Comprehensive Care of Diabetes
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Diabetes affects 23.6 million Americans (7.8%); of these 5.7 million (24.2%) are undiagnosed. If the current trend continues, 1 in 3 Americans will develop diabetes at some point in their lifetime, and those with diabetes will lose, on average, 10-15 years of life. Uncontrolled diabetes is associated with serious, long-term macro- and micro vascular complications – cardiovascular disease (CVD), nephropathy, retinopathy, neuropathy, and premature death. Diabetes also yields a considerable financial impact on the country. The National Center for Chronic Disease Prevention and Health Promotion estimates the total cost of diabetes in the United States to be $174 billion ($116 billion in direct medical costs). The significant clinical and economic impact of uncontrolled diabetes underscores the importance of optimal disease management. Much of the burden of diabetes can be prevented or reduced by controlling blood glucose, blood pressure, and blood lipids and receiving other preventive care in a timely manner.

Glycemic Control

Diabetes is a condition in which the body has a shortage of insulin or a decreased ability to use insulin. This results in hyperglycemia. Excessive glucose in the blood damages vital organs over time. Thus, glycemic control is fundamental to the management of diabetes. Additionally, glycemic control beneficially modifies plasma lipid levels and reduces the risk of CVD. Currently, the standard for measuring glycemic control is the glycated hemoglobin test (HbA1c or A1C test). This test represents the average blood glucose levels. The more glucose found in the blood, the higher the percentage of glycated hemoglobin will be found. Once a cell has been glycated, it stays glycated for a lifespan of four months. Therefore, the A1C test is a marker for long-term blood glucose control and subsequently a strong predictor for diabetes complications. The American Diabetes Association (ADA) recommends A1C testing every three months for those not meeting glycemic control or at least every six months for patients well-controlled and not undergoing a change in therapy.

Self-monitoring of blood glucose (SMBG) depicts how meals, daily activities, medications, and stress can increase or decrease blood glucose at a single moment in time over the course of a day. The ADA recommends patients on less frequent insulin injections, non-insulin therapies, or medical nutrition therapy (MNT) practice SMBG at least once daily to help guide successful treatment. SMBG should take place three or more times daily for patients using multiple insulin injections per day or insulin pump therapy. However, each patient’s SMBG schedule is individualized based on the SMBG results. Patient counseling is crucial at initiation of SMBG testing and at routine follow-up visits to ensure that patients are able to use the monitoring device correctly and can understand the results to assist in therapy adjustments to achieve more optimal glucose control. Important monitoring goals are listed below.

Glycemic Goals

<table>
<thead>
<tr>
<th>Target</th>
<th>ADA&lt;sup&gt;1&lt;/sup&gt;</th>
<th>AACE&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C (%)</td>
<td>&lt;7</td>
<td>&lt;6.5</td>
</tr>
<tr>
<td>FPG (mg/dL)</td>
<td>70-130</td>
<td>&lt;110</td>
</tr>
<tr>
<td>2-hour PPG (mg/dL)</td>
<td>&lt;180</td>
<td>&lt;140</td>
</tr>
</tbody>
</table>

(FPG: fasting plasma glucose; PPG: post-prandial glucose)
For information to help select a glucometer for your patients, see Appendix 1. A list of glucometers covered by New Mexico Medicaid and Managed Care Organizations can be found at the following websites:

New Mexico Medicaid
http://www.hsd.state.nm.us/mad/PPPharmacy.html

Presbyterian
http://www.phs.org/PHS/programs/pharmacy/Medicaid/index.htm

Lovelace Health Plan
http://www.lovelacehealthplan.com/documents/LHP%20TWO-TIER%20FORMULARY%205-4-10.pdf

Molina Health Care
http://www.molinahealthcare.com/medicaid/members/nm/drug/Pages/formulary.aspx

Blue Cross Blue Shield

Amerigroup Community Care
https://providers.realsolutions.com/AGP%20Documents/NMCoLTSPDL.pdf

Evercare Health Plan
http://evercarehealthplans.com/medicaid/find_a_drug.jsp?state=NM&plan=Coordination%20of%20Long-Term%20Services%20(CoLTS)

The best way to assess overall blood glucose control is to review the day-to-day SMBG results along with regular A1C results. It is important to note the glucometer test results will likely give a lower blood glucose reading when compared to the laboratory value because labs test plasma and most meters test whole blood. Glycemic goals should be individualized based on the patient’s duration of diabetes, age/life expectancy, co-morbid conditions, known CVD or micro vascular complications and hypoglycemia unawareness. Individual patient considerations should also be noted. Achieving recommended glycemic goals correlates to significant reductions in diabetes complications. The Diabetes Control and Complication Study (DCCT) showed having an A1C at goal reduces the risk of eye disease by 75%, nerve damage by 60%, kidney disease by 50%, and CVD by 42%.

Beyond Glycemic Control: Prevention and Management of Co-Morbidities

Complete diabetes care is complex and goes beyond treatment of hyperglycemia. Preventive therapies and aggressive treatment of co-morbidities and risk factors for long-term complications are as much a part of a comprehensive diabetes care plan as is glycemic control. Recognizing risk factors and monitoring for specific disease markers are important in the management of diabetes and related complications. CVD is the major cause of mortality for individuals with diabetes. Adults with diabetes are two to four times more likely to die of heart disease or stroke than those without diabetes. Reducing cardiovascular risk factors, such as hypertension and dyslipidemia, has been shown to prevent or slow CVD and decrease resulting mortality rates.

Hypertension

Blood pressure control reduces the risk for heart disease and stroke among people with diabetes by 33-50%. It also reduces the risk for retinopathy, nephropathy, and neuropathy by about 33%. Hypertension is generally diagnosed when systolic blood pressure (SBP) is ≥140 mmHg and/or diastolic blood pressure (DBP) is ≥90 mmHg. However, because of the synergistic CVD risks of hypertension and diabetes, the ADA recommends patients with diabetes maintain a SBP ≤130 mmHg and a DBP ≤80 mmHg. Blood pressure should be measured at every routine diabetes visit.

Patients with a systolic BP of 130-139 mmHg or a diastolic BP of 80-89 mmHg may use lifestyle therapies for a maximum of three months. If goals are not achieved, drug therapy should be initiated. Patients with more severe hypertension at diagnosis should receive both pharmacologic and lifestyle therapies initially. Lifestyle therapies include weight loss (if indicated), DASH-diet with reduced sodium and increased potassium intake, moderate
alcohol intake, and increased physical activity. Angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) have been shown to improve cardiovascular outcomes in high-risk patients, as well as delay the progression of nephropathy. The ADA guidelines recommend all patients with diabetes and hypertension be treated with either an ACE inhibitor or an ARB in the absence of contraindications. Multiple drug therapy is generally required to achieve blood pressure targets. The ADA recommends adding a thiazide diuretic if glomerular filtration rate is ≥ 30 mL/min per 1.73m² or a loop diuretic if glomerular filtration rate is <30 mL/min per 1.73m². Closely monitoring serum potassium and kidney function are vital with pharmacologic therapy.

Hyperlipidemia

Patients with type 2 diabetes have an increased prevalence of lipid abnormalities, which contributes to higher rates of CVD. The ADA guidelines recommend all adult patients be tested for lipid disorders at least annually. The primary goal is to lower low-density lipoprotein (LDL) cholesterol to <100mg/dL in patients without overt CVD; a goal of <70mg/dL is an alternative goal for patients with overt CVD. If patients are unable to reach these targets with maximum doses of drug therapy, a reduction in LDL cholesterol of 30-40% from baseline is an alternative therapeutic goal. Interventions to obtain these goals include lifestyle changes, smoking cessation, and pharmacologic therapy. In multiple clinical trials, lipid-lowering therapy has shown significant primary and secondary prevention of CVD events in diabetic patients. The most robust outcomes data is for HMG CoA reductase inhibitors (statins). The ADA recommends adding statin therapy to lifestyle modifications regardless of baseline lipid levels for diabetic patients with overt CVD and those without overt CVD who are over the age of 40 and have one or more additional CVD risk factors. Statin therapy should be considered in lower risk patients if LDL cholesterol is >100 mg/dL or multiple risk factors are present. If targets are not achieved on maximally tolerated statin therapy, other lipid lowering agents may be added.

Preventive Therapy, Routine Screenings, and Patient Education

Utilization of proven intervention and screenings for early detection in conjunction with patient education can reduce the morbidity and mortality associated with diabetes.

Preventive Therapy

Aspirin therapy (75-162 mg/day) is recommended as secondary prevention in diabetic patients (most men >50 years of age and most women >60 years of age) with increased cardiovascular risk (10-year risk >10% with at least one additional risk factor such as family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria). The ADA states clinical judgment is necessary for primary prevention of aspirin therapy in patients at a lower risk (men <50 years of age and women <60 years of age), without other major risk factors. In many trials, aspirin therapy resulted in a 30% decrease in myocardial infarction and a 20% decrease in stroke in a wide range of patients. Clopidogrel therapy (75 mg/day) has been associated with a reduction in CVD rates in diabetic patients and may be considered as adjunctive therapy to aspirin in very high-risk patients or as an alternative in aspirin-intolerant patients.

Routine Screenings

Kidney Function Tests

Diabetic nephropathy occurs in 20-40% of patients with diabetes and is the single leading cause of end-stage renal disease (ESRD). Persistent microalbuminuria (30-299 mg/24h) has been shown to be the earliest stage of diabetic nephropathy in type 1 diabetes and a marker for development of nephropathy in type 2 diabetes. Microalbuminuria is also a well-established marker of increased CVD risk. Annual screening for microalbuminuria is recommended for all diabetic patients. Please note the urine albumin test is not included in a routine urine analysis, it must be ordered separately as a “urine for micro albumin” test. Per ADA guidelines, patients with any degree of albuminuria should be treated with an ACE inhibitor or an ARB, barring contraindications, as these agents have been shown to delay progression of nephropathy.

The ADA guidelines also recommend annual screening for serum creatinine, regardless of the degree of urine albumin excretion, for the estimation of glomerular filtration rate (GFR). GFR is used to stage kidney disease. Stage 3 or higher chronic kidney disease (GFR <60 ml/min per 1.73 m²) in the absence of increased urine albumin excretion occurs in a substantial percentage of adults with diabetes. Thus, screening for urine albumin excretion alone will miss a considerable number of chronic kidney disease cases.
Eye Exams
Diabetes is the leading cause of blindness among adults aged 20-74; diabetic retinopathy accounts for approximately 12,000-24,000 new cases of blindness each year. Annual dilated eye exams are recommended for all patients with diabetes. This exam serves as a measure for early detection of retinopathy so that early intervention with laser photocoagulation surgery can reduce the risk of future visual loss. Detecting and treating diabetic eye disease with laser therapy can reduce the risk for loss of eyesight by about 50-60%.1-3

Foot Exams
Sixty to seventy percent of people with diabetes have mild to severe forms of nervous system damage. Amputation and foot ulceration are the most common consequences of diabetic neuropathy and are major causes of morbidity and disability in people with diabetes. All patients should be screened for distal symmetric polyneuropathy (DPN) when diabetes is first diagnosed and then annually thereafter to identify high-risk foot conditions.3 Foot ulcers are a major predictor of future lower extremity amputation in patients with diabetes. Early recognition and management of independent risk factors can prevent or delay adverse outcomes. Comprehensive foot care programs can reduce amputation rates by 45%-85%.1-2

Patient Education
Diabetes self-management education (DSME) is an integral component of a comprehensive care program. Patient education and involvement are requirements for successful management of diabetes. DSME helps patients optimize metabolic control, prevent and manage complications and maximize quality of life.

A Healthy “Diabetic Diet”
Most patients when diagnosed with diabetes become concerned that having diabetes means not being able to eat the foods they enjoy. Patients may still eat the same kinds of food, but they instead must become more cognizant of how a food selection will affect their blood sugar. Each patient is different when designing a meal plan for a “diabetic diet.” However, for most people with diabetes, the general rule is to have a diet consisting of 40-60% of calories from carbohydrates, 20% from protein, and 30% or less from fat, with less than 7% coming from saturated fat. The diet should also be low in sodium, cholesterol, and added sugar. Tips for managing proper glycemic control with the intake of food include establishing a routine for eating meals, controlling over-eating, and making healthy decisions in the correct amounts and types of food for each meal or snack.5 Taking steps to make better food selections will not only improve glycemic control and potentially decrease episodes of hypo- and/or hyperglycemia, but will also increase quality of life and decrease co-morbid conditions such as hypertension and hyperlipidemia.

The ADA has created an online nutrition tool to help educate patients when it comes to planning their meals, called MyFoodAdvisor™, which can be found at: http://tracker.diabetes.org/myfoodadvisor.html. Aligning a patient with a nutritionist for consultation may also be beneficial, especially for a newly diagnosed diabetic patient, to help provide education about the effects of food on glycemic control.

Physical Activity and Diabetes
Studies have shown that a loss of just five to ten pounds lowers the risk of getting diabetes.4 The ADA recommends a weight loss of 5-10% of body weight, if overweight. The weight loss would be supported through an increase in physical activity of at least 150 minutes/week of moderate-intensity aerobic activity (50-70% of maximum heart rate).3 For patients without contraindications, resistance training three times per week is also recommended.3 Patients need education to understand what healthy weight loss consists of and how to set proper goals, such as diet and exercise, to reach their target weight. Therefore, follow-up on lifestyle counseling is imperative for the achievement of goals.3 In addition, educating patients on the effects of physical activity with diabetes must also be addressed; such as drinking plenty of water while exercising and monitoring for symptoms of hypoglycemia.

Conclusion
Developing and implementing a comprehensive diabetes care management plan can result in improved outcomes, prevention or delay of long-term complications, decreased costs, and increases the quality of life for patients with diabetes.
For more details regarding Diabetes and patient education materials, please visit the following websites or call 1-800-DIABETES:

American Diabetes Association (ADA) www.diabetes.org
American Association of Diabetes Educators (AADE) www.diabeteseducator.org
National Diabetes Education Program (NDEP) www.ndep.nih.gov
International Diabetes Federation (IDF) www.idf.org
Worldwide Initiative for Diabetes Education www.worldwidediabetes.com

References:

To report medical fraud, contact the Medicaid Quality Assurance Bureau. NMMedicaidFraud@state.nm.us or (505) 827-3100 or (505) 827-3185.

We appreciate your continued support of our efforts to encourage quality care for our Medicaid clients. Questions and/or comments about this newsletter may be directed to Diana Moya, R.Ph. at (505) 827-3174 or DianaJ.Moya@state.nm.us
Appendix 1: List of commonly available glucometers and their specifications.7-11

<table>
<thead>
<tr>
<th>Product</th>
<th>Manufacturer</th>
<th>Sample size needed (µL)</th>
<th>Range (mg/dL)</th>
<th>Test time (sec)</th>
<th>Battery</th>
<th>Memory</th>
<th>Miscellaneous Features</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCU-Chek: Aviva®</td>
<td>Roche</td>
<td>0.6</td>
<td>10-600</td>
<td>5</td>
<td>3-volt lithium (2000-test battery life)</td>
<td>500-value memory with 7-, 14- and 30-day averaging; 4 customizable test reminders</td>
<td>Load-and-go drum of 6 pre-loaded test strips; 6 testing sites</td>
<td>1.800.858.8072 <a href="http://www.accu-check.com">www.accu-check.com</a></td>
</tr>
<tr>
<td>ACCU-Chek: Compact Plus®</td>
<td>Roche</td>
<td>1.5</td>
<td>10-600</td>
<td>5</td>
<td>2 regular AAA batteries (1000-test battery life)</td>
<td>500-value memory with 7-, 14- and 30-day averaging; 4 customizable test reminders</td>
<td>Load-and-go drum of 17 pre-loaded test strips; 6 testing sites; detachable lancing device</td>
<td>1.800.858.8072 <a href="http://www.accu-check.com">www.accu-check.com</a></td>
</tr>
<tr>
<td>Ascencia: Contour® TS™</td>
<td>Bayer</td>
<td>0.6</td>
<td>10-600</td>
<td>5</td>
<td>3-volt lithium (1000-test battery life)</td>
<td>Advanced mode: 480-value memory with 7-, 14- and 30-day averaging; selectable post-meal reminder</td>
<td>No Coding™ technology</td>
<td>1.800.348.8100 <a href="http://www.simplewinspro.com">www.simplewinspro.com</a></td>
</tr>
<tr>
<td>Ascencia: Breeze®2™</td>
<td>Bayer</td>
<td>1.0</td>
<td>10-600</td>
<td>5</td>
<td>3-volt lithium (1000-test battery life)</td>
<td>420-value memory with 7-, 14- and 30-day averaging</td>
<td>No Coding™ technology; 10-test strip disc</td>
<td>1.800.348.8100 <a href="http://www.simplewinspro.com">www.simplewinspro.com</a></td>
</tr>
<tr>
<td>FreeStyle: FreedomLite®</td>
<td>Abbott</td>
<td>0.3</td>
<td>20-500</td>
<td>10</td>
<td>CR2032 &quot;coin cell&quot; battery</td>
<td>400-value memory with 7-, 14- and 30-day averaging</td>
<td>No coding; larger buttons and screen; 6 test site options</td>
<td>1.888.522.5226 <a href="http://www.abbottdiabetescare.com">www.abbottdiabetescare.com</a></td>
</tr>
<tr>
<td>OneTouch: Ultra®2™</td>
<td>LifeScan</td>
<td>1.0</td>
<td>20-600</td>
<td>5</td>
<td>3-volt lithium (1000-test battery life)</td>
<td>150-value memory with 14- and 30-day averaging</td>
<td>2 test site options</td>
<td>1.800.524.7226 <a href="http://www.lifescan.com">www.lifescan.com</a></td>
</tr>
<tr>
<td>OneTouch: UltraSmart®</td>
<td>LifeScan</td>
<td>1.0</td>
<td>20-600</td>
<td>5</td>
<td>2 regular AAA</td>
<td>Electronic logbook to create charts and graphs to help lower A1C</td>
<td>2 test site options</td>
<td>1.800.524.7226 <a href="http://www.lifescan.com">www.lifescan.com</a></td>
</tr>
<tr>
<td>Precision: Xtra™</td>
<td>Abbott</td>
<td>0.6</td>
<td>20-500</td>
<td>5</td>
<td>Coin lithium (1000-test battery life)</td>
<td>450-value memory</td>
<td>End-fill/top-fill test strip with visual confirmation; blood ketone testing</td>
<td>1.888.522.5226 <a href="http://www.abbottdiabetescare.com">www.abbottdiabetescare.com</a></td>
</tr>
<tr>
<td>TRUEresult®</td>
<td>Home Diagnostics</td>
<td>0.5</td>
<td>25-600</td>
<td>4</td>
<td>3-volt lithium</td>
<td>500-value memory with 7-, 14- and 30-day averaging; 4 testing reminder alarms</td>
<td>No coding; audible fill detection; can use with TRUE2go meter</td>
<td>1.800.803.6025 <a href="http://www.homediagnostics.com">www.homediagnostics.com</a></td>
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