1. Improving Care and Promoting Health in Populations: *Standards of Medical Care in Diabetes—2018*

American Diabetes Association

The American Diabetes Association (ADA) "Standards of Medical Care in Diabetes" includes ADA's current clinical practice recommendations and is intended to provide the components of diabetes care, general treatment goals and guidelines, and tools to evaluate quality of care. Members of the ADA Professional Practice Committee, a multi-disciplinary expert committee, are responsible for updating the Standards of Care annually, or more frequently as warranted. For a detailed description of ADA standards, statements, and reports, as well as the evidence-grading system for ADA's clinical practice recommendations, please refer to the Standards of Care Introduction. Readers who wish to comment on the Standards of Care are invited to do so at professional.diabetes.org/content/clinical-practice-recommendations.

DIABETES AND POPULATION HEALTH

Recommendations

- Ensure treatment decisions are timely, rely on evidence-based guidelines, and are made collaboratively with patients based on individual preferences, prognoses, and comorbidities. **B**
- Align approaches to diabetes management with the Chronic Care Model, emphasizing productive interactions between a prepared proactive care team and an informed activated patient. **A**
- Care systems should facilitate team-based care, patient registries, decision support tools, and community involvement to meet patient needs. **B**
- Efforts to assess the quality of diabetes care and create quality improvement strategies should incorporate reliable data metrics, to promote improved processes of care and health outcomes, with simultaneous emphasis on costs. **E**

Population health is defined as "the health outcomes of a group of individuals, including the distribution of health outcomes within the group"; these outcomes can be measured in terms of health outcomes (mortality, morbidity, health, and functional status), disease burden (incidence and prevalence), and behavioral and metabolic factors (exercise, diet, A1C, etc.) (1). Clinical practice recommendations for health care providers are tools that can ultimately improve health across populations; however, for optimal outcomes, diabetes care must also be individualized for each patient. Thus, efforts to improve population health will require a combination of system-level and patient-level approaches. With such an integrated approach in mind, the American Diabetes Association (ADA) highlights the importance of *patient-centered care,* defined as care that is respectful of and responsive to individual patient preferences, needs, and values and that ensures that patient values guide all clinical decisions (2). Clinical

practice recommendations, whether based on evidence or expert opinion, are intended to guide an overall approach to care. The science and art of medicine come together when the clinician is faced with making treatment recommendations for a patient who may not meet the eligibility criteria used in the studies on which guidelines are based. Recognizing that one size does not fit all, the standards presented here provide guidance for when and how to adapt recommendations for an individual.

Care Delivery Systems

Over the past 10 years, the proportion of patients with diabetes who achieve recommended A1C, blood pressure, and LDL cholesterol levels has increased (3). The mean A1C nationally among people with diabetes has declined from 7.6% (60 mmol/mol) in 1999–2002 to 7.2% (55 mmol/mol) in 2007–2010 based on the National Health and Nutrition Examination Survey (NHANES), with younger adults less likely to meet treatment targets than older adults (3). This has been accompanied by improvements in cardiovascular outcomes and has led to substantial reductions in end-stage microvascular complications.

Nevertheless, 33–49% of patients still do not meet targets for glycemic, blood pressure, or cholesterol control, and only 14% meet targets for all three measures while also avoiding smoking (3). Evidence suggests that progress in cardiovascular risk factor control (particularly tobacco use) may be slowing (3,4). Certain segments of the population, such as young adults and patients with complex comorbidities, financial or other social hardships, and/or limited English proficiency, face particular challenges to goal-based care (5–7). Even after adjusting for these patient factors, the persistent variability in the quality of diabetes care across providers and practice settings indicates that substantial system-level improvements are still needed.

Chronic Care Model

Numerous interventions to improve adherence to the recommended standards have been implemented. However, a major barrier to optimal care is a delivery system that is often fragmented, lacks clinical information capabilities, duplicates services, and is poorly designed for the coordinated delivery of chronic care. The Chronic Care Model (CCM) takes

these factors into consideration and is an effective framework for improving the quality of diabetes care (8).

Six Core Elements. The CCM includes six core elements to optimize the care of patients 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 (basing care on evidence-based, effective care guidelines)
4. Clinical information systems (using registries that can provide patient-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)

Redefining the roles of the health care delivery team and empowering patient self-management are fundamental to the successful implementation of the CCM (9). Collaborative, multidisciplinary teams are best suited to provide care for people with chronic conditions such as diabetes and to facilitate patients' self-management (10–12).

Strategies for System-Level Improvement

Optimal diabetes management requires an organized, systematic approach and the involvement of a coordinated team of dedicated health care professionals working in an environment where patient-centered high-quality care is a priority (7,13,14). While many diabetes processes of care have improved nationally in the past decade, the overall quality of care for patients with diabetes remains suboptimal (15). Efforts to increase the quality of diabetes care include providing care that is concordant with evidence-based guidelines (16); expanding the role of teams to implement more intensive disease management strategies (7,17,18); tracking medication-taking behavior at a systems level (19); redesigning the organization of care process (20); implementing electronic health record tools (21,22); empowering and educating patients (23,24); removing financial barriers and reducing patient out-of-pocket costs for diabetes education, eye exams, self-monitoring of blood glucose, and necessary medications (7); assessing and addressing

psychosocial issues (25,26); and identifying, developing, and engaging community resources and public policies that support healthy lifestyles (27). The National Diabetes Education Program maintains an online resource (www.betterdiabetescare .nih.gov) to help health care professionals design and implement more effective health care delivery systems for those with diabetes.

The care team, which includes the patient, should prioritize timely and appropriate intensification of lifestyle and/or pharmacologic therapy for patients who have not achieved the recommended metabolic targets (28–30). Strategies shown to improve care team behavior and thereby catalyze reductions in A1C, blood pressure, and/or LDL cholesterol include engaging in explicit and collaborative goal setting with patients (31,32); identifying and addressing language, numeracy, or cultural barriers to care (33–35); integrating evidence-based guidelines and clinical information tools into the process of care (16,36,37); soliciting performance feedback, setting reminders, and providing structured care (e.g., guidelines, formal case management, and patient education resources) (7); and incorporating care management teams including nurses, dietitians, pharmacists, and other providers (17,38). Initiatives such as the Patient-Centered Medical Home show promise for improving health outcomes by fostering comprehensive primary care and offering new opportunities for team-based chronic disease management (39).

For rural populations or those with limited physical access to health care, telemedicine is an approach with a growing body of evidence for its effectiveness, particularly with regards to glycemic control as measured by A1C (40,41). Telemedicine is defined as the use of telecommunications to facilitate remote delivery of health-related services and clinical information (42). Interactive strategies that facilitate communication between providers and patients, including the use of web-based portal or text messaging and those that incorporate medication adjustment appear more effective. There is limited data available on the cost-effectiveness of these strategies.

Successful diabetes care also requires a systematic approach to supporting patients' behavior change efforts. High-quality diabetes self-management education and

support (DSMES) has been shown to improve patient self-management, satisfaction, and glucose outcomes. National DSMES standards call for an integrated approach that includes clinical content and skills, behavioral strategies (goal setting, problem solving), and engagement with psychosocial concerns (26). For more information on DSMES, see Section 4 "Lifestyle Management."

In devising approaches to support disease self-management, it is notable that in 23% of cases, uncontrolled A1C, blood pressure, or lipids was associated with poor medication-taking behaviors (19). At a system level, "adequate" medication taking is defined as 80% (calculated as the number of pills taken by the patient in a given time period divided by the number of pills prescribed by the physician in that same time period) (19). If medication taking is 80% or above and treatment goals are not met, then treatment intensification should be considered (e.g., uptitration). Barriers to medication taking may include patient factors (remembering to obtain or take medications, fear, depression, or health beliefs), medication factors (complexity, multiple daily dosing, cost, or side effects), and system factors (inadequate follow-up or support). Success in overcoming barriers to medication taking may be achieved if the patient and provider agree on a targeted approach for a specific barrier (11).

The Affordable Care Act has resulted in increased access to care for many individuals with diabetes with an emphasis on health promotion and disease prevention (43). As mandated by the Affordable Care Act, the Agency for Healthcare Research and Quality developed a National Quality Strategy based on the triple aims that include improving the health of a population, overall quality and patient experience of care, and per capita cost (44,45). As health care systems and practices adapt to the changing landscape of health care, it will be important to integrate traditional disease-specific metrics with measures of patient experience, as well as cost, in assessing the quality of diabetes care (46,47). Information and guidance specific to quality improvement and practice transformation for diabetes care is available from the National Diabetes Education Program practice transformation website and the National Institute for Diabetes and Digestive and Kidney Diseases report on diabetes care and

quality (48,49). Using patient registries and electronic health records, health systems can evaluate the quality of diabetes care being delivered and perform intervention cycles as part of quality improvement strategies (50). Critical to these efforts is provider adherence to clinical practice recommendations and accurate, reliable data metrics that include sociodemographic variables to examine health equity within and across populations (51).

In addition to quality improvement efforts, other strategies that simultaneously improve the quality of care and could 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 (52) and incentives that accommodate personalized care goals (7,53).

TAILORING TREATMENT FOR SOCIAL CONTEXT

Recommendations
- Providers should assess social context, including potential food insecurity, housing stability, and financial barriers, and apply that information to treatment decisions. **A**
- Refer patients to local community resources when available. **B**
- Provide patients with self-management support from lay health coaches, navigators, or community health workers when available. **A**

Health inequities related to diabetes and its complications are well documented and are heavily influenced by social determinants of health (54–58). Social determinants of health 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 (59). The ADA recognizes the association between social and environmental factors and the prevention and treatment of diabetes and has issued a call for research that seeks to better understand how these social determinants influence behaviors and how the relationships between these variables might be modified for the prevention and management of diabetes (60). While a comprehensive strategy to reduce diabetes-related health inequities in populations has not been formally studied, general recommendations from other chronic disease models

can be drawn upon to inform systems-level strategies in diabetes. For example, the National Academy of Medicine has published a framework for educating health care professionals on the importance of social determinants of health. Furthermore, there are resources available for the inclusion of standardized sociodemographic variables in electronic medical records to facilitate the measurement of health inequities as well as the impact of interventions designed to reduce those inequities (61–63).

Social determinants of health are not always recognized and often go undiscussed in the clinical encounter (57). A study by Piette et al. (64) found that among patients with chronic illnesses, two-thirds of those who reported not taking medications as prescribed due to cost never shared this with their physician. In a more recent study using data from the National Health Interview Survey (NHIS), Patel et al. (57) found that half of adults with diabetes reported financial stress and one-fifth reported food insecurity (FI). Creating systems-level mechanisms to screen for social determinants of health may help overcome structural barriers and communication gaps between patients and providers (57). In addition, brief, validated screening tools for some social determinants of health exist and could facilitate discussion around factors that significantly impact treatment during the clinical encounter. Below is a discussion of assessment and treatment considerations in the context of FI, homelessness, and limited English proficiency/low literacy.

Food Insecurity
FI is the unreliable availability of nutritious food and the inability to consistently obtain food without resorting to socially unacceptable practices. Over 14% (or one of every seven people) of the U.S. population is food insecure. The rate is higher in some racial/ethnic minority groups, including African American and Latino populations, in low-income households, and in homes headed by a single mother. The risk for type 2 diabetes is increased twofold in those with FI (60). Risk for FI can be assessed with a validated two-item screening tool (65) that includes the 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." An affirmative response to either statement had a sensitivity of 97% and specificity of 83%.

Treatment Considerations

In those with diabetes and FI, the priority is mitigating the increased risk for uncontrolled hyperglycemia and severe hypoglycemia. Reasons for the increased risk of hyperglycemia include the steady consumption of inexpensive carbohydrate-rich processed foods, binge eating, financial constraints to the filling of diabetes medication prescriptions, and anxiety/depression leading to poor diabetes self-care behaviors. Hypoglycemia can occur as a result of inadequate or erratic carbohydrate consumption following the administration of sulfonylureas or insulin.

If using a sulfonylurea in patients with FI, glipizide may be considered due to its relatively short half-life. It can be taken immediately before meals, thus obviating the need to plan meals to an extent that may be unreachable for those with FI.

For those needing insulin, rapid-acting insulin analogs, preferably delivered by a pen, may be used immediately after meal consumption, whenever food becomes available. While such insulin analogs may be costly, many pharmaceutical companies provide access to free medications through patient assistance programs. If rapid-acting insulin analogs are not options for those with FI who need insulin therapy, a relatively low dose of an ultra-long-acting insulin analog may be prescribed simply to prevent marked hyperglycemia, while recognizing that tight control may not be possible in such cases. Providers should also seek local resources that might help patients with diabetes and their family members to more regularly obtain nutritious food (66).

Homelessness

Homelessness often accompanies many additional barriers to diabetes self-management, including FI, literacy and numeracy deficiencies, lack of insurance, cognitive dysfunction, and mental health issues. Additionally, patients with diabetes who are homeless need secure places to keep their diabetes supplies and refrigerator access to properly store their insulin and take it on a regular schedule. Risk for homelessness can be ascertained using a brief risk assessment tool developed and validated for use among veterans (67). Given the potential challenges, providers who care for homeless individuals should

be familiar with resources or have access to social workers that can facilitate temporary housing for their patients as a way to improve diabetes care.

Language Barriers

Providers who care for non-English speakers should develop or offer educational programs and materials in multiple languages with the specific goals of preventing diabetes and building diabetes awareness in people who cannot easily read or write in English. The National Standards for Culturally and Linguistically Appropriate Services in Health and Health Care provide guidance on how health care providers can reduce language barriers by improving their cultural competency, addressing health literacy, and ensuring communication with language assistance (68). The site offers a number of resources and materials that can be used to improve the quality of care delivery to non-English–speaking patients.

Community Support

Identification or development of community resources to support healthy lifestyles is a core element of the CCM (8). Health care community linkages are receiving increasing attention from the American Medical Association, the Agency for Healthcare Research and Quality, and others as a means of promoting translation of clinical recommendations for lifestyle modification in real-world settings (69). Community health workers (CHWs) (70), peer supporters (71,72), and lay leaders (73) may assist in the delivery of DSMES services (61), particularly in underserved communities. A CHW is defined by the American Public Health Association as a "frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served" (74). CHWs can be part of a cost-effective, evidence-based strategy to improve the management of diabetes and cardiovascular risk factors in underserved communities and health care systems (75).

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