2011 Pocket Edition of CHRC/PAHO

Managing Diabetes in Primary Care in the Caribbean

CARIBBEAN HEALTH RESEARCH COUNCIL

T&THSI
trinidad and tobago
health sciences initiative

Working in collaboration with
Johns Hopkins Medicine

Symptoms

- Polyuria
- Polydipsia
- Weight loss which may sometimes be associated with polyphagia
- Blurred vision

Criteria for the Diagnosis of Diabetes Mellitus

1) FPG ≥126 mg/dL (≥7.0 mmol/L). Fasting is defined as no caloric intake for at least 8 h.*

OR

2) 2-h post-load glucose ≥200 mg/dL (≥11.1 mmol/L) during an OGTT. The test should be performed as described by the WHO, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.*

OR

3) In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥200 mg/dl (11.1 mmol/1).

*In the absence of unequivocal hyperglycemia, criteria 2 and 3 should be confirmed by repeat testing.

Note: New diagnostic criteria include HbA1c (≥6.5%), which should be performed only in a laboratory using a method that is certified by a glycohemoglobin standardization program and standardized to the Diabetes Control and Complications Trial (DCCT) reference assay.

Source: American Diabetes Association, 2010

Categories of Increased Risk for Future Diabetes

Category	Criteria
Impaired Fasting Glucose (IFG)	Fasting plasma glucose 100-125 mg/dl (5.6-6.9 mmol/l)
Impaired Glucose Tolerance (IGT)	2h plasma glucose 140-199 mg/dl (7.8-11.0 mmol/l)
Elevated HbA1c*	HbA1c 5.7-6.4%

*The HbA1c criterion applies to tests performed in a laboratory using a method that is certified by a glycohemoglobin standardization program and standardized to the Diabetes Control and Complications Trial (DCCT) reference assay.

Source: Adapted from the American Diabetes Association, 2010

Metabolic, Blood Pressure and Nutritional Targets

Measurement	Good
Blood glucose: Preprandial Postprandial	90-130 mg/dL (5.0-7.2 mmol/L) <180 mg/dL (<10.0 mmol/L)
HbA1c	<6.5%
Total cholesterol	<200 mg/dL (<5.2 mmol/L)
HDL cholesterol	>40 mg/dL (>1.0 mmol/L)
LDL cholesterol	<70 mg/dL (<1.8 mmol/L)
Fasting triglycerides	<150 mg/dL (<1.7 mmol/L)
Blood Pressure	≤130/80 mmHg
Body Mass Index	18.5-25 kg/m^2
Waist Circumference General: Women Men **East Indians/Chinese:** Women Men	<80 cm (<32") <94 cm (<37") <80 cm (<32") <90 cm (<35")

Source: International Diabetes Federation

Body Mass Index and Waist Circumference

BMI = Weight (in kilos) ÷ Height (in metres)^2
or
BMI = [Weight (in lbs.) x 703] ÷ Height (in inches)^2

The WC is measured at the part of the trunk located midway between the lower costal margin (bottom of lower rib) and the iliac crest (top of pelvic bone) while the person is standing, with feet about 20-30 cm apart (10-12 in). The measurer should stand beside the individual and fit the tape snugly, without compressing any underlying soft tissues. The circumference should be measured to the nearest 0.5 cm (1/4 in), at the end of a normal expiration.
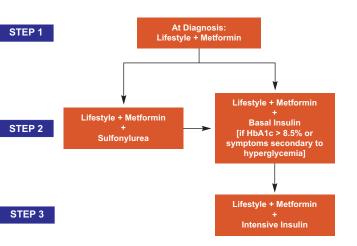
Treatment Algorithm for the Metabolic Management of Type 2 Diabetes

STEP 1 — At Diagnosis: Lifestyle + Metformin

STEP 2 — Lifestyle + Metformin + Sulfonylurea → Lifestyle + Metformin + Basal Insulin [if HbA1c > 8.5% or symptoms secondary to hyperglycemia]

STEP 3 — Lifestyle + Metformin + Intensive Insulin

Note:
- Less well-validated therapies including Meglitinides, acarbose, or DPP-4 Inhibitors can be considered as treatment options in Step 2.
- Reinforce lifestyle interventions at every visit.
- Check HbA1c every 3 months until HbA1c is <7% and then at least every 6 months.
- The interventions should be changed if HbA1c is >7%.
- Consider specialist referral if drugs and non-pharmacological interventions do not lead to satisfactory metabolic control.

Source: American Diabetes Association/European Association for the Study of Diabetes, 2009

Screening for Microalbuminuria

Category of Abnormality in Albumin Excretion	Spot collection (µg/mg creatinine)
Normal	<30
Microalbumin	30-299
Clinical albuminuria	≥300

Note: Random spot collection is the preferred method; 24-hour and timed collections are more burdensome and add little to prediction or accuracy. Two of three specimens collected within a 3 to 6-month period must be abnormal for a patient to have crossed diagnostic thresholds.

Source: American Diabetes Association, 2010

Profile of Principal Oral Glucose-Lowering Agents

Class	Action	Advantages	Contraindications	Side Effects	Dosing
Biguanides Metformin (this is the only drug used in this class.)	Reduce hepatic glucose output and delay glucose absorption from the gut	Do not cause weight gain Lower LDL cholesterol Do not cause hypoglycaemia	Renal insufficiency Hepatic insufficiency Severe heart failure	Lactic acidosis Gastrointestinal problems	Start with 500 mg once or twice daily with meals
Sulphonylureas Gliclazide, Glimepiride Glipizide Glyburide (short acting)	Stimulate insulin release	Low cost Effective	Pregnancy Lactation	Hypoglycaemia	Short acting drugs preferable for use in the elderly Start with a low dose and increase as necessary
Meglitinides Repaglinide	Increase insulin release	Rapid on-off effect due to short half life	Pregnancy Lactation	Gastrointestinal upset Hypoglycaemia	New patient or HbA1c < 8%, start with 0.5 mg before meals. HbA1c > 8%, start with 1 mg or 2 mg.
Alpha glucosidase inhibitors Acarbose	Reduce intestinal absorption of carbohydrates	Do not cause hypoglycaemia	Pregnancy Kidney disease Cirrhosis	Gastrointestinal symptoms	Start with low dose 25 mg 2-3 times daily (Take with the first bite of each main meal) Increase to maximally tolerated dose
Dipeptidyl peptidase-4 (DPP-4) Inhibitors (e.g. Sitagliptin)	Decrease glucagon Increase insulin Decrease postprandial hyperglycemia	Weight neutral Low hypoglycemic risk	Pregnancy Lactation Gastroparesis	Pharyngitis Pancreatitis (rare)	Can be combined with metformin, sulphonylureas and taken with or without food. Normal dose is 100 mg (once daily). Dose based upon patients renal insufficiency: Moderate, 50 mg. Severe, 25 mg.

Note: 1) Chlorpropamide, a long-acting sulphonylurea is not recommended. Where still available, it should be used with extreme caution in the elderly and should be avoided in those with renal disease. **2)** Thiazolidinediones are not recommended due to European Medicines Agency/European Association for the Study of Diabetes Advisory regarding cardiovascular risk (rosiglitazone).

Types of Insulin Available

Type of Insulin	Examples
Rapid-acting	lispro, aspart, glulisine
Short-acting	Regular Humalog
Intermediate	NPH, Lente Ultralente
Long-acting	Glargine Detemir
Pre-mixed	70% Lente: 30% Regular 80% Lente: 20% Regular

Note: 1) Regular insulin should be injected subcutaneously 15-30 minutes before a meal for the onset of action to coincide with food absorption. Humalog (an analogue insulin) can be given at the start of the meal. **2)** Glargine is given once daily, preferably on mornings, either alone or in combination with short-acting insulin or oral agents.

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1) Screen with questions related to risk factors:
- > 25 years of age
- overweight
- first degree family history of diabetes
- previous history of abnormal glucose metabolism
- glycosuria
- previous poor obstetric history
- ethnicity associated with high prevalence of diabetes mellitus
- a previous large baby weighing more than 4.0 kg (9 lbs)

2) High-risk patients should be tested with the Oral Glucose Tolerance Test

If the first test is normal, **retest** high-risk patients at 24-28 weeks gestation.

Diagnostic Criteria

There are two main glucose tolerance tests used for diagnosing gestational diabetes.

The test using 100 g glucose is also widely used for detection of 'at risk' infants and mothers.

Glucose Tolerance Tests for Gestational Diabetes

100 g glucose (Traditional Method)

Time	mg/dL	mmol/L
Fasting	>95	>5.3
1-h	>180	>10.0
2-h	>155	>8.6
3-h	>140	>7.8

75 g glucose

Time	mg/dL	mmol/L
Fasting	>95	>5.3
1-h	>180	>10.0
2-h	>155	>8.6

Note: Clinical practice includes the use of a screening 50g glucose load (fasting not required). If the one hour value is ≥ 7.8 mmol/L, proceed to a diagnostic OGTT.

Mixing of Insulins

- If Lente or Ultralente is mixed with Regular insulin in a syringe, it should be injected immediately, or the action of the Regular insulin becomes impaired.
- Glargine should not be mixed in the syringe with other insulins or injected at the same site as other insulins.
- If it is necessary to mix short and long acting insulin, then NPH is preferable to Lente or Ultralente.
- When insulins are mixed, the Regular insulin should be drawn up first before the Lente or Ultralente.

Possible Insulin Regimens In Type 2 Diabetes Mellitus

1) Combined oral agents and insulin:
- Morning: Oral agents e.g. Metformin or Sulphonylureas
- Bedtime: Glargine or NPH insulin: Start with 10 - 15 units and adjust to achieve target fasting values.

(continued on next panel)

Mixing of Insulins *(continued from preceeding panel)*

2) Twice Daily regimen of Both 'Regular' and 'NPH' Insulin
- Use the 'Rule of Thirds'
- 1/3 short-acting insulin and 2/3 long-acting insulin
- 2/3 of daily dose in morning and 1/3 in evening

3) Multiple Dosing Regimen:
- Short-acting analogue e.g. Regular analogue immediately before each meal together with long acting analogue insulin at bedtime e.g. Glargine
- This regimen is useful in patients with little control or those who desire flexibility due to their lifestyles. High levels of motivation, frequent testing and adjustment of dosages are necessary for good control on this regimen.
- Whenever possible, it may be useful to get input from a diabetes specialist.

Check Every Visit
- ❏ Weight / BMI
- ❏ Home monitoring results
- ❏ Blood glucose
- ❏ Blood pressure
- ❏ Dietary advice
- ❏ Exercise advice
- ❏ Foot inspection
- ❏ Smoking/alcohol
- ❏ Symptoms
- ❏ Review Drugs
- ❏ Adherence with treatment
- ❏ State of injection sites for Insulin treatment

Check Every 3-6 months
- ❏ HbA1c

Check at Least Once Every Year
- ❏ Foot pulses
- ❏ Foot sensation
- ❏ Visual acuity
- ❏ Fundoscopy
- ❏ Urine protein
- ❏ Blood urea/creatinine
- ❏ Blood Lipids (HDL-C, LDL-C, Triglycerides)
- ❏ Waist circumference
- ❏ Oral Health
- ❏ Mental Health
- ❏ ECG
- ❏ Smoking
- ❏ Alcohol
- ❏ Other