Win by Losing: The Paradox in Heart Health Promotion

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• Speaker bureau:
  CDA, HSFC, AstraZeneca, Abbott, Bayer, Boehringer-Ingelheim, BMS, Janssen, Eli Lilly, Merck, Novo Nordisk, sanofi and Valeant

I will use some slides developed by the Cardiometabolic Risk Working Group
Learning Objectives

Following this workshop, the participant will be able to:

1. Understand the concept of metabolic syndrome and cardiometabolic risk
2. Explain the rationale for obesity management in people with prediabetes or cardiometabolic risk
3. Outline a comprehensive approach to assess and manage cardiometabolic risk
4. Outline a comprehensive approach to improve heart health in people with diabetes
The shape of things to come
The Changing Landscape of Modifiable CVD Risk Factors

- Smoking
- Hypercholesterolemia
- Hypertension
- Type 2 diabetes
- Abdominal obesity
- Metabolic syndrome

- Statins
- HBP medication
- Smoking cessation
- Sedentary lifestyle
- ↑ Energy density of food
**Definition of Obesity and Overweight by Body Mass Index (BMI)**

\[
\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}
\]

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m(^2))</th>
<th>Risk of co-morbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy wt</td>
<td>18.5-24.9</td>
<td>Normal</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0-29.9</td>
<td>Increased, High</td>
</tr>
<tr>
<td>Obese Class I</td>
<td>30.0-34.9</td>
<td>High, Very high</td>
</tr>
<tr>
<td>Class II</td>
<td>35.0-39.9</td>
<td>Very High</td>
</tr>
<tr>
<td>Class III</td>
<td>≥ 40.0</td>
<td>Extremely High</td>
</tr>
</tbody>
</table>

* WC (waist circumference) cut-offs: >102 cm men and >88 cm in women

Global Prevalence of Overweight and Obesity in 1980 and 2008

9.1 million people from 199 countries

Mean BMI in 2008
Men: 23.8 kg/m² (23.6-24.0)
Women: 24.1 kg/m² (23.9-24.4)

Average BMI of Canadian adults increased by 2 kg/m² to > 25 kg/m² (1981-2007)!

Prevalence of Overweight Adults

34% of adults and 17% children (age 2-19) in the US are obese
62% of Canadian adults were overweight or obese in 2008!

Prevalence of Obesity Among Adult Canadians

65% of men and 53% of women are overweight or obese!

Statistics Canada: Findings from the 2004 Canadian Community Health Survey. Ottawa, 2005
## Prevalence of Obesity in Canada
### Adjusted Self-reported Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Obesity Rate in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>22.3</td>
</tr>
<tr>
<td>2005</td>
<td>22.8</td>
</tr>
<tr>
<td>2007</td>
<td>23.8</td>
</tr>
<tr>
<td>2008</td>
<td>24.2</td>
</tr>
<tr>
<td>2009</td>
<td>24.9</td>
</tr>
<tr>
<td>2010</td>
<td>25.1</td>
</tr>
<tr>
<td>2011</td>
<td>25.3</td>
</tr>
</tbody>
</table>

Estimated Prevalence of Obesity in Canadian Adults (2000-2011)

Age-adjusted Percentage of U.S. Adults with Obesity or Diagnosed Diabetes

CDC’s Division of Diabetes Translation. National Diabetes Surveillance System
Available at http://www.cdc.gov/diabetes/statistics
Medical Complications of Obesity

Pulmonary Disease
- Abnormal function
- Obstructive sleep apnea
- Hypoventilation syndrome

Nonalcoholic Fatty Liver Disease
- Steatosis
- Steatohepatitis
- Cirrhosis

Gall Bladder Disease

Gynecologic Abnormalities
- Abnormal menses
- Infertility
- Polycystic ovarian syndrome

Idiopathic Intracranial Hypertension

Stroke
Cataracts
Coronary Heart Disease
Diabetes
Hypertension
Dyslipidemia

Severe Pancreatitis

Cancer
Breast, uterus, cervix, colon, esophagus, pancreas, kidney, prostate
Phlebitis
- Venous stasis

Osteoarthritis
Skin

Gout
All-cause Mortality and BMI

57 prospective studies
N = 894,576

Annual deaths per 1000

Overweight

Male
Female

Baseline BMI (kg/m²)

Prospective Studies Collaboration. Lancet 2009;373:1083-96
Mortality and BMI at Ages 35-79 Years

Annual deaths per 1000 & 95% CI (floated so matches EU rate at ages 35-79)

Baseline BMI (kg/m^2)

Adjusted for age, smoking and study; 1st 5 years of follow-up excluded

Lancet 2009;373:1083-96
INTERHEART Study: Abdominal Obesity Predicts Acute MI

Cardiometabolic Risk Factors

Abdominal obesity predicts CVD risk beyond BMI

Proportion of MI in the total population attributable to a specific risk factor

PAR: population attributable risk

From Yusuf S et al, 2004
### Waist Circumference Cut-points

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Cut Points</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Central obesity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European, Mid-east</td>
<td>&gt; 94 cm (37 in)</td>
<td>&gt; 80 cm (31.5 in)</td>
<td></td>
</tr>
<tr>
<td>S. Asians, Chinese</td>
<td>&gt; 90 cm (35 in)</td>
<td>&gt; 80 cm (31.5 in)</td>
<td></td>
</tr>
</tbody>
</table>

For East Mediterranean, Middle East (Arab) and sub-Saharan African, use European cut-points
For South and Central American and Japanese, use South Asian cut-points

Adapted from Lau DCW et al, Can Med Assoc J 2007;176 (8 suppl):S1-S13
### 2009 Harmonized Classification of the Metabolic Syndrome

Any 3 of the following for diagnosis:

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Cut Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central obesity</td>
<td></td>
</tr>
<tr>
<td>➢ Europids, Mid-east</td>
<td>Men: &gt; 94 cm (37 in)</td>
</tr>
<tr>
<td>➢ S. Asians, Chinese</td>
<td>Men: &gt; 90 cm (35 in)</td>
</tr>
<tr>
<td>➢ Japanese</td>
<td>Men: &gt; 85 cm (33 in)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>&gt; 1.7 mmol/L (150 mg/dL)</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td></td>
</tr>
<tr>
<td>➢ Men</td>
<td>&lt; 1.03 mmol/L (40 mg/dL)</td>
</tr>
<tr>
<td>➢ Women</td>
<td>&lt; 1.29 mmol/L (50 mg/dL)</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>≥ 130 Syst. or ≥ 85 mm Hg or Rx</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>≥ 5.6 mmol/L (100 mg/dL)</td>
</tr>
</tbody>
</table>

Abdominal Adiposity and Increased Cardiometabolic Risk

Visceral fat = High Risk

- Inflammatory Markers ↑
- Free Fatty Acids ↑
- Adipokine Secretion ↑

Dyslipidemia
Insulin resistance
Inflammation
Increased Cardiometabolic Risk

Adapted from Lau DCW, et al. Can J Cardiol 2006;22(suppl B):85-90B
Adipokines and Cardiometabolic Risk

Adipokines and Cardiometabolic Risk

Inflammation

↑ IL-6

↑ CRP

↑ TNFα

↑ Adipsin (Complement D)

↓ Adiponectin

Fat

↑ Chemokines

↑ Angiotensinogen

↑ Insulin

↑ FFA

↑ Resistin, RBP4

↑ Leptin

↓ Visfatin, omentin, vaspin

↑ Plasminogen activator inhibitor-1 (PAI-1)

Hypertension

Angiogenesis

Atherosclerosis

Thrombosis

Abdominal Obesity and Ectopic Fat Accumulation

↑ Caloric intake and/or ↓ Energy expenditure

Positive energy balance

Excessive and inflamed adipose tissue

↑ FFA

Lipid overflow into liver, pancreas, muscle, heart and visceral compartment

Imbalance between loading and export of lipids results in ectopic fat accumulation at organs

Adapted from www.myhealthywaist.com
Potential Contribution of Ectopic Fat Deposition to the CMR Profile of Intra-abdominally Obese Patients

- Intra-abdominal (visceral) adipose tissue↑
- Insulin-resistant subcutaneous adipose tissue
- Systemic FFA↑
- Hepatic lipase↑
- Portal free fatty acids↑
- Lipoprotein lipase↓
- Insulin resistance
- Insulin↑
- Glucose↑
- Triglycerides↑
- ApoB↑
- IL-6↑
- TNFα↑
- PAI-1↑
- Adiponectin↓
- Coronary atherosclerosis unstable plaque
- Altered CMR profile

Adapted from Després JP. Ann Med 2006;38:52-63
Visceral Obesity is Associated with a Cluster of Metabolic Abnormalities Often Described as the “Metabolic Syndrome”

These features lead to type 2 diabetes and cardiovascular disease

- Hypertriglyceridemia
- Low HDL-cholesterol
- Elevated apoB
- Small, dense LDL-C particles
- Inflammatory profile
- Insulin resistance
- Hyperinsulinemia
- Glucose intolerance
- Impaired fibrinolysis
- Endothelial dysfunction

Adapted from Després JP et al. NEJM 1996; 334:952-57
Lamarche B et al. JAMA 1998; 279:1955-61
Abdominal Obesity and BMI

# Revised Estimates of BMI and Waist Circumference in Asians

<table>
<thead>
<tr>
<th>BMI Target</th>
<th>Asian BMI Target</th>
<th>Risk</th>
<th>Waist Circumference Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
<td>&lt;18.5</td>
<td>Low</td>
</tr>
<tr>
<td>Ideal Range</td>
<td>18.5-24.9</td>
<td>18.5-22.9</td>
<td>Average</td>
</tr>
<tr>
<td>Overweight</td>
<td>25 or more</td>
<td>23 or more</td>
<td>Increased</td>
</tr>
<tr>
<td>Obese I</td>
<td>30-34.9</td>
<td>25-29.9</td>
<td>Moderate</td>
</tr>
<tr>
<td>Obese II</td>
<td>35 or more</td>
<td>30 or more</td>
<td>Severe</td>
</tr>
</tbody>
</table>

South Asians Have a Unique Cardiovascular Risk Profile

As compared across healthy volunteers of South Asian, Chinese, and European origin residing in Canada

- ↑ Dysglycemia
- ↑ LDL-C; ↓ HDL-C
- ↓ Tobacco use
- ↑ Abdominal obesity
- ↑ Metabolic syndrome
- ↑ hsCRP
- ↑ Homocysteine
- ↑ Lipoprotein (a)
- Impaired fibrinolysis
- Altered dietary practices

In multivariate analysis, South Asian ethnicity was an independent risk factor for CVD (OR 4.5)

2006 Canadian clinical practice guidelines on the management and prevention of obesity in adults and children [summary]

www.cmaj.ca/cgi/content/full/176/8/S1/DC1

Lau DCW et al, Can Med Assoc J 2007;176 (8 suppl):S1-S13
Obesity Treatment Pyramid

Obese Class 3
BMI ≥ 40 kg/m²

Obese Class 2
BMI ≥ 35 kg/m²

Obese Class 1
BMI ≥ 30 kg/m²

Overweight
BMI ≥ 25 kg/m²

Adapted from Lau DCW et al, Can Med Assoc J 2007;176 (8 suppl):S1-S13
Overweight or Obese Adult
Measure BMI
Measure WC (if BMI < 35 kg/m²)

Health team to advise lifestyle modification program

Lifestyle modification program
Nutrition: 500-1000 kcal/day reduction
Physical Activity:
Evaluation before starting activity. Initially 30 min of moderate activity 3-5 times/wk, eventually ≥ 60 min on most days. Add endurance exercise training.
Cognitive Behaviour therapy

Satisfactory progress or goal achieved

Regular monitoring
Assist with weight maintenance
Reinforce lifestyle modification

Weight maintenance & prevent regain
Nutritional therapy
Physical Activity
Cognitive-behavior therapy
Address other risk factors
Monitor wt, BMI and WC every 1-2 yrs.

Conduct clinical and lab investigations to assess comorbidities BP, HR, fasting glucose and lipid profile

Assess and screen for depression, eating and mood disorders

Treat comorbidities and health risks

Assess barriers to weight loss and readiness to change behaviours

Devise goals and lifestyle modification program for weight loss & ↓ risk factor
5-10% of body weight loss or 0.5-1 kg (1-2 lb)/ week over 6 months

Pharmacotherapy
BMI ≥ 27 + RF or BMI ≥ 30
Adjunct to health behaviour modification.
Consider if patient has not lost 0.5 kg or 1 lb/wk by 6 mos. after lifestyle changes.

Bariatric surgery
BMI ≥ 35 + RF or BMI ≥ 40
Consider if other weight loss attempts have failed.
Requires lifelong medical monitoring.

No

CPG Treatment algorithm for obesity

Lau DCW et al, CMAJ 2007;176(8):1103-1106
1. Obesity is a chronic condition which requires a long-term and sustainable treatment approach.

2. Successful obesity management is about improving health and well-being, and not just weight loss.

3. Early intervention means addressing root causes and removing barriers.

4. Success is different for every individual.

5. A person’s best weight may never be an ideal weight.
Patients must be ready to consider change before it can happen!

- Patients cannot accept the progressive and chronic nature of obesity without understanding the root causes of their obesity
- Early identification and management of treatment drivers and barriers to weight management is key to long-term success and patient commitment
General Approach to Assessing CMR

Identification
Reached guideline screening threshold
– Patients ≥ 40 years
– In patients 18-39 years (if high risk ethnic background and/or family history of premature CVD)

Risk Factors
– Overweight/Obese/Abdominally Obese – increased BMI or WC
– Elevated BP
– Diet high in total or saturated fats
– Family history of premature CVD or diabetes

Comprehensive Risk Assessment
- Abdominal obesity – consider ethnic specific cutoffs
- Fasting glucose ≥ 6.1 mmol/L
- LDL-C > recommended treatment threshold
- Triglycerides ≥ 1.7 mmol/L
- HDL-C (Men) < 1.0 mmol/L; (Women) < 1.3 mmol/L
- BP ≥ 140/90 mmHg (≥ 130/80 mmHg in pt with DM/CKD)
- Additional investigations as indicated; renal function, A1C, ECG, exercise stress test, apoB, hs-CRP

Adapted from Leiter LA et al. Can J Cardiol 2011; 27:e1-e33
Assess and Calculate the CMR

1. **Global CMR** (CVD and DM):
   - Assessing qualitative sources of risk
     - Age, gender, family history, smoking status
     - Abdominal obesity
     - Elevated BP, dysglycemia, dyslipidemia
     - Renal function
     - Ethnic origin

2. **METABOLIC SYNDROME** Diagnosis
   - Presence of required number of factors
   - Use harmonized AHA/IDF definition

3. **Quantify the risk:**
   - **Absolute CV Risk Calculation**
     - Use validated CV risk prediction tool eg.
       - Framingham Risk Score
       - Reynolds Risk Score

4. **METABOLIC SYNDROME** Factor
   - Metabolic syndrome increases absolute risk by a factor of 1.5 to 2.0

**Total CMR = Absolute CV Risk x 1.5 to 2.0**
Cardiometabolic Complications of Obesity

- Obesity-related Insulin resistance and diabetes
- Metabolic Syndrome
  - Abdominal obesity (High waist circumference values)
  - Dyslipidemia ($\uparrow$ TG; $\downarrow$ HDL-C; $\uparrow$ Apo B)
  - High Blood Pressure
  - Dysglycemia (FPG > 5.6 mmol/L)
- Inflammation ($\uparrow$ hs-CRP, $\uparrow$ IL-6 and IL-18)
- Prothrombotic state

Relative Risk of Morbidity and Mortality Associated with the Metabolic Syndrome (Meta-analysis)

General Approach for Patients with ↑ Cardiometabolic Risk

Patient with ↑ CMR

Health behaviour modification

If not achieving treatment targets

Pharmacologic and/or surgical interventions

Adapted from Leiter LA et al. Can J Cardiol 2011;27:e1-e33
What is Successful Weight Management?

Natural Course of Weight Gain

Starting weight

Body weight (kg)

Weight loss phase

Weight maintenance

Weight maintenance phase

Months

Years
Is Modest Weight Loss Beneficial?

Yes!
Aim: Can lifestyle intervention or metformin prevent type 2 diabetes in high risk people (IGT)?

RCT Design:
- 7% body weight loss (diet + 150 min/wk exercise)
- Metformin 850 mg BID

- N = 3234 (M/F: 33/67), mean age 51 years
- Wt. 94 kg, BMI 34 kg/m², WC 105 cm
- FPG 5.8 mmol/L, A1C 5.9%

Modest Weight Loss Prevents Diabetes!

1.2% /year Weight Loss = 58% Diabetes Risk Reduction
Metformin = 31% ↓ RRR
DPP-OS: 10-year Incidence of Diabetes

Diabetes Risk Reduction: 34% with Lifestyle and 18% with metformin
Median delay in diabetes: 4 yrs by lifestyle and 2 yrs by metformin

The LOOK AHEAD Trial: Benefits of Lifestyle Intervention in Type 2 Diabetes

- Study began in 2001; estimated completion 2014
- 5,145 overweight/obese subjects with type 2 diabetes, aged 55-75 years treated by intensive lifestyle modification or usual approach
- Primary endpoints: Long-term CVD and other health outcomes
- Control group: education/support group, 3 group sessions per year
- Lifestyle intervention group:
  - goal 175 minutes/week of physical activity
  - prepared meals, liquid formulas
  - regular individualized/group support
- Results at 4 years:
  - weight loss: -6.15% vs. -0.88% ($p < 0.001$)
  - fitness, A1C, SBP, HDL-C levels better in intervention group

Look AHEAD: Results at 4 years

Weight
Average across visits: -5.27 (P<0.001)

Fitness
Average across visits: -10.78 (P<0.001)

A1C Level
Average across visits: -0.27 (P<0.001)

SBP
Average across visits: -2.36 (P<0.001)

Benefits of Modest Weight Loss

1 kg of weight loss is associated with:

• ↓ CHD risk by 6% in women and 3% in men

• 1 mm Hg ↓ in both systolic and diastolic BP

• ↓ TC 1%, LDL-C 0.7%, TG ~2% and ↑ HDL-C 0.2%

• ↓ 0.2 mmol/L glucose

• 1 kg (1.1%) body weight loss is associated with a 16% RRR in risk for diabetes

• Similar benefits in overweight people with DM2

Hypocaloric Diets: Weight Changes During 2 Years

Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

Frank M. Sacks, M.D., George A. Bray, M.D., Vincent J. Carey, Ph.D., Steven R. Smith, M.D., Donna H. Ryan, M.D., Stephen D. Anton, Ph.D., Katherine McManus, M.S., R.D., Catherine M. Champagne, Ph.D., Louise M. Bishop, M.S., R.D., Nancy Laranjo, B.A., Meryl S. Leboff, M.D., Jennifer C. Rood, Ph.D., Lilian de Jonge, Ph.D., Frank L. Greenway, M.D., Catherine M. Loria, Ph.D., Eva Obarzanek, Ph.D., and Donald A. Williamson, Ph.D.

This randomized trial compared the effect of reduced-calorie diets with various compositions of fat, protein, and carbohydrates on weight loss over a 2-year period. Compliance with the diets was not high. No significant differences in weight loss were observed among the various diets. Reduced-calorie diets appear to have similar effects on weight loss regardless of their particular compositions.
Similar Weight Loss with All Diet Groups

Physical Activity Needed for Weight Maintenance

- 80 min/day of moderate activity ¹
- 35 min/day of vigorous activity ¹
- 77 min/day of moderate activity ²
- 33 min/day of vigorous activity ²
- 60-90 min/day of moderate activity ³
- 45-60 min/day of higher intensity ³

¹ Schoeller et al, AJCN 66:551-556, 1997
² Weinsier et al, AJCN 75:499-504, 2002
³ Stock conf, Ob Res, 2003
Principles of Pharmacologic Therapy for Cardiometabolic Risk

• Health behavioural (diet and exercise) therapy, including smoking cessation, is fundamental

• Recommendations should follow existing Canadian single-factor guidelines for lipids, hypertension, diabetes, obesity

• More subtle disease states or special circumstances may still warrant pharmacotherapy (e.g. IGT, evidence of CKD)

Dyslipidemia warranting therapy is “intertwined” with consideration of Metabolic Syndrome for final CVD risk assessment (ie will affect all Metabolic Syndrome patients, especially those with FRS or RRS of > 5%/10 yrs)

Chose drugs that will not aggravate the Metabolic Syndrome component risk markers

Bariatric surgery: when BMI > 40 kg/m² or BMI > 35 kg/m² plus comorbid conditions, and only when lifestyle and medical therapy have failed and there is an acceptable operative risk

Bariatric Surgery

Indications: When BMI > 40 kg/m² or BMI > 35 kg/m² plus comorbid conditions, and only when lifestyle and medical therapy have failed and there is an acceptable operative risk

Adjustable laparoscopic gastric banding
Roux-en-Y gastric bypass
Sleeve gastrectomy
Biliopancreatic diversion

Lau DCW Can Diabetes 2010;23:3-13
Adjustable Gastric Banding

Restrictive
- 0.05% mortality
- Minimal metabolic effects
- Good results in trials from Europe and Australia
- > 50% excess weight loss
- 10-20% re-operation rate:
  - Port site infection/ malfunction
  - Gastric slippage
  - Band erosion

Roux-en-Y Gastric Bypass

Combination (Restrictive & malabsorptive)

- 0.5% mortality
- 5-30 mL gastric pouch
- 75-150 cm alimentary limb
- > 67% excess weight loss
- Laparoscopic approach becoming the gold standard

Sleeve Gastrectomy

Restrictive

- Complication rate: 0 - 24%
  - 0 - 15% in 11 studies with N >100
- 5 post-operative mortalities (0.19%)
- Good excess weight loss
- Technically less complicated
- Safe

Biliopancreatic Diversion (BPD)

**Malabsorptive**
- 0.5% mortality
- Distal gastrectomy
- 250 cm alimentary limb
- 50-75 cm common limb
- > 75% excess weight loss
- Lesser degree of nutrient absorption:
  - Vitamin deficiency
  - Metabolic anomalies
Bariatric Surgery: Change in Metabolic Syndrome Components

Baseline and follow-up prevalence of Metabolic syndrome components in bariatric surgery and non-operative patient groups

### Summary: Bariatric Surgery for Diabetes

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Effective and sustained long-term weight loss &gt; 10%</td>
<td>• Surgical complications (short- and long-term)</td>
</tr>
<tr>
<td>• More patients achieve glycemic and metabolic goal targets</td>
<td>• Remission not achieved in all patients who achieved &gt; 10% wt loss</td>
</tr>
<tr>
<td>• Reduction in anti-diabetic medications</td>
<td>• Long surgical wait list</td>
</tr>
<tr>
<td>• No hypoglycemia</td>
<td>• Requires long-term follow-up</td>
</tr>
<tr>
<td>• May be cost-effective</td>
<td>• Long-term efficacy and safety data not available</td>
</tr>
</tbody>
</table>

Vascular Protective Measures Are Essential for All Patients with \( \uparrow \) Cardiometabolic Risk

**Optimize BP**
- Initiate behavioural changes
  - Daily exercise
  - Appropriate diet
- If BP >140/90 mmHg (or >130/80 in DM or CKD), after behavioural changes are made, consider pharmacotherapy as per 2011 CHEP guidelines

**Optimize Blood Glucose Levels**
- Initiate behavioural changes
  - Daily exercise
  - Appropriate diet
- If A1C >6.5% after behavioural changes are made, consider pharmacotherapy as per 2008 CDA guidelines

**Optimize Lipid Levels**
- Initiate behavioural changes with pharmacotherapy if necessary (see next point)
  - Daily exercise
  - Appropriate diet
- Pharmacotherapy
  - High risk: Initiate statin Tx immediately
  - Intermediate risk:
    - If LDL-C >3.5mmol/L, start statin Tx
    - If CRP >2mg/L, start statins (if age appropriate)
    - Multiple CMR risk factors, initiate statin treatment
  - Low risk: Observe and if LDL-C >5.0mmol/L, initiate statin treatment

**Smoking Cessation**
- Smoking cessation counselling
- Consider group therapy and medication support (nicotine replacement, bupropion, varenicline)

Adapted from Leiter LA et al. Can J Cardiol 2011; 27:e1-e33
General Approach for Patients with ↑ Cardiometabolic Risk

Patient with ↑ CMR

Health behaviour modification

If not achieving treatment targets

Pharmacologic and/or surgical interventions

Adapted from Leiter LA et al. Can J Cardiol 2011;27:e1-e33
Management of Cardiometabolic Risk

• Health behaviour interventions are cornerstone therapy:
  - Achieve and maintain a healthy body weight
  - Regular physical activity
  - Healthy diet
  - Smoking cessation
  - Moderate alcohol consumption

• Vascular protective measures, including pharmacotherapy in appropriate patients, to reduce cardiometabolic risk

• A multidisciplinary team approach is desirable to adequately address cardiometabolic risk factors

• Health care professionals should consider ethnicity-related risk factors to appropriately evaluate all individuals in their diverse patient populations

Managing Patients with Abdominal Obesity and Increased Cardiometabolic Risk

Abdominal Obesity  Risk Factors  Coronary heart disease

- Hypertension
- Dyslipidemia
- Type 2 diabetes

Treating the cause

Management of coronary heart disease risk

Adapted from Després J-P. Br Med J 2001;322:716-720
Key Messages

• Metabolic syndrome is common and is associated with increase risk for diabetes and cardiovascular disease
• Health behaviour interventions are the cornerstone therapy for people with increased cardiometabolic risk
• 1 kg of weight loss is associated with a 16% reduction in diabetes risk and heart health
• Win by losing!
“Superior Doctors Prevent the Disease. Mediocre Doctors Treat the Disease Before Evident. Inferior Doctors Treat the Full Blown Disease.”

Huang Dee, 2600 B.C.

In Nai Ching, 1st Chinese Medical Text
Mindful Eating and Get Fit!
Thank you

Questions?