



Canadian Liver Foundation
Fondation canadienne du foie

Bringing liver research to life
Donner vie à la recherche sur le foie



UNIVERSITY OF
ALBERTA

Liver Health & Nutrition for the Whole Family

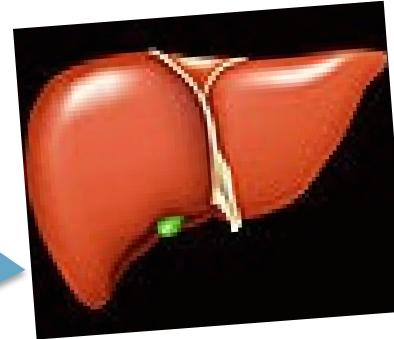
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The Order of the Day

- Role of the Liver in Health and Wellbeing and the Benefits of Healthy Eating in Chronic Liver Disease
- Fatty Liver Disease and the Link to Poor Eating Habits
- What are your nutritional needs in chronic liver diseases such as Biliary Atresia or Primary Biliary Cirrhosis: What nutrients are Nutrition Labeling
- Canada's Food Guide; with a focus on healthy food choices and portion sizes.
- Daily Movement, Physical Activity & Exercise

Your Liver

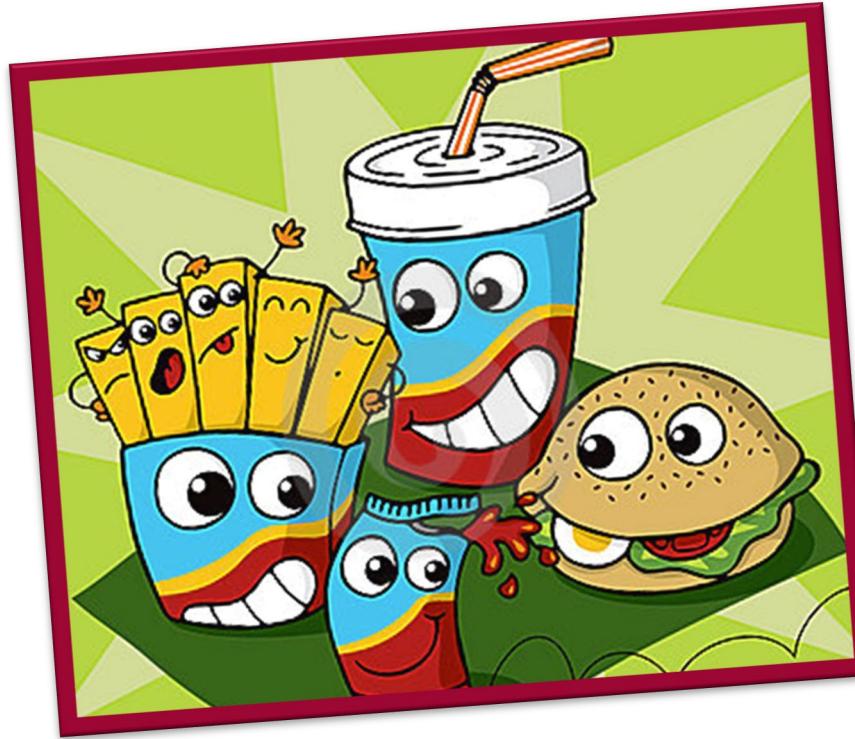


- Processes food.
- Produce important nutrients and growth factors that are important for health and growth.
- Storage of energy, fat, and vitamins and minerals.
- Is a filter to remove toxins
- Protect us from infections.

Benefits of healthy eating

- Helps your liver to function well
- You will have more energy
- Helps you to have a healthy body weight
- Helps to prevent diseases
- You will look and feel better





Fatty Liver Disease: Are we making pate of our livers by eating the wrong types of foods?

NAFLD Spectrum

Diet/Physical Inactivity

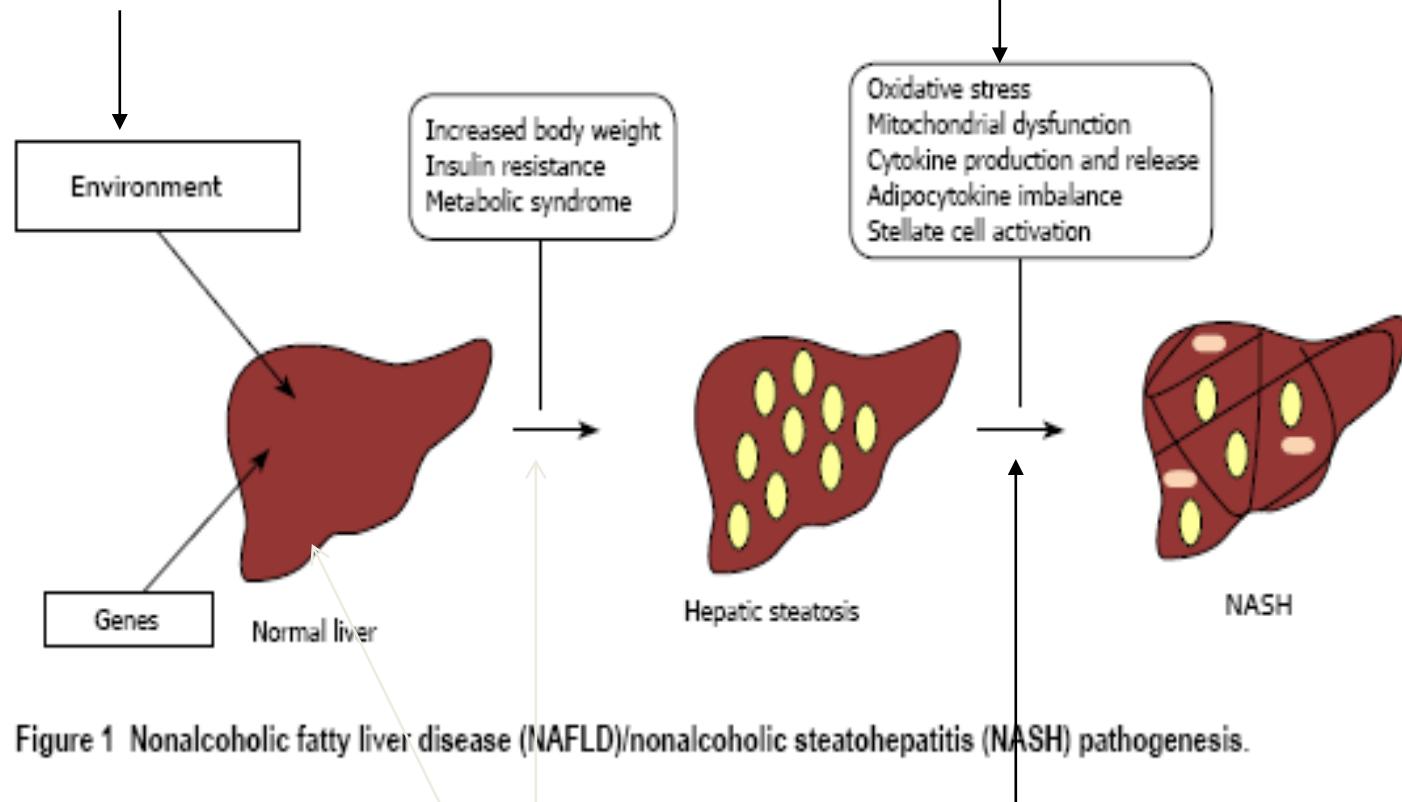


Figure 1 Nonalcoholic fatty liver disease (NAFLD)/nonalcoholic steatohepatitis (NASH) pathogenesis.

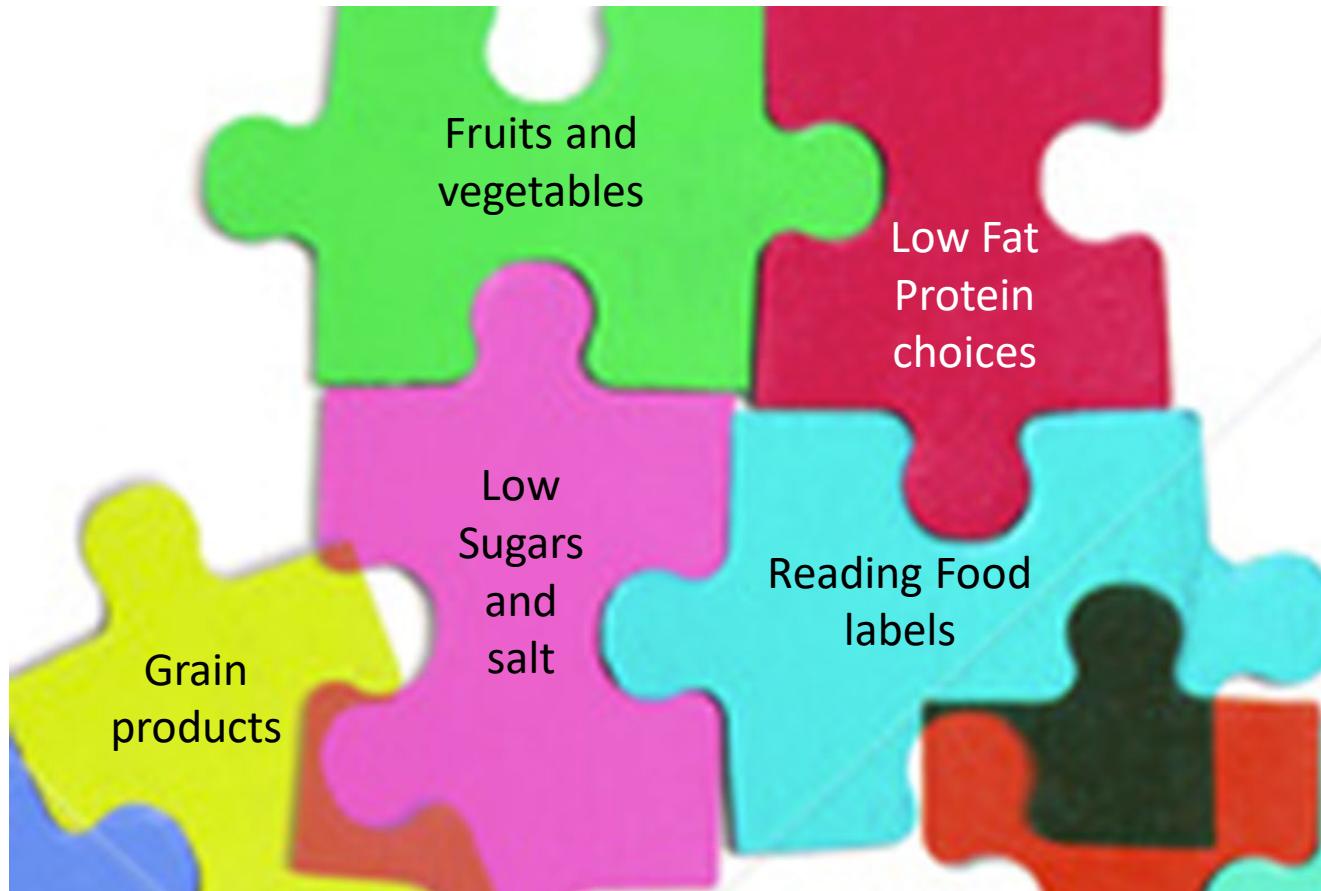
Saturated fat intake/low polyunsaturated fat?

Adapted from Nobili et al W J Gastroenterology 2009

Are we putting the pieces together like this?



Or are we putting the pieces together like this?



So what are the factors that are thought to influence NAFLD?

- High intakes of fried foods, fast food meals.
- Large Portion Size (Super Size Me?).
- High intakes of simple sugars in carbonated beverages.



High Fructose Corn Syrup....be careful

Found naturally
in fruit, plant foods
and honey



Used as
sweetener in food
industry



Fructose in Naturally occurring vs processed foods.

In excess: turns into fat in the liver

Mean consumption in children and adolescents: 50-70 g/d

Adults > 70 g/d.

3rd National Health and Nutrition Examination Survey estimated

So what is important to Liver Health:



Healthy Eating and Physical Activity
Throughout the Liver Cycle

Fruits and vegetables

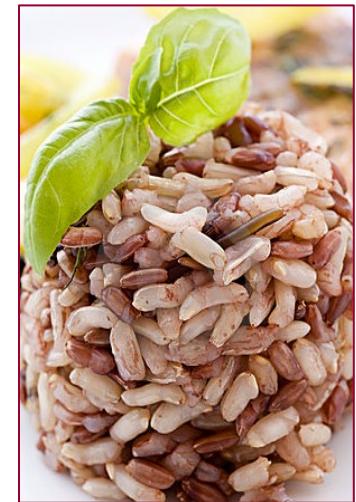
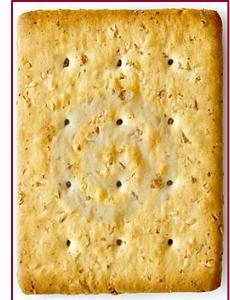
- Rich in vitamins, minerals and antioxidants that are healthy for your liver.
- Good source of fibre.
- They are low in fat and calories.
- Have to be consumed in larger portions*
- **CHOOSE MORE OFTEN GREENLY VEGETABLES AND FRESH FRUITS.**
- Limit juice to 1 serving (4 oz) per day.



*The serving/portion size of fruits and vegetables consumed is important

Grain products and liver health

- Carbohydrates
- Rich in fibre, vitamins and minerals
- Protein
- Choose whole grain



Meat and alternatives

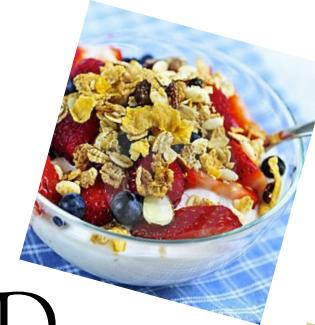
Provides

- Protein
- Fat: Choose lean meats to **protect your liver**
- Vitamins and Minerals
- Consume more often nuts and legumes



Dairy products

- Rich in calcium and vitamin D
important for optimal bone health.
- Good source of protein
- Content of fat depend of preparation
- Contain carbohydrates
- Choose skim milk products with no added sugar to **Maintain a healthy liver**



Oils and Fats



- Supply calories and help our bodies absorb fat-soluble vitamins A, D, E and K.
- The type of fat consumed is as **important for your liver** as the total amount consumed.
- Omega-3 FA vs Omega-6 FA

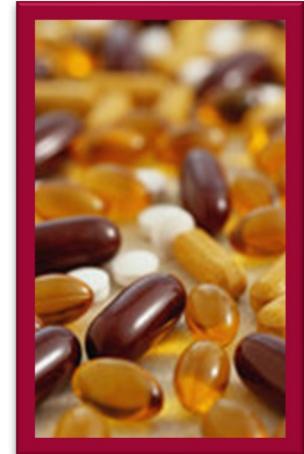


Vitamins and Minerals in Chronic Liver Disease



Fat-Soluble Vitamins

- Vitamins A, D, E and K are fat-soluble
- Body can use them only when bound to fat
- If there is not enough bile in the intestine for fat digestion, one may suffer from vitamin deficiency
- Supplements by mouth may be needed
- Infants, children and adults with prolonged jaundice often have problems absorbing certain vitamins due to poor bile flow will need to take extra vitamin supplements; particularly those containing these vitamins.

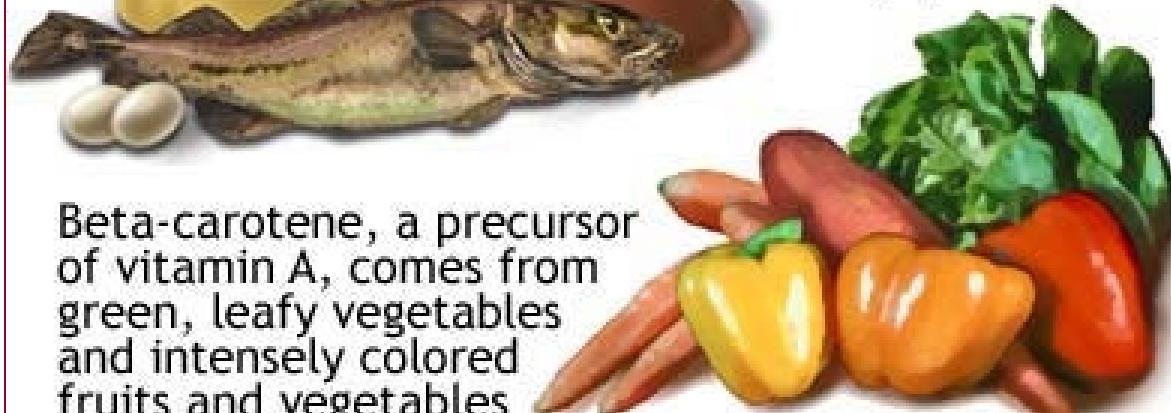


Vitamin A

Sources of vitamin A and beta-carotene:



Vitamin A comes from animal sources such as eggs, meat and dairy products



Beta-carotene, a precursor of vitamin A, comes from green, leafy vegetables and intensely colored fruits and vegetables

ADAM

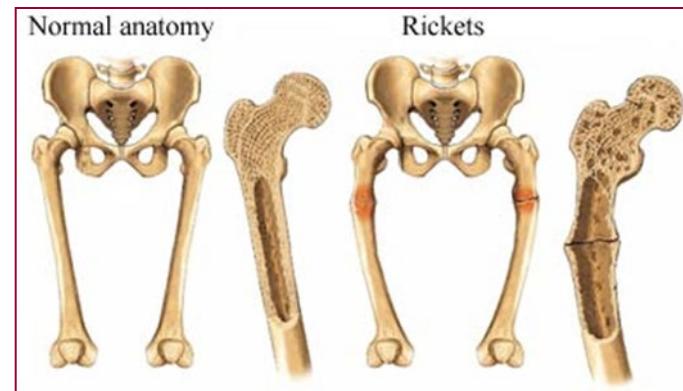
How much vitamin A do we need

- RDA for Healthy Populations: Infants-8 yrs: 300-500 RE/D; Children/Adults >9 yrs: 600-900 RAE:
- Infants, Children and Adults with Liver Disease and jaundice: may need as high as 500-2000 RAE per day.
- How do I get this? Red-yellow vegetables are the best source; but also may need to take a vitamin supplement that contains 1000-3000 RAE; avoid any supplement with vitamin A content about 10,000 RAE /tablet.
- Consult your health professional regarding the need for routine supplementation.

Classic Features of Vitamin D deficiency

Child

- Early childhood: Classic: rickets, increased bone fragility, bone fracture risk
- Other issues: significant growth motor impairment and growth delay

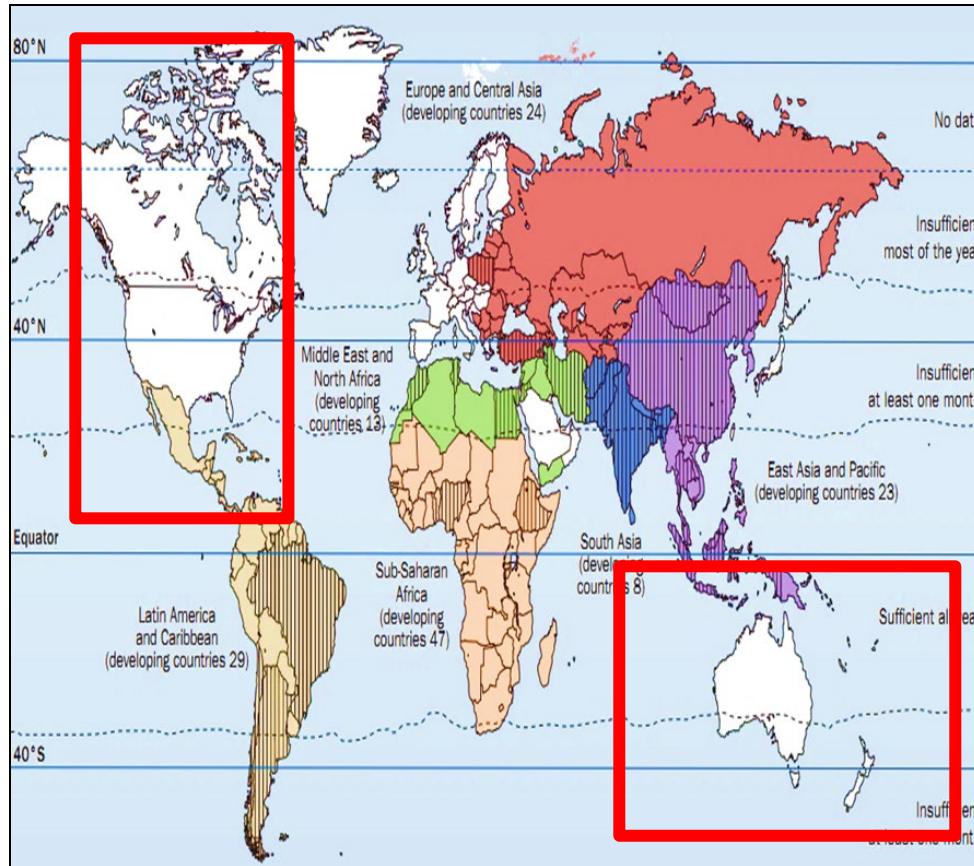


Adults

- Osteomalacia with increased bone fragility
- Reduced BMD: Osteopenia/Osteoporosis associated with reduced bone mineral density
- Muscle pain and weakness, twitching

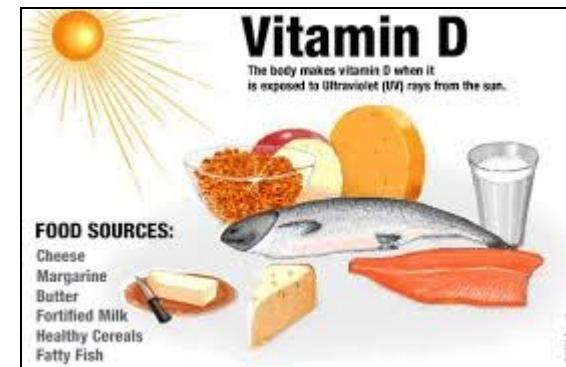


Sunlight exposure and vitamin D synthesis in the skin



Vitamin D in Liver Disease

- Few sources of dietary vitamin D :liver, fish, fortified milk/yogurts (some), margarine
- Sunlight exposure can be very important way to meet vitamin D needs. However, in northern climates this can be challenging.
- Most individuals rely on vitamin supplements to meet RDA due to low levels of intake; particularly in individuals with chronic disease such as Biliary Atresia due to issues of reduced absorption and altered metabolism.





How much vitamin D do we need when you have liver disease?

- Recommended Dietary Allowance (RDA):
 - 600 IU/day (15 µg/d) (18-70yr), 800 IU/day (>70yr)
 - Toxicity rare; chronic intakes :50,000-100,000/d (over many months); toxicity related more to D2
 - May tolerate doses of >10,000 IU/d of D3 > 20 weeks without signs of toxicity: hypercalcemia
 - Controversy in literature with requirements: especially in liver disease; Most practitioners agree that 800-2000 IU/D are needed every day in chronic liver disease.



Vitamin E

Tocopherol



Vitamin E is found in corn, nuts, olives, green, leafy vegetables, vegetable oils and wheat germ, but food alone cannot provide a beneficial amount of vitamin E, and supplements may be helpful

 ADAM.



Vitamin K

Food sources of vitamin K include cabbage, cauliflower, spinach and other green, leafy vegetables, as well as cereals



A.D.A.M.

How much vitamin K do we need in liver disease

- RDA: 90-120 ug/d in adults; lower in children (30-60 ug/d)
- Most children and adults with chronic liver disease need 1-10 mg/d vitamin K.
- What does vitamin K do; Vitamin K is important for blood clotting; bone health, neurological function.
- Best sources of vitamin K: green leafy vegetables.

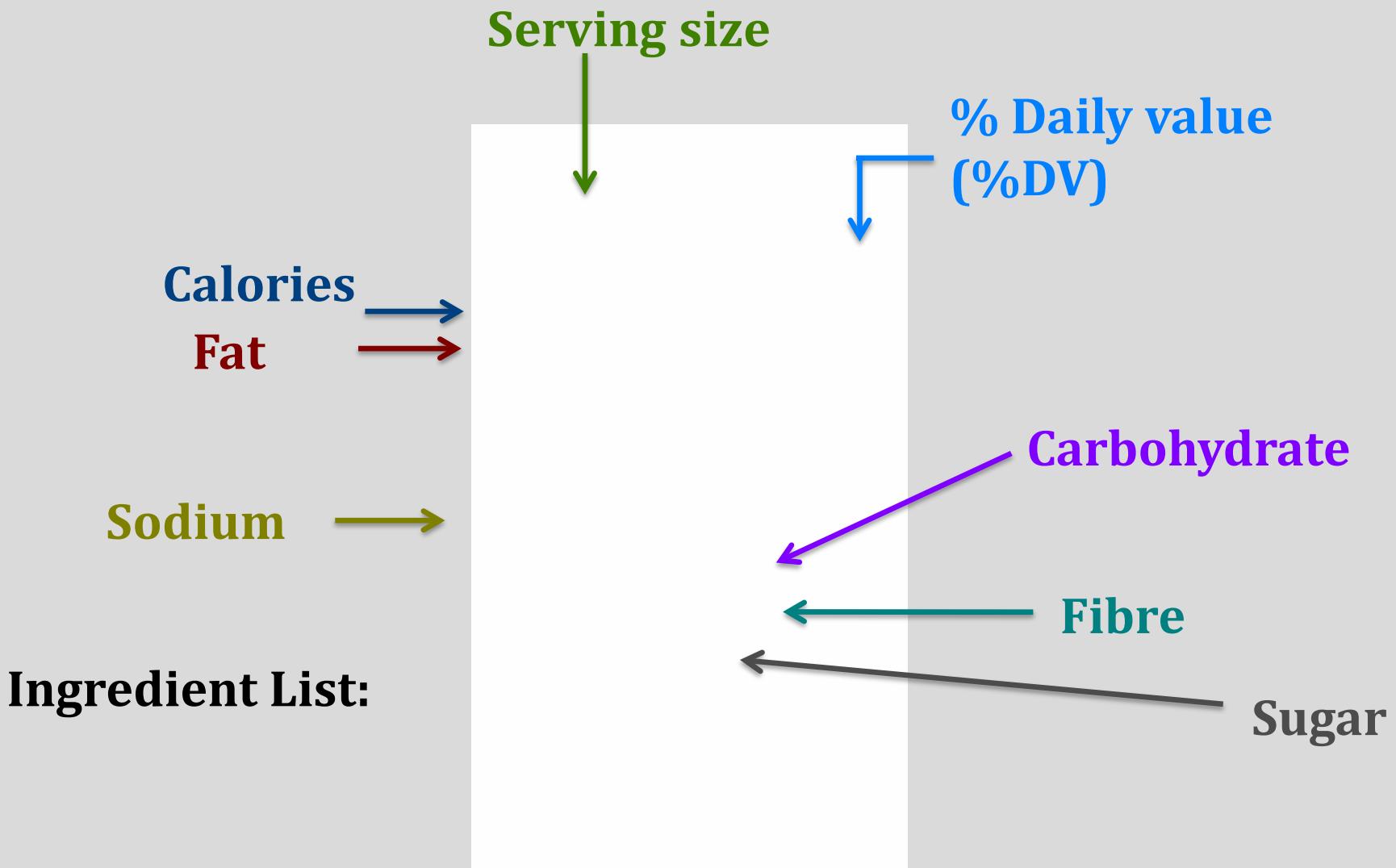
Sodium

A tablespoon = 2000mg of sodium



- Function: maintain the fluid balance, blood pressure, transmit nerve impulses.
- Most of the salt we consumed is added in **processed food** or during food preparation.
- Pickled foods, **canned** vegetables and soups, snack foods, cured meats, **packaged** mixes and frozen dinners have higher amounts of sodium than **fresh foods**.

WWW.EATRIGHT.ORG

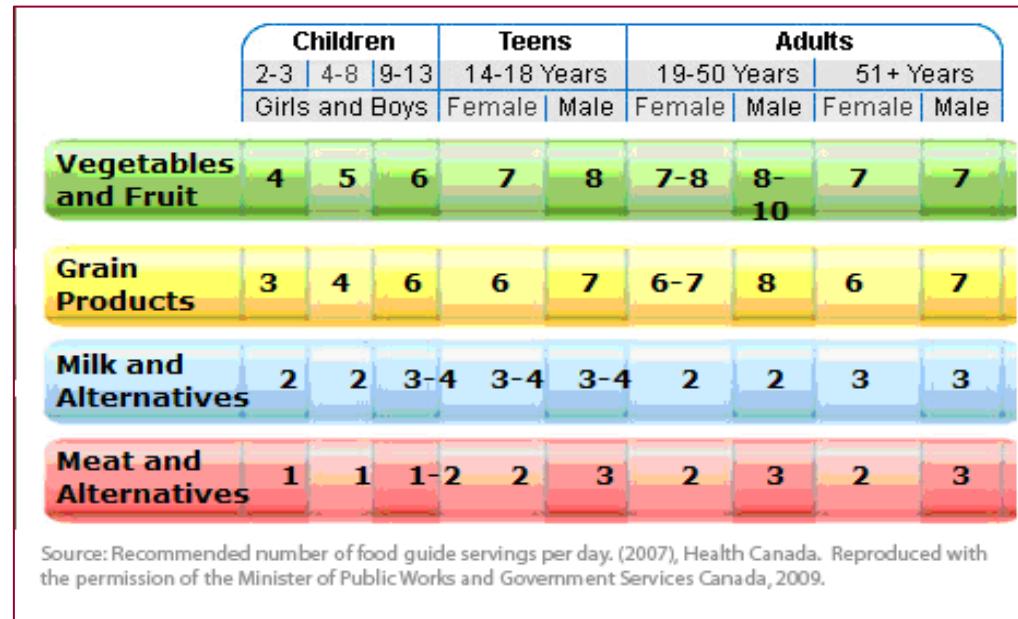


What types of food choices are healthy for your liver and how much should you eat?



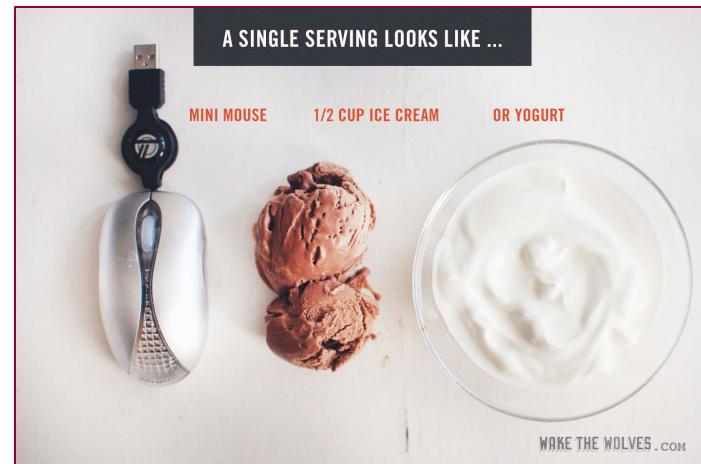
Canada's Food Guide: Servings & Portion Size

- Serving: a reference amount of food determined by Health Canada or a food manufacturer¹
- Portion: the amount of food you eat¹



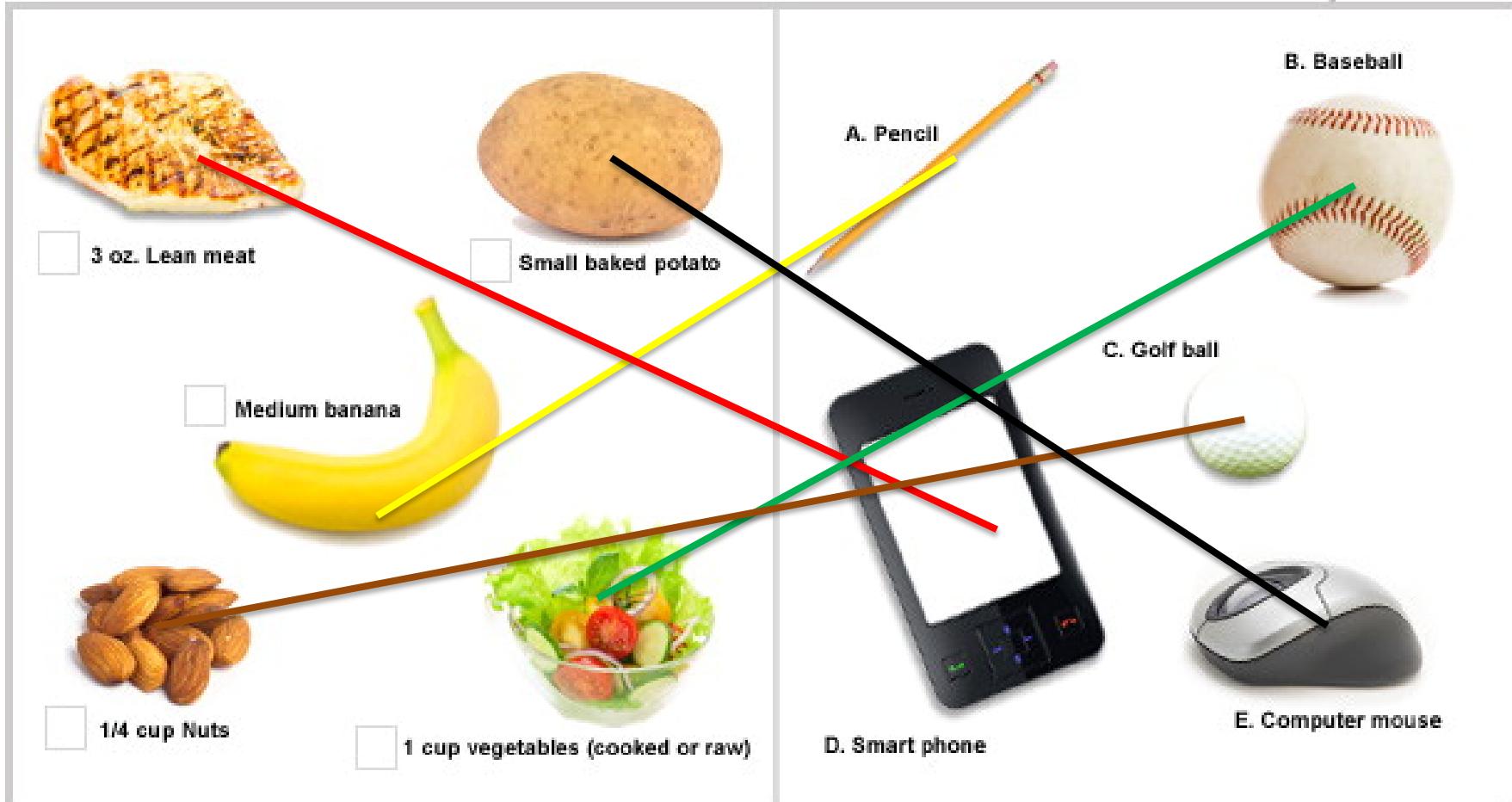
1: <http://www.eatrightontario.ca/en/Articles/Nutrition-Labelling/Understanding-Portion-Sizes#.VQ4ytRreujd>

Photos of Servings/Portions



Match the Food to the Correct Item

Which food on the left matches the portion size on the right?



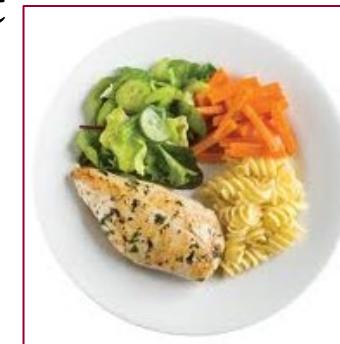
Answer



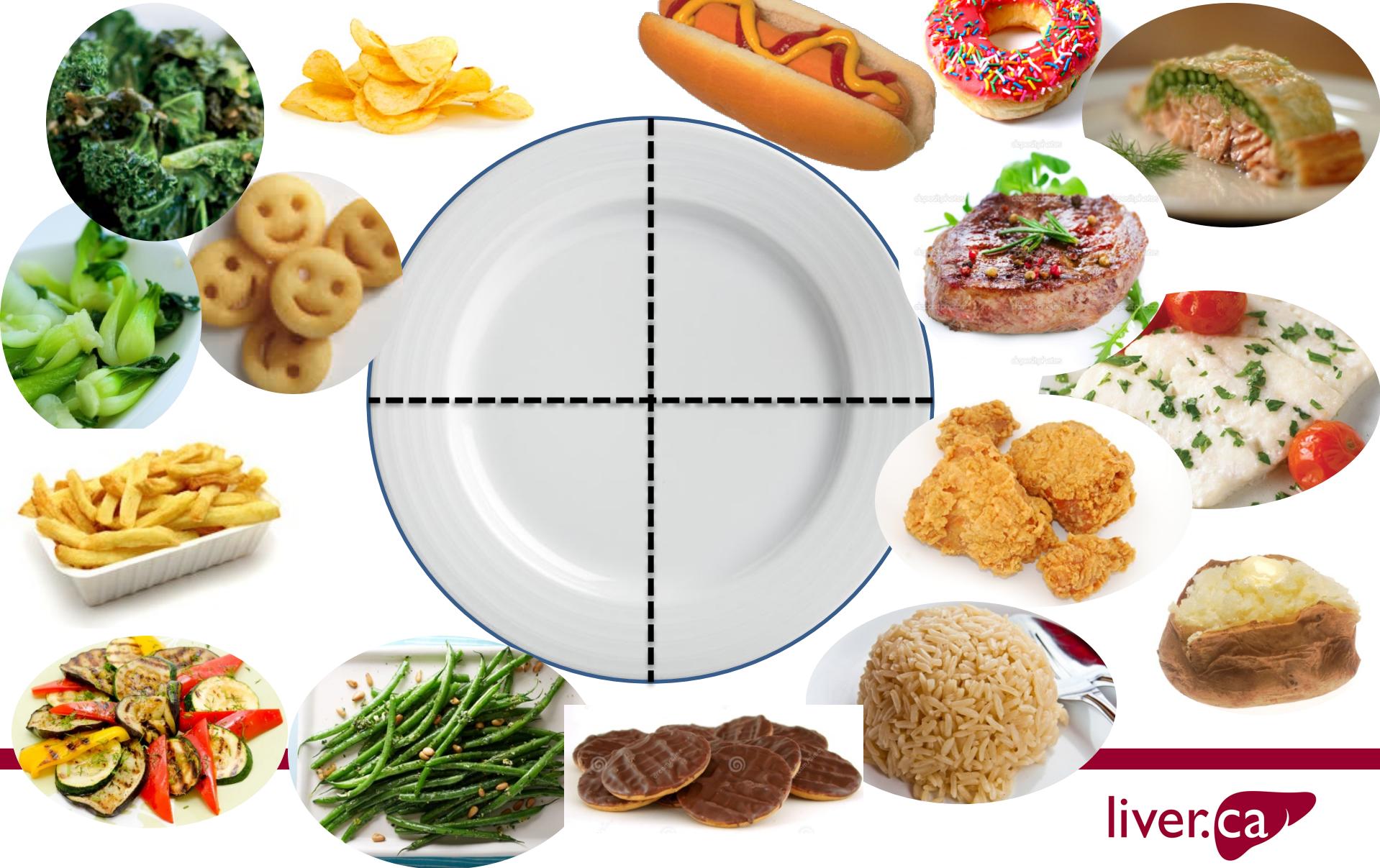
My Plate



- $\frac{1}{2}$ Vegetables (or $\frac{1}{4}$ Veggies + $\frac{1}{4}$ Fruit)
- $\frac{1}{4}$ Grain
- $\frac{1}{4}$ Meat/Protein
- 1 cup Milk or an alternative



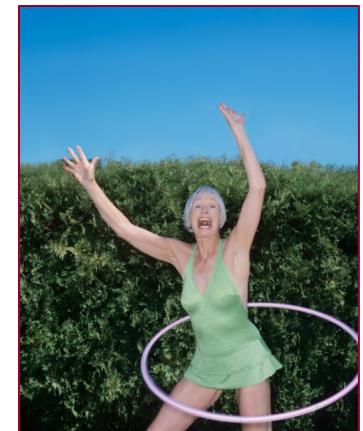
This is My Plate Activity

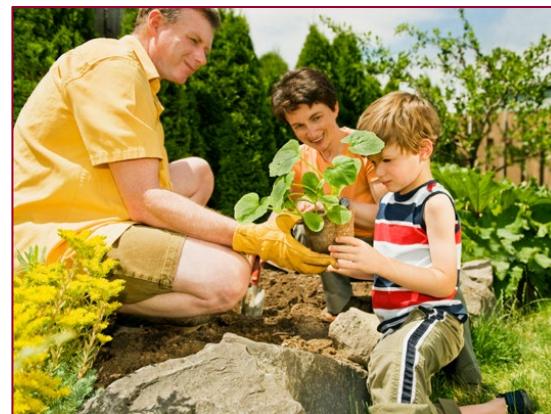




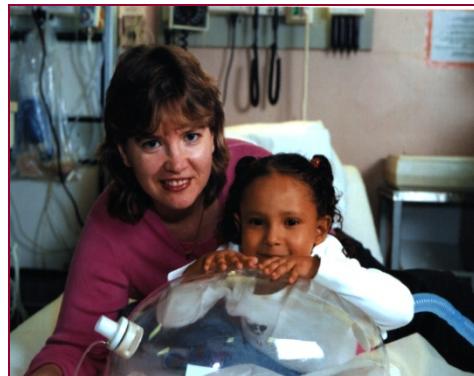
Canadian Physical Activity & Sedentary Behaviour Guidelines

- Early Years: 180 min/day
- Children & Youth: 60 min/day
- Adults (18-64): 150min/week
- Older Adults (65+): 150 min/week
- Should include moderate to vigorous intensity activity





Acknowledgements



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Is ignorance bliss or is knowledge empowering?

