ASCVD Risk Factors in Older Adult with Diabetes

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Background

- ✓ It is estimated that in 2017 there were 451 million (age 18– 99years) people with diabetes worldwide, and these figures are expected to increase to 693 million by 2045.
- ✓ A major shift in the epidemiology of diabetes has been to those aged 60–79 years.
- ✓ Apart from this advancing tide of older people with diabetes, the ageing process itself is increasing the number of people living with the sequelae of ill health, chronic diseases, frailty and injuries, all of which enhance disability and functional decline, and pose real clinical challenges and burdens in those with Type 2 diabetes.
- ✓ Diabetes is highly prevalent in the aging population, affecting >25% of individuals aged >65 years and 19% of those aged >75 years. Physiological changes associated with aging increase susceptibility to coronary heart disease and other atherosclerotic cardiovascular disease (ASCVD) processes. The incidence and prevalence of ASCVD-related macrovascular events essentially doubles in older adults with diabetes.
- ✓ The overlap of older age, diabetes, and other ASCVD risk factors enhances risk for microvascular and macrovascular complications, functional disability, and geriatric syndromes (including frailty, multimorbidity, polypharmacy, cognitive impairment, depression, urinary incontinence, and falls). As the population of older adults grows, the implications of diabetes on ASCVD risk escalate, and insights regarding optimal care become increasingly important.

Table 1. ADA Criteria for Prediabetes and Diabetes

Prediabetes[a]	Diabetes[b]
FPG 100 mg/dL (5.6 mmol/L) to 125 mg/dL (6.9 mmol/L) = IFG OR 2-h PG during 75-g OGTT 140 mg/dL (7.8 mmol/L) to 199 mg/dL (11.0 mmol/L) = IGT OR A1C 5.7%–6.4% (39–47 mmol/mol)[d]	FPG ≥126 mg/dL (7.0 mmol/L) OR 2-h PG ≥200 mg/dL (11.1 mmol/L) during OGTT[c] OR A1C ≥6.5% (48 mmol/mol)[d] OR In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random PG ≥200 mg/dL (11.1 mmol/L).

Table 2. Clinical Care of Older People

General Health Assessment[a]	General Health Tests[b]	Diabetes-Specific Health[c]
Functional status (ADLs/IADLs[d])	ECG	Retinopathy
Depression	Lipid panel	Nephropathy
Cognition	Bone mineral density	Neuropathy
Fall risk	AAA ultrasound	Medical nutrition therapy
Weight (kg)/height $(m)^2$ = BMI	Diabetes screening (for nondiabetic persons)	Diabetes management
Blood pressure		Diabetes self-management training
Tobacco use		
Alcohol use		
Medication review		
Cancer screening		
Hearing		
Comorbid conditions		
Visual acuity		
Frailty/physical performance		

Table 3. Conceptual Framework for Considering Overall Health and Patient Values in Determining Clinical Targets in Adults Aged 65 y and Older

Overall Health Category		Group 1: Good Health	Group 2: Intermediate Health	Group 3: Poor Health
Patient characteristics		No comorbidities **or** 1-2 non-diabetes chronic illnesses* **and** No ADL€ impairments and ≤1 IADL impairment	3 or more non-diabetes chronic illnesses* **and/or** Any one of the following: mild cognitive impairment or early dementia ≥2 IADL impairments	Any **one** of the following: End-stage medical condition(s)** Moderate to severe dementia ≥2 ADL impairments Residence in a long-term nursing facility
		Reasonable glucose target ranges and HbA1c by group Shared decision-making: individualized goal may be lower or higher		
Use of drugs that may cause hypoglycemia (e.g., insulin, sulfonylurea, glinides)	No	Fasting: 90–130 mg/dL Bedtime: 90–150 mg/dL <7.5%	Fasting: 90–150 mg/dL Bedtime: 100–180 mg/dL <8%	Fasting: 100–180 mg/dL Bedtime: 110–200 mg/dL <8.5%¥
	Yes£	Fasting: 90–150 mg/dL Bedtime: 100–180 mg/dL ≥7.0 and <7.5%	Fasting: 100–150 mg/dL Bedtime: 150–180 mg/dL ≥7.5 and <8.0%	Fasting: 100–180 mg/dL Bedtime: 150–250 mg/dL ≥8.0 and <8.5%¥

Coexisting chronic illnesses

- ✓ Osteoarthritis
- ✓ Hypertension
- ✓ CKD stages 1-3
- ✓ Stroke

Chronic illnesses with limited treatment and reduced life expectancy

- ✓ Metastatic cancer
- ✓ Oxygen-dependent lung disease
- ✓ ESRD requiring hemodialysis
- ✓ Advanced heart failure

Activity of daily living

- ✓ Bathing
- ✓ Dressing
- ✓ Eating
- ✓ Toileting
- ✓ Transferring

Instrumental activity of daily living

- ✓ Preparing meals
- ✓ Shopping
- ✓ Managing money
- ✓ Using the telephone
- ✓ Managing the medications

Treatment of Hyperglycemia

Setting glycemic targets and goals

- ✓ In patients aged 65 years and older with diabetes, outpatient diabetes regimens be designed specifically to minimize hypoglycemia.
- ✓ In the adult population aged 65 years and older, hypoglycaemia appears to increase the risk of traumatic falls and has a bidirectional relationship with cognitive dysfunction.
- ✓ Hypoglycemia has also been associated with morbidity and mortality in post hoc analyses of data from large clinical trials that included older adults.

Action in Diabetes and Vascular Disease: Preterax and Dimicron Modified Release Controlled Evaluation (ADVANCE) trial

- ✓ 231 patients had at least one severe hypoglycemic episode. Of these patients, most (65%) had been randomized to the intensive control arm of the trial (goal HbA1c <6.5%).
- ✓ Severe hypoglycemia was associated with an approximate doubling of the adjusted risks of major macrovascular and microvascular events, death from a cardiovascular cause and death from any cause ($P < 0.001$).
- ✓ Severe hypoglycemia was also associated with other conditions such as respiratory and gastrointestinal conditions.
- ✓ Although avoidance of hypoglycemia is a critical treatment strategy, overall glucose control remains an important goal.
- ✓ Blood glucose levels consistently over the renal threshold for glycosuria (>200 in chronic hyperglycemia, although variable) routinely increases the risk of dehydration, electrolyte abnormalities, urinary infections, dizziness, and falls.
- ✓ Hyperglycemic crisis, including diabetic ketoacidosis, hyperglycemic hyperosmolar syndrome, and the combination of the two (hyperosmolar ketoacidosis), are severe complications of unrecognized or undertreated hyperglycemia in older adults.
- ✓ Older adults with these conditions have higher mortality rates than do younger individuals.
- ✓ Relaxing glycemic targets for older patients with a high burden of comorbidities and limited life expectancy may be appropriate, yet goals that minimize hyperglycemia are indicated for all patients.

Action in Diabetes and Vascular Disease: Preterax and Dimicron Modified Release Controlled Evaluation (ADVANCE) trial (Contd.)

- ✓ A secondary analysis of the Action to Control Cardiovascular Risk in Diabetes (ACCORD) randomized trial further highlighted the complexity of targets by addressing setting vs achieving HbA1c targets.
- ✓ This trial compared the outcomes of achieving a relatively low glycemic target of HbA1c <6.5% with those of achieving an HbA1c of 7% to 7.9%.
- ✓ Multiple treatment options were available to providers to achieve glucose goals.
- ✓ After 5 years, the intensive treatment group had a 20% higher rate of mortality, which was significant.
- ✓ Importantly, older individuals enrolled in diabetes clinical trials are more likely to have better overall health than are older individuals in the general population.
- ✓ Numerous studies successfully achieved standard glycemic targets without increased hypoglycemia in older adults with good or intermediate health.
- ✓ Because these trials exclude older adults with poor health, they support the concept that intensive strategies for selected individuals can be effective and safe.

In patients aged 65 years and older with diabetes who are treated with insulin, check frequent fingerstick glucose monitoring and/or continuous glucose monitoring (to assess glycemia) in addition to HbA1c.

Lifestyle interventions for older adults with diabetes

Lifestyle modifications

- ✓ In patients aged 65 years and older with diabetes who are ambulatory, recommend lifestyle modification as the first-line treatment of hyperglycemia.
- ✓ In overweight patients, lifestyle modifications resulting in as little as 5% weight loss can improve glycemic control and the need for medications to control glucose levels.
- ✓ Nonetheless, older patients face a number of issues related to nutrition and exercise capacity.
- ✓ Weight loss should be approached with caution in older adults, as both intentional and unintentional weight loss may lead to severe nutritional deficiencies.
- ✓ The recommendation of a combination of physical activity and nutritional therapy, including the recommended intake of calcium, vitamin D, and other nutrients, is an appropriate strategy for this population.
- ✓ In patients aged 65 years and older with diabetes and frailty, we suggest the use of diets rich in protein and energy to prevent malnutrition and weight loss.

Lifestyle interventions for older adults with diabetes (Contd)

- ✓ Low-quality studies suggest that consuming energy dense and protein-rich food could improve food consumption and prevent weight loss and malnutrition risk.
- ✓ Approximately 40% of older adults do not meet the recommended 0.8 g/kg protein intake requirement.
- ✓ Experts have proposed a protein intake of at least 1.5 g/kg/d (15% to 20% of the total caloric intake) in sarcopenic or cachectic older individuals.
- ✓ Nutrition plans for patients with diabetes are generally individualized healthy diets based on preferences, abilities, and treatment goals. We must emphasize healthful eating patterns consisting of nutrient-dense, high-quality foods rather than specific nutrients to improve overall health regarding body weight; glycemic, BP, and lipid targets; and reductions in the risk of diabetes complications.
- ✓ The Mediterranean, Dietary Approaches to Stop Hypertension (DASH), and plant-based diets are all examples of healthful eating patterns.
- ✓ Dietary guidelines recommend an increase in fiber intake of 25 to 35 g/d. Choosing vegetables, legumes, whole grains, and high-fiber breakfast cereals is the best way to increase fiber consumption, although increasing fiber should be avoided in cases of delayed gastric emptying (gastroparesis).

Lifestyle interventions for older adults with diabetes (Contd)

- ✓ Additionally, meeting fluid intake recommendations is important for preventing constipation and fecal impaction in older adults.
- ✓ People with diabetes should limit their sodium consumption to <2300 mg/d.
- ✓ Palatability, availability, affordability, and the difficulty of achieving low-sodium recommendations in a nutritionally adequate diet are all important considerations.
- ✓ Additionally, older adults are much more likely to suffer the adverse effects of alcohol due to changes in their ability to metabolize alcohol, particularly those taking multiple medications and those who are at increased risk of adverse events.
- ✓ In patients aged 65 years and older with diabetes who cannot achieve glycemic targets with lifestyle modification, suggest avoiding the use of restrictive diets and instead limiting consumption of simple sugars if patients are at risk for malnutrition.

Glycemic management of diabetes in older individuals

- ✓ In patients aged 65 years and older with diabetes, we recommend metformin as the initial oral medication chosen for glycemic management in addition to lifestyle management.
- ✓ This recommendation should not be implemented in patients who have significantly impaired kidney function [estimated GFR (eGFR) <30 mL/min/1.73 m2] or have a gastrointestinal intolerance.
- ✓ Metformin is highly effective, may reduce cardiovascular events and mortality, and does not cause hypoglycaemia or weight gain.
- ✓ As clinical events that may precipitate acute kidney injury, such as radiocontrast dye, nephrotoxic drugs, hypotension, heart failure, and surgery, may cause metformin accumulation, with a potential risk for lactic acidosis, metformin use is often stopped when patients are hospitalized.
- ✓ An additional concern is the development of vitamin B12 deficiency, and levels should be monitored yearly.
- ✓ In patients aged 65 years and older with diabetes who have not achieved glycemic targets with metformin and lifestyle, we recommend that other oral or injectable agents and/or insulin should be added to metformin.
- ✓ To reduce the risk of hypoglycemia, avoid using sulfonylureas (SUs) and glinides, and use insulin sparingly.
- ✓ Glycemic treatment regimens should be kept as simple as possible.

Drug therapy for Hyperglycemia

- ✓ SUs and Glinides
- ✓ Thiazolidinediones
- ✓ α-Glucosidase inhibitors
- ✓ Dipeptidyl peptidase-4 inhibitors
- ✓ Sodium-glucose cotransporter 2 inhibitors
- ✓ Glucagon-like peptide 1 receptor agonists
- ✓ Insulin

SUs and Glinides

- ✓ SUs, repaglinide, and nateglinide can cause hypoglycemia and weight gain.
- ✓ Should be used with caution.
- ✓ If used, shorter-duration SUs, such as glipizide, is preferred.
- ✓ Glyburide is a longer-duration SU and contraindicated in older adults because of a substantially increased risk of hypoglycemia.

α-Glucosidase inhibitors

- ✓ α-Glucosidase inhibitors have only modest efficacy, and in older individuals, the gastrointestinal adverse effects of flatulence and diarrhoea tend to cause a relatively high rate of nonadherence.

Thiazolidinediones

- ✓ Pioglitazone and rosiglitazone can cause fluid retention and may precipitate or worsen heart failure; indeed, these drugs are contraindicated in patients with class III and IV heart failure.
- ✓ Furthermore, these medications are associated with increased fracture rates and bone loss in women; thus, use in older women with underlying bone disease, such as osteoporosis, could potentially be problematic.

Dipeptidyl peptidase-4 inhibitors

- ✓ Dipeptidyl peptidase- 4 (DPP-4) inhibitors are generally well tolerated.
- ✓ Importantly, early concerns regarding an increased risk of pancreatitis have not been borne out, although some DPP-4 inhibitors have been associated with heart failure.

Sodium-glucose cotransporter 2 inhibitors

- ✓ Sodium-glucose cotransporter 2 (SGLT2) inhibitors reduce HbA1c by 0.8%, can reduce weight, and do not cause hypoglycemia.
- ✓ Recently, both empagliflozin and canagliflozin have been shown to decrease major adverse cardiovascular events (MACE), heart failure, and the progression of CKD.
- ✓ These compounds cause an obligate increase in urine volume and an increase in urogenital candida infections. Because adverse effects related to volume depletion were more frequent in older patients treated with canagliflozin, recommendations limit the dosage to 100 mg/d in such patients.
- ✓ Canagliflozin has also been shown to be associated with a decrease in bone mineral density at the hip, but not the femoral neck, lumbar spine, or distal radius, with a significant increase in fractures of arms and legs but not the spine.
- ✓ Very rare cases of diabetic ketoacidosis have been reported in patients with T2D taking SGLT2 inhibitors, including patients over the age of 65 years.

Glucagon-like peptide 1 receptor agonists

- ✓ Glucagon-like peptide 1 (GLP-1) receptor agonists increase insulin release, decrease glucagon secretion, delay gastric emptying, suppress appetite, and do not cause hypoglycemia; however, nausea is a common side effect.
- ✓ Initial concern about an increased risk for pancreatitis has not been proven. Liraglutide and semaglutide have been found to improve cardiovascular outcomes.

Insulin

- ✓ In patients with T2D, insulin therapy is usually initiated when oral agents do not provide sufficient glycemic control.
- ✓ Self-monitoring of blood glucose must be performed for insulin to be used safely and effectively.
- ✓ Initially, a single long-acting insulin analog can be added as basal insulin therapy with dose adjustment to maintain fasting glucose in the desired range.
- ✓ Recently, insulin glargine U300 and insulin degludec, which are longer-acting basal insulins compared with insulin glargine U100, showed overall similar levels of glycemic control but with less variability and hypoglycemia.
- ✓ If fasting glucose is near goal but the HbA1c remains above goal, rapid-acting insulin can be added first, prior to the largest meal and then prior to other meals, as necessary.
- ✓ Additionally, premixed insulins (neutral protamine hagedorn with regular or analog insulin) given twice daily may be a simpler approach, but the lack of flexibility, especially in patients who may skip or delay meals, may increase the risk of hypoglycemia.
- ✓ Increasing from one to three or four injections per day means moving from a less complex to a more complex regimen, which may be limiting.
- ✓ The complexity of the treatment regimen must be balanced against the treatment goals and risks of hypoglycemia.
- ✓ For patients with arthritis of their hands, the use of insulin pens, or other assistive appliances, can be helpful.

Insulin (Contd)

- ✓ Recently, fixed doses of GLP-1 receptor agonists and basal insulin, insulin degludec and liraglutide (IDegLira) and insulin glargine and lixisenatide (LixiLan), have become available in a single syringe, and thus only one injection is needed.
- ✓ A low dosage of the combination is started, and then the dosage is gradually titrated upward.
- ✓ Interestingly, studies have reported excellent reduction in HbA1c with less hypoglycemia and weight loss rather than weight gain compared with increased titration of basal insulin alone or intensification with basal/bolus insulin.
- ✓ Because T2D slowly worsens over time, increasing dosages and numbers of medications may be needed to control glucose levels.
- ✓ However, the sequence in which drugs should be added after metformin is not clear.
- ✓ Recent recommendations indicate that GLP-1 receptor agonists and SGLT2 inhibitors be prescribed early, given their beneficial cardiovascular outcomes.
- ✓ In general, the more drugs that are prescribed, the poorer is adherence to a particular regimen.
- ✓ Of critical importance is the avoidance of hypoglycemia, which can have devastating outcomes in older patients.
- ✓ Thus, SUs and insulin should be avoided if at all possible.

Table 4—Treatment strategies for achieving glycemic goals in older adults

Class	Considerations for use in older adults	Dose adjustment for renal insufficiency	Cost
Sulfonylureas (glyburide, glipizide, glimepiride)	Hypoglycemia (can be prolonged) (particularly with glyburide)	Yes	Low
Glinides (repaglinide, nateglinide)	Hypoglycemia; Require dosing with each meal	Yes	Moderate
Biguanide (metformin)	GI side effects: nausea, diarrhea; Use cautiously if at all with eGFR <45 mL/min; Lactic acidosis rare	Yes	Low
Thiazolidinediones (rosiglitazone, pioglitazone)	Increase in risk for CHF, weight gain; Decrease in bone density, increase risk of fractures in women	No	Low
α-Glucosidase inhibitors (acarbose, miglitol)	GI side effects are common; Require dosing with each meal	No	Low
DPP-4is (sitagliptin, saxagliptin, alogliptin, linagliptin)	Low risk of hypoglycemia when used alone; Low incidence of side effects; Some studies report increases in UTIs, upper respiratory tract infections; Case reports of pancreatitis, increased liver function tests, severe skin reactions, musculoskeletal complaints	Selected agents	High
GLP-1RAs (exenatide, liraglutide, dulaglutide, albiglutide)	Low risk of hypoglycemia; GI side effects common: nausea, vomiting, anorexia (often resolve with continued use); Case reports of pancreatitis, renal insufficiency	Caution advised	High
SGLT2is (empagliflozin, dapagliflozin, canagliflozin)	Cause polyuria and polydipsia; Counsel patients to avoid dehydration; Increased risk for genital infections and UTIs; Cases of euglycemic diabetic ketoacidosis reported	Yes	High

Selected cardiovascular outcome studies in older adults with diabetes

Empagliflozin	7,020	T2D with ASCVD	63 ± 9	Cardiovascular death or nonfatal MI or stroke at median follow-up of 3.8 years	Empagliflozin vs. placebo (10.5% vs. 12.1%, $P = 0.01$); subgroup analysis demonstrated significant benefit in subjects aged ≥65 but not <65 years for primary outcome
Liraglutide	9,340	T2D with ASCVD	64 ± 7	Cardiovascular death or nonfatal MI or stroke at median follow-up of 3.1 years	Liraglutide vs. placebo (13% vs. 14.9%, $P = 0.01$); subgroup analysis demonstrated significant benefit in subjects aged <60 (HR 0.78 [0.62–0.97]) but not ≥60 (HR 0.90 [0.79–1.02]) years
Pioglitazone	3,876	Subjects with insulin resistance with recent stroke or transient ischemic attack (~6% of subjects had diabetes)	64.5 ± 10.6	MI or stroke at 4.8 years	Pioglitazone vs. placebo (9% vs. 11.8%, $P < 0.01$); subgroup analysis demonstrated benefit in subjects aged <65 (HR 0.73 [0.55–0.97]) but not ≥65 (HR 0.79 [0.60–1.03]) years

Management of hypertension in older adults with diabetes

- ✓ In patients aged 65 to 85 years with diabetes, we recommend a target BP of 140/90 mm Hg to decrease the risk of CVD outcomes, stroke, and progressive CKD.
- ✓ Patients in certain high-risk groups could be considered for lower BP targets (130/80 mm Hg), such as those with previous stroke or progressing CKD (eGFR <60 mL/min/ 1.73 m2 and/or albuminuria).
- ✓ If lower BP targets are selected, careful monitoring of such patients is needed to avoid orthostatic hypotension.
- ✓ Patients with high disease complexity (group 3, poor health) could be considered for higher BP targets (145 to 160/90 mm Hg).
- ✓ In patients aged 65 years and older with diabetes and hypertension, recommend that an angiotensin converting enzyme inhibitor or an angiotensin receptor blocker should be the first-line therapy.
- ✓ If one class is not tolerated, the other should be substituted.
- ✓ The need for more than one drug to treat hypertension is common in patients with T2D.

Management of hypertension in older adults with diabetes (Contd)

- ✓ Two drugs should be started together if the initial BP is ≥160/100 mm Hg.
- ✓ The calcium channel blocker amlodipine has been shown to provide better cardiovascular outcomes than other agents by the Avoiding Cardiovascular Events Through Combination Therapy in Patients Living With Systolic Hypertension (ACCOMPLISH) study and is therefore commonly added as a secondary antihypertensive agent.
- ✓ The question of the third or fourth drugs to be added after renin-angiotensin system blockers and calcium blockers has not been addressed in either controlled clinical trials or meta-analyses.
- ✓ Because hypertension involves a volume component in many patients with T2D, a thiazide diuretic is commonly recommended as the third drug unless the eGFR is <30 mL/min/1.73 m2, in which case a loop diuretic might be more appropriate.
- ✓ If coronary artery disease is significant, a beta-blocker may be appropriate and can be added as a fourth drug to a prior three-drug regimen.
- ✓ If a beta-blocker is used, carvedilol has been shown to have fewer metabolic effects than metoprolol.
- ✓ Notably, when BP is not controlled with three or more medications, referral to a hypertension specialist is indicated.

Management of Hyperlipidemia

- ✓ In patients aged 65 years and older with diabetes, recommend an annual lipid profile.
- ✓ In patients aged 65 years and older with diabetes, recommend statin therapy and the use of an annual lipid profile to achieve the recommended levels for reducing absolute CVD events and all cause mortality.
- ✓ For patients aged 80 years old and older or with short life expectancy, advocate that LDL-C goal levels should not be so strict.
- ✓ A role for LDL-C in hyperglycemic patients became apparent in several early large clinical trials [e.g., the 4S trial, the Cholesterol and Recurrent Events (CARE) trial, and the LIPID trial using pravastatin].
- ✓ In all of these trials, aggressive LDL-C– lowering therapy reduced recurrent CHD events in patients with diabetes, including those >65 years of age, by 25% to 35%.
- ✓ Additionally, the Treating to New Targets (TNT) study showed that patients with a high risk of CVD, including risk factors for diabetes and aging, should be treated with high doses of statins (atorvastatin at 80 mg vs atorvastatin at 10 mg) to reduce their LDL-C levels to <70 mg/dL and improve CVD outcomes.

Management of Hyperlipidemia (Contd)

- ✓ In contrast to statins, fibrates did not cause a significant reduction in stroke events compared with placebo in clinical trials.
- ✓ The Prospective Study of Pravastatin in the Elderly at Risk (PROSPER) trial included men and women, and the average age was 75 years.
- ✓ Approximately 8% of the participants had diabetes, and 3 years of pravastatin treatment reduced CVD during the subsequent 8 years.
- ✓ The average age in the Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) trial was 63 years, and 16% of the patients had diabetes.
- ✓ High-dose atorvastatin was shown to reduce recurrent stroke by almost 25% in this trial.
- ✓ Most studies have included men and women >65 years of age, and subgroup analyses have also shown beneficial results for patients with known diabetes.

Management of Hyperlipidemia (Contd)

- ✓ Overall, older patients with diabetes experienced a 35% decrease in CVD events from statin therapy, and side effects were minimal.
- ✓ In general, high-dose statin therapy is indicated for all patients with diabetes, irrespective of age, unless specifically contraindicated.
- ✓ Furthermore, although LDL-C levels are not necessarily elevated in patients with diabetes, statins still have a profound effect on the prevention of CVD, and thus all patients with T2D should be treated with statins.
- ✓ In patients aged 65 years and older with diabetes, suggest that if statin therapy is inadequate for reaching the LDL-C reduction goal, either because of side effects or because the LDL-C target is elusive, then alternative or additional approaches [such as including ezetimibe or proprotein convertase subtilisin/kexin type 9 inhibitors (PCSK9)] should be initiated.
- ✓ In patients aged 65 years and older with diabetes and fasting triglycerides >500 mg/dL, we recommend the use of fish oil and/or fenofibrate to reduce the risk of pancreatitis.

Table 12.1—Framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes (2)

Patient characteristics/ health status	Rationale	Reasonable A1C goal‡	Fasting or preprandial glucose	Bedtime glucose	Blood pressure	Lipids
Healthy (few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.5% (58 mmol/mol)	90–130 mg/dL (5.0–7.2 mmol/L)	90–150 mg/dL (5.0–8.3 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Complex/intermediate (multiple coexisting chronic illnesses* or 2+ instrumental ADL impairments or mild-to-moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0% (64 mmol/mol)	90–150 mg/dL (5.0–8.3 mmol/L)	100–180 mg/dL (5.6–10.0 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Very complex/poor health (LTC or end-stage chronic illnesses** or moderate-to-severe cognitive impairment or 2+ ADL dependencies)	Limited remaining life expectancy makes benefit uncertain	<8.5%† (69 mmol/mol)	100–180 mg/dL (5.6–10.0 mmol/L)	110–200 mg/dL (6.1–11.1 mmol/L)	<150/90 mmHg	Consider likelihood of benefit with statin (secondary prevention more so than primary)

Summary of patients' characteristics to DEINTENSIFY hypoglycaemic medications

- **D**ementia, especially those with erratic eating pattern and abnormal behaviour.
- **E**lderly, especially those ≥80 years old.
- **I**mpaired renal function, especially those with end stage renal disease.
- **N**umerous comorbidities, especially those with ≥5 comorbidities.
- **T**ight glycaemic control, especially those with HbA1c <7% (<53 mmol/mol).
- **E**nd of life phase, especially those with less than or equal to one year life expectancy.
- **N**ursing home residents, especially those with multiple comorbidities.
- **S**ignificant weight loss, especially unintentional indicating frailty.
- **I**nappropriate medications, especially insulin or sulfonylureas.
- **F**requent hypoglycaemia, especially serious episodes needing assistance.
- **Y**ears long of diabetes, especially those >20 years duration.

References

- ✓ Treatment of Diabetes in Older Adults: An Endocrine Society Clinical Practice Guideline
- ✓ Evidence-based diabetes care for older people with Type 2 diabetes: a critical review
- ✓ Older Adults: Standards of Medical Care in Diabetes 2019 (American Diabetes Association)
- ✓ Management of Atherosclerotic Cardiovascular Disease Risk Factors in the Older Adult Patient With Diabetes
- ✓ Deintensification of hypoglycaemic medications-use of a systematic review approach to highlight safety concerns in older people with type 2 diabetes

Thank you!