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**FOR LIFE'S JOURNEY**

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# Diabetes Management for Non-Pregnant Adults in the Outpatient Setting

Clinical Care Guideline

## PURPOSE

To inform decision-making about Diabetes Self-Management Education and medication choices to optimize glycemic control in patients with diabetes mellitus (DM) in the outpatient setting.

## SCOPE

This applies to Denver Health (DH) Ambulatory Care Services (ACS) Adult Patients (>18 years old) that are not pregnant and at least 12 weeks postpartum.

## GUIDELINE

Care providers are expected to follow the most current evidence-based recommendations for diabetes care detailed in the American Diabetes Association's *Standards of Medical Care in Diabetes*. The 2019 Standards are attached and can be viewed at: ([http://care.diabetesjournals.org/content/42/Supplement\\_1](http://care.diabetesjournals.org/content/42/Supplement_1)).

The following is a summary of the 2019 ADA *Standards of Care* and the *Management of Hyperglycemia in Type 2 Diabetes, 2018* (<https://doi.org/10.2337/dci18-0033>) consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD), with additional specific guidance for Denver Health providers.

### A. CLASSIFICATION AND DIAGNOSIS OF DIABETES

1. Use Hemoglobin **A1c** as the preferred screening test for prediabetes and diabetes. Risk of future diabetes is continuous and becomes disproportionately greater at the higher end of the range. In absence of unequivocal hyperglycemia, confirm results by repeat testing.
2. A1c ranges:
  - Normal = <5.7%
  - Prediabetes = 5.7-6.4%
  - Diabetes = >6.5%

3. Distinguishing Type 1 from Type 2 diabetes- Measure glutamic acid decarboxylase (GAD) antibodies and c-peptide secretion to distinguish type 1 from type 2 diabetes. The presence of two or more of the following should raise suspicion for type 1 diabetes: age of onset <50 years, acute symptoms, body mass index (BMI) <25 kg/m<sup>2</sup>, and personal or family history of autoimmune disease. Individuals in whom the diagnosis of type 2 diabetes is uncertain can be referred to the Endocrinology Clinic for evaluation.
4. Screening- Screen all adults beginning **at age 45 years (regardless of BMI or risk factors)**, and younger adults who are overweight or obese (BMI ≥25 kg/m<sup>2</sup> (or ≥23 kg/m<sup>2</sup> in Asian) **and** have one or more of the following additional **risk factors** for diabetes:
  - First-degree relative with diabetes
  - High-risk race/ethnicity (e.g. African American, Latino, Native American, Asian American, Pacific Islander)
  - History of CVD
  - Other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)
  - Physical inactivity
  - Women with polycystic ovary syndrome
  - HLD cholesterol level <35 mg/dL and/or a triglyceride level >250 mg/dL
  - Hypertension (≥140/90 mmHg or on therapy for hypertension)
5. Test individuals with **prediabetes** and anyone on **atypical antipsychotic** medication **every year**, and individuals with **normal** screening every **1-3** years (depending on risk status).
6. Evaluate individuals with **prediabetes** for other cardiovascular disease risk factors.

#### B. PREVENTION OR DELAY OF TYPE 2 DIABETES

1. Refer individuals with prediabetes to an intensive behavioral lifestyle intervention program modeled on the Diabetes Prevention Program to achieve and maintain 7% weight loss and increase moderate-intensity physical activity to at least 150 min/week.
2. Consider metformin therapy for prevention of diabetes, particularly for individuals with BMI ≥35 kg/m<sup>2</sup>, those less than 60 years of age, and women with history of gestational diabetes.

#### C. COMPREHENSIVE MEDICAL EVALUATION AND ASSESSMENT OF COMORBIDITIES

1. Complete a comprehensive diabetes medical evaluation at the initial, follow-up, and annual visits for all individuals with diabetes (See ADA Standards, Table 4.1)

#### D. LIFESTYLE MANAGEMENT

1. DSMES- All individuals with diabetes should receive DSMES. Evaluate the need for DSMES at diagnosis, annually, when complications arise, and after transitions of care. Referrals for Denver Health DSME classes can be made through Epic.
2. Nutrition therapy- An individualized medical nutrition therapy program is recommended for all individuals with type 1 or type 2 diabetes, prediabetes, and gestational diabetes. Encourage individuals with diabetes to eat a healthy balanced diet, with reduced intake of refined carbohydrates and added sugars, and a focus on nutrient-dense carbohydrates that are high in fiber, including vegetables, legumes, fruits, dairy (milk and yogurt), and whole grains. Discourage consumption of sugar-sweetened beverages and processed “low-fat” or “nonfat” food products with high amounts of

refined grains and added sugars in all individuals.

3. Weight management - Refer individuals who are overweight or obese and have type 2 diabetes or prediabetes to weight-loss intervention programs. Goal weight loss should be >5% and should be achieved by the combination of reduced caloric intake and lifestyle modification.
4. Physical activity- Most adults with diabetes should engage in 150 minutes or more of moderate-to-vigorous intensity aerobic activity per week, spread over at least 3 days/week, with no more than 2 consecutive days without activity. Shorter durations (minimum 75 min/week) of vigorous-intensity or interval training may be sufficient for younger and more physically fit individuals. Adults with diabetes should engage in 2-3 sessions/week of resistance exercise on nonconsecutive days. All adults, particularly those with type 2 diabetes, should minimize prolonged sitting/sedentary behavior.
5. Smoking Cessation- Advise all individuals to not use cigarettes or other tobacco products, or e-cigarettes.
6. Psychosocial Issues- All individuals with diabetes should be evaluated for psychosocial factors that may affect diabetes control, including: attitudes about diabetes, expectations for medical management and outcomes, affect or mood, general and diabetes-related quality of life, available resources (financial, social, and emotional), and psychiatric history. Consider screening for symptoms of diabetes distress, depression, anxiety, disordered eating, and cognitive impairment.

#### E. GLYCEMIC MONITORING AND TARGETS

1. Monitoring
  - a. Establish and review A1c/blood glucose target and monitoring frequency at every visit
  - b. Most individuals using intensive insulin regimens (multiple-dose insulin or insulin pump therapy) should perform self-monitoring of blood glucose (SMBG) prior to meals and snacks, at bedtime, occasionally postprandially, prior to exercise, when they suspect low blood glucose, after treating low blood glucose until blood sugar normalizes, and prior to critical tasks such as driving.
  - c. SMBG can help guide treatment decisions and/or self-management for individuals on less frequent insulin injections. Bluetooth-enabled glucometers can be downloaded for data review at the time of the clinic visit.
  - d. Continuous glucose monitoring (CGM) along with intensive insulin regimens, is a useful tool to lower A1c in adults with type 1 diabetes who are not meeting glycemic targets.
  - e. Intermittently scanned continuous glucose monitoring may be considered as a substitute for self-monitoring in adults with diabetes requiring frequent glucose testing, but is not recommended for most DH patients at this time due to high cost and no proven benefit over SMBG with finger-sticks.
  - f. DH patients for whom CGM is deemed appropriate should be referred to Endocrine Clinic for assessment, ordering, and CGM education.
2. Check A1c **every 3 months** in individuals who are not at goal or whose therapy has changed, and **every 6 months** in individuals at goal and with no change in therapy.
3. A1c target

- a. The **A1c target for most non-pregnant adults with diabetes should be <7%**.
  - b. A more stringent A1c target of <6.5% may be appropriate for certain individuals (those with diabetes for less than 5 years, type 2 diabetes treated with lifestyle +/- metformin only, long life expectancy, or no significant cardiovascular disease) as long as it can be achieved without hypoglycemia.
  - c. A less stringent A1c target of <8% or <8.5% may be appropriate for individuals with a history of severe hypoglycemia, limited life expectancy, advanced microvascular or macrovascular complications, extensive comorbid conditions, or long-standing diabetes in whom the goal is difficult to achieve despite diabetes self-management education, appropriate glucose monitoring, and effective doses of multiple glucose-lowering agents including insulin.
  - d. A1c < 8% within the last 3 months is generally adequate for elective surgery. Individuals who are not eligible for surgery due to high A1c but are motivated to improve their glycemic control can be referred to Clinical Pharmacist or Endocrinology for intensive management.
  - e. There is no benefit to A1c target or A1c monitoring for patients at end of life.
4. SMBG (self-monitored blood glucose) goal- A1c levels correlate to the following SMBG goals:
- a. **A1c < 7%:**
    - Fasting 80-130 mg/dL
    - Pre-prandial 80-130 mg/dL
    - 2 hour post-prandial < 180 mg/dL
    - Bedtime 100-150 mg/dL
  - b. A1c < 8%
    - Fasting 100-150 mg/dL
    - Pre-prandial 100-150 mg/dL
    - 2 hour post-prandial < 200 mg/dL
    - Bedtime 150-200 mg/dL
5. Hypoglycemia
- a. Hypoglycemia classifications
    - i. Hypoglycemia alert value (level 1) - blood glucose **≤70 mg/dL**. Should prompt treatment with fast-acting carbohydrate and dose adjustment of glucose lowering therapy.
    - ii. Clinically significant hypoglycemia (level 2) – blood glucose **<54 mg/dL**. Sufficiently low to indicate serious, clinically important hypoglycemia.
    - iii. Severe hypoglycemia (level 3) - No specific glucose threshold. Hypoglycemia **associated with severe cognitive impairment requiring external assistance** for recovery.
  - b. Hypoglycemia treatment
    - i. Treat conscious individuals with blood glucose ≤70 mg/dL with 15-20 grams oral glucose, or any form of carbohydrate that contains glucose. Repeat treatment after 15 minutes if SMBG shows continued hypoglycemia. Once SMBG returns to normal, individual should eat a meal or snack to prevent recurrence of hypoglycemia.
    - ii. Prescribed glucagon for all individuals at increased risk of clinically-significant

hypoglycemia. Family members/friends/caregivers should know where glucagon is kept and when and how to administer it.

- iii. Re-evaluate treatment regimen in all patients with hypoglycemia

#### F. PHARMACOLOGIC APPROACHES TO GLYCEMIC TREATMENT

1. Type 1 diabetes- Refer individuals with type 1 diabetes to Endocrinology for ongoing management.
2. Type 2 diabetes- general recommendations
  - a. Individualized glycemic management can be achieved by following the steps outlined in the Decision Cycle for Patient-centered Glycemic Management in Type 2 Diabetes figure from the ADA Standards 2019 document (See ADA Standards, Figure 4.1)
3. Type 2 diabetes management- (See ADA Standards, Figure 9.1)
  - a. **First-line** therapy for **ALL** individuals with type 2 diabetes- **metformin** and comprehensive lifestyle interventions including weight management and physical activity. Consider early combination therapy if A1c is > 9.5% or > 1.5% above goal
  - b. **Intensification** of therapy for individuals **WITH established ASCVD or CKD** (See ADA/EASD Consensus Report, Figure 3) - SGLT2i or GLP-1 RA with proven ASCVD/CKD benefit are preferred.
    - i. If **A1c is AT GOAL**, individual is already **on two or more** glucose lowering medications, and is **NOT on an SGLT2i or GLP-1 RA**,
      - a. Consider **switching** to agent with proven CVD benefit as detailed below, **OR**
      - b. Reconsider/**lower A1c goal** and **add** SGLT2i or GLP-1 RA, **OR**
      - c. **Reassess A1c every 3 months** and add SGLT2i or GLP-1RA if A1c increases above goal
    - ii. **If ASCVD predominates**,
      - a. **Second-line** agent- **GLP-1 RA** and **SGLT2i** are preferred
        - i. **GLP-1 RA with proven CVD benefit** (strongest evidence for liraglutide > semaglutide > exenatide extended release), **OR**
        - ii. **SGLT2i with proven CVD benefit** if eGFR adequate (evidence modestly stronger for empagliflozin > canagliflozin; see ADA Standards, Table 9.1 for renal dosing recommendations)
      - b. **Fourth- or fifth-line- DPP-4i** if not on GLP1 RA, **Basal insulin** (degludec or U100 glargine have demonstrated CVD safety), **TZD, Sulfonylurea** (choose later generation SU with lower risk of hypoglycemia)
    - iii. **If HF or CKD predominates**,
      - a. **Second-line- SGLT2i with evidence of reducing HF and/or CKD progression** if eGFR is adequate (empagliflozin or canagliflozin; see ADA Standards, Table 9.1 for renal dosing recommendations)
      - b. **Third-line-** if SGLT2i not tolerated or contraindicated or if eGFR less than adequate

add **GLP-1 RA with proven CVD benefit** (strongest evidence for liraglutide > semaglutide > exenatide extended release; caution in ESRD)

c. **Fourth- or fifth-line- (Avoid TZD in the setting of HF)**

- i. **DPP-4i (not saxagliptin)** in the setting of HF (if not on GLP-1 RA)
- ii. **Basal insulin** (degludec or U100 glargine have demonstrated CVD safety)
- iii. **Sulfonylurea** (choose later generation SU with lower risk of hypoglycemia)

c. **Intensification of therapy for individual WITHOUT established ASCVD or CKD**

i. If compelling **need to minimize hypoglycemia** (See ADA/EASD Consensus Report, Figure 5)

a. **Second-line**

- i. **DPP4i or GLP-1 RA, OR**
- ii. **SGLT2i** if eGFR adequate (see ADA Standards, Table 9.1 for renal dosing recommendations), **OR TZD**

b. **Fifth and sixth-line agents:**

- i. **Later generation sulfonylurea (SU)**
- ii. **Basal insulin** with lower risk of hypoglycemia (Degludec/glargine U300 < glargine U100 < NPH insulin)

ii. If compelling **need to minimize weight gain or promote weight loss** (See ADA/EASD Consensus Report, Figure 4)

a. **Second- and third-line**

- i. **GLP-1 RA** with good efficacy for weight loss (semaglutide > liraglutide > dulaglutide > exenatide > lixisenatide), **OR**
- ii. **SGLT2i** if eGFR adequate (see ADA Standards, Table 9.1 for renal dosing recommendations),

b. **Fourth-line**

- i. **Add DPP-4i** if not on GLP-1 RA, **OR**
- ii. **If DPP-4i not tolerated or contraindicated or patient on GLP-1 RA, cautious addition of: later generation SU, low dose TZD, or basal insulin**

iii. **If Cost** is a major issue for patient, and **no specific comorbidities** (no established CVD or CKD, lower risk of hypoglycemia, and lower priority to avoid weight gain or no weight-related comorbidities); (See ADA/EASD Consensus Report, Figure 6). NOTE- Standards of care recommendations should be followed for all patients regardless of payer source or insurance. Low-cost algorithm should only be followed if patient is unable to otherwise afford recommended medication regimen. Discount programs and Patient Assistance Programs are available for most Denver Health patients who do not have health insurance.

a. **Second-line- (Add based on lowest cost for patient):**

- i. **later generation SU**, OR
      - ii. **TZD** (low-dose TZDs are better tolerated), OR
      - iii. **DPP-4i**, OR
      - iv. **SGLT2i**
    - b. **consider addition of basal insulin with lowest acquisition cost**
  - d. **Intensification to injectable therapies** (See ADA Standards, Figure 9.2)
    - i. Consider initial injectable combination (i.e. GLP-1 RA + basal insulin or prandial/basal insulin) if A1c >10% or >2% above goal
    - ii. If A1c above target despite dual/triple therapy
      - a. Consider GLP-1 RA prior to insulin in most patients. If CVD, consider GLP-1 RA with proven CVD benefit
      - b. Consider insulin as first injectable if A1c >11%, symptoms or evidence of catabolism suggestive of insulin deficiency (weight loss, polyuria, polydipsia), or if type 1 diabetes is a possibility (refer to Endocrinology for evaluation and management).
      - c. If already on GLP-1 RA or if GLP-1 RA not appropriate OR insulin preferred, proceed with addition of insulin (see below)
    - iii. If A1c continues above goal after 3 months of maximum-tolerated dose of GLP-1 RA, add basal insulin.
      - a. Initiation for basal insulin- start 10 units/day OR 0.1-0.2 units/kg/day.
      - b. Titration for basal insulin- Instruct patient on self-titration or refer to Nurse-run insulin titration program. Set fasting plasma glucose target that correlates to A1c goal (See section 5) GLYCEMIC MONITORING AND TARGETS, d) SMBG goal). Choose evidence-based titration algorithm, i.e. increase 2 units every 3 days to reach fasting glucose target without hypoglycemia. Determine cause for hypoglycemia if it occurs. If no clear reason, lower dose by 10-20%
      - c. For patients on GLP-1 RA and basal insulin, consider referral to Endocrinology for consideration of fixed dose GLP-1 RA/insulin combination pens (iDegLira or iGlarLixi)
    - iv. If A1c continues above goal after 3 months despite adequately titrated basal insulin, OR once basal dose >0.7-1.0 units/kg OR fasting glucose at target, add prandial insulin
      - a. Initiation- Dose prandial insulin with largest meal or meal with greatest postprandial glucose excursion. Rapid-acting analog insulin (lispro/Humalog or aspart/Novolog) is preferred over regular insulin due to its shorter duration of action. Start with 4 units per day or 10% of basal dose. If A1c <8%, consider lowering the total insulin dose by 4 units per day or 10% of basal dose.
      - b. Titration of prandial insulin- Increase dose by 1-2 units or 10-15% twice weekly. Determine cause for hypoglycemia if it occurs. If no clear reason, lower corresponding dose by 10-20%. If A1c continues above goal after 3 months, despite 1 injection of prandial insulin daily, add additional injections of prandial insulin. Add 1 injection of

prandial insulin with second-largest meal or meal with second-largest glucose excursion. NOTE- stepwise addition of prandial insulin every 3 months is associated with lower risk of hypoglycemia and increased patient satisfaction compared with immediate introduction of full basal-bolus regimen

- v. Consider twice or three times daily premixed insulin regimen instead of basal-bolus injections
  - a. Regular/NPH premixed insulin is more affordable than analog premixed insulin (Humalog 70/30 but has higher risk of hypoglycemia due to its physiologic action profile
  - b. Initiation of premixed insulin twice daily- In insulin-naïve patients, start 10-12 units or 0.3 units/kg. If already on insulin, divide current basal dose into  $\frac{2}{3}$  AM and  $\frac{1}{3}$  PM, OR  $\frac{1}{2}$  AM and  $\frac{1}{2}$  PM
  - c. Titration of premixed insulin twice daily- Increase dose by 1-2 units or 10-15% once or twice weekly until SMBG target is reached. Determine and address cause for hypoglycemia. If no clear cause, decrease corresponding dose by 2-4 units or 10-20%.
  - d. Titration to premixed insulin three times daily- Add additional injection before lunch. Increase dose by 1-2 units or 10-15% once or twice weekly until SMBG target is reached. Determine and address cause for hypoglycemia. If no clear cause, decrease corresponding dose by 2-4 units or 10-20%.
- vi. Considerations for oral therapy in combination with injectable therapies
  - a. Metformin- continue treatment with metformin
  - b. TZD- consider reducing dose or stopping when adding insulin to avoid fluid retention and/or weight gain
  - c. Sulfonylurea- Stop, or reduce dose by 50% when basal insulin started to avoid hypoglycemia. Stop if prandial insulin or premixed insulin is started.
  - d. SGLT2i- Continue SGLT2i when adding injectable therapy. Consider adding SGLT2i when on injectable therapy if patient has established ASCVD, if A1c above target, or as weight reduction aid. Beware euglycemic DKA in type 1 DM.
  - e. DPP-4i- stop if GLP1 RA started

#### 4. REFERRALS

- a. Patients who require titration of basal insulin can be referred to RN for Insulin Titration Protocol
- b. Referral to Clinical Pharmacist is recommended for patients who have inadequate glycemic control and are on complex medical regimens and/or have diabetes comorbidities requiring medical management.
- c. Management by Endocrinology is recommended for the following patients with diabetes:
  - i. Patients with type 1 diabetes
  - ii. Patients on an insulin pump



- iii. Patients receiving concentrated insulin
- iv. Patients with history of severe or clinically significant hypoglycemia (severe cognitive impairment requiring external assistance for recovery, history of confirmed BG <54 mg/dL, or BG <70 mg/dL despite medication adjustment after initial occurrence)
- v. Patients with hypoglycemia unawareness
- vi. Patients with ESRD, on dialysis
- vii. Patients with steroid-induced hyperglycemia

## G. CARDIOVASCULAR DISEASE AND RISK MANAGEMENT

### 1. Hypertension/Blood pressure control

- a. Diagnosis – hypertension is defined as a sustained blood pressure  $\geq 140/90$  mmHg.
- b. Treatment Goals
  - i. ASCVD risk score <15% - treat to blood pressure goal of <140/90 mmHg
  - ii. ASCVD risk score >15% - treat to blood pressure goal of <130/80 mmHg
- c. Treatment Strategies for Hypertension in Patients with Diabetes (See ADA Standards, Figure 10.1)
  - i. Choice of agent
    - a. - If albuminuria- start ACEi or ARB agent
    - b. - If no albuminuria- start ACEi, ARB, CCB, or Diuretic (chlorthalidone and indapamide preferred)
  - ii. For patients with blood pressure  $\geq 160/100$  mmHg- start lifestyle intervention and two blood pressure agents
  - iii. For patients with blood pressure not at target after maximum-tolerated titration of above agents- consider addition of Mineralocorticoid Receptor Antagonist

### 2. Lipid Management

- a. Screening and monitoring
  - i. Patients not on statins or other lipid-lowering therapy should have fasting lipids checked at time of diabetes diagnosis, at initial medical evaluation, and **every 1-5 years** thereafter depending on risk for ASCVD
  - ii. Patients with dyslipidemia and/or on lipid therapy should have fasting lipids **every year** to monitor response to therapy and adherence
- b. Risk evaluation and Management
  - i. **Familial Hypercholesterolemia**- Patients with LDL $\geq 190$  mg/dL, regardless of age, should be treated with high dose statin therapy and referred to Endocrinology for evaluation of Familial Hypercholesterolemia and further management
  - ii. **Secondary Prevention** - Patients with diabetes and **ASCVD**, regardless of age, should be

treated with **high** dose statins +/- ezetimibe or PCSK9 inhibitor to **LDL goal <70 mg/dL**

iii. **Primary Prevention-**

- a. Patients with baseline LDL<190 mg/dL, no ASCVD, and **age >=40 years** should be started on **moderate** dose statin therapy
- b. Consider moderate dose statin therapy in patients **younger** than 40 years with **high risk for ASCVD**

c. Moderate- and High-Intensity Statin Therapy

i. **Moderate-Intensity-** lowers LDL cholesterol by 30-50%:

- Atorvastatin/Lipitor 10-20 mg
- Rosuvastatin/Crestor 5-10 mg
- Simvastatin/Zocor 20-40 mg
- Pravastatin/Pravachol 40-80 mg
- Fluvastatin/Lescol XL 80 mg
- Pitavastatin/Livalo 2-4 mg

ii. **High-Intensity-** lowers LDL cholesterol by >=50%

- Atorvastatin/Lipitor 40-80 mg
- Rosuvastatin/Crestor 20-40 mg

3. Antiplatelet Agents

a. Secondary Prevention- Patients with diabetes and ASCVD

- i. aspirin therapy (75-162 mg/day)
- ii. clopidogrel (75 mg/day) if allergic to aspirin

b. Primary Prevention- Patients with diabetes and NO ASCVD

- i. Determine cardiovascular risk and safety profile. Consider aspirin (75-162 mg/day) for patients with:
  - a. Type 1 or 2 diabetes, AND
  - b. >=50 years of age, AND
  - c. At least 1 additional major risk factor:
    - Family history of premature ASCVD
    - Hypertension
    - Dyslipidemia
    - Smoking
    - Albuminuria
  - d. AND, not at increased risk of bleeding

4. Coronary Heart Disease

a. Screening- consider screening in the presence of any of the following:

- i. Atypical cardiac symptoms (e.g., unexplained dyspnea, chest discomfort)
- ii. Signs or symptoms of associated vascular disease including carotid bruits, transient

ischemic attack, stroke, claudication, or peripheral arterial disease, OR

iii. Electrocardiogram abnormalities (e.g., Q waves)

b. Treatment

i. In patients with known ASCVD, consider ACEi or ARB to reduce the risk of cardiovascular events

ii. In patients with prior MI, continue beta-blockers for at least 2 years after the event

iii. In patients with CHF, metformin can be used if eGFR remains  $>30$  mL/min/1.73 m<sup>2</sup> but should be avoided in unstable or hospitalized patients

c. In patients with ASCVD, antihyperglycemic therapy should begin with lifestyle management and metformin and subsequently incorporate an agent proven to reduce major adverse cardiovascular events and cardiovascular mortality (see Section 6, PHARMACOLOGIC APPROACHES TO GLYCEMIC TREATMENT)

H. MICROVASCULAR COMPLICATIONS AND FOOT CARE

1. Diabetic Kidney Disease

a. Screening- assess urinary albumin and assess glomerular filtration rate at least once per year in patients with:

- Type 1 diabetes with duration of  $\geq 5$  years
- Type 1 diabetes and comorbid hypertension
- Type 2 diabetes

b. Treatment

i. Optimize glucose control

ii. Optimize blood pressure control

iii. For patients with nondialysis-dependent diabetic kidney disease, limit dietary protein intake to no more than 0.8g/kg body weight/day.

iv. Use ACEi or ARB as first-line treatment for hypertension in patient with proteinuria and/or decreased eGFR.

v. Consider use of SGLT2i or GLP-1 RA as second-line treatment (after metformin) for glycemic control in patients with chronic kidney disease (See Section 6, PHARMACOLOGIC APPROACHES TO GLYCEMIC TREATMENT)

vi. Monitoring of urinary albumin-to-creatinine ratio in patients with albuminuria treated with ACEi or ARB is reasonable to assess response to treatment and progression of diabetic kidney disease.

vii. Patients with eGFR  $<30$  mL/min/1.73 m<sup>2</sup>, uncertain etiology of kidney disease, rapidly progressing kidney disease, or difficult management issues should be referred to Nephrology for evaluation and treatment.

2. Diabetic Retinopathy

a. Screening

- i. Adults with type 1 diabetes- initial dilated and comprehensive eye examination within 5 years of onset of diabetes
    - ii. Type 2 diabetes- initial dilated and comprehensive eye examination at time of diagnosis
    - iii. Continue screening every 1-2 years if no evidence of retinopathy and glycemia is well controlled; every year or more frequently if diabetic retinopathy is present.
  - b. Management
    - i. Patients with any level of macular edema, severe non-proliferative retinopathy, or any proliferative diabetic retinopathy, should be managed by Ophthalmology.
- 3. Neuropathy
  - a. Screening
    - i. Screen patients with type 1 diabetes starting 5 years after diagnosis, and then annually
    - ii. Screen patients with type 2 diabetes at diagnosis and then annually
    - iii. Assess for distal symmetric polyneuropathy with:
      - Temperature or pinprick sensation (small fiber function)
      - Vibration sensation using 128-Hz tuning fork (large-fiber function)
      - 10-g monofilament test- protective sensation (risk for ulceration and amputation)
  - b. Differential diagnosis- diabetic neuropathy is a diagnosis of exclusion. Consider other causes of neuropathy including:
    - Vasculitis
    - Inherited neuropathies
    - Chronic inflammatory demyelinating neuropathy
    - Infections (HIV)
    - Malignancies (multiple myeloma, bronchogenic carcinoma)
    - Renal disease
    - Hypothyroidism
    - Vitamin B12 deficiency (increased risk with metformin therapy)
    - Neurotoxic medications (chemotherapy)
    - Toxins (alcohol)
  - c. Treatment
    - i. Optimize glucose control to prevent or delay the development of neuropathy in patients with type 1 diabetes and too slow the progression of neuropathy in patients with type 2 diabetes
    - ii. Assess and treat to reduce pain related to diabetic peripheral neuropathy and symptoms of autonomic neuropathy and to improve quality of life
    - iii. Pregabalin/Lyrica or duloxetine/Cymbalta are recommended as initial treatments for neuropathic pain
    - iv. Medications not approved for the treatment of painful diabetic peripheral neuropathy (tricyclic antidepressants, gabapentin, venlafaxine, tramadol, and topical capsaicin) may also be effective and can be considered for use.

#### 4. Foot Care

##### a. Evaluation

- i. A comprehensive foot evaluation is recommended at least annually to identify risk factors for ulcers and amputations.
- ii. Foot examination should include:
  - Inspection of the skin
  - Assessment of foot deformities
  - Neurological assessment (10-g monofilament testing with at least one other assessment: pinprick, temperature, vibration), and
  - vascular assessment including pulses in the legs and feet
- iii. Patients with symptoms of claudication or decreased or absent pedal pulses should be referred for ankle-brachial index and for further vascular assessment as appropriate

##### b. Prevention and Treatment

- i. Provide general preventive foot self-care education to all patients with diabetes
- ii. Specialized therapeutic footwear is recommended for patients with high risk for diabetic ulcers including those with severe neuropathy, foot deformities, or history of amputation
- iii. Refer patients with foot ulcers to the DH Wound Care clinic

## PROCEDURES

Follow treatment recommendations detailed in the most current American Diabetes Association Standards of Medical Care in Diabetes document and additional specific Denver Health recommendations detailed in this Guideline.

## EXTERNAL REFERENCES

- A. Standards of Medical Care in Diabetes- 2019. Diabetes Care, 2019; 42(Suppl. 1):S1-S193. Freely accessible online at [care.diabetesjournals.org/content/42/Supplement\\_1](http://care.diabetesjournals.org/content/42/Supplement_1).
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## ATTACHMENTS

None

## Attachments

No Attachments

## Approval Signatures

Step Description	Approver	Date
	Thomas MacKenzie: Chief Quality Officer	02/2019
Nursing Services Advisory Council	Adrienne Bauer: RN Nursing Program Mgr.	01/2019
	Tara Vlasimsky: Assistant Director, Ambulatory Pharmacy Lic 18091	01/2019
	Debra Gardner: Assistant Chief Nursing Officer	01/2019
Diabetes QI Workgroup	Rocio Pereira: Physician - Endocrinology	01/2019
Formatting Review	Colette Morris: Program Manager of Document Management	01/2019
	Rocio Pereira: Physician - Endocrinology	01/2019

## Applicability

Denver Health

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