GUIDELINES FOR THE MANAGEMENT

OF

DIABETES

MINISTRY OF HEALTH
JAMAICA

NOVEMBER, 2007

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This document was entitled Protocols for the Management of Diabetes and Hypertension from 1996 until its previous revision in 2001. Its title was changed to Guidelines for the Management of Hypertension during its most recent revision which was completed in November 2007.

TABLE OF CONTENTS

TABLES

FOREWORD

This document is a comparative review of the Protocol for the Management of Diabetes, Jamaica with international standards. Major amendments to the protocol include:

1. Criteria for screening & screening procedure ;

2. Screening for the smoking of tobacco and for depression;

3. Change in the diagnostic thresholds for diabetes;

4. Procedure for the initial evaluation/visit;

5. A management plan for each patient

6. The incorporation of lipid management

7. Details regarding microvascular, macrovascular and cardiovascular diseases and complications and their management in patients with diabetes (apart from foot care) including CHD screening and treatment, retinopathy and neuropathy.

8. Other complications including infections, acute metabolic states, malformations among infants of pregnant women with diabetes and complications of influenza and pneumococcal pneumonia.

9. Issues pertaining to children, adolescents and the elderly with diabetes

10. The relationship between depression and diabetes mellitus and its complications.

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I. INTRODUCTION

Diabetes Mellitus is a state of chronic hyperglycaemia resulting from defective production and/or ineffective action of insulin**.** This disease is responsible for a heavy burden of chronic illness, long-term disability and premature loss of life throughout the Caribbean. In 2000, the prevalence of diabetes in Jamaica was estimated to be 11-14% of the population over 25 years of age.

Diabetes is a chronic disease that requires a lifetime of treatment. Therefore, the diagnosis should not be made without a good degree of certainty. A definitive diagnosis of diabetes mellitus should only be made after the finding of elevated blood sugar on more than one occasion. The presence of sugar in the urine although suggestive of diabetes mellitus should never be considered diagnostic.

The level of glucose in the blood is the result of a dynamic balance between:

(a) Glucose absorption from the diet;
(b) Glucose uptake by the tissues (enhanced by insulin action and modified by exercise and other activity levels) and
(c) Gluconeogenesis by the liver.

Importance of Metabolic Control

The United Kingdom Prospective Diabetes Study (UKPDS) and Diabetes Control & Complications Trial (DCCT) have demonstrated conclusively that 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 diabetes complications. The importance of metabolic control must be communicated to the patient in layman's terms so that clear management goals may be arrived at in collaboration with the patient soon after the diagnosis of diabetes. **These treatment goals should be clearly documented and reviewed and reinforced with the patient at each visit**. Adjustments in diet and medications should be made if treatment goals are not achieved.

Metabolic control is best attained though patient education, encouraging the practice of regular self-monitoring of blood glucose (SMBG), attention to healthy eating practices, a consistent physical activity programme and compliance with prescribed medication.

II. CLASSIFICATION

Diabetes Mellitus can be classified into three main types. However diabetes may also be secondary to other conditions or syndromes such as endocrinopathies, chronic pancreatic or liver disease, pregnancy, malnutrition or drugs/toxins such as steroids, thiazide and alcohol.

TABLE 1

FACTORS FOR CLASSIFICATION AS TYPE 1 OR TYPE 2 DIABETES

TYPE 1 DIABETES	TYPE 2 DIABETES
Results from β-cell destruction, usually leading to absolute Insulin deficiency	Results from a combination of insulin resistance and a progressive insulin secretory defect
Usually develops in youth but may appear at any age	The disease is usually found in middle and older age groups but may appear in younger age groups including children
Male/female incidence similar	Slight female preponderance
Patients are usually non-obese	60% of persons with type 2 DM are overweight or obese
Family history in 30-40% of cases	Family history in up to 90% of cases
Associated with HLA types DR3 and DR4	Levels of insulin may be high, normal or low
Patients prone to ketosis	Patients are less prone to ketosis
Found in 7-10% of people with diabetes in Caribbean countries	Most common type of diabetes found in Caribbean populations and worldwide
Antibodies to islet cells present in 80-95% of newly diagnosed cases	Relative insulin deficiency and insulin resistance

GESTATIONAL DIABETES MELLITUS (GDM)

- GDM results from a combination of insulin resistance and increased demand due to pregnancy - related hormones.
- GDM is first recognized during the second trimester of pregnancy.
- GDM must be differentiated from “Pregnancy with pre-existing type 1 or type 2 diabetes”. The presence of elevated fasting and postprandial glucose levels during the first trimester may suggest the presence of diabetes prior to the pregnancy.
- After delivery, women with gestational diabetes mellitus generally revert to the normoglycaemic state but still remain at high risk for long-term diabetes.

GUIDELINE: CLASSIFICATION		
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III. CRITERIA FOR SCREENING FOR TYPE 2 DIABETES AND GDM

III.1 RATIONALE FOR SCREENING

Unlike type I diabetes which usually presents with acute symptoms, type 2 diabetes has an indolent initial course and often goes undetected for several years before a definitive diagnosis is made. This means that irreversible complications are often present at the time of diagnosis.

Family history, age, activity, body habits and co-morbid conditions all affect the risk for type 2 diabetes. Routine screening of high risk individuals for diabetes and pre-diabetes allows early intervention to decrease complications.

III.2.1 CRITERIA FOR SCREENING FOR TYPE 2 DIABETES IN ADULTS

Adults > 45 years with no risk factors should be screened for diabetes every 3 years.

Adults with any of the following risk factors should be screened for DM yearly.

- First degree family history of diabetes (parents or sibling)
- Obesity (BMI ≥30 kg/m^2) or central obesity (waist circumference of ≥ 94 cm/37 inches (males) and 80cm / 32 inches (females))
- Women who have been diagnosed with GDM or have given birth to babies weighing > 4.1 Kg (9lbs)
- Signs of insulin resistance or conditions associated with insulin resistance such as polycystic ovarian syndrome (PCOS) or acanthosis nigricans
- A history of vascular disease (ischaemic heart disease, stroke, peripheral vascular disease)
- Chronic usage of medications (such as corticosteroids) that predispose to
- hyperglycaemia
- A history of an endocrinopathy that is known to be associated with diabetes— such as hypothyroidism, hyperthyroidism, cushing's syndrome and vitiligo
- Evidence of the metabolic syndrome including elevated blood pressure (≥140/90 mmHg), decreased serum HDL cholesterol ≤ 0.90 mmol/l (35 mg/dl) and/or increased serum triglyceride ≥ 1.7 mmol/l (150 mg/dl)
- A past history of impaired fasting glucose (IFG) or impaired glucose tolerance (IGT) on previous testing

GUIDELINE: RATIONALE FOR SCREENING; CRITERIA FOR SCREENING FOR TYPE 2 DIABETES IN ADULTS		
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III.2.2 CRITERIA FOR SCREENING FOR TYPE 2 DIABETES IN CHILDREN AND YOUNG ADULTS

Children with any of the following risk factors should be screened for DM yearly.

- Overweight (BMI>85th percentile for age and sex, weight for height>85th percentile or weight >20% of ideal for height)
- Family history of type 2 diabetes in first degree relative
- Signs of insulin resistance or conditions associated with insulin resistance such as hypertension, PCOS, dyslipidaemia or acanthosis nigricans.
- Chronic use of a medication (such as corticosteroids) that is known to predispose to hyperglycaemia

The incidence of type 2 diabetes in children and adolescents worldwide has increased significantly in the last decade. The majority of this increase is due to the worldwide epidemic of obesity. The highest incidence occurs at the onset of puberty as there is increased insulin resistance due to the hormones of puberty.

III.3 CRITERIA FOR SCREENING FOR GESTATIONAL DIABETES MELLITUS (GDM)

First trimester

Gestational diabetes mellitus must be distinguished from diabetes that predates pregnancy. This is best done by assuring that all pregnant women receive a random glucose test on the first antenatal visit or as early as possible during the first trimester.

Second trimester

All pregnant women require screening in the second trimester (between 24 and 28 weeks gestation).

Post Partum

Women with GDM should be screened for diabetes 6–12 weeks postpartum and followed up with counseling and lifelong screening for the development of diabetes.

GUIDELINE: CRITERIA FOR SCREENING FOR TYPE 2 DIABETES IN CHILDREN AND YOUNG ADULTS; CRITERIA FOR SCREENING FOR GESTATIONAL DIABETES MELLITUS (GDM)		
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III.4. SCREENING PROCEDURE

Screening procedures for Non-Pregnant Adults:

- The fasting plasma glucose (FPG) is the most cost - effective means of screening. Fasting is defined as no caloric intake for at least 8 hours.
- A FPG of < 5.6 mmol/l (100 mg/dl) is normal.
- A FPG of 5.6-6.9 mmol/l (100-125 mg/dl) is abnormal and is diagnostic of impaired fasting glucose (IFG).
- A FPG ≥7.0 mmol/l (126 mg/dl) is suggestive of diabetes but requires further testing to confirm the diagnosis.

Screening procedures for Pregnant Women:

Two-step approach:

1. Conduct an initial screening by measuring the plasma or serum glucose concentration 1 h after a 50-g oral glucose load (Glucose Challenge Test [GCT]) Women with a plasma glucose of < 7.2 mmol/l (130 mg/dl) need no further screening.

2. A plasma glucose of ≥ 7.2 mmol/l (130 mg/dl) is suggestive of glucose intolerance. This should be confirmed by a diagnostic 2-hour (100 g) oral glucose tolerance test (OGTT).

GUIDELINE: SCREENING PROCEDURE		
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IV. CLINICAL PRESENTATION

The classic symptoms of uncontrolled diabetes are:

- Persistent uncontrollable thirst (polydypsia)
- Frequent urination (polyuria)
- Weight loss
- Unexplained tiredness /fatigue
- Blurred vision
- Itching (generalized or vaginal or penile)
- Slow healing of minor skin lesions
- Increased hunger associated with increased food intake without weight gain (polyphagia)
- Some patients have no symptoms.

V. DIAGNOSIS

V.1 DIAGNOSIS OF IFG, IGT AND DM

ASYMPTOMATIC

- **FPG≥ 7.0mmol/l (126mg/dl)**
- **2-h PG ≥11.1mmol/l(200mg/dl)during an OGTT***

Confirm with repeat testing (FPG and OGTT) if results are abnormal

SYMPTOMATIC

- **1. Casual plasma glucose ≥11.1 mmol/l(200mg/dl)**

Casual is defined as any time of day without regard to time since last meal.
If not diagnostic but suggestive of glucose intolerance, proceed to steps 2 and/or 3 as necessary.

- **2. FPG≥ 7.0 mmol/l (126 mg/dl)**
- **3. 2-h PG ≥11.1 mmol/l (200 mg/dl)during an OGTT***

OGTT should not be performed if there are symptoms suggesting an acute metabolic decompensation.

Values are mmol/l (mg/dl) *Strictly 2 hrs (2-h) post 75 g glucose (post prandial – pp) plasma glucose(PG); fasting plasma glucose(FPG)

The FPG is cheaper, more easily reproduced and convenient than the 2-h PG, although the latter is a more sensitive assay in the majority of populations.

SCREENING WITH BLOOD GLUCOSE METER

If you are screening with a blood glucose meter (finger prick method) the values are as follows:

- **FBG** **≥6.1 mmol/l (110mg/dl)**
- **2Hr PP** **≥10.0 mmol/dl (180 mg/dl)**

Confirm the diagnosis by sending a blood glucose sample for testing at the lab using the values in Table 2

TABLE 2
CRITERIA FOR DIAGNOSIS OF IFG, IGT & DM

Test	Normal mmol/l (mg/dl)	Impaired Fasting glucose (IFG) mmol/l (mg/dl)	Impaired Glucose Tolerance (IGT) mmol/l (mg/dl)	Diabetes[1] mmol/l (mg/dl)
Fasting Plasma Glucose	**≤5.6 (100)**	**5.6–6.9 (100-125)**	**–**	**≥7.0 (126)**
2-hr Plasma Glucose	**<7.8 (140)**	**–**	**7.8–11.0 (140-199)**	**≥11.1 (200)**
Casual Plasma Glucose[2]	**<11.1 (200)**	**–**	**–**	**≥11.1 (200)**
Fasting Blood Glucose[3] (finger stick)	**<4.8 (85)**	**4.8–6.0 (85-109)**	**–**	**≥6.1 (110)**
2-hr Blood Glucose[3] (finger stick)	**<6.6 (120)**	**–**	**6.6–9.9 (120-179)**	**≥10.0 (180)**

[1] Diagnosis must be confirmed on subsequent day by plasma glucose
[2]Patient must be symptomatic for diabetes
[3]Diagnosis must be confirmed by fasting plasma glucose or 2-hr plasma glucose

GUIDELINE: DIAGNOSIS OF IFG, IGT AND DM		
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V.2 DETECTION AND DIAGNOSIS OF GESTATIONAL DIABETES MELLITUS (GDM)

FIRST PRENATAL VISIT

All women should be screened (with a random plasma glucose) for pre-existing diabetes at the first prenatal visit using the values in Table 2.

Confirm the diagnosis by sending a blood glucose sample for testing at the lab on a subsequent day.

24- 28 WEEKS OF GESTATION

All women should be screened for GDM between 24-28 weeks of gestation. Testing should involve the following:

Two-step approach:

1. Perform an initial screening by measuring the plasma or serum glucose concentration 1 hour (hr) after a 50-gram oral glucose load (glucose challenge test [GCT]). If the glucose value is ≥ 7.2 mmol/l(130 mg/dl) then proceed to step 2

2. Do a diagnostic 100-g OGTT.

The 100-g OGTT is positive if two (2) or more of the following criteria are met or exceeded:

- **FBG ≥ 5.3 (95)**
- **1hr PP ≥ 10 (180)**
- **2hr PP ≥ 8.6 (155)**
- **3hr PP ≥ 7.8 (140)**

The test should be conducted in the morning after an overnight fast of 8–14 hours.

VI. MANAGEMENT OF DIABETES

1. Aims and Objectives
2. Initial Evaluation
3. Follow-Up Visits
4. Frequency of Visits per Annum
5. Health Management Team
6. Management Plan
7. Therapeutic Management

VI.1. AIMS AND OBJECTIVES

The main aim in managing diabetes is the attainment and maintenance of satisfactory metabolic control of the disease and thereby to:

- Relieve symptoms of the disease.
- Prevent acute complications.
- Avoid or delay the development of long-term complications.
- Minimize the impact of long - term complications by detecting them early and instituting treatment.
- Maintain as normal a life as possible.

The principal means of achieving these goals are:-

(a) Nutritional therapy to:
  - reduce hyperglycaemia
  - achieve and maintain normal or near normal body weight
  - improve lipid profile

(b) Physical activity – regular and sustained
(c) Education of patient, immediate family and support groups
(d) Healthy lifestyle and avoidance of smoking and alcohol[1]
(e) Drug therapy
  glucose control[2]
  lipid control[3]
  blood pressure control[4]

Data from the UKPDS has shown that the early use of Metformin may retard the progression of ß-cell loss in type 2 diabetes. The data on Beta cell sparing with Thiazolidinedione is suggestive but inconclusive.

[1]People with diabetes should not use tobacco products of any kind and should restrict their intake of alcohol to a maximum of 2 drinks per day for men and 1 drink per day for women.1 drink= ½ oz of spirits (e.g. rum or whiskey), 12 oz of beer or 5 oz of wine.
Alcohol should be taken with food to reduce the risk of hypoglycaemia.

[2] Lifestyle changes will control many patients initially. However, the majority of patients will eventually need one or more oral agents and /or insulin.

[3] Most persons with diabetes will not achieve target LDL goals without use of a lipid lowering medication.

[4] Many patients will need multiple drugs to achieve blood pressure control.

TABLE 3
MANAGEMENT OF DIABETES – METABOLIC TARGETS

AIMS	Tests	Targets		Frequency
Achieve Metabolic Targets	**Glucose***			
		Fasting	2hrpp	
	Capillary	<5.6 (101)	<7.8 (140)	Insulin 3x/d
				Non-insulin users 2x/wk
				Non-insulin users 2x/d if poor control
	Plasma	4 – 6.0 (72-108)	4 – 7.8 (72-140)	Per clinic visit
	HbA1c**	4.8% to 6.9%		At least yearly***
	Lipids**			
	LDL	<2.6 mmol/l		
		≤2.8 mmol/l		Child with CV risk factors
	Triglycerides	<1.7 mmol/l		
	HDL	>1.1 mmol/l		Men
		>1.3 mmol/l		Women
	Blood Pressure			
	Sys/Dias	<130/80 mm/Hg		Per clinic visit

**Glycaemic goals should be individualized depending on patient's age, health status and the presence of complications of diabetes. Attempts to attain this goal may need to be tempered if severe or troubling hypoglycaemia occurs*

.

***HBA1c – minimal care involves an HbA1c <7%* and *standard care is < 6.5%*.

****HBA1c – more frequently if HBA1c more than 8*

*****Lipids – yearly if medium to high risk; every 2 years if low risk*

TABLE 4
MANAGEMENT OF DIABETES – AIMS AND OBJECTIVES

AIMS	OBJECTIVES
Nutrition and Lifestyle Changes	**Recommend to Dietitian/Nutritionist**
Body weight	**BMI < 25** kg/m^2
	Patients with a BMI of > 25 kg/m^2 **should be referred for nutritional consultation to achieve initial weight loss of 10% of body weight towards BMI target of < 25** kg/m^2
Physical Activity	**30 min. most days of the week**
Smoking	**Abstain from all tobacco products**
Alcohol	**Limit alcohol to a maximum of 2 drinks daily for men and 1 drink daily for women**
Education	**1. What is diabetes** **2. Types of diabetes** **3. Self-Management** **Including Self-monitoring of Blood Glucose (SMBG)** **Medication** **Nutrition** **Physical activity** **Acute & chronic complications** **4. Coping with diabetes** **Depression evaluation tool** **Self esteem**
Goals to Prevent Complications	**Prevent Micro & Macrovascular Diseases and CVDs by** **1. Glycaemic control** **2. BP<130/80 mm/Hg** **3. Lipid management** **4. Preventing/Controlling microalbuminuria or GFR<60ml/min** **5. Weight loss of at least 5-10% if BMI >25** kg/m^2 **6. Nutrition therapy** **7. Physical activity** **8. Moderate alcohol consumption** **9. Smoking cessation** **10. Daily foot inspection** **11. Sick day guidelines**

Approved By: Health Promotion and Protection Division

VI.2. INITIAL EVALUATION (Standards of Medical Care in Diabetes, American Diabetes Association (ADA))[5]

MEDICAL HISTORY

- Symptoms results of laboratory tests and special examination results related to the diagnosis of diabetes.
- Prior HBA1C records.
- Eating patterns, nutritional status, weight history; growth and development in children and adolescents.
- Details of previous treatment programmes including nutrition and diabetes self-management education, attitudes and health beliefs.
- Current treatment of diabetes including medications, meal plan and results of glucose monitoring and patients' use of data.
- Exercise history.
- Frequency, severity and cause of acute complications such as ketoacidosis and hypoglycaemia.
- Prior or current infections, particularly skin, foot, dental, and genitourinary infections.
- Symptoms and treatment of chronic complications of diabetes (eye; kidney; nerve; genitourinary (including sexual), bladder and gastrointestinal function (including symptoms of celiac disease in type 1 diabetic patients); heart; peripheral vascular; foot and cerebrovascular complications.
- Other medications that may affect blood glucose levels.
- Risk factors for atherosclerosis: smoking, hypertension, obesity, dyslipidaemia and family history.
- Family history of diabetes and other endocrine disorders.
- History and treatment of other conditions, including endocrine and eating disorders.
- Lifestyle, cultural, psychosocial, educational and economic factors that might influence the management of diabetes.
- Tobacco, alcohol and/or controlled substance use.
- Contraception, reproductive and sexual history including toxaemia.
- Assessment for mood disorder (Screening for Depression using a standard screening tool - see Appendix II) [6]

PHYSICAL EXAMINATION (ADA Standards of Medical Care in Diabetes, 2006) [6]

- Height and weight measurement (and comparison to norms in children and adolescents)
- Blood pressure determination, including orthostatic measurements when indicated
- Fundoscopic examination
- Examination of the oral cavity
- Thyroid examination
- Abdominal examination (e.g., for hepatomegaly)
- Evaluation of pulses by palpation and with auscultation
- Hand/finger examination
- Skin examination (for acanthosis nigricans and insulin injection sites)
- Cardiac examination
- Foot examination
- Neurological examination (especially sensory)[6]
- Signs of diseases that can cause secondary diabetes (e.g., haemochromatosis, pancreatic disease)

Additional Items in Children and adolescents

- Sexual maturation staging (during pubertal period)
- Blood pressure determination and comparison to age-related norms

LABORATORY EVALUATION[7]

- HbA1c (this is a measure of the patient's average blood sugar level over the preceding 2-3 months which assists in assessing treatment efficacy)

[5] **American Diabetes Association (ADA),** Table 5, Comprehensive Diabetes Evaluation, **Standards of Medical Care in Diabetes, 2006.**

[6] Amendment to **Standards of Medical Care in Diabetes, 2006, ADA**

- Fasting lipid profile including total cholesterol, HDL cholesterol, triglycerides

LDL cholesterol and liver function tests with further evaluation for fatty liver or hepatitis if abnormal

- Test for microalbuminuria in type 1 diabetic patients who have had diabetes for at least 5 years and in all patients with type 2 diabetes; screening pubertal children who have had type1 diabetes for less than 5 years .
- Serum creatinine and calculated GFR in adults (in children, if proteinuria is present)
- Thyroid-stimulating hormone (TSH) in all type 1 diabetic patients and in type 2, if clinically indicated
- Electrocardiogram in adults
- Urinalysis for ketones, protein, sediment

REFERRALS[7]

- All children (<18 years) should be referred to a hospital clinic or an endocrinologist who specializes in paediatric diabetes for specialist evaluation.
- All persons with type 2 DM should be referred to an endocrinologist
- All persons with chronic kidney disease – defined as a GFR of < 60ml/l, should be referred to an internist
- Eye examination
- Family planning for women of reproductive age
- Nutrition therapy
- Diabetes educator, if available
- Mental Health specialist, as indicated
- Foot specialist, as indicated
- Other specialties and services as appropriate

[7] Amended **Standards of Medical Care in Diabetes, 2006, ADA**

GUIDELINE: INITIAL EVALUATION		
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VI.3. FOLLOW-UP VISITS

- Symptom evaluation and review of patient concerns
- Blood pressure
- Weight/waist circumference
- Blood glucose
- Review of SBGM results
- Review of medication regime
- Foot inspection
- General physical examination

GUIDELINE: FOLLOW-UP VISITS		
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VI.4. FREQUENCY OF VISITS PER ANNUM

TABLE 5
FREQUENCY OF VISITS

Assessment of Control	Frequency of Visit
UNCONTROLLED DIABETES	MONTHLY
MODERATE LACK OF CONTROL	EVERY 2 MONTHS
MILD LACK OF CONTROL	EVERY 3 MONTHS
GOOD CONTROL	EVERY 3-6 MONTHS

Clinics and providers who care for persons with diabetes should encourage **regularly scheduled maintenance visits** but should also provide avenues for patients to visit their health care provider to obtain advice and care whenever problems or concerns arise.

TABLE 6
CLASSIFICATION OF BLOOD GLUCOSE CONTROL[2]

Classification of Blood Glucose Control	Blood Glucose Values mmol/l, (mg/dl)		
	HbA1c	Fasting Plasma glucose(FPG)	2 hr Plasma glucose (PG) or Post Prandial (PP)
UNCONTROLLED DIABETES	>10%	>13.3, (240)	>14, (250)
MODERATE LACK OF CONTROL	7.6 – 10%	8.9 – 13.3, (160-240)	10-14, (180-250)
MILD LACK OF CONTROL	6.5 – 7.5%	7.0 – 8.9, (126-160)	7.8 – 10, (140-180)
GOOD CONTROL	<6.5%	<7.0, (126)	<7.8, (140)

Refer to table 3 for frequency of tests

TABLE 7
MEDICAL HISTORY QUICK REFERENCE

TYPES OF ASSESMENT	INITIAL VISIT	ROUTINE VISIT	YEARLY VISIT
Medical History			
Symptoms	☑	☑	☑
Review Prior Lab HbA1c and SMBG	☑	☑	☑
Nutritional Assessment	☑	☑	☑
Previous Treatment Plan	☑	☑	☑
Physical Activity	☑	☑	☑
Acute Complications	☑	☑	☑
Prior Complications	☑	☑	☑
Chronic Complications	☑	☑	☑
Medication History	☑	☑	☑
Family History	☑		
Coronary Heart Disease	☑		☑
Tobacco & Alcohol use	☑		☑
Immunization Status	☑		☑
Screen for Depression	☑		☑

TABLE 8
PHYSICAL EXAMINATION QUICK REFERENCE

TYPES OF ASSESSMENT	INITIAL VISIT	ROUTINE VISIT	YEARLY VISIT
Physical Examination			
Height	☑		
Blood Pressure	☑	☑	☑
Weight/ Waist Circumference	☑	☑	☑
Fundoscopic Examination	☑		☑
Thyroid Palpation	☑		☑
Cardiac Examination	☑		☑
Pulses including carotids	☑		☑
Abdominal Examination	☑		☑
Foot Inspection	☑	☑	☑
Monofilament and Vibration Testing	☑		☑
Skin Examination	☑		☑
Oral Examination	☑		☑

TABLE 9
LABORATORY EVALUATION QUICK REFERENCE

TYPES OF ASSESMENT	INITIAL VISIT	ROUTINE VISIT	YEARLY VISIT
Laboratory Evaluation			
HbA1c*	☑		☑
Blood glucose testing (finger stick)	☑	☑	☑
Fasting plasma glucose (lab)	☑		☑
Fasting Lipid Profile	☑		☑
Serum Creatinine	☑		☑
Electrocardiogram	☑		☑
Microalbuminuria**	☑		☑
Urinalysis: glucose, ketones, protein, sediment	☑		

*__HbA1c__ more frequently (2-4 per year) if more than 8
**Microalbumin is an early indicator of kidney disease
Dipstick urine is a late indicator of kidney disease

GUIDELINE: FREQUENCY OF VISITS PER ANNUM		
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VI.5. HEALTH MANAGEMENT TEAM

An integrated team approach should be employed in patient management.

The Health Management Team should be comprised of:

- Medical Practitioners
- Nurses/Nurse Practitioner
- Community Health Aides
- Dietitian/Nutritionist
- Health Educator/Diabetes Educator
- Physiotherapist/Occupational Therapist
- Podiatrists, Chiropodists and Foot Care Assistants
- Mental Health Practitioner
- Social Worker
- Pharmacist.

GUIDELINE: HEALTH MANAGEMENT TEAM		
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VI.6 MANAGEMENT PLAN

A management plan that incorporates the following should be established for each patient:

1. Individualized Nutrition Therapy (NT) plan comprised of an appropriate meal plan developed by a registered Dietitian/Nutritionist, integrated with the medication regimen. Refer to Protocol for the Nutritional Management of Obesity , Diabetes and Hypertension in the Caribbean (Caribbean Food and Nutrition Institute, PAHO/WHO)

2. Regular planned physical activity programme most days of the week.

3. Cessation of smoking

4. Limit alcohol consumption to 2 or less drinks daily for men and 1 or less daily for women[1]

5. Development of coping skills/adjustment to lifestyle changes; the effects of the disease and its complications.

6. Pharmacotherapy

Various factors including the patient's age, health status, eating patterns, school/work schedule, level of physical activity and socio-cultural issues should be taken into account in the formulation of the plan.

Treatment goals must be set in collaboration with the patient, family and health care team, patient self-management (including problem-solving) skills being emphasized as efficient and effective implementation of the management plan requires that each aspect be understood and agreed on by the patient and the care providers. The goals and objectives of the treatment plan should be reasonable and achievable.

[1]drink= ½ oz of spirits (e.g. rum or whiskey), 12 oz of beer or 5 oz of wine

VI.7. THERAPEUTIC MANAGEMENT

TYPE 1 DIABETES MELLITUS

The onset of illness is usually abrupt with thirst, polyuria, weight loss and ketones in the urine. These patients need rapid referral to a Diabetes specialist for insulin treatment.

TYPE 2 DIABETES MELLITUS

- Lifestyle interventions
- Assess the degree of obesity:

a) Calculation of Body Mass Index (BMI) in Adults:
Weight in kg / (Height in meters)^2

TABLE 10
Body Mass Index

Body Mass Index (BMI)	Classification
<18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight (Pre-obese)
>30	Obese

See BMI Chart in Appendix 3

b). Waist Circumference in Adults

A high waist circumference is associated with an increased risk for type 2 diabetes, high cholesterol, high blood pressure and cardiovascular disease.

TABLE 11
Waist Circumference

Indicators of Risk (Waist Circumference)	
Men	>94cm (37in)
Women	>80cm (31.5in)

c) Waist Circumference in Children

Use growth charts

IN OBESE/OVERWEIGHT, NON-PREGNANT SUBJECTS:

A weight-reducing diet and *regular, organized physical activity* are an integral first step in the management of type 2 diabetes in the obese patient. However, since data from the UKPDS suggests that the early use of Metformin retards the progression of ß-cell loss in type 2 diabetes, many experts advocate early addition of Metformin.

PHARMACOTHERAPY (STEP-WISE APPROACH)

Depending on the glucose level, the following is to be applied:

1. <19.0 **mmol**, start with insulin sensitizer (Metformin) and or insulin secretagogue (sulphonylreas or glinides) and/or acarbose if the target is not achieved. **See figure 1.**
2. Increase to the maximum and add other classes. **See figure 1.**
3. >19.0 **mmol,** start insulin therapy and titrate to achieve glycaemic goals.

TABLE 12
Step-Wise Approach to Pharmacotherapy

Initial Blood Glucose (mmol)	Step-Wise Approach in Metabolically Stable Patients
13.3 – 19.0	**Orally hydrate patient and consider a bolus dose of regular insulin, then:** ***Start: Metformin or Thiazolidinedione (TZD)** ***Add: Sulphonylureas,** **Glinides or** **Acarbose**
>19.0	**Institute oral or IV hydration and administer a bolus dose of regular insulin, then:** **Titrate insulin to achieve glycaemic goals** ***Add: Metformin,** **Thiazolidinedione (TZD)** **Sulphonylureas or** **Glinides**

*Increase to the maximum and add other classes if target is not achieved
See figure 1
See page 38/39 for other indications for insulin therapy

TABLE 13.1
DRUGS USED IN THE MANAGEMENT OF DIABETES

DRUG	ACTION / INDICATIONS	CAUTION/ CONTRAINDICATIONS	NOTES
BIGUANIDES			
METFORMIN	• decreases glucose production in liver • increases insulin sensitivity	• renal impairment • CHF requiring drug Tx • hepatic impairment • respiratory failure • recent MI • peripheral vascular disease • diabetic ketoacidosis • metabolic acidosis • lactic acidosis • iodonated contrast • alcohol abuse • shock / dehydration • surgery • infection • breast feeding • pregnancy	• assists with weight loss • improves lipid profile • may induce ovulation in PCOS
ALPHA GLUCOSIDASE INHIBITORS			
ACARBOSE	• delays carbohydrate absorption from gut	• diabetic ketoacidosis • cirrhosis • inflammatory bowel disease • malabsorption syn-dromes • renal impairment	• diarrhoea • flatulence • abdominal pain • LFT elevation • jaundice • postprandial hyperglycaemia
1st & 2nd GENERATION SULPHONYLUREAS			
CHLORPROPRAMIDE GLIBENCLAMIDE GLYBURIDE	• Increases insulin secretion	• diabetic ketoacidosis • hepatic impairment • renal impairment • pregnancy • breast feeding	• risk of hypoglycaemia >70yrs. • discontinue in elderly>70yrs. • discontinue in pregnancy • weight gain
3rd GENERATION SULPHONYLUREAS			
GLICLAZIDE GLIMIPERIDE GLIPIZIDE	• Increases insulin secretion	• As for sulphonylureas	• use in elderly • less risk of hypoglycaemia

TABLE 13.2
DRUGS USED IN THE MANAGEMENT OF DIABETES

DRUG	ACTION/ INDICATIONS	CAUTIONS/ CONTRAINDICATIONS	NOTES
THIAZOLIDINEDIONES			
ROSIGLITAZONE (Avandia)	Insulin sensitizer	• CCF • pregnancy • breast feeding • liver disease	• monitor liver function • weight gain • fluid retention
PIOGLITAZONE (Actos)	Insulin sensitizer		
GLINIDES			
NATEGLINIDE (Starlix)	Increases insulin secretion	• hepatic impairment • as for sulphonylureas	• hypoglycaemia less common • discontinue in pregnancy
REPAGLINIDE (Novonorm)	Increases insulin secretion	• renal impairment • as for sulphonylureas	
INSULINS			
INSULINS	• pregnancy • breast feeding • coma • Infection • Infarction • trauma • surgery • intercurrent illness	• hypokalaemia • hepatic impairment • renal impairment	• risk of hypoglycaemia • risk of hypokalaemia
LISPRO (Humalog) ASPART (Novorapid)	• <0.5h onset • 0.5 – 1.5h peak • <6h dur.		• <15 min before meal • SC b.i.d, q.i.d
REGULAR	• 0.5 - 1h onset • 2 - 4h peak • 6 – 12h dur.		• 30-60 min before meal • SC b.i.d, q.i.d
70/30 or other mixtures: 70 NPH/30 Aspart or Lispro	• 0.5 onset • 4 – 8h dur.		• 30-60 min before meal • SC o.d, b.i.d
GLARGINE (LANTUS)	• 1h onset • no true peak • 24h dur.		• SC o.d
NPH	• 1 - 2h onset • 4 - 14h peak • 10 - >24h dur.		• SC o.d, b.i.d
LENTE	• 1 - 3h onset • 6 - 16h peak • 12 - >24h dur.		SC o.d, b.i.d
ULTRA LENTE	• 4 - 8h onset • 10- 30h peak • 18- 36h dur.		SC o.d, b.i.d

INSULIN THERAPY IN PATIENTS PREVIOUSLY CONTROLLED ON ORAL AGENTS

OR NUTRITION THERAPY

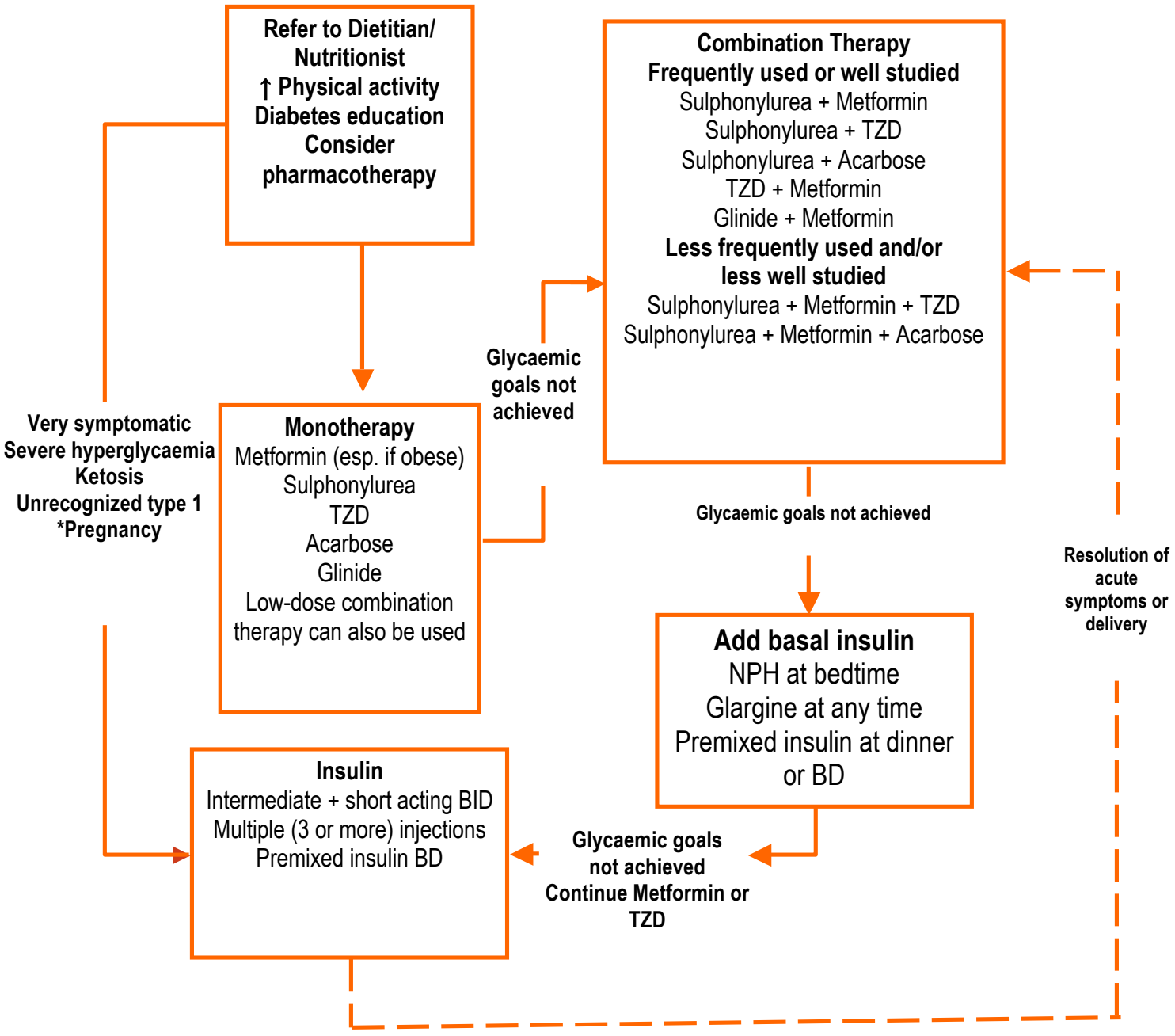
Patients with type 2 diabetes who have been controlled on oral agents should be immediately switched to insulin in the following circumstances:

- Pregnancy
- Significant hyperglycaemia as a result of Infections, the use of corticosteroids or surgery
- Marked weight loss, severe symptoms and/or ketonuria especially with the following:
  - Random Glucose > 350mg/dl (19.4 mmol/l)
  - Glucose > 300mg/dl fasting (16.7mmol/l)
- Life-threatening acute metabolic complications of diabetes such as hyperosmolality (300-400mOsm/L), hyperglycaemia (Serum glucose>400mg/dl or 22.2mmol/l), lactic acidosis, metabolic acidosis (serum pH<7.3) and small to moderate amounts of ketones.

In these circumstances, insulin therapy may be temporary. Many patients may be switched back to oral agents or a combination of insulin and an oral agent after the acute event has resolved.

FIGURE 1

Management of Type 2 Diabetes



Modified from American Diabetes Association. Diabetes Care. 1995;18:1510-1518.

*Pregnancy in woman with preexisting diabetes.

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VII. PREVENTION & TREATMENT OF COMPLICATIONS

The following major long-term complications of diabetes mellitus are preventable/ modifiable by appropriate medical care:

1) Microvascular including diabetic retinopathy, nephropathy and neuropathy
2) Macrovascular including coronary artery disease (CAD), peripheral artery disease (PAD) and cerebrovascular disease (CVD)
3) Susceptibility of infection and increased risk for infection with pneumococcal and other capsulated bacteria[8]
4) Increased pregnancy loss and increased risk of major malformations in the infants of women with diabetes[9]

The incidence of these complications is significantly decreased by regular clinical follow-up for intercurrent symptoms along with:

- Good glycaemic control (HbA1c $\leq$ 7.0 mmol/l)
- Good blood pressure control (BP < 130/80mm/Hg)
- Good lipid control
  - LDL <2.6 mmol/l [100 mg/dl],
  - HDL>1.1 mmol/l [40 mg/dl])
- One-time vaccination with pneumococcal vaccination and
- Yearly influenza vaccination.

[8] Pneumococcal pneumonia, influenza:
Although there are limited studies regarding the mortality and morbidity of pneumococcal pneumonia and influenza in people with diabetes, adequate data exists to show that there is an association between these conditions and increased hospitalization for influenza and its complications. In addition, people with diabetes are at increased risk of contracting the bacteraemic form of pneumococcal pneumonia and have a high risk of nosocomial bacteraemia with a mortality rate as high as 50% due to these agents.

[9] Major congenital malformations in infants of mothers with type 1 and type 2 diabetes: The principal cause of morbidity and mortality in infants of mothers with type 1 and type 2 diabetes world-wide is major congenital malformations. Studies have shown that the risk of malformations increases continuously with the rise in maternal glycaemia during the first 6–8 weeks of gestation as indexed in first trimester HbA1c concentrations. Malformation rates greater than the 1–2% background rate evident in non-diabetic pregnancies are apparently limited to pregnancies in which first trimester HbA1c concentrations are >1% above the normal range.

VII.1.1. MICROVASCULAR DISEASES

VII. 1. 1.1 KIDNEY

Diabetes is the single leading cause of end-stage renal disease (ESRD) worldwide and the second major cause of ESRD in Jamaica. Hypertension is the principal cause of ESRD in Jamaica. Diabetic nephropathy generally develops over a prolonged period beginning with its earliest marker, persistent microalbuminuria (30–299µg/mg) and progressing over 10 to 15 years through macroalbuminuria (≥300µg/mg) and chronic kidney disease (CKD) to ESRD.

Risk factors for developing CKD in the diabetic population include:

- Duration of type 1 diabetes mellitus (CKD is rare before 10 years with a 25-30 year peak incidence). Patients with type 2 diabetes mellitus may have the disease for many years before diagnosis. The peak incidence is between 15 and 20 years of diagnosis.
- Poor glycaemic control
- Hypertension
- Family history of renal disease or hypertension
- Ethnicity: Blacks, Asians, Native Americans and Pacific Islanders have a higher incidence of CKD than Whites
- Previous acute renal failure, urinary obstruction, stone or urinary infections.

Table 14
Diagnosis and Definitions of Abnormalities in Albumin Excretion

Category	Spot Collection (µg/mg creatinine)
Normal	**<30 (negative dipstick)**
Microalbuminuria	**30–299 (negative dipstick)**
Clinical albuminuria	**≥300 (positive dipstick)**

Modified from: Standards of Medical Care in Diabetes - 2007. American Diabetes Association... Diabetes Care, Volume 30, Supplement 1, January 2007

Due to variability in urinary albumin excretion, two of three specimens collected within a 3 to 6-month period should be abnormal before considering a patient to have crossed one of these diagnostic thresholds. Exercise within 24 hours, infection, fever, congestive heart failure, semen contamination of the urine, marked hyperglycaemia and hypertension may temporarily elevate urinary albumin excretion over baseline values.

Albuminuria – microalbuminuria or macroalbuminuria – is generally present in approximately 50% of persons who have had type 2 diabetes for more than 10 years. Microalbuminuria is reversible. Macroalbuminuria is not. Microalbuminuria may be significantly decreased by a combination of medications plus careful attention to blood pressure control, aiming for BP<130/80 mm/Hg. Angiotensin converting enzyme inhibitors (ACE Inhibitors) and angiotensin 11 receptor blockers (ARBs) have significant reno-protective properties in patients with microalbuminuria and/or overt nephropathy and have been shown to slow the deterioration in the glomerular filtration rate (GFR) and the progression from microalbuminuria to macroalbuminuria in these patients. They have also been shown to decrease all cause mortality.

Calculation of GFR

The GFR can be calculated using the:Crockcroft-Gault Equation or the Modification of Diet in Renal Disease (MDSRD) Study Equation:

A GFR Calculator can be used online or downloaded from **www.kdoqi.org**

Table 15
Classification of Chronic Kidney Disease

Stages of CKD	Renal Symptoms	Action plan	GFR (ml/min) Normal 100-120
Stage 1 Kidney Damage with Normal or ↑ Glomerular Filtration	None	Monitor Creatinine, Microalbuminuria & reduce BP to 130/70-80 mm/Hg Add ACE Inhibitor if Microalbuminuria present	90-155
Stage 2 Kidney Damage with Mild ↓ Kidney Function	None	As above plus Add ACE Inhibitor /ARB Refer to an Internist	60-89
Stage 3 Kidney Damage with Moderate ↓ Kidney Function	None	Consult with Nephrologist re Dialysis options	30-59
Stage 4 Kidney Damage with Severe ↓ Kidney Function	Hyperkalaemia, Anaemia and other early symptoms	Refer to a Nephrologist for Dialysis Access and Kidney Replacement Planning	15-29
Stage 5 Kidney Failure	Hyperkalaemia, Fluid retention and Severe Uremia symptoms Dialysis indicated	Care by Nephrology Kidney Replacement or Dialysis Necessary	<15

Action Plan

1. Use Angiotensin Converting Enzyme (ACE) Inhibitors or Angiotensin II Receptor Blockers(ARBs) to prevent/delay progression of nephropathy[10]
2. Aim for tight glycaemic control. (See Table 3)
3. Lower blood pressure to <130/80 mm/Hg
4. Lower lipids to recommended targets. (See Table 3)
5. Advise patient to stop smoking.
6. Patients with a Glomerular Filtration Rate (GFR) of <60 ml / min should be referred to an internist for routine follow up.
7. Patients with a GFR of <30 ml / min should be referred to a Nephrologist.
8. Patients with severe or persistent hyperkalaemia which does not resolve with medication adjustment should be referred to an internist or nephrologist.

[10] Use with caution in women of childbearing age as ACE Inhibitors and ARBs are associated with teratogenic effects and are contraindicated in pregnancy. The usage of a non-dihydropyridine calcium channel agent such as diltiazem should be considered among patients in whom ACE inhibitors or ARBs are not well tolerated or are contraindicated.

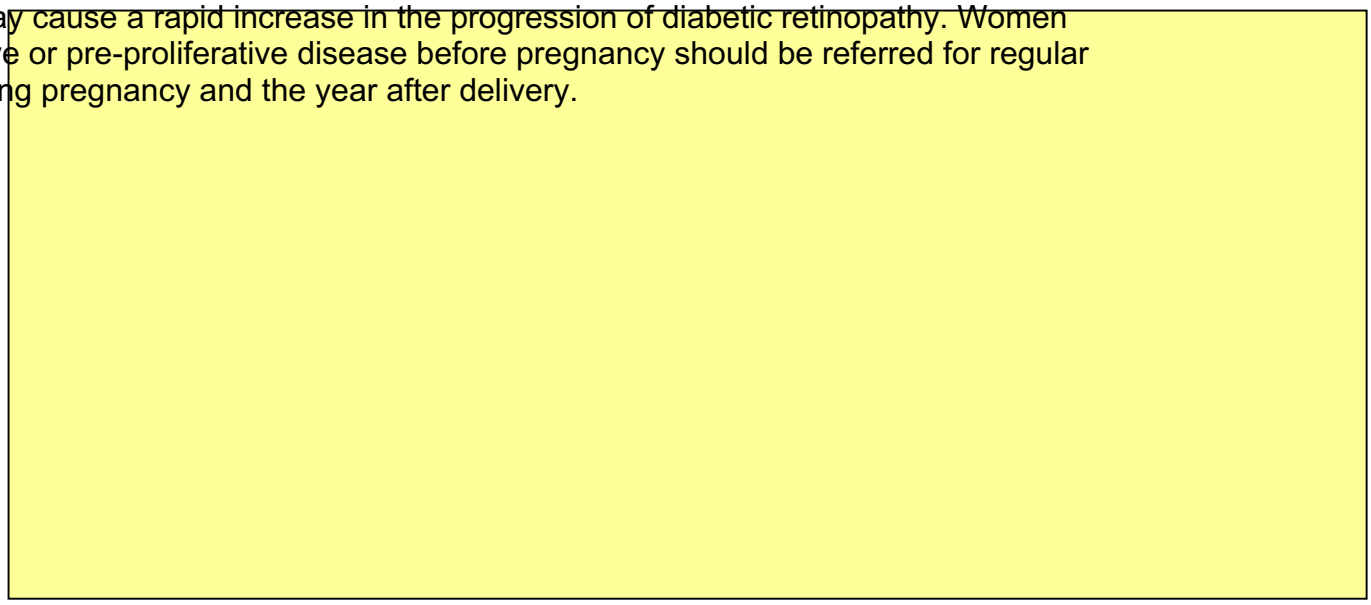
ction Plan

1. Refer all patients to an Ophthalmologist for regular screening and preventative care.
2. Aim for tight glycaemic control. (See Table 3)
3. Lower blood pressure to <130/80 mm/Hg
4. Lower lipids to recommended targets. (See Table 3)
5. Advise patient to stop smoking.
6. Look for and treat associated diabetic nephropathy aggressively
7. Screen pregnant women more frequently.*

VII. 1.1.2 EYE

Diabetic Retinopathy is a microvascular complication of type 2 diabetes. It is a frequent cause of new cases of blindness among adults aged 20–74 years. The prevalence of retinopathy is highly dependent on the duration of diabetes. Cataracts and glaucoma are more common in people with diabetes.

Pregnancy may cause a rapid increase in the progression of diabetic retinopathy. Women ith proliferative or pre-proliferative disease before pregnancy should be referred for regular llow - up during pregnancy and the year after delivery.



VII. 1. 1.3 LIMBS

The limbs are affected by both microvascular and macrovascular disease.

Diabetic Neuropathy
There are four main types of diabetic neuropathy:

1. Distal Symmetric Sensorimotor Polyneuropathy, the most common type of neuropathy
2. Autonomic Neuropathy
3. Focal Neuropathy (mono neuropathy multiplex)
4. Proximal Motor Neuropathy (diabetic amyotrophy)

DISTAL SYMMETRIC SENSORIMOTOR POLYNEUROPATHY

SYMPTOMS

- Numbness
- Shocking, burning and stabbing pain
- Loss of dexterity and balance
- Foot slapping
- Impaired co-ordination and toe scuffing

SIGNS

- Wasting of the small muscles of the foot
- Clawing of the toes
- Dry, cracked skin (anhidrosis)
- Reduced power distally more than proximally
- Loss of or reduced deep tendon reflexes- ankle then knees
- Unstable gait
- Reduced vibration sensation (128 Hz tuning fork at the base of the great toe)
- Reduced pain, light touch and temperature sensation

Do not be reassured by the presence of warm feet or “good” pulses as these are both frequent in the setting of significant diabetic neuropathy.

AUTONOMIC NEUROPATHY
SYMPTOMS

- Postural hypotension
- Decreased cardiovascular response to Valsalva’s maneuver
- Gastroparesis

- Alternating bouts of diarrhea (especially nocturnal) and constipation
- Inability to empty the bladder
- Impotence

SIGNS

- A fall in systolic BP on standing of >20mmHg and diastolic of > 10mmHG
- Persistent tachycardia
- A palpable bladder

Focal Neuropathy (mono neuropathy multiplex) and a Proximal Motor Neuropathy (diabetic amyotrophy)

SYMPTOMS

- Femoral nerve (diabetic amyotrophy)
  - Acute pain and weakness of the thigh muscles
- Cranial nerves
  - Sudden onset of diplopia due to ophthalmoplegia
- Spontaneous resolution occurs in 6-12 weeks
- In severe cases, anorexia and weight loss may occur (malignant cachexia)

THE DIABETIC FOOT

The diabetic foot is a clinical syndrome that results from the combination of microvascular and macrovascular complications with or without infection. The combination of an insensate foot due to neuropathy and poor blood supply due to large and small vessel vascular disease which results in this complex condition, frequently ends in amputation.
The Caribbean has one of the highest rates of non-traumatic amputations in the world. The majority of amputations in patients with diabetes are preventable.

Specific causative mechanisms of the diabetic foot are:

- Neuropathy with decreased sensation
- Ischaemia due to peripheral vascular disease
- Infection
- Trauma—may be related to insensate feet
- Increased pressure points due to orthopaedic problems/deformities

Lesions may be*:*

- Non ulcerated - non-infective (skin changes)

ction Plan

1. Visual inspection of the feet of each patient at each visit.

2. A comprehensive foot examination annually on each patient to identify risk factors predictive of ulcers and amputations and ensure that any problems identified are thoroughly treated. A visual foot examination should include:
   i. Visual examination.
   ii. Palpation of distal pulses (dorsalis pedis, tibialis posterior)
   iii. Semmes-Weinstein monofilament for light touch testing
   iv. Vibration test with 128 Hz tuning fork at base of great toe.
3. Problems involving the feet, especially ulcers and wound care may require the services of a Podiatrist, Orthopaedic Surgeon or Physiotherapist experienced in the management of persons with diabetes.

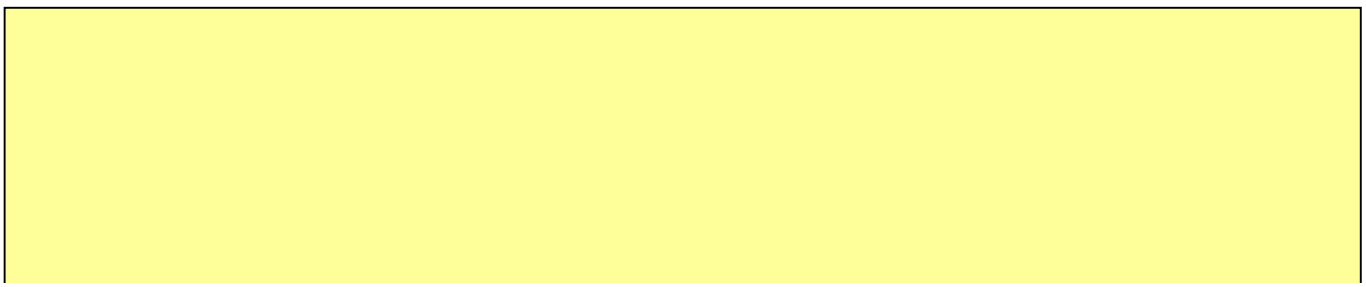
- Ulcerated
  - superficial (acute or chronic)
  - deep (perforating, non-perforating)
  - puncture wounds
- Due to/of Osteomyelitis

rovide patient education and reinforce at each visit. All patients, particularly those with sensate feet or with prior lower extremity complications, should be educated about the eed for prevention of foot problems including the importance of self-care and monitoring.
**See Patient education section for patient handouts for foot care.

Patients should be advised to:

1. Inspect feet daily to detect nail problems, minor injuries, infections, redness, bleeding.
2. Keep feet clean and dry (especially between toes).
3. Exercise care in cutting toe nails and not use a knife or razor blade.
4. Use Vaseline (or other suitable lotion) on skin to reduce cracks and not to use it between toes as this increases the risk of infection.
5. Protect feet from injury.
6. Check shoes every day to see whether objects may have fallen inside or there exists excessive wear or areas which may cause irritation.
7. Wear proper fitting shoes whenever walking on the ground (avoid open shoes, slippers or sandals which do not offer adequate protection).
8. Do not tamper with corns or callouses yourself.
9. Obtain prompt treatment (professional management of cuts, bruises, infections).
10. Avoid use of elastic for garters on limbs.
11. Avoid soaking feet unless that is advised by a health care provider.
12. Be cautious regarding usage of hot water.
13. Elevate swollen feet whenever possible.

Patients should be informed that impaired sensation in the feet interferes with appreciation of pain, heat and other sensations.



1. Visual inspection of the feet of each patient at each visit.
2. A comprehensive foot examination annually on each patient to identify risk factors predictive of ulcers and amputations and ensure that any problems identified are thoroughly treated. Annual foot examination should include:
    i. Visual examination.
    ii. Palpation of distal pulses (dorsalis pedis, tibialis posterior)
    iii. Semmes-Weinstein monofilament for light touch testing
    iv. Vibration test with 128 Hz tuning fork at base of great toe.
3. Problems involving the feet, especially ulcers and wound care may require the services of a Podiatrist, Orthopaedic Surgeon or Physiotherapist experienced in the management of persons with diabetes.
4. Provide patient education and reinforce at each visit. All patients, particularly thoswith insensate feet of or with prior lower-extremity complications, should be educated about the need for prevention of foot problems including the importance of self-care and monitoring. ****See Patient education section for patient handouts for foot care

REFERRALS

1. Patients with deep lesions or spreading soft-tissue infections should be referred for hospital admission and surgical intervention.
2. Patients with significant claudication or in need of additional vascular assessment should be referred for a surgical consult.
3. High-risk patients (insensate foot; previous diabetic foot) should be referred to foot care specialists or for a surgical consult for ongoing preventive care and follow-up.

GUIDELINE: MICROVASCULAR DISEASES		
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VII.1.2. MACROVASCULAR DISEASE

Patients with type 2 diabetes have an increased prevalence of lipid abnormalities which contribute significantly to macrovascular diseases: Coronary Artery Disease (CAD or

ction Plan

1. Aim for tight glycaemic control. (See Table 3).
2. Lower blood pressure to <130/80 mm/Hg
3. Lower lipids to recommended targets. (See Table 3)
4. Advise patient to stop smoking.
5. Use aspirin therapy >40 years of age or with additional CVD (cardiovascular disease) risk factors.

(See Section VII.2.1)

Arteriosclerosis), Peripheral Arterial Disease (PAD) and Cerebrovascular Disease (stroke).

VII.2.1 HEART

Coronary artery disease is silent in 25% or more patients with diabetes . It is the major cause of mortality in type 2 diabetes mellitus and may also present atypically. ECG rhythm strip is recommended once per year. Stress testing may be done in selected persons based on history and symptomatology.

VII. 1.2.2. BRAIN

Increased risk of cerebrovascular accidents is seen in diabetes mellitus. Smoking cessation and the treatment of hypertension, dyslipidaemia, hyperglycaemia and microalbuminuria can reduce death rates by 40-65%.

VII. 1.2.3 LIMBS

The prevalence of peripheral arterial disease (PAD) among patients with diabetes is estimated to be 20% in those greater than age 40 and as high as 30% among those with diabetes who are over the age of 50. Diabetes and smoking are the strongest risk factors for PAD. Other risk factors include advanced age, hypertension, and hyperlipidaemia. The most frequent symptom of PAD is intermittent claudication or muscle pain that occurs with activity and is relieved during rest.

Initial screening for PAD should include a directed history seeking evidence of claudication and an assessment of the pedal pulses. Consider obtaining an ankle-brachial index (ABI) in symptomatic patients who appear to have normal pulses. Refer patients with significant or a positive ABI for further vascular assessment and consider exercise, medications and surgical options.

GUIDELINE: MACROVASCULAR DISEASE		
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VII.2 ACUTE METABOLIC STATES

GOAL & OUTCOME

VII. 2.1. GLYCAEMIC CONTROL DURING INTERCURRENT ILLNESS

Glycaemic control is often disturbed by intercurrent illness. The patient should be encouraged to increase his/her monitoring of blood glucose and urine ketones during all illnesses even minor ones. Insulin may be temporarily required by patients usually treated with oral glucose-lowering agents or Nutrition Therapy. Patients on insulin should be educated about the **increased insulin needs during an illness** and strongly cautioned NOT to stop their insulin during a period of illness.

VII. 2.2. DIABETIC KETOACIDOSIS (DKA) AND HYPEROSMOLAR HYPERGLYCAEMIC STATE (HHS)

Diabetic ketoacidosis (DKA) is a vomiting illness with ketosis. It is a life-threatening condition necessitating immediate medical care to prevent complications and mortality. The possibility of DKA should always be considered in a person with diabetes who has any illness that includes vomiting. Even in the absence of DKA an infection in a person with diabetes is more likely to require hospitalization.

VII.2.2.1 HYPERGLYCAEMIC CRISES

The most common precipitating factor in the development of DKA or hyperosmolar hyperglycaemic state (HHS) is infection. Other precipitating factors include cerebrovascular accident, alcohol abuse, pancreatitis, myocardial infarction and trauma. Drugs that affect carbohydrate metabolism such as corticosteroids, thiazides, and sympathomimetic agents (e.g.,Terbutaline and Dobutamine), may precipitate the development of HHS or DKA.

Clinical History: For both DKA and HHS, the classic clinical picture includes a history of polyuria, polydipsia, polyphagia, weight loss, vomiting, dehydration, weakness, clouding of sensoria and finally coma. In DKA, abdominal pain is often also present.

Physical findings: These may include poor skin turgor, Kussmaul respirations (in DKA), tachycardia, hypotension, alteration in mental status, shock and ultimately, coma (more frequent in HHS). Up to 25% of DKA patients have emesis which may be coffee-ground in appearance and guaiac positive. Endoscopy has related this finding to the presence of haemorrhagic gastritis. Mental status can vary from full alertness to profound lethargy or coma, with the latter more frequent in HHS. Although infection is a common precipitating factor for both DKA and HHS, patients can be normothermic or even hypothermic primarily because of peripheral vasodilation. These states require referral to hospital for management.

VII.2.2.1.1 DIABETIC KETOACIDOSIS (DKA)

The metabolic alterations typical of ketoacidosis usually evolve within a short time frame (typically <24 h). However, the symptoms of an infection or of poorly controlled diabetes would generally have been present for several days. Occasionally, however, the entire symptomatic presentation may evolve or develop more acutely and the patient may present with DKA with no prior clues or symptoms.

VII.2.2.1.2 HYPEROSMOLAR HYPERGLYCAEMIC STATE

Unlike DKA, the process of HHS usually evolves over several days to weeks. The patient is generally an elderly type 2 person with diabetes and there is generally a significant precipitating illness such as a serious infection or a myocardial infarction.

VII.2.2.2 Sick Day Management

Appropriate sick-day management can prevent many cases of DKA and HHS. Sick-day management should be reviewed periodically with all patients. It should include specific information on:

1. when to contact the health care provider.
2. blood glucose goals.
3. use of supplemental short-acting insulin during illness and
4. methods to suppress fever and treat infection.

In addition, patients should be advised that they should never discontinue insulin and that they should seek professional advice early in the course of illness.

Successful sick-day management depends on involvement by the patient and/or a family member. The patient/family member must be able to accurately measure and record blood glucose, urine or blood ketone determination when blood glucose is >16.6 mmol/l (300 mg/dl), insulin administered, temperature, respiratory and pulse rate and body weight and communicate this information to a health care professional. Adequate supervision and help from staff or family may prevent many of the admissions for HHS due to dehydration among elderly individuals who are unable to recognize or treat this evolving condition.

VII.2.3 HYPOGLYCAEMIA

Hypoglycaemia is the term used to describe a blood glucose level of < 4 mmol/l (<70 mg/dl)

VII.2.3.1 GOAL & OUTCOME - PREVENTION OF HYPOGLYCAEMIA

In selecting glycaemic goals, the well-documented benefits of achieving a lower HbA1c must be weighed against the unique risks of hypoglycaemia. Less stringent treatment goals may be appropriate for patients with a history of severe hypoglycaemia, patients with limited life expectancies, older adults and individuals with comorbid conditions. *Hypoglycaemia is most frequently due to skipping of meals and/or poor timing of medication and meals. However,* it may be precipitated by other factors such as altered nutritional state, heart failure, renal or liver disease, malignancy, infection or sepsis.

VII.2.4 SELF MANAGEMENT OF BLOOD GLUCOSE

Self management of blood glucose (SMBG) allows patients to evaluate their individual response to their medication. Results of SMBG can be useful in preventing hypoglycaemia and adjusting medications. The frequency and timing of SMBG should be dictated by the particular needs and goals of the patient

All patients with diabetes (especially those on oral sulphonylureas or insulin therapy) should be encouraged to:

- avoid skipping meals
- always carry 15 g of Carbohydrates – the number of pieces of hard candy or glucose gel or tablets noted on the package to add up to 15 grams of carbohydrate
- vary the times at which they check their blood sugars, recording that information in a SMBG diary which includes notation about what they eat
- occasionally check sugars in the very early morning hours to assess for nocturnal hypoglycaemia., if they are Insulin - treated patients

Patients who have frequent symptomatic hypoglycaemia may need to have their target HbA1c adjusted upwards.

VII.3 NUTRITION THERAPY (NT)

Nutrition therapy entails the formulation of an individualized plan for the management of diabetes with a diet comprised of appropriate food, nutrient/caloric and fluid intake. The goals of nutrition therapy are:

1. *achievement and maintenance of* near normal blood glucose levels
2. *achievement and maintenance of* a healthy body weight
3. *achievement and maintenance of* a favorable blood lipid profile
4. minimizing complications such as hypoglycaemia
5. providing appropriate nutrition/ meeting metabolic and growth needs.

In the non-pregnant adult, this is facilitated by a diet that includes the following distribution of calories*.

- Carbohydrates 50-60%
- Added sugars 10%
- Protein 15-20%
- Total fat< 30%
- Saturated fat < 10%

Refer to Dietitian/Nutritionist

*Source : Caribbean Food and Nutrition Institute, PAHO/WHO. Protocol for the Nutritional Management of Obesity, Diabetes and Hypertension in the Caribbean, . 2004

VII.4 ASPIRIN PROPHYLAXIS

The role of aspirin is to block thromboxane synthesis by acetylating platelet cyclo-oxygenase.

A significant number of clinical trials with aspirin have demonstrated a 30% decline in myocardial infarction and a 20% decline in stroke in young, middle-aged and old patients of both sexes, including patients with hypertension and with and without a history of any other CVD.

Aspirin has proven to be very effective in reducing the risk of CAD (Arteriosclerosis) in Type 2 Diabetics and has been used as primary and secondary therapy to prevent cardiovascular events in diabetic and non-diabetic individuals.

Dosages of 75 to 325 mg/day are utilised in most clinical trials. No evidence exists to support a specific age at which to start using aspirin nor any specific dose, but side effects may be reduced by the usage of the lowest possible dosage and enteric-coated preparations. There is also no justification for the use of aspirin for primary prevention for persons under 30 years as the risk of CVD is low.

RECOMMENDATION

Aspirin therapy (81–325 mg/day) for the following:

- Primary prevention in patients ≥40 years of age and older with diabetes and one or more other cardiovascular risk factor (including hypertension with established target organ damage [TOD]).
- Patients 30-40 years old with other CVD risk factors
- All adult patients (21 years and over) with diabetes and macrovascular disease as aspirin should not be utilised in patients <21 years of age due to the increased risk of Reye's syndrome.

Aspirin therapy (81mg/day) as outlined below:

- Primary prevention in patients with hypertension >50 years of age with a 10-year CVD risk ≥20% and in whom BP is controlled to the audit standard, unless contraindicated.
- Secondary prevention for all patients with ischaemic CVD

Low-dose aspirin therapy should only be used when BP is controlled as there is an increase in the risk of haemorrhagic stroke in patients with uncontrolled hypertension.

GUIDELINE: ASPIRIN PROPHYLAXIS		
Date Revised: 11/07	Distribution to all Health Facilities	Index: VII.4
Approved By: Health Promotion and Protection Division		

VII.5 LIPID MANAGEMENT

GOAL & OUTCOME
LDL<2.6 (100), HDL > 1.1 (40) men, > 1.3(50) women, triglycerides < 1.7 (150)

Lipid management is also critical and should be aimed at the levels stipulated in table 3 above in order to bring about a significant reduction in macrovascular diseases, CVDs and mortality in patients with type 2 diabetes, particularly those who have experienced prior cardiovascular events.

INTERVENTIONS

Nutrition therapy (NT) & lifestyle changes aimed at attaining ideal body weight and improving glycaemic control should be instituted in all patients. Pharmacotherapy should be instituted as needed when levels are very high or when goals are not met by NT alone.

NT should be suited to the patient's age, type of diabetes, lipid levels, pharmacological therapy and other medical conditions and should be geared towards the reduction of saturated fat, cholesterol and trans-unsaturated fat intake. More aggressive nutrition therapy combined with pharmacotherapy is required in patients with low-density lipoprotein (LDL) cholesterol between 2.60 mmol/l (100 mg/dl) and 3.30 mmol/l (129 mg/dl). Glycaemic control leads to the attainment of optimal glucose levels which cause a significant reduction mainly in triglycerides and other plasma lipid levels.

The LDL is considered the primary target and statins are considered the first line of pharmacological treatment in patients with diabetes with lipid abnormalities.
Pharmacotherapy should involve the following:

- Statins as first-line drugs to attain the initial priority of lowering LDL cholesterol to <100 mg/dl (2.6 mmol/l) in adults and children/adolescents in general; ≤ 110 mg/dl (2.80 mmol/l) in children with diabetes with cardiovascular risk factors as stipulated in recommendations of the National Cholesterol Education Program's Report of the Expert Panel on Blood Cholesterol Levels in Children and Adolescents.

- Fibrates to increase HDL cholesterol to >40 mg/dl (1.15 mmol/l), thus contributing to the reduction of CVD rates and carotid intimal medial progression.

- Niacin, most effective for the increase of high-density lipoprotein (HDL) cholesterol to >40 mg/dl (1.15 mmol/l). However, doses must be modest (750-2,000 mg/day) in order for moderate changes in plasma glucose to be effected as high doses lead to a significant increase in blood glucose and hyperglycaemia.

- Niacin, in moderate doses (750-2,000 mg/day) also causes adjustment of LDL and triglycerides to the optimum levels required.

- Combination therapy of a statin and a fibrate or statin and niacin, may be efficacious

for patients requiring management of all three lipid fractions, but this combination is associated with an increased risk of adverse effects due to abnormal myositis, rhabdomyolysis or liver dysfunction.

GUIDELINE: LIPID MANAGEMENT		
Date Revised: 11/07	Distribution to all Health Facilities	Index: VII.5
Approved By: Health Promotion and Protection Division		

VII.6 IMMUNIZATION

GOAL & OUTCOME
Prevention of pneumococcal pneumonia and bacteraemia

Vaccines reduce the risk of serious complications from tetanus, pneumococcal pneumonia, influenza and other diseases in patients with diabetes to a significant extent.

It has been recommended by the Centers for Disease Control that the influenza vaccine be administered to all patients with diabetes, 6 months or older and pneumococcal vaccine to all adults with diabetes.

Tetanus Toxoid should also be administered to reduce the risk of tetanus in instances of chronic leg ulcers.

GUIDELINE: IMMUNIZATION		
Date Revised: 11/07	Distribution to all Health Facilities	Index: VII.6
Approved By: Health Promotion and Protection Division		

VII.7 PRECONCEPTION CARE

GOAL & OUTCOME

Prevention of major congenital malformations

All women of child-bearing age who have diabetes should receive patient/self-management education on the increased risk of congenital malformations. Patients should be specifically instructed that this risk may be decreased by keeping blood sugars near normal in the pre-conception period.

The goals of care of pregnant women with diabetes and those contemplating pregnancy should be to:

1) Teach the patient self-management of her diabetes and involvement in her management
2) Attain the lowest possible HbA1c test results while avoiding hypoglycaemia during the pre-conception period and during pregnancy
3) Encourage delay in conception until stable and acceptable glycaemic control is achieved
4) Identify, evaluate and manage complications such as retinopathy, nephropathy, neuropathy, hypertension and CVDs
5) Plan pregnancy -- manage diabetes and convert from oral hypoglycaemic agents to insulin prior to pregnancy
6) Discontinue the use of ACE Inhibitors and ARBs prior to and during pregnancy.

This should be undertaken by a multi-disciplinary team preferably comprised of an internist or a family physician, an obstetrician, a health educator, a dietitian, a social worker and other specialists as deemed necessary.

VII.8 CHILDREN AND ADOLESCENTS

A significant percentage of newly diagnosed cases of type 1 diabetes occurs in individuals less than 18 years of age. This is not surprising as type 1 diabetes usually develops in adolescence but may appear at any age.

However, of particular concern is the significant rise in the incidence of type 2 diabetes in children and adolescents.

Immediately after diagnosis, it is critical to establish the goals of care including NT and lifestyle needs with the required changes in the regimen of the child/adolescent and appropriate control of co-morbidities such as hypertension and dyslipidaemia. Diabetes self-management education of the individual and family should also be provided. Family involvement is an integral component of optimal diabetes management throughout childhood and into adolescence and early adulthood.

It may be necessary to alter glycaemic goals being cognizant of the fact that most children <6 or 7 years lack the cognitive capacity to recognize and react to hypoglycaemic symptoms and may therefore be at greater risk for hypoglycaemia.

Initially, quite a number of these young type 2 individuals with diabetes can be managed with NT and regular, organized physical activity but many will require pharmacotherapy.

As intercurrent illnesses are more frequent in young children, management of these illnesses including assessment for ketosis with each bout must be undertaken and taught to prevent severe hyperglycaemia and diabetic ketoacidosis which require hospitalization as they may lead to severe morbidity and even mortality.

The School Nurse, Guidance Counselor, Principal, other personnel and relevant students should be informed of the student's health status. In addition, medical records and information on the medical practitioners managing the patient should be provided to the school.

The School Nurse should make the patient and other relevant persons at school aware of the signs, symptoms and treatment of diabetes, in the event that he/she is not available to administer treatment.

For these children/adolescents with diabetes, the following should pertain:

(i) Insulin (if required) should be administered before lunch.

(ii) Blood glucose testing should be performed daily at the school or day care facility before lunch and when signs or symptoms of abnormal blood glucose levels are evident.

concepts in setting glycaemic goals:

oals should be individualized and lower goals may be reasonable based on benefit-risk
ssessment.
ood glucose goals should be higher than those listed above in children with frequent
ypoglycaemia or hypoglycaemia unawareness.
ostprandial blood glucose values should be measured when there is a disparity between
e-prandial blood glucose values and HbA1c levels.

Table 16
BLOOD GLUCOSE & HbA1c GOALS FOR TYPE 1 DIABETES BY AGE GROUP

AGE (years)	PLASMA BLOOD GLUCOSE GOAL mmol/l (mg/dl)		HbA1c	RATIONALE
	Before meals	Bedtime/overnight		
0 – 6	5.5 – 10 (100-180)	6.1 – 11.1 (110–200)	7.5 - 8.5	High risk and vulnerability to hypoglycaemia
6 – 12	5 – 10 (90–180)	5.5 – 10 (100–180)	<8	Risks of hypoglycaemia and relatively low risk of complications prior to puberty
13 – 19	5 – 7.2 (90–130)	5 – 8.3 (90–150)	<8	Risk of severe hypoglycaemia
				Developmental and psychological issues
				A lower goal (<7.0%) is reasonable if it can be achieved without excessive hypoglycaemia

VII.9 CARE OF OLDER ADULTS (60 YEARS AND OVER) WITH DIABETES

An individualized approach should be applied, taking into account the aging process. Patients who will still be able to benefit from long-term glycaemic control (10–20 years), are active, cognitively capable and willing to continue with self-management, should be encouraged to proceed accordingly (ADA 2007).

However, patients with advanced diabetic complications, life-limiting comorbid sickness and/or cognitive or functional impairment may not be able to maintain such rigid goals (ADA 2007). There exists the possibility that the reduction in the risk of microvascular complications will be less beneficial to those patients and they are more likely to encounter serious adverse effects due to hypoglycaemia. On the other hand, chronic hyperglycaemia can yield a catabolic state resulting in acute complications of diabetes, including malnutrition, functional impairment, hyperglycemic hyperosmolar coma and symptoms with decreased quality of life.

The same pharmacotherapy can be utilized for older patients as younger patients but caution is required in the prescription and monitoring of drug therapy (ADA 2007).

No long-term studies have been conducted which reveal the benefits of tight glycaemic control in persons over 65 years of age (ADA 2007).

VIII. PATIENT EDUCATION AND SELF- MONITORING

VIII. 1 Patient Education

Patients who are well motivated and understand their condition are more likely to be successful at caring for and controlling their diabetes.

Poor compliance with therapeutic measures is a major factor in the general unsatisfactory control of the disease in the majority of patients. This is most likely to occur when patients:

- Have little understanding of the nature of the disease.
- Have little appreciation of the relationship between control of blood glucose and the quality and duration of life.
- Do not realize that the lack of disturbing symptoms is not necessarily indicative of satisfactory control.
- Exhibit general resignation to diabetes and its problems.

In some instances, negative attitudes and actions by members of the health team may further de-motivate patients.

Education of the patient and the immediate family on an individual basis, in groups and through the media can improve compliance. A period of time should be devoted at regular intervals to the educational process.

For children with diabetes, innovative ideas and methods are often necessary to help them to get a good grasp of the disease and its management. The information must be appropriate and well-timed. The early recognition and prompt treatment of hypoglycaemia is critical.

Patient Empowerment

Diabetes is a chronic lifestyle condition. As such, it is significantly affected by the multiple life choices and decisions that the patient makes throughout the days and weeks between clinic visits. Sustained success in the management of diabetes will not occur without the understanding, consent and buy-in of the person with diabetes.

Physicians, clinics and health care teams who truly desire to improve outcomes must understand and acknowledge explicitly that the patient and his/her family are the most important members of his/her health care team.

The clinician and patient must negotiate and agree on HbA1c, BP and lipid goals and estimated time to reach each of them, and these goals should be clearly recorded in the patient's chart. With the support of the clinician, the patient must be empowered with the understanding that following medical regimen and making behavioral changes are ultimately his/her responsibility.

Assess patient's understanding and acceptance of the diagnosis of diabetes.
Discuss patient's concerns and clarify misunderstandings
Tell patient the blood glucose, lipid and blood pressure readings and provide a written copy

Come to agreement with the patient on goal blood glucose, lipids and blood pressure.
Ask patient to rate (1 to 10) his or her chance of staying on treatment
Inform patient about recommended treatment and provide specific written information about the role of lifestyle including diet, physical activity, dietary supplements and alcohol intake. Use standard brochures when available.
Elicit concerns and questions and provide opportunities for the patient to state specific behaviors to carry out treatment recommendations
Emphasize:

- Need to continue treatment.
- Control does not mean cure.
- One cannot tell if BP or Blood Sugar is elevated by feelings or symptoms, they must be measured.

TABLE 17
Patient Education about Treatment

apted from Table 28, Patient Education about Treatment, JNC7

DEFINE DIABETES MELLITUS (DM)

1. Outline the types of diabetes and describe the difference between them.
2. State the type of diabetes that he/she has.
3. Describe the symptoms of very high blood sugar (hyperglycemia) and a very low sugar (hypoglycaemia) and three causes of each.
4. Describe the symptoms of DM.
5. Describe the risk factors for DM and know which risk factors he/she has.
6. Explain the blood glucose values that are used to make the diagnosis of diabetes.

MANAGEMENT / TREATMENT OF DM

7. Describe the objectives of the management of DM (ABC—DEF).
8. Specify the components of a diabetes management plan (meal, glucose, medication and sick day plan).

MONITOR BLOOD GLUCOSE

9. Demonstrate self- monitoring of blood glucose and complete a record card.
10. Explain why self-monitoring of blood glucose is critical for patients treated with insulin.
11. Name and have contact information for a health professional who can provide further assistance with self-monitoring of blood glucose (SMBG) and symptoms.

KNOW THE IMPORTANCE AND SIDE EFFECTS OF MEDICATION

12. Name the tablets that he/she is taking and state the importance of taking this medication, and know the timing of each dose and the side effects that may occur as a consequence of these tablets (such as hypoglycaemia with the steps which should be taken to prevent and treat it).
13. Those taking or administering insulin should be able to demonstrate:
    - Knowledge of the types of insulin that they are on.
    - Care of injection sites.
    - Correctly measure insulin dose.
    - Demonstrate injection technique.
    - Storage of insulin.

KNOW THE COMPLICATIONS OF DM

14. Describe the various symptoms and complications associated with poorly controlled diabetes including the following:
    - Problems with feet.
    - Problems with eyes.
    - “Heart problems”.
    - “Kidney problems”.
    - Problems with infants born to women with diabetes.
    - DKA & hyperosmolar coma.
    - Pneumococcal pneumonia and Influenza infections.
15. Describe the care of the feet and benefits of good care.
16. Outline pre-conception care (women with diabetes of child-bearing age).
17. Specify management of DM in children and adolescents (patients & caregivers) including the value of family participation in all aspects of the management of diabetes such as drug and nutrition therapy and regular, organized physical activity.

RELATIONSHIP BETWEEN DEPRESSION & DM& ITS COMPLICATIONS

18. Outline the Relationship between depression and DM and its complications.
19. Specify non-drug therapy for depression.

VIII.1.1 NUTRITION THERAPY (NT)

1. State what is nutrition therapy (NT).
2. Outline the components of an assessment done prior to the development of a NT plan.
3. Specify why NT plans have to be individualized.
4. Specify which NT plan is relevant to him/her – whether isocaloric or weight- reducing.
5. List the types of foods and drinks to be avoided and confirm those that they regularly avoid (5 examples).
6. Describe ways to improve poor diabetic control by modifications in NT.
7. State how they can decrease the energy content of their diet (3 examples).
8. State the pattern of his/her food intake over a typical day and whether this conforms to the advice on NT which he/she has been given.
9. Specify why a single large evening meal should be avoided.
10. Outline the importance of the timing of meals for a type 1 diabetic individual.
11. State the importance of NT for a type 2 diabetic individual.
12. Outline the goals of dietary management for a patient with diabetes.
13. Indicate how long it can take to obtain the full benefit of NT.
14. Specify how nutrition-related outcomes are evaluated.
15. State his/her current weight and relate to his/her Ideal body weight.
16. State why weight loss should be a gradual process.
17. State how the risk for type 2 diabetes mellitus can be reduced.

VIII.1.2 REGULAR ORGANIZED PHYSICAL ACTIVITY

1. Describe the effect of regular, organized physical activity on diabetic control.
2. Explain the importance of a detailed medical examination prior to starting a physical activity programme.
3. State the reasons why it is necessary to have an individualized physical activity programme.
4. Outline the components of an individualized physical activity programme.
5. State when physical activity is most effective.
6. Specify types of physical activity.
7. Explain the importance of integrating therapeutic regimen into the physical activity programme.

VII.1.3 TOBACCO/ALCOHOL USE

1. Outline the adverse effects of smoking tobacco products.
2. State whether he/she has quit smoking and if not, state why this has not been done.
3. Outline the adverse effects of alcohol consumption in general and without food.
4. State the maximum number of alcoholic drinks which should be consumed each day.

50. Indicate whether he/she is conforming to this stipulation.

IX. THE RELATIONSHIP BETWEEN DEPRESSION AND DIABETES MELLITUS AND ITS COMPLICATIONS

There exists a strong relationship between depression and diabetes mellitus as has been demonstrated by a marked number of studies which have shown that the odds of co-morbid depression in people with diabetes is twice that of people without diabetes in similar settings and the lifetime prevalence of major depressive disorder in people with diabetes is approximately 29%. As such, depression impacts negatively on people with diabetes as a significant percentage of those concerned often do not adhere to drug regimen, self-management and medical treatment in general resulting in aggravation of the problem of hyperglycaemia and a predominantly increased risk of diabetic complications. In fact, a significant association has been found between depression and diabetic complications ($p<.00001$, $z=5.94$), specifically diabetic nephropathy, retinopathy, neuropathy and macrovascular complications.

In view of this, it is proposed that depression screening of people with diabetes be instituted as a routine procedure at all health centres throughout Jamaica. Depression screening of people with diabetes and other chronically ill patients using the Zung Self-Rating Depression Scale was initiated at the Maxfield Park Health Centre in Kingston in 2000. This instrument has been adapted to a two (major) question screening tool (Appendix II).

Concrete evidence also exists that treatment of depression improves glycaemic control with reduction in glycosolated haemoglobin of 0.5-1.0 percent demonstrated in patients who have recovered from depression. Serotonin Reuptake Inhibitors (SSRIs) such as Prozac (Fluotexine Hydrochloride) and Zoloft, preferred choices in pharmacotherapy for the management of depression, selectively inhibit the reuptake of Serotonin 5-HT1a and 5-HT2a (receptors which operate in tandem as a key element in the development of depression) from synapses (the communicating space between nerves) in the brain, reduce cortisol levels and possibly increase insulin sensitivity, subsequently causing a reduction in blood sugar levels. The various mechanisms may be drug-specific and the understanding of the details of the processes involved requires additional research.

However, SSRIs must be used with caution in people with diabetes as hypoglycaemia and other adverse effects may occur during treatment. The majority of SSRIs are also not recommended for use in children and adolescents.

This notwithstanding, SSRIs have demonstrated marked efficacy and tolerability in patients with a range of conditions, particularly, cardiovascular diseases and macrovascular events such as cerebrovascular disease as well as in elderly patients including those with Alzheimer's disease and dementia. On the contrary, tricyclic anti-depressants such as Amitriptyline have hyperglycaemic, cardiovascular (such as Arrhythmias) and other side effects which impact negatively on people with diabetes and patients with cardiac disease. In view of this and the relatively high prevalence of diabetes mellitus and depression in Jamaica (14-21% - mild to moderate depression), it is recommended that a clinical trial be conducted to clearly illustrate the degree of association between both conditions and determine the most appropriate measures for management/pharmacotherapy as the actual treatment modalities from evidence in the literature do not clearly determine the expert approach to this twin problem.

The measures utilised for the management of depression include antidepressant pharmacotherapy, cognitive behavioural therapy, improvement in problem-solving skills;regular, organized physical activity to address both depressive and physiologic dysregulation and health education. The measures focusing on behaviour change and physical activity are of tremendous benefit to people with diabetes.

TABLE 18.1
MANAGEMENT TO CONTROL DM & AVOID/DELAY ITS COMPLICATIONS & ASSOCIATED CONDITIONS

MONITOR	INTERVENTION
RISK FACTORS	**INDIVIDUALIZED MANAGEMENT PLAN**
• Ideal Body Weight • HbA1c levels • Blood Glucose • Blood Pressure • LDL Cholesterol • HDL Cholesterol • Triglyceride Levels	• Optimise Metabolic Control • Reduce Microvascular Disease • Reduce Macrovascular Disease • Reduce Complications
MICROVASCULAR COMPLICATIONS	
• Blood Glucose	• HbA1c < 7% • FBG < 7 mmol/l • 2hr < 10 mmol/l
• Blood Pressure	• BP < 130/80mm/Hg
NEPHROPATHY	
• Urinary Protein – each visit • Urea – yearly • Creatinine – yearly	• Use ACE Inhibitors (monitor for hyperkalaemia) • ARBs (monitor for hyperkalaemia) • ß- blockers as required • Refer to a Nephrologist if: a. GFR <80 ml / min – urgently b. GFR <30 ml / min – very urgently c. Hyperkalaemia • Monitor the renal status as required
RETINOPATHY	
	• Refer to Ophthalmologist a. Assessment b. Pharmacotherapy c. Laser therapy
NEUROPATHY	
• Loss of sensation • Signs of injury	• Examine Feet & Lower Limbs a. monofilament sensation b. vibration testing • Advise on foot care • Refer to specialist as needed

TABLE 18.2
MANAGEMENT TO CONTROL DM & AVOID/DELAY ITS COMPLICATIONS & ASSOCIATED CONDITIONS

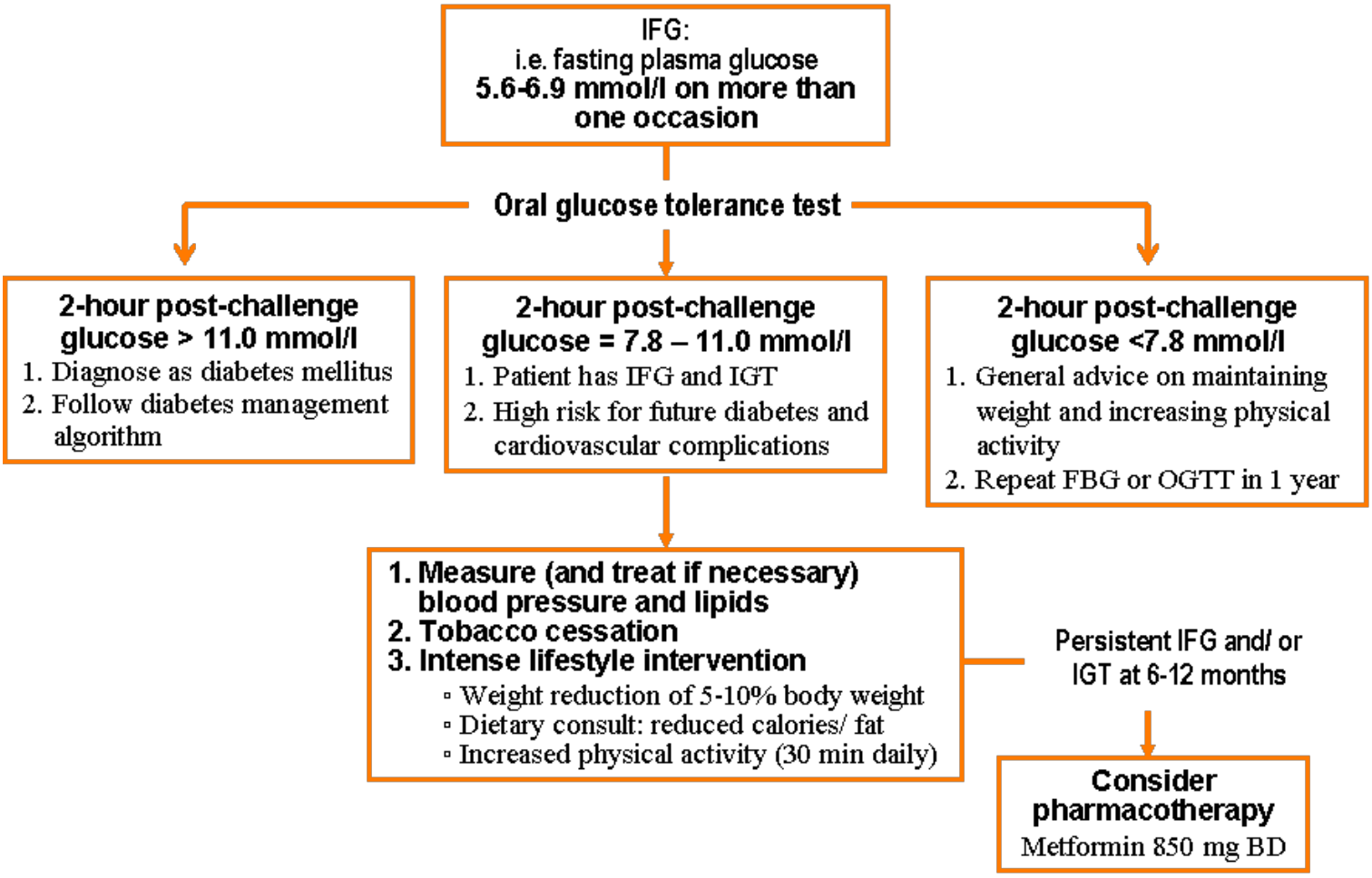
MONITOR	INTERVENTION
MACROVASCULAR / CARDIOVASCULAR COMPLICATIONS	
	• Glycaemic control (see above) • Blood pressure of <130/80 mm/Hg • Treatment of micro/macroalbuminuria • Lipid management • Nutrition therapy (NT) • Smoking cessation / avoidance of Environmental tobacco smoke • Moderate alcohol consumption • Structured physical activity • Pharmacotherapy • Referral to a specialist as appropriate
ASSOCIATED CONDITIONS	
• Diabetic Ketoacidosis	• Immediate referral to hospital
• Influenza • Pneumonia	• Annual influenza vaccine • Pneumococcal vaccine x 1 • Pneumococcal booster if >64 yrs. old if the vaccine was administered > 5 years before when the patient was less than 65 years old or the patient concerned has chronic renal disease, nephrotic syndrome and other immuno-compromised situation e.g. post-organ transplantation.

TABLE 18.3

MANAGEMENT TO CONTROL DM & AVOID/DELAY ITS COMPLICATIONS & ASSOCIATED CONDITIONS

MONITOR	INTERVENTION
Periodontal(Gum) Disease	**Proper brushing and flossing.** **Avoid smoking.** **Refer to dentist for plaque removal, medication, surgery and dental implants.**
Older adults	**An individualized approach with major consideration regarding the aging process.** **Self-management by patients able to benefit from long-term glycaemic control (10–20 years) with less rigid goals for patients with advanced diabetic complications, life-limiting co-morbid sickness and/or cognitive/functional impairment.** **The same drug as for younger patients with caution as their usage may be contraindicated due to co-morbidity and/or complications.**
Mental status by screening for depression	**Screening of patients with diabetes at island's major public and private clinics and treatment. See Screening Instrument.**

Management of Impaired Fasting Glucose (IFG)



APPENDIX II
DEPRESSION SCREENING QUESTIONS

A. Screening Questions	Yes	No
Have you been feeling down, depressed, or hopeless in the past month?	1	0
Are you bothered by little interest or pleasure in doing things?	1	0
Total (if ≥ 1 proceed below)		
B. Confirmatory Questions	Yes	No
Have you had a change in appetite?	1	0
Have you had a change in sleeping pattern?	1	0
Have you been feeling guilty or worthless?	1	0
Total (if = 3 treat for depression)		

If Section A ≥1 and Section B=3, a diagnosis of Major Depressive Disorder can be made and treatment initiated.

APPENDIX III
BMI CHART

Applicable for Males and Females Over the Age of 18 years

WEIGHT - LBS																																
	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	
5"0"	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	1.52
5'1"	19	20	21	22	22	24	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37	38	39	40	42	43	44	44	45	46	47	1.55
5'2"	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	32	33	33	34	35	36	37	38	39	40	41	42	43	44	45	46	1.57
5'3"	18	19	20	20	21	22	23	24	24	25	26	27	28	29	30	31	32	32	33	34	35	36	37	38	39	40	41	42	43	43	44	1.60
5'4"	17	18	19	20	20	22	22	23	24	24	25	26	27	28	29	30	31	31	32	33	34	35	36	37	38	39	40	40	41	42	43	1.63
5'5"	17	18	18	19	20	21	22	22	23	24	25	25	26	27	28	29	30	30	31	32	33	34	35	35	37	37	38	39	40	41	42	1.65
5'6"	16	17	18	19	19	20	21	22	22	23	24	25	25	26	27	28	29	29	30	31	32	33	34	34	36	36	37	38	39	40	40	1.68
5'7"	16	17	17	18	18	19	20	21	22	23	23	24	25	25	26	27	28	29	29	30	31	32	33	33	35	35	36	37	38	38	39	1.70
5'8"	15	16	16	17	18	19	20	20	21	22	23	23	24	25	25	26	27	28	28	29	30	31	32	32	33	34	35	36	37	37	38	1.73
5'9"	14	15	16	17	17	18	19	20	21	21	22	23	24	24	25	25	26	27	28	28	29	30	31	31	33	33	34	35	35	36	37	1.75
5'10"	14	15	16	16	17	18	18	19	20	21	22	22	23	23	24	25	25	26	27	28	28	29	30	30	32	32	33	34	34	35	36	1.78
5'11"	14	15	15	16	17	18	18	18	19	20	21	22	22	23	23	24	25	25	26	27	28	28	29	30	31	31	32	33	34	34	35	1.80
6'0"	13	14	15	16	16	17	18	18	19	20	20	21	22	22	23	23	24	25	25	26	27	27	28	29	30	31	31	32	33	33	34	1.83
6'1"	13	14	15	15	16	17	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	30	30	31	32	32	33	1.85
6'2'	13	14	14	15	15	16	17	17	18	18	19	20	21	21	21	22	23	23	24	25	25	26	27	27	28	29	30	30	31	31	32	1.88
6'3"	12	13	14	14	15	16	16	17	17	18	18	19	20	20	21	21	22	23	23	24	25	25	26	26	28	28	29	29	30	31	31	1.91
6'4"	12	12	13	14	14	15	15	16	17	17	18	18	19	20	20	21	22	22	23	23	24	25	25	26	27	27	28	29	29	30	30	1.93
	45	48	50	52	54	57	59	61	63	66	68	70	73	75	77	79	82	84	86	88	91	93	95	97	100	102	104	107	109	111	113	
WEIGHT - KG																																

UNDERWEIGHT	HEALTHY WEIGHT	PRE-OBESE	OBESE	EXTREMELY OBESE
BMI <18.5	BMI 18.5 to 24.9	BMI 25 to 29.9	BMI 30 to 39.9	BMI 40 and above

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X. REFERENCE

1. **Standards of Medical Care for Patients with Diabetes Mellitus**
Diabetes Care 28:S4-S36, 2005
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