Canadian Diabetes Association
2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada

Kathleen Gibson, RD CDE
SLICK Dietitian
September 2009
Outline

• Facts about Diabetes
• What are Clinical Practice Guidelines?
• What are the key areas for community practice?
• What is diabetes?
• Putting it into Practice
• How does SLICK fit in?
Facts: Diabetes in the 21st century

One of the most challenging health problems facing the world

- 246 million people worldwide diagnosed in 2007
- 5th leading cause of death in developed countries
- Complications – heart attacks, stroke, kidney failure, amputations and blindness
- 380 million people worldwide projected to be diagnosed by 2025
Facts: Diabetes in Canada

2.4 million Canadians living with diabetes
  • 1.9 million formally diagnosed in 2007
    – 570,000 Canadians have undiagnosed type 2 diabetes
  • More than 150,000 Albertans living with diabetes

6 million Canadians with pre-diabetes or at high risk of type 2 diabetes
  • Fastest growing population segments at highest risk!
    – Aboriginal
    – Asian, Southeast Asian, Latin American and African
    – “Boomers”
Facts: Economic Burden

**Worldwide**
- Over $1,500 billion est. cost

**USA**
- $174 billion est. direct and indirect cost

**Canada**
- $17.4 billion est. economic cost
Facts: Direct Acute Care Costs

Canada

- $5.6 billion est. direct costs in 2005
  - Estimated at $8.14 billion in 2016

1 in 10 hospital admissions

- 10% of 2,803,300 admissions in 2006 were for diabetes or diabetes-related complications
What is to be done?
Canadian Journal of Diabetes

Canadian Diabetes Association
2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada

A Publication of the Professional Sections of the Canadian Diabetes Association
What are Clinical Practice Guidelines?

- Comprehensive, evidence-based recommendations for health care professionals to consider in the management of their clients living with diabetes.
- First presented in 1998, and again in 2003 and 2008
- Every update includes the latest evidence related to the prevention and management of diabetes
- A reference tool to help translate the best available evidence into practice.
What are Clinical Practice Guidelines?

• Meant to help in the decision-making process
• But the actual treatment decisions are supposed to be individualized
• Client values and preferences need to be part of the decision-making process
• Hope that the use of these guidelines leads to better lives for people living with diabetes in Canada
Key Areas for our Practice

- Definition, Classification and Diagnosis of Diabetes (*S10*)
- Screening for Diabetes (*S14*)
- Prevention of Diabetes (*S17*)
- Management
  - Self Management (*S25*)
  - Targets (*S29*)
  - Lifestyle (Physical Activity, Nutrition Therapy) (*S37, S40*)
  - Pharmacological Treatments (*S46, S53*)
  - Hypoglycemia (*S62*)
  - Complementary and Alternative Medicine (*S91*)
Key Areas for our Practice - continued

• Complications
  • Heart Disease *(S95, S99, S102, S119, S123)*
  • Cholesterol *(S107)*
  • High Blood Pressure *(S115)*
  • Kidney Disease *(S126)*
  • Retinopathy (or eye damage) *(S134)*
  • Neuropathy (or nerve damage) *(S140)*
  • Foot Care *(S143)*
  • Sexual Health *(S147)*
Key Areas for our Practice - continued

- **Diabetes in Children**
  - Type 1 (*S150*)
  - Type 2 (*S162*)
- **Diabetes in Special Populations**
  - Diabetes and Pregnancy (*S168*)
  - Diabetes in the Elderly (*S181*)
  - Type 2 Diabetes in Aboriginal People (*S187*)
Basic Diabetes Information

When someone has diabetes, it means their body has difficulty making insulin, or has trouble using the insulin their body makes.

Insulin is required to get the glucose from our blood into the body to be burned as fuel.

The glucose in our blood comes from the food we eat.
Four terms related to diabetes (*S10*):

- Prediabetes
- Type 1 diabetes
- Type 2 diabetes
- Gestational diabetes
Diagnosis of diabetes *(S10)*

FPG $\geq 7.0$ mmol/L

*OR*

Casual PG $\geq 11.1$ mmo/L + symptoms of diabetes

*OR*

2hPG in a 75-g OGTT $\geq 11.1$ mmol/L
Risk factors for Type 2 Diabetes (*S14*)

- Older than 40 years old
- Family History
- Member of a high-risk population
- Female
- Gestational diabetes
- History of delivery of baby \( \geq 9 \text{ lbs} \)
Preventable Risk Factors (S14)

- Prediabetes
- High blood pressure
- High cholesterol
- Overweight
- Carrying your weight on your stomach
- Low physical activity levels
- Unhealthy eating habits
Screening for Diabetes \((S14, S187)\)

For adults with \(\geq 1\) additional risk factor:
A FPG every 1-2 years

For children 10 years old with \(\geq 1\) additional risk factor:
A FPG every 2 years

For very obese children (BMI \(\geq 99.5\%\)ile):
An OGTT every year
Prevention of Diabetes *(S17, S188)*

Programs need to be culturally appropriate

Focus on:

- Increasing awareness of diabetes
- Increasing physical activity
- Improving eating habits
- Achieving healthy body weights (loss of 5% of initial body weight)
- Creating an environment supportive of a healthy lifestyle

People with prediabetes may benefit from medication to help prevent type 2 diabetes.
Management of Diabetes

• Diabetes care depends on the daily commitment of the person with diabetes to self-management practices (S20)
• This daily commitment is supported by a multidisciplinary Diabetes Healthcare Team
  • Can include any or all of the following: Family physician, specialist, nurse, dietitian, CHR, pharmacist, social worker, SLICK team
Self management Education (S25)

- Increase the client’s involvement in, confidence with and motivation for control of their diabetes.
- A key part is self-monitoring of blood glucose, SMBG (using a glucometer, and knowing what the numbers mean)
- Healthy self-management behaviours include:
  - Healthy Eating
  - Checking blood glucose
  - Using medications
  - Physical Activity
  - Smoking Cessation
Targets for Control *(S29)*

- Good control of blood glucose is key to managing diabetes. Good control of blood glucose can reduce the risks of complications such as heart disease.
- Both fasting and post-meal glucose levels can play a role in complications.
- When setting treatment goals, individual risk factors need to be considered: age, presence of complications, awareness of low blood glucose
### Targets for Control - continued

<table>
<thead>
<tr>
<th>A1C</th>
<th>≤ 7.0 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Meals</td>
<td>4.0 – 7.0 mmol/L</td>
</tr>
<tr>
<td>After Meals</td>
<td>5.0 – 10.0 mmol/L</td>
</tr>
<tr>
<td>After Meals if A1C target not met</td>
<td>5.0 – 8.0 mmol/L</td>
</tr>
</tbody>
</table>
Monitoring Blood Glucose Control (S32)

A1C
• Every 3 months if targets are not met, and when treatment is being changed.
• Every 6 months if targets are regularly met and treatment is stable

SMBG
• Needs to be *individual* and depends on medications used
Physical Activity (S37)

1. At least 150 minutes of moderate aerobic physical activity each week. Spread over at least 3 days per week, with no more than 2 consecutive days without exercise.

2. All people with diabetes, including the elderly, should perform resistance exercise 3 times per week.

3. An exercise ECG stress test should be considered for activity more vigorous than brisk walking.
**Nutrition Therapy (S40)**

- Nutrition counselling by a registered dietitian, in either small group or one-on-one setting.
- Follow “Eating Well with Canada’s Food Guide”.
- Maintain regular timing and spacing of meals.
- Consistency with starchy foods is helpful.
- Choose foods with a low glycemic index.
- Caution is needed when taking insulin and using alcohol.
Medications in type 2 diabetes *(S53)*

- If targets are not met using lifestyle within 2-3 months, medication should be started.
- If the A1C >9.0% at diagnosis, medication(s) should be started along with lifestyle changes.
- Often more than one medication is needed to reach target A1C. This target should be achieved in 6 to 12 months.
- Metformin is often the first medication started.
- Basal insulin can be used along with oral medications.
Hypoglycemia *(S62)*

- Means a blood glucose < 4.0 mmol/L
- Can be caused by medications for clients with type 2 diabetes
- Treat a low blood glucose with 15g of carbohydrate (3 glucose tabs, 4 dextrose tabs, 3 tsp of sugar mixed with water, 175 mL regular pop), wait 15 minutes and check blood glucose again. Retreat if necessary.
- If the next meal is > 1 hr away, a snack can prevent a repeat low blood sugar.
Influenza and Pneumococcal Immunization (S86)

• People with diabetes should receive an annual influenza vaccine.

• People with diabetes should be considered for vaccination against pneumococcus.
Complementary and Alternative Medicine (S91)

• Up to 30% of people with diabetes use complementary and alternative medicine for various issues.
• Potentially serious problems
• Not enough evidence regarding safety and efficacy.

• Clients with diabetes should be routinely asked if they are using complementary and alternative medications.
Complications of Diabetes

- Heart Disease
- Kidney Disease
- Eye Disease
- Amputations
Complications Prevention (S102)

Step 1. Vascular protection
Step 2. Treat high blood pressure
Step 3. Protect the kidneys
Heart Disease

- People with diabetes develop heart disease 10-12 years earlier than someone without diabetes.
- The following individuals should be considered high risk:
  - Men ≥ 45 years and Women ≥ 50 years
  - Men < 45 years and Women < 50 years with more than 1 of:
    - Existing heart disease, kidney disease, eye disease, family hx, extreme single risk factor, diabetes > 15 years with age >30 years
- Assessment for heart disease risk should include:
  - Smoking, physical activity, nutrition, duration of diabetes, sexual function history, waist circumference, lipid profile, blood pressure, glycemic control, kidney function, periodic ECGs
Heart Disease - continued

• Baseline resting ECG should be performed in:
  • All people > 40 years
  • All people with duration > 15 years
  • All people with high blood pressure, kidney disease and/or reduced pulse

A repeat resting ECG should be done every 2 years in people considered at high risk for heart disease.
Heart Disease - continued

Vascular protection (S102) for all people with diabetes:
- Lifestyle modification (healthy body weight, healthy diet, physical activity, smoking cessation)
- Optimize blood pressure control (< 130/<80)
- Optimize blood glucose control (A1C ≤ 7.0%)

For people at high risk:
- ACE inhibitor or ARB therapy
- Low dose aspirin
- Lipid-lowering medication (LDL <2.0 mmol/L, TC:HDL < 4.0)
Heart Disease - continued

Lipid (S107)
Fasting lipid levels should be measured at diagnosis and then every 1-3 years. More frequent testing is needed if someone is on medication for lipids (at least once per year).

Blood Pressure (S115)
People with diabetes and high BP should be aggressively treated to reach the target of <130/80 mm Hg. This may require more than one medication.
Kidney Disease

Chronic kidney disease is one of the most common and devastating complication of diabetes. Fifty percent (50%) of people with diabetes have kidney disease. Kidney disease from diabetes is one of the leading causes of kidney failure in Canada. Screening for kidney disease: at diagnosis of diabetes and once a year afterwards.
Kidney Disease - continued

What is screening?

- Urine dipstick for protein: screens for other kidney disease

- Random Albumin to Creatinine Ratio (ACR): screens for the presence of very small proteins in the urine.
  - Men < 2.0 mmol/L
  - Women <2.8 mmol/L

- Estimated Glomerular Filtration Rate (eGFR): serum creatinine, age, gender
Kidney Disease - continued

To prevent the onset, and delay the progression:

1. Best possible control of blood glucose
2. Best possible control of blood pressure
   - Using an ACE inhibitor or ARB, has been shown to protect the kidneys.
Diabetic retinopathy is the most common cause of new cases of legal blindness in people of working age.

An estimated 2 million people in Canada have some form of diabetic retinopathy (just about everyone with diabetes!).

Vision loss is associated with a 4-fold increase in early death.
Eye Disease – Screening (S134)

When:
- At diagnosis for all people with type 2 diabetes.
- If retinopathy is not present, rescreen annually.

How:
- Gold standard is 7-field stereoscopic colour fundus photography with interpretation by a specialist.
- Direct ophthalmoscopy through dilated pupil
Eye Disease – Prevention \( (S135) \)

1. Best possible control of blood glucose
2. Best possible control of blood pressure
3. Best possible control of lipids
Nerve Damage *(S140)*

Detectable nerve damage will develop within 10 years of diagnosis in 40 to 50% of people with diabetes. Risk factors for nerve damage and pain are exposure to:

- high blood glucose
- high triglycerides
- overweight/obese,
- Smoking
- high blood pressure
Nerve Damage – Screening (S140)

At diagnosis and then annually.

Done using a 10-g Semmes-Weinstein monofilament or a 128-Hz tuning fork. (S199)

- Assessing the loss of sensation on the top and bottom of the foot.
- May include reflexes and assessment of pedal pulses
Foot Care *(S143)*

Foot problems are a major cause of illness and death in people with diabetes. Foot problems contribute to increased healthcare costs.

Foot examinations should be done by the individual daily and healthcare providers at least annually.

- Range of motion, callus pattern, bony deformities, skin temperature and sensation testing.
Erectile dysfunction affects 34 to 45% of men with diabetes.

Risk factors:
- Increasing age
- Duration of diabetes
- Poor control of blood glucose
- Smoking
- High blood pressure
- Poor control of lipids
- Cardiovascular disease
Type 2 in Children and Adolescents (S162)

Increasing in frequency over the past 20 years, especially in high risk populations.

Risk factors:

- Family history
- Overweight
- Impaired glucose tolerance
- Polycystic ovary syndrome, acanthosis nigricans
- Exposure to diabetes in utero
- High blood pressure
- High blood lipids
Type 2 in children

Management:
• Healthy eating
• Physical activity
• Attain a healthy body weight
• Family counselling
• Medications (metformin or insulin)
• Screening targets and frequency are the same as for adults with type 2 diabetes
  • At diagnosis and annually thereafter
Diabetes and Pregnancy (S168)

Pre-existing diabetes
• Best possible control of blood glucose before conception
  • Pre-pregnancy: A1C: ≤ 7.0%
  • During pregnancy
    – A1C: ≤ 6.0%
    – Fasting and before meals: 3.8 – 5.2 mmol/L
    – 1 hour after a meal: 5.5-7.7 mmol/L
    – 2 hours after a meal: 5.0-6.6 mmol/L
Gestational Diabetes

Onset happens during pregnancy.
Screening between 24 and 28 weeks gestation.

Initial screen is with a 50-g glucose load and blood glucose check 1 hour later.
If positive (between 7.8 and 10.2 mmol/L), then a 75-g OGTT is done.
If >10.3 mmol/L, then gestation diabetes
Gestational Diabetes - continued

Gestational diabetes is diagnosed if 2 of the following values are found on the OGTT. If only one is met, then Impaired Glucose Tolerance of pregnancy is diagnosed.

- Fasting blood glucose $\geq 5.3$ mmol/L
- 1 hour blood glucose $\geq 10.6$ mmol/L
- 2 hour blood glucose $\geq 8.9$ mmol/L

Once diagnosed, the targets are the same as for women with pre-pregnancy diabetes.
Gestational Diabetes- continued

During pregnancy

- A1C: ≤ 6.0%
- Fasting and before meals: 3.8 – 5.2 mmol/L
- 1 hour after a meal: 5.5-7.7 mmol/L
- 2 hours after a meal: 5.0-6.6 mmol/L

• Test blood glucose at both before and after meals (4 times a day)
• If targets are not met within 2 weeks using nutrition alone, then insulin should be started.
Postpartum

All mothers should be encouraged to breastfeed.

Gestation Diabetes

- OGTT 6 weeks and 6 months postpartum.
- Follow screening for diabetes guidelines.
- Get screened for diabetes when planning next pregnancy.
How can SLICK fit in?

**Complications Screening Team** (mobile and community-based)

Screen for:
- Blood Glucose Control (A1C, blood glucose)
- Cardiovascular (blood pressure, lipids, lifestyle counselling)
- Kidneys (urine dipstick, ACR)
- Eyes (visual acuity, gold standard photographs)
- Nerves (sensation testing)
Questions? Discussion?