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Guidelines & Protocols Advisory Committee

Diabetes Care

Effective Date: October 27, 2021

Scope

This guideline describes the care objectives for the prevention, diagnosis, and management of diabetes mellitus (diabetes or DM in this guideline) in adults aged ≥ 19 years. It focuses on the approaches and systems that are ideally in place to improve care for the majority of people, the majority of the time.

Diabetes in pregnancy (including gestational diabetes) is outside the scope of this guideline, although statements about pre-conception care for people with diabetes are included.

Key Recommendations

- Diabetes care should be holistic and centred around the person living with diabetes. Include an individualized management plan developed by the person with diabetes and their primary care provider(s).
- Goals include reducing microvascular and cardiovascular complication, reducing hyperglycemia and its symptoms, reducing risk and occurrence of hypoglycemia, and improving quality of life.
- The 5 Rs describe the key components to consider when organizing diabetes care in the office or clinic: Recognize, Register, Resource, Relay, and Recall.
- People ≥ 40 years of age and those younger than 40 with risk factors should be screened for diabetes.
- Glycosylated hemoglobin (A1C), fasting plasma glucose (FPG) or rarely 2-hour plasma glucose (2hPG) as part of a 75g oral glucose tolerance test (OGTT) can be used for diagnosis and screening.
- Individualized glycemic targets are based on age, duration of diabetes, risk of hypoglycemia, cardiovascular disease presence, and life expectancy.
- Measure A1C every 3 months to assess if glycemic goals are met. Consider testing every 6 months if targets are consistently met, and treatment and lifestyle are stable.

Management of Type 2 Diabetes

- A systematic approach to cardiovascular management is recommended, including healthy behaviour choices, glycemic and blood pressure control, and pharmacological interventions.
- Metformin is recommended as initial pharmacotherapy.
- **NEW:** Choose antihyperglycemic agents (AHA's) with cardiorenal protection for those with Atherosclerotic Cardiovascular Disease (ASCVD/CVS), Chronic Kidney Disease (CKD), Heart Failure (HF) or ≥ age 60 with CVS risk factors. These agents should be used even if A1C is at target.
- Achieve glycemic goal (A1C target) in 3-6 months. Adjust therapy if glycemic targets are not reached or if there is a change in clinical status.
- If frailty, cognitive decline, or limited life expectancy are present, target an A1C of 7.1 to 8.5. Prioritize use of agents with low risk of hypoglycemia.

Epidemiology

- On average, over 32,000 people are diagnosed with diabetes every year in British Columbia (BC). In 2019/2020, over 497,000 people had diabetes in BC.*
- Geographic variations exist. Some regions have higher or lower rates of incidence and prevalence compared to the provincial totals.
- In Canada, age standardized prevalence rates for diabetes for 2011 are shown in Table 1: Prevalence Rates for Diabetes in Canada.[1,2]

Table 1: Prevalence Rates for Diabetes in Canada in 2011

Population Group	Age Standardized Prevalence Rates
General Population	5.0%
First Nations individuals living on-reserve	17.2%
First Nations individuals living off-reserve	10.3%
Métis people	7.3%
South Asian descent	14.4%
African descent	12.9%
Arab/West Asian descent	9.4%
East/Southeast Asian descent	8.2%
Latin American descent	4.5%

Classification and Risk Factors

Diabetes mellitus is a complex chronic disease characterized by hyperglycemia due to defective insulin secretion, defective insulin action or both.[3,4] See Table 2: Diabetes Classification, or Diabetes Canada's Definition, Classification and Diagnosis of Diabetes, Prediabetes and Metabolic Syndrome outline the different categories of diabetes.

Table 2: Diabetes Classification[3,4]

Diabetes Category	Definition
Type 1	• Primarily due to beta cell destruction, usually leading to total insulin deficiency and is susceptible to ketoacidosis. • May be due to autoimmune processes or unknown etiology. • Includes Latent Autoimmune Diabetes in Adults (LADA) a slow, progressive form of autoimmune diabetes that shares clinical characteristics of Type 2 Diabetes. • **Risk Factors:** Family history of Type 1 Diabetes and other autoimmune disease.
Type 2	• Due to a combination of insulin resistance and inadequate insulin secretory response. • Ranges from predominantly insulin resistance with relative insulin deficiency to predominantly an insulin secretory defect with insulin resistance. • **See Table 3: Diabetes Risk Factors**
Gestational	• Defined as glucose intolerance with onset or first recognition during pregnancy, regardless of whether the condition persists after pregnancy. • Gestational diabetes does not exclude the possibility of pre-existing, undiagnosed diabetes, or glucose intolerance.
Other	• Includes a wide variety of relatively uncommon conditions, primarily specific genetically defined forms of diabetes, or diabetes associated with other diseases or medication use.

* British Columbia Ministry of Health [data provider]. BC Observatory for Population and Public Health [publisher]. Chronic Disease Dashboard. Available at: http://www.bccdc.ca/health-info/disease-system-statistics/chronic-disease-dashboard.

Reducing the Risk of Developing Diabetes

Type 1 Diabetes

Safe and effective therapies for the prevention of Type 1 Diabetes have not yet been identified.[3]

Type 2 Diabetes

For those with prediabetes and overweight/obesity, healthy behaviour changes (i.e., eating well and a minimum of 150 minutes of regular physical activity over 5 days a week) that result in a modest weight loss of 5% of initial body weight can delay or prevent Type 2 Diabetes from developing. In some cases, medication may help reduce the risk for developing diabetes.[3,5] Pre-diabetes in geriatric populations may deserve an altered approach.[6]

Pharmacologic therapy with metformin can be considered for patients with impaired glucose tolerance (IGT). When compared to standard diet and exercise metformin slightly reduces or delays development of diabetes. However, when compared to intensive diet and exercise, metformin does not provide an additional benefit in reducing or delaying development of diabetes.[7] Diabetes Canada offers personalized prevention programs. See Canadian Diabetes Prevention Program for more information.

Diabetes Prevention in Ethnicities with High Risk: Certain ethnic groups, including Indigenous, South Asian, African, Arab, Asian, and Hispanic peoples are at very high risk for and have a high prevalence of Type 2 Diabetes (12% to 15% in the Western world).[8,9] Activities aimed at reducing the risk for ethnic groups at higher risk for diabetes should consider the broader impact that the social determinants of health, colonialism and racism have on overall health. Consider cultural preferences and approaches that support self-determination.

Screening and Diagnosis

Screening[3]

- General screening for Type 1 Diabetes is not recommended.
- Diabetes Canada recommends screening every 3 years in individuals ≥40 years of age or those at high risk in order to avoid missing those with undiagnosed dysglycemia, particularly in racial/ethnic minorities. Assess and screen more frequently in people with additional risk factors.[3,10,11] See Appendix A: Screening Algorithm for Type 2 Diabetes in Adults (in 2021, the United States Preventive Services Task Force (USPSTF) released updated recommendation for targeted screening for Type 2 Diabetes in overweight or obese adults aged 35 to 70 years[12]).
- Canadian Diabetes Risk Assessment Questionnaire (CANRISK) is a statistically valid risk tool appropriate as an educational tool for patients to self-assess their risk.

Table 3: Diabetes Risk Factors[3,4]

Age ≥40 years
First-degree relative with Type 2 Diabetes
History of prediabetes (IGT, IFG or A1C 6.0%–6.4%) History of GDM History of delivery of a macrosomic infant (big baby)
Member of high-risk population (e.g., African, Arab, Asian, Hispanic, Indigenous or South Asian descent, low socioeconomic status)
Presence of associated diseases: • History of pancreatitis • Polycystic ovary syndrome • Acanthosis nigricans • Hyperuricemia/gout • Non-alcoholic steatohepatitis • Psychiatric disorders such as bipolar disorder, depression, schizophrenia (incidence of Type 2 Diabetes is at least 3 times higher) • Human immunodeficiency Virus (HIV) infection (increases the risk of prediabetes [IGT] and Type 2 Diabetes by 1.5- to 4-fold) • Obstructive sleep apnea (independent risk factor for diabetes) • Cystic fibrosis
Presence of end organ damage associated with diabetes: • Microvascular (i.e., retinopathy, neuropathy, nephropathy) • Cardiovascular (i.e., coronary, cerebrovascular, peripheral)
Presence of vascular risk factors: • High Density Cholesterol-C <1.0 mmol/L in males, <1.3 mmol/L in females • Triglycerides ≥1.7 mmol/L • Hypertension • Overweight (BMI 25.0–29.9) • Abdominal obesity • Smoking
Use of drugs associated with diabetes: • Anti-rejection drugs (e.g., Tacrolimus, Cyclosporin) • Atypical antipsychotics • Glucocorticoids • Highly active antiretroviral therapy • Statins (weak association)

Diagnosis (Type 1 & 2)[3]

- Test with either A1C ($5.30*) and/or FPG ($1.46), or 2hPG ($12.94) in a 75g oral glucose tolerance test (OGTT). Best choice of test will depend on clinical circumstances.†

† Prices as per the Schedule of Fees – Laboratory Services Outpatient Payment Schedule as of June 1, 2020.

Table 4: Diagnosis of Diabetes[3]

Diagnosis of Diabetes Meeting ANY of the following criteria confirms diagnosis when classic symptoms of hyperglycemia are present Absence of classic symptoms of hyperglycemia requires a repeat confirmatory test	
FPG ≥7.0 mmol/L	• Test needs to be done after fasting (i.e., no caloric intake) for 8 hours (if fasting lipid test is ordered concurrently extend to 10 hours). • Full fasting lipid panel rarely needed for most people with Type 1 Diabetes. • Since a number of people with Type 2 Diabetes have elevated triglycerides to the point where this affects management, a full fasting lipid panel may be needed.
A1C ≥6.5% (in adults)	• Not used for diagnosis in suspected Type 1 Diabetes, pregnant women, children, or adolescents. • Results may be inaccurate in patients with hemoglobinopathies, very low eGFR, hematologic malignancies, anemia. See Diabetes Canada for more information.
2hPG in a 75 g OGTT ≥11.1 mmol/L	
Random PG ≥11.1 mmol/L in a patient with classic symptoms of hyperglycemia	• Random = any time of the day, regardless of the interval since the last meal

- In the absence of classic symptoms of hyperglycemia (e.g., polyuria, polydipsia, polyphagia, and/or unexplained weight loss), if a single lab test is in diabetes range, **a repeat confirmatory test (preferably the same test) must be done another day (in a timely fashion) to rule out any error**.
- In case of **classic symptoms of hyperglycemia, a repeat test is not required**. Diagnosis is confirmed.
- If there is a discordance between tests, repeat the previous positive test. See Diabetes Canada's Screening for and Diagnosing Diabetes Healthcare Provider Tool.
- If the results of two different tests are both above diagnostic cut-points, the diagnosis is confirmed.
- In individuals who are suspected of Type 1 Diabetes, confirmatory testing should not delay treatment.

Management[3]

1. Organization of Care

Diabetes care is centred around the person living with diabetes. It includes an individualized management plan developed by the person with diabetes, their family/caregivers and primary care provider(s). The 5 R's describe the key components for organizing diabetes care in the office or clinic. The Practice Support Program (PSP) Diabetes Learning Series includes additional information. BC physicians should contact their local PSP Regional Support Team coach for more information.

Table 5: The 5 Rs of Diabetes Care

The 5 Rs of Diabetes care	
Recognize	• Consider diabetes risk factors for all patients and screen appropriately. • See Screening section above.
Register	• Develop a list of patients with diabetes to facilitate recall and track changes in practice management. • See Diabetes Canada Registry for more information.
Resource	• Support self–management using inter-professional teams, including a primary care provider, diabetes educator, nurse, dietitian, pharmacist, or specialist. Consider referral to a diabetes education centre. • A team specializing in diabetes care is suggested for the following situations: ▪ Type 1 Diabetes: at diagnosis and at least annually ▪ Diabetes and pre-gestational assessment/counselling ▪ Diabetes in pregnancy (gestational/pre-gestational counselling) ▪ Type 2 Diabetes when complex or not reaching target • Self-management support consists of collaborative self-management education, incorporating problem solving and goal setting. Patients may require education in management measurements such as blood glucose, A1C, blood pressure, and lipid profile. • For further information on self-management, see Patient, Family and Caregiver Resources.
Relay	• Facilitate information sharing between the person with diabetes and the diabetes care team (e.g., telephone, electronic, paper-based). See Associated Document: Diabetes Patient Care Flow Sheet.
Recall	• Develop a system to remind patients of timely reviews and reassessments.

2. Individualized Targets

Blood Glucose: Glycemic Targets

- The focus of glycemic goals is on achieving target A1C levels and on minimizing symptomatic hyper- and hypoglycemia. Glycemic targets are individualized based on the person's age, duration of diabetes, risk of hypoglycemia, cardiovascular disease presence, and life expectancy. See Table 6: Targets for Glycemic Control for recommended targets, or to find a target for an individual patient, use the interactive Diabetes Canada tool for A1C targets.

Table 6: Recommendations for Glycemic Targets (adapted from Diabetes Canada)[3]

A1C%	Targets for Glycemic Control
≤ 6.5	Adults with Type 2 Diabetes (to reduce the risk of CKD and retinopathy), if at low risk of hypoglycemia*
≤ 7.0	**Most adults with Type 1 or Type 2 Diabetes**
7.1 ↓ **8.5**	Functionally dependent: 7.1-8% Recurrent severe hypoglycemia and/or hypoglycemia unawareness: 7.1-8.5% Limited life expectancy: 7.1-8.5% Frail elderly and/or with dementia: 7.1-8.5% (See Diabetes Canada Diabetes in Older Adult)
	Avoid higher A1C to minimize risk of symptomatic hyperglycemia and acute and chronic complications

Note: At end of life, A1C measurement is not recommended. Avoid symptomatic hyperglycemia and any hypoglycemia.

*based on class of antihyperglycemic medication(s) utilized and the person's characteristics.

Blood Glucose: Hypoglycemia[3]

Hypoglycemia can be a serious complication of therapy. Use less stringent glycemic targets in patients at risk of hypoglycemia. See Appendix B: Treatment of Hypoglycemia in Diabetes.

Table 7: Risk factors, Symptoms, Severity and Treatment of Hypoglycemia[3]

Hypoglycemia	
Symptoms	**Neurogenic/Autonomic:** Trembling, palpitations, sweating, anxiety, hunger, nausea, tingling. **Neuroglycopenic:** Difficulty concentrating, confusion, weakness, drowsiness, vision changes, difficulty speaking, headache, dizziness.
Severity of hypoglycemia	**Mild:** Autonomic symptoms are present. The individual can self-treat. **Moderate:** Autonomic and neuroglycopenic symptoms are present. The individual is able to self-treat. **Severe:** Individual requires assistance from another person. May become unconscious. Plasma Glucose is typically <2.8 mmol/L.
Risk factors	• Prior episode of severe hypoglycemia. • Long-term diabetes. • Current A1C low (<6.0%). • Autonomic neuropathy. • Hypoglycemia unawareness. • Current treatment with insulin or secretagogues. • Chronic kidney disease (CKD). • Low economic status. • Food insecurity. • Low health literacy. • Preschool-aged children unable to detect and/or treat mild hypoglycemia on their own. • Adolescence, pregnancy, elderly, frailty, cognitive impairment.
Treatment	• Educate patients and families about: Prevention, Detection, Treatment. • Increased frequency of Self-Monitoring of Blood Glucose (SMBG). • Reassess insulin doses and types. • Re-evaluate glycemic control targets. • Consider education for patient and family/caregivers in glucagon administration.

In BC, a driver with a medical condition (e.g., diabetes) that has the potential to affect their fitness to drive may be required to have a Driver's Medical Examination Report completed by their primary care provider.[13]

- See the BC Driver Fitness Handbook for Medical Professionals for further information.

Blood Glucose: Long-Term Control[3,13]

- Studies suggest there is a long-term benefit of glucose lowering early during Type 1 & 2 Diabetes, in terms of reducing complications.
- Measure A1C every 3 months to ensure that glycemic goals are being met and maintained.
- **Consider testing A1C every 6 months if treatment and lifestyle remain stable and if targets have been consistently met.** For individualizing the patient's A1C targets use the interactive Diabetes Canada tool for A1C targets.
- Focus on minimizing symptomatic hypo- and hyperglycemia, in addition to A1C levels.

Blood Glucose: Self-Monitoring of Blood Glucose[3]

- People with low risk of hypoglycemia may need less frequent Self-Monitoring of Blood Glucose (SMBG) testing frequency. People at higher risk of hypoglycemia may need more frequent testing. SMBG is more important when using pharmacotherapies that can cause hypoglycemia.
- Develop a SMBG schedule with the patient and review records as needed. Frequency and timing of SMBG is individualized, based on type of diabetes, treatments (e.g., use of insulin), need for information, and individual's capacity to use testing to modify behaviours or medications. Use Diabetes Canada's SMBG frequency guidance tool.
- For most adults with Type 2 Diabetes using antihyperglycemic agents (without insulin) or healthy behavior interventions only to meet glycemic targets, the value of routine use of SMBG is significant only in the short term.[14,15]
- Annual accuracy verification of glucose meter is recommended (simultaneous fasting glucose meter/lab comparison within 20%).
- Continuous glucose monitoring (CGM) and Flash glucose monitoring (FGM) systems measure glucose concentrations in the interstitial fluid. CGM and FGM can provide real time notifications when glucose level is above or below a preset limit or capture glucose readings for retrospective analysis. CGM sensors can be worn continuously for 7 to 10 days, and FGM sensors can be worn continuously for up to 14 days. FGM displays blood glucose levels when the sensor is "flashed" with a reader device on demand. For the latest PharmaCare coverage of glucose monitoring devices, please refer to PharmaCare Medical Supplies Coverage.
- Increasing evidence suggest that decreasing the glucose variability may decrease vascular complications of diabetes.
- Blood glucose test strips are a Pharmacare benefit for those holding a valid Certificate of Training in SMBG from a BC diabetes education centre. See Appendix C: PharmaCare Quantity Limits for Blood Glucose Test Strips and information on coverage.

3. Non-Pharmacological Management

Healthy Behaviour Interventions and Holistic Health Approaches

- People with diabetes will benefit from healthy behaviour education and interventions, including
  - Activity 150 minutes per week etc.
  - Nutrition therapy‡ (individualized nutrition counselling)
  - Sustained weight loss >5% if have obesity, etc.
  - Smoking cessation
- Regular physical activity (i.e., at least 150 minutes per week of aerobic exercise and two sessions of resistance training per week, if not contraindicated), sustained weight loss of ≥5% of initial body weight for individuals with obesity, and smoking cessation.
- Stress management, sleep, and mental and emotional wellness are important aspects of overall diabetes care and management.
- Diabetes education clinics are offered throughout the province. People may also find value in other approaches that are more specific to their community and culture.

‡ Medical Nutrition Therapy (MNT) is an evidence-based approach used in the nutrition care process (NCP) of treating and/or managing chronic diseases. MNT is often used in clinical and community settings, that focuses on nutrition assessment, diagnostics, therapy, and counselling. MNT is often implemented and monitored by a registered dietitian, in collaboration with physicians and other health professionals.

Weight Management

- risk factors. For people with diabetes who are overweight/obese, weight loss and A1C lowering may be possible with healthy behaviour modifications including nutrition therapy, increased and regular physical activity, and stress management.
- When discussing weight and health with patients, it is recommended that health care practitioners use approaches presented in the 2020 Obesity Canada guidelines.
- The root causes of obesity (e.g., trauma, chronic stress, food insecurity, medical conditions, genetics, social determinants of health, etc.) should be considered as conventional treatment options may not be feasible for all people.[16]
- People with diabetes may choose to try to lose weight by changing their diet. They should consult with their health-care provider to define goals and reduce the likelihood of adverse effects. They may need more frequent blood glucose monitoring and adjustment of medications that may cause hypoglycemia (e.g., if pursuing low carbohydrate diets, intermittent fasting, very low carbohydrate/keto diet).[17] Ongoing care from a Registered Dietitian is also beneficial.
- Pharmacotherapy directed at weight management has not been adequately studied in people with Type 1 Diabetes.
- For persons living with Type 2 Diabetes and a BMI ≥ 27 kg/m^2, pharmacotherapy (liraglutide 3.0 mg, naltrexone/bupropion combination, and orlistat) can be used in conjunction with health behaviour changes for weight loss and improvement in glycemic control.[16]
- For persons with prediabetes and BMI > 27 kg/m^2, who have or Type 2 Diabetes may benefit from pharmacotherapy (liraglutide 3.0 mg, orlistat, semaglutide) may be considered in conjunction with health behaviour changes to delay or prevent Type 2 Diabetes.[16]
- Consider diabetes medications with favourable weight loss profiles (SGLT2i and GLP1 receptor agonists).
- Bariatric surgery is a therapeutic option for people with Type 2 Diabetes and body mass index ≥35.0 kg/m^2 who have already attempted healthy behaviour choices with or without weight management medication(s).
- Some procedures are covered by the Medical Services Plan.
- For more information on obesity management, see BCGuidelines.ca – *Overweight and Obese Adults: Diagnosis and Management*, Diabetes Canada: Weight Management in Diabetes and Obesity Canada: Canadian Adult Obesity Clinical Practice Guidelines.

4. Individualized Pharmacologic Management

Type 1 Diabetes

Multiple (3-4) daily insulin injections or the use of Continuous Subcutaneous Insulin Infusion (CSII or insulin pump) should be considered as part of an intensive diabetes management program. PharmaCare covers insulin pumps for people with Type 1 Diabetes or other forms of diabetes requiring insulin. PharmaCare covers supplies for insulin pumps, regardless of whether the pump was covered. For more information visit PharmaCare for B.C. residents: Medical Devices and Supplies Coverage.

Type 2 Diabetes[18,19]

The following algorithms (Figures 1-3) from Diabetes Canada's Pharmacologic Glycemic Management of Type 2 Diabetes in Adults: 2020 Update[18] (used here with permission) lay out the management pathway for Type 2 Diabetes.

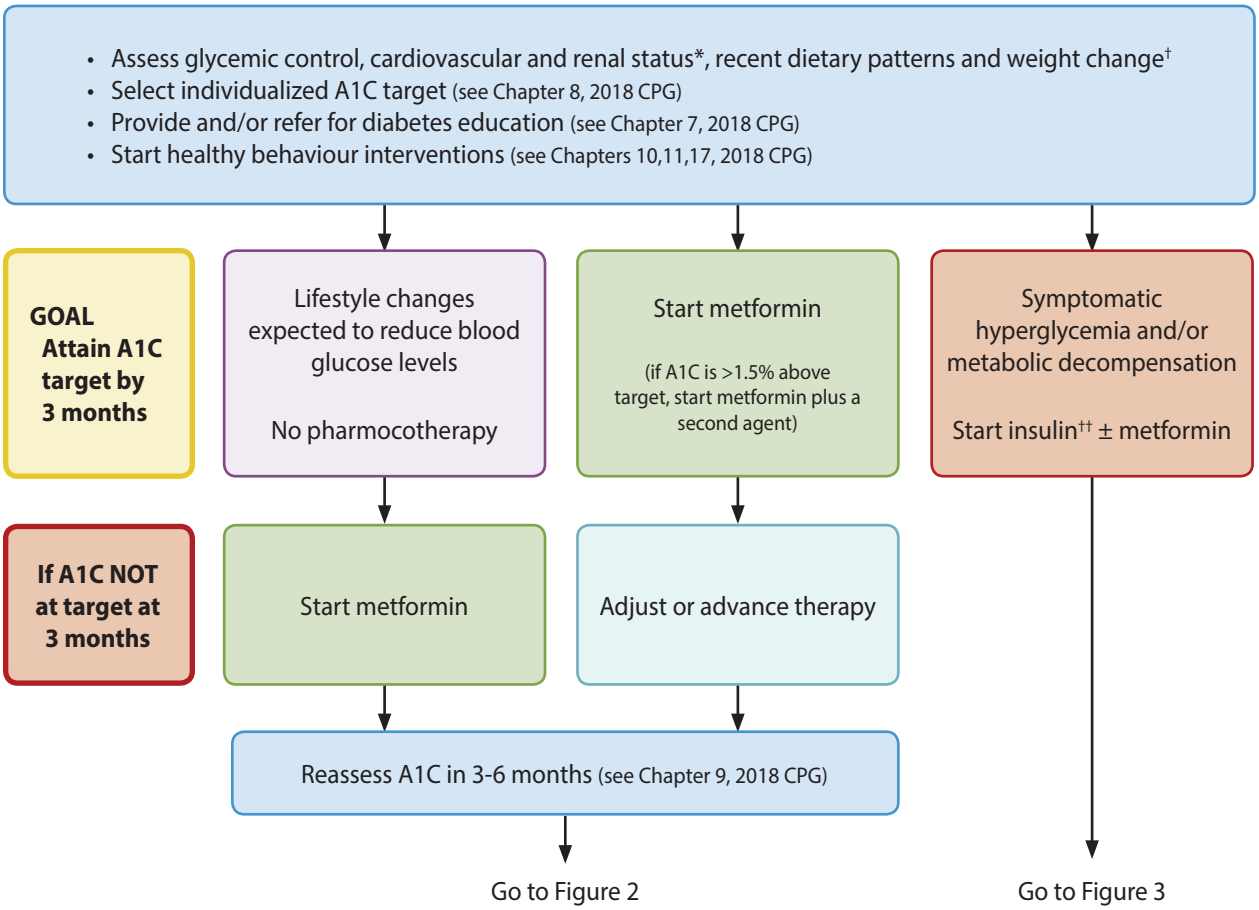
- If glycemic targets are not achieved with existing antihyperglycemic medication(s), or the individual's clinical status changes, other classes of agents should be used (either by addition or replacement) to reduce cardiorenal impact and/or improve glycemic control; or glycemic targets should be reassessed. See: Appendix D: Commonly Used Antihyperglycemic Agents and Adjunctive Agents for Use in Type 2 Diabetes.

- Consider the following medications in adults with:

Diabetes AND	Medication
Atherosclerotic CVD (ASCVD)	GLP1-RA or SGLT2i
History of HF (reduced ejection fraction ≤ 40%)	SGLT2i and avoid TZD and saxagliptin
CKD and an estimated eGFR >30 mL/min/1.73m^2	SGLT2i
Aged 60 years or older with at least 2 CV risk factors	GLP1-RA, SGLT2i

- If reducing risk of hypoglycemia is a priority, consider DPP4i or GLP1-RA, SGLT2i, as add-on medication.
- If weight loss is a priority, consider GLP1-RA and/or SGLT2i as add-on medication.
- When glycemic targets are not achieved, consider addition of a basal insulin regimen. Bolus insulin may be initiated using a stepwise approach. See Figure 3: Starting or advancing insulin in Type 2 Diabetes. To minimize the risk of hypoglycemia, consider a long-acting insulin analogue (insulin glargine U-100, glargine U-300, detemir, degludec) over NPH insulin. Insulin degludec or insulin glargine U-300 (57) may be considered over insulin glargine U-100 for individuals with > 1 risk factor for hypoglycemia. See: Appendix E: Insulin: Therapeutic Considerations and Availability.
- If glycemic targets are not achieved with insulin, consider GLP1-RA or SGLT2i or DPP4i as add-on therapy. When bolus insulin is added, consider rapid-acting analogues over short acting (regular) insulin. Bolus insulin may be initiated using a stepwise approach.

Figure 1: Management of Type 2 Diabetes[3]



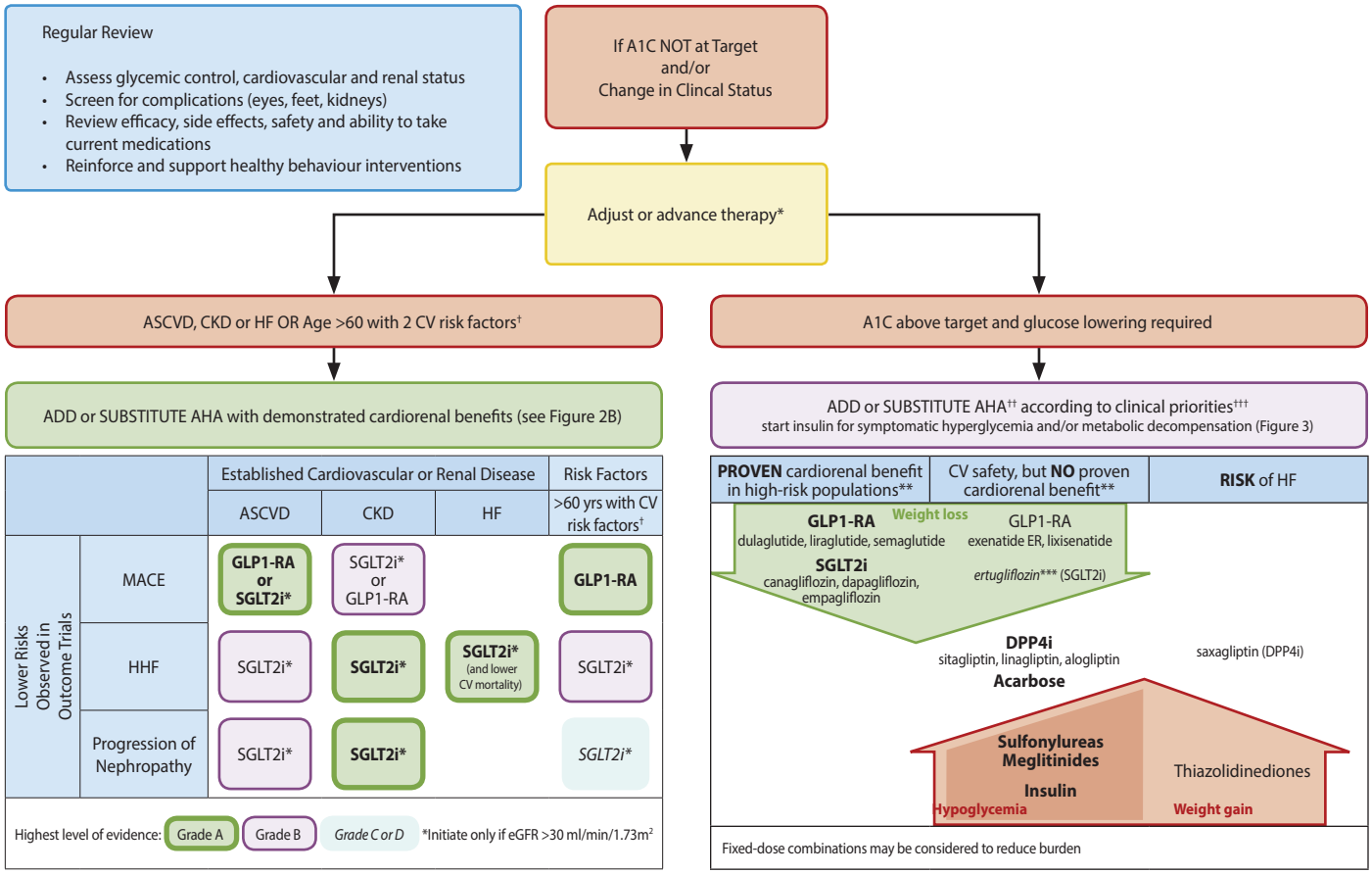
* In individuals with atherosclerotic cardiovascular disease, history of heart failure (with reduced ejection fraction) or chronic kidney disease, agents with cardiorenal benefits (Figure 2) may be considered (see Pharmacologic Glycemic Management of Type 2 Diabetes in Adults: 2020 Update – The User's Guide).

† Unintentional weight loss should prompt consideration of other diagnoses (e.g. type 1 diabetes or pancreatic disease).

†† Reassess need for ongoing insulin therapy once type of diabetes is established and response to health behaviour interventions is assessed.

A1C, glycated hemoglobin; *CPG*, clinical practice guidelines.

Figure 2: Reviewing, Adjusting or Advancing Therapy in Type 2 Diabetes[3]



* Changes in clinical status may necessitate adjustment of glycemic targets and/or desprescribing.

† Tobacco use; dyslipdemia (use of lipid-modifying therapy or a documented untreated low-density lipoprotein (LDL) ≥3.4 mmol/L, or high-density lipoprotein-cholesterol (HDL-C) <1.0 mmol/L for men and <1.3 mmol/L for women, or triglycerides ≥2.3 mmol/L); or hypertension (use of blod pressure drug or untreated systolic blood pressure [SBP] ≥140 mmHg or diastolic blood pressure [DBP] ≥95 mmHg).

†† All antihyperglycemic agents (AHAs) have Grade A evidence for effectiveness to reduce blood glucose levels.

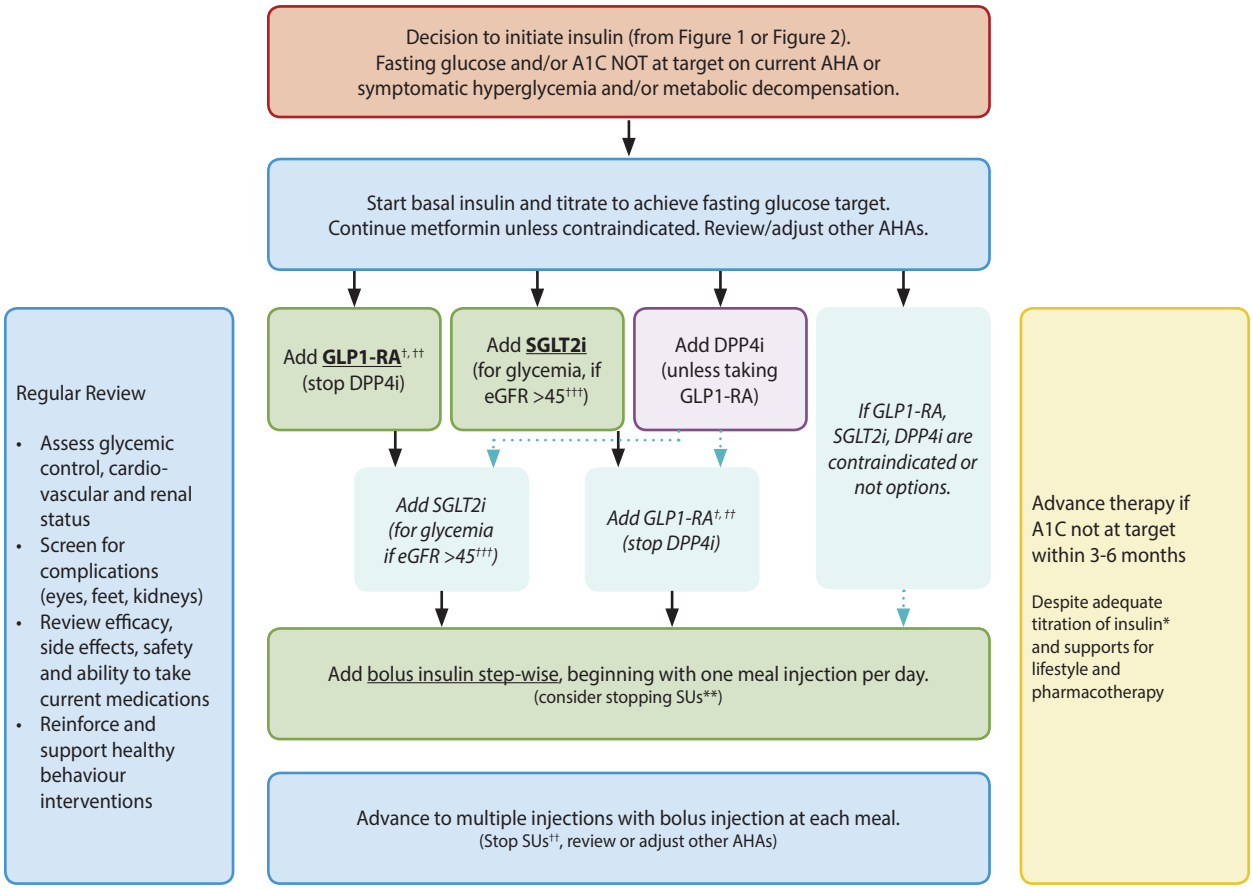
††† Consider degree of hyperglycemia, costs and coverage, renal function, comorbidity, side effect profile and potential for pregnancy.

** In CV outcome trials performed in people with atherosclerotic cardiovascular disease (ASCVD), chronic kidney disease (CKD), heart failure (HF) or at high cardiovascular (CV) risk.

*** VERTIS (CV outcome trial for ertugliflozin) presented at American Diabetes Association (ADA) June 2020 showed noninferiority for major adverse CV events (MACE). Manuscript not published at time of writing.

A1C, glycated hemoglobin; *DPP4i*, dipeptidyl peptidase-4 inhibitors; *eGFR*, estimated glomerular filtration rate; *GLP1-RA*, glucagon-like peptide-1 receptor agonists; *exenatide ER*, exenatide extended-release; *HHF*, hospitalization for heart failure; *SGLT2i*, sodium-glucose cotransporter 2 inhibitors; *yrs*, years.

Figure 3: Starting or Advancing Insulin in Type 2 Diabetes[3]



Highest level of evidence: Grade A | Grade B | *Grade C or D*

* Titration of basal insulin to achieve FPG target without hypoglycemia.
† And titrate dose of GLP1-RA, as tolerated..
†† Or fixed-ration combination.
††† If eGFR >30 ml/min/1.73m^2, may be used for cardiorenal benefit.
** Sulfonylureas or meglitinides.
AHAs, antihyperglycemic agents; *A1C*, glycated hemoglobin; *DPP4i*, dipeptidyl peptidase-4 inhibitors; *eGFR*, estimated glomerular filtration rate; *GLP1-RA*, glucagon-like peptide-1 receptor agonists; *SGLT2i*, sodium-glucose cotransporter 2 inhibitors; *SU*, sulfonylureas.

5. Preventing Complications and Comorbidities

Global Cardiovascular Management[3]

- People with diabetes are at significantly increased risk of cardiovascular disease. BCGuideline.ca: *Cardiovascular Disease: Primary Prevention* recommends using a risk assessment tool, medical history, physical examination, and lipid profile. While the current Framingham Risk Score now includes diabetes status to individualize a Type 2 Diabetes patient's risk, the United Kingdom Prospective Diabetes (UKPDS) risk calculator is the recommended tool.
  - A risk assessment calculator is not recommended for people with Type 1 Diabetes.
- A systematic approach to vascular protection is recommended, including healthy behaviour interventions, glycemic control, blood pressure control, and pharmacological interventions.
- Consider the "**ABCDESSS**" as a useful mnemonic device for vascular protection strategies. See Table 8: Consider the ABCDESSS below.

Table 8: Consider the ABCDESSS

GUIDELINE TARGET (or personalized goal)		
A	A1C targets	• A1C ≤7% • If on insulin or insulin secretagogue, assess for hypoglycemia and ensure driving safety
B	BP targets	• BP <130/80 mmHg • If on treatment, assess for risk of falls
C	Cholesterol targets	• LDL-C <2.0 mmol/L
D	Drugs for CVD risk reduction	• ACEi/ARB (if CVD, age ≥55 with risk factors, OR diabetes complications) • Statin (if CVD, age ≥40, OR diabetes complications) ASA (if CVD) • Antihyperglycemic agents with proven cardio-renal benefit (SGLT2i and GLP1RA)
E	Exercise and healthy eating goals	• 150 minutes of moderate (e.g., brisk walking, lawn mowing, recreational badminton) to vigorous aerobic activity (e.g., hiking, jogging, soccer game) and resistance exercises 2-3 times/week • Follow healthy dietary pattern as determined by the individual (e.g., Mediterranean diet, low glycemic index, low carbohydrate/ketogenic diets)
S	Screening for complications	• Cardiac: ECG every 3-5 years if age >40 OR diabetes complications • Neuropathy (Foot): Monofilament/Vibration yearly or more if abnormal • Nephropathy (Kidney): Test eGFR and ACR yearly, or more if abnormal • Retinopathy: Yearly dilated retinal exam
S	Smoking cessation	• If smoker: Offer advice, arrange therapy, and provide support
S	Self-management, stress, other barriers	• Set personalized goals • Assess for stress, mental health, financial or other concerns that might be barriers to achieving goals

Heart Failure[3]

- The incidence of heart failure is 2 to 4 times higher in people with diabetes compared to those without and, when present, occurs at an earlier age. It is recognized that diabetes can cause heart failure independently of ischemic heart disease by causing a diabetes-related cardiomyopathy.
- SGLT2i reduce the risk of hospitalization for heart failure with reduced ejection fraction.[20] Individuals with diabetes and heart failure should receive the same heart failure therapies. See BCGuidelines: *Chronic Heart Failure – Diagnosis and Management*.

Hypertension[3]

- Blood pressure control is a priority for people with diabetes. Record at diagnosis and regularly thereafter.
- For people with diabetes, reaching a desirable Manual Office Blood Pressure (MOBP) reading of <130/80 is recommended by Hypertension Canada, American College of Cardiology, European Society of Hypertension and the Diabetes Canada Clinical Practice Guidelines. The desired level of MOBP <130/80 was determined by these groups following review of several recent clinical trials that support lower Blood Pressure levels with reductions in risk of microvascular diabetic endpoints, stroke and major cardiovascular events.[21,22] See BCGuidelines: *Hypertension – Diagnosis and Management*.
- If healthy behavior interventions are insufficient, then pharmacological treatment may be required:
  - DM with moderately or severely increased albuminuria, chronic kidney disease, cardiovascular disease, or cardiovascular disease risk factors:
    - First-line – ACEi or ARB (if ACEi intolerant).
    - Second-line – Dihydropyridine calcium channel blocker (DHP-CCB) (e.g., amlodipine, felodipine, and nifedipine).
  - DM no chronic kidney disease or cardiovascular disease risk factors:
    - First-line – ACEi or ARB or Thiazide/Thiazide-like diuretic or DHP-CCB. ACEi and ARBs should not be used in combination.
    - Second-line – Combination of first line drugs (note: in combination with ACEi, a DHP-CCB is preferable to a thiazide/thiazide-like diuretic.

Lipid Lowering Strategies[3]

- Primary prevention: healthy behavior interventions are usual first-line strategies in vascular protection. Statin therapy is a second line intervention, considered on an individual basis following an evaluation of risk and benefits. Additional agents now approved are ezetimbe, PSK-9i and IPE.
- Risk assessment discussions on whom to use statin therapy are discussed in the 2021 Canadian Cardiovascular Society (CCS) Guidelines for the Management of Dyslipidemia.[23]
- Diabetes Canada aligns with the 2016 CCS guidelines and recommends statin therapy to reduce cardiovascular disease risk in adults with Type 1 or Type 2 Diabetes with any of the following features:
  - Age ≥ 40 years.
  - Age > 30 years and diabetes duration > 15 years.
  - Microvascular complications.
  - Cardiovascular disease.
- The CCS 2021 guidelines recommends treating high risk and intermediate risk people (listed above) to a specific LDL-C target of ≤ 1.8 mmol/L. Alternate targets include an apoB target of ≤0.7 g/L and a non-HDL-C target of ≤2.4 mmol/L. The recommendation for low-risk people is to treat to 50% of their baseline LDL-C. See Associated Document: Patient Care Flowsheet for frequency of monitoring.
- In people with diabetes achieving LDL-C goal with statin therapy; fibrates, niacin and omega-3 fatty acids should not be routinely added for the sole purpose of further reducing CV risk.
- If statin therapy is decided upon, select statin based on tolerability, potential for drug interactions, and cost. For information on dosages, see BCGuidelines.ca: *Cardiovascular Disease – Primary Prevention*.

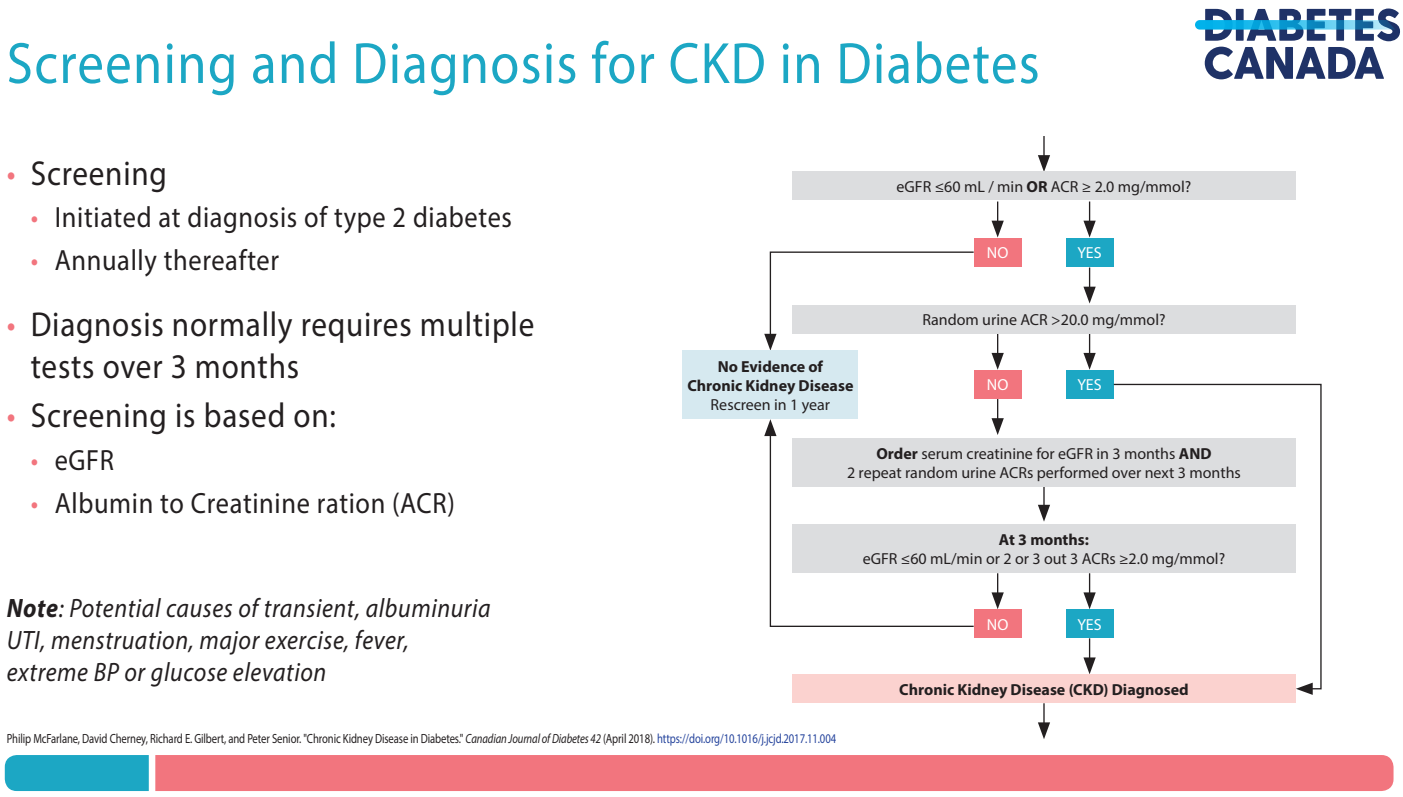
Retinopathy[3]

- Early recognition and treatment of retinopathy can prevent vision loss.
- Retinopathy can worsen during pregnancy. Women with existing diabetes considering pregnancy or in early pregnancy should be assessed by an eye care specialist.
- Those with pre-existing eye disease who have a rapid significant drop in A1C can experience a worsening in retinopathy. Closer follow-up with an eye care specialist is recommended.
- Ensure individual with Type 2 Diabetes receives dilated pupil retinal examination at diagnosis, then every 1-2 years or as indicated. For individuals with Type 1 Diabetes the first pupil retinal exam can start at 5 years post-diagnosis, then annually.
- Optimal glycemic control and BP levels reduces the onset and progression of sight-threatening diabetic retinopathy.
- Anti-VEGF injections, laser therapy and/or vitrectomy may be used to manage diabetic retinopathy.

Nephropathy and Chronic Kidney Disease[3]

- People with Type 1 Diabetes are not expected to have kidney disease at the time of onset of diabetes, so screening can be delayed until the duration of diabetes exceeds 5 years post-pubertal and repeated annually.
- Significant renal disease can be present at the time of diagnosis of Type 2 Diabetes, so screening should be initiated immediately at the time of diagnosis and then repeated annually.
- A diagnosis of CKD should be made in people with an estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m^2 and/or random urine albumin/creatinine ratio (ACR) ≥2.0 mg/mmol on at least 2 of 3 samples over a 3-month period. See Figure 4: Screening and Diagnosis for CKD in Diabetes below (adapted from Diabetes Canada).

Figure 4: Screening and Diagnosis for CKD in Diabetes



Philip McFarlane, David Cherney, Richard E. Gilbert, and Peter Senior. "Chronic Kidney Disease in Diabetes." *Canadian Journal of Diabetes 42* (April 2018). https://doi.org/10.1016/j.jcjd.2017.11.004

- Check ACR, eGFR, and urinalysis annually: if tests are normal continue annual monitoring. If tests are abnormal, repeat within 3 months in a well hydrated state to confirm, unless there is deteriorating renal function requiring urgent investigation, management and referral.
- If abnormal and confirmed, monitor renal function (ACR, eGFR) more frequently. Elevated ACR can be an early marker of diabetes nephropathy. See BCGuidelines: *Chronic Kidney Disease – Identification, Evaluation and Management of Adult Patients*.

- Optimize blood pressure and glucose control to prevent or slow progression of nephropathy.
- Progression of chronic kidney disease in diabetes can also be slowed using medications that disrupt the renin angiotensin aldosterone system (ACE-I, ARBs RAAS) and SGLT-2i.
- The Kidney Risk Calculator may be used to calculate the 2 and 5 year probability of kidney failure requiring dialysis or transplant based on age, gender, eGFR and ACR.

Neuropathy[3]

- • In people with Type 2 Diabetes, screening for peripheral neuropathy should begin at diagnosis of diabetes and occur annually thereafter.
- In people with Type 1 Diabetes, annual screening should commence after 5 years post-pubertal duration of diabetes.
- The best way to prevent diabetic neuropathy is to achieve long-term glycemic control.[1]
- Screening can be performed via 10-g monofilament or 128-Hz tuning fork during foot exam.
- At a minimum, check annually for symptoms or findings such as peripheral anesthesic neuropathy or pain, or autonomic neuropathy (e.g., erectile dysfunction, gastrointestinal disturbance, orthostatic hypotension).

Foot Examination[3]

- Examine feet annually, or more frequently for those at high risk (e.g., known neuropathy, macrovascular complications, smokers, patient with foot or leg abnormalities).
- Management of foot ulcer requires an interdisciplinary care approach to address infections, wound care, glycemic control, lower-extremity vascular status, and off-loading of high pressure areas.
- Encourage regular self-examination of feet. A foot care checklist is available here: Diabetes.ca/footcare.

Psychosocial Aspects of Diabetes[3]

- Psychosocial factors affect many aspects of diabetes management and glycemic control.
- Screen for psychiatric disorders including depression, anxiety and eating disorders. Consider using screening tools such as Patient Health Questionnaire (PHQ-9), or GAD-7. Treatment of these conditions may improve outcomes. Additional life factors such as adverse childhood experiences, trauma, and stress should also be addressed.
- Disease specific psychologic issues include diabetes-related distress (i.e., the emotional impact of living with diabetes, stressors around self-management regimen, the stress associated with social relationships and including the patient-provider relationship), fear of hypo- and hyperglycemia, and fear around insulin use.
- Use person-centred approaches such as motivational interviewing, and cognitive behavioral therapy to help reduce stress, cope with diabetes diagnosis and achieve self-management.

Sexual Dysfunction

- Diabetes can significantly impair sexual function in both males and females. This is multifactorial including microvascular, neuropathy, and hormonal.[24] This can lead to significant psychosocial impact and should be reviewed with patients routinely.

Immunizations[3]

- Annual influenza vaccination is recommended.
- In adults with DM, pneumococcal vaccination/pneumo-vax 23 is recommended. Re-vaccination is recommended for those ≥ 65 years of age and if the original vaccine was given when they were < 65 years of age. For further information, see the BC Centre for Disease Control Immunization Manual.

In Case of Acute Illness[3]

- Educate those with diabetes about acute illness particularly when they are unable to drink enough fluid to keep hydrated or when vomiting.
- People who experience illness and are unable to maintain adequate fluid intake, or at risk for acute decline in renal function (e.g., gastrointestinal upset or dehydration) should increase the frequency of SMBG and may need to adjust doses of insulin, adjust or hold antihyperglycemic agents and/or other medications. A mnemonic for these medications is: SADMANS (Sulfonylureas, ACEi, Diuretics, Direct renin inhibitors, Metformin, ARB, Nonsteroidal anti-inflammatory, SGLT2 inhibitors). See the Sick Day medication list at: Diabetes.ca/sick-day/medication/list and Diabetes Canada Sick Day Management Tool.
- Encourage individuals with Type 1 Diabetes to perform ketone testing during acute illness accompanied by elevated blood glucose. Blood ketone testing may be preferred over urine ketone testing.

6. Populations with Additional Considerations

Populations with Mental Health Concerns

- People diagnosed with serious mental illnesses (e.g., major depressive disorder, bipolar disorder and schizophrenia), or those taking antipsychotic medications, have a higher risk of developing diabetes and worse outcomes compared to the general population and require regular metabolic monitoring.
- Liaise with mental health-care professionals as necessary to ensure appropriate care plans are developed that include psychosocial interventions and glycemic control.
- Mental health treatments may improve diabetes outcomes.

Indigenous Peoples

- The causes of higher rates of diabetes among Indigenous people in Canada are complex. Clinicians should seek to understand the relationship between the history of colonization and diabetes (See Diabetes Canada Chapter Type 2 Diabetes and Indigenous Peoples), including the historic and ongoing impacts of trauma, loss of culture, food insecurity, and systemic racism, including healthcare settings.
- The recently released provincial report titled In Plain Sight: Addressing Indigenous-specific Racism and Discrimination in B.C. Health Care highlighted findings of significant experiences of racism by Indigenous people in the BC health care system. All clinicians have a role to play in breaking the cycle of racism and discrimination towards Indigenous clients. It is recommended that all clinicians read the In Plain Sight Full Report and/or Summary Report and consider what changes they might make in their own practices.
- Create a culturally safe space by asking Indigenous clients about the importance of culture, family and community in their treatment care plans, and inquiring about their use of any traditional medicines.

Geriatric Population

- Older adults with diabetes, who are functionally fit and have a life expectancy of greater than 10 years, receive the same treatment as younger adults in order to achieve the same glycemic, BP and lipid targets.

In frail elderly people with diabetes:

- Pay attention to:
  - Polypharmacy – review full medication list periodically. A patient presenting with depression, falls, cognitive impairment, perceptual difficulties, or urinary incontinence should trigger a full medication review.
  - Glycemic targets – consider less strict targets (7.1-8.5% A1C) in those with limited life expectancy, high functional dependency, extensive disease, or multiple co-morbidities.
  - Postural hypotension – contributes to falls and fractures. Check lying and standing BP; review medications
  - Renal function – regularly review medications to reduce or eliminate nephrotoxic effects and prevent hypoglycemic events.
- Consider use of:
  - DPP-4 inhibitors over sulfonylureas. Use sulfonylureas (especially glyburide) with caution as the risk of hypoglycemia increases with age.
  - Lower starting doses (initial doses can be half of those for younger people) and slower titration of medications.
  - Long-acting basal analogues (lower frequency of hypoglycemia), rather than intermediate-acting or premixed insulin.
  - Cognitive assessment (such as clock face tests), and functional dexterity verification prior to initiating insulin. See the BCGuidelines.ca: *Cognitive Impairment – Recognition, Diagnosis and Management in Primary Care* for assessment tests.
  - Premixed insulins and prefilled insulin pens preferred to reduce dosing errors and to potentially improve glycemic control.
- In those with clinical CVD and in whom glycemic targets are not achieved with existing antihyperglycemic medication(s) and with an eGFR >30 mL/min/1.73 m^2, an antihyperglycemic agent with demonstrated CV outcome benefit could be added to reduce the risk of major CV events.

Pregnancy

- Contraception and pre-pregnancy planning in all patients with diabetes is critical to improved outcomes. Refer promptly for specialized care.
- Optimal glucose control pre-conception (A1C≤ 7% or ≤6.5% if safely achieved) will reduce risk of:
  - spontaneous abortion
  - congenital abnormalities
  - preeclampsia
  - progression of retinopathy
- Statins and ACEi are not safe in pregnancy and should be discontinued.
- ACE/ARBs for hypertension should be discontinued prior to pregnancy and once pregnant if using for CKD.
- Statins and/or fibrates should be discontinued prior to pregnancy.
- Metformin and glyburide pre-conception may be continued if glycemic control is adequate until pregnancy is achieved. Those on other medications should be transferred to insulin prior to pregnancy or in early pregnancy while awaiting specialty care.
- Identify women with previous gestational diabetes. They can develop Type 2 Diabetes and special attention is necessary prior to future pregnancies and in later life.
- See the Diabetes Canada guide on women of child-bearing age at: Guidelines.diabetes.ca/cpg/chapter36.

Resources

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Abbreviations

2hPG	2-hour Plasma Glucose
A1C	Glycosylated hemoglobin
ACR	Albumin/Creatinine Ratio
ACEi	Angiotensin-converting enzyme inhibitors
AHA's	Antihyperglycemic Agents
ARBs	Angiotensin receptor blockers
ASA	Acetylsalicylic Acid
ASCVD/CVD	Atherosclerotic Cardiovascular Disease/ Cardiovascular Disease
BMI	Body Mass Index
CCS	Canadian Cardiovascular Society
CGM	Continuous Glucose Monitoring
CKD	Chronic Kidney Disease
DM	Diabetes Mellitus
DHP-CCB	Dihydropyridine calcium channel blocker
DPP-4i	Dipeptidyl peptidase 4 Inhibitors
eGFR	Creatinine/Estimated Glomerular Filtration Rate
FGM	Flash Glucose Monitoring
FPG	Fasting Plasma Glucose
GLP-1	Glucagon-like Peptide
HDL-C	High-Density Lipoprotein Cholesterol
HF	Heart Failure
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance
LDL-C	Low-Density Lipoprotein Cholesterol
MOBP	Manual Office Blood Pressure
OGTT	Oral Glucose Tolerance Test
SGLT2i	Sodium-glucose Cotransporter 2 Inhibitors
SMBG	Self-Monitoring of Blood Glucose
T2DM	Type 2 Diabetes Mellitus
TG	Triglycerides
TZDs	Thiazolidinediones

Practitioner Resources

Diabetes Canada has several resources for practitioners and can be found at: guidelines.diabetes.ca/health-care-provider-tools. They also have the Diabetes Canada 2018 CPG Webinar Series available at: guidelines.diabetes.ca/webinar

RACE: Rapid Access to Consultative Expertise Program – www.raceconnect.ca

RACE means timely telephone advice from specialist for Physicians, Medical Residents, Nurse Practitioners, Midwives, all in one phone call. **Monday to Friday 0800 – 1700. Online at** www.raceapp.ca **or though** Apple **or** Android **mobile device. For more information on how to download RACE mobile applications, please visit** www.raceconnect.ca/race-app/

Local Calls: 604–696–2131 | **Toll Free:** 1–877–696–2131

For a complete list of current specialty services visit the Specialty Areas page.

Pathways – PathwaysBC.ca

An online resource that allows GPs and nurse practitioners and their office staff to quickly access current and accurate referral information, including wait times and areas of expertise, for specialists and specialty clinics. In addition, Pathways makes available hundreds of patient and physician resources that are categorized and searchable.

General Practice Services Committee – www.gpscbc.ca

- **Practice Support Program**: offers focused, accredited training sessions for BC physicians to help them improve practice efficiency and support enhanced patient care.
- **Chronic Disease Management and Complex Care Incentives**: compensates GPs for the time and skill needed to work with patients with complex conditions or specific chronic diseases.

Health Data Coalition – hdcbc.ca

An online, physician-led data sharing platform that can assist you in assessing your own practice in areas such as chronic disease management or medication prescribing. HDC data can graphically represent patients in your practice with chronic kidney disease in a clear and simple fashion, allowing for reflection on practice and tracking improvements over time.

HealthLinkBC – healthlinkbc.ca

HealthLinkBC provides reliable non-emergency health information and advice to patients in BC. Information and advice on managing Diabetes in several languages is available by telephone, website, a mobile app and a collection of print resources.

People can speak to a health services navigator, registered dietitian, registered nurse, qualified exercise professional, or a pharmacist by calling 8-1-1 toll-free in B.C, or 7-1-1 for the deaf and hard of hearing.

See also Associated Documents: Diabetes Patient Care Flow Sheet

Patient, Family and Caregiver Resources

- Diabetes Canada: Tools and Resources
- HealthLinkBC: Managing Diabetes
- Island Health Community Virtual Care: Community Virtual Care provides support to people with a range of medical conditions. Registered nurses help you to manage your condition from the comfort of your home. All the tools needed are loaned to you at no cost.
- Self-Management BC: Diabetes Self-Management Program
- iCON: Diabetes

Diagnostic Code

250 – Diabetes mellitus

786 – Smoking cessation

783 – Unhealthy eating and medical obesity

785 – Physical inactivity

14066 – Personal health risk assessments

PG14050 – GPSC annual chronic care incentive (diabetes mellitus)

Appendices

Appendix A: Screening Algorithm for Type 2 Diabetes in Adults

Appendix B: Treatment of Hypoglycemia in Diabetes

Appendix C: PharmaCare Quantity Limits for Blood Glucose Test Strips

Appendix D: Commonly Used Antihyperglycemic Agents and Adjunctive Agents for Use in Type 2 Diabetes

Appendix E: Insulin Therapeutic Considerations and Availability

Associated Documents

Diabetes Patient Care Flow Sheet

This guideline is based on scientific evidence current as of effective date.

This guideline was developed by the Guidelines and Protocols Advisory Committee in collaboration with the Provincial Laboratory Medicine Services, and adopted under the Medical Services Act and the Laboratory Services Act.

For more information about how BC Guidelines are developed, refer to the GPAC Handbook available at BCGuidelines.ca: GPAC Handbook.

THE GUIDELINES AND PROTOCOLS ADVISORY COMMITTEE

The principles of the Guidelines and Protocols Advisory Committee are to:

- encourage appropriate responses to common medical situations
- recommend actions that are sufficient and efficient, neither excessive nor deficient
- permit exceptions when justified by clinical circumstances

Contact Information:

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Victoria BC V8W 9P1

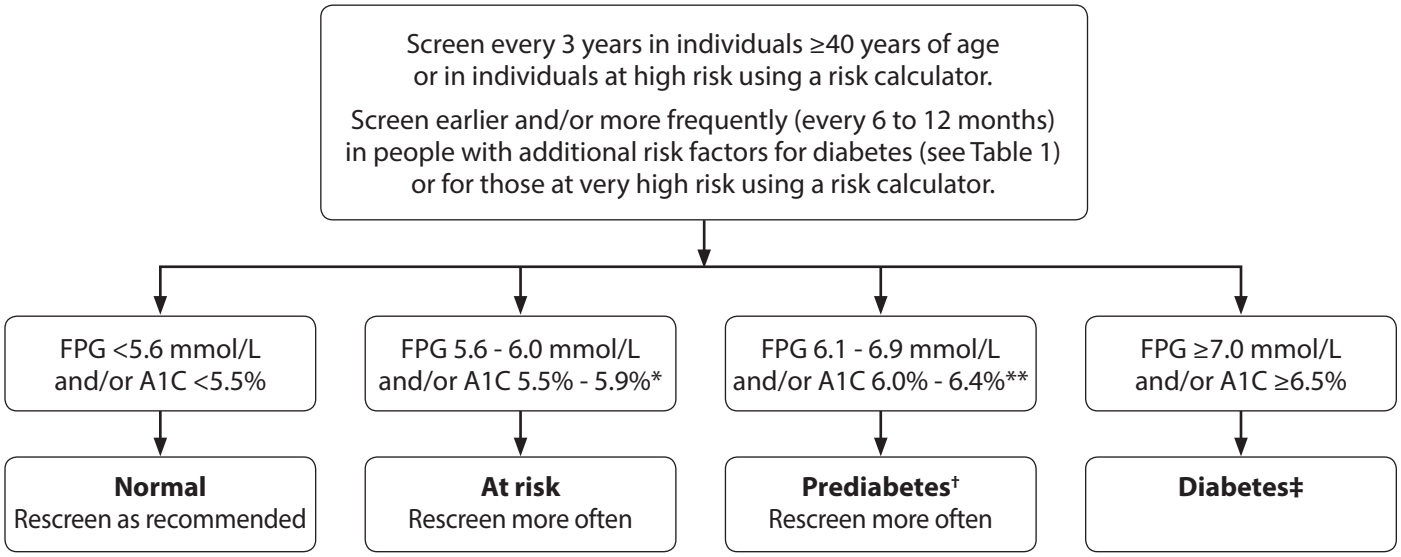
Email: hlth.guidelines@gov.bc.ca
Website: www.BCGuidelines.ca

Disclaimer

Appendix A: Screening Algorithm for Type 2 Diabetes in Adults

(adapted from Diabetes Canada with permission)[1]

Note: an interactive form of this tool is available here: guidelines.diabetes.ca/ScreeningAndDiagnosis/Screening



If both FPG and A1C are available, but discordant, use the test that appears furthest to the right side of the algorithm.

*Consider 75 g OGTT if ≥1 risk factors; ** Consider 75 g OGTT (see Tables 3 and 5 in the Definition, Classification and Diagnosis of Diabetes, Prediabetes and Metabolic Syndrome chapter, p. S10 for interpretation of 75 g OGTT).

†Prediabetes = IFG or A1C 6.0 to 6.4% (see Table 5 in the Definition, Classification and Diagnosis of Diabetes, Prediabetes and Metabolic Syndrome chapter, p. S10).

‡In the presence of symptoms of hyperglycemia, a single test result in the diabetes range is sufficient to make the diagnosis of diabetes. In the absence of symptoms of hyperglycemia, if a single laboratory test result is in the diabetes range, a repeat confirmatory laboratory test (FPG, A1C, 2hPG in a 75 g OGTT) must be done on another day. It is preferable that the same test be repeated (in a timely fashion) for confirmation, but a random PG in the diabetes range in an asymptomatic individual should be confirmed with an alternate test. If results of two different tests are available and both are above the diagnostic cut points the diagnosis of diabetes is confirmed.

A1C, glycated hemoglobine; *FPG*, fasting plasma glucose; *IFG*, impaired fasting glucose

Appendix B: Treatment of Hypoglycemia in Diabetes

<table>
<tr><th>Severity</th><th>Definition</th><th>Initial Treatment</th><th>Follow-up</th></tr>
<tr><td>Mild</td><td>Autonomic symptoms present. Individual able to self-treat.</td><td rowspan="2">Oral ingestion of 15 g of carbohydrate, preferably as glucose or sucrose tablets or solution:
• 15 g glucose as glucose tablets.
• 15 mL (3 teaspoons) or 3 packets of table sugar (sucrose) dissolved in water.
• 150 ml (3/4 cup) of juice or regular soft drink.
• 6 LifeSavers (1 = 2.5 g carbohydrate)
• 15 mL (1 tablespoon) honey
• Following initial treatment, retest blood glucose (BG) in 15 minutes and re-treat with another 15 g carbohydrate if the BG level remains <4.0 mmol/L.</td><td rowspan="4">Once the hypoglycemia has been reversed, the person should have the usual meal or snack that is due at that time of the day to prevent repeated hypoglycemia. If a meal is >1 hour away, a snack (including 15 g carbohydrate and a protein source) should be consumed.

Discuss episode with the diabetes healthcare team as soon as possible.

Individuals (as well as their families and caregivers) at high risk of severe hypoglycemia should be taught to administer glucagon.</td></tr>
<tr><td>Moderate</td><td>Autonomic and neuroglycopenic symptoms present. Individual able to self-treat.</td></tr>
<tr><td rowspan="2">Severe</td><td rowspan="2">Individual requires assistance. Unconsciousness may occur. Plasma glucose (PG) typically < 2.8 mmol/L.</td><td>• Conscious: Oral ingestion of 20g carbohydrate, preferably glucose tablets.
• Retest blood glucose (BG) in 15 minutes and re-treat with another 15 g carbohydrate if the BG level remains <4.0 mmol/L.</td></tr>
<tr><td>• Unconscious:
  • Seek emergency assistance
  • 1 mg glucagon subcutaneously or intramuscularly or 3 mg intranasally.
  • Discuss with the diabetes healthcare team as soon as possible.</td></tr>
<tr><td colspan="2">People on Acarbose (GlucoBay™)</td><td>• Glucose (dextrose) or if unavailable honey or milk
• Avoid table sugar (sucrose)</td></tr>
</table>

Appendix C: PharmaCare Quantity Limits for Blood Glucose Test Strips

TREATMENT CATEGORY	NOTES – For combination therapy, the highest eligible quantity limit applies. E.g., If a patient takes insulin, this higher limit applies, regardless of other diabetes medications.	ANNUAL QUANTITY LIMIT
Managing diabetes with insulin		3,000
Managing diabetes with anti-diabetes medications with a high risk of causing hypoglycemia	Drugs with a higher risk of hypoglycemia (insulin secretagogues-sulfonylureas, meglitinides).	400
Managing diabetes with anti-diabetes medications with a low risk of causing hypoglycemia	Drugs with a lower risk of hypoglycemia (acarbose, metformin, Dipeptidyl Peptidase-4 Inhibitors DPP4I's, incretin mimetics/glucagon-like peptide (GLP-1) agonists, sodium-glucose cotransporter 2 (SGLT2i) inhibitors and thiazolidinediones (TZDs).	200
Managing diabetes through diet/lifestyle		200

SPECIAL AUTHORITY ADDITIONAL STRIP COVERAGE

If a person meets one of the criteria below and is not on insulin, BC PharmaCare will cover 100 extra strips per year on receipt of a Special Authority Request from a physician or from a health professional at a Diabetes Education Centre recognized by the BC Ministry of Health.

BGTS Limited Coverage Form: www2.gov.bc.ca/Limited Coverage Medical Supplies – Blood Glucose Test Strips

For patients requiring 100 additional blood glucose test strips **AND** who are not using insulin **AND** are experiencing at least one of the following:

- Not meeting glycemic targets, as determined by a physician, for 3 months or more **OR**
- Acute illness or comorbidities that may impact blood glucose control **OR**
- Changes in drug therapy that may impact blood glucose control (e.g., starting or stopping hypo- or hyperglycemic inducing medications, or drug-to-drug or drug-to-disease interactions) **OR**
- Occupations where hypoglycemia presents a significant safety risk (e.g., pilots, air traffic controllers, commercial drivers) **OR**
- Gestational diabetes

For more information on BC PharmaCare coverage of test strips, please see their website at: www2.gov.bc.ca/gov/Blood Glucose Testing

Note: In the rare case that a patient has a medical need for even more frequent testing, or when a **patient on insulin** needs to test more frequently, an endocrinologist may submit a **written request** to PharmaCare for additional strips. Requests will be considered on a case-by-case basis. The letter should outline the need for the additional strips and the quantity required.

Appendix D: Commonly Used Antihyperglycemic Agents and Adjunctive Agents for Use in Type 2 Diabetes[a]

Generic Name *Trade Name* Dosages	Adult Dosage	Cost/ 30 days[b]	PharmaCare Coverage	Therapeutic Considerations
Biguanides				
Metformin *Glucophage, G* Tabs: 500, 850 mg *Glumetza, G* ER tabs: 500, 1000 mg	**Initial**: 250 or 500 mg PO BID **Usual**: 1000 mg PO BID **Maximum**: 2550 mg/day[1] ER tabs: **Initial**: 1000 mg PO daily **Usual**: 2000 mg PO daily **Maximum**: 2000 mg PO daily	*G*: $3 *ER tabs*: $70	Regular benefit ER tabs: Non-benefit	**Pros**: first line drug for type 2 diabetes; low rates of hypoglycemia; weight loss (2.9 kg/4 years), lowers A1C by 1-1.5%, decrease mortality and MI. [2,3,4] **Cons**: GI side effects including diarrhea and nausea, Vitamin B12 deficiency. Use with caution / reduce dose if eGFR < 60 mL/min/1.73m^2.[1] **Administration**: Take with food to reduce GI side effects. ER tabs should be taken once daily with the evening meal. **Contraindications**: eGFR < 30 mL/min/1.73m^2, hepatic or cardiac failure.[1] **Notes**: Hold during acute illnesses associated with risk for dehydration or procedures associated with high risk of acute kidney injury.[2] Metformin: doses ≥ 2000 mg per day reduced A1C by an additional 0.26% compared to lower doses (1000 to 1500 mg per day); lactic acidosis 0.03 cases per 1000 patient years.[5]
Insulin Secretagogues, Sulfonylureas				
Glyburide *G* Tabs: 2.5, 5 mg	**Initial**: 5 mg PO daily **Usual**: 2.5-20 mg PO daily (divide BID if >10 mg) **Maximum**: 20 mg/day	$4	Regular Benefit	**Pros:** cost effective as a second line agent if patient has no CVD; extensive clinical experience, lowers A1C by 1-1.5%.[4] **Cons:** weight gain (1.5-2.5 kg), higher risk of hypoglycemia, especially in older or frail patients.[1] **Contraindications:** eGFR < 60 mL/min/1.73m^2 (glyburide), eGFR < 30 mL/min/1.73m^2 (gliclazide, glimepiride). **Notes**: Trials have shown microvascular benefit and similar, neutral CV outcomes with glimepiride when compared to linagliptin.[4]
Gliclazide *Diamicron, G* Tabs: 80 mg, *Diamicron MR, G* MR tabs: 30, 60 mg	**Initial**: 80-160 mg PO daily **Usual**: 80-320 mg PO daily (≥160 mg divide BID) **Maximum**: 320 mg/day MR Tabs: **Initial**: 30 mg PO daily at breakfast **Usual**: 30-120 mg PO daily **Maximum**: 120 mg/day	*G*: $6 *MR tabs*: $5	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	
Glimepiride *G* Tabs: 1, 2, 4 mg	**Initial**: 1 mg PO daily **Usual**: 1-4 mg PO daily **Maximum**: 8mg/day	$35	Non-benefit	

Generic Name *Trade Name* Dosages	Adult Dosage	Cost/ 30 days[b]	PharmaCare Coverage	Therapeutic Considerations
Sodium-Glucose Cotransporter 2 Inhibitors				
Dapagliflozin *Forxiga, G* Tabs**:** 5, 10 mg	**Initial**: 5 mg PO daily in the am **Maximum**: 10 mg PO daily in the am	$25	Regular Benefit	**Pros**: reduce risk of major adverse cardiovascular events and death from any cause in patients with T2DM and CV risk factors, decrease risk of end stage kidney disease, demonstrated benefit for cardiorenal outcomes, reduce risk of hospitalization for heart failure and the progression of chronic kidney disease, weight loss (2-3 kg), low rates of hypoglycemia.[4,12] **Cons**: modest improvement in A1C (0.5-0.8%), decreased bone mineral density and increased risk of bone fractures (canagliflozin), reports of euglycemic diabetic ketoacidosis, volume depletion (more in age > 65 years), genital mycotic infections, UTI, increased LDL, glucose lowering is independent of beta cell function and insulin sensitivity.[4,9] **Contraindications**: pregnancy, renal impairment (refer to product monograph for details), dialysis.[9] **Notes**: SGLT2 inhibitors should not be used in individuals with type 1 diabetes or in individuals with type 2 sdiabetes who have factors predisposing to diabetic ketoacidosis.[9]
Dapagliflozin plus Metformin *Xigduo* Tabs**:** 5/850 mg, 5/1000 mg		$85	Non-benefit	
Empagliflozin *Jardiance* Tabs: 10, 25 mg	**Initial**: 10 mg PO daily in the am **Maximum**: 25 mg PO daily in the am	$90	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	
Empagliflozin plus Metformin *Synjardy* Tabs: 5/500 mg, 5/850 mg, 5/1000 mg, 12.5/500 mg, 12.5/850 mg, 12.5/1000 mg		$90	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	
Empagliflozin plus Linagliptin *Glyxambi* Tabs: 25/5 mg		$155	Non-benefit	
Canagliflozin *Invokana* Tabs: 100, 300 mg	**Initial**: 100 mg PO daily in the am **Maximum:** 300 mg PO daily	$95	Non-benefit	
Canagliflozin plus Metformin *Invokamet* Tabs: 50/500 mg, 50/1000 mg, 150/500 mg, 150/1000 mg		$110	Non-benefit	

Generic Name *Trade Name* Dosages	Adult Dosage	Cost/ 30 days[b]	PharmaCare Coverage	Therapeutic Considerations
Glucagon-Like-Peptide 1 (GLP-1) Receptor Agonists				
Semaglutide *Ozempic* Pre-filled pen: 2 mg/1.5 mL 4 mg/3 mL *Rybelsus* Oral tabs: 3 mg, 7 mg, 14 mg	**Initial:** 0.25 mg SC once weekly x 4 weeks, then increase to 0.5 mg SC weekly. May increase to 1 mg SC weekly after additional 4 weeks **Usual:** 0.5 – 1 mg SC once weekly **Maximum**: 1 mg SC once weekly **Initial:** 3 mg PO daily **Usual:** 7 mg PO daily **Maximum**: 14 mg PO daily	*Ozempic:* $220 *Rybelsus:* $230	*Ozempic* Limited Benefit (hyperlinked to Special Authority criteria and form) *Rybelsus:* Non-benefit	**Pros**: reduce risk of major adverse cardiovascular events and death from any cause in patients with T2DM and CV risk factors (liraglutide, dulaglutide, semaglutide SC), modest weight loss, low risk of hypoglycemia, lowers A1C by 1-1.5% (semaglutide SC: 1.5-2%).[2,4,5,8] **Cons**: GI side effects, rare reports of pancreatitis, increased heart rate, injectable. Use with caution in patients with renal impairment.[8] **Contraindications:** pregnancy, history of pancreatitis, personal or family history of medullary thyroid carcinoma or multiple endocrine neoplasia syndrome type 2. **Notes:** Semaglutide: tablets should be taken by mouth on an empty stomach when waking up with a sip of plain water (no more than 4 ounces). Wait 30 minutes before taking anything else by mouth. Liraglutide: 1.8 mg per day and 1.2 mg per day were generally similar in reducing A1C across studies reviewed by the U.S. FDA.[5]
Dulaglutide *Trulicity* Pre-filled pen: 0.75 mg/0.5 mL 1.5 mg/0.5 mL	**Initial:** 0.75 mg SC once weekly **Maximum**: 1.5 mg SC once weekly	$230	Non-benefit	
Liraglutide *Victoza* pre-filled pen: 0.6 mg/0.1 ml; 3 mL	**Initial**: 0.6 mg SC once daily x 1 week **Usual:** Increase to 1.2 mg SC once daily **Maximum**: 1.8 mg SC once daily	$210	Non-benefit	
Lixisenatide *Adlyxine* Pre-filled pen: 0.15 mg/3 mL 0.3 mg/3mL	**Initial:** 10 mcg SC daily AC (for 14 days) **Usual**: 20 mcg SC daily AC	$130	Non-benefit	

Generic Name *Trade Name* Dosages	Adult Dosage	Cost/ 30 days[b]	PharmaCare Coverage	Therapeutic Considerations
Dipeptidyl Peptidase-4 Inhibitors (DPP4i)				
Linagliptin *Trajenta* Tabs: 5 mg	**Usual**: 5 mg PO daily	$80	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	**Pros**: low risk of hypoglycemia [4] **Cons**: Mortality and CVD outcomes neutral, modest lowering of A1C (0.5-0.7%), rare reports of pancreatitis, reports of severe joint pain, hospitalization for heart failure may increase in patients treated with saxagliptin.[4,7] **Contraindications**: pregnancy, hepatic failure, previous lactic acidosis.[7] **Notes**: Saxagliptin and sitagliptin: Dose reduction required for patients with renal impairment (refer to product monographs for details). Dose adjustment not required for linagliptin.[7]
Linagliptin plus metformin *Jentadueto* Tabs: 2.5/500 mg, 2.5/850 mg, 2.5/1000 mg		$80	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	
Saxagliptin *Onglyza, G* Tabs: 2.5, 5mg	**Usual**: 5 mg PO daily	$50	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	
Saxagliptin plus metformin *Komboglyze* Tabs: 2.5/500 mg, 2.5/850 mg, 2.5/1000 mg		$85	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	
Alogliptin *Nesina* Tabs: 6.25 mg, 12.5 mg, 25 mg	**Usual**: 25 mg PO daily	$70	Non-benefit	
Alogliptin-metformin *Kazano* Tabs: 12.5/500 mg, 12.5/850 mg 12.5 mg/1000 mg		$80	Non-benefit	
Sitagliptin *Januvia* Tabs: 25, 50, 100 mg	**Usual**: 100 mg PO daily	$95	Non-benefit	
Sitagliptin plus metformin *Janumet* Tabs: 50/500 mg, 50/1000 mg		$100	Non-benefit	
Sitagliptin plus metformin XR *Janumet XR* XR tabs: 50/500 mg, 50/1000 mg, 100 mg/1000 mg		$100	Non-benefit	
Insulin Secretagogues, Meglitinides				
Repaglinide *GlucoNorm, G* Tabs: 0.5, 1, 2 mg	**Initial**: 0.5 mg (treatment-naïve) or 1 mg PO TID AC **Usual:** 0.5mg to 4 mg PO TID AC **Maximum**: 16 mg/day	$25	Non-benefit	**Pros**: lowers A1C 1-1.5% [4] **Cons**: moderate risk of hypoglycemia (less than SU), weight gain (1 kg) **Contraindications:** pregnancy **Notes:** If meal is skipped, skip dose

Generic Name *Trade Name* Dosages	Adult Dosage	Cost/ 30 days[b]	PharmaCare Coverage	Therapeutic Considerations
Alpha-glucosidase inhibitor				
Acarbose *Glucobay, G* Tabs: 50, 100 mg	**Initial**: 50 mg PO once daily with first bite of main meal **Usual:** 50 mg PO TID with first bite of main meal **Maximum:** 100 mg PO TID with first bite of main meal	$25	Non-benefit	**Pros:**low risk hypoglycemia, weight neutral to modest weight loss. **Cons:** modest reduction in A1C (0.5-0.8%, no additional A1C reduction at doses >150 mg/day), frequent GI side effects, not recommended if eGFR < 25 mL/min/1.73m^2. [4,5] **Contraindications:** IBS and IBD **Notes:** Must use glucose (dextrose) for hypoglycemia, not sucrose as complex sugars are ineffective. If meal is skipped, skip dose.
Thiazolidinediones (TZDs)				
Pioglitazone *G* Tabs: 15, 30, 45 mg	**Initial**: 15-30 mg PO daily **Usual:** 30 mg PO daily **Maximum**: 45 mg/day	$25	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	**Pros:** lowers A1C by 0.5 to 1.4%, low risk of hypoglycemia, increase HDL.[6] **Cons:** weight gain (2-5 kg), use with caution in patients with renal impairment, pioglitazone increases the risk of fractures in women[4] **Contraindications:** pregnancy, metabolic bone disease, heart failure, ischemic heart disease.[6] **Notes**: Pioglitazone is contraindicated in active bladder cancer, history of bladder cancer or uninvestigated macroscopic haematuria.[5,6] Rosiglitazone is not approved as a monotherapy unless metformin treatment is inappropriate. Rosiglitazone is not recommended for use in combination with metformin and sulfonylurea.[5,6]
Rosiglitazone *G* Tabs: 2, 4, 8 mg	**Initial**: 4 mg PO daily in 1-2 doses **Usual:** 4 mg PO daily **Maximum**:8 mg /day	$65	Non-benefit	

Abbreviations: AC=before meals; A1C=glycosylated hemoglobin; BID=twice a day; BC=British Columbia; CV=cardiovascular; eGFR=estimated glomerular filtration rate; ER=extended release; G=generic; GI=gastrointestinal; HDL=high density lipoprotein; HF=heart failure; IBD= inflammatory bowel disease; IBS=Irritable bowel syndrome; LDL=low density lipoprotein; MACE=major adverse CV events (nonfatal myocardial infarction, stroke or CV death); mg=milligram; MI= myocardial infarction; MR=Modified release; NPH=Neutral protamine hagedorn (e.g., Humulin N); NYHA=New York Heart Association Functional Classification; PO=orally; SC=subcutaneous; Tab=tablet; TID=three times a day; URTI=upper respiratory tract infection; UTI=urinary tract infection; XR=Extended Release

Footnotes: a Not an exhaustive list; b for reference only; pricing is approximate of usual dose as of September 2021 for generics, and does not include dispensing fees or additional markups; only include the lowest price for drugs with multiple dosage forms and package sizes; c Special Authority Required; please refer to this link for specific criteria: https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/pharmacare/prescribers/special-authority#_Special_Authority_drug
Note: Please review product monographs at hc-sc.gc.ca/dhp-mps/prodpharma/databasdon/index-eng.php and regularly review current Health Canada advisories, warnings and recalls at www.hc-sc.gc.ca/ahc-asc/media/advisories-avis/index_e.html.

PharmaCare Coverage Definitions: **Regular Benefit**: Eligible for full reimbursement*; does not require Special Authority. **Limited Coverage**: Requires Special Authority to be eligible for reimbursement*. **RDP**: Reference Drug Program. Drugs included in the RDP are comparable agents of the same therapeutic class. **RDP Reference Drug**: Eligible for full reimbursement* within the therapeutic class, subject to Benefit status of the therapeutic class. **Partial Benefit RDP**: Eligible for limited reimbursement* under the RDP program up to the price of the Reference Drug. **Non-benefit**: Not eligible for coverage under any circumstances.

Appendix E: Insulin: Therapeutic Considerations and Availability

Basal Insulin (Long-acting)[a]

Generic Name (Trade Name), Dosages	Cost/ 100 units[b]	Pharmacare Coverage	Therapeutic Considerations 10, 11
Insulin NPH (neutral protamine Hagedorn) *Humulin N* *Novolin ge NPH* Pre-filled pen, cartridge, vial: 100 units/mL	$4	Regular Benefit	• Duration of action: up to 18 hours • Once a day at bedtime or twice a day dosing • Must be re-suspended by gently rolling the pre-filled syringe or vial before repeated use. • Only basal insulin which can be mixed in same syringe with bolus insulin (i.e., regular, aspart, lispro): draw up regular insulin first; generally, not advised to mix with aspart or lispro as binding occurs rapidly, must inject immediately after mixing • Prefilled pen provides 1 to 60 units per single injection
Insulin glargine *Basaglar (biosimilar)* *Lantus* Pre-filled pen, cartridge, vial: 100 units/mL *Toujeo* Pre-filled pen: 300 units/mL (high concentration)	Basaglar: $5 Lantus: $7 Toujeo: $7	Basaglar: Limited Coverage[c] (hyperlinked to Special Authority criteria and form) Lantus: Non-benefit Toujeo: Non-benefit	• Duration of action: up to 24 hours • Once a day or twice a day dosing • Health Canada: biosimilar = no clinically meaningful differences in pharmacokinetics, pharmacodynamics, clinical efficacy, safety or immunogenicity • Prefilled pen provides 1 to 80 units per single injection • Toujeo is not bioequivalent to glargine 100 units/mL
Insulin detemir *Levemir* Pre-filled pen, cartridge: 100 units/mL	$8	Limited Coverage[c] (hyperlinked to Special Authority criteria and form)	• Duration of action: 18 to 24 hours • Once a day or twice a day dosing • Prefilled pen provides 1 to 80 units per single injection
Insulin degludec *Tresiba* Pre-filled pen: 100 units/mL; 200 units/mL (high concentration)	$8	Non-benefit	• Duration of action: 42 hours • Once a day dosing • Minimum time between dose increases: 3 to 4 days • 100 units/mL prefilled pen provides 1 to 80 units per single injection • 200 units/mL prefilled pen provides 2 to 160 units per single injection; dose counter shows exact number of insulin units, if switching from another insulin, no dose recalculation required

Prandial Insulin (Mealtime)[a]

Generic Name (Trade Name), Dosages	Cost/ 100 units[b]	Pharmacare Coverage	Therapeutic Considerations 10,11
Insulin glulisine *Apidra* Prefilled pen, cartridge, vial: 100 units/mL	$4	Regular Benefit	• Onset of action: 10 to 15 minutes • Duration of action: 3.5 to 5 hours
Insulin lispro *Admelog* Pre-filled pen, cartridge, vial: 100 units/mL *HumaLOG* Prefilled pen, cartridge, vial: 100 units/mL; 200 units/mL (high concentration) **Insulin lispro/lispro protamine** *HumaLOG Mix 50* *HumaLOG Mix 25*	*Admelog:* $4 *HumaLOG:* $5	*Admelog*: Regular benefit *HumaLOG, HumaLOG Mix 25, HumaLOG Mix 50*: Non-benefit	• Onset of action: 10 to 15 minutes • Duration of action: 3.5 to 5 hours • ADMELOG is biosimilar to *HumaLOG*; these insulin lispro 100units/mL products have similar pharmacokinetic profiles (same onset and duration) and adverse effects.[11]
Insulin aspart *Trurapi* Pre-filled pen, cartridge: 100 units/mL *Novorapid* Prefilled pen, cartridge, vial: 100 units/mL *Fiasp* Pre-filled pen, cartridge, vial: 100 units/mL **Insulin aspart/aspart protamine** *NOVOMIX 30*	*Trurapi*: $4 *Novorapid:* $5 *Fiasp:* $5	*Trurapi*: Regular benefit *Novorapid, Novomix 30*: Non-benefit *Fiasp*: Non-benefit	*Trurapi* • Onset of action: 10 to 20 minutes • Duration of action: 3 to 5 hours • Biosimilar to Novorapid *Novorapid* • Onset of action: 10 to 15 minutes • Duration of action: 3 to 5 hours *Fiasp*: • Onset of action: 5 minutes • Duration of action: 3 to 5 hours • Not biosimilar to Novorapid
Insulin regular *HumuLIN R* Pre-filled pen, cartridge, vial: 100 units/mL *NovoLIN ge Toronto* Cartridge, vial: 100 units/mL *Entuzity* Pre-filled pen: 500 units/mL (high concentration) **Insulin regular/NPH** *NovoLIN ge 50/50* *NovoLIN ge 40/60* *NovoLIN ge 30/70* *HumuLIN 30/70*	*HumuLIN R:* $4 *NovoLIN ge Toronto:* $4 *Entuzity:* $4	*HumuLIN R,* *NovoLIN ge Toronto*: Regular benefit *Entuzity*: Non-benefit	*HumuLIN R. Novolin ge Toronto*: • Onset of action: 30 to 60 minutes • Duration of action: 5 to 8 hours *Entuzity*: • Onset of action: 15 minutes • Duration of action: 17 to 24 hours • Reserved for people with severe insulin-resistant i.e. requiring >200 units of insulin per day (basal and/or prandial)[11]; recommended to be used by experienced clinicians only. • Not biosimilar to insulin regular; e.g. *HumuLIN R*; pharmacokinetic profile is similar to NPH (high concentration delays onset & lengthens duration of action).[11]

Glucagon

Generic Name (Trade Name), Dosages	Adult Dosage[b]	Cost/unit[c]	PharmaCare Coverage	Therapeutic Considerations
Glucagon *Glucagen, Glucagen Hypokit, G* Vial: 1 mg	1 mg SC; may repeat in 15 minutes as needed	Vial: $110	Vial/Hypokit: Regular Benefit	IV dextrose should be administered as soon as it is available; if patient fails to respond to glucagon, IV dextrose must be given.
Baqsimi Nasal powder: 3 mg single dose	Hypokit: IM/IV Nasal powder: intranasal	Nasal powder: $145	Nasal powder: Non-benefit	Nasal powder come as a single use, pre-filled nasal device.

Footnotes: a Not an exhaustive list; b for reference only; pricing is approximate of usual dose as of September 2021 for generics, and does not include dispensing fees or additional markups; only include the lowest price for drugs with multiple dosage forms and package sizes; c Special Authority Required; please refer to this link for specific criteria: https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/pharmacare/prescribers/special-authority#_Special_Authority_drug
Note: Please review product monographs at https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/applications-submissions/guidance-documents/product-monograph.html and regularly review current Health Canada advisories, warnings and recalls at https://recalls-rappels.canada.ca/en.

PharmaCare Coverage Definitions: **Regular Benefit**: Eligible for full reimbursement*; does not require Special Authority. **Partial Benefit**: Eligible for limited reimbursement*. **Limited Coverage**: Requires Special Authority to be eligible for reimbursement*. **Non-benefit**: Not eligible for coverage under any circumstances.
*Subject to a patient's PharmaCare plan including any deductibles and co-pays.

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Sample Diabetes Care Flow Sheet

Name:	**Type of diabetes**: Type 1 □ Type 2 □ Other □	**Date of birth**:	**Age at diagnosis**:

Comorbidities, Risk Factors Date:

□ Hypertension (target <130/80)

□ Dyslipidemia

□ CVD	□ Smoking (date stopped)
□ HF	□ Alcohol/ other substances: (assess/discussed)
□ CKD	□ Mental Health Diagnosis
□ Stroke	□ Foot disease
□ PAD □ ED □ PCOS	□ Retinopathy □ Family History

Self-management (discuss and share decisions)

Priorities and Goals:_____

Possible Barriers to Self –management _____

_____

Self-management Education _____

□ Weight management:

Baseline weight: Wt. . Ht: _____

Baseline BMI: ___ (Healthy BMI 18.5–24.9)

□ Physical activity (150 min/week- aerobic/ resistance 2-3 times a week)

_____

□ Glucose meter/lab comparison

□ Patient care plan (including pregnancy planning) □ Driving Guidelines

Visits (every 3 to 6 months)

Date	BP	Weight as required	A1C (Target ≤ 7% or ____)	Notes (concerns, goals, clinical status)	Hypoglycemia	DM Medication Baseline and Changes: Allergies, side effects, contraindications. Consider: ASA, ACEI, ARB, antihyperglycemics as indicated

Review SMBG records. Target: premeal 4–7 mmol/L; 2-hour postprandial 5–10 mmol/L (5-8 mmol/L if A1C not at target)

Screen for diabetes complications annually or as indicated

Nephropathy: CKD: eGFR< 60 ml/min or ACR >2 mg/mmol

Date	ACR	eGFR

□ Neuropathy

- Check feet for lesions and sensation (10-g monofilament or 128 Hz tuning fork)
- Check for pain, ED, GI symptoms

Date: Findings:
Date: Findings:
Date: Findings:

□ Retinopathy

Annual eye exam:
Date:
Date:

Ophthalmologist/Optometrist:

_____

For vascular protection (see back for details):

□ Statins if ≥ 40 yrs Or > 30 yrs and >15 yrs duration or end organ damage

□ ACE /ARB if macro or micro vsc. disease or > 55 yrs with 1 CVD risk factor

□ SGLT2i or GLP1-RA: Consider if ASCVD, HF, CKD

CVD Assessment:

□ ECG (see back)

Stress ECG:_____

Other:

□ Lipids Targets: If indicated to treat:

Primary target: LDL <2 mmol/L

Date	Medication	LDL-C	HDL-C	TG	(Non-HDL-C)	(Apo B)

□ Vaccinations

Annual influenza
Date:
Date: _____

Pneumococcus
Date:

See reverse side for care objectives and targets

Care	Objective	Target
Self-monitoring of Blood Glucose	Ensure proper use of glucose meter, flash meter, or CGM. Interpret results and modify treatment as needed. Develop blood glucose monitoring schedule using goals and shared decisions. Review records.	Premeal (mmol/L) = **4.0-7.0 for most people** 2hr Postmeal (mmol/L) **5.0 -10.0 for most people with DM** **5.0 -8.0** if not achieving A1C target
Blood Glucose Control	Measure **A1C every three months** for most adults Consider testing at least every 6 months in adults during periods of treatment and lifestyle stability when glycemic targets have been consistently achieved. Understand when A1C is not accurate. (eg CKD). Check accuracy of meter with laboratory annually	A1C ≤ **7.0 % for most people with DM** Individualized based on patient and agent Characteristics. Simultaneous fasting glucose/meter lab comparison within **20%.**
Regular Review Adjust Treatment	Regular review of clinical status: Advance / adjust AHA if not at target and identify those with ASCVD, HF, CKD who may require adjustments even is at target	**Add or substitute AHA with cardiorenal benefit (SGLT2i / GLP1RA). Even if A1C is at target**
Nutrition	Encourage individualized nutritional therapy (by a registered dietitian) as an integral part of treatment and self-management (can reduce A!C by 1-2%). If overweight or obesity is present, strategies that include energy restriction to achieve a modest weight loss of 5% to 10% of initial body weight are a primary consideration.	To attain and maintain a healthy or lower body weight for the long term, to prevent further weight gain or to prevent weight regain while meeting nutritional needs.
Physical Activity	Discuss and encourage aerobic and resistance exercise. Evaluate those with possible CVD or microvascular complications undertaking exercise substantially more vigorous than brisk walking	Aerobic: ≥ **150 minutes /week** Resistance: **3 sessions/week**
Body Mass Index	Calculate BMI (mass in kilograms/height in metres2)	Healthy body weight target: **BMI: 18.5 – 24.9**
Smoking	Encourage smoking cessation at each visit; provide support as needed	**Smoking cessation**
CVD Risk Identification and Protection	Review for presence of CVD disease **Conduct CVD risk assessment periodically** : CV history, lifestyle, duration of DM, sexual function, abdominal obesity, lipid profile, BP, reduced pulses, bruits, glycemic control, retinopathy, eGFR, ACR. Resting ECG every 3-5 years if any of : age > 40 years, duration of DM>15yrs.+>30yrs,end organ damage(microvasc. or CVS)),>1 CV risk factor.	**Vascular Protection:** First priority in prevention of diabetes complications is **reduction of cardiovascular risk by vascular protection** through a comprehensive multifaceted approach **All people with DM:** optimize: BP, glycemic control and healthy behaviours **Statin if**: age ≥ 40y or macrovascular disease OR if <40y + microvascular disease or long duration of DM (DM>15yr and age >30y) **ACE-I or ARB if CVD or microvsc. disease or >55 yrs with 1 CVD risk factors** **Use of AHA (SGLT2i or GLP1-RA)** EVEN if at A1C target for those with ASCVD, CKD,HF,>60yrs.+CVrisk factors
Hypertension	Measure BP at **diagnosis and at every diabetes clinic visit**	**<130/80**
Dyslipidemia	**Fasting lipid levels (TC, HDL, TG and calculated LDL)** at diagnosis, then yearly if treatment not initiated. More frequent testing if treatment initiated.	Lipid targets for those who need therapy: **Primary target : LDL < 2.0 mmol/L or >50% reduction. Alternate Primary target: apo B < 0.8 g/L or non-HDL-C < 2.6 mmol/L**
Retinopathy	**Type 1 diabetes** Screen 5 years after diagnosis, then rescreen annually **Type 2 diabetes** Screen at diagnosis and 1- 2 years after initial screening if no retinopathy is present. The interval for follow-up assessment should be tailored to the severity of the retinopathy. Screening conducted by an experienced eye care professional	Early detection and treatment
Chronic Kidney Disease	Identification of CKD requires screening for **proteinuria** using random urine **ACR** (2 out of 3 samples over 3 mths.) and **assessment of renal function** using a serum creatinine converted to **eGFR.** **Type 1 diabetes** Screen at 5 years duration and then annually if no CKD **Type 2 diabetes–** Screen at diagnosis and then yearly if no CKD If CKD present, ACR and eGFR should be done at least every 6 months	**ACR (mg/mmol) < 2.0** **eGFR > 60 mL/min**
Neuropathy/ Foot examination	**Type 1 diabetes**– Screen 5 years duration and annually **Type 2 diabetes** – Screen at diagnosis, then annually Screen for neuropathy with 10-g monofilament or 128 Hz tuning fork at dorsum of great toe. In foot exam look for: structural abnormalities, neuropathy, vascular disease, ulceration, infection	Early detection and treatment. If neuropathy present: require foot care education, specialized footwear, smoking cessation. If ulcer present: manage by multidisciplinary team with expertise
Immunizations	Recommend annual influence vaccination. Recommend pneumo-vax 23	
Populations with Mental Health Concerns	Liaise with mental health-care professionals where necessary to ensure appropriate care plans are developed that include psychosocial interventions and glycemic control	Mental health treatments may improve diabetes outcomes

Care Objectives: People with diabetes will have better outcomes if primary care providers 1) identify people with diabetes in their practices 2) assist them by incorporating the suggested care objectives; 3) schedule diabetes-focused visits; 4) use diabetes flow sheets and systematic recall for visits