diabetes and 15.8% of adults with insulin-treated type 2 diabetes reported rationing (i.e., skipping, taking less, and/or delaying) their insulin to save money (64). Insulin underuse due to cost has been termed "cost-related medication nonadherence" (here referred to as cost-related barriers to medication use). The ADA Insulin Access and Affordability Working Group has recommended system-level approaches to address this issue, including concepts such as cost-sharing for insured people with diabetes based on the lowest price available, a list price for insulins that closely reflects the net price, and health plans that ensure people with diabetes can access insulin without undue administrative burden or excessive cost (65). In 2021, the Centers for Medicare & Medicaid Services (CMS) launched the Part D Senior Savings Model (66), which requires participating plans to cover insulins with a \$35 maximum monthly out-of-pocket payment. In 2022, 43% of stand-alone Part D plan enrollees and 60% of Medicare Advantage Part D plan enrollees participated in the Senior Savings Model (67). Most recently, the Inflation Reduction Act of 2022 capped out-of-pocket payments for insulin at \$35 per insulin per month for all Medicare beneficiaries. A patchwork of solutions

has also been introduced for individuals with commercial insurance and those without health insurance. Over the past 5 years, 25 states and the District of Columbia have capped out-of-pocket expenditures for insulin in select state-regulated commercial health plans (68). Between 2023 and 2024, three major insulin manufacturers similarly lowered the price of insulin to \$35 per month in select circumstances (69). These programs may help reduce the financial hardship of diabetes management, though many are challenging to navigate, not all people with diabetes can benefit, and costs for insulin delivery and glucose monitoring remain high. Thus, all people with diabetes should be screened for financial hardship of treatment, cost-related barriers to medication use, and rationing of other essential services due to medical costs (70).

The cost of medications (not only insulin) influences prescribing patterns and medication use because of the financial strain on the person with diabetes and the lack of secondary payor support (public and private insurance) for effective approved glucose-lowering, cardiovascular and kidney disease risk-reducing, and weight management therapies. There is robust evidence of disparities in the use of evidence-based therapies among individuals from racial and ethnic minoritized backgrounds, those with lower income levels, those living in rural areas, and those with limited insurance coverage (4,71–80). Financial barriers remain a major source of health disparities, and costs should be a focus of treatment goals and clinical decisions (81). (See TAILORING TREATMENT FOR SOCIAL CONTEXT.) Reduction in cost-related barriers to medication use is associated with better health outcomes and quality of life (82).

Access to Care

The Affordable Care Act and Medicaid expansion have increased access to care for many individuals with diabetes, emphasizing the protection of people with preexisting conditions, health promotion, and disease prevention (83). In fact, health insurance coverage increased from 84.7% in 2009 to 90.1% in 2016 for adults with diabetes aged 18–64 years. As of early 2022, more than 35 million people in the U.S. were enrolled in some form of Affordable Care Act-related health insurance (84). Coverage for those aged ≥65 years remained nearly universal (85). People with diabetes who have either

private or public insurance coverage are more likely to meet quality indicators for diabetes care (86). However, even individuals with insurance coverage can experience financial barriers to care, particularly if enrolled in high-deductible health plans. In 2021, 28% of individuals with employer-sponsored health plans were enrolled in high-deductible health plans (87). Such plans are increasing in popularity; by 2023, 51% of private industry employees had the option to enroll in a high-deductible health plan, although only 36% had access to health savings accounts, which can offset some of the out-of-pocket costs incurred with high-deductible plans (88). Switching to a high-deductible health plan has been shown to increase financial hardship among people with diabetes (89), decrease and delay screening for retinopathy (90), decrease blood pressure and A1C monitoring (90), and increase the risks of experiencing both acute (severe hypoglycemia, hyperglycemic crises) (91) and chronic (myocardial infarction, stroke, hospitalization for heart failure, kidney failure, lower-extremity complications, proliferative retinopathy, and blindness) (92) diabetes complications. Insurance coverage and formulary design influence treatment decisions; it is essential that payors cover evidence-based diabetes care with minimal cost sharing by the person with diabetes. Health care teams should also discuss insurance coverage and financial barriers to care with all individuals with diabetes and pursue therapeutic strategies that minimize financial hardship.

Access to primary and specialty care is also essential for people with diabetes. While most adults with diabetes have access to a primary care clinician (a 2016 nationally representative population-based study found that 88% of adults with diabetes saw a primary care clinician in the prior year) (93), fewer have access to specialty endocrinology/diabetes care (94). A study of Medicare beneficiaries found that just 33% of older adults with type 1 diabetes, 14% of adults with type 2 diabetes and history of severe hypoglycemia, and 9% of other adults with type 2 diabetes saw an endocrinologist in 2019 (94). Racial and ethnic minoritized individuals, those with low income, those living in rural areas, and those residing in a long-term care facility were less likely to receive endocrinology care. Improving health outcomes for people with diabetes

will therefore require improving availability of and access to primary and specialty services necessary to meet the full range of their health care needs (**Table 1.1**).

Quality Improvement

A recent Cochrane systematic review concluded that quality improvement (QI) can significantly improve outcomes for people with diabetes (18). As mandated by the Affordable Care Act, the Agency for Healthcare Research and Quality developed a National Quality Strategy based on three aims: improving the health of populations, improving overall quality and the personal experience of care, and reducing per capita cost (95). QI methods have been documented to improve diabetes device uptake, increase screening for psychosocial care, and reduce inequities in access to diabetes technologies (96–99). Information and guidance specific to quality improvement and practice transformation for diabetes care are available from the National Institute of Diabetes and Digestive and Kidney Diseases guidance on diabetes care and quality (100).

A successful QI team should include a clinical champion, administrative leader, QI/data specialist, and an individual living with or impacted by diabetes. Using patient registries and EHRs, health systems can evaluate the quality of diabetes care being delivered, benchmark metrics, and perform intervention cycles as part of QI strategies (13,57,101). QI can also be used as an effective strategy to support application of clinical practice recommendations by health care professionals.

In addition to QI approaches, other strategies that simultaneously improve the quality of care and potentially reduce costs are gaining momentum and include reimbursement structures that, in contrast to visit-based billing, reward the provision of appropriate and high-quality care to achieve metabolic goals (102); value-based payments; and incentives that accommodate personalized care goals (8,103). See **EVIDENCE-BASED CARE MODELS TO IMPROVE POPULATION HEALTH**, above, for more information.

TAILORING TREATMENT FOR SOCIAL CONTEXT

Recommendations

1.6 Health systems should assess and address disparities in diabetes care

and health outcomes (e.g., by stratifying clinical quality data by factors such as insurance status, race, ethnicity, preferred language for health care discussions, disability, and other social determinants of health). **C** (104)

1.7 During clinical encounters, assess for social determinants of health, including food insecurity, **A** housing insecurity, financial barriers, health insurance and health care access, environmental and neighborhood factors, and social capital/social community support, **B** to inform treatment decisions, with referral to appropriate local community resources.

1.8 Provide people with diabetes additional self-management support from lay health coaches, navigators, or community health workers when available. **A**

1.9 Consider the involvement of community health workers to support management of diabetes and cardiovascular risk factors, especially in underserved communities and health care systems. **B**

Health inequities related to diabetes and its complications are well documented, are heavily influenced by SDOH, and have been associated with greater risk for developing diabetes, higher disease prevalence, and worse diabetes-related outcomes (104–106). SDOH are defined as the economic, environmental, political, and social conditions in which people live and are responsible for a major part of health inequality worldwide (107). Greater exposure to adverse SDOH over the life course results in poor health (108). Interventions to address SDOH can improve diabetes-related outcomes (104,109). Using clinical quality data to identify inequities and opportunities for improvement is valuable for health care professionals, health systems, payors, policymakers, and people with diabetes (110). The Joint Commission requires that all accredited organizations in its ambulatory health care, behavioral health care and human services, critical access hospital, and hospital accreditation programs collect race and ethnicity information and implement specific steps to reduce health care disparities. The Joint Commission specifically requires that organizations designate an individual or individuals) to lead efforts to reduce health care disparities, assess

health-related social needs and provide information on community resources to meet these needs, identify health care disparities by stratifying quality and safety data using sociodemographic characteristics, develop an action plan to address health care disparities, work to actively reduce health care disparities, and inform key stakeholders about progress to reduce health care disparities (111). The CMS Framework for Health Equity similarly prioritizes collection, reporting, and analysis of standardized individual-level demographic (including race, ethnicity, language, gender identity, sex, sexual orientation, and disability status) and SDOH data as well as assessing for and addressing disparities through improved access to culturally tailored services, team-based care, and community resources (112). Quality measures assessing SDOH screening and intervention have been introduced by the National Committee for Quality Assurance (focused on food, housing, and transportation insecurity) (113) and CMS (focused on food, housing, and transportation insecurity, utility difficulties, and interpersonal safety) (114).

Outside of SDOH, there are several contributors to inequities, including bias, institutional practices, and systemic factors (115–117). The ADA recognizes the association between interpersonal, social, and environmental factors and the prevention and treatment of diabetes and has issued a call for research that seeks to better understand how social determinants influence behaviors and how the relationships between these variables might be modified for enhancing the prevention and management of diabetes (104). While a comprehensive strategy to reduce diabetes-related health disparities in populations is yet to be formally studied, general recommendations from other chronic disease management and prevention models can be drawn upon to inform system-level strategies in diabetes (118). For example, the National Academy of Medicine has published a framework for educating health care professionals on the importance of SDOH (119). Furthermore, there are resources available for the inclusion of standardized sociodemographic variables in EHRs to facilitate the measurement of health disparities and the impact of interventions designed to reduce those disparities (95,119,120).

SDOH are not consistently recognized and often go undiscussed—and are

ultimately not addressed—during the clinical encounter (106). Among people with chronic illnesses, two-thirds of those who reported not taking medications as prescribed due to cost-related barriers never shared this information with their physician (121). A study using data from the National Health Interview Survey (NHIS) (106) found that half of adults with diabetes reported financial stress and about 20% reported food insecurity. Studies of both type 1 diabetes and type 2 diabetes have noted an association of one or more adverse SDOH with health care utilization and poor diabetes outcomes among individuals with diabetes (121,122). It is therefore important for people with diabetes to be screened for SDOH during clinical encounters and be referred to appropriate clinical and community resources to address these needs (**Table 1.1**). Furthermore, health systems may benefit from compiling an inventory of such resources to facilitate referrals at the point of care. Policies and payment models that support addressing SDOH, both within and outside the health care setting, are needed to ensure that these efforts are both feasible and sustainable. One example of a statewide payment model that incentivizes value-based care, addressing SDOH and funding community-based health care professionals, is the Maryland Total Cost of Care Model, although it is currently limited by a narrow focus on preventing diabetes and does not consider diabetes care quality or health outcomes in people with diabetes (110,123).

Another population in which such issues must be considered is older adults, for whom social difficulties may further impair quality of life and increase the risk of functional dependency (124) (see Section 13, “Older Adults,” for a detailed discussion of social considerations in older adults).

Creating system-level mechanisms to screen for SDOH may help overcome structural barriers and communication gaps between people with diabetes and health care professionals (106,125). A number of studies have proven the effectiveness of identifying SDOH by using validated screening tools (126). In addition, brief, validated screening tools for some SDOH exist and could facilitate discussion around factors that significantly impact treatment during the clinical encounter.

Food Insecurity

Food insecurity is a household-level economic and social condition of limited or uncertain access to adequate food (127). In 2022, almost 13% of Americans were food insecure (127), and food insecurity is associated with increased risk of type 2 diabetes and higher-than-recommended glycemia (128,129). The rate is disproportionately higher among some groups that have been historically marginalized, low-income households, and households headed by single mothers. Additionally, those facing food insecurity have lower engagement in self-care behaviors and medication use, have higher rates of depression and diabetes distress, and have worse glycemic management compared with individuals who are food secure (128,129). Older adults with food insecurity are more likely to have emergency department visits and hospitalizations compared with older adults who do not report food insecurity (130). Risk for food insecurity can be assessed with a validated two-item screening tool (131) that includes the following statements: 1) “Within the past 12 months, we worried whether our food would run out before we got money to buy more” and 2) “Within the past 12 months the food we bought just didn’t last, and we didn’t have money to get more.” Interventions such as food prescription programs are considered promising to address food insecurity by integrating community resources into primary care settings and directly dealing with food deserts in underserved communities (132).

In those with diabetes and food insecurity, the priority is mitigating the increased risk for severe hyperglycemia and hypoglycemia (133,134). The reasons for the increased risk of hyperglycemia can include the consumption of inexpensive carbohydrate-rich processed foods, binge eating, financial constraints to filling diabetes medication prescriptions, anxiety and depression, and poor sleep, all contributing to hyperglycemia and poor diabetes self-care behaviors. Hypoglycemia can occur due to inadequate or inconsistent carbohydrate consumption following the administration of sulfonylurea or insulin. Health care professionals should consider these factors when making treatment decisions for people with food insecurity and seek local resources to help people with diabetes and their

family members obtain nutritious food more regularly (135).

Housing Insecurity

Housing insecurity has been shown to be directly associated with a person's ability to maintain their diabetes self-management (136). Housing insecurity often accompanies other barriers that challenge diabetes self-management. Food insecurity, lack of insurance, cognitive impairment, behavioral health concerns, and low literacy and numeracy skills are also factors (135). The prevalence of diabetes among people experiencing housing insecurity is estimated to be around 8% (137). Additionally, people with diabetes and housing insecurity need secure places to keep their diabetes medications and supplies as well as refrigerator access to safely store insulin. The risk for housing insecurity can be ascertained using a brief risk assessment tool developed and validated for use among veterans (138). Given the potential challenges, health care professionals who care for housing-insecure individuals should be familiar with resources to support these individuals or have access to social workers who can facilitate stable housing as a way to improve diabetes care (139).

Refugee, Migrant, and Seasonal Agricultural Workers

Refugee status, like having a diabetes diagnosis, is an independent risk factor for cardiovascular disease (140). In areas undergoing humanitarian crises, refugees are at greater risk for obstacles to achieving optimal chronic disease management, but unfortunately there are few quality investigations into the particular situations of refugees with diabetes. There have been efforts to develop models of care specifically aimed at improving the health of refugee populations, but more work is needed to demonstrate effectiveness of those care models and approaches (141).

Migrant and seasonal agricultural workers likely have a higher risk of type 2 diabetes than the general population. While migrant farmworker-specific data are lacking, most agricultural workers in the U.S. are Latino, a population with a high rate of type 2 diabetes. In addition, living in severe poverty brings with it food insecurity, high chronic stress, and an increased risk of diabetes; there is also an association between the exposure to

certain pesticides and the incidence of diabetes (142).

Data from the Department of Labor indicate that there are approximately 2.18 million agricultural workers in the U.S. (143). These agricultural workers often travel throughout the country seasonally (144), although less so than in past decades. According to 2022 health center data, 175 health centers across the U.S. reported providing care to 843,071 adult migrant farmworkers, and 91,839 had encounters for diabetes (142). In a 2023 report on the National Agricultural Workers Survey, age-adjusted self-reported diabetes prevalence was 13.51% (95% CI 10.0–17.1) among migrant farmworkers and 10.8% (95% CI 9.0–12.6) among nonmigrant farmworkers (142).

Migrant farmworkers and other agricultural workers encounter numerous and overlapping barriers to receiving care. Migration, which might occur as frequently as every few weeks for some, disrupts care. Common barriers to adequate diabetes care include those related to cost, culture, language, literacy, transportation, geographic distance, food access, long work hours, unfamiliarity with new communities, the complexity of the U.S. health care system, and limited access to various other resources like medications and DSMES (144). Without regular care, farmworkers with diabetes can experience severe and often expensive complications that incur morbidity and mortality and affect quality of life. Nontraditional care delivery models, including mobile integrated health and telehealth, should be leveraged to improve access to high-quality care.

Health care professionals need to be attuned to the working and living conditions of people with diabetes. For example, if a farmworker with diabetes presents for care, appropriate referrals should be initiated to social workers and community resources, as available, to assist with removing barriers to care.

Language Barriers

Health systems and health care professionals caring for those with limited English proficiency should develop or offer educational programs and materials in culturally appropriate languages. Professional language assistance (i.e., interpreters) should be provided to individuals with limited English proficiency and/or other

communication needs at no cost to them (145). Use of untrained interpreters, including family members, should be avoided when possible, as this can result in confusing or inaccurate conveyance of information. Accompanying written materials should be in the language appropriate for the individual being supported and at a reading level that is not overly complicated—typically this is defined as a sixth-grade reading level. The National Standards for Culturally and Linguistically Appropriate Services in Health and Health Care (National CLAS Standards) provide guidance on how health care professionals can reduce language barriers by improving their cultural competency, addressing health literacy, and ensuring communication with professional language assistance (145). In addition, the National CLAS Standards website offers several resources and materials that can be used to improve the quality of care delivery to individuals with limited English proficiency (145).

Health Literacy and Numeracy

Health literacy is the degree to which individuals can obtain, process, and understand basic health information and services needed to make appropriate decisions (146,147). Health literacy is strongly associated with individuals engaging in complex disease management and self-care (148). Approximately 9 out of 10 American adults are estimated to have limited or low health literacy (146,149). Clinicians and diabetes care and education specialists should provide easy-to-understand information and reduce unnecessary complexity when developing care plans. Interventions addressing low health literacy in populations with diabetes seem effective in improving diabetes outcomes, including ones focusing primarily on education, self-care training, or disease management. Combining easily adapted materials with formal diabetes education demonstrates effectiveness on clinical and behavioral outcomes in populations with low literacy (150). However, more research is needed to establish the most effective strategies for enhancing retention and application of diabetes knowledge among various populations of people with diabetes (148,151).

Health numeracy is also essential in diabetes prevention and management. Health numeracy requires primary numeric skills,

applied health numeracy, and interpretive health numeracy, which is especially important for people using diabetes technologies like insulin pumps (152). An emotional component also affects a person's ability to understand concepts of risk, probability, and communication of scientific evidence (153). People with prediabetes or diabetes often need to perform numeric tasks such as interpreting food labels and blood glucose levels to make treatment decisions. Thus, both health literacy and numeracy are necessary for enabling effective communication between people with diabetes and health professionals, arriving at a treatment plan, and making diabetes self-management task decisions. If people with diabetes appear not to understand concepts associated with treatment decisions, both can be assessed using standardized screening measures (154). Adjunctive education and support may be indicated if limited health literacy and numeracy are barriers to optimal care decisions (60).

Social Capital and Community Support

Social capital, which comprises community and personal network instrumental support, promotes better health, whereas lack of social support is associated with poorer health outcomes in individuals with diabetes (104). Of particular concern are the SDOH, including, among others, racism and discrimination (155). These factors are rarely addressed in routine clinical practice but may be underlying reasons for adverse health outcomes and lower engagement in beneficial self-care behaviors and medication use. Optimally identifying and leveraging community resources are core components of chronic care management (15).

Health care community linkages are receiving increasing attention from the American Medical Association, the Agency for Healthcare Research and Quality, and others to promote the translation of clinical recommendations for nutrition and physical activity in real-world settings (156). Community health workers (CHWs) (157), community paramedics (158), peer supporters (159,160), and lay leaders (161) may assist in the delivery of DSMES services (119,162), particularly in underserved communities. The American Public Health Association defines a CHW as a "frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served"

(163). CHWs can be part of an evidence-based strategy to improve the management of diabetes and cardiovascular risk factors in underserved communities and health care systems (164). The CHW scope of practice in areas such as outreach and communication, advocacy, social support, basic health education, referrals to community clinics, and other services has successfully provided social and primary preventive services to underserved populations in rural and hard-to-reach communities. Even though CHWs' core competencies are not clinical in nature, in some circumstances, clinicians may delegate limited clinical tasks to CHWs. If such is the case, these tasks must always be performed under the direct supervision of the delegating health professional and following state health care laws and statutes (165,166). Community paramedics are advanced paramedics with training in chronic disease monitoring and education, medication management, care coordination, and SDOH in addition to their emergency medical services expertise. While their scope of practice varies across states, community paramedics can engage and support people living with diabetes under the direction of a medical director by delivering diabetes education, assisting with medication management, performing health assessments and wound care, and connecting people with diabetes and care partners with clinical and community resources (158).

SUMMARY

Improving individual and population health for people with and at risk for diabetes requires engagement of and collaboration between people with diabetes and their caregivers, interprofessional health care teams, health systems, community partners, payors, policymakers, and public health agencies. This section provides guidance to facilitate implementation of evidence-based diabetes care recommendations that are discussed in the Standards of Care with the goal of improving health, eliminating health disparities, and reducing the impact of diabetes and its complications on individuals and society.

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