Update on the American Diabetes Association Standards of Medical Care

By Bruce S. Zitkus, EdD, APRN, ANP-BC, FNP-BC, CDE

According to the National Diabetes Education Program, 1.5 million individuals in the United States had diabetes in 1958, and that number increased to 18.8 million in 2010, with an additional 7 million individuals with diabetes who were undiagnosed in 2010.[1] The CDC recently updated their estimates of individuals who have diabetes in the U.S., which increased the number of individuals who had diabetes in 2010 by 3 million in 2012.[2] This new data is from the 2012 U.S. Census obtained from the 2009 to 2012 National Health and Nutrition Examination Survey. The CDC now estimates a total of 9.3% or 29.1 million individuals of all ages living in the U.S. who have diabetes.[2] Additionally, an estimated 86 million individuals are at high risk or have "prediabetes." This trend could mean that one in five Americans and one in three Americans could have diabetes by 2025 and 2050, respectively.[2]

2014 standards of medical care

Each January, the American Diabetes Association (ADA) updates the "Standards of Medical Care" for both adults and children in their journal *Diabetes Care*.[3] The Association's multidisciplinary Professional Practice Committee reviews these evidence-based standards. Only the highlights or sections with "substantive" changes will be reviewed in this article. However, the reader is encouraged to examine the full discussion of the clinical practice recommendations in the *Diabetes Care* annual supplement for 2014. The supplement is available at no cost and can be found at: care.diabetesjournals.org/content/37/Supplement_1.toc.

Individualized care and diabetes

The "increased amount of individualized care" given by healthcare providers to those who have diabetes is an important focus that appears to be reflected in this update. As per the Chair of the Professional Practice Committee, Dr. Richard Grant, MD, MPH, and research scientist with the Kaiser Permanente Division of Research, who stated in a press release, "Individualized care is becoming more important in the treatment of diabetes."[4] Dr. Grant also noted in the same press release that "As the evidence base evolves, we are learning more about how to apply this data to our patients, and we're finding that the evidence often supports looking at individual patient needs rather than a one-size-fits-all approach."[4] The updated Medical Nutrition Therapy section is another change that can be seen where the word "diet" cannot be found. The focus is on "eating patterns" and "eating plans" instead of "diet" in order to develop an individualized approach to understand what "their goals" are and what they want to achieve through a diabetes management plan.

Prevention strategies

Healthcare providers use primary, secondary, and tertiary prevention strategies when evaluating most medical

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Keywords: diabetes, diagnosis, guidelines, management, standards, treatment

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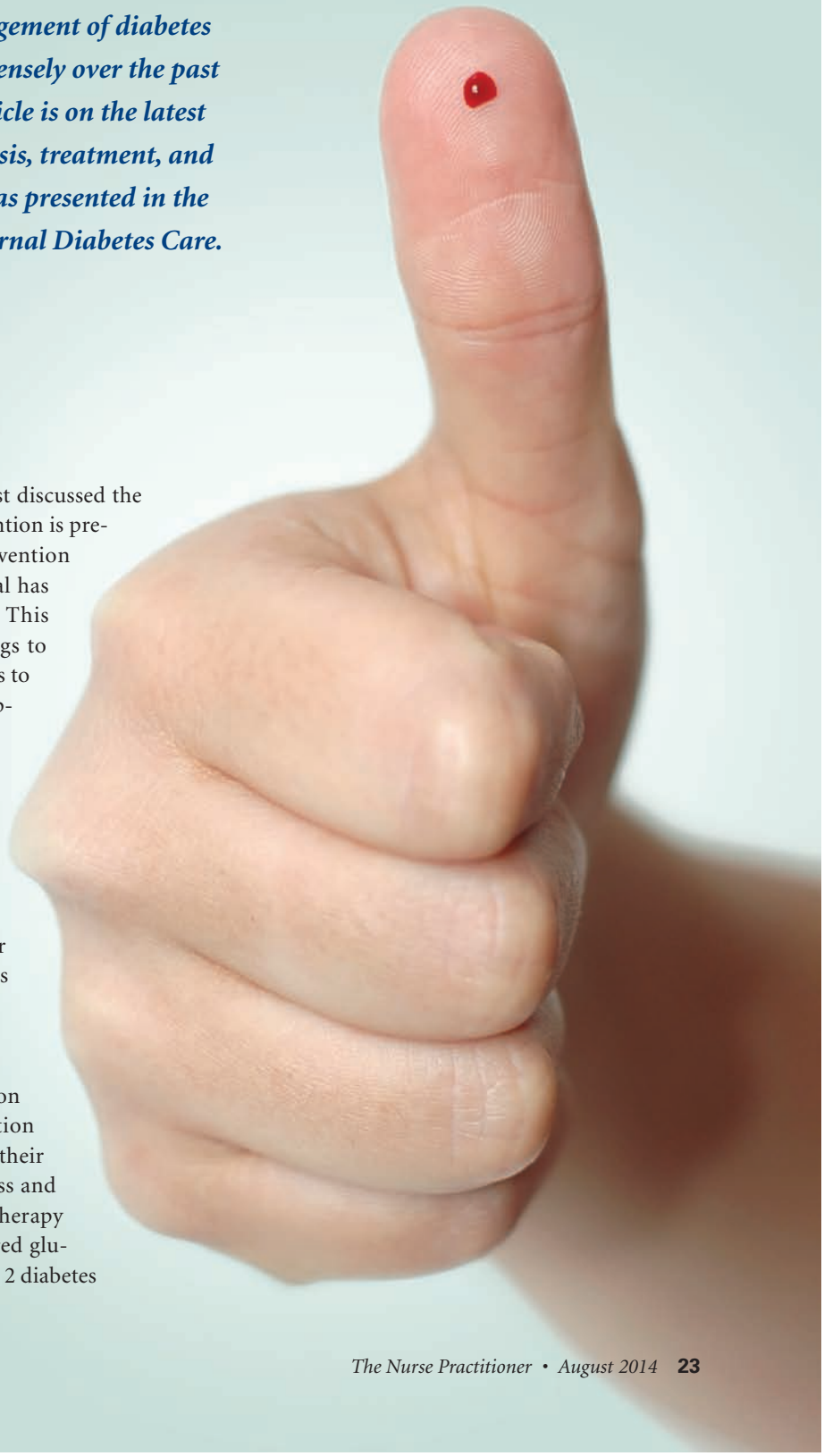
Abstract: The diagnosis and management of diabetes in primary care has increased immensely over the past several years. The focus of this article is on the latest substantive revisions in the diagnosis, treatment, and management of diabetes, which was presented in the January 2014 issue of the ADA's journal Diabetes Care.



conditions or diseases. Leavell and Clark first discussed the various levels of prevention.[5] Primary prevention is prevention of the disease itself. Secondary prevention "interrupts" the process where an individual has the disease, but it remains asymptomatic. This level of prevention often requires screenings to detect a disease. Tertiary prevention attempts to stabilize or prevent the worsening of a symptomatic disease. All of these types of prevention strategies are important in providing individuals who are at risk or those already diagnosed with diabetes the best care possible. The clinical practice recommendations discussed will be reviewed according to how prevention strategies (primary, secondary, or tertiary) are useful for diagnosing, treating, and managing individuals with diabetes.

Primary prevention

Primary prevention focuses on the prevention of a disease. In 2002, The Diabetes Prevention Program (DPP) Research Group published their findings on lifestyle intervention (weight loss and physical activity) or use of pharmacologic therapy (metformin) in individuals who had impaired glucose tolerance and a high risk to develop type 2 diabetes

mellitus (T2DM).[6] The research revealed a 58% reduction in the incidence rate of diabetes through use of lifestyle interventions and a 31% reduction with the use of metformin.[7] In 2009, the DPP Research Group completed a 10-year follow-up of the DPP study to ascertain the long-term success rates of the two interventions.[8] Results revealed that the cumulative incidence, through using either lifestyle intervention or metformin therapy, persisted for at least 10 years; however, the incidence of diabetes in the lifestyle group remained the lowest overall cumulatively.

The current guidelines continue to emphasize lifestyle changes (weight loss of 7% and increasing physical activity of at least 150 minutes/week) as well as the use of metformin for those who are at risk for prediabetes (A1c 5.7%-6.4%), have a body mass index greater than 35 kg/m^2, are under age 60, or in women who had gestational diabetes mellitus (GDM) during pregnancy.[3] The guidelines also discuss the need to focus on other lifestyle factors, such as smoking, alcohol use, the amount and types of fat ingested, and the quality and quantity of carbohydrates eaten. These will be discussed under the secondary and tertiary prevention strategy sections.

Secondary prevention

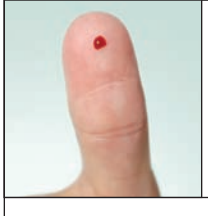
Secondary prevention strategies focus on finding an asymptomatic disease. An individual can have diabetes without knowledge or diagnosis of it for many years. Unfortunately, they may start to develop complications during this time even when asymptomatic. In reality, this is often the case in most chronic diseases until the signs and symptoms worsen to a point that it affects the individual. The patient is given a diagnosis at this point. In T2DM, insulin sensitivity reduction can start to decline up to 13 years prior to the diagnosis of T2DM in individuals who are at risk.[9-11] A more rapid decline often occurs approximately 5 years before diagnosis.[9-11] With the reduction of insulin sensitivity at the cell level, both glucose and insulin levels can slowly begin to rise in the bloodstream and affect various organs and body systems without the individual knowing it. Thus, screening individuals who are "at risk for diabetes" can lead to an earlier diagnosis and thereby possibly prevent or delay the potential development and consequences of uncontrolled diabetes. The changes in the 2014 guidelines surrounding secondary prevention strategies focus mainly on methods and populations.

In 2010, the use of a glycated hemoglobin (A1C) level with a threshold of 6.5% or greater became an accepted ADA criterion in diagnosing diabetes.[8,9,12] The 2014 recommendations clarify this option and specifically focus on certain limitations healthcare providers need to be aware of when using A1C in the diagnosis of diabetes.[3] These include the type of instruments used to perform the test, history of anemias, hemoglobinopathies, race/ethnicity, and age.

Point-of-care A1C instruments

Many primary care offices and specialty medical practices own and operate point-of-care (POC) A1C instruments. These instruments provide immediate feedback about an individual's average glucose level. Healthcare providers can use this real-time data to immediately make changes to an individual's treatment and/or management plan without waiting for results from an outside lab. The National Glycohemoglobin Standardization Program (NGSP) certifies that the A1c is standardized to the reference assay from the Diabetes Control and Complications Trial. Offices may use A1C POC assays certified by the NGSP; however, proficiency testing is not mandated for performing the test. Ordinarily, proficiency testing is required through the Clinical Laboratory Improvement Amendments (CLIA) of the Centers for Medicare and Medicaid Services (CMS) in order to guarantee quality lab testing.

Labs, which are CLIA approved, receive unknown samples sent to their lab approximately three times a year in order to verify the accuracy and reliability of its testing. This does not occur in offices that have A1C POC instruments, as this requirement is waived by the CMS. Therefore, the sole use of test results for diagnostic purposes at sites with their own POC device may be problematic per the 2014 recommendations.[3] The use of comparison testing between the POC A1C result and that provided by an outside CLIA-approved lab may prove beneficial in determining the correctness of the results obtained from the POC device if the POC device in each individual office does not require proficiency testing. This, however, would need to be determined by each office, taking into account the cost, the need for additional outside lab testing, and any other administrative considerations. However, the safety of the patient and making sure the results are correct in order to make the appropriate changes to a treatment plan should always outweigh other considerations.



Many primary care offices and specialty medical practices own and operate point-of-care (POC) A1C instruments.

Fasting plasma glucose level

Individuals who have certain types of anemias or hemoglobinopathies, where there is an abnormal red cell turnover, should not be evaluated by the A1c method.[13] Rather, the use of a fasting plasma glucose level, or the 75-g oral glucose tolerance test (OGTT), is required because the results may be falsely elevated or lowered from what their actual A1C level really is. Thus, the potential for over- or undertreatment of their diabetes can occur. Hemoglobinopathies that may interfere with the A1C method include HgS, HgC, HgD, HgE, and HgF.[14] The most common methods used by labs to measure A1C are listed on the NGSP website at: www.ngsp.org/interf.asp. Additionally, the website indicates how each hemoglobinopathy interferes with A1C results.

Other conditions can interfere with accurate A1C levels by providing false results.[13,14] These include hemolytic anemia, a recent transfusion, or blood loss, which can produce false-low results. False elevated A1c levels are often produced by having a very low iron deficiency anemia or iron deficiency anemia due to pregnancy often occurring during late pregnancy in those with or without diabetes. Additionally, false A1C results occur in individuals with hypertriglyceridemia, hyperbilirubinemia, uremia, chronic liver disease, uremia, hemodialysis, opioid addiction, or alcohol abuse. Therefore, it is recommended that the A1c method not be used in individuals who fall into the categories listed above.

A1c levels: Race and ethnicity

Variations in A1C levels and glycation rates can occur depending upon the race and ethnicity of an individual.[15-17] In a retrospective study by Ziemer et al., non-Hispanic Blacks had higher A1C levels than Whites across the full spectrum of glycemia.[15,16] However, they could not determine the cause of this difference. Wolffenbuttel et al. reviewed data from 1,879 participants in The **DURA**bility of **B**asal versus **L**ispro mix 75/25 insulin **E**fficacy trial ages 30 to 80 years with T2DM.[17] Study participants were required to collect three 7-point self-monitored blood glucose (SMBG) results. These SMBG measurements consisted of three premeal glucose levels (first to be fasting), three 2-hour, postprandial glucose levels, and one glucose level at 3:00 a.m. The researchers used logistic regression analysis to determine the relationship between HbA1c and the mean of the SMBG results obtained above.[17]

The results of the estimated average glucose levels (mean of the SMBG results) were evaluated to see if there was a difference among different ethnic groups. Results revealed that Hispanics had the highest A1C rates per SMBG level followed by Asians and Blacks of African descent. Whites had the lowest A1C per SMBG levels. Overall, A1C levels were elevated between 0.2% and 0.5% higher than those found in Whites. These elevated levels were seen in A1Cs between 7.0% and 9.0% (53 and 75 mmol/mol). Thus, healthcare providers may need to evaluate non-White individuals, using either a fasting glucose test (no caloric intake for at least 8 hours) or a 75-g OGTT to further evaluate glucose level when diagnosing diabetes or making changes to a treatment plan.

Type 1 diabetes' prevalence

There has been an increase in the number of individuals who develop type 1 diabetes mellitus (T1DM) annually.[18-25] Although last year's recommendations used the phrase "to consider referring relatives" to a "clinical research study" site, the current guidelines make a more direct statement. One of several studies revealed that individuals who had more than two autoantibodies for type 1 diabetes had a 70% chance of developing type 1 diabetes in 10 years and an 84% chance within 15 years.[26] In the study, two of the three cohorts of children were recruits from the general populations of Finland and United States and one cohort from Germany who had parents with T1DM. Of the 13,377 enrolled in the study, 1,059 seroconverted to islet autoantibody positive, and the rest (12,318) remained islet autoantibody negative. The results found 69.7% of the 585 children who seroconverted with two or more autoantibodies progressed to T1DM within 10 years and 84% within 15 years. There is no recommendation to test individuals who are asymptomatic and at low risk for T1DM. However, those who have a higher risk of developing T1DM (relative with T1DM) should go to a site that performs clinical research studies in diabetes. There are currently several clinical studies researching how to prevent individuals with autoimmunity evidence from developing T1DM. The following website identifies current research studies sites: www.diabetestrialnet.org.

Screening methods

A recent update to the National Institutes of Health (NIH) Consensus Guidelines identifies two methods to screen and diagnose pregnant women for gestational diabetes. The previous recommendation for screening and diagnosing GDM in nondiabetic pregnant women was the method used by the International Association of Diabetes and Pregnancy Study Groups (IADPSG). This is a 1-step method, more common in Europe, where screening occurs between 24 to 28 weeks of gestation.[27] The individual receives a 2-hour, 75-g OGTT. A set of cut points indicate whether the woman has GDM. The diagnostic cut points after ingestion of the 75-g OGTT include: an initial fasting level of 92 mg/dL or greater; a 1-hour level of 180 mg/dL or greater; or a 2-hour level of 153 mg/dL or greater.[3]

An additional method for screening and diagnosing GDM (commonly used in the United States) is the 2-step method and is from the *NIH Consensus Guidelines*.[28] The timeframe is the same as the IADPSG method; however, the individual receives a 50-g, nonfasting glucose load test, instead of a fasting, 2-hour, 75-g OGTT. If the plasma glucose level is 140 mg/dL or greater after 1 hour, the individual returns for a 3-hour fasting 100-g OGTT. Diagnosis of GDM is confirmed if the plasma glucose level is 140 mg/dL or greater 3 hours after receiving the 100-g glucose dose. The American College of Obstetricians and Gynecologists recommends the 2-step method as their preferred choice.[29]

Tertiary prevention

The majority of prevention occurs in those individuals who have diabetes. This will often take place in the early stages of the disease in an attempt to prevent hyperglycemia and uncontrolled blood glucose levels. However, anyone who has worked with those who are diagnosed with diabetes knows that the only way one can truly provide effective care is to individualize it. The updated guidelines can be divided into two basic categories when discussing tertiary prevention. They are the prevention of hypoglycemia, increased hyperglycemia, or erratic changes in blood glucose levels, and the need for screening, prevention, or worsening of comorbid conditions.

Continuous glucose monitoring

Many individuals with T1DM or T2DM who require insulin therapy can experience episodes of nocturnal hypoglycemia, which can be severe and life threatening. The FDA recently approved a continuous glucose-monitoring (CGM) device with a sensor that has the ability to automatically suspend insulin delivery to the individual who is wearing the associated insulin pump if a certain glucose threshold (individualized) is reached. The results of the Automation to Simulate Pancreatic Insulin Response trial showed that individuals (over 16 years of age) who used "sensor-augmented insulin pump therapy with a low glucose suspend" feature experienced a reduction in nocturnal hypoglycemia episodes.[30] Additionally, there was no increase in their A1C levels. In fact, one study of those with T1DM revealed that some individuals had a 0.5% reduction of their A1C level. Therefore, the use of a CGM with sensor-augmented insulin pump therapy may prevent nocturnal hypoglycemia in those who experience it. The 2014 recommendations suggest a cautious approach and indicate that there needs to be more data analysis prior to this device being adopted for use as standard practice. They specifically suggest this data need to be reported and analyzed using a standard universal template that is predictable and intuitive.[3,31]

Alcohol use

Research in recent years has revealed that alcohol use might protect or decrease the risk of certain cardiovascular diseases (CVDs), such as coronary artery disease, in diverse populations.[32] Recommendations are for moderate alcohol consumption. A recent review was published that focused on the relationship between alcohol consumption in individuals with T2DM and the risk of vascular complications and mortality.[33] The results revealed that moderate alcohol use (particularly wine) reduced the risk of cardiovascular event and mortality. With this understanding, it is important to educate those who manage their diabetes with insulin or insulin secretagogues about the potential for delayed hypoglycemia after drinking alcohol. If an individual chooses to drink alcohol, they should do so in moderation (one drink per day for women and two drinks per day for men) and should be aware of the possibility for delayed hypoglycemia.

Initial hyperglycemia management

Hyperglycemia is the main cause of organ damage in diabetes, subsequently causing those with diabetes a potentially decreased quality of life. Earlier guidelines suggested using pharmacologic monotherapy for 3 to 6 months initially in an attempt to reach A1C goals. The current guidelines are more aggressive and suggest limiting the use of monotherapy only for 3 months before adding another agent. This second agent can be a "second oral agent, a glucagon-like peptide 1 (GLP-1) receptor agonist, or insulin." The need to frequently discuss the progressive nature of diabetes with individuals who have diabetes is important. Education about the disease and its process can prevent feelings of being a failure when new medications need to be added to an individual's regimen. It also provides the opportunity to develop a better relationship with each individual patient treated. The goal can often be achieved through a team effort.[34,35]

Lifestyle changes

The use of behavioral and lifestyle changes is a hallmark of diabetes treatment and management, especially in those with T2DM. The recommendations found under Medical Nutritional Therapy (MNT) have the most extensive changes found in the 2014 revisions. This section used the contents of the new Position Statement on Nutrition Therapy Recommendations for the Management of Adults with Diabetes.[36] The previous 2013 MNT section consisted of 16 recommendations within five categories, and the current section consists of 29 recommendations within nine categories. Although some of these may have been presented in previous articles, they are newly documented as recommendations within the MNT categories.

The new recommendations state "nutrition therapy is recommended for all people with type 1 and type 2 diabetes as an effective component of the overall treatment plan." According to studies provided in the updated Nutrition Position Statement, the majority of individuals with diabetes have received little "structured diabetes education and/or nutrition therapy." A1C decreases have been seen in individuals with T1DM from 0.3% to 1% and in T2DM from 0.5% to 2% through the use of group nutrition therapy or individualized education sessions. It is important that all members of the healthcare team understand the importance of nutrition therapy and the support that is needed by patients as they attempt to change eating habits, previous lifestyle choices, and behaviors.[37,38] Weight loss is important through the reduction of energy intake as part of this nutrition therapy. Additionally, lifestyle interventions such as physical activity and nutritional counseling can help achieve weight loss goals. Overall, these interventions can also improve glycemia, lipids, and BP levels.[39,40] Ongoing support needs to be provided to individuals who are attempting to lose weight to help patients keep motivated.[37]

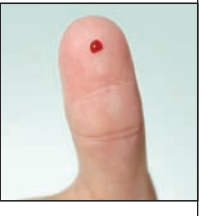
An individual's eating habits and patterns are important to review and discuss when seeing those who have diabetes. Healthcare providers need to individualize their assessment of the patient's eating patterns, since one size does not fit all. This is especially true regarding macronutrient distribution or proportions in individuals with diabetes.[37,41] Healthcare providers need to take into account an individual's personal preferences (tradition, culture, religion, and so on) when discussing eating patterns and metabolic goals.[41] It can often be very difficult for an individual to change eating habits and cultural food choices as a person ages. Focus should be on guiding an individual to choose vegetables, fruits, whole grains, legumes, and dairy products over carbohydrates that contain added fats, sugars, and sodium.[42] Eating various types of foods within the Mediterranean-style, DASH (Dietary Approaches to Stop Hypertension)-style, plant-based (vegan or vegetarian)-style, low-fat, or lower-carbohydrate type food groups are effective ways to manage diabetes and glycemic levels.[38,40,41] Although the ideal amount of suggested fat intake is not known, the quality of the fat intake is more important than the quantity.[41,42] Foods (fatty fish) containing long-chain n-3 fatty acids (eicosapentaenoic acid and docosahexaenoic acid [EPA and DHA]) are beneficial to eat; however, evidence does not support recommending n3 (EPA and DHA) over-the-counter supplements. If an individual chooses to use supplements, he or she should be educated to choose supplements that contain the recommended daily allowance of micronutrients.

Managing diabetes in hospitalized patients

At times, individuals with diabetes may need to be admitted to the hospital for acute medical or surgical treatments, management and control of chronic conditions, or elective surgery. Draznin et al. developed their PRIDE (Planning Research in Inpatient Diabetes) group to encourage and promote research on the management of diabetes in hospitalized individuals.[43]

They estimate that 25% to 30% of patients in hospitals have diabetes. Those placed in critical care units may be placed on insulin I.V. depending upon their status. However, the majority of time, individuals with either T1DM or T2DM will be placed on sliding scale insulin in order to prevent hyperglycemic or hypoglycemic episodes during their hospitalization. The development of sliding scale insulin occurred initially when patients with T2DM were sent to the hospital and healthcare providers needed to dose insulin at mealtimes. However, the dosing was based on what an individual's blood glucose was prior to eating instead of what they were about to eat.

A1C decreases have been seen in individuals with T1DM and in T2DM through the use of group nutrition therapy.

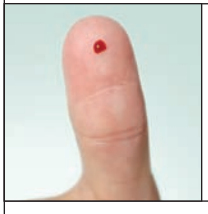


The current recommendations "strongly discourage" the use of sliding scale insulin dosing during inpatient hospital stays. Rather, a physiologic insulin regimen is recommended, as it provides better coverage.[3] Physiologic insulin therapy is a basal-bolus regimen. This regimen includes the use of basal insulin (long-acting dose) and the bolus dose (mealtime insulin). The bolus dose is calculated by determining the number of carbohydrate grams in the individual's meal. Obtaining a 2-hour, postprandial blood glucose level provides information regarding the insulin-to-carbohydrate ratio and if any adjustments may be needed for future meals. Additionally, carbohydrates taken after eating regular meals while hospitalized must be taken into account when developing an insulin regimen. Dosing insulin for individuals with T1DM solely based on premeal glucose would likely deliver suboptimal insulin doses and may potentially lead to diabetic ketoacidosis.[3,43]

Salt intake

Although the discussion of salt use is found under the MNT section, a review of the use of salt is under tertiary prevention because of the dilemma of decreasing salt intake to control BP and how this decrease may affect those with

diabetes. There are guidelines suggesting to limit salt use in those with T1DM as a means to decrease BP.[44] However, it is also known that limiting salt intake can activate the sympathetic nervous system, the renin-angiotensin-aldosterone system, increase low-density lipoprotein cholesterol in those with T1DM, and lower insulin sensitivity in those with T2DM.[45-48] There are few studies regarding the use of sodium in the diabetes population and its effect on mortality. However, two studies–one focusing in those with T1DM and the other with T2DM–caution a universal sodium restriction of 1,500 mg.[49,50] In the latter study, researchers found that intake of dietary sodium is associated with all-cause mortality and end-stage kidney disease in those with T1DM. Individuals who have macroalbuminuria or persistent albuminuria at levels 300 mg/24 h or greater were more prone to develop end-stage renal disease, and this correlated with low sodium excretion. However, those who had high sodium intakes also had a high risk of mortality.



The autonomic nerve fibers that innervate the heart and blood vessels are usually damaged by hyperglycemia.

In the former study, the results revealed a similar relationship with a decrease in 24-hour urinary sodium excretion. This was associated with all-cause and cardiovascular mortality in those with T2DM. The researchers who conducted both studies were not able to provide or determine the causality of these relationships. Both suggest further research into these phenomena. According to the current ADA nutrition guidelines, all adults who have diabetes should reduce their salt intake to less than 2,300 mg/d. The guidelines also suggest that healthcare practitioners should make a determination of whether or not to abide by the recommended guidelines of less than 2,300 mg/d in those individuals who also have hypertension. This is due to the research results mentioned above. Therefore, they give no specific guidance except to make these determinations on an individual basis. However, the guidelines remind practitioners of the need to consider obtaining a nutritionally adequate and palatable diet as well as understanding that cost of low-sodium products may be prohibitive for some when making these determinations.[51]

Aspirin therapy

Currently, the U.S. Preventive Services Task Force has the following recommendations for aspirin (ASA) use in the general population.[52] In men aged between 45 to 79 years of age, the use of 75 mg/day of ASA is recommended to reduce the risk of a myocardial infarction if the potential benefits outweigh the potential harm from a gastrointestinal hemorrhage.[52] In women between 55 to 79 years of age, the same dose of ASA is recommended to reduce the risk of an ischemic stroke if the potential benefits outweigh the potential harm from a gastrointestinal hemorrhage.[52] Both are category "A" recommendations. The use of aspirin (ASA) therapy has been part of the ADA recommendations as primary prevention and secondary prevention strategies that healthcare providers should consider in those with either T1DM or T2DM who are at risk for or have CVD.[3] Currently, men over 50 and women over 60 who have at least one major cardiovascular risk factor are candidates for the use of a low-dose ASA as a primary prevention strategy.[3] Those individuals who have diabetes with a history of CVD should use a low-dose ASA as a secondary prevention strategy.

However, individuals who have acute coronary syndrome often require dual therapy for at least an additional year. Previously, the use of aspirin and clopidogrel was suggested for dual antiplatelet therapy. The current guidelines approve the use of ASA with either ticagrelor or clopidogrel if there was no percutaneous coronary intervention. The suggestion is to use ASA with ticagrelor, clopidogrel, or prasugrel if there is percutaneous coronary intervention.

Cardiovascular autonomic neuropathy

Cardiovascular autonomic neuropathy (CAN) is associated with both T1DM and T2DM. It is the impairment of autonomic control of the cardiovascular system in the setting of diabetes after exclusion of other causes.[53] It is an independent risk factor for cardiovascular mortality.[3,53-56] Specifically, the 2014 recommendations point out that the mortality risk of CAN is independent from other cardiovascular risk factors an individual may have. Therefore, an individual without other cardiovascular risk factors still has a mortality risk from CAN. The autonomic nerve fibers that innervate the heart and blood vessels are usually damaged by hyperglycemia. This often causes abnormalities in both heart rate and vascular dynamics.[55,56]

Early stages of CAN may be asymptomatic; however, the damage caused by CAN increases with age, how long an individual has had diabetes, and the level and control of hyperglycemia that is present.[53,55] Common symptoms and signs include resting tachycardia, orthostatic hypotension, exercise intolerance, silent myocardial ischemia, and orthostatic tachycardia/bradycardia syndromes. Some individuals will not have any signs and symptoms. It is recommended

that if an individual has autonomic neuropathy, he or she should also have a cardiac evaluation prior to increasing any physical activities greater than the current activity level. It is noted that there are various tests to evaluate for CAN, and it is suggested that the individual have more than one test in order to verify and authenticate the diagnosis of CAN.[56] Intensive therapy of controlling glucose, BP, and lipids as well as smoking cessation may slow the progression of CAN.[52,55,56]

Orthostatic hypotension

Orthostatic hypotension is most commonly seen in individuals who are diagnosed with CAN. Treatment of orthostatic hypotension is required if the individual is symptomatic. The goal is not to restore normotension but rather to minimize postural symptoms.[56,57] The suggestions to reach this goal are to use both pharmacologic and nonpharmacologic methods. Nonpharmacologic methods include, but are not limited to, avoiding medications that aggravate hypotension, gradual movements with postural change, and using compressive garments over the legs and abdomen.[56,57] Pharmacologic treatments should be individualized and include peripheral selective alpha$_1$-adrenergic agonists (midodrine), which exerts a pressor effect, or 9-alpha-fluorohydrocortisone, which works through sodium retention. A review of the adverse reactions is important to discuss with those who will be given one of these medications as should be done with all medications.

Autoimmune disorders

Some autoimmune disorders (celiac disease, autoimmune thyroid disease) are associated with T1DM.[58] Screening is an important factor when evaluating and managing individuals with T1DM in order to provide excellent care as well as prevent complications that may affect their diabetes causing issues of uncontrolled glycemia. If a child has signs and symptoms of diarrhea, weight loss, or poor weight gain, growth failure, abdominal pain, chronic fatigue, malnutrition due to malabsorption, other gastrointestinal problems, and unexplained hypoglycemia or erratic blood glucose concentrations, the healthcare provider needs to consider an autoimmune disease as the possible cause.[58] After ruling out a more serious condition or acute abdomen, the individual should be screened for celiac disease. Screening includes measuring serum IgA antitissue transglutaminase or antiendomysial antibodies with a small bowel biopsy in antibody-positive children.[3]

Additionally, fluctuation in blood glucose in children with T1DM can be from thyroid disease. Screening for antithyroid peroxidase and antithyroglobulin antibodies should occur soon after their diagnosis. Thyroid-stimulating hormone level is to be evaluated again once there is stabilization of their initial blood glucose fluctuations. These are to be repeated every 1 to 2 years if symptoms of thyroid hormone dysfunction, thyromegaly, an abnormal growth rate, or unusual glycemic variations reoccur.[3] Several of the recommendations do not necessarily fit into a specific prevention section, since they focus on terminology or treatment changes. These will be discussed briefly here.

Albuminuria

There is a change in language about albuminuria in the section on nephropathy. No longer will the terms microalbuminuria (30-299 mg/24 h) and macroalbuminuria (greater than 300 mg/24 h) be used when discussing or indicating albumin levels related to diabetic nephropathy. Instead, the terms persistent albuminuria at levels of 30-299 mg/24 h and persistent albuminuria at levels 300 mg/24 h or greater will be used to discuss levels of albuminuria that affect individuals with diabetes. This change is to follow the current nomenclature that is being used to indicate the continuous nature of albuminuria found in diabetes.[3]

Eye exams

The recommended time frame of eye exams is every 2 years instead of every 2 to 3 years under the retinopathy section. This is for individuals with either T1DM or T2DM even if there was no retinopathy found after one or more eye exams.[3] An eye exam every three years is acceptable if a patient with T2DM is well controlled and there is minimal risk for retinopathy (the patient does not have the additional risk of hypertensive retinopathy or other eye disease).[59]

Diabetic neuropathy

Diabetic neuropathy has been found to be a challenging condition to treat, and it is suggested that medication be trialled when attempting to treat neuropathic pain in order to find the right drugs and/or combinations of drugs that may decrease the pain often associated with diabetic neuropathy. Neuropathic pain treatment requires an individual approach. Healthcare providers need to discuss that using medications to control pain is to reduce pain symptoms, and complete pain relief may not be possible. However, there are treatments or treatment combinations that may be more effective than others. This is why a trial period is important.

Preventing neuropathy

Several new discussions on the treatment for various diabetic autonomic neuropathies have been added to the recommendations. The first and most important is prevention of developing neuropathy, and this can be through having

tight and stable glycemic control.[60] Discussion about the importance of obtaining early glycemic control in those with T1DM and, to a lesser degree, in those with T2DM can prevent the development of neuropathies in both. Additionally, it has been observed that prevention of "extreme blood glucose fluctuations" improves neuropathic symptoms.

The pain from distal symmetric polyneuropathy (DPN) can be very severe and lead to quality-of-life issues, including depression and immobility.[61] Very few individuals obtain complete relief from their symptoms and pain from use of pregabalin and duloxetine (current medications approved for diabetic neuropathic pain by the FDA).[62,63] Although not mentioned in the current recommendations, tapentadol extended-release was approved by the FDA as the first opioid for treatment of diabetic neuropathy.[64] Tapentadol ER is for use in individuals who need continuous opioid treatment over a period of time for neuropathic pain relief.

There are several specific medications listed in the recommendations that have not been approved by the FDA and would be considered "off-label use" and may decrease pain symptoms. These include venlafaxine, amitriptyline, gabapentin, valproate, and opioids (morphine sulfate, tramadol, and oxycodone controlled release).[3] These may all potentially be effective and could be considered for treatment of painful DPN.[3,65] Suggesting the use of a tailored and stepwise pharmacologic strategy in order to achieve pain reduction and an improved quality of life is imperative.

Gastroparesis

Gastroparesis is a common clinical disorder often seen in individuals with both types of diabetes. It is characterized by upper gastrointestinal symptoms related with delayed gastric emptying of solids and liquids. There is no associated mechanical obstruction. Pharmaceuticals available include metoclopramide (an antinauseant and prokinetic) and Domperidone (a dopamine antagonist). However, the use of metoclopramide is restricted to 5 days due to the potential complication of tardive dyskinesia, and Domperidone can only be obtained through the FDA by a new investigational drug application.[66] The European Medicines Agency recently restricted the use of metoclopramide to 5 days extrapyramidal symptom risks (crosses the blood-brain barrier).[67]

The further use of metoclopramide in the United States is pending, and it is only recommended for the most severe cases; monitoring of adverse reactions is necessary. It should be noted that metoclopramide is the only approved drug in the United States for the treatment of diabetic gastroparesis.[68,69] Research is focusing on alternative treatments for diabetic gastroparesis. Erythromycin has been used and is effective as a prokinetic agent; however, development of tachyphylaxis prevents it from being used as a long-term agent. Additional treatment options, while continued research occurs in the development of other pharmaceutical options, include tight glycemic control, symptom treatment, evaluation and management of the individual's nutritional status, and psychological counseling (if needed).[68,69]

Moving forward

The discussion of the various updates in this year's Standards of Medical Care in Diabetes has been reviewed through the use of prevention strategies often used in the clinical environment. It should be noted that several of the topics found in the three separate sections could have easily been placed in other sections (for example, MNT is used as a primary prevention strategy to prevent T2DM). The purpose of this article was to provide the reader with information about the substantive changes found in the standards.

The number of individuals who have diabetes is moving into epidemic proportions as seen in the statistics provided at the beginning of this article. According to Rowley and Bezold (2012), "The Diabetes 2025 Model estimates that the total number of Americans living with diabetes will increase by 64% between 2010 and 2025 to 53.1 million, and the resulting annual medical and societal costs will increase 72% to $514 billion."[70] Healthcare providers must continue to monitor their patients using various prevention strategies depending on their patient's medical, social, and family/genetic history. Early treatment can help prevent complications from diabetes as well as premature death.

The ADA, through the use of their journal *Diabetes Care,* provides "the best possible guidance to healthcare professionals for diagnosing and treating adults and children with all types of diabetes."[3] All healthcare providers should review the 2014 Clinical Practice Recommendations in order to provide the latest evidence-based and individualized care to those who have diabetes, prediabetes, or are at risk for diabetes. Through appropriate diagnosis, treatment, and management of diabetes and its complications, as well as use of prevention strategies, healthcare providers can make a difference and potentially improve the quality of life in those who have diabetes and those yet to be diagnosed.

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Bruce S. Zitkus is an associate professor graduate director of the Family Nurse Practitioner Program at LIU Post School of Health Professions and Nursing, Department of Nursing, Brookville, N.Y.

The author and planners have disclosed that they have no financial relationships related to this article.

DOI-10.1097/01.NPR.0000451880.48790.50