



1. Promoting Health and Reducing Disparities in Populations

American Diabetes Association

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Recommendations

- Treatment decisions should be timely, rely on evidence-based guidelines, and be made collaboratively with patients based on individual preferences, prognoses, and comorbidities. **B**
- Providers should consider the burden of treatment and self-efficacy of patients when recommending treatments. **E**
- Treatment plans should align with the Chronic Care Model, emphasizing productive interactions between a prepared proactive practice team and an informed activated patient. **A**
- When feasible, care systems should support team-based care, community involvement, patient registries, and decision support tools to meet patient needs. **B**

DIABETES AND POPULATION HEALTH

Clinical practice guidelines are key to improving population health; however, for optimal outcomes, diabetes care must 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 ensuring that patient values guide all clinical decisions (1). 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 last 10 years, there has been steady improvement in the proportion of patients with diabetes who are treated with statins and who achieve recommended hemoglobin A1C (A1C), blood pressure, and LDL cholesterol levels (2). 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 (2). 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 (2). Evidence suggests that progress in cardiovascular risk factor control (particularly tobacco use) may be slowing (2,3). 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 (4–6). 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

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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 (7).

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 (8). Collaborative, multidisciplinary teams are best suited to provide care for people with chronic conditions such as diabetes and to facilitate patients' self-management (9–11).

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 (6). The National Diabetes Education Program (NDEP) maintains an online resource (www.betterdiabetescare.nih.gov) to help health care professionals to design and implement more effective health care delivery systems for those with diabetes. Three specific objectives, with references to literature outlining practical strategies to achieve each, are as follows.

Objective 1: Optimize Provider and Team Behavior. The care team, which includes the patient, should prioritize timely and appropriate intensification of lifestyle

and/or pharmacological therapy for patients who have not achieved the recommended metabolic targets (12–14). To inform this process, providers should routinely assess medication adherence. At a system level, “adequate” adherence 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) (15). If adherence is 80% or above, then treatment intensification should be considered (e.g., up-titration). Additional strategies shown to improve care team behavior and thereby catalyze reductions in A1C, blood pressure, and/or LDL cholesterol include explicit and collaborative goal setting with patients (16,17); identifying and addressing language, numeracy, or cultural barriers to care (18–20); integrating evidence-based guidelines and clinical information tools into the process of care (21–23); soliciting performance feedback, setting reminders, and providing structured care (e.g., guidelines, formal case management, and patient education resources) (6); and incorporating care management teams including nurses, dietitians, pharmacists, and other providers (24,25).

Objective 2: Support Patient Self-management

Successful diabetes care requires a systematic approach to supporting patients' behavior change efforts, including the following:

1. Healthy lifestyle choices (healthy eating, physical activity, tobacco cessation, weight management, and effective strategies for coping with stress)
2. Disease self-management (taking and managing medications and, when clinically appropriate, self-monitoring of glucose and blood pressure)
3. Prevention of diabetes complications (self-monitoring of foot health; active participation in screening for eye, foot, and renal complications; and immunizations)
4. Identification of self-management problems and development of strategies to solve those problems, including self-selected behavioral goal setting

High-quality diabetes self-management education (DSME) has been shown to improve patient self-management,

satisfaction, and glucose outcomes. National DSME standards call for an integrated approach that includes clinical content and skills, behavioral strategies (goal setting, problem solving), and engagement with psychosocial concerns (26).

In devising approaches to support disease self-management, it is notable that in 23% of cases, uncontrolled A1C, blood pressure, or lipids were associated with poor medication adherence (15). Barriers to adherence 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). A patient-centered, nonjudgmental communication style can help providers to identify barriers to adherence as well as motivation for self-care (17). Nurse-directed interventions, home aides, diabetes education, and pharmacy-derived interventions improved adherence but had a very small effect on outcomes, including metabolic control (27). Success in overcoming barriers to adherence may be achieved if the patient and provider agree on a targeted approach for a specific barrier (10). For example, simplifying a complex treatment regimen may improve adherence in those who identify complexity as a barrier.

Objective 3: Change the Care System.

A characteristic of most successful care systems is making high-quality care an institutional priority (28). Changes that increase the quality of diabetes care include providing care on evidence-based guidelines (21); expanding the role of teams to implement more intensive disease management strategies (6,24,29); tracking medication adherence at a system level (15); redesigning the care process (30); implementing electronic health record tools (31,32); empowering and educating patients (33,34); removing financial barriers and reducing patient out-of-pocket costs for diabetes education, eye exams, self-monitoring of blood glucose, and necessary medications (6); assessing and addressing psychosocial issues (26,35); and identifying/developing/engaging community resources and public policy that support healthy lifestyles (36).

Initiatives such as the Patient-Centered Medical Home show promise for improving

outcomes by coordinating primary care and offering new opportunities for team-based chronic disease management (37). Additional strategies to improve diabetes care include reimbursement structures that, in contrast to visit-based billing, reward the provision of appropriate and high-quality care to achieve metabolic goals (38), and incentives that accommodate personalized care goals (6,39).

TAILORING TREATMENT TO REDUCE DISPARITIES

Recommendations

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

The causes of health disparities are complex and include societal issues such as institutional racism, discrimination, socioeconomic status, poor access to health care, education, and lack of health insurance. Social determinants of health can be defined as the economic, environmental, political, and social conditions in which people live, and are responsible for a major part of health inequality worldwide (40). Given the tremendous burden that obesity, unhealthy eating, physical inactivity, and smoking place on the health of patients with diabetes, efforts are needed to address and change the societal determinants of these problems (41).

The ADA recognizes the association between social and environmental factors and the development of obesity and type 2 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 (42).

Ethnic/Cultural/Sex Differences

Ethnic, cultural, and sex differences may affect diabetes prevalence and outcomes. Despite advances over the last several decades in medical knowledge

around diabetes management, racial and ethnic minorities remain at higher risk for microvascular complications than nonminorities. Type 2 diabetes develops more frequently in women with prior gestational diabetes mellitus (43) and in certain racial/ethnic groups (African American, Native American, Hispanic/Latino, and Asian American) (44). Women with diabetes are also at greater risk of coronary heart disease than men with diabetes (45).

Access to Health Care

Socioeconomic and ethnic inequalities exist in the provision of health care to individuals with diabetes (46). For example, children with type 1 diabetes from racial/ethnic minority populations with lower socioeconomic status are at risk for poor metabolic control and poor emotional functioning (47). Significant racial differences and barriers exist in self-monitoring and outcomes (48).

Lack of Health Insurance

Not having health insurance affects the processes and outcomes of diabetes care. Individuals without insurance coverage for blood glucose monitoring supplies have a 0.5% higher A1C than those with coverage (49). In a recent study of predominantly African American or Hispanic uninsured patients with diabetes, 50–60% had hypertension, but only 22–37% had systolic blood pressure controlled by treatments to under 130 mmHg (50). The Affordable Care Act has improved access to health care; however, many remain without coverage (www.cdc.gov/nchs/fastats/health-insurance.htm).

System-Level Interventions

Eliminating disparities will require individualized, patient-centered, and culturally appropriate strategies as well as system-level interventions. Structured interventions that are developed for diverse populations and that integrate culture, language, finance, religion, and literacy and numeracy skills positively influence patient outcomes (51). All providers and health care systems are encouraged to use the National Quality Forum's National Voluntary Consensus Standards for Ambulatory Care—Measuring Healthcare Disparities (52).

Community Support

Identification or development of resources to support healthy lifestyles is a core element of the CCM (7). 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 (53). To overcome disparities, community health workers (54), peers (55,56), and lay leaders (57) may assist in the delivery of DSME and diabetes self-management support services (58), particularly in underserved communities. Strong social support leads to improved clinical outcomes, a reduction in psychosocial issues, and adoption of healthier lifestyles (59).

Food Insecurity

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 in the U.S.) are 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. FI may involve a tradeoff between purchasing more expensive nutritious food and less expensive energy- and carbohydrate-dense processed foods, which may contribute to obesity.

The risk for type 2 diabetes is increased twofold in those with FI (42). Therefore, in people with FI, interventions should focus on preventing diabetes. 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 administration of sulfonylureas or insulin. Providers should recognize that FI complicates diabetes management and seek local resources that can help patients and the parents of patients with diabetes to more regularly obtain nutritious food (60).

Treatment Options

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, short-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 short-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.

Language Barriers

Diabetes is more common among non-English speaking individuals in the U.S., as is FI. Therefore, it is important to consider screening for diabetes and FI in this population. Providers that care for non-English speakers should develop or offer educational programs and materials in multiple languages with the specific goal of preventing diabetes and building diabetes awareness in people who cannot easily read or write in English.

Homelessness

Homelessness often accompanies many barriers to diabetes self-management, including FI, literacy and numeracy deficiencies, lack of insurance, cognitive dysfunction, and mental health issues. Therefore, providers who care for homeless individuals should be well versed or have access to social workers to facilitate temporary housing for their patients as a means to prevent and control diabetes. Additionally, patients with diabetes who are homeless need secure places to keep their diabetes supplies and refrigerator access to properly store their insulin and have access to take it on a regular schedule.

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