MINISTRY OF
HEALTH &
WELLNESS

INTERIM GUIDELINES FOR THE CLINICAL MANAGEMENT OF DIABETES IN JAMAICA

August 2020

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Preface

The management of Diabetes has changed since the last version of the Guidelines for the Management of Diabetes was published. The Ministry of Health and Wellness is in the process of conducting a comprehensive and holistic revision of these guidelines. The objective of these interim guidelines is to provide key clinical updates in Diabetes Care.

The Ministry of Health and Wellness thanks the Association of Consultant Physicians of Jamaica for its support in the preparation of these guidelines.

Special thanks to:

1. Dr. Andrene Chung, Consultant Physician (Internal Medicine), Consultant Cardiologist
2. Dr. Karen Phillips, Consultant Physician (Internal Medicine), MSc (Diabetes & Endocrinology)
3. Professor Rainford Wilks, Consultant Physician (Internal Medicine), Professor of Epidemiology

List of Acronyms

2hrPG	2-hour post (75g) glucose
2hrPP	2-hour postprandial
Anti-GAD65	anti-glutamic acid decarboxylase 65 antibodies
DCCT	The Diabetes Control and Complications Trial
DKA	diabetic ketoacidosis
DM	diabetes mellitus
DNA	deoxyribonucleic acid
DPP-4	dipeptidyl peptidase 4
ECG	electrocardiogram
eGFR	estimated glomerular filtration rate
EHR	electronic health record
FPG	fasting plasma glucose
GIP	glucose-dependent insulinotropic polypeptide
GLP-1	glucagon-like protein-1
GPP	glycated plasma proteins
HbA1c	haemoglobin A1c
HCP	health care provider
HGP	hepatic glucose production
HDL	high density lipoprotein
IFCC	The International Federation of Clinical Chemistry and Laboratory Medicine
IFG	impaired fasting glucose
IGT	impaired glucose tolerance
LDL	low density lipoprotein
MODY	maturity onset diabetes of the young
NGSP	The National Glycohaemoglobin Standardization Programme
NICE	National Institute for Health and Care Excellence

NPH	neutral protamine hagedorn
O_2	oxygen
OGTT	oral glucose tolerance test
PAD	peripheral arterial disease
SGLT-2	sodium-glucose co-transporter-2
SMBG	self-monitoring of blood glucose
T2DM	type 2 diabetes mellitus
TSH	thyroid stimulating hormone

Introduction

Diabetes mellitus, also called diabetes, is a chronic metabolic condition in which the hormone insulin is not produced by the pancreas in sufficient quantities or is not utilized effectively by the body to control blood glucose levels. As a result, blood glucose levels are abnormally high (hyperglycaemia). Chronic uncontrolled hyperglycemia leads to long-term target organ damage, such as: retinopathy, nephropathy and neuropathy (microvascular complications); stroke, coronary heart disease and peripheral arterial disease (macrovascular complications).

Jamaica is in the middle of an epidemic of this metabolic disease that is responsible for a heavy burden of chronic illness, long-term disability and premature loss of life throughout the Caribbean. In 2016, 2,339 persons died from diabetes in Jamaica, accounting for 12.7% of all deaths. As a cause of death, it ranks third for men with 966 deaths and first for women with 1,373 (Source: STATIN, MOHW NCDI Unit). The prevalence of diabetes has increased by 41.1% from 2001 to 2017 among Jamaicans 15 to 74 years old. Approximately 11.9% (9% men, 14.6% women) or 236,200 of Jamaicans 15 years and older have diabetes . The prevalence increases with age and more women than men have diabetes. There are 92.5% (91.3% male, 93.0% females) of Jamaicans 15 years and older with diabetes that are on treatment. Of those on treatment only 27.5% (29.0% males, 27.0% females) are controlled (Jamaica Health and Lifestyle Survey III, 2016-17).

As a chronic disease, diabetes requires a lifetime of treatment. Therefore, the diagnosis should be made with a good degree of certainty. There should always be a high level of suspicion when managing patients with metabolic risk factors, namely abdominal obesity, high triglycerides level, low levels of high density lipoprotein (HDL) cholesterol, high blood pressure and elevated fasting blood sugar. The presence of these risk factors increases the impacted individual's risk for diabetes and other chronic diseases and complications thereof.

It has been demonstrated conclusively that improved glycaemic and metabolic control – the maintenance of blood glucose within a near normal range combined with control of blood lipids and blood pressure – can prevent or significantly delay all complications of diabetes. Such tight control can be achieved through adherence to lifestyle changes and prescribed medications, as well as self-monitoring of blood glucose (SMBG).

Definition and Classification of Diabetes

Diabetes mellitus is a group of diseases characterised by elevated glucose levels resulting from a relative or absolute deficiency of insulin which over time results in vascular and autonomic complications.

Common symptoms of diabetes are lethargy, polyuria, polydipsia, polyphagia, blurred vision and paresthesia.

There are several classification systems for diabetes mellitus. The updated classification system focuses on the specific underlying aetiology of diabetes and is as follows:

1. Type 1 Diabetes (5 – 10% of cases): due to destruction of beta cells in the pancreas usually leading to absolute insulin deficiency
2. Type 2 Diabetes (90% of cases): due to defective insulin secretion, usually with defective insulin action
3. Gestational Diabetes
4. Other specific types:

Type	Conditions
Genetic defects of beta cell function	a. Maturity Onset Diabetes of the Young (MODY) b. Mitochondrial DNA mutation c. Neonatal Diabetes

Type	Conditions
Genetic defects of insulin action	a. Lipodystrophies b. Insulin receptor mutations c. Rare down streaming insulin signaling defects d. Monogenic obesity/ hyperphagia
Diseases of the exocrine pancreas	a. Pancreatitis b. Trauma c. Pancreatectomy d. Neoplasia e. Pancreatic destruction including cystic fibrosis and haemochromatosis
Endocrinopathies	a. Cushing's Syndrome b. Acromegaly c. Pheochromocytoma d. Glucagonoma e. Hyperthyroidism f. Autoimmune polyglandular syndrome 1 and 2
Drug or chemical induced	a. Glucocorticoids b. Thyroid hormone c. Diazoxide d. Beta adrenergic agonists e. Thiazides f. Gamma interferon g. Antiretroviral drugs
Infections	a. Congenital rubella b. Cytomegalovirus, and others

Type	Conditions
Uncommon form of immune mediated diabetes	a. Stiff man syndrome
Other genetic syndromes associated with diabetes	a. Down's syndrome b. Klinefelter's Syndrome c. Turner's Syndrome d. Wolfram Syndrome e. Friedreich's Ataxia f. Huntington's Chorea g. Laurence Moon-Biedl Syndrome h. Myotonic Dystrophy i. Prader Willi Syndrome

Clinical presentation and disease progression may vary considerably in both Type 1 and Type 2 Diabetes.

Diagnosis of Diabetes and Prediabetes

The diagnosis of DM should be made using fasting plasma glucose (FPG) or 2hr post 75g glucose (2hrPG) challenge.

Laboratories that test for HbA1c should be aware of potential interferences, including haemoglobinopathies that may affect HBA1c test results, depending on the method used. In selecting assay methods, laboratories should consider the potential for interferences in their particular patient population. In addition, disorders that affect erythrocyte turnover may cause spurious results, regardless of the method used.

Laboratories should use only HbA1c assay methods that are certified by the National Glycohemoglobin Standardization Programme (NGSP) and traceable to the Diabetes Control and Complications Trial (DCCT) reference. The manufacturers of HBA1c assays should also show traceability to the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) reference method for glycated plasma proteins (GPP).

An oral glucose tolerance test (OGTT) is necessary to diagnose impaired glucose tolerance (IGT).

The diagnosis of DM may also be made with use of the random blood glucose in the presence of osmotic symptoms. The FPG is cheaper, more easily reproduced and more convenient than the 2hrPG although the latter is a more sensitive assay in the majority of populations.

Diagnostic criteria for diabetes and prediabetes are based on the 2006/2011 World Health Organisation Guidelines and 2019 American Diabetes Association recommendations. IFG and IGT reflect the natural history of progression from normoglycaemia to T2DM.

Diagnosis/Test	WHO 2006/2011	ADA 2019
Diabetes		
FPG	≥ 7.0mmol/l (126mg/dL)	≥ 7.0mmol/l (126mg/dL)
2hPG	≥ 11.1mmol/l (200mg/dL)	≥ 11.1mmol/l (200mg/dL)
HbA1C**	≥ 6.5	≥ 6.5
Random Plasma Glucose	≥ 11.1mmol/l (200mg/dL) plus osmotic symptoms	≥ 11.1mmol/l (200mg/dL) plus osmotic symptoms

Impaired Glucose Tolerance		
FPG	< 7.0mmol/l (126mg/dL)	< 7.0mmol/l (126mg/dL)
2hPG	≥ 7.8 – <11.1mol/l (140 – 200mg/dL)	> 7.8 – < 11.0mmol/l (140 – 199mg/dL)
Impaired Fasting Glucose		
FPG	6.1 – 6.9mmol/l (110 – 125mg/dL)	5.6 – 6.9mmol/l (100 – 125mg/dL)
2hPG	< 7.8mmol/l (< 140mg/dL)	< 7.8mmol/l (< 140mg/dL)
Gestational Diabetes		
FPG	≥ 7.0mmol/l (126mg/dL)	
2hPP	≥ 7.8mmol/l (140mg/dL)	

** At present the use of HbA1c for screening and diagnosis of Diabetes Mellitus is not recommended

Evaluation of Persons with Diabetes

The evaluation of the diabetic patient should bear in mind salient features in the history and examination.

Medical History:

- Age and characteristics of onset of diabetes (e.g., DKA, asymptomatic laboratory finding)
- Eating patterns, physical activity habits, nutritional status, weight history, growth and development in adolescents
- Presence of common comorbidities, psychosocial problems and dental disease
- Review of previous treatment regimens and response to therapy (HbA1c records)
- Current treatment of diabetes, including medications, medication adherence and barriers to same, meal plan, physical activity patterns and readiness for behaviour change
- Results of glucose monitoring and patient's use of data
- DKA frequency, severity and cause
- Hypoglycaemic episodes
- Hypoglycaemic awareness
- Any severe hypoglycemia: frequency and cause
- History of diabetes related complications
    - Microvascular complications: retinopathy, nephropathy, neuropathy (sensory, including history of foot lesions; autonomic including sexual dysfunction and orthostasis)
    - Macrovascular complications: coronary heart disease, cerebrovascular disease and peripheral arterial disease

Laboratory Evaluation:

- Glucose profile (fasting and postprandial glucose values)
- HbA1c, if results not available within the past 3 months
- Fasting lipid profile, including LDL & HDL cholesterol and triglycerides as needed
- Liver function tests
- Uric acid
- Spot urine albumin to creatinine ratio
- Serum creatinine and calculated glomerular filtration rate
- TSH in type 1 diabetes, or women over 50 years
- Urine ketones*
- Beta cell antibodies (e.g. anti-GAD 65) in patients less than 45 years at diagnosis

**Urine ketones may suggest the possibility of impending or established diabetic ketoacidosis but this should be confirmed by plasma bicarbonate or an arterial blood gas measurement (consider starvation and dehydration as other causes of ketonuria).*

Routine Referrals:

- Eye care professional for annual dilated exam
- Registered dietitian for medical nutritional therapy
- Dentist for comprehensive periodontal examination
- Mental health professional if needed

Screening for Diabetic Complications:

- Retinopathy:
    - For type 1 diabetes this should begin 5 years after diagnosis in those > 15 years of age and then annually

    - For type 2 diabetes this should start at diagnosis and then annually but may be tailored to the degree of retinopathy if present
- Foot examination:
    - Type 1 diabetes: > 5 years from diagnosis
    - Type 2 diabetes: at diagnosis and then annually
- Lipid profile:
    - Type 2 diabetes: at diagnosis then annually
- Albumin:creatinine ratio:
    - Type 1 diabetes: > 5 years from diagnosis
    - Type 2 diabetes: at diagnosis then annually
- Blood pressure: should be measured of every visit
- Electrocardiogram:
    - Type 2 diabetes: at diagnosis then annually

Note: Frequency of testing may vary based on the severity of the condition

Treatment of Diabetes

The main goals of treatment of Diabetes Mellitus are elimination of symptoms and prevention or reduction of complications primarily through attainment of glycaemic control.

In adults with type 2 diabetes:

1. review the dose of metformin if the estimated glomerular filtration rate (eGFR) is < 45ml/min/1.73m^2
2. prescribe metformin with caution for those at risk for a sudden deterioration in renal function and those at risk of eGFR falling below 45ml/min/1.73m^2
3. stop metformin if eGFR is below 30ml/min/1.73m^2

In adults with type 2 diabetes, if metformin is not tolerated or contraindicated consider initial drug treatment with one of the following:

- a dipeptidyl peptidase-4 (DPP-4) inhibitor
- pioglitazone
- a sulphonylurea

In adults with type 2 diabetes, do not offer or continue pioglitazone if they have any of the following:

- heart failure or history of heart failure
- hepatic impairment
- diabetic ketoacidosis
- current or past history of bladder cancer
- uninvestigated macroscopic haematuria

First intensification of drug treatment:

In adults with type 2 diabetes, if initial treatment with metformin has not resulted in lowering of HbA1c to the agreed target, consider dual therapy with one of the following combinations:

- metformin and a sulphonylurea
- metformin and a DPP-4 inhibitor
- metformin and pioglitazone
- metformin and a sodium glucose cotransporter 2 (SGLT-2) inhibitor

In adults with type 2 diabetes in whom metformin is contraindicated or not tolerated and initial drug treatment has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider dual therapy with one of the following combinations:

- a sulphonylurea and pioglitazone
- a sulphonylurea and DPP-4 inhibitor
- pioglitazone and a DPP-4 inhibitor
- a sulphonylurea and SGLT-2 inhibitor

Second intensification of drug treatment:

In adults with type 2 diabetes, if dual therapy with metformin and another oral drug has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider either:

- triple therapy with one of the following combinations:

    - metformin, pioglitazone and a sulphonylurea
    - metformin, a DPP-4 inhibitor and a sulphonylurea
    - metformin, a sulphonylurea and SGLT-2 inhibitor
- starting insulin based treatment

Insulin based treatments:

When starting insulin therapy in adults with type 2 diabetes use a structured programme employing active insulin dose titration that encompasses:

- injection technique, including rotating injection sites and avoiding repeated injections at the same point within sites
- continuing support via telephone or social media
- self-monitoring
- dose titration to target levels
- dietary understanding
- driving guidance
- management of hypoglycaemia
- management of acute changes in plasma glucose control
- support from an appropriately trained and experienced health care professional

When starting insulin therapy in adults with type 2 diabetes continue to offer metformin for people without contraindication or intolerance. Review the need for other blood glucose lowering therapies:

- Offer NPH insulin injected once or twice daily according to need
- Consider starting both NPH and a short acting insulin

(particularly if the HbA1c is 9.0% or higher), administered either separately or as a pre-mixed (biphasic) human insulin preparation

- Consider as an alternative to NPH insulin, using insulin detemir or insulin glargine if:
    - the client needs assistance from a caregiver or health care professional to inject the insulin, and use of detemir or glargine would reduce the frequency of injections to twice or once daily, or
    - the client's lifestyle is restricted by recurrent symptomatic hypoglycemic episodes, or
    - the client would otherwise need twice daily NPH insulin injections in combination with oral glucose lowering drugs
- Consider premixed preparations that include short-acting insulin analogues rather than premixed preparations that include short-acting human insulin preparations if:
    - the client prefers injecting insulin immediately before a meal, or
    - hypoglycaemia is a problem, or
    - blood glucose levels rise markedly after meals
- Consider switching to insulin detemir or glargine from NPH insulin in adults with type 2 diabetes who:
    - do not reach their target HbA1c because of significant hypoglycaemia, or
    - experience significant hypoglycaemia on NPH insulin irrespective of the level of HbA1c reached, or
    - cannot use the device needed to inject NPH insulin but who could administer their own insulin safely and accurately if a switch to one of the long acting insulin analogues was made, or

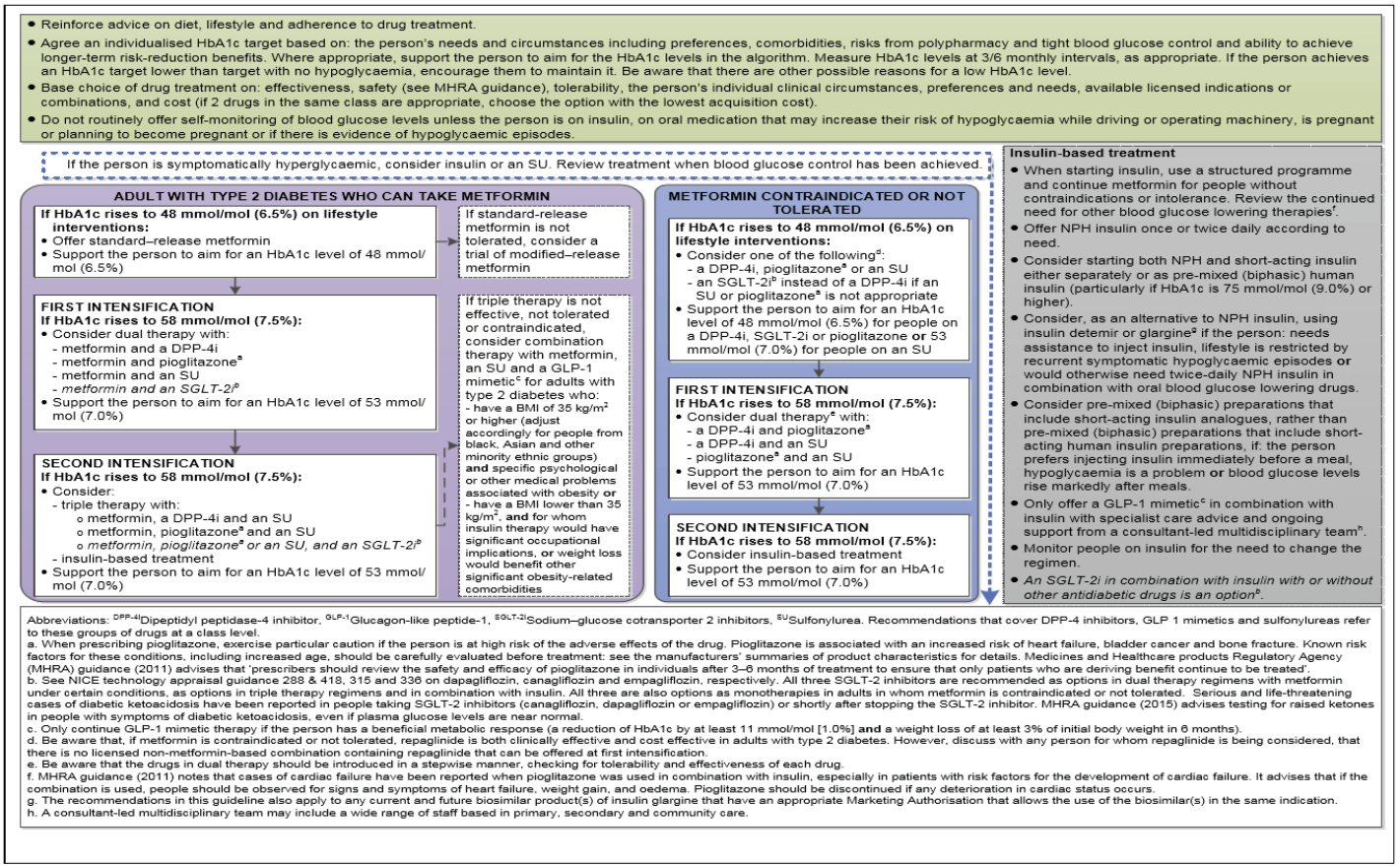
- need help from a care or health care professional to administer insulin injections and for whom switching to one of the long acting insulin analogues would reduce the number of daily injections

- Monitor adults with type 2 diabetes who are on a basal insulin regimen (NPH, insulin detemir or glargine) for the need for short acting insulin before meals
- Monitor adults with type 2 diabetes who are on a premixed insulin for the need for a change to a basal bolus regime with NPH, insulin detemir or glargine if blood glucose control remains inadequate

The following algorithm adapted from the National Institute for Health and Care Excellence (NICE) Guidance summarises the approach to the treatment of Type 2 Diabetes.

NICE National Institute for Health and Care Excellence

Algorithm for blood glucose lowering therapy in adults with type 2 diabetes



Abbreviations: [DPP-4i]Dipeptidyl peptidase-4 inhibitor, [GLP-1]Glucagon-like peptide-1, [SGLT-2i]Sodium–glucose cotransporter 2 inhibitors, [SU]Sulfonylurea. Recommendations that cover DPP-4 inhibitors, GLP 1 mimetics and sulfonylureas refer to these groups of drugs at a class level.

a. When prescribing pioglitazone, exercise particular caution if the person is at high risk of the adverse effects of the drug. Pioglitazone is associated with an increased risk of heart failure, bladder cancer and bone fracture. Known risk factors for these conditions, including increased age, should be carefully evaluated before treatment: see the manufacturers' summaries of product characteristics for details. Medicines and Healthcare products Regulatory Agency (MHRA) guidance (2011) advises that 'prescribers should review the safety and efficacy of pioglitazone in individuals after 3–6 months of treatment to ensure that only patients who are deriving benefit continue to be treated'.

b. See NICE technology appraisal guidance 288 & 418, 315 and 336 on dapagliflozin, canagliflozin and empagliflozin, respectively. All three SGLT-2 inhibitors are recommended as options in dual therapy regimens with metformin under certain conditions, as options in triple therapy regimens and in combination with insulin. All three are also options as monotherapies in adults in whom metformin is contraindicated or not tolerated. Serious and life-threatening cases of diabetic ketoacidosis have been reported in people taking SGLT-2 inhibitors (canagliflozin, dapagliflozin or empagliflozin) or shortly after stopping the SGLT-2 inhibitor. MHRA guidance (2015) advises testing for raised ketones in people with symptoms of diabetic ketoacidosis, even if plasma glucose levels are near normal.

c. Only continue GLP-1 mimetic therapy if the person has a beneficial metabolic response (a reduction of HbA1c by at least 11 mmol/mol [1.0%] **and** a weight loss of at least 3% of initial body weight in 6 months).

d. Be aware that, if metformin is contraindicated or not tolerated, repaglinide is both clinically effective and cost effective in adults with type 2 diabetes. However, discuss with any person for whom repaglinide is being considered, that there is no licensed non-metformin-based combination containing repaglinide that can be offered at first intensification.

e. Be aware that the drugs in dual therapy should be introduced in a stepwise manner, checking for tolerability and effectiveness of each drug.

f. MHRA guidance (2011) notes that cases of cardiac failure have been reported when pioglitazone was used in combination with insulin, especially in patients with risk factors for the development of cardiac failure. It advises that if the combination is used, people should be observed for signs and symptoms of heart failure, weight gain, and oedema. Pioglitazone should be discontinued if any deterioration in cardiac status occurs.

g. The recommendations in this guideline also apply to any current and future biosimilar product(s) of insulin glargine that have an appropriate Marketing Authorisation that allows the use of the biosimilar(s) in the same indication.

h. A consultant-led multidisciplinary team may include a wide range of staff based in primary, secondary and community care.

Type 1 Diabetes

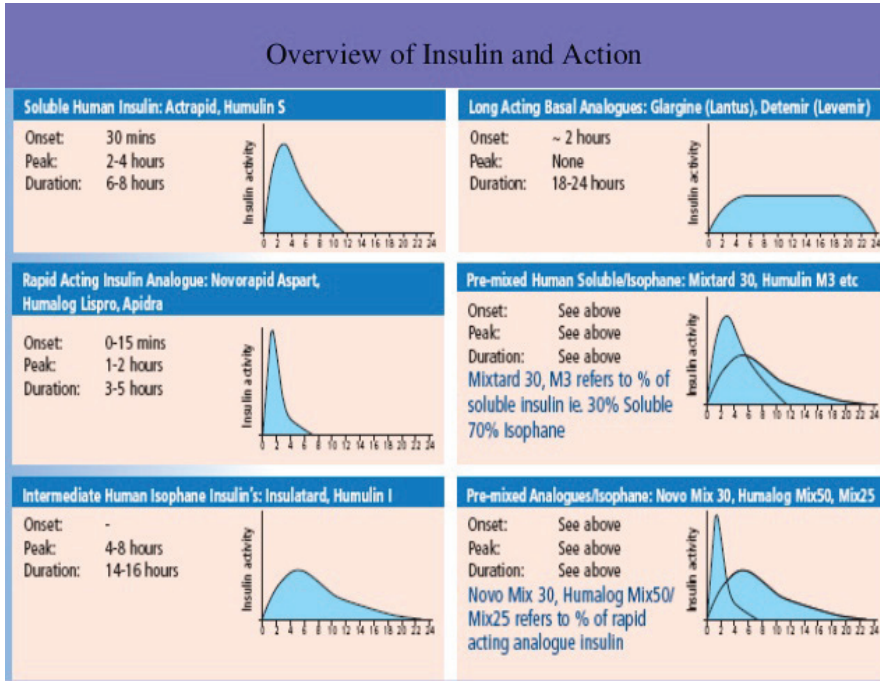
1. Offer multiple daily injection basal bolus regimens, rather than twice daily mixed insulin regimens as the insulin injection of choice for all adults with type 1 diabetes. Provide the client with guidance on using multiple daily injection basal bolus regimens
2. Do not offer adults newly diagnosed with 1 diabetes non basal bolus insulin regimens (i.e. twice daily mixed, basal only or bolus only)

Long acting insulin:

- Offer twice daily insulin detemir or basal insulin therapy for adults with type 1 diabetes
- Consider an alternative basal insulin therapy for adults with type 1 diabetes if:
    - an existing insulin regimen being used by the client is achieving his/her agreed targets
    - once daily insulin glargine or twice daily insulin detemir injection is not acceptable to the client or once daily insulin glargine or twice daily insulin detemir is not tolerated
- Consider other basal insulin regimens for adults with type 1 diabetes only if the regimens in the recommendations stated above do not deliver agreed targets. When choosing an alternative insulin regimen take into account the client's preferences and acquisition cost

Rapid acting insulin:

- Offer rapid acting insulin analogues before meals rather than rapid acting soluble human or animal insulins for mealtime replacement for adults with type 1 diabetes
- Do not advise routine use of rapid acting insulin analogues AFTER meals for adults with type 1 diabetes
- If an adult with type 1 diabetes has a strong preference for an alternative mealtime insulin, respect his/her wishes and offer the preferred insulin



Characteristics of medications used to treat diabetes

Drug Class	Mechanism of action	Protective effects on ß-cell function and/or mass	Expected HbA1c% decrease, monotherapy (%)	Risk for hypoglycaemia	Weight	Common side effects/ warning and precautions
Biguanides – Metformin	Decreases HGP (primary); decreases fasting plasma insulin concentrations and improves insulin resistance	Probable (limited preclinical trials)	1.4	Neutral	Loss (-0.64 kg)	GI side effects; Contraindicated in renal impairment, acidosis
Glucagon-like protein-1 (GLP-1) receptor agonists	Increases insulin secretion and decreases glucagon secretion by activating the GLP-1 receptors; slows gastric emptying and increases satiety	Yes (preclinical and clinical trials)	0.8 – 2.0	Neutral	Loss (1-4 kg)	GI side effects; increased heart rate; potential for increased risk of acute pancreatitis
Sodium glucose cotransporter 2 (SGLT-2) inhibitors	Inhibits renal glucose reabsorption and increases urinary glucose excretion	Yes (preclinical and clinical trials)	<1.2	Neutral	Loss (up to 4.7 kg)	Genital infection; potential for serious urinary tract infection; polyuria, volume depletion, hypotension, and dizziness; increased LDL-C and transient increase in creatinine
Dipeptidyl peptidase-4 (DPP-4) inhibitors	Increases insulin secretion and decreases glucagon production by increasing concentrations of GLP-I and GIP	Yes (preclinical and clinical trials)	0.5 – 0.9	Neutral	Neutral	Potential for increased risk of acute pancreatitis; potential for increased risk for hospitalizations for HF
Thiazolidinediones (TZDs) – Pioglitazone	Reduces insulin resistance in skeletal muscle, liver, and adipose tissue	Yes (preclinical and clinical trials)	0.7 – 1.2	Neutral	Gain (3-4 kg)	Oedema/HF; risk for bone fracture; potential for HF due to fluid retention; increased LDL-C (rosiglitazone)
Sulphonylureas (SUs)	Stimulate insulin secretion from pancreatic ßcells	No (possible effect on ß-cells)	0.4 – 1.2	Moderate to severe	Gain (1-4 kg)	Low durability; potential for increased CV risk
Basal insulin analogs	Increases glucose disposal and decreases HGP by activating insulin receptors	Yes (clinical trials)	1.5 – 1.8	Moderate to severe	Gain (1-3 kg more vs other anti-diabetes medications)	Allergic reactions and injection site reactions; oedema

HGP - hepatic glucose production
GIP - glucose-dependent insulinotropic polypeptide

Management of Diabetes in Special Circumstances

The special situations covered under this guidance are limited to those listed below. Diabetes management in circumstances such as Diabetic Ketoacidosis, Hyperosmolar Hyperglycaemic States, Chronic Kidney Disease, Heart Failure, Myocardial Infarction, Stroke with associated dysphagia requiring tube feedings should be referred to the Specialist.

Type 2 diabetes is also associated with increased risks for several cancers including colon, postmenopausal breast, pancreatic, liver, endometrial, bladder and non-Hodgkins Lymphoma. Patients should be screened accordingly.

1. Sick Day Management:
    - Advise patients to continue taking insulin and/or most diabetes medications even when appetite is decreased. A dose adjustment may be needed
    - Advise patients to discontinue SGLT-2 Inhibitors
    - Advise patients to test blood glucose more often, at least every 4 hours if using insulin treatment. Persons with Type 1 diabetes should be tested for ketones
    - Advise patients to stay well hydrated
    - Advise patients to seek medical attention if vomiting or unable to keep fluids down

Note: Patients suspected of having the novel Coronavirus (SARS-CoV2) should be referred to the local facilities identified to manage these cases, as per the protocols of the Ministry of Health and Wellness.

2. Diabetes Management during Exercise:
    - Explain to patients with diabetes about the effects of exercise on blood glucose levels and about strategies for avoiding hypo- or hyperglycaemia during or after physical activity
    - Encourage patients with diabetes to monitor blood glucose levels before and after exercise so that they can:
        - identify when changes in insulin or food intake are necessary
        - learn the blood glucose response to different exercise conditions
        - be aware of exercise-induced hypoglycaemia
        - be aware that hypoglycaemia can occur several hours after prolonged exercise
    - Advise patients with diabetes that additional carbohydrate should be consumed as appropriate to avoid hypoglycaemia and that carbohydrate rich foods should be readily available during or after exercise
    - Explain to patients with diabetes that additional carbohydrates should be consumed if plasma glucose levels are less than 7mmol/l before exercise is undertaken
    - Explain to patients with diabetes that changes in daily exercise patterns may require insulin dose and/or carbohydrate intake to be altered

Indications for Medical Referrals

1. At time of diagnosis, refer to :
    a. Diabetes Educator – structured education programme tailored to the needs of the patient, their family members and caregivers
    b. professional with expertise and competency in nutrition for individualised and ongoing dietary advice
    c. Ophthalmology for initial dilated and comprehensive eye examination within 3 months of referral. Structured eye screening should be repeated annually. Eye examinations should occur before pregnancy or in the first trimester in patients with pre-existing type 1 or type 2 diabetes
2. At any time, refer to:
    a. Endocrinologist –
        i. for unexplained discrepancies between HbA1c and other glucose measurements
        ii. for patients with suboptimal control or erratic blood glucose readings despite appropriate adjustment in management
    b. Foot Care Specialist for ongoing preventive care and lifelong surveillance –
        i. for patients who smoke
        ii. for patients with history of prior lower extremity complications
        iii. for patients with loss of protective sensation (neuropathy)
        iv. for patients with peripheral arterial disease (PAD)

c. Nephrology – for patients with significant albuminuria ± at least moderate reduction in GFR (see accompanying diagram/algorithm)
d. Ophthalmology –
    i. Emergency
        1. Sudden loss of vision
        2. Rubeosis iridis
        3. Preretinal or vitreous haemorrhage
        4. Retinal detachment
    ii. Prompt referral
        1. Macular oedema
        2. Severe non-proliferative retinopathy
        3. Any degree of proliferative retinopathy

The figure below shows the risk of chronic kidney disease progression, frequency of visits, and referral to nephrology according to estimated glomerular filtration rate (eGFR) and albuminuria.

Risk of chronic kidney disease progression, frequency of visits, and referral to nephrology according to estimated glomerular filtration rate (eGFR) and albuminuria:

CKD is classified based on: · Cause (C) · GFR (G) · Albuminuria (A)				Albuminuria categories Description and range A1 Normal to mildly increased <30 mg/g <3 mg/mmol	 A2 Moderately increased 30-299 mg/g 3-29 mg/mmol	 A3 Severely increased ≥300 mg/g ≥30 mg/mmol
GFR categories (ml/min/1.73m^2) Description and range	G1	Normal or high	≥90	1 if CKD	Treat 1	Refer* 2
	G2	Mildly decreased	60-89	1 if CKD	Treat 1	Refer* 2
	G3a	Mildly to moderately decreased	45-59	Treat 1	Treat 2	Refer 3
	G3b	Moderately to severely decreased	30-44	Treat 2	Treat 3	Refer 3
	G4	Severely decreased	15-29	Refer* 3	Refer* 3	Refer 4+
	G5	Kidney failure	<15	Refer 4+	Refer 4+	Refer 4+

Vassalotti JA, Centor R, Turner BJ, Greer RC, Choi M, Sequist TD; National Kidney Foundation Kidney Disease Outcomes Quality Initiative. Am J Med 2016;129:153–162.e7.

Home Monitoring of Diabetes

Self-monitoring of blood glucose (SMBG) in persons with diabetes provides information regarding the individual's dynamic blood glucose profile. This information can be used to detect hypoglycemia and help establish a profile of blood glucose levels and response to nutrition and pharmacotherapy. The following should be taken in consideration when recommending home glucose monitoring in these individuals.

Type 1 diabetes:

1. Routine self-monitoring of blood glucose should be advised for all adults with type 1 diabetes
2. Testing is recommended at least four times daily including before each meal and before bed
3. Frequency of testing should be increased as needed if any of the following apply:
    a. Blood glucose target is not achieved
    b. Frequency of hypoglycaemic episodes increase
    c. There is a legal requirement to do so in relation to medical standards of fitness to drive
    d. During periods of illness
    e. Before, during or after sport
    f. When planning pregnancy, during pregnancy and while breastfeeding
    g. If there is a need to know glucose levels more than four times a day for other reasons, e.g., hypoglycaemic unawareness

Type 2 diabetes:

1. Do not routinely offer self-monitoring of blood glucose levels for adults with type 2 diabetes unless:
    a. the person is on insulin
    b. there is evidence of hypoglycaemic episodes
    c. the patient is on oral medication that may increase their risk of hypoglycaemia while driving or operating machinery
    d. the patient is pregnant or planning to become pregnant
2. Consider short-term self-monitoring of blood glucose levels in adults with type 2 diabetes:
    a. when starting treatment with oral or IV steroids
    b. to confirm suspected hypoglycaemia
3. A structured assessment should be carried out at least annually in all adults with type 2 diabetes who self-monitor their blood glucose. The assessment should include:
    a. the person's self-monitoring skill
    b. the quality and frequency of testing
    c. checking that the person knows how to interpret the blood glucose result and knows what action to take
    d. the impact on the person's quality of life
    e. the continued benefit to the person
    f. the equipment used

Diabetes and Telehealth

Telehealth is defined as the exchange of medical information from one location to another using electronic communication, which improves patient health status. It has multiple applications and can be used for different services including wireless tools, email, two-way video, smartphones and other methods of telecommunications technology. The remote delivery of health care services such as health assessments over the telecommunications infrastructure is an alternate definition.

Commonly used telehealth technologies include:

1. Wired “landline” telephone
2. Wireless smartphone applications
3. Internet-based website via computers and handheld devices
4. Text messaging
5. Email messaging
6. Social networking and social media websites/applications
7. Wireless BP measurement devices
8. Electronic pill dispensers/counters

General considerations in transitioning to a telehealth practice include the following:

1. Liability/Indemnity considerations:
   - Be sure that malpractice insurance allows for remote visits. There is currently no clear guidance regarding provision of care during a pandemic. National and local guidance should be sought before embarking on telemedicine consultations.

- Verify where the encounter is considered to have taken place, i.e., the patient's physical location or the health care provider's, particularly if the patient is in a remote location.
- Ensure that the health care provider has the technical skills and competence to do telemedicine consultations. Consider the learning curve.
- Determine whether the health care provider will see new patients as well as known patients.

2. Remuneration:
- Ensure that the patients' health insurance providers will reimburse or cover for telehealth consultations at in-office rates.

3. IT considerations:
- Use Telehealth providers e.g. Microsoft Teams, Zoom for Healthcare, Skype for business, Doxy.me, Updox, VSee, Google G suite Hangouts Meet.
- Encourage video-consultations; this improves contact with the patient and is important for identification purposes
- Secure internet access and virtual private networks are required
- Use of personal devices is possible e.g. smartphones but should be used with strong passwords and encryption for patient information security. Safe secure networks should be used

How to proceed:

1. Identify appropriate patients in the practice. Choose known regular patients for routine follow-up, and for whom medical records are available. Telephone triage should be performed to determine if a remote consultation can be done. If yes, continue on telephone or do video-conferencing. Explain to the patient why remote consultation is required e.g. COVID-19 pandemic and need for physical distancing. Let patients know that face-to-face consultations are the norm. The patient needs to give consent and understand what can and cannot be done during a remote consultation. If someone is too ill, breathless while speaking or unstable, direct them to a face-to-face or urgent/emergent visit.

   Reasons to convert to a face-to-face visit include:

   i) Unknown patient, no records or no referral letter
   ii) Concerns about safeguarding data
   iii) Physical examination required
   iv) Technical limitations
   v) Potential confidentiality breach possible e.g. related to location of patient or HCP

2. Use an existing scheduling system to schedule virtual or telephone visits. Create an encounter and document the phone visit. Use standard templates or a narrative note and bill by time. Document as you would during an in-person visit. You may e-prescribe and place orders although diagnostics, e.g., ECG or stress test, will require an in-person visit.

3. Whether using a makeshift video tool or a formal telehealth platform, once set up, interaction can proceed. A scheduled visit in the EHR will tell the HCP and the patient the time at which to launch the application. Unmute the microphone, raise the volume, allow video connection and alert the patient to do the same. The patient may use a smartphone, tablet, laptop or desktop computer. Look at the camera, not the screen in order to maintain eye contact.

4. The Telehealth team may be just the HCP and the patient but an effective structure is to have an administrative/ medical assistant call the patient in advance to ensure they have the setup for the visit, confirm insurance details for billing and review past medical history, medications, allergies and enter any vital signs obtained at home.

5. Lead the visit as if the patient is in the room. Find out who else is in the room and ask to be introduced to them. A history should be taken as usual but only limited physical examination, if any, can be done. For example, the patient can show scars, abdominal swelling or may be able to push on their skin to demonstrate oedema. Your clinical skills will tell you if they look ill or sound breathless, for example. Eventually, patients may buy blood pressure cuffs, weight scales, heart rate and O_2 saturation monitors and share their readings over the patient portal or during the visit or upload to the EHR, but to start with, take a history, answer questions, review medication, provide advice and reassurance, make a plan. Education and counselling are also important.

6. You may also e-prescribe but avoid controlled substances without legal advice. Orders for diagnostics may be placed.

7. If referral or a face-to-face visit is required after the remote consultation:
    a. document rationale for why face-to-face visit is needed
    b. determine which is the most appropriate clinician to see patient
    c. determine how urgently examination must take place

New patients:

New patients may be "seen" through remote consultations though they will be more suitable for face-to-face visits. Telephone triage, such as for known patients, should be performed. Considerations particular to new patients include:

1. Are medical records available?
2. Is the referring physician contactable?
3. Is there a referral letter, or are you able to verify the history or medical examination findings?
4. Is it safe for the patient?

Documentation:

Documentation requirements for a telehealth service are the same as for a face-to-face encounter. The information of the visit, history, review of systems, consultative notes, any examination or observations or any information used to make a medical decision about the patient should be documented. Advice provided should be recorded.

A statement that the service was provided through telehealth should be included. The HCP must have patient consent to record the video or telephone conversation and any such recording must form part of the patient record.

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