

---

---

---

---

---

---

---

---

**Disclosures**

- Research funding:  
CIHR, AHFMR, Alberta Cancer Board, AstraZeneca, BMS, Dainippon, GSK, Eli Lilly, Pfizer and sanofi-aventis
- Consultant or advisory board member:  
Abbott, Allergan, AstraZeneca, Bayer, Boehringer-Ingelheim, GSK, Eli Lilly, Merck, Novartis, Novo Nordisk, Pfizer, Roche, sanofi-aventis, Sepracor
- Speaker bureau:  
CDA, HSFC, AstraZeneca, Abbott, Bayer, Boehringer-Ingelheim, Eli Lilly, GSK, Merck, Novo Nordisk, Pfizer sanofi-aventis and Sepracor

---

---

---

---

---

---

---

---

**Outline of Talk**

- To review prevalence and health consequences of obesity
- To understand the link between obesity and chronic diseases, optimal health and longevity
- To review evidence-based approach to the management and prevention of obesity

---

---

---

---

---

---

---

---

### Chronic Disease Prevention – Why?

- Two-thirds of all deaths globally can be attributed to cardiovascular disease & cancers
- At least half of all new cancers are due to preventable factors
- Prevention offers the most cost-effective, long-term strategy for preventing cardiovascular disease, diabetes and cancers

World Cancer Research Fund & Amer Inst Cancer Research. 2007

---

---

---

---

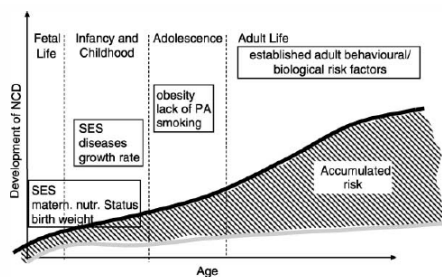
---

---

---

---

### Life Course of Non-communicable Chronic Diseases



Darnton-Hill I, et al. Public Health Nutr 2004;7(1A):101-121

---

---

---

---

---

---

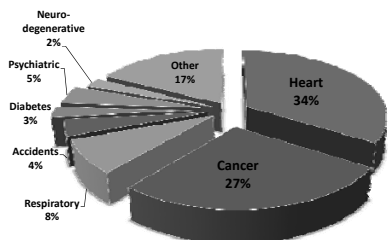
---

---

### Burden of Chronic Diseases in Canada

2/3 deaths are attributed to CVD, Cancers & Diabetes

Causes of Death in Canada



Statistics Canada 2009

---

---

---

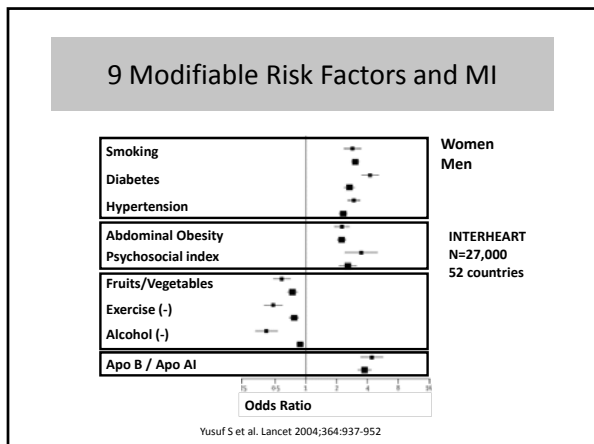
---

---

---

---

---




---

---

---

---

---

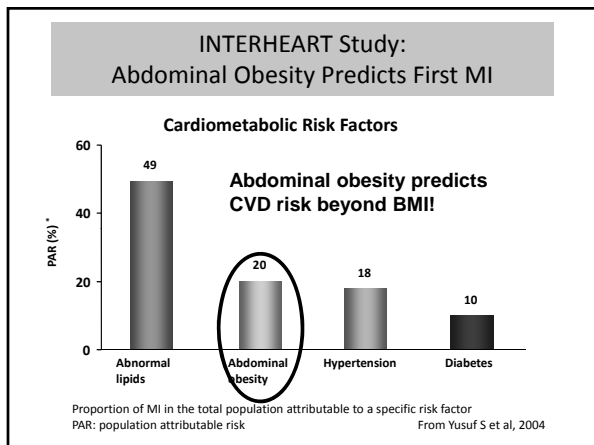
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

- ### Risk Factors for Cancers
- Tobacco use accounts for 30% of cancer incidence and mortality!
  - Overweight and obesity
  - Physical inactivity
  - Diabetes
  - Behavioural factors such as stress
  - Low fruit and vegetable intake
  - Alcohol use

---

---

---

---

---

---

---

---

---

---

### New Cancer Cases in Canada

- 5 million new cancer cases are expected to occur between 2004 and 2033 when risk factors are controlled for
- Without an effective strategy, 3 million cancer-related deaths will be expected during the same period

---

---

---

---

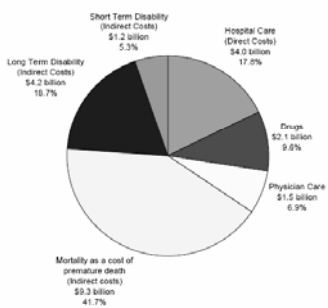
---

---

---

---

### Economic Costs of CVD in Canada



Public Health Agency of Canada, 2009

---

---

---

---

---

---

---

---

### Body Weight Classification by Body Mass Index (BMI)

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

Classification	BMI (kg/m <sup>2</sup> )	Risk of co-morbidities	
		WC <102/88 cm	>102/88 cm *
Healthy wt	18.5-24.9	Normal	
Overweight	25.0-29.9	Increased	High
Obese Class I	30.0-34.9	High	Very high
Class II	35.0-39.9	Very High	
Class III	≥ 40.0	Extremely High	

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

Canadian guidelines for body weight classification in adults. Ottawa: Health Canada; 2003

---

---

---

---

---

---

---

---



---

---

---

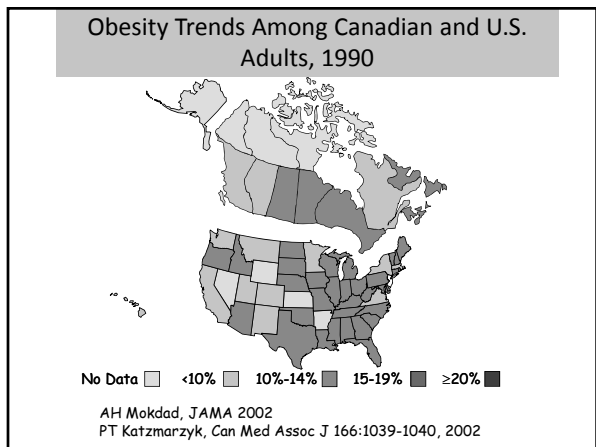
---

---

---

---

---



---

---

---

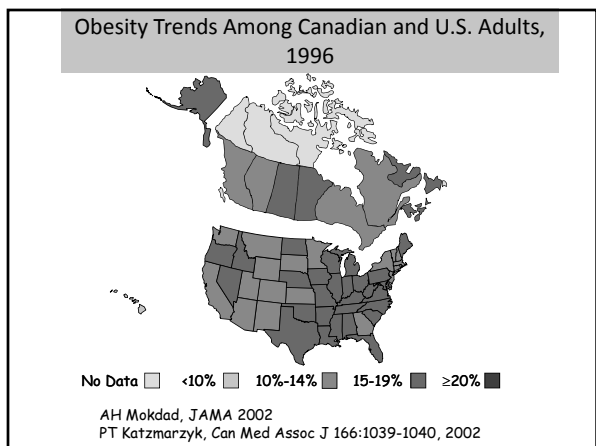
---

---

---

---

---



---

---

---

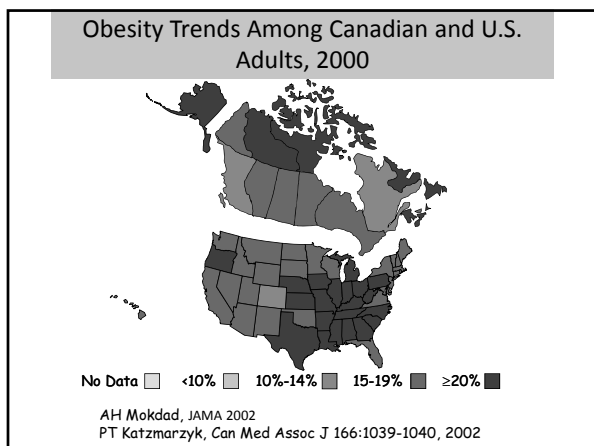
---

---

---

---

---




---

---

---

---

---

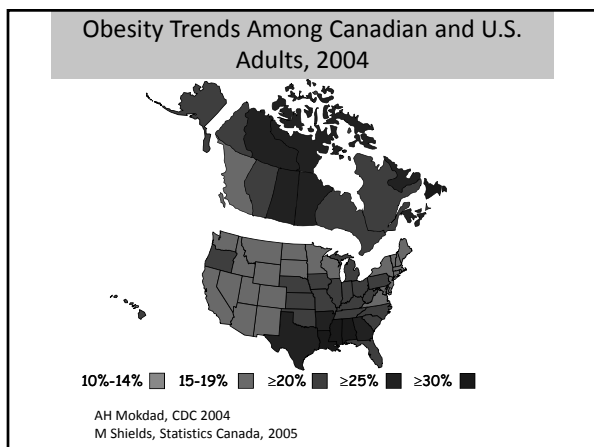
---

---

---

---

---




---

---

---

---

---

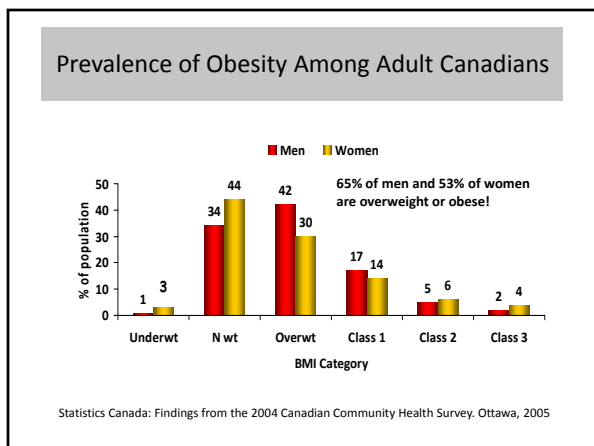
---

---

---

---

---




---

---

---

---

---

---

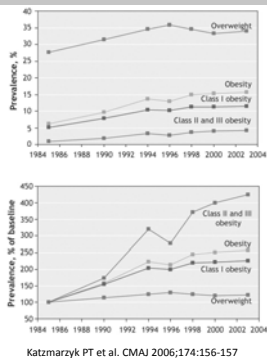
---

---

---

---

### Prevalence of Overweight and Obesity in Canada, 1985-2003




---

---

---

---

---

---

---

---

---

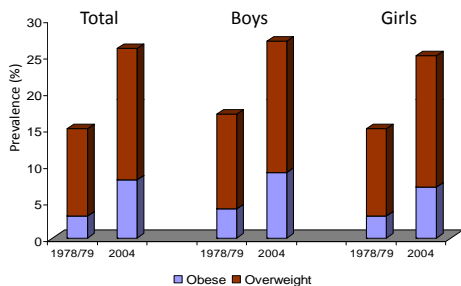
---

---

---

### Prevalence of Overweight and Obesity in Children and Youth: Significant Increase in Boys and Girls

Obese children tend to become obese adults. In later life these individuals will have higher rates of concomitant disease and will increase the economic burden to society




---

---

---

---

---

---

---

---

---

---

---

---

### BMI and Metabolic Co-morbidities

BMI  $\geq 30$  kg/m<sup>2</sup>

No co-morbidity



Co-morbidity:  
Type 2 diabetes  
Hypertension  
Dyslipidemia

Adapted from NHANES III

---

---

---

---

---

---

---

---

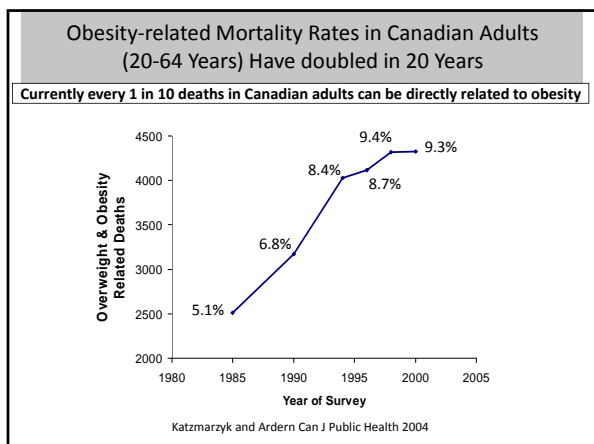
---

---

---

---






---

---

---

---

---

---

---

---

---

---

### Obesity and Burden of Chronic Diseases

- Overweight and obesity are attributable to the major comorbidities:
  - 80% of Type 2 diabetes
  - 32% of hypertension
  - 30% of pulmonary embolism
  - 27% of endometrial cancer

Paeratakul S, et al. Int J Obesity 2002;26:1205-1261

---

---

---

---

---

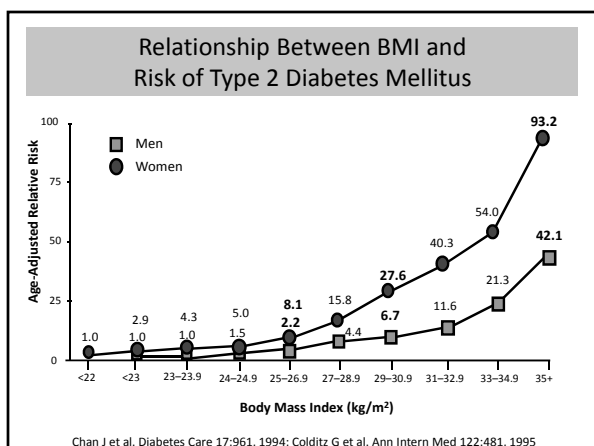
---

---

---

---

---




---

---

---

---

---

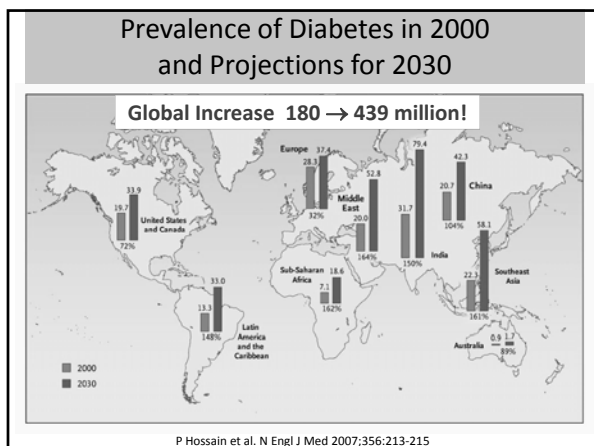
---

---

---

---

---




---

---

---

---

---

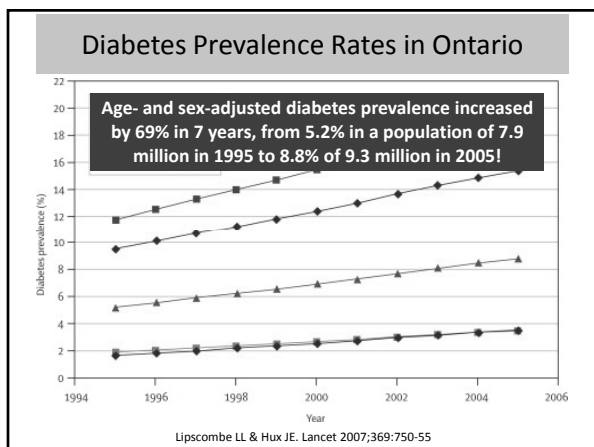
---

---

---

---

---




---

---

---

---

---

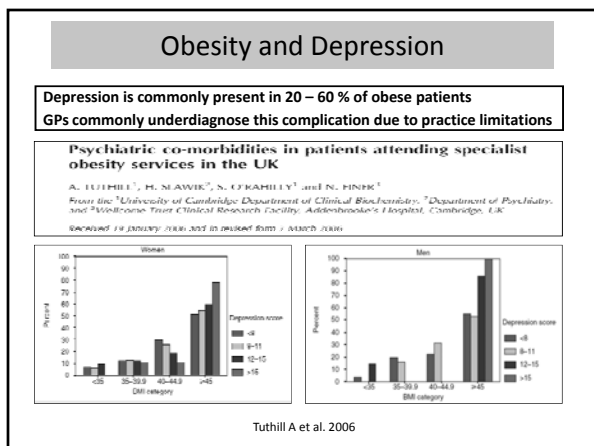
---

---

---

---

---




---

---

---

---

---

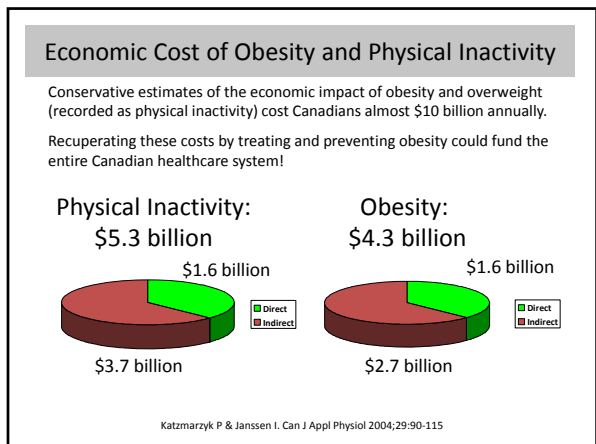
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

### Lifetime Medical Costs (Discounted @ 3%)

	Class I Obesity	Class II/III Obesity
White females	\$28,040	\$46,410
White males	\$41,970	\$72,520
Black females	\$16,520	\$34,790
Black males	\$28,000	\$74,460

Finkelstein E et al. Ann Rev Public Health 2005;26:239-257

---

---

---

---

---

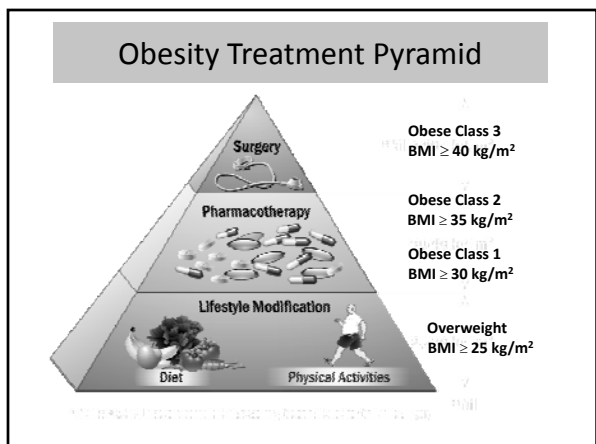
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---



### What is One Food Guide Serving?

- A “Food Guide Serving” is:
  - A reference amount
  - Not necessarily intended to represent what would be eaten in one sitting
- Illustrations and different measures are used to help communicate what is one Food Guide Serving




---

---

---

---

---

---

---

---

### Counting Food Guide Servings

- An example is provided illustrating how to estimate the number of Food Guide Servings in a meal

*How do I count Food Guide Servings in a meal?*

Here is an example:

<b>Vegetable and beef stir-fry with rice, a glass of milk and an apple for dessert</b>	
250 mL (1 cup) mixed beans, carrots and green and pepper	= 2 Vegetables and Fruit Food Guide Servings
75 g (2 1/2 oz.) lean beef	= 1 Meat and Alternatives Food Guide Serving
250 mL (1 cup) brown rice	= 2 Grain Products Food Guide Servings
5 mL (1 tsp) canola oil	= part of your Oils and Fats intake for the day
250 mL (1 cup) 1% milk	= 1 Milk and Alternatives Food Guide Serving
1 apple	= 1 Vegetables and Fruit Food Guide Serving

---

---

---

---

---

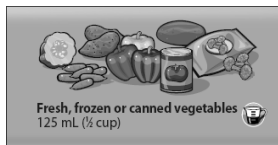
---

---

---

### Guidance on the Quality of Food Choices: Vegetables and Fruit

- Eat at least one dark green and one orange vegetable each day
  - For folate and vitamin A intake
- Have vegetables and fruit more often than juice
  - For fibre intake




---

---

---

---

---

---

---

---

### Nutrients and CVD: Dietary Fats

- Saturated fats } Increases total and LDL-C
- Trans fats } Decreases HDL-C
- Monounsaturated fats – Lowers glucose & TG
- PUFAs
  - ↓ 20% all cause and 30% CVD mortality in GISSI study (fish oil) <sup>1</sup>
  - ↓ 70% CVD mortality in the Lyon Heart Study (Mediterranean diet) <sup>2</sup>

1. GISSI-Prevenzione Investigators. Lancet 1999;354:447-455  
 2. de Lorgeril, M. et al. Circulation 1999;99:779-785

---

---

---

---

---

---

---

---

---

---

### Nutrients and CVD: Carbohydrates

- High carb diets lower HDL-C and increase small dense LDL particles and TG <sup>1</sup>
- Adverse impact on glycemic control <sup>1</sup>
- 4 weeks of Eco-Atkins diet (plant-based low-carb diet) lowers LDL-C, TG, Apo B/Apo A1 ratio <sup>2</sup>

1. Liu S, et al. AJCN 2000;71:1455-1461  
 2. Jenkins, DA, et al. Arch Intern Med 2009;169:1046-1054

---

---

---

---

---

---

---

---

---

---

### Salt and Cardiovascular Disease

- Average sodium intake is 4100 mg for men and 2900 mg for women (recommended intake < 2300 mg/day) <sup>1</sup>
- Reduction in dietary salt lowers BP levels in normotensive and hypertensive subjects
- DASH diet confirms benefit of salt restriction <sup>2</sup>
- Intensive interventions, unsuited to primary care or population prevention programmes, provide only minimal reductions in blood pressure during long-term trials <sup>3</sup>
- Evidence from a large and small trial showed that a low sodium diet helps in maintenance of lower blood pressure following withdrawal of antihypertensives <sup>3</sup>

1. Bibbins-Domingo K et al. New Engl J Med 2010;362:590-599  
 2. Sacks FM, et al. N Engl J Med 2001;344:3-10  
 3. Cochrane Database Syst Rev. 2004;(1):CD003656

---

---

---

---

---

---

---

---

---

---



Summary of Nutrients and CVD Risk			
Evidence	↑ Risk	↓ Risk	No effect
Convincing	High saturated fats	Fruits and vegetables	Vitamin E
	High Na <sup>+</sup> intake	Fish and fish oils	
Probable	Dietary cholesterol	Dietary fibre	
		Nuts	
Possible		Flavonoids	
		Soy products	

---

---

---

---

---

---

---

---

Summary of Nutrients and Cancer Risk			
Evidence	↑ Risk	↓ Risk	No effect
Convincing	Aflatoxin (liver)		
	Chinese style salted fish (nasopharyngeal)		
	Alcohol (liver)		
Probable	Preserved meat and red meat (colon)	Fruits and vegetables	
	Salt preserved foods (stomach)		
	Very hot drinks and food (esophageal)		
Insufficient	Animal fats	Fibre, soy, fish, flavonoids	

---

---

---

---

---

---

---

---

- Association between Foods and Chronic Diseases**
- Convincing evidence
    - ↑ Vegetables and fruit: ↓CVD and ↓ Cancer
    - ↑ Whole grains: ↓ CVD
    - ↑ Fish: ↓ CVD
  - Food intake pattern reviewed for consistency
    - Consistent with vegetables, fruit and whole grains
    - Added statement "Eat at least two Food Guide Servings of fish each week."

---

---

---

---

---

---

---

---

### Summary of Nutrition Advice

- Achieve a healthy body weight (BMI <23 kg/m<sup>2</sup>) by watching food portion sizes
- Limit total fats to <30% of total energy intake and reduce saturated fat to <7%, and eliminate trans fats if possible
- Eat more fruit, vegetables, legumes and nuts
- Limit intake of free sugars and eat more whole grain products
- Limit salt consumption to less than 2300 mg daily

---

---

---

---

---

---

---

---



### Nutrition Recommendations

- We recommend a reduced calorie diet and regular physical activity as the first treatment option for overweight/obese adults and children to attain clinically important weight loss and reduce obesity-related symptoms [Grade A, Level 1]
- We recommend that the optimal dietary plan for achieving a healthy body weight, and dietary counseling for adults, adolescents and children be developed with a qualified and experienced health professional (preferably a registered dietitian), together with the individual and family to meet their needs [Grade A, Level 2]

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

---

---

---

---

---

---

---

---



### Nutrition Recommendations 2

- We recommend a nutritionally balanced diet (designed to reduce caloric intake) be combined with other supportive interventions to achieve a healthy body weight [Grade A, Level 2]
- We suggest a high protein or low fat diet as reasonable treatment options for obese adults as part of a weight loss program [Grade B, Level 2]
- We suggest that meal replacements be considered as a component of calorie-reduced diet for selected adults interested in commencing a weight loss program [Grade C, Level 2]

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

---

---

---

---

---

---

---

---

**What is the Best Diet:  
Calories or Macronutrients?**

The NEW ENGLAND  
JOURNAL of MEDICINE

ESTABLISHED IN 1812      FEBRUARY 26, 2009      VOL. 360 NO. 9

**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.

N Engl J Med 2009;360(9):859-873

---

---

---

---

---

---

---

---

---

---

Original Article

**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

N Engl J Med 2009;360(9):859-873

---

---

---

---

---

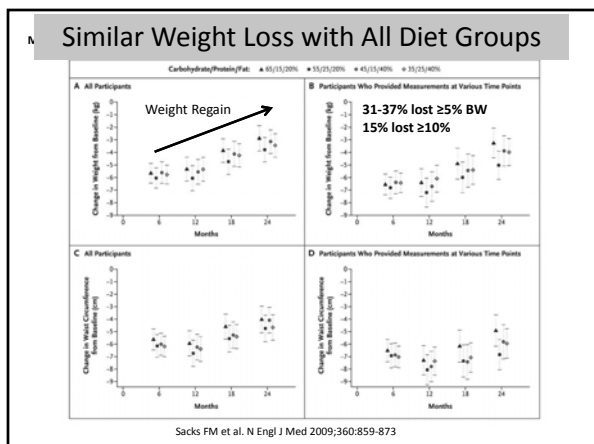
---

---

---

---

---




---

---

---

---

---

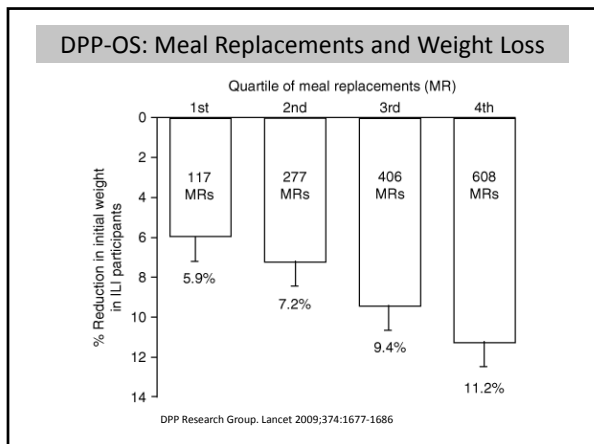
---

---

---

---

---




---

---

---

---

---

---

---

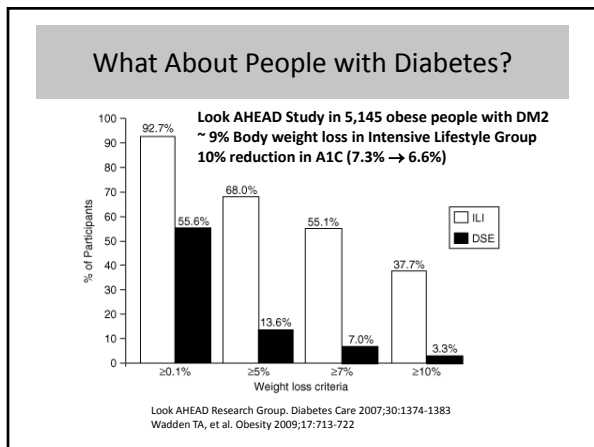
---

---

---

---

---




---

---

---

---

---

---

---

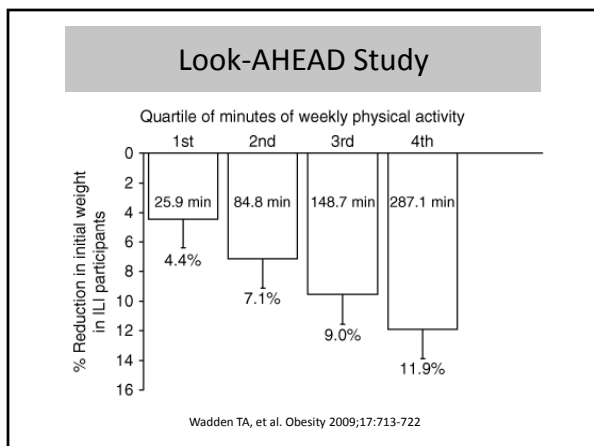
---

---

---

---

---




---

---

---

---

---

---

---


---

---

---

---

---



**Lifestyle Intervention for Children & Adolescents**

- An energy-reduced diet and regular physical activity is recommended as the first treatment option for overweight and obese children to achieve clinically important weight loss and reduce obesity-related symptoms [Grade A, Level 2]
- In children, ongoing follow-up by health professionals for a minimum of 3 months is recommended [Grade A, Level 2]  
When treating obesity in children, family-oriented behaviour therapy is suggested [Grade B, Level 1]

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

---

---

---

---

---

---

---

---

**Physical Activity Needed for Weight Maintenance**

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

<sup>1</sup> Schoeller et al, AJCN 66:551-556, 1997  
<sup>2</sup> Weinsier et al, AJCN 75:499-504, 2002  
<sup>3</sup> Stock conf, Ob Res, 2003

---

---

---


---

---

---

---

---



**Exercise Recommendations**

- All individuals considering a vigorous exercise program are encouraged to first consult their physician or HCP [Grade C, Level 4]
- We suggest long-term, regular physical activity, which is associated with maintenance of or a modest reduction in body weight in all overweight people [Grade B, Level 2]
- Physical activity and exercise should be sustainable and tailored to the individual and the total duration can be increased gradually to maximize the weight loss benefits [Grade A, Level 2]

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

---

---

---


---

---

---

---

---

 **Exercise Recommendations 2**

- We suggest physical activity (30 minutes of moderate intensity, increasing when appropriate, to 60 minutes daily) as part of an overall weight loss program [Grade B, Level 2]
- Endurance exercise training may reduce the risk of cardiovascular morbidity in healthy people and we suggest its use for adults with a high BMI [Grade B, Level 2]

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

---

---

---

---

---

---

---

---

**Case: Mr. BM, a 68 year old lawyer**

- You saw this man in your office and he seeks your advice on weight loss
- He lives a sedentary lifestyle and his work is stressful at times
- Nonsmoker, healthy otherwise and on no meds
- Wt. 106.5 kg, Ht. 1.75 m, BMI 34.8 kg/m<sup>2</sup>, WC 109 cm
- BP 139/75 mmHg, HR 72/min.
- FPG 5.7 mmol/L
- T-C 4.85, TG 1.71, LDL-C 3.07, HDL-C 1.01 mmol/L
- ALT 43 U/L (N: 1-40)

---

---

---

---

---

---

---

---

**How Do You Counsel Mr. BM?**

- Lose weight?
- Exercise?
- Medication?

---

---

---

---

---

---

---

---

### Diet and Exercise Recommendations

- Aim for 1-2 lb/week weight loss (-500-600 kcal/day)
- Exercise x 3/ week, each 90-minute session consists of:
  - 15 min flexibility
  - 30 minutes aerobic
  - 30 minutes strength training
  - 15 minutes balance
- Exercise-induced calorie loss 300 kcal/session x 3/week → ~130 kcal/day deficit

---

---

---

---

---

---

---

---

### Mr. BM, 6 Months Later

	Baseline	Diet	Difference	Diet + Ex	Difference
<b>Weight (kg)</b>	106.5	97.3	-9.2	98.2	-8.3
<b>BMI (kg/m<sup>2</sup>)</b>	34.8	31.8	-3.0	32.1	-2.7
<b>WC (cm)</b>	109	102	-7	100	-9
<b>Fat mass</b>	43.3	37.7	-5.6	36.7	-6.6
<b>FPG</b>	5.7	5.4	-0.3	5.1	-0.6
<b>TG</b>	1.71	1.50	-12%	1.28	-25%
<b>HDL-C</b>	1.01	1.02	+0.01	1.03	+0.02
<b>ALT</b>	43	35	-8	37	-6
<b>Liver fat (%)</b>	100	54	-46%	55	-45%
<b>Insulin sensitivity</b>	100	166	+66%	168	+68%

Adapted from Shah K et al. Obesity 2009; 126:1-7

---

---

---

---

---

---

---

---

### What are your next steps?

- Counsel patient on weight maintenance
- Prevent weight regain
- Continue with lifestyle changes

---

---

---

---

---

---

---

---





### Caloric Restriction Extends Lifespan

- First discovered in 1935 to extend maximum lifespan in rats
- Similar findings in mice, fish, flies, worms and yeast
- 30-70% extension has been achieved using different CR regimens
- Human studies are ongoing and preliminary data are encouraging in extending lifespan

---

---

---

---

---

---

---

---

### Key Messages

- Obesity and physical inactivity are big societal and public health issues!
- Obesity predisposes to increased cardiometabolic and cancer risks
- Obesity is a chronic disease and requires a long-term solution, which includes lifestyle intervention and when indicated pharmacotherapy and bariatric surgery
- A modest 5-10% body weight loss reaps big health benefits especially in preventing diabetes and other chronic diseases

---

---

---

---

---

---

---

---

**38TH ANNUAL FORZANI GROUP FOUNDATION MOTHER'S DAY RUN & WALK**

**Half-million raised for healthy hearts**

**Mindful Eating and Get Fit!**

**No. 1 for nine years running**

**HEALTHY SET GO**

---

---

---

---

---

---

---

---

上医医未病之病  
中医医将病之病  
下医医已病之病  
~黄帝内经~

“Superior Doctors Prevent the Disease.  
Mediocre Doctors Treat the Disease Before Evident.  
Inferior Doctors Treat the Full Blown Disease.”  
*-Huang Dee: Nai - Ching (2600 B.C. 1st Chinese Medical Text*

---

---

---

---

---

---

---

---

Thank you!

Questions?

---

---

---

---

---

---

---

---