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CHAPTER 4

Guideline for the Care of the Older Adult With Diabetes

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Objective: The Joslin Guideline for the Care of the Older Adult with Diabetes is designed to assist primary care physicians, specialists, and other healthcare providers in addressing the unique challenges and issues of the older person with diabetes. The guideline should be used in conjunction with Joslin's Clinical Guideline for Adults with Diabetes as well as Joslin's Clinical Guideline for Pharmacological Management of Adults with Type 2 Diabetes (T2D).

The primary goal of diabetes management in older adults is to achieve balance between optimal glycemic control to prevent and/or slow the onset and progression of acute and chronic complications, while avoiding hypoglycemia and its consequences. Hypoglycemia can result in worse outcomes in older adults as it can lead to traumatic falls and worsening of chronic conditions such as cognitive dysfunction. Therefore, in many cases, aggressive treatment may not be appropriate if the older adult's comfort, safety, and overall quality of life are thereby compromised, or if aggressive treatment may not improve outcomes. Recent consensus on the management of diabetes recommends individualization of treatment goals based on coexisting medical conditions, cognitive status, functionality, and available resources. The older adult's view on illness, health, and aging should also be considered. Appropriate support systems for complex diabetes are not uniformly available nationwide. As a result, treatment decisions become more complex as the capacity to cope with self-care declines.

To assist with self-care, education strategies also require adaptation for aging. Learning new diabetes self-management skills may be difficult for older people, increasing the need for education to proceed in a simple, step-like manner. Cognitive dysfunction, depression, and functional disabilities (such as vision and hearing deficits and a decline in dexterity) are important issues to consider when assessing the older adult's ability for self-care. Involvement of family members or friends may be required to assure appropriate self-care and adherence to treatment programs.

Portions of this guideline are based upon recommendations of the International Diabetes Federation's Global Guideline for Managing Older People with Type 2 Diabetes and the American Diabetes Association/American Geriatrics Society Consensus Report on Diabetes in Older Adults.

4.1.0 GENERAL CONSIDERATIONS

- In determining treatment plans and goals, individualized patient assessment is required, being cognizant of the following:
  - Chronological age versus actual health status
  - Duration of disease and age of onset (for example, older-age onset of T2D is more prominent in non-Hispanic whites and is associated with a lower likelihood of insulin use than middle-age onset; retinopathy is more likely to occur in middle-age–onset rather than older-age–onset diabetes. There is no difference in coronary artery disease or neuropathy prevalence in middle vs older age onset)
  - Presence of complications and comorbidities
  - Life expectancy
  - Social support system
  - Financial status
  - Patient preferences
- Treatment programs should be simplified to decrease

TABLE 1. Geriatric Syndrome: Screening and Modifications

Condition	Clinical Presentation	Shorn Screening Test	Modification to Treatment Plans and Goals
Cognitive dysfunction	• Decline in self-care and/or worsening of glycemic control without clear etiology • Appears stubborn or not able to follow instructions • Seems uninterested in helping him/herself • Makes errors, especially when problem-solving	• Clock drawing test • MiniCog test[a] • Montreal Cognitive Assessment Test[b]	• Avoid tight glucose control and complex diabetes medication programs • Educate caregivers and seek their support in managing the patient's diabetes • Repeat important education topics at each visit, eg, how to recognize and treat hypoglycemia • Avoid diabetes medications that have a risk of hypoglycemia, as the hypoglycemia may go unnoticed and untreated • Recommend reminders, such as alarms, notes, and pill boxes, for taking medications or eating meals
Depression	• Seems uninterested in helping him/herself • Is less interested in activities • Seems overwhelmed with life events • Has a decline in self-care and/or worsening of glycemic control without clear etiology	• Patient Health Questionnaire (PHQ-2) • Geriatric Depression Scale	• Assess and treat depression
Physical disabilities • Vision impairment • Hearing loss • Gait abnormality	• Dosing errors • Discrepancies between log book and meter download • Disinterest in conversation • Inactivity, lack of follow-up with exercise recommendations • Reports of falls	• Vision and hearing screening • Physical exam to evaluate for peripheral neuropathy • Ask about recent falls and fear of falls • Assess for risk factors for falls • Bone-density study to evaluate bone heath and fracture risk	• Recommend use of assistive devices for vision and hearing impairment, such as hearing aids, talking glucose meters, glucose meters with large readouts, magnifiers • Recommend use of assistive devices such as cane or walker for balance and gait issues • Recommend safe-venue, supervised exercise program/physical therapy • Recommend an exercise program that is suitable for the patient's current level of activity, eg, wheelchair exercises, exercise pedals, etc

Malnutrition/ weight loss	• Weight loss
	• Dental issues
		• Nutrition assessment tools, eg, DETERMINE survey	• Avoid restrictive diets; encourage adequate calories, hydration, protein intake, nutrition supplements
			  - Consider Meals on Wheels if unable to shop/cook for self
			  - Consider communal meals at senior centers if socially isolated
			  - Consider community food pantries if finances impede healthy food purchases.
			• Encourage regular dental checkups

Polypharmacy/ medication nonadherence	• Fluctuations in glucose, blood pressure, and/or cholesterol levels • Inability to accurately list names and doses of medications • Voices lack of trust in medication safety or efficacy • Appears overly medicated	• Carefully reconcile medication list at each visit • Assess for lack of resources	• Ask patient to carry current medication list with them • Ask patient what he/she actually takes on the list of medications they carry • When possible, discontinue medications that have no clear benefit • Look for medication adverse effect or drug–drug interaction as the possible cause of any new symptoms • If needed, review patient's medication refill history with their pharmacy • Refer patient/family to financial resources to assist with obtaining needed medications

[a]MiniCog. Screening for impairment in older adults. [b]Montreal Cognitive Assessment Test.

the potential of medication errors and to avoid overwhelming the patient and their caregivers.
- Treatment goals should be reassessed at frequent intervals as health status can change quickly in older adults.

4.2.0 GERIATRIC SYNDROME

The table below lists a group of conditions collectively called *geriatric syndrome*, which occurs more frequently in older adults with diabetes. These conditions can interfere with a patient's ability to perform self-care activities and make healthcare more challenging for the older adult and for their caregivers. The table below includes the condition, possible clinical presentations, commonly used short clinical screening tests, and suggested modifications to treatment plans and goals to compensate for the condition.

4.3.0 DIAGNOSIS

See Joslin's Clinical Guideline for Adults with Diabetes (Chapter 1) for more details.

CDC data indicate that about half of older adults have prediabetes. It is recommended that all adults ≥45 years of age be screened for diabetes every 1-3 years using a glycated hemoglobin (A1C), fasting glucose, or oral glucose tolerance test. This recommendation should be modified for those with shorter life expectancies and those with multiple comorbidities.

4.4.0 TREATMENT GOALS

See Joslin's Clinical Guideline for Adults with Diabetes for more details. Treatment goals are modified for health status, based on recommendations from the American Diabetes Association.

Treatment goals for A1C, glucose, blood pressure, and lipid levels should be modified for the older adult based on patient characteristics and on health status. See Table 2 below.

4.5.0 EDUCATION

Education strategies require adaptation for aging. Simplify and focus programs:

- Use focused educational material that is easy to follow and excludes extraneous information.
- Provide individual rather than group education if the patient has cognitive or physical deficits.
- Focus on 1-2 topics at a time. Repetition and re-education are needed for many older adults.
- Education sessions should be slow-paced, with instruction occurring in steps.
- Multiple sessions may need to be scheduled, to prevent "information overload."
- Use memory aids (eg, personalized handouts) to reinforce points made during face-to-face sessions.
- When possible, simplify the patient's medication program especially for those who have multiple medical problems, cognitive dysfunction, or functional disability (eg, changing insulin to 2 injections per day from 4 injections per day).
- When discussing medications, focus education on medication adherence by using charts, pill boxes, and other reminders.
- Caregivers should be instructed in how to track amounts of medication used.
- Educate the patient that uncommon symptoms such

TABLE 2. Treatment Goals for the Older Adult[12]

Patient Characteristics/ Health Status	Rationale	A1C	Fasting or Postprandial Glucose (mg/dL)	Bedtime Glucose (mg/dL)	Blood Pressure (mmHg) (see HYPERTENSION section in this guideline for details)	Lipids Treatment (see LIPID section in this guideline)
Healthy • Few coexisting chronic illnesses[a] • Intact cognitive status • Intact functional status	• Longer life expectancy	<7.5% **[1C]**	80-130	90-150	<140/90 **[2B]**	Statins (unless not tolerated) **[1B]**
Complex/intermediate • Multiple coexisting chronic illnesses[a] • Mild-to-moderate cognitive impairment • 2+ Instrumental Activities of Daily Living (IADL)[b]	• Intermediate life expectancy • High treatment burden • Hypoglycemia vulnerability • Fall risk	<8% **[2C]**	90-150	100-180	<150/90 **[2C]**	Statins unless not tolerated **[1C]**
Very complex/poor health • Long-term care residents • End-stage chronic illnesses • Moderate-to-severe cognitive impairment • 2+ Activities of Daily Living (ADL) dependenciesc	• Limited life expectancy • Benefits uncertain	<8.5% **[2C]**	100-180	110-200	<150/90 **[2C]**	Consider stopping statin use if expected longevity is less than 1 year **[2C]**

[a]Coexisting chronic illnesses: conditions serious enough to require medication or lifestyle management. They may include arthritis, cancer, congestive heart failure, depression, chronic obstructive pulmonary disease, falls, and chronic renal failure.
[b]IADL: measures functioning in traveling, shopping, housework, managing finances, using the telephone, and taking medications.
[c]ADL: measures the 5 basic functions of bathing, toileting, dressing, transferring, and eating.

as confusion, dizziness, and weakness can be manifestations of hypoglycemia.
- Involve the patient's caregiver or arrange for visiting nurse evaluation if medication adherence is an issue.
- Provide very specific guidelines on when the patient and/or caregiver should call the healthcare provider for assistance.

4.6.0 DEVICES
- Recommend equipment that is easy to hold, easy to read, and requires the least number of steps.
- Insulin pens, pens that contain noninsulin glucose-lowering medication, and pre-filled syringes may be easier for older patients to use than manipulating a syringe and vial. Syringe magnifiers are available if vision is impaired.
- For some patients, inhaled insulin may be another option for prandial insulin.
- Choose blood glucose meters that have a large display, are easy to hold and use, and that minimize handling of strips and lancets. "Talking meters" are available for those with vision impairment.

4.7.0 MONITORING
- Emphasize the importance of regular self-monitoring of blood glucose (SMBG), especially before driving or using power tools.
- Checking glucose levels at different times of the day, on different days of the week, will allow the provider to assess glucose patterns throughout the day without having the patient check the glucose several times each day. For example, check the fasting and pre-supper glucose levels one day, and pre-lunch and bedtime levels another day.
- Some older adults may not be able to perform SMBG due to physical or cognitive impairment. To decrease the risk of hypoglycemia in these situations, glycemic goals may need to be adjusted and medication programs may need to be simplified. In type 2 diabetes, if appropriate, use diabetes medications that have a low risk for hypoglycemia.
- Develop a plan to treat hypoglycemia. Encourage the patient to carry a source of glucose on their person and to have one at the bedside at all times.
- Develop a sick day plan.
- Encourage caregivers to accompany patients to education sessions and receive appropriate education in glucose monitoring and blood glucose interpretation.

4.8.0 DRIVING
- A referral for education and counseling should be advised if the patient's ability to drive is in question. Organizations such as local elder services, the American Geriatric Society, and the various state motor vehicle registries may have additional information for patients as well as family members.
- Drive-wise programs, where available, can be useful to assess the patient's ability to drive.

4.9.0 NUTRITION CHALLENGES (see Appendix for examples of nutrition prescriptions)

Although diabetes nutritional guidelines for the older adult are no different than for younger adults, unique challenges often exist due to:
- Lack of motivation
- Impaired food shopping or preparation capabilities
- Omission of meals due to cognitive dysfunction or depression
- Compromised dentition
- Altered taste perception
- Altered gastrointestinal function
- Weight loss and malnutrition
- Coexisting illnesses
- Limited finances

4.9.1 Nutritional recommendations

Consider referral to a dietitian to work with the older adult patient and caregivers to:
- Assess nutritional needs
- Avoid making unnecessary dietary changes in life-long eating habits, remembering that to treat coexisting illnesses multiple changes may be required, such as reducing potassium, sodium, and dietary fats
- Minimize the complexity of meal planning and engage the spouse, or others living with the patient, in creating a home environment that supports positive lifestyle change
- Educate how consistency in carbohydrate intake and meal timing can help minimize fluctuations in blood glucose levels as well as help maintain or achieve a reasonable weight
- Consider giving prandial insulin after the meal rather than before, based on carbohydrate intake
- Assess the ability to buy and prepare healthy meals
- Help maximize a limited food budget
- Suggest community resources such as Meals on Wheels

4.9.2 Weight loss/potential malnutrition
- Weight-loss diets commonly recommended to younger adults should be prescribed with great caution to the older adult, since undernutrition/malnutrition is often more of a problem than obesity in the older adult.
- Weight loss and the potential for malnutrition should be carefully monitored, especially after acute illness, hospitalization, and social stress.
    - Use serial weight measurements to monitor changes.
- To avoid weight loss, it may be necessary to let patients

eat what they enjoy and adjust diabetes medications accordingly.

4.9.3 Chronic care settings

- In chronic care settings, there is no need for a rigid and restrictive meal plan. A regular meal plan with consistent, moderate carbohydrate intake may be sufficient and may help avoid undernutrition.

4.10.0 PHYSICAL ACTIVITY

(see Appendix for examples of activity prescriptions)

4.10.1 Benefits of activity

Physical activity should be stressed in all older adults as it is crucial in maintaining functionality, independence, and acceptable quality of life.

- Regular exercise program offers other benefits to older adults, such as:
  - Reduced glucose levels
  - Improved lipid profile
  - Improved blood pressure
  - Increased muscle tone and strength
  - Improved gait and balance
  - Overall physical conditioning
  - Decreased depression, and an overall sense of improved well-being.

4.10.2 Types of activity

- Types of physical activities that may be appropriate for the older adult should take into account the current level of physical fitness/disability. It is important to develop an activity program to increase mobility, endurance, and strength, and to increase the duration of the activity gradually. Common activities to achieve these goals include:
  - Aerobic activities
  - Walking
  - Swimming or water aerobics
  - Stationary bicycle riding
  - Resistance training
  - Armchair exercises
  - Weight lifting
  - Balance exercise
  - Tai chi
  - Yoga
  - Flexibility exercises
  - Other physical activities:
    - Gardening
    - Household chores

4.10.3 Challenges to consider

- Challenges to maintaining a regular physical activity program include:
  - Fluctuations in health
  - Comorbidities, such as cardiovascular disease, osteoarthritis, and osteoporosis
  - Risk and fear of falls
  - Finding a safe environment for exercise
  - Issues with transportation
  - Hypoglycemia
    - The risk of hypoglycemia is increased among those using insulin and other diabetes medications that can cause hypoglycemia. More frequent SMBG may reduce this risk.
- An exercise physiologist or a physical or occupational therapist can provide a supervised environment to help a patient perform exercises safely.

4.11.0 MEDICATIONS: GENERAL CONSIDERATIONS

General principles to consider when prescribing medications to an older adult include:

- "Start low and go slow" when dosing and titrating medications
- Agents with low risk of hypoglycemia are preferred in this age group
- Deintensification (or simplification) of complex regimens is recommended to reduce the risk of hypoglycemia

4.11.1 Overtreatment of diabetes is common in older adults and should be avoided.

- Consider drug–drug interactions carefully, as most older adults are on multiple medications as well as supplements
- Evaluate renal function using the estimated glomerular filtration rate (eGFR) rather than serum creatinine because low muscle mass in the older population may result in a "normal" creatinine level despite significant renal dysfunction-
- Monitor liver and kidney function with periodic tests
- Assess financial resources when using newer, generally more expensive agents

4.11.2 Oral glucose-lowering medications (Table 3)

Please also refer to Joslin's Clinical Guideline for Pharmacological Management of Adults With Type 2 Diabetes (Chapter 1) for more detailed information on diabetes medications.

4.11.3 Injectable noninsulin antidiabetic medications (Table 4)

4.11.4 Insulin products (Table 5)

4.12.0 HYPERTENSION: GENERAL CONSIDERATIONS

The goals of therapy for hypertension in the older adult are the same as those for younger adults with diabetes. The target blood pressure should be less than 140/90 mmHg as tolerated. Isolated

systolic hypertension is much more common in the older adult. Systolic blood pressure <150 is acceptable in patients with multiple comorbidities or limited life expectancy. Care should be taken to treat with antihypertensive agents to bring systolic blood pressure to goal, if feasible. Blood pressure should be lowered gradually in order to reduce the risk of hypotensive symptoms. Older adults are prone to "white coat" hypertension. If suspected, patients should be asked to measure blood pressure at home and keep a log for periodic evaluation.

4.12.1 Antihypertensive drugs (Table 6)

4.13.0 LIPIDS (for more detail please see Joslin's Clinical Guideline for Adults with Diabetes Chapter 1)

GENERAL CONSIDERATIONS

- **All individuals with preexisting cardiovascular disease (CVD):** Based on a large body of clinical-trial evidence, all individuals with preexisting CVD should be treated with high-intensity statin therapy designed to lower low-density lipoprotein cholesterol (LDL-C) by ≥50% from baseline, regardless of baseline cholesterol. The adherence to statin therapy should be monitored at 4-12 weeks after initiation, and every 3-12 months thereafter, as indicated.
- If age >75 years, or if adverse events occur while on a high-intensity statin dose, treat with moderate-intensity statin therapy, designed to lower LDL-C between

TABLE 3. Oral Antidiabetic Medications

For additional details see Joslin's Clinical Guideline for Pharmacological Management of Adults With Type 2 Diabetes				
Medication Class	**Mechanism of Action**	**Advantages**	**Disadvantages**	**Caveats in the Older Population**
Biguanides • liquid metformin* (Riomet) • metformin (Glucophage) • metformin extended release (Glucophage XR, Fortamet, Glumetza) *Liquid formulation for patients unable to swallow large tablets	Decrease hepatic glucose production, increase GLP-1 secretion	Low risk for hypoglycemia Low cost Well understood adverse effects (AEs)	Contraindicated in advanced liver disease, alcohol excess, decompensated congestive heart failure, acute intercurrent illness, dehydration AEs include gas, diarrhea, B12 deficiency, lactic acidosis	Use as initial therapy unless contraindicated Initiate at low dose, increase dose slowly, and take with food to decrease gas, diarrhea Extended release formulation may decrease gastrointestinal (GI) symptoms May cause weight loss May cause GI symptoms initially or symptoms may develop after prolonged use Measure liver functions, serum creatinine, and eGFR initially, then periodically and with any increase in dose Avoid initiating and stop use if eGFR <45
Insulin secretagogues **Sulfonylureas** • glimepiride (Amaryl) • glipizide (Glucotrol) • glipizide extended release (Glucotrol XL) • glyburide (Micronase, Diabeta) • micronized glyburide (Glynase) **Meglitinides** • repaglinide (Prandin) **D-phenylalanine derivatives** • nateglinide (Starlix)	Stimulate beta-cell insulin secretion	Many sulfonylureas are available at lower cost Shorter-acting agents like glipizide, or the nonsulfonylurea insulin secretagogues repaglinide and nateglinide, may lower the risk of nocturnal hypoglycemia. In patients with erratic oral intake, these drugs may lower the risk of daytime hypoglycemia	Contraindicated in severe liver or renal disease Risk of hypoglycemia, especially with longer-acting sulfonylureas such as chlorpropamide (first-generation sulfonylurea) and glyburide	Consider use of short-acting sulfonylurea in the setting of renal disease to reduce the risk for hypoglycemia Repaglinide or nateglinide may be useful for those with postprandial hyperglycemia or hypoglycemia on sulfonylurea Watch for increased risk of hypoglycemia in those with memory issues, or that may accompany acute illness, hospitalization, weight loss, lack of appetite, and skipped meals
TZDs • pioglitazone (Actos) • rosiglitazone (Avandia)	Improve glucose transport; decrease hepatic glucose production	TZDs can be well tolerated in healthy older adults as they do not cause hypoglycemia Can be used in renal impairment but may increase fluid retention	Fluid retention and CHF are common comorbidities in the elderly, preventing the use of TZDs Should be avoided in patients with Class III and Class IV CHF See footnotes 1-3 for cardiovascular and other risks Contraindicated in liver disease Increases bone loss and risk for bone fracture May increase risk for macular edema	AEs of fluid retention can be limiting factors in using this class of medications Concerns re: bladder cancer are fewer in the elderly with shorter life expectancy See footnotes 1-3 for CV and other risks

table continued SPxxx

TABLE 3 (cont.). Oral Antidiabetic Medications

Medication Class	Mechanism of Action	Advantages	Disadvantages	Caveats in the Older Population
Alpha-glucosidase inhibitors • acarbose (Precose) • miglitol (Glyset)	Delay absorption and breakdown of carbohydrates	Use if postprandial hyperglycemia predominates Low risk of hypoglycemia if used as monotherapy	Contraindicated in chronic intestinal disorders May cause gas, diarrhea Acarbose is contraindicated in cirrhosis Do not use in renal impairment (creatinine >2.0)	Modest glucose-lowering effect Ideally, use pure glucose to treat hypoglycemia when used in combination therapy, because the drugs decrease absorption of other forms of carbohydrate Initiate at low dose and increase slowly to decrease flatulence
DPP-4 inhibitors • sitagliptin (Januvia) • saxagliptin (Onglyza) • linagliptin (Tradjenta) • alogliptin (Nesina)	In a glucose-dependent manner, these medications slow the inactivation of incretin hormones, resulting in increased insulin secretion and decreased glucagon levels	Helpful in controlling postprandial glucose elevations Lower risk of hypoglycemia	AEs include occasional diarrhea and stomach discomfort Safety of use in the setting of prior pancreatitis is unknown. Stop medication if pancreatitis is suspected when a DPP-4 inhibitor is in use High cost Lower glucose-lowering efficacy may result in the need for a multidrug program Increased risk for CHF with saxagliptin	Low risk of hypoglycemia Assess kidney function prior to initiating and periodically thereafter Reduce dose in renal disease with some members of the class Good drug for frail elderly with newly diagnosed diabetes Postmarketing reports of hepatic failure with alogliptin
SGLT2 inhibitors • canagliflozin (Invokana) • dapagliflozin (Farxiga) • empagliflozin (Jardiance) • ertugliflozin (Steglatro)	Block the reabsorption of glucose by the proximal tubule of the kidney, thereby increasing excretion of glucose in the urine	Low risk of hypoglycemia	Do not use in moderate-to-severe renal disease as it may worsen renal function May reduce blood pressure Increased risk for genital mycotic infections and for urinary tract infection May result in dehydration, weight loss, hyperkalemia, increased low-density lipoprotein cholesterol High cost Little data available for safety in the older population	Adjust dose in mild kidney disease To decrease the risk of hypotension and dehydration, consider adjustment of antihypertensive medication, especially diuretics, when starting this medication class Do not use dapagliflozin in setting of bladder cancer; use with caution with a history of bladder cancer
Many of the oral diabetes medications are available in fixed combinations. Please see Joslin's Clinical Guideline for Pharmacological Management of Adults with Type 2 Diabetes. Fixed combinations have the advantage of 1 versus 2 co-payments. Adherence may improve as there are fewer tablets to administer and to remember. The disadvantage to fixed combinations is decreased flexibility in dosing. **Colesevelam, a bile acid sequestrant, and quick-release bromocriptine** are approved by the FDA for the treatment of diabetes, but there is very limited use in the older population.				

CHF indicates congestive heart failure; DPP-4, dipeptidyl peptidase-4; eGFR, estimated glomerular filtration rate; GLP-1, glucagon-like peptide-1; SGLT2, sodium glucose co-transporter-2; TZD, thiazolidinedione.

Footnotes

[1]There is an increased risk for edema when insulin and a TZD are used together. Rosiglitazone should not be used in combination with insulin.

[2]FDA requirements for liver function tests with TZDs: If initial alanine aminotransferase (ALT) is >2.5 times normal, do not start this medication. Once TZD is started, monitor ALT periodically thereafter according to clinical judgment. If ALT is >2.5 times normal during treatment, check weekly. If rise persists or becomes >3 times normal, discontinue TZD.

[3]TZDs cause or exacerbate congestive heart failure in some patients. After initiation of TZDs and after dose increases, observe patients carefully for signs and symptoms of heart failure (including excessive, rapid weight gain; dyspnea; and/or edema). If these signs and symptoms develop, the heart failure should be managed according to current standards of care. Furthermore, discontinuation or dose reduction of the TZD must be considered. TZDs are not recommended in patients with symptomatic heart failure or in patients with established New York Heart Association Class III or IV heart failure.

[3i]On September 23, 2010, the FDA announced regulatory actions with respect to products containing rosiglitazone: Avandia (rosiglitazone maleate) tablets, Avandamet (rosiglitazone maleate and metformin hydrochloride) tablets, and Avandaryl (rosiglitazone maleate and glimepiride) tablets. These FDA actions required GlaxoSmithKline to implement restrictions on the use of these products through a Risk Evaluation and Mitigation Strategy (REMS) program to assure their safe use and through additional labeling changes in response to the agency's review of data that suggested an elevated risk of CV events. However, based on additional data review, the REMS program was removed as of May 2014. Rosiglitazone now has the same indications for prescribing as pioglitazone.

[3ii]According to an FDA advisory issued on June 15, 2011, on potentially increased risk of bladder cancer with pioglitazone use: a) do not use pioglitazone in patients with active bladder cancer; b) use pioglitazone with caution in patients with a prior history of bladder cancer. The benefits of glycemic control versus unknown risks for cancer recurrence with pioglitazone should be considered in patients with a prior history of bladder cancer.

4.11.3. Injectable Noninsulin Antidiabetic Medications (**TABLE 4**)

Medication Class	Mechanism of Action	Advantages	Disadvantages	Caveats in the Older Population
Incretin mimetics • exenatide (Byetta) • liraglutide (Victoza) • extended release exenatide (Bydureon) • dulaglutide (Trulicity) • semaglutide (Ozempic)	In a glucose-dependent manner, increase insulin secretion, decrease glucagon secretion, slow gastric emptying, and increase satiety	Use may be associated with weight loss, which is helpful in the overweight/obese person Low risk of hypoglycemia	Medications must be injected Dosing frequency is dependent on the medication and can range from twice a day to once weekly Adverse effects include nausea, diarrhea, and increased satiety, which can affect nutritional status in the older adult Increased risk for pancreatitis Risk for acute renal impairment High cost Limited data on safety in the older population	Low risk of hypoglycemia, and formulation that can be used once weekly, makes this an attractive agent to use in elderly Consider the person's cognitive abilities, dexterity, and visual acuity before considering use of any injectable medication To decrease risk of hypoglycemia if using with a sulfonylurea or basal insulin, consider initially decreasing sulfonylurea or insulin dose

30% and 49% from baseline. If the baseline LDL-C is not known, the minimum target should be LDL-C <70 mg/dl, or non–HDL-C <100 mg/dl.

For primary prevention in older people aged ≤75 years: Statin therapy should be based on 10-year CVD risk as calculated by the revised risk calculator (my.americanheart.org/cvriskcalculator).

If the 10-year risk is <7.5%, a moderate-to-intensive statin therapy is indicated, designed to lower LDL-C by 30% to 50% from baseline. If the baseline LDL-C is not known, the minimum target should **be LDL-C <100 mg/dl, or non–HDL-C <130 mg/dl.**

If the 10-year risk is ≥7.5%, intensive statin therapy should be instituted, designed to lower LDL-C by ≥50% from baseline, regardless of baseline cholesterol. If the baseline LDL-C is not known, the minimum target should be LDL-C <70 mg/dl, or non–HDL-C <100 mg/dl**.**

For primary prevention in older people aged >75 years: Initiation of statin therapy is of uncertain value, and should be individualized, based on comorbidities, life expectancy, safety considerations, and priorities of care. Consider stopping statin therapy if life expectancy is less than 1 year.

4.13.1 Lipid-lowering medications (Table 7)

4.14.0 FOOT CARE

- Recommendations for foot examinations and treatment in older adults with diabetes are the same as those for younger individuals. Older adults may require additional education and devices such as mirrors to examine their feet due to decreased mobility and dexterity. See Joslin's Clinical Guideline for Adults with Diabetes for more detail.
- Older adults should be encouraged to see a podiatrist regularly. Medicare provides coverage for podiatrist visits every 9 weeks, along with special footwear for patients with diabetes-related qualifying foot problems.

4.15.0 EYE CARE

Recommendations for eye examinations and treatment in older adults with diabetes are the same as those recommended in Joslin's Clinical Guideline for Adults with Diabetes.

- Providers should also consider eye conditions commonly seen in older adults, including glaucoma, macular degeneration, and cataracts, which may be present without evidence of diabetic eye disease or coincident with diabetic eye disease.
  - Nondiabetic ocular conditions such as cataracts may complicate evaluation and treatment of diabetic retinopathy
  - Interventions for nondiabetic ocular conditions may be risk factors for progression of diabetic retinopathy
  - Interventions for diabetic eye disease may pose risk factors for progression of nondiabetic eye conditions such as cataracts and glaucoma
- Although tighter glycemic control has been shown to lower the risk of eye complications, the overall risk of hypoglycemia and increased mortality risk with tight control in the older population should be considered when setting the glycemic goals.

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4.11.4. Insulin Products (**TABLE 5**)

Medication Class	Mechanism of Action	Advantages	Disadvantages	Caveats in the Older Population
Injectable U-100 insulins **Rapid-acting:** • Insulin aspart analog (Novolog) • Insulin glulisine analog (Apidra) • Insulin lispro analog (Humalog) **Short-acting:** • Human Regular • (Humulin R • Novolin R) **Intermediate-acting:** • Human NPH insulin • (Humulin N • Novolin N) **Long-acting:** • Insulin detemir (Levemir) • Insulin glargine (Lantus) • Insulin degludec (Tresiba) **Premixed insulins:** • 70% NPH; 30% Regular (Humulin 70/30) • 70% NPH; 30% Regular (Novolin 70/30) • 50% lispro protamine suspension, 50% lispro (Humalog Mix 50/50) • 75% lispro protamine suspension, 25% lispro (Humalog Mix 75/25) • 70% aspart protamine suspension, 30% aspart (Novolog Mix 70/30)	Allow glucose to enter cells for an energy source; decrease hepatic glucose production	Improved glucose control in type 2 diabetes when used in combination with other antidiabetic medications, or when other programs do not give adequate control. Insulin can be used as monotherapy Insulin is the only treatment choice in treating T1D	Older adult patients taking insulin often face difficulties with self-administration because of reduced dexterity, impaired vision, and cognitive deficits Risk of hypoglycemia	Consider the person's type of diabetes, cognitive abilities, dexterity, and visual acuity before considering the use of insulin Long-acting insulin can be used safely with other noninsulin diabetes medications to control postprandial glycemia. When deciding on the timing and dose of basal insulin, consider the individual's glucose pattern. In general, older adults have a higher contribution of postprandial hyperglycemia compared with fasting hyperglycemia. Thus, starting basal insulin in the morning in this population may decrease the risk of nocturnal hypoglycemia and improve postprandial glucose control It is often beneficial to use simpler insulin regimens with fewer daily injections, such as premixed insulin preparations and easier injection systems (eg, insulin pens with easy-to-set dosages). If syringe and vial are to be used, a careful assessment of the individual's ability to draw up and give an injection needs to be made prior to devising the insulin and self-monitoring program The risk for hypoglycemia when using premixed insulins is lessened when meal times are more fixed There is a potential increased risk for nocturnal hypoglycemia when taking a premixed insulin at the evening meal Other self-management skills, such as treating hypoglycemia and eating on a regular schedule, will need to be assessed prior to determining the person's insulin program and reassessed periodically thereafter
Injectable U-300 Insulin				Limited experience May be used in patients with large insulin requirement (greater than 200 units daily)
Injectable U-500 Insulin				May be used in patients with large insulin requirement (greater than 200 units daily)
Inhaled insulin Afrezza inhalation insulin		May be used instead of prandial insulin.	Older adult patients taking insulin often face difficulties with self-administration because of reduced dexterity, impaired vision, and cognitive deficits. Risk of hypoglycemia Need to ensure normal pulmonary function periodically	Limited experience

NPH indicates neutral protamine Hagedorn.

4.12.1. Antihypertensive Drugs (**TABLE 6**)

Medication Class	Mechanism of Action	Advantages	Disadvantages	Caveats in the Older Population
ACEI/ARB Examples: **ACEIs:** lisinopril, ramipril, benazepril, trandolapril **ARBs:** losartan, valsartan irbesartan	Inhibition of the renin-angiotensin system	Evidence for cardiovascular benefits Evidence for renal protection	Dry cough with ACEI Hyperkalemia Drop in eGFR (contraindicated in renal vascular disease) Angioneurotic edema with ACEI (rare)	Before initiating therapy, check-baseline renal function and serum potassium; recheck within 1-2 weeks of initiation of therapy, with each medication dose increase, and at least yearly thereafter
Diuretics Include hydrochlorothiazide, chlorthalidone, furosemide, torsemide, bumetanide, indapamide	Sodium excretion; limit volume expansion	May be effective as monotherapy; also additive blood-pressure–lowering effect with other agents	Hypokalemia Volume depletion Dehydration (dose- related)	Before initiating therapy, check-baseline electrolytes; recheck electrolytes within 1 to 2 weeks of initiation of therapy, with each medication dose increase, and at least yearly thereafter
Calcium Channel Blockers Include diltiazem, verapamil, amlodipine	Direct vascular effects by inhibition of calcium channels	Potent antihypertensive effect May have greater effect in stroke prevention	Fluid retention with certain agents in class (amlodipine, diltiazem) Bradycardia with certain agents in class (diltiazem, verapamil)	Some evidence suggests that treatment with calcium channel blockers, diuretics, and ACE inhibitors are more effective than beta blockers in this population
Beta Blockers Include metoprolol, atenolol, propranolol, carvedilol	Reduce cardiac output	Evidence for cardiovascular benefits after acute coronary events	Bradycardia, fatigue	May be less effective in older adults and African Americans
Mineralocorticoid Receptor Antagonists Include spironolactone, eplerenone	Inhibit mineralocorticoid receptor	Additive effects as antihypertensives or in heart failure	Hyperkalemia	Before initiating therapy, check-baseline renal function and serum potassium; recheck within 1 to 2 weeks of initiation of therapy, with each medication dose increase, and at least yearly thereafter
Combination therapy				Most patients require more than 1 antihypertensive medication to reach goal

ACEI indicates angiotensin-converting-enzyme inhibitor; ARB, angiotensin receptor blocker; eGFR, estimated glomerular filtration rate.

4.13.1. Lipid-Lowering Medications **(TABLE 7)**

Medication Class	Mechanism of Action	Advantages	Disadvantages	Caveats
HMG CoA-R reductase inhibitors (statins) • atorvastatin (Lipitor) • fluvastatin (Lescol) • lovastatin (Altoprev, Mevacor) • pitavastatin (Livalo) • pravastatin (Pravachol) • rosuvastatin (Crestor) • simvastatin (Zocor)	Reduce cholesterol synthesis and promote cholesterol excretion by enhancing the activity of LDL receptors	Drug class of choice for lowering LDL-C on the basis of many clinical trials Reduce LDL-C ~20%-60%, depending on drug and dose Reduce CVD events in both primary prevention and in patients with preexisting CVD	3%-6% probability of liver toxicity; 10%-15% probability of myalgia or muscle weakness; rarely myositis or rhabdomyolysis May precipitate new-onset diabetes, especially in those with prediabetes or metabolic syndrome Rarely result in gastrointestinal (GI) adverse effects (AEs) Rarely result in cognitive disturbances (reversible)	Check ALT within 4-12 weeks of initiation of the medication, with each dose increase, and with any signs or symptoms of liver dysfunction Routine CK measurements are not necessary unless symptoms warrant Older adults on medications for hyperlipidemia should have periodic evaluation of liver enzymes
Ezetimibe	Reduces cholesterol absorption	Well tolerated Additive efficacy in lowering LDL-C, beyond statin effects	Modest effect; lowers LDL-C by 15%-20% Rare AEs	May improve CVD event reduction when added to moderate-dose statin, if statin intensification not feasible Not preferred in monotherapy, but may be useful as adjunct to statin, if statin alone cannot be intensified
Bile acid sequestrants	Bind to bile acids and promote excretion of cholesterol in gut	Dose-dependent reduction in LDL-C, 15%-30% Can be combined with statins	Adherence issues due to GI AEs	Limited data on CVD event reduction Not preferred in monotherapy unless other agents can't be used
Niacin	Inhibits lipolysis, and has multiple lipid effects via diverse mechanisms	Dose-dependent lowering of LDL-C by 10%-20%; raises HDL-C by 15%-25%; lowers TG 15%-30% Additive efficacy with statins in achieving lipid goals	Adherence issues due to multiple AEs, including flushing, pruritus, liver toxicity, hyperuricemia, and raised glucose levels	Effects on CVD prevention unproven
Fibrates	Inhibit lipolysis and VLDL production; enhance triglyceride clearance	Drug of choice to lower TG; raises HDL-C; minimal effect on LDL-C	Myalgia in combination with other drugs, including statins Caution in presence of CKD; may promote gallstones	Limited data on CVD event reduction Indicated in preventing pancreatitis, if TG >500 mg/dL Additional studies on CVD events underway
Omega-3 fatty acids	Inhibit triglyceride synthesis in liver	Well tolerated. 25%-30% reduction in TG levels; modest effects on HDL-C; may raise LDL-C	Adherence issues May prolong bleeding time	No data on CVD event reduction; studies ongoing Currently approved to lower TG if >500 mg/dl; may reduce risk of pancreatitis
PCSK 9 inhibitors		Antibody to PCSK 9 further reduces LDL-C in combination with statin or if statin intolerant	Expensive	Limited data in elderly

ALT indicates alanine aminotransferase; CK, creatinine kinase; CVD, cardiovascular disease; PCSK9, proprotein convertase subtilisin/kexin type 9; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; TG, triglycerides; VLDL, very low-density lipoprotein cholesterol.

Appendix

Examples of Exercise Prescriptions

For inactive or frail patients
Do the items checked below. If an item is not checked, ignore it.

- Walk 5 minutes inside the house or in the hallway, every day
  - Start with 1-3 times a day before meals
  - Increase a little each week to 10 minutes 3 times every day
- Pedal with legs and arm
  - Start with what you can do and increase a little each week up to 15-20 minutes every day
- Stationary bike
  - Start with 5 minutes, 1-3 times a day
  - Increase a little each week up to 30 minutes every day

For active patients
Do the items checked below. If an item is not checked, ignore it.

- Aerobic activity: Do 1 of these at least 5 days each week. You can do the same one each time or pick a different one for variety. Start with short periods of time and increase to 30-60 minutes a day.
  - Walking (use pedometer to increase activity as tolerated)
  - Stationary bike
  - Swimming
  - Water aerobics
- Resistive training: Do 1 of these at least 2 days each week. You can do the same one each time or pick a different one for variety. Start with no/low weights and increase weights and repetitions as tolerated, up to 8-10 reps for 2-3 cycles for each muscle group
  - Hand weights (or 8-ounce water bottle)
  - Resistance bands
  - Use machines at gym
- Stretching: Do 1 of these daily. You can do the same one each time or pick a different one for variety. Again, start low and go slow. Avoid excessive stretching and injury.
  - Yoga
  - Stretching

Examples of Nutrition Prescriptions

To avoid low blood sugar

- ☐ Do not skip or delay meals
- ☐ Have some carbohydrate/starch to eat at each meal
- ☐ Keep glucose tablets/gel or hard candy with you at all times
- ☐ Check your blood sugar anytime you feel unwell, sick, or confused
- ☐ Eat a snack before any significant activity

Nutrition prescriptions

Do the items checked below. If an item is not checked, ignore it.

- ☐ Do not skip or delay meals
- ☐ Have some carbohydrate/starch to eat at each meal
- ☐ Have at least 1500 mg of calcium and 800 units of vitamin D every day
- ☐ Eat a snack at bedtime
- ☐ Eat a snack between meals
- ☐ Eat a snack before any physical activity

DETERMINE Nutritional Assessment
For each statement, circle the response in the YES/NO column that applies to you.

I have an illness or condition that made me change the kind and/or amount of food I eat.	YES	NO
I eat fewer than 2 meals per day.	YES	NO
I eat few fruits or vegetables, or milk products (less than 3 fruits/vegetables, 2 dairy).	YES	NO
I have 3 or more drinks of beer, liquor, or wine almost every day.	YES	NO
I have tooth or mouth problems that make it hard for me to eat.	YES	NO
I don't always have enough money to buy the food I need.	YES	NO
I eat alone most of the time.	YES	NO
I take 3 or more different prescribed or over-the-counter drugs a day.	YES	NO
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	YES	NO

Basic Activities of Daily Living

- **Bathing**: includes grooming activities such as shaving, and brushing teeth and hair
- **Dressing**: choosing appropriate garments and being able to dress and undress, having no trouble with buttons, zippers or other fasteners
- **Eating**: being able to feed oneself
- **Transferring**: being able to walk, or, if not ambulatory, being able to transfer oneself from bed to wheelchair and back
- **Continence**: being able to control one's bowels and bladder, or manage one's incontinence independently
- **Toileting**: being able to use the toilet

Instrumental Activities of Daily Living

- **Using the telephone**: being able to dial numbers, look up numbers, etc
- **Managing medications**: taking the appropriate medications and correct dosages on time
- **Preparing meals**: making appropriate food choices and preparing meals safely
- **Maintaining the home**: doing or arranging for housekeeping and laundry
- **Managing finances**: budgeting, paying mortgage/rent and bills on time, etc
- **Shopping**: being able to shop for groceries and other small necessities, and transport purchases from store to home
- **Using transportation**: being able to drive or use public transportation for appointments, shopping, etc

Depression Screening

Over the past 2 weeks, how often have you been bothered by any of the following problems?

a. Little or no interest or pleasure in doing things

0: not at all

1: several days

2: more than half the days

3: nearly every day

a. Feeling down, depressed, or hopeless

0: not at all

1: several days

2: more than half the days

3: nearly every day

Total score (Add a. and b.): _____

(If patient scores >0, administer full Geriatric Depression Scale)