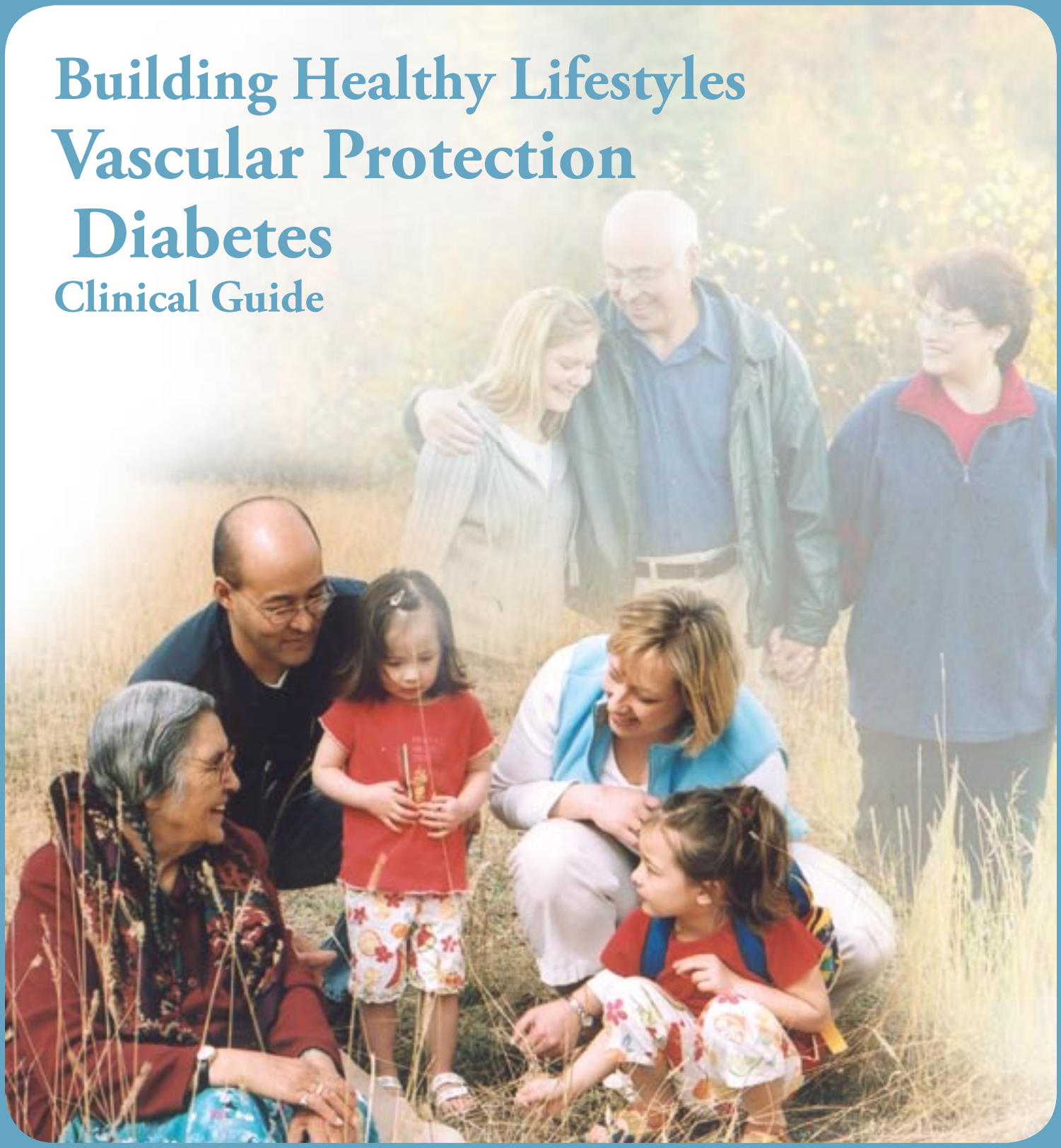
Building Healthy Lifestyles
Vascular Protection
Diabetes
Clinical Guide



Building Healthy Lifestyles

CHR Chinook Health Region

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We would like to acknowledge the contribution of the following groups:

Vascular Protection Interdisciplinary Working Groups

Chronic Disease Physician Advisory Group

Chronic Disease Clinical Leadership Group

Specialist Consultants

Vascular Protection Clinical Champions

CHR Diabetes Advisory Group

Utilizing the Chronic Care model, these groups developed the Vascular Protection: Type 2 Diabetes Clinical Guide as a decision-support tool for improved functional and clinical outcomes. This Guide supports primary care interdisciplinary team-based practice with a strong focus on self-management.

Chronic Disease Management and Prevention Network
An Alberta Health Capacity Building Initiative

Chinook Health Region
Lethbridge, AB
April 2006

Table of Contents

BUILDING HEALTHY LIFESTYLES VASCULAR PROTECTION - DIABETES

1. Diagnosis

a. Definition

Diabetes mellitus: is a metabolic disorder characterized by the presence of hyperglycemia due to defective insulin secretion, impaired insulin action or both.

b. Risk Factors

Risk Factors for Type 2 Diabetes
Age ≥ 40 years
First-degree relative with diabetes
Member of high-risk population (e.g. people of Aboriginal, Hispanic, South Asian, Asian or African descent)
History of IFG (Impaired Fasting Glucose) or IGT (Impaired Glucose Tolerance)*
Presence of complications associated with diabetes
Vascular disease *
History of GDM (Gestational Diabetes Mellitus)
History of delivery of a macrosomic infant (> 4 kg or approximately 9 lbs)
Hypertension* (Blood Pressure ≥ 140/90)
Dyslipidemia*
Obesity* (Body Mass Index-BMI- ≥ 30kq/m^2)
Abdominal obesity* (Waist Circumference for men ≥ 102 cm/40 in OR women ≥ 88cm/35 in)
Polycystic ovary syndrome* (characterized by amenorrhea, hirsutism and infertility)
Acanthosis nigricans* (a darkening of the skin's pigments especially noted on the neck and axilla areas)
Schizophrenia

* Metabolic Syndrome is diagnosed when 3 or more of the risk determinants are present. They are: **Fasting Plasma Glucose (FPG)** ≥ 6.1 mmol/L, **B.P.** ≥ 130/85, **Triglycerides (TG)** ≥ 1.7 mmol/L, **High Density Lipoprotein (HDL)**: men < 1.0 mmol/L and women < 1.3 mmol/L and **Abdominal obesity**: Waist Circumference for men ≥ 102 cm/40 in OR women ≥ 88cm/35in.

Some prescription medications may also increase an individual's blood glucose levels and may, in combination with the other risk factors, place the individual at an increased risk for developing diabetes. These prescription medications are included in the following table:

Prescription Medications That May Increase Blood Glucose Levels	
Atypical Antipsychotics (Clozapine)	↓ Insulin secretion; Weight gain
Beta Blockers	↓ Insulin secretion ↓ Insulin sensitivity
Diuretics (Thiazides* and Loop)	↓ Insulin secretion ↓ Insulin sensitivity
Glucocorticoids	↑ Gluconeogenesis ↓ Insulin sensitivity
Nicotine Acid (Niacin)	↓ Insulin sensitivity
Oral Contraceptives	↓ Insulin sensitivity
Sympathomimetics	↑ Gluconeogenesis
Estrogen Containing Compounds	Uncertain

*High dose Thiazides (25mg) are associated with hyperglycemia

Other possible medications are: phenytoin, lithium, growth hormones, thyroid hormones, dobutamide, barbiturates, smoking, diltiazem, rifampin, and protease inhibitors.

There are also some over-the-counter medications that are associated with hyperglycemia and may interfere with glucose levels. They are outlined as follows:

Over-the-counter Medications That May Affect Blood Glucose Levels	
Caffeine	Main ingredient in stimulant medications and diuretics
Ephedrine, epinephrine	Used in medications to treat respiratory illness
Phenylephrine	Used in nasal decongestants and cold prescriptions
Phenylpropanolamine	Used in many medications from headache to cold treatments
Sugar	Used in many cold and cough elixirs
Vitamin B	Used as a dietary supplement
Vitamin C	Used as a dietary supplement/cold medicine

c. Screening for Type 2 Diabetes

Impaired Fasting Glucose (IFG) and Impaired Glucose Tolerance (IGT)

Every 3 years for individuals ≥ 40 years of age with no other risk factors. Earlier and/or more frequently for individuals < 40 years of age with risk factors and as clinically indicated in individuals 40 years of age with other risk factors.

Obese children ≥ 10 years of age should be considered for screening for type 2 diabetes every 2 years using Fasting Plasma Glucose (FPG) test if they meet 2 of the following criteria:

- member of a high-risk ethnic group
- family history of type 2 diabetes, especially if the child was exposed to diabetes in utero
- acanthosis nigricans
- PCOS
- hypertension
- dyslipidemia

An Oral Glucose Tolerance Test (OGTT) may also be considered as a screening test in this population.

Ideally, in order to diagnose diabetes, the "gold standard" is to use the 75g OGTT. However, there is a rare group of individuals who may not be able to tolerate such a test. In these cases, a meal of 75g carbohydrate may be optional. The following is a sample meal of a 75g carbohydrate load:

Breakfast:

- 2 slices of toast
- 1 tbsp honey
- 1 cup milk
- 1 small orange

Lunch:

- 1 pita
- sliced beef, cheddar cheese and lettuce (optional)
- 1 cup carrot sticks
- 1/3 cup apple juice
- 3/4 cup diet yogurt

d. Signs and Symptoms

Severe symptoms of hyperglycemia may include:

- Polyuria
- Polydipsia
- Weight loss
- Polyphagia

Subtle symptoms of hyperglycemia may include:

- Fatigue / weakness
- Blurred vision
- Impaired healing of wounds, cuts and infections
- Pain, numbness and tingling
- Itchy skin
- Nausea, vomiting and abdominal pain
- No symptoms

Not all individuals with diabetes have obvious symptoms of the disease. There are many people who have undetected diabetes for several weeks, months or years because they experience such subtle symptoms, which could be attributed to the natural aging process or other chronic conditions. Therefore, it is no wonder that "up to 2.7% of the general adult population have undiagnosed type 2 diabetes" (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2003: S10).

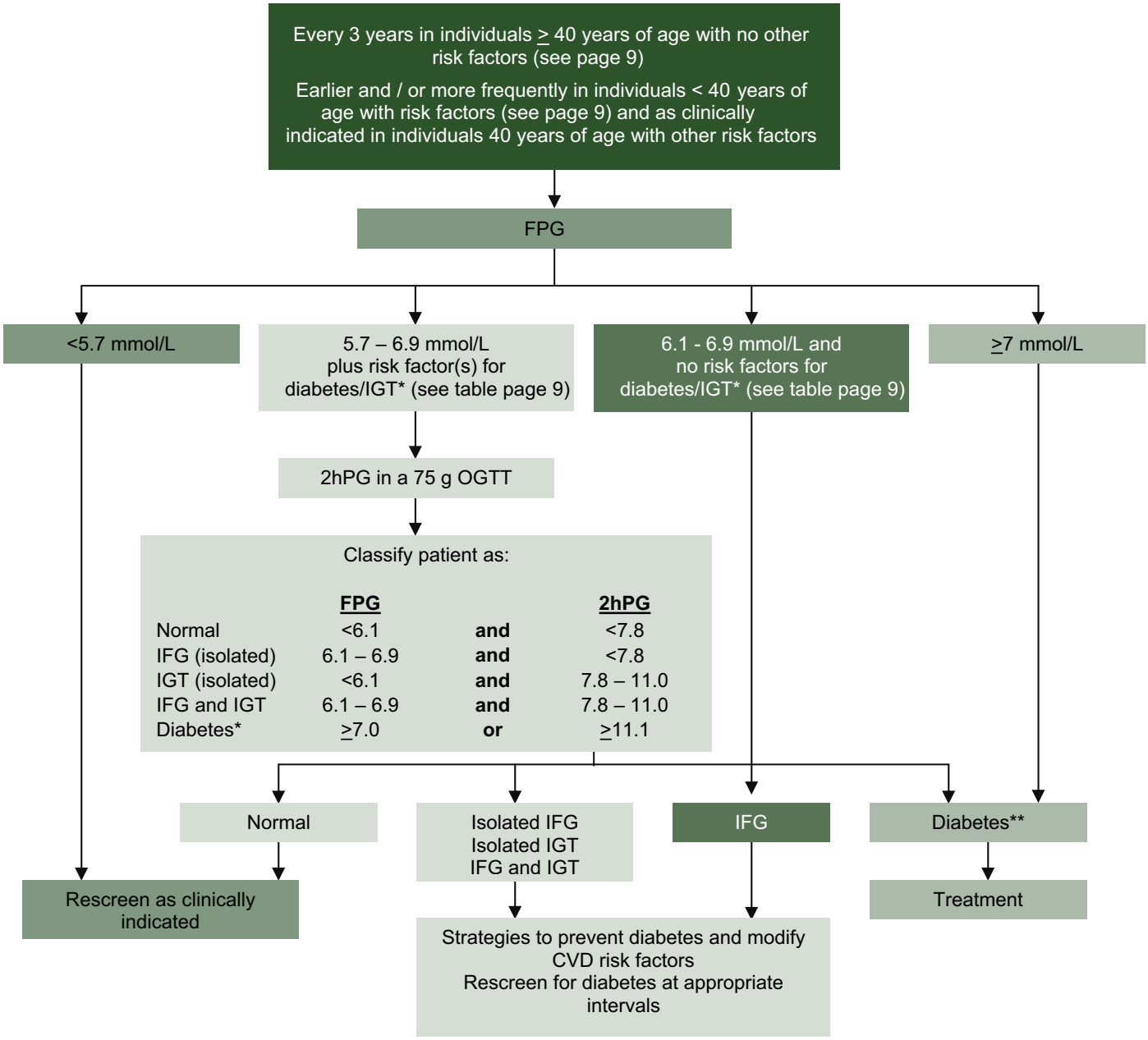
e. Testing and Evaluation

- Fasting Plasma Glucose (FPG)
- CPeptide and insulin levels to determine type 1 and type 2 diabetes

f. Further Testing

- Referral to internal medicine, diabetes specialist if diagnosis is uncertain

g. Algorithm



*In the absence of other risk factors, a Fasting Plasma Glucose (FPG) of 5.7–6.0 mmol/L does not require further investigation, except routine screening at appropriate intervals.

**A confirmatory laboratory glucose test (FPG, casual Plasma Glucose (PG), or a 2hPG in a 75-g Oral Glucose Tolerance Test (OGTT)) must be done on another day in all cases in the absence of unequivocal metabolic decompensation.

2hPG = 2-hour Plasma Glucose
CVD = Cardiovascular Disease
FPG = Fasting Plasma Glucose
IFG = Impaired Fasting Glucose
IGT = Impaired Glucose Tolerance
OGTT = Oral Glucose Tolerance Test
PG = Plasma Glucose

Adapted from Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2003: S11.

2. Classification/Type/Staging

a. Stages/Types of Disease

Classification of Diabetes

- **IFG (Impaired Fasting Glucose)** is a practical term for "prediabetes" and places the individual at risk of developing diabetes and its complications. The term refers to a metabolic stage intermediate between normal glucose homeostasis and diabetes. The individual's fasting blood glucose levels would be between 6.1-6.9 mmol/L.
- **IGT (Impaired Glucose Tolerance)** is a practical term for "prediabetes" and places the individual at risk of developing diabetes and its complications. The term refers to a metabolic stage intermediate between normal glucose homeostasis and diabetes. The individual's two hour plasma glucose levels would be between 7.8 -11.0 mmol/L.
- **Type 1 Diabetes** is primarily the result of pancreatic beta cell destruction and is prone to ketoacidosis. An autoimmune process is often involved, but the etiology of the beta cell destruction is unknown.
- **Type 2 Diabetes** may range from predominant insulin resistance with relative insulin deficiency to a predominant secretory defect with insulin resistance.
- **Gestational Diabetes Mellitus** is defined as any degree of glucose intolerance with onset or first recognition during pregnancy.

TYPES OF DIABETES – KEY CHARACTERISTICS

Classification	Type 1 Diabetes 10% of Diabetes Cases	Type 2 Diabetes 90% of all Diabetes Cases	Gestational Diabetes Approximately 4% of Non-Aboriginal Pregnancies
Overview	Autoimmune process destroys the beta cells of the pancreas Very little or no insulin secreted Prone to diabetic ketoacidosis (DKA)	A combination of one or more of the following may occur: • Insulin resistance • Delayed insulin response • Decreased insulin secretion • Increased hepatic glucose output	Pancreas is unable to produce enough insulin to overcome insulin resistance caused by placental hormones
Age of Onset	Usually < 30 years	Usually > 30 years	Usually develops between 24 and 28 weeks of gestation and does not persist postpartum
Body Type	Usually lean individuals	80% are overweight.	More common in overweight women
Family History of Diabetes	Seldom	Common	Common
Symptoms of Onset	Acute, severe, sudden	Subtle, gradual	Asymptomatic
Management	1. Calculated meal plan or carbohydrate counting 2. Insulin therapy is essential 3. Physical activity	1. Healthy eating and physical activity to promote weight loss and reduce insulin resistance 2. The addition of antihyperglycemic agents may be required if healthy eating and activity do not achieve goal blood glucose levels 3. A combination of oral antihypergylcemic agents and/or insulin may be required to achieve blood glucose levels 4. Type 2 diabetes is progressive and the individual should expect changes in his/her management plan over time (More oral agents and/or insulin only may be required for management)	1. A calculated meal plan and regular physical activity that is suitable for pregnancy are encouraged throughout the pregnancy 2. Oral antihypergylcemic agents are contraindicated during pregnancy 3. Insulin therapy may be required if healthy eating and increased activity do not achieve goal blood glucose levels

3. Chronic Disease Patient Care Flowsheet

Diabetes Patient Care Flow Sheet

Patient Name

PHN

Comorbid Conditions

Year of Diagnosis	Diabetes ☐ Type 1 ☐ Type 2

Date: _____ _____ _____ _____ _____ _____ _____ _____

		REVIEW ITEMS								
3 TO 6 MONTHS	Glycemic Control	Pre-prandial (4-7)mmol/L 2-hour Post-prandial (5-10)mmol/L								
		A1C ≤ 7.0%								
		Frequency of hypoglycemia								
		Antihyperglycemic medications								
	Hypertension	BP ≤ 130/80 mm Hg								
		Antihypertensive medications ACE/ARB Other								
	Other	Weight								
		Waist Circ. m<102 cm (40 in) f < 88 cm (35 in)								
		Lower extremity inspection								
		Address smoking, activity								
		Nutrition								
		Other medications: ☐ ASA ☐ Intolerant								
ANNUALLY AND/OR AS INDICATED	Lipids	High risk targets: LDL<2.5 mmol/L								
		TC:HDL-C<4.0								
		Antihyperlipidemic medications								
	Screen for Microvascular Complications: Type 1 annually ≥ 15 years old with ≥ 5 years hx of DM. Type 2 at diagnosis then every 1 - 2 years or as indicated.									
	Kidney	Random albumin/creatinine ratio								
		Creatinine clearance (Cockcroft-Gault) or MDRD-GFR								
		Serum creatinine								
	Eyes	Refer for dilated eye exam								
	Neuropathy	*Check for loss of sensation* *10-g monofilament/vibration at great toe*	*Left +–* *Right +–*							
		Sexual dysfunction								
	Self Management	*Anxiety, depression, economic concerns*								
		Referrals: Education/specialist, etc.								
		Vaccinations: ☐ *Pneumococcal (once lifetime)* ☐ *Annual influenza vaccine*								

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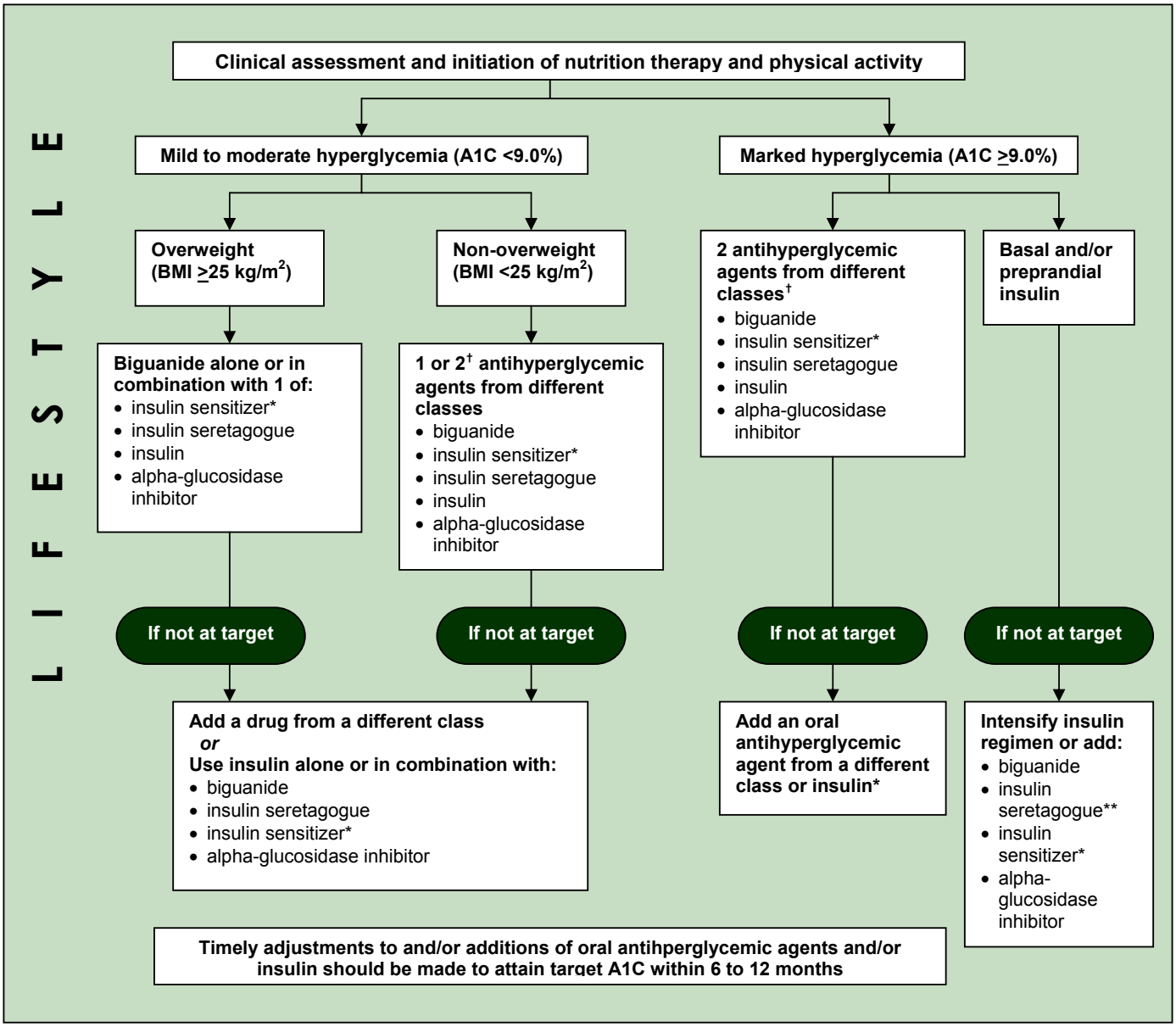
December/04



THERAPEUTIC NOTES

Key adverse effects

Gastrointestinal upset, loose bowels
biguanide

Hypoglycemia
insulin, insulin secretagogues (less with gliclazide, glimepiride, nateglinide and repaglinide than with glyburide)

Edema, fluid retention
insulin sensitizers, rarely with insulin

Moderate weight gain
insulin, insulin secretagogues, insulin sensitizers

Key precautions/contraindications

Hepatic disease
glyburide, biguanide, insulin sensitizers

Significant renal insufficiency
biguanide, sulfonylureas

Significant cardia failure
biguanide, insulin sensitizers

Sulfa allergy
sulfonylureas

* When used in combination with insulin, insulin sensitizers may increase the risk of edema or CHF. The combination of an insulin sensitizer and insulin is currently not an approved indication in Canada.

**If using preprandial insulin, do not add an insulin secretagogue.

†May be given as a combined formulation: rosiglitazone and metformin (Avandamet™).

Physicians should refer to the most current *Compendium of Pharmaceuticals and Specialties (*Canadian Pharmacists Association, Ottawa, ON) and product monographs for detailed prescribing information.

A1C = glycosylated hemoglobin
BMI = Body Mass Index
CHF = Chronic Heart Failure

4. Management Strategies for Health Teams

a. and b. Goals of Management and Key Clinical Targets

	Content	Target Population	Initial Recommendations	Goal Recommendation
Glycemic Control	Blood Glucose	All DM Individuals	• People with Type 1 diabetes should measure their BG at least three times/day • The frequency of testing for individuals with Type 2 diabetes varies depending upon their glycemic control and management regime* (see SBGM, p 16) • Complete a capillary blood glucose value (finger poke) simultaneously with a venous FPG to ensure meter accuracy	• The targets for pre-prandial PG are 4.0-7.0 mmol/L and 2hr postprandial PG goals are 5.0-10.0 mmol/L for adult population Type 1 and Type 2 (see Self Blood Glucose Monitoring - SBGM, p 16) • If it can be safely achieved, lowering PG goals to 4.0-6.0 mmol/L and 2hr postprandial PG to 5.0-8.0 mmol/L can be considered • Encourage Annual fasting meter/lab comparisons with no more than a 20% variance
	A1C	All DM Individuals	• Measure A1C approximately every 3-6 months	• The target for most patients is ≤ 7.0% (or 0.070) (see Blood Glucose Targets, p 16) • If it can be safely achieved, lowering the goal of an A1C to 6.0% should be considered (or 0.060)
Hypertension	Blood Pressure	All DM Individuals	• Measure blood pressure at every diabetes visit	• Blood Pressure targets are < 130/80 mm Hg for all individuals with or without diabetic nephropathy
Other	Weight and Waist Circ.	All DM Individuals	• Waist circumference values of ≥ 102 cm (40 inches) in men and ≥ 88 cm (35 inches) in women are associated with increased health problems	• The individual should work to attain a BMI between 18.5-24.9 (kg/m²) • A weight reduction of 5-10% is encouraged
	Smoking	All DM Individuals	• Awareness of the risks associated with smoking and diabetes	• Smoking cessation is strongly encouraged due to the linkage between diabetes and CVD
	Activity	All DM Individuals	• Brisk walking is generally a safe place to start • Sessions should be 10 minutes at a time spread out at least in 3 non-consecutive days	• Accumulation of at least 30 minutes per week for people with Type 2 diabetes
	Nutrition	All DM Individuals	• Suggest portion control • Encourage all food groups • Limit sugars, fat, salt, alcohol and caffeine	• Encourage Individual/group counseling • Use Canada's Guidelines for Healthy Eating as a guide
	Antiplatelet Therapy	All DM Individuals, unless intolerant	• Encourage people with Type 2 diabetes to adopt a healthy lifestyle to lower risk of CVD	• Continually assess risk reduction • If tolerated, low dose of ASA

	Content	Target Population	Initial Recommendations	Goal Recommendation
Lipids	Lipid Panel	All DM Individuals	• Complete a fasting lipid profile at the time of diagnosis and then every 1-3 years as is clinically indicated	• For high risk individuals, the goals for LDL are < 2.5mmol/L with a TC : HDL ratio of < 4.0mmol/L • For moderate risk individuals, the goals for LDL are < 3.5 mmol/L with a TC : HDL ratio of < 5.0 mmol/L • The optimal TG level is < 1.5 mmol/L
Kidney	ACR	All DM Individuals	• Screen individuals with Type 2 diabetes at the time of diagnosis and yearly thereafter	• If the ACR is within normal limits (men < 2.0 mg/mmol and women < 2.8 mg/mmol) then an annual follow-up screen is indicated. • If elevated, see page 12
	Creatinine Clearance or MDRD-GFR	All DM Individuals	• Measure serum creatinine levels and estimate creatinine clearance annually in those individuals with diabetes without albuminuria and at least every 6 months in those with albuminuria	• Normal serum creatinine levels range between 40-105 umol/L and a normal MDRD is > 60 ml/min
Eyes	Dilated Eye Exam	All DM Individuals	• Screening and evaluation for retinopathy at the time of diagnosis for the individual with type 2 diabetes	• Tailor the interval for follow-up assessments to the severity of the retinopathy • In those individuals with no or minimal retinopathy, the recommended interval is 1-2 years
Neuropathy	10g Monofilament Assessment	All DM Individuals	• Screening for peripheral neuropathy at onset of diagnosis and annually thereafter in people with type 2 diabetes • A 10g monofilament at the great toe can be used to detect any change/loss of sensation	• Foot examinations in adults by both patients and healthcare providers is an integral component of diabetes management to decrease the risk of foot lesions and amputations
	Sexual Dysfunction	All Men with DM	• Begin screening for Erectile Dysfunction (ED) at diagnosis of Type 2 diabetes	• Periodic re-assessment

	Content	Target Population	Initial Recommendations	Goal Recommendation
Self Management	Mental Health	All DM Individuals	• Regular screening of individuals with diabetes for psychosocial problems, depression and anxiety disorders • Stress, inadequate social and family support, entrenched belief systems and ineffective coping skills may have a negative impact on self-care and glycemic control • Atypical, antipsychotic medications may induce hyperglycemia	• Encourage regular screening for psychological concerns and interventions towards self-care
	Referrals	All DM Individuals	• Group or individual counseling sessions may be offered depending upon the learning needs of the individual	• Self care is achieved by all clients with diabetes
	Vaccinations: • Pneumococcal • Annual Flu Shot	All DM Individuals	• Encourage vaccinations to lessen the stress of influenza or pneumococcal bacteremia on the individual with diabetes	• Annual vaccinations for influenza are encouraged to reduce the risk of complications associated with these epidemics • Once a lifetime premium for pneumococcal

DM = Diabetes mellitus
BG = Blood glucose
PG = Plasma glucose
A1C = Regular glycosylated hemoglobin
LDL = Low density lipoprotein
TC : HDL = Total cholesterol, high density lipoprotein ratio
TG = Triglyceride
ACR = Albumin to Creatinine Ratio
MDRD-GFR = Modification of Diet in Renal Disease -Glomerular Filtration Rate

c. Non-Pharmacologic Strategies

Self Blood Glucose Monitoring (SBGM)

SBGM is one of the most important and essential components of diabetes self-management. It allows individuals with diabetes to monitor daily changes in blood glucose, which enables them to make decisions and take action based on informed judgment.

How Often?

- The frequency of monitoring in those individuals with Type 2 diabetes should be individualized depending on glycemic control and type of therapy
- For most people with Type 2 diabetes who treat with insulin or oral antihyperglycemic agents, SBGM is recommended at least once per day
- In many situations, more frequent testing may be required to provide the information needed to make behavioural or treatment adjustments

When to Monitor?

Encourage individuals to include both pre-prandial (before meals) and 2-hour post-prandial (after meals) blood glucose monitoring depending upon their medication regime, lab work results, etc. The following are two examples of before and after meal testing schedules:

Once per Day (Before Meals)
Day 1: Before Breakfast
Day 2: Before Lunch
Day 3: Before Supper
Day 4: Before Bedtime Snack
Repeat cycle

Once per Day (After Meals)
Day 1: 2-hr after Breakfast
Day 2: 2-hr after Lunch
Day 3: 2-hr after Supper
Repeat cycle

Blood Glucose Targets

Targets for glycemic control (ADULTS)

	A1C (%)	FPG/ pre-prandial PG (mmol/L)	2-hour postprandial PG (mmol/L)
Target for most patients	≤ 7.0	4.0 - 7.0	5.0 - 10.0
Normal range (consider for patients in whom it can be achieved safely)	≤ 6.0	4.0 - 6.0	5.0 - 8.0

Adapted from Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2003: S19.

The same glycemic targets apply to otherwise healthy, elderly individuals as to younger people with diabetes. In people with multiple comorbidities, high level of functional dependency and limited life expectancy, goals are more conservative and clinicians should work to avoid symptoms of hyperglycemia and prevent hypoglycemia.

Targets For Glycemic Control (CHILDREN AND ADOLESCENTS)

Age (years)	A1C (%)	Pre-prandial PG(mmol/L)	Considerations
< 5	≤ 9.0	6.0-12.0	Extreme caution is required to avoid severe hypoglycemia because of the risk of cognitive impairment in this group
5-12	≤ 8.0	4.0-10.0	Graduate targets to the child's age
13-18	≤ 7.0 ≤ 6.0	4.0-7.0 4.0-6.0	Appropriate for most patients Consider for patients in whom the targets can be achieved safely

Adapted from Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2003: S85.

Nutrition

Lifestyle choices, such as nutrition and physical activity, are key components in the treatment and management of diabetes. Please note: nutritional education may be offered in group classes or on an individual basis. The following are general guidelines for nutritional therapy:

General Nutrition Guidelines

Eat three meals each day (and snacks if recommended)
Eat at regular times (space main meals 4-6 hours apart with snacks, if required, eaten at least 2 hours before the next meal)
Eat foods high in fibre
Choose lower fat foods
Limit sugars and sweets
Limit "dietetic" foods
Caution fad diets
Limit salt and salty foods
Use Canada's Food Guide to Healthy Eating as a guide

Once an individual has an understanding of the general nutritional guidelines, more detailed information may be required to enhance diabetes management. Consider the following suggestions:

Nutrition Management For Diabetes

Carbohydrates	• 50-55% of the total caloric intake comes from carbohydrates • Found in foods such as grains and grain products, fruits, sweet vegetables and milk products • Sucrose intake of up to 10% of total daily energy intake is acceptable • Artificial sweeteners may be used in moderation • Sugar alcohols (Maltitol, Mannitol, Sorbitol, Isomalt and Xylitol) are nutritive sweeteners. An intake of ≤ 10g/day of sugar alcohols are thought to be safe. • Foods with low to moderate glycemic index (GI) should be selected more often than high GI foods
Protein	• 15-20% of total caloric intake comes from protein
Fat	• < 30% of total caloric intake comes from fats with less than 10% from saturated and trans fats and less than 10% from polyunsaturated fats
Alcohol	• Alcohol intake should be limited to ≤ 2 standard drinks/day or ≤ 14 standard drinks/week for men and ≤ 9 standard drinks/week for women
Vitamin and Mineral Supplements	• There is no evidence to support that individuals with diabetes benefit from taking vitamin and mineral supplements

Physical Activity

Regular physical activity helps to:

- Control blood glucose levels
- Improve lipid profile
- Lose weight
- Lower blood pressure
- Improve cardio respiratory fitness
- Decrease insulin resistance
- Decrease stress
- Increase vigor

Physical Activity Guidelines

Type	Recommendations	Example
Aerobic	• 150 minutes/week of moderate-intensity exercise • Spread out over 3 non-consecutive days • Increase to 4 or more hours/week • Sessions should be at least 10 minutes at a time	Brisk walking Biking Dancing Raking Leaves Swimming
Resistance	• 3 times/week • Start with 1 set of 10-15 repetitions • Progress to 2 sets of 10-15 repetitions • Then to 3 sets of 8 repetitions, 3 times/week	Weight lifting Weight machines

GOAL for Physical Activity:
150 minutes per week

d. Pharmacologic Strategies

This section is devoted to effectively managing **adult** Type 2 Diabetes.

Building Healthy Lifestyles Diabetes Program

INSULIN ACTION			
INSULIN	Rapid-Acting Analogue Humalog® (insulin lispro) Novorapid® (insulin aspart)	Fast-Acting Humulin®-R Novolin® ge Toronto	Intermediate-Acting Humulin®-L Humulin®-N Novolin® ge NPH
Appearance	Clear	Clear	Cloudy
Onset	10 – 15 min	0.5 – 1 hour	1 – 3 hours
Peak	60 – 90 min	2 – 4 hours	5 – 8 hours
Duration	4 – 5 hours	5 – 8 hours	Up to 18 hours

INSULIN ACTION			
INSULIN	Long-Acting Humulin®-U	Extended Long-Acting Analogue Lantus® *(insulin glargine)	Premixed Humalog® Mix25 TM Humulin® (20/80, 30/70) Novolin® (10/90, 20/80, 30/70, 40/60, 50/50)
Appearance	Cloudy	Clear	Cloudy
Onset	3 – 4 hours	90 min	A single vial or cartridge contains a fixed ratio of insulin (% rapid or fat-acting to % intermediate-acting insulin)
Peak	8 – 15 hours	None	
Duration	22 – 26 hours	24 hours	

*Approved, but not yet available in Canada

Source: DA, 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada, Vol. 27. Suppl.2.

Action Times of Insulin

Rapid-Acting (clear)

Humalog (insulin sispro) or Novorapid (insulin aspart) is a rapid-acting insulin that begins working 10 – 15 minutes after an injection. It peaks (works the hardest) in 60 – 90 minutes and last 4 – 5 hours in the system. This is an **INJECT** and **EAT** insulin.

Fast-Acting (clear)

Humulin R or Novolin Toronto is a short-acting insulin that begins working 30 – 60 minutes after an injection. This insulin peaks in 2 – 4 hours and lasts 5 – 8 hours in the system.

Intermediate-Acting (cloudy)

Humulin N or Novolin NPH is the most common intermediate acting insulin that begins working 1 – 3 hours after an injection. This insulin peaks in 5 – 8 hours and lasts up to 18 hours in the system.

Humulin L is a less common intermediate-acting insulin that begins working 1 – 3 hours after an injection. This insulin peaks in 5 – 8 hours and lasts up to 18 hours in the system.

Long-Acting (cloudy)

Humulin U is a long-acting insulin that begins working 3 – 4 hours after an injection. This insulin peaks in 8 – 15 hours and lasts 22 – 26 hours in your system.

Extended Long-Acting (cloudy)

Lantus (glargine): This insulin begins to work 90 minutes after an injection. This insulin does not peak and lasts 24 hours in the system.

Premixes (cloudy)

Premixes have a percentage of rapid or fast-acting to a percentage of intermediate-acting insulin mixed together: Humalog Mix 25; Humulin 20/80, 30/70; Novolin 10/90, 20/80, 30/70, 40/60, 50/50.

NOTE: The action of insulin may vary in each individual. Insulins in the same category should not be used together.

ORAL MEDICATIONS FOR TYPE 2 DIABETES

MEDICATION TARGET SITE	DRUG NAME GENERIC / TRADE	MAJOR ACTIONS	DOSAGE	DOSING SCHEDULE	PEAK	DURATION	HALF LIFE	COMMON ADVERSE EFFECTS
INSULIN SECRETAGOGUES								
PANCREAS	**Sulfonylureas – Second Generation**							
	Glyburide "Diabeta"	• Stimulates insulin secretion • Enhances the number and sensitivity of insulin receptors • Reduces hepatic glucose production	STARTING DOSE: 5 mg QD – BID MAXIMUM DAILY DOSAGE: 20 mg	• 1 – 2 times daily with breakfast and/or supper	2 – 4 hr	18 – 24 hr	10 hr	• Hypoglycemia • Nausea • Heartburn • Stimulates appetite • Usually not recommended for use in elderly due to hypoglycemic effect • Contraindicated with other insulin secretagogues
	Gliclazide "Diamicron"	• Same as Glyburide	STARTING DOSE: 80 mg QD – BID MAXIMUM DAILY DOSAGE: 320 mg	• 1 – 2 times daily with breakfast and/or supper	4 – 6 hr	12 – 24 hr	10 hr	• Hypoglycemia (usually not as pronounced as Glyburide) • Nausea • Tolerated better in the elderly • Contraindicated with other insulin secretagogues
	Gliclazide Modified Release "Diamicron" MR	• Same as Diamicron, modified release over 24 hours	STARTING DOSE: 30 mg QD MAXIMUM DAILY DOSAGE: 120 mg	• Once daily at breakfast time	6 – 12 hr	24 hr	16 hr	• Hypoglycemia (usually not as pronounced as Glyburide) • Nausea • Tolerated better in the elderly • Contraindicated with other insulin secretagogues
	Glimepiride "Amaryl"	• Require functioning Beta cells • Can increase sensitivity of penperal tissues to insulin	STARTING DOSE: 1 mg QD MAXIMUM DAILY DOSAGE: 8 mg QD	• Daily with breakfast or first main meal • Once 2 mg dosage is reached, titrate by no more than 1 mg at 1 – 2 week intervals	2 – 3 hr		9 hr	• Hypoglycemia • G.I. disturbances, such as nausea, fullness, vomiting, abdominal pain, diarrhea • Use cautiously with renal / hepatic dysfunction

ORAL MEDICATIONS FOR TYPE 2 DIABETES

MEDICATION TARGET SITE	DRUG NAME GENERIC / TRADE	MAJOR ACTIONS	DOSAGE	DOSING SCHEDULE	PEAK	DURATION	HALF LIFE	COMMON ADVERSE EFFECTS
	Meglitinides							
PANCREAS	**Repaglinide "Gluconorm"**	• Stimulates insulin secretion • Dependent upon functioning beta cells • Targets post-prandial blood glucose levels	STARTING DOSE: 0.5 – 4.0 mg TID with meals • A fourth dose may be given with an extra meal MAXIMUM DAILY DOSAGE: 16 mg	• 0.5 – 4 mg administered directly before meals 3 or 4 times per day • If meals are skipped or delayed, the dose of Gluconorm should be omitted or delayed • Dosage adjustments should be made at one week intervals • 2 hour post-prandial testing is helpful to assess effectiveness of Gluconorm • No snacks are required between meals	1 hour	Less than 4 hours	1.0 – 1.4 hr	• Hypoglycemia • Contraindicated with other insulin secretagogues (Sulfonylureas, Amino Acid Derivatives) • Contraindicated with Prandase (Acarbose) • Use cautiously in individuals with impaired liver function
	Amino Acid Derivatives							
	Nateglinide "Starlix"	• Stimulates insulin secretion • Dependent upon functioning beta cells • Targets post-prandial blood glucose levels	STARTING DOSE: 120 mg TID with meals • A fourth dose may be given with an extra meal MAXIMUM DAILY DOSAGE: 720 mg	• 120 – 180 mg administered directly before meals 3 or 4 times per day • If meals are skipped or delayed, the dose of Starlix should be omitted or delayed • 2 hour post-prandial testing is helpful to assess effectiveness of Starlix • No snacks are required between meals	1 hour	3 – 4 hr	1.5 hr	• Hypoglycemia • Contraindicated with other insulin secretagogues (Sulfonylureas, Amino Acid Derivatives) • Contraindicated with Prandase (Acarbose) • Use cautiously in individuals with impaired liver function

ORAL MEDICATIONS FOR TYPE 2 DIABETES

MEDICATION TARGET SITE	DRUG NAME GENERIC / TRADE	MAJOR ACTIONS	DOSAGE	DOSING SCHEDULE	PEAK	DURATION	HALF LIFE	COMMON ADVERSE EFFECTS
ALPHA-GLUCOSIDASE INHIBITORS								
SMALL INTESTINES	**Acarbose "Prandase"**	• Delays absorption of sucrose and complex carbohydrates from the gastrointestinal tract, therefore, decreasing post-prandial glucose peaks • Currently approved as monotherapy for Type 2 diabetes, but can safely be combined with both Biguanides and Sulfonylureas	STARTING DOSE: 25 QD MAXIMUM DAILY DOSAGE: 300 mg	• 3 times per day with meals, taken with the first mouthful of food • Start slow and go slow For example: Week 1: 25 mg QD Week 2: 25 mg BID Week 3: 25 mg TID • Adjustments based on 2 hour post-prandial glucose levels	1 hour	Minimal amount absorbed systematically	2 hours	• Gastrointestinal side effects such as: ➢ Fullness/bloating ➢ Diarrhea ➢ Flatulence • Weight loss • Hypoglycemia rare, but may occur when combined with a sulfonylurea or insulin • Treatment of hypoglycemia must be with Dextrosol tablets or B-D glucose tablets. Do not use other treatments as digestion is slowed by the action of Prandase • Do not use with Humalog or NovoRapid • Contraindicated with Gluconorm (Repaglinide) and Starlix (Nateglinide)
	INSULIN SENSITIZERS							
	Biguanides							
LIVER	**Metformin "Glucophage"**	• Lowers blood glucose by: • Inhibiting hepatic glucose production • Increases sensitivity of peripheral tissue to insulin leading to increased glucose uptake in muscles • May contribute to weight loss by decreasing appetite and slowing rate of glucose absorption from gut	STARTING DOSE: 500 – 850 mg QD - TID MAXIMUM DAILY DOSAGE: 2500 - 2550 mg	• 2 – 4 times daily with meals and h.s. • Take with food • Gradually increasing the dose minimizes gastrointestinal side effects	2 – 4 hr	6 hours	1.5-5hr	• Gastrointestinal side effects such as: ➢ Nausea ➢ Bloating ➢ Diarrhea • Side effects lessen with lower starting dosage and often gradually diminish over time • Contraindicated in renal impairment, liver disease, severe cardiorespiratory compromise e.g.: CHF, excessive alcohol intake (acute or chronic) • Discontinue metformin 48 hours prior to IVP, angiography or surgery; can be restarted once oral intake resumes and renal function is evaluated as normal

ORAL MEDICATIONS FOR TYPE 2 DIABETES

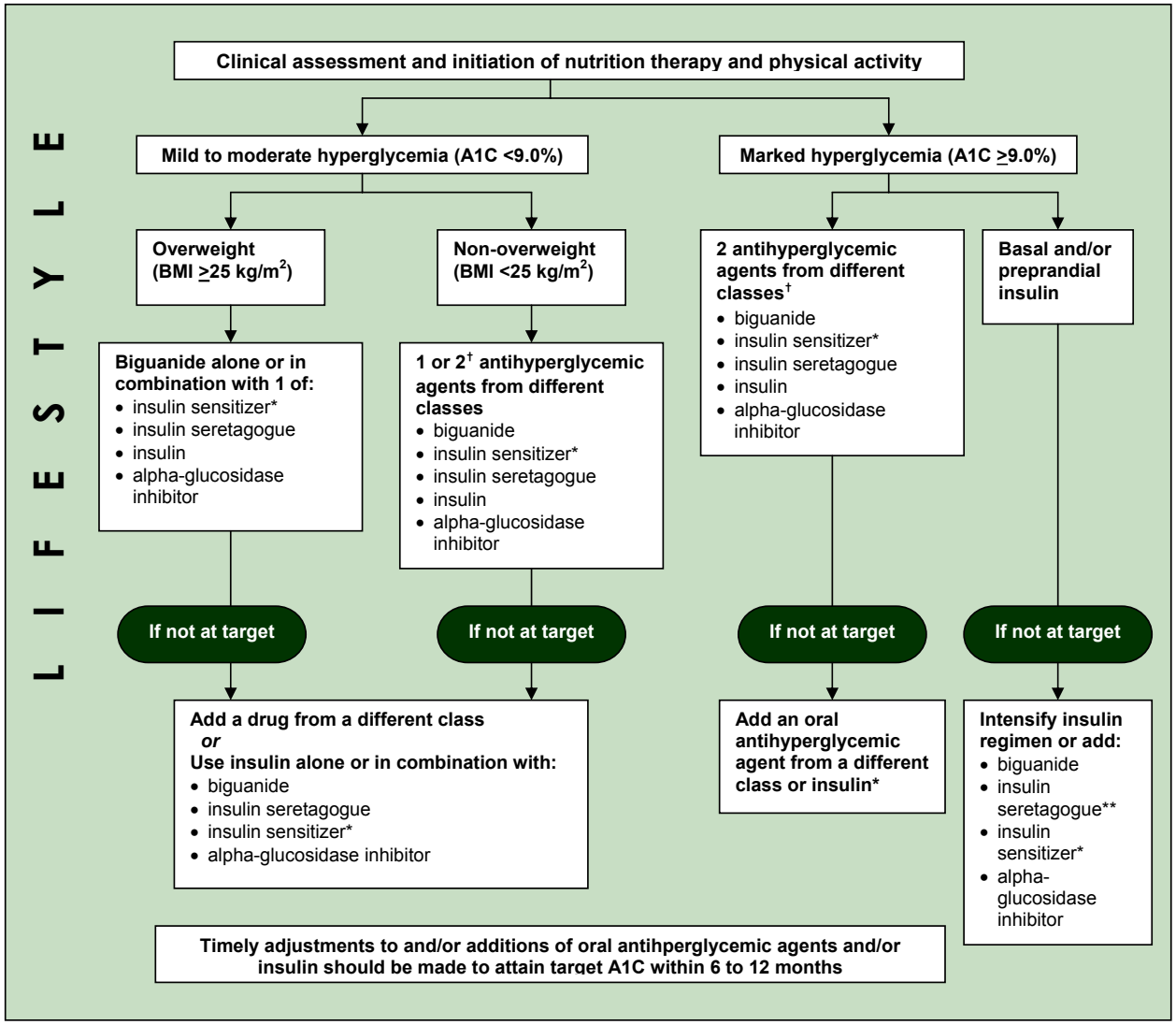
MEDICATION TARGET SITE	DRUG NAME GENERIC / TRADE	MAJOR ACTIONS	DOSAGE	DOSING SCHEDULE	PEAK	DURATION	HALF LIFE	COMMON ADVERSE EFFECTS
	Thiazolidinediones (TZDs)							
C E L L S	**Rosiglitazone "Avandia"**	• Decreases insulin resistance • Decreases circulating insulin levels • Decreases liver glucose output Also: ↑ HDL cholesterol ↑ LDL cholesterol ↑ Diastolic BP ↑ Micro-albuminuria	STARTING DOSE: 4 mg MAXIMUM DAILY DOSAGE: 8 mg	• Single daily dose or BID dose with or without food • Medication may take 8-12 weeks to have an impact on blood glucose levels, therefore, no dosage increases should be initiated prior to this time period • Baseline ALT liver enzyme should be drawn prior to initiation of therapy and evaluated every 2 months X 1 year and periodically thereafter • Do not initiate therapy if ALT greater than 2.5 times the upper limit of normal • Any ALT elevations above the normal range should be discussed with the physician prior to initiation of drug therapy	1 hour	24 hours	3 – 4 hr	• Upper respiratory infection • Headache • Anemia • Swelling • Use with caution in individuals who have liver problems and/or edema • Can cause fluid retention and exacerbate chronic heart failure • Watch for symptoms of heart failure and liver disease • May cause premenopausal women with insulin resistance (e.g.: polycystic ovary syndrome) to ovulate • Not indicated for use in individuals with New York Heart Association (NYHA) Class III and IV Cardiac Status
	Amino Acid Derivatives							
	Rosiglitazone Maleate/ Metformin Hydrochloride Tablets "Avandamet"	• Combined therapy in a single tablet • Refer to Avandia and Glucophrage	STARTING DOSE: 1 – 4 mg/500mg tablets once or twice daily	• Refer to Avandia and Glucophrage	Refer to Avandia and Glucophrage	Refer to Avandia and Glucophrage	Refer to Avandia and Gluco-phrage	• Refer to Avandia and Glucophrage

ORAL MEDICATIONS FOR TYPE 2 DIABETES

MEDICATION TARGET SITE	DRUG NAME GENERIC / TRADE	MAJOR ACTIONS	DOSAGE	DOSING SCHEDULE	PEAK	DURATION	HALF LIFE	COMMON ADVERSE EFFECTS
Thiazolidinediones (TZDs)								
C E L L S	**Pioglitazone "Actos"**	• Decreases insulin resistance • Decreases liver glucose output • Decreases circulating insulin levels Also: ↑ HDL ↓ Triglycerides	STARTING DOSE: 15 – 30 mg MAXIMUM DAILY DOSAGE: 45 mg	• Single daily dose with or without food • Medication may take 8-12 weeks to have an impact on blood glucose levels, therefore, no dosage increases should be initiated prior to this time period • Baseline ALT liver enzyme should be drawn prior to initiation of therapy and evaluated every 2 months X 1 year and periodically thereafter • Do not initiate therapy if ALT greater than 2.5 times the upper limit of normal • Any ALT elevations above the normal range should be discussed with the physician prior to initiation of drug therapy	2 hours 3 – 4 hr with food	24 hours	3 – 7 hr (just Actos) 16 – 24 hours (combined metabolites)	• Upper respiratory infection • Headache • Anemia • Swelling • Use with caution in individuals who have liver problems and/or edema • Can cause fluid retention and exacerbate chronic heart failure • Watch for symptoms of heart failure and liver disease • May cause premenopausal women with insulin resistance (e.g.: polycystic ovary syndrome) to ovulate • Not indicated for use in individuals with New York Heart Association (NYHA) Class III and IV Cardiac Status

Oral Hypoglycemic Agents are contraindicated:

- In Type I Diabetes
- In Diabetic Ketoacidosis
- In clients with known hypersensitivity to the drug or its inactive ingredients
- In clients who are pregnant, breastfeeding or planning a pregnancy



THERAPEUTIC NOTES

Key adverse effects

Gastrointestinal upset, loose bowels
biguanide

Hypoglycemia
insulin, insulin secretagogues (less with gliclazide, glimepiride, nateglinide and repaglinide than with glyburide)

Edema, fluid retention
insulin sensitizers, rarely with insulin

Moderate weight gain
insulin, insulin secretagogues, insulin sensitizers

Key precautions/contraindications

Hepatic disease
glyburide, biguanide, insulin sensitizers

Significant renal insufficiency
biguanide, sulfonylureas

Significant cardia failure
biguanide, insulin sensitizers

Sulfa allergy
sulfonylureas

* When used in combination with insulin, insulin sensitizers may increase the risk of edema or CHF. The combination of an insulin sensitizer and insulin is currently not an approved indication in Canada.

**If using preprandial insulin, do not add an insulin secretagogue.

†May be given as a combined formulation: rosiglitazone and metformin (Avandamet™).

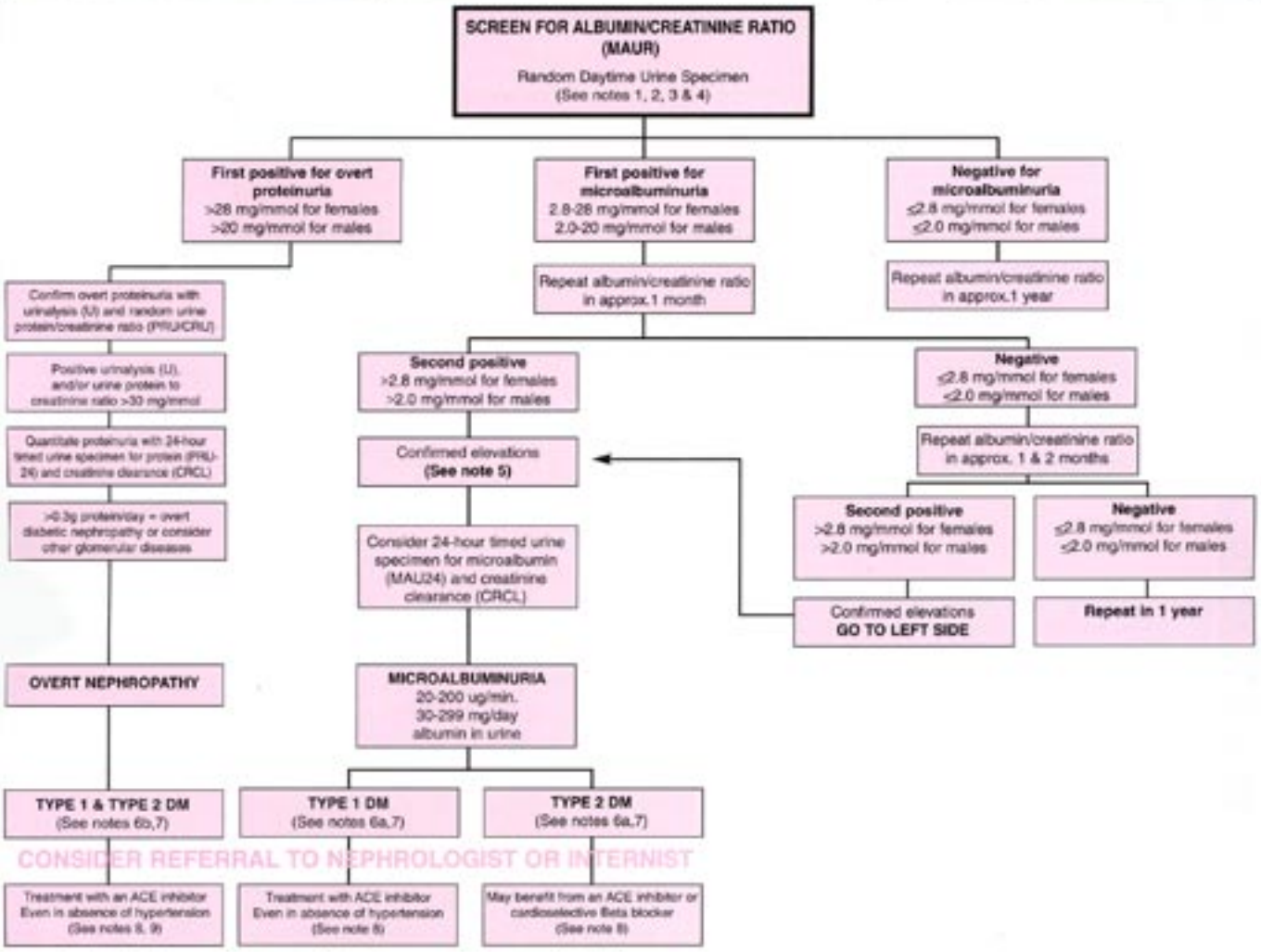
Physicians should refer to the most current *Compendium of Pharmaceuticals and Specialties (*Canadian Pharmacists Association, Ottawa, ON) and product monographs for detailed prescribing information.

A1C = glycosylated hemoglobin
BMI = Body Mass Index
CHF = Chronic Heart Failure

Adolescents (13-18 years of age) with type 2 diabetes should receive intensive counseling regarding lifestyle modification. If glycemic targets are not achieved using lifestyle modification alone, metformin or insulin should be considered.

Adapted from Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2003: S39.

Screening Protocol for Diabetic Nephropathy



1. Type 1 DM - screening initiated in individuals ≥15 years of age with a 5-year history of Type 1 DM.
2. Type 2 DM - screening initiated upon diagnosis and annually.
3. Avoid screening if patient acutely ill, febrile or engaging in strenuous activity.
4. Option - may use urine dipstick in clinic for proteinuria - if positive (>trace proteinuria) proceed directly to 24-hour timed urine specimen.
5. Confirmation required elevation in 2 out of 3 albumin/creatinine ratio measurements performed over 3 months. If uncertainty about elevation exists, consider a timed urine collection to measure the rate of microalbuminuria.

6a. Blood pressure goal ≤130/80

6b. With overt nephropathy BP goal ≤125/75

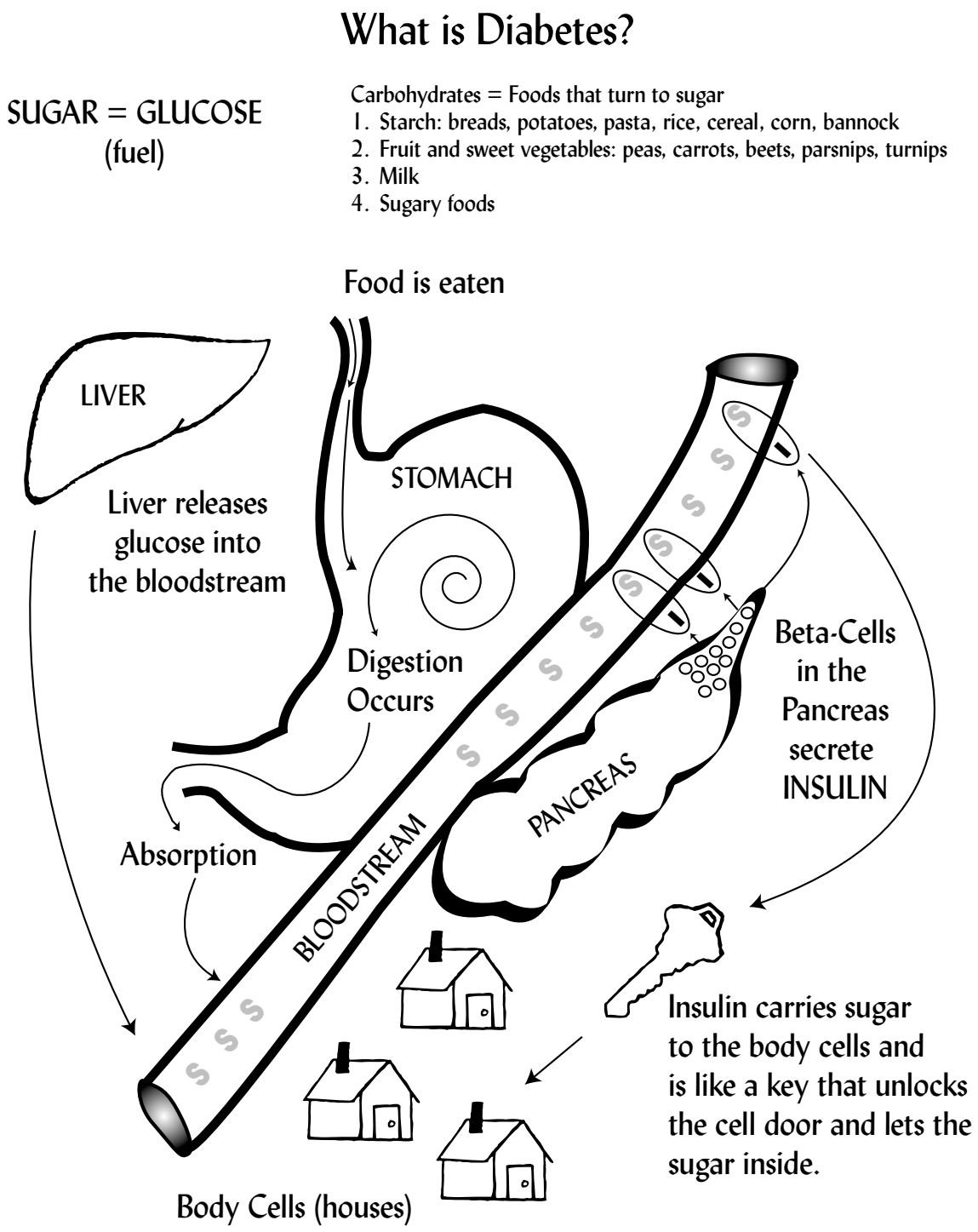
7. Other considerations:
   - Elimination of all CV risk factors (discontinue smoking, treat dyslipidemia)
   - Intensive glucose control
   - Protein as per recommended nutrient intake (consult dietitian)
   - Measure serum potassium and serum creatinine
   - If serum creatinine >130 umol/L discontinue Metformin
   - > 50% decrease in creatinine clearance rate requires a referral to a nephrologist or internist
8. ACE inhibitor use assumes no contraindications. Serum potassium and creatinine levels should be monitored 1-2 weeks after initiation of therapy or after each dosage change.
9. Monitor serum creatinine, serum potassium, 24-hour urine creatinine clearance and rate of proteinuria at least 2x/year.

**Adapted from the 1998 Clinical Practice Guidelines For The Management Of Diabetes in Canada.*

5. Management Strategies for Patients/Clients

What is Diabetes?

Diabetes is a chronic condition whereby the body cannot properly utilize carbohydrates (glucose) from the foods that are eaten. Insulin is needed to help the body use sugar for energy. When an individual develops diabetes, the pancreas either does not produce insulin or produces very little insulin (resulting in type 1 diabetes), or the body cannot properly use the insulin that is produced (causing or resulting in type 2 diabetes). When insulin is not available, the sugar from food stays in the bloodstream causing blood glucose levels to rise. A third type of diabetes, Gestational Diabetes, is a temporary condition that occurs during pregnancy.



Symptoms

Type 1 Diabetes: symptoms progress quickly and are dramatic.

Type 2 Diabetes: symptoms are slower to progress and often more subtle. Therefore, it is possible to have no apparent symptoms and be diagnosed at a non-related medical examination.

The classic symptoms of diabetes are:
Polyuria (increased urination)
Polydipsia (increased thirst)
Polyphagia (excessive hunger)

However, it is possible to have any combination of the following symptoms or no symptoms at all (especially with Type 2 diabetes).

1. **Polyuria (increased urination)** – When blood glucose is high, the kidneys will filter out excessive glucose into the urine. During this process, additional water is drawn from the tissues, resulting in large volumes of urine.

2. **Polydipsia (increased thirst)** - Increased thirst is caused by the body's need to replace the fluids that are lost through increased urination, thus trying to prevent dehydration.

3. **Polyphagia (excessive hunger)** – Due to lack or inefficient insulin, or the body's inability to use insulin (insulin resistance), the body cannot utilize its available glucose. Therefore, the body's need for energy (or rather more glucose) causes increased hunger.

4. **Fatigue/Weakness** – When glucose is unable to access the body's cells, there is no fuel source for energy, which can lead to the sensation of fatigue and weakness.

5. **Weight loss** – When the body is unable to utilize glucose as a fuel source for energy, the "starving" body cells convert fat stores to glucose. This "burning up" of fat stores results in weight loss.

6. **Blurred Vision** – High blood glucose can lead to a build up of glucose in the fluid of the eye. The excessive glucose draws in extra fluid, causing the eye's outer lens to change shape, thus distorting vision. This is a temporary change that usually improves after 6 - 8 weeks of improved blood glucose control.

7. **Impaired Healing of Wounds, Cuts and Infections** – In the presence of high blood glucose levels, the immune system is less effective, resulting in a perfect medium for the growth of bacteria and yeast. As a result, wounds, cuts and infections take longer to heal and women may be more prone to vaginal infections.

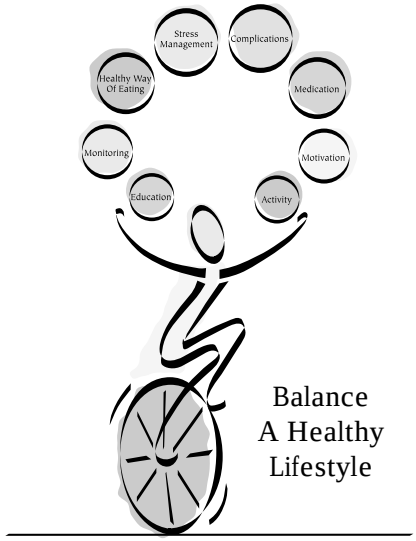
8. **Pain, Numbness or Tingling** – A build up of glucose on the lining of nerves and small blood vessels in the body's extremities can attribute to the sensations of pain, numbness and/or tingling. Most commonly, these sensations are felt in the hands and/or feet and may decrease with improved blood glucose control.

9. **Itchy skin** – High blood glucose leads to deposits of sugar crystals just beneath the skin's surface causing itchiness.

10. **Nausea, Vomiting, Abdominal Pain, Fruity Odor to the Breath and Coma** – are all the later signs and symptoms of high blood glucose that can occur when the body uses stored fat instead of glucose as an alternative source of energy. This use of fat produces an acid substance called ketones, which can build up in the blood and may lead to a diabetic ketoacidosis (DKA).

Diabetes Management

Individuals with diabetes can expect to live active, independent and vital lives if they make a lifelong commitment to careful management of the disease. As depicted in the image to the left, diabetes management may seem like a balancing act.



In order to "balance a healthy lifestyle", an individual may require ongoing motivation, education, dedication and support. The following components of diabetes management contribute to a healthy lifestyle:

Education – ongoing diabetes education is the key to understanding and successfully managing diabetes. All individuals who have diabetes should be given the opportunity to learn more about the condition in order to successfully manage diabetes and make healthy lifestyle choices.

Monitoring – self-monitoring of blood glucose levels is an essential component of diabetes management and is recommended for all individuals who have diabetes. Monitoring also includes monitoring for ketones when indicated and regular glycosylated hemoglobin (A1C) monitoring.

Healthy Way of Eating – what, when and how much an individual eats plays an important role in regulating blood glucose levels and promoting a healthy body weight. General guidelines for healthy eating may be adequate for individuals with Type 2 diabetes who do not require insulin therapy. However, a calculated meal plan or carbohydrate counting may be an option for individuals who require insulin or for women with diabetes during pregnancy.

Stress Management – both physical and/or mental stress may cause an increase in blood glucose levels. Acquiring and practicing effective stress management skills can not only bring an increased sense of calm and order to day to day life, but also helps individuals with diabetes to better manage their condition.

Complications – the onset of complications due to diabetes (increased risk of cardiovascular disease and stroke, retinopathy, nephropathy and neuropathy) may be delayed and even prevented through effective diabetes management. Early detection of complications may be achieved through regular screening of the eyes, heart, kidneys and feet and by monitoring blood pressure.

Medication – individuals who have Type 1 diabetes will always require daily injections of insulin. Multiple daily injections (3 - 4 per day) or the use of continuous subcutaneous insulin infusion (insulin pump), are usually required to achieve target blood glucose levels.

For many individuals, Type 2 diabetes may initially be controlled by following healthy eating guidelines and keeping active. Over time, however, due to the progressive nature of diabetes, oral antihyperglycemic agents and/or insulin therapy will most likely be required to achieve optimal blood glucose control.

Motivation – controlling diabetes requires an "around the clock" commitment from the individual with diabetes. The support of family and health professionals may help keep the individual motivated. Joining support groups or going to educational programs for diabetes may also help facilitate continued motivation.

Activity – regular physical activity helps control glucose levels, provides cardiovascular benefits, promotes healthy weight and facilitates general overall health and well-being.

Healthy Eating for People with Diabetes

When we eat, food breaks down into sugar (glucose) and goes into the blood stream. When you have diabetes, the body does not have enough insulin to move the sugar from your blood stream to your cells. The sugar stays in your blood and cannot be used by your body for energy.

Manage diabetes by balancing the kinds and the amounts of foods eaten.

Some foods raise blood sugar:

- **Carbohydrates** (sugar and starches): breads, cereals, fruits, vegetables and milk.

Some foods slow down how fast sugar goes into the bloodstream:

- **Protein foods:** meat, fish, poultry, cheese, eggs, tofu and peanut butter
- **Fats and oils:** butter, margarine, gravy, oil and salad dressings
- **Dietary Fiber:** whole grain breads and cereals, fresh

fruits, vegetables, dried peas, beans and lentils

Other factors can lower your blood sugar such as:

- **Activity**
- **Diabetes pills and insulin**

General Guidelines

1. **Eat three meals each day (and snacks if recommended)**. Work towards eating at least 3 of the 4 main food groups at each meal. Be sure to add a protein food. If you are overweight, choose smaller servings at your meals. DO NOT skip meals.

The food groups are:
- Starch (grain products)
- Fruits and Vegetables
- Protein (meat and alternatives)
- Milk products

2. **Eat at regular times.** The spacing and timing of meals is very important. Allow 4 - 6 hours between main meals. Eat snacks (if recommended) at least 2 hours before the next meal.
3. **Eat foods high in fibre.** These are whole grains breads and cereals, fruits, vegetables and legumes (dried peas, beans, lentils).
4. **Choose lower fat foods.** Limit the amount of fat you add to food, such as butter, margarine, gravy, cream, oil, mayonnaise and salad dressings. Test your culinary skills by baking, barbequing, boiling, roasting and broiling more often. Limit fried, creamed, breaded or scalloped dishes.
5. **Limit sugars and sweets.** Read labels carefully! Look for words that mean sugar, such as glucose, fructose, lactose, corn syrup, corn sweeteners, dextrose, sucrose and invert sugar. If sugar is in the first 3 ingredients, then the product or item is high in sugar.
6. **Limit dietetic foods.** This includes diet candy, diet cookies, diet chocolate, etc. Discuss the use of these foods with your dietitian.
7. **Limit salt and salty foods.** Eat fewer processed foods, condiments and snack foods. This may help control blood pressure. Try herbs and spices instead of salt. (e.g. Mrs. Dash™, Lawry's Natural Seasoning™, etc). Do not use No-Salt™, Half Salt™, or Co-Salt™ until you have discussed it with your dietitian.
8. **Keep active every day!** Walk, swim, stationary bike, etc.

Client Checklist for Diabetes

✓	What to expect at each office visit with your family physician:
	Review blood sugar results
	HgbA1C
	Check blood pressure
	Measure weight
	Measure waist circumference
	Check feet/lower legs
	Review nutrition
	Discuss activity
	Review medications
	Discuss tobacco use
	Discuss alcohol use
✓	**Tests & Measurements that should be done or discussed on a yearly basis, or as recommended by your health care team:**
	Cholesterol levels monitored (you must fast for 12-14 hours)
	Kidney screen (MAUR & MDRD)
	Urinalysis
	Dilation of eyes
	Monofilament foot assessment
	Support systems discussed
	Vaccinations Pneumococcal (once in a lifetime) Annual influenza vaccine
	Referral for further education (BHL)

6. Referral to Specialists/Specialty Program

a. and b. Indications for Referral to Medical Specialists and the Building Healthy Lifestyles Diabetes Program

1. Hypoglycemia unawareness
2. Severe hypoglycemia
3. Uncontrolled diabetes
4. Pregnancy and pre-existing diabetes
5. Persistent hyperglycemia
6. Complex management issues
7. Pump management

Please refer to the Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada for indications as to when to refer to a nephrologist and/or ophthalmologist as well as for hypertension and/or lipid management.

c. Local Contacts

For general information contact Building Healthy Lifestyles at 388-6654 or 1-866-506-6651.

Clinical Guides are available on-line at:

www.chinookprimarycarenetwork.ab.ca/extranet/resources/guides.php

7. References

a. Evidence

1. American Diabetes Association, 2002. Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 25: S5-S20, 2002
2. American Diabetes Association, 2004. Standards of Medical Care in Diabetes. Diabetes Care 27: S15-S35, 2004
3. BCHealthCare, 2003. Guidelines and Protocols-Advisory Committee. Diabetes Care Revised 2004
4. BCHealthCare, 2003. Resources for People with Diabetes
5. Building Healthy Lifestyles: Diabetes Program (2005). Diabetes Education. Chinook Health Region
6. Calgary Health Region (2004). Diabetes Template for Community Care Coordinators
7. Canadian Diabetes Association (2003). Building Competency in Diabetes Education: Advancing Practice
8. Expert Committee (2003). Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. Canadian Journal of Diabetes, Volume 27, Supplement 2
9. Lifescan/Canadian Diabetes Association 2004. New CDA 2003 Clinical Practice Guidelines-What do they mean to you?
10. National Kidney Foundation (2003). Kidney Disease Outcomes Quality Initiative. K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. Part 5. Evaluation of laboratory measurements for clinical assessment of kidney disease. Guideline 4. Estimation of GFR
11. UK Prospective Diabetes Study, 1999. Diabetes Today 1999; 2:22-24.

b. On-line Resources

Many individuals may find on-line resources helpful. Some of the key websites for additional information are listed as follows:

Canadian Diabetes Association	www.diabetes.ca
Alberta Monitoring for Health Program	www.diabetes.ca/Section_Regional/alb_amfh.asp
Healthy U	www.healthyalberta.ca
Health Canada	www.hc-sc.gc.ca/english/lifestyles/index.html
Alberta Centre for Active Living	www.centre4activeliving.ca
Dietitians of Canada	www.dietitians.ca
Nutrition Labeling Education Centre	www.healthyeatingisinstore.ca
Health Link Alberta	www.healthlinkalberta.ca
5 to 10 a day	www.5to10aday.com
Inform Alberta	www.informalberta.ca
National Aboriginal Diabetes Association	www.nada.ca

Supplementary Handouts Available

Living Well with Diabetes: Your Resource Calendar