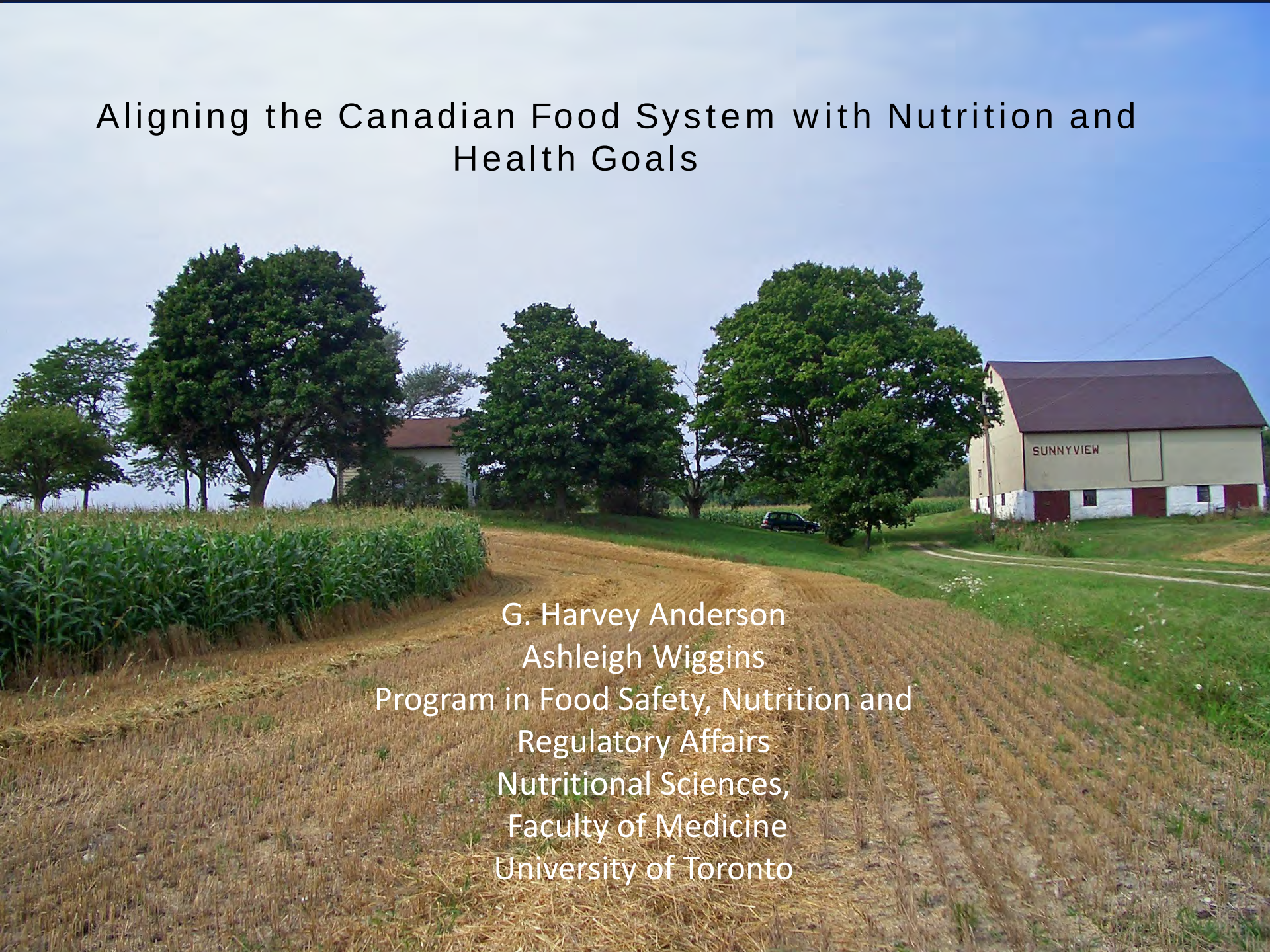
# Aligning the Canadian Food System with Nutrition and Health Goals




G. Harvey Anderson
Ashleigh Wiggins
Program in Food Safety, Nutrition and Regulatory Affairs
Nutritional Sciences,
Faculty of Medicine
University of Toronto

# Conflicts of Interest

- Served as consultant to many food and drug companies and associations.
- Served on many industry science advisory committees
- Own a farm  in Ontario
- Direct the UofT  NSERC Program in Food Safety, Nutrition and Regulatory Affairs (17 Food Industry donors)
- Currently advisor to the Healthy Grains Institute (NFP)
- Served as Vice-Dean, Research and Dean of Medicine

# Our Food System And Chronic Disease

"The agriculture and agri-food sector is one of the key drivers of the Canadian economy. The health system is one of the largest sources of government spending. Maintaining both a strong health care system and a strong vital agriculture and agri-food sector are deeply entrenched values"

*- Dube, L et al. The Canadian Agri-Food Policy Institute, Ottawa, August 2009*

But are their objectives compatible?

# Our Food System and Chronic Disease: Summary Points

1. The agri-food system has been the major contributor to prevention of disease since the industrial revolution, but needs to take a new approach to chronic disease
2. Canadian solutions to chronic disease need to be developed by Canadians based on our climate, crops, culture and health system
3. The solution resides in a “whole of society” approach the integrates the agri-food and health systems

# Agri-Food and Health: History

- Decrease in mortality largely due to better nutrition, food distribution and prosperity

  - *McKeown and Brown. Population Studies 9(1955):119-41)*

- 50% of the economic growth in Britain since the industrial revolution has been due to better nutrition

  *- Fogel, R. In: Favorites of Fortune. Eds. Higonnet, P., Landes, D.S., Rosovsky, H. Harvard University Press 1991*

# Agri-Food and Health

"Agriculture and the Food Industry Has Contributed 50-70% of the Advances in Health and Economic Status since the Industrial Revolution"

- *Frank, J. and Mustard, F. 1994. J. Amer. Acad. Arts and Sci. 123: 1-18)*

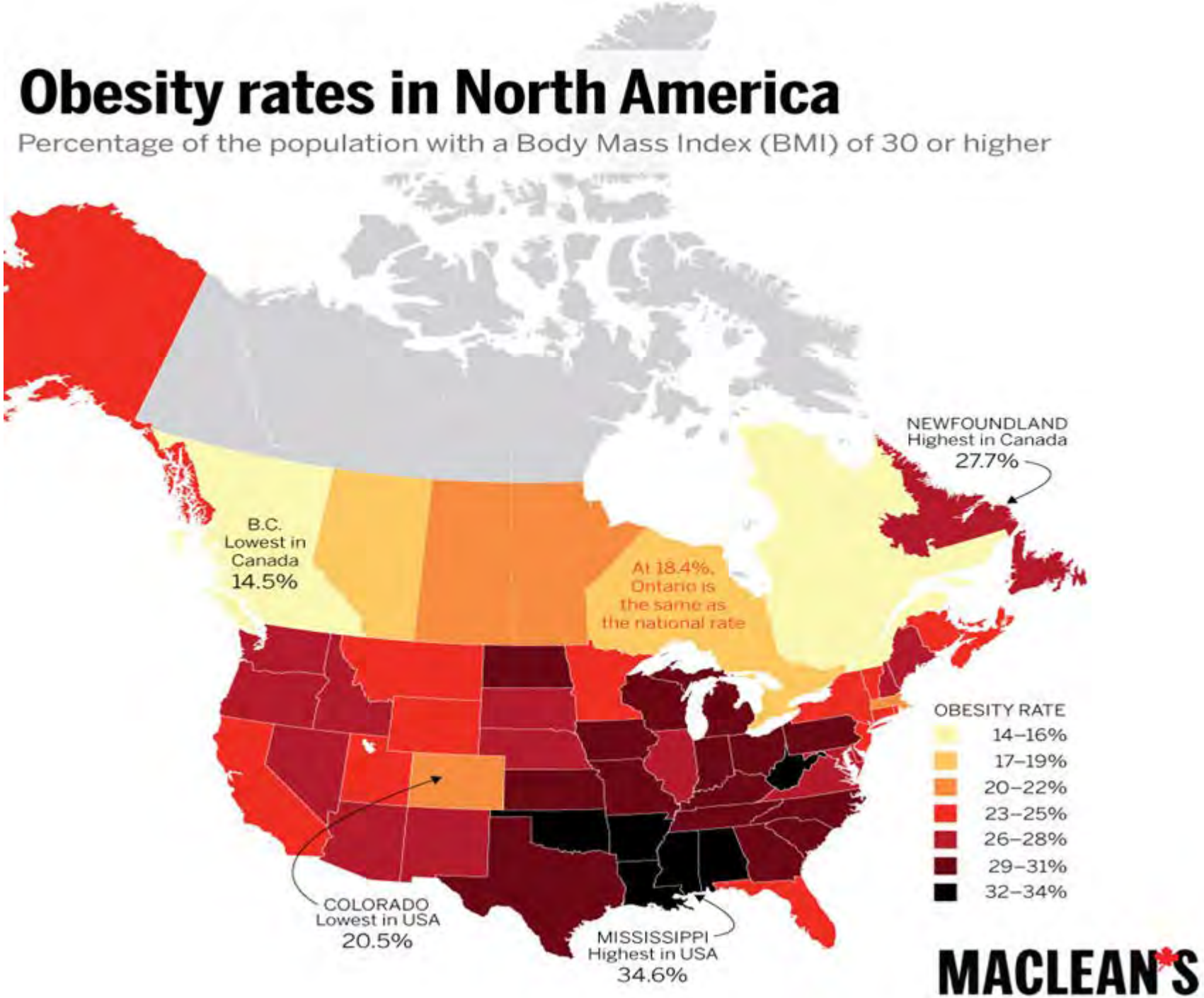
**Can/will Agriculture and the Food Industry Respond to the Modern Day Challenge of Chronic Diseases?**

# Food vs. Medicine: The Conflict

- 12th century: “Let food be thy medicine” (Hippocrates)
- Late 20th century: “Let drugs by thy medicine”
  - The food supply is seen as the cause of premature morbidity and mortality and drugs promoted as the solution
  - Financial rewards of medicine based on a business models that depend on treatment, not prevention
  - Financial rewards in agri-food based on a business model that depends heavily on quantity, not health impact

# Obesity rates in North America

Percentage of the population with a Body Mass Index (BMI) of 30 or higher




MACLEAN'S

# The Cost of Health Care in Canada

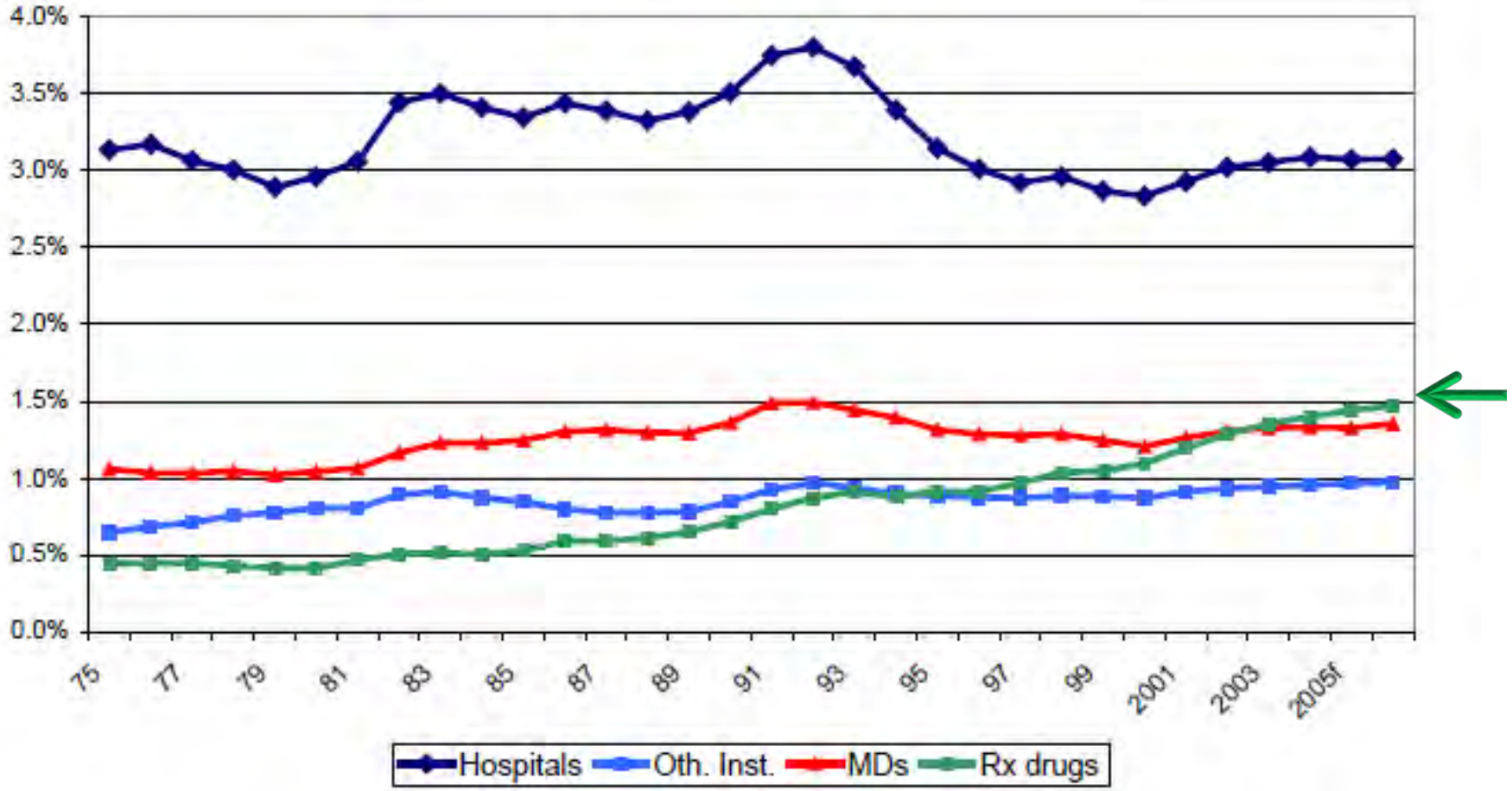
- In 2016 Canada's health care spending was over $228B, continues to outpace inflation and population. **That's 11.1 per cent of Canada's entire GDP** and $6,299 for every Canadian resident.

  - 40% + of provincial budgets. ON=$55B
  - 1.7 million people employed. Accounts for 11.2% of all Canadian employment

- The annual direct healthcare cost of obesity (**BMI>30),** including physician, hospitalization and medication costs) is currently estimated to be between $4.6 billion and $7.1 billion (*Can Obesity Network, 2017*)

- Nationally, the estimated annual economic burden attributed to excess weight is now 25% higher compared to that of tobacco smoking – $23.3 billion compared to $18.7 billion (*CJPH*)

# Canada, Health Expenditures as Percentage of GDP, 1975 - 2014




**Total: 1999=9.2%, 2014=11%, US 17.5% of GDP**

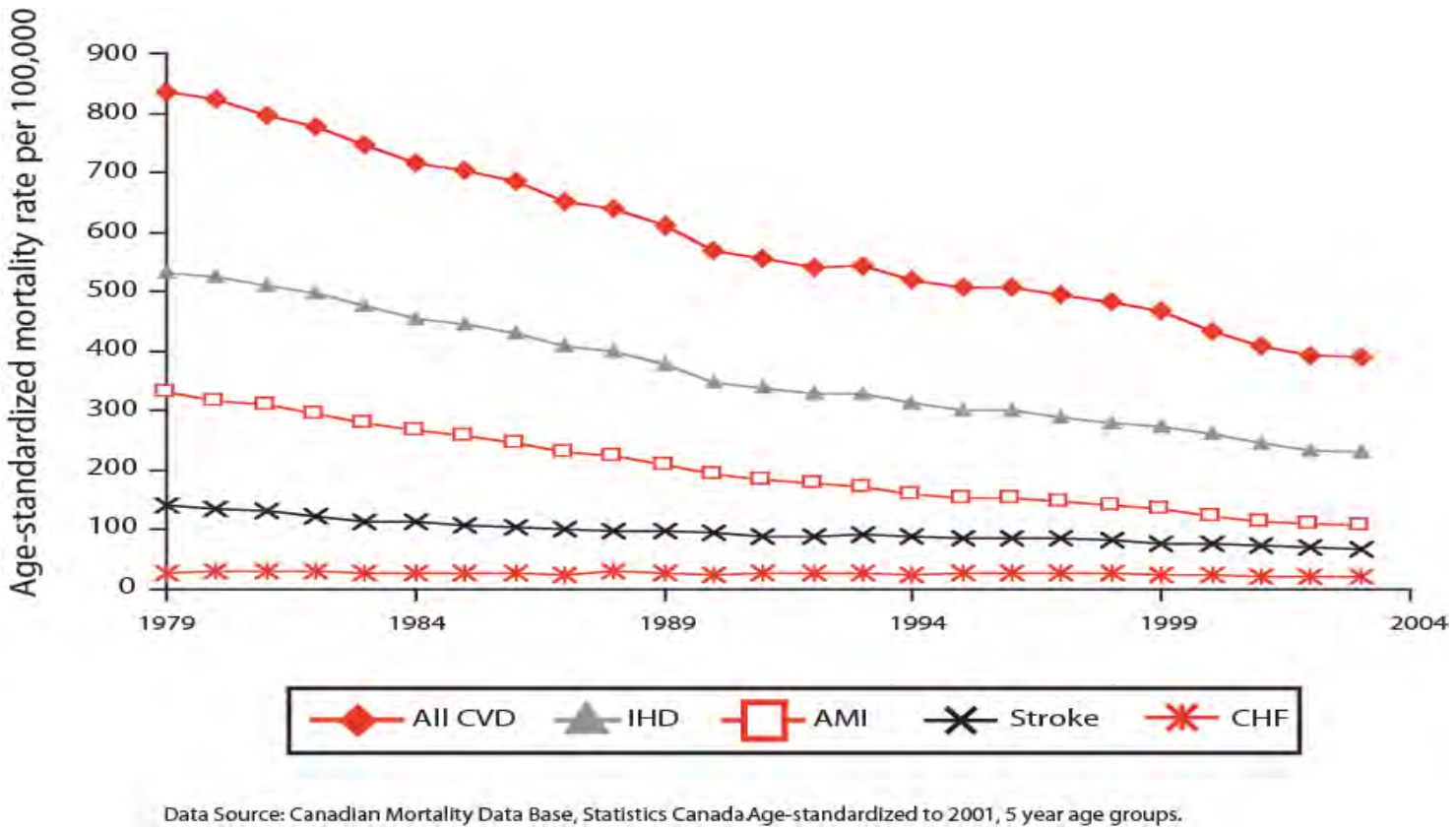
Source: UBC Center for Health Services and Policy,2007

# Our Success - Our Medical System

- Since 1952, the cardiovascular death rate in Canada has declined by more than 75% – and nearly 40% in the last decade – largely due to research advances in surgical procedures, drug therapies and prevention efforts

*- Statistics Canada, 2011*

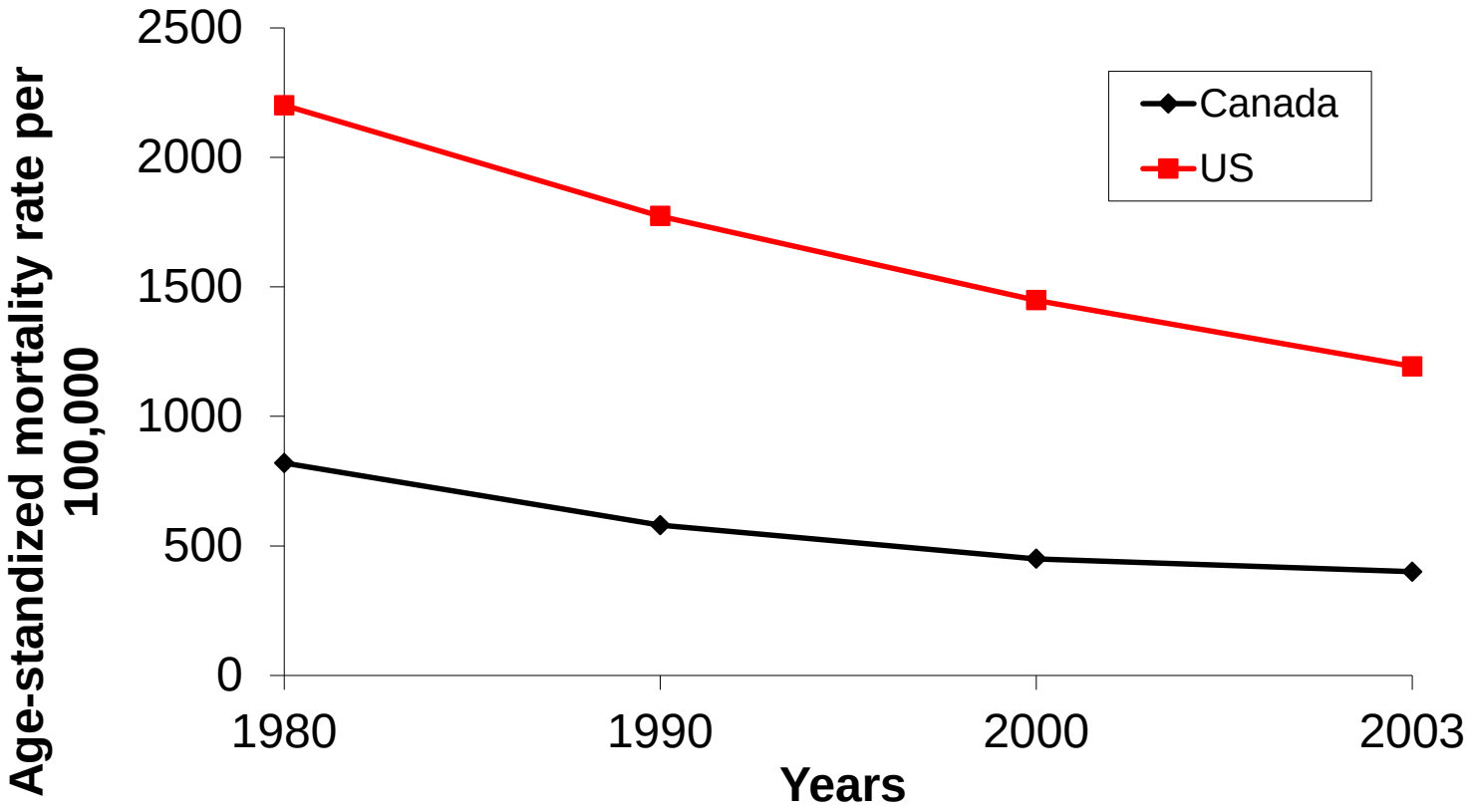
# Age-Standardized Mortality Rate/100,000 for Selected Cardiovascular Diseases Aged 20+, Men, 1979 - 2003




Data Source: Canadian Mortality Data Base, Statistics Canada Age-standardized to 2001, 5 year age groups.

Heart disease and stroke costs the Canadian economy more than $20.9 billion every year in physician services, hospital costs, lost wages and decreased productivity (Conference Board of Canada, 2010).

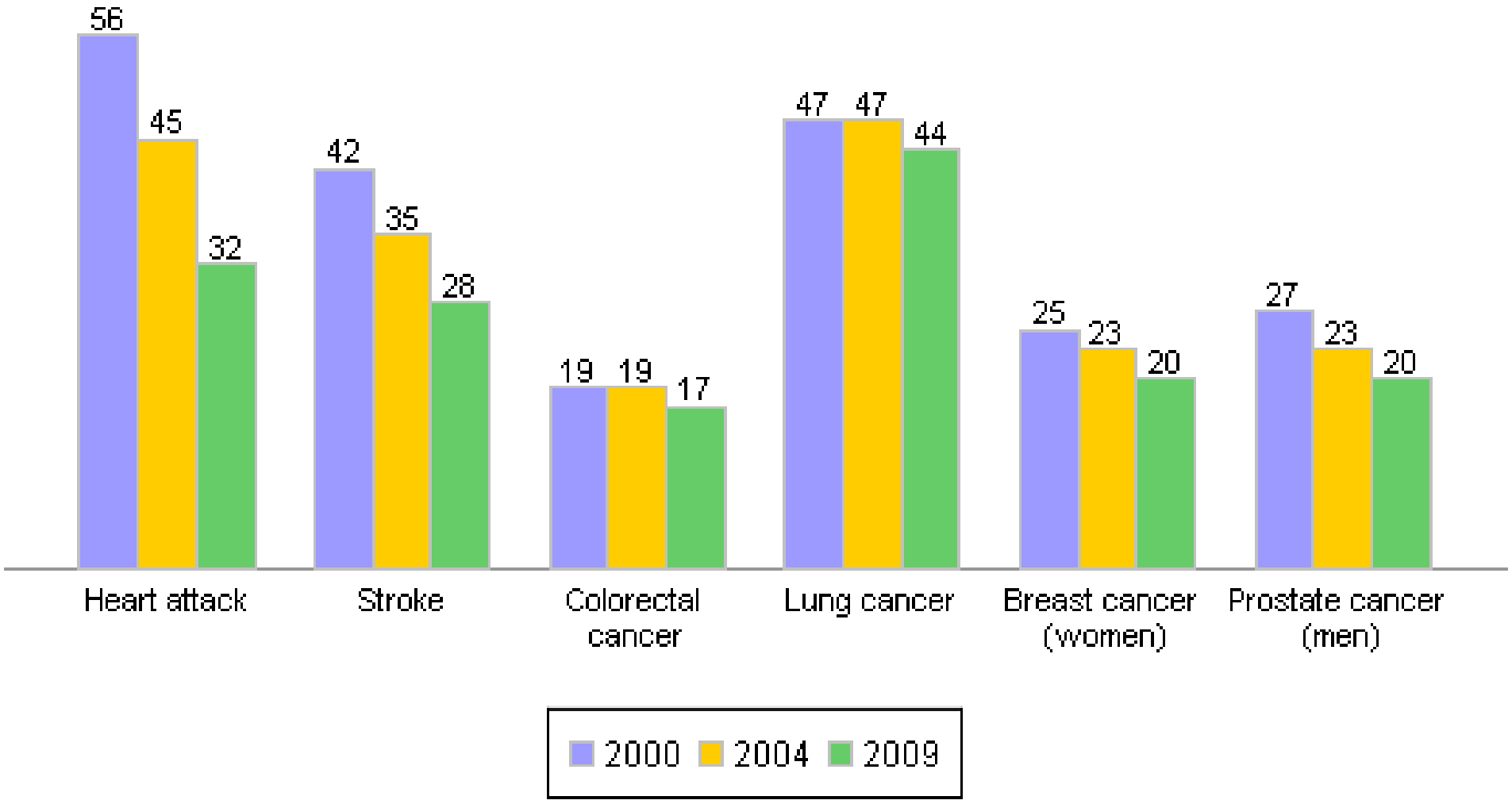
# Age-Standardized Mortality Rate/100,000 for Cardiovascular Diseases Aged 20+, Men, 1979 - 2003




Source: Canadian Mortality Data Base, Statistics Canada, Age Standardized, 5 year age groups.
Estimated from: CDC, Heath, United States, 2008

# Mortality from leading circulatory diseases and cancers, Canada, 2000, 2004 and 2009

## (per 100,000 people)



# The Agriculture and Agri-Food System Plays a Significant Role in the Canadian Economy

- The Canadian agriculture and agri-food system accounted for 6.7% % of total Canadian Gross Domestic Product (GDP) in 2016.

- **The system provides one in eight jobs (12.5%), and employs nearly 2.3 million people.** The system also indirectly generates additional GDP and employment in other economic sectors.

# Canada's Food Manufacturing Sector

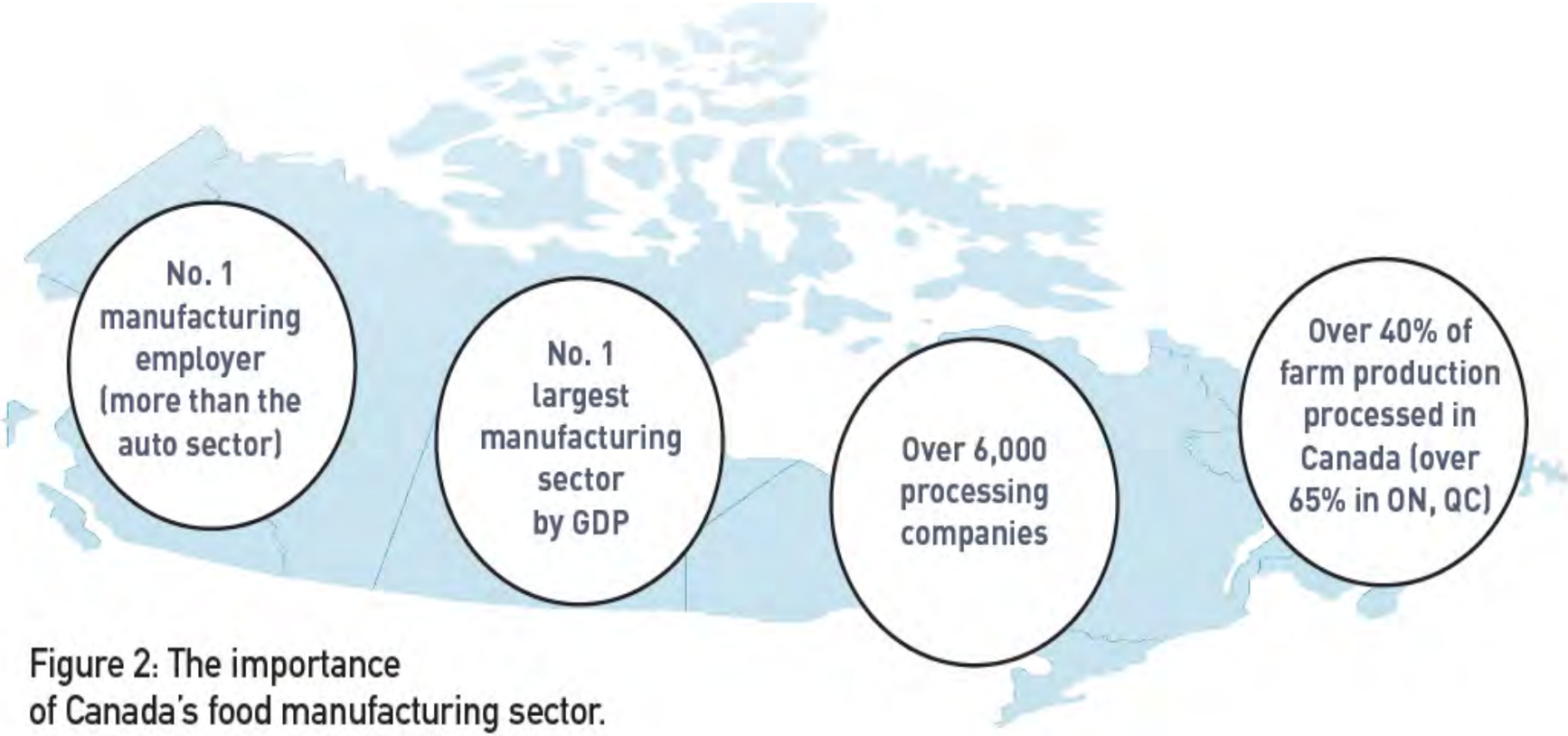



Figure 2: The importance of Canada's food manufacturing sector.

Canadian Agri-Food Policy Institute

# Agri-Food Systems and Health

Agriculture and the Food Industry have Contributed 50-70% of the Advances in Health and Economic Status since the Industrial Revolution”

*- Fraser Mustard, John Frank, Health Economists 1990*

**Can Agriculture and the Food Industry Respond to the Modern Day Challenge of Reducing Chronic Diseases and Health Care Costs?**

**It’s a Tough Environment! Why?**

# Agri-Food and Health-The Transistion

- Enough
- Safe
- Nutrient complete
- Affordable
- Convenient
- Indulgent (provide excess)
- Chronic disease
- Increased health care costs


Nutrition Reviews 57:368-372, 1999

# Obesity Has Become A Front-Page Issue

# Whose Fault? Food Industry?


**(Food industry marginalized)**

# The “Fake News?”

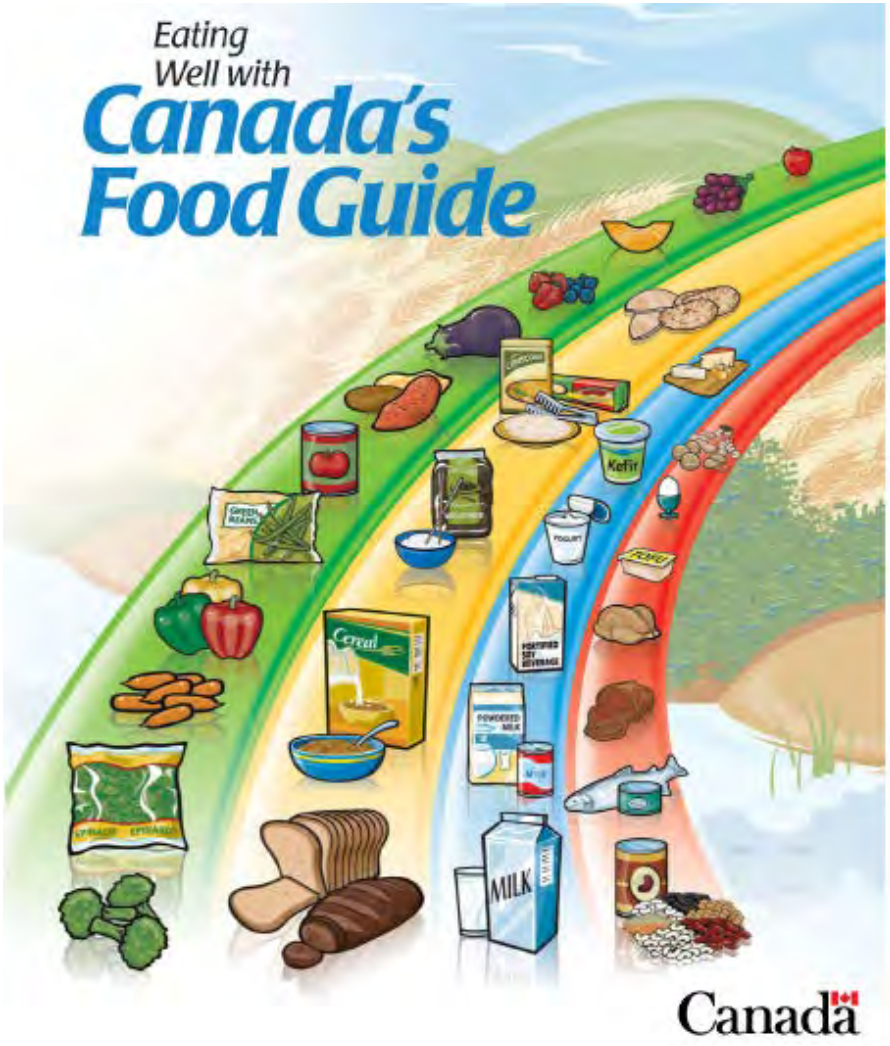
- **Our Healthy Grains: “Wheat Gluten”**
  - Wheat Belly
  - Grain Brain
- **Our Potatoes- “unhealthy vegetable”**
  - Glycemic Index, French Fries
  - Consumption down 40%
- **Our Beef, Pork and Dairy**
  - “Saturated Fat”
- **Our Crop Development- “GMO”**

# Public Health Solutions

- Isolate the agri-food industry
- Increase regulations
- Prevent advertising to children
- Classify foods as good and bad
- Place taxes on sweet foods and beverages
- Food Guides
- Food Guidelines

**Where is the evidence?  Obesity marches on!**

# Solution? Canada's Food Guide – A Nutrient Based Diet Pattern: NOT ENOUGH




**Recommended Number of Food Guide Servings per Day**

| Age in Years | Children 2-3 | Children 4-8 | Children 9-13 | Teens 14-18 | Teens 14-18 | Adults 19-50 | Adults 19-50 | Adults 51+ | Adults 51+ |
|---|---|---|---|---|---|---|---|---|---|
| Sex | Girls and Boys | Girls and Boys | Girls and Boys | Females | Males | Females | Males | Females | Males |
| Vegetables and Fruit | 4 | 5 | 6 | 7 | 8 | 7-8 | 8-10 | 7 | 7 |
| Grain Products | 3 | 4 | 6 | 6 | 7 | 6-7 | 8 | 6 | 7 |
| Milk and Alternatives | 2 | 2 | 3-4 | 3-4 | 3-4 | 2 | 2 | 3 | 3 |
| Meat and Alternatives | 1 | 1 | 1-2 | 2 | 3 | 2 | 3 | 2 | 3 |

The chart above shows how many Food Guide Servings you need from each of the four food groups every day.

**Having the amount and type of food recommended and following the tips in *Canada's Food Guide* will help:**

- Meet your needs for vitamins, minerals and other nutrients.
- Reduce your risk of obesity, type 2 diabetes, heart disease, certain types of cancer and osteoporosis.
- Contribute to your overall health and vitality.

# Solution? Dietary Guidelines: NOT ENOUGH

- ***Dietary Guidelines***
  - –Began in the 1970's
  - –Example- Reduce saturated fat intake
  - –Changes with time
  - –Confusing, Contradictory and Conflicting

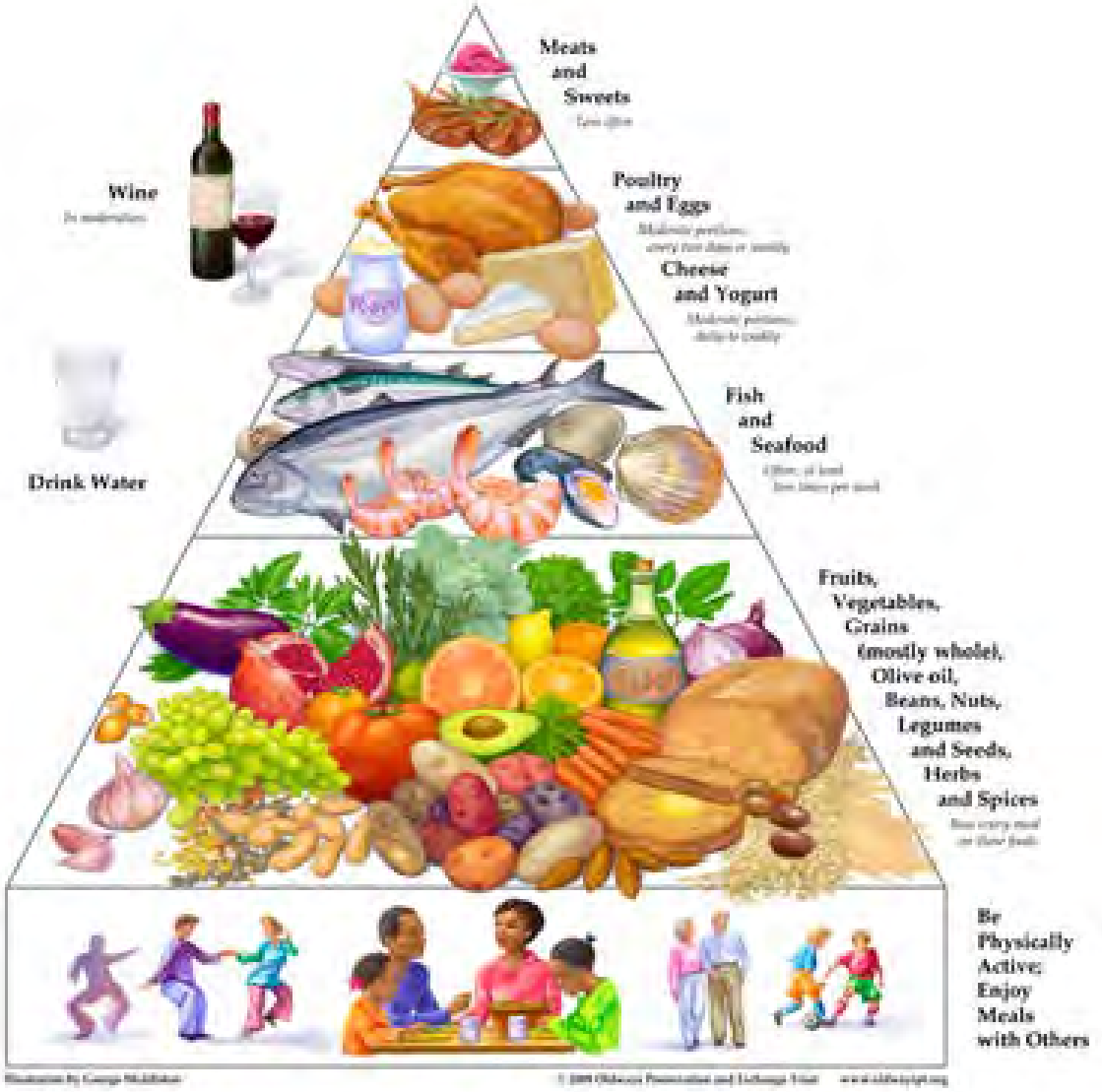
- ***Dietary Guidelines for Americans***

The *Dietary Guidelines for Americans* has been published jointly every 5 years since 1975 by the Department of Health and Human Services (HHS) and the Department of Agriculture (USDA).

They provide advice about how good dietary habits can promote health and reduce risk for major chronic diseases.

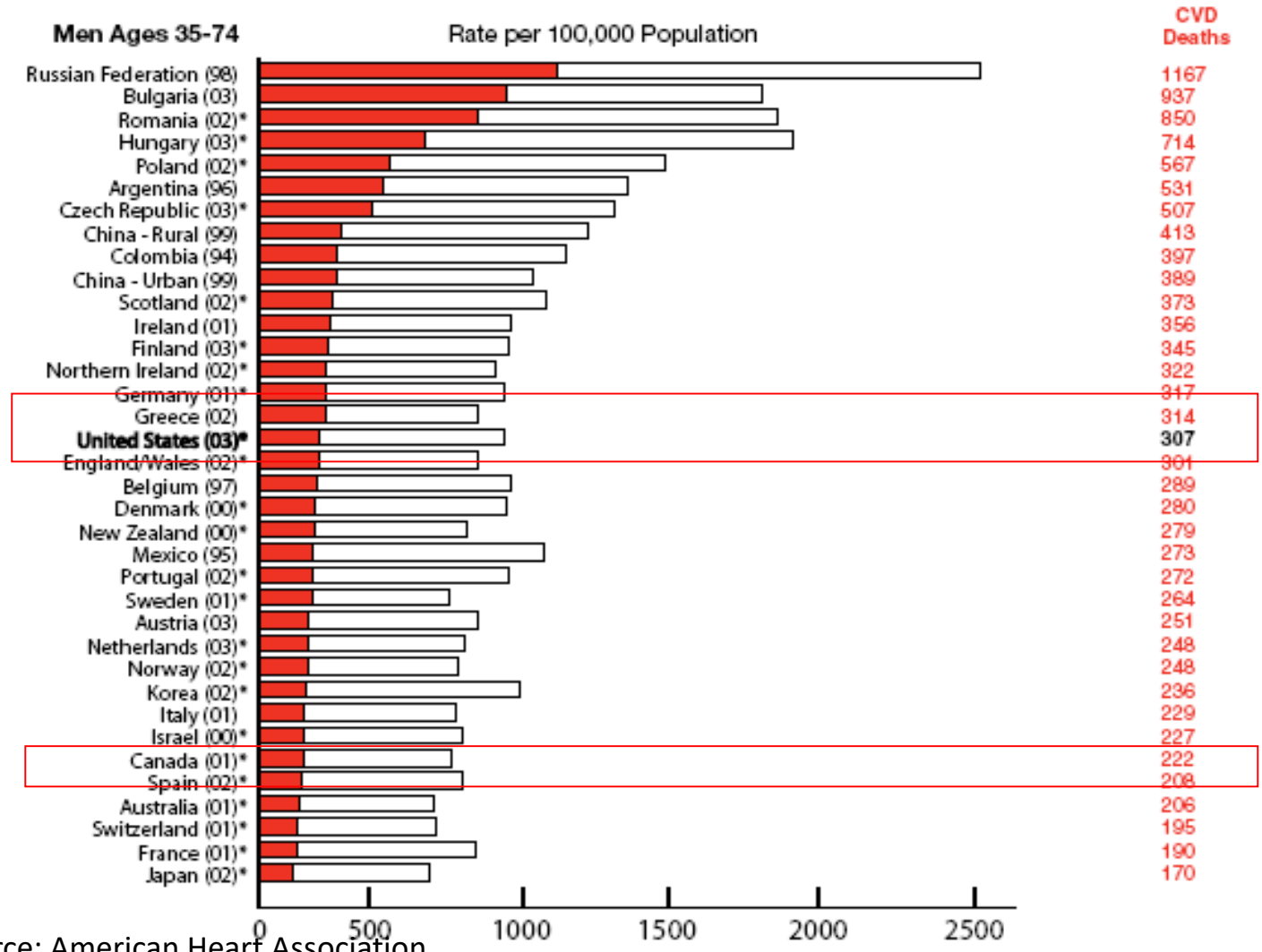
They serve as the basis for Federal food and nutrition education programs.

# Food Solutions? The Mediterranean Food Pattern?



# International CVD Death Rates

**Death Rates for Total Cardiovascular Disease, Coronary Heart Disease, Stroke and Total Deaths in Selected Countries (most recent year available) (Revised 2005)**

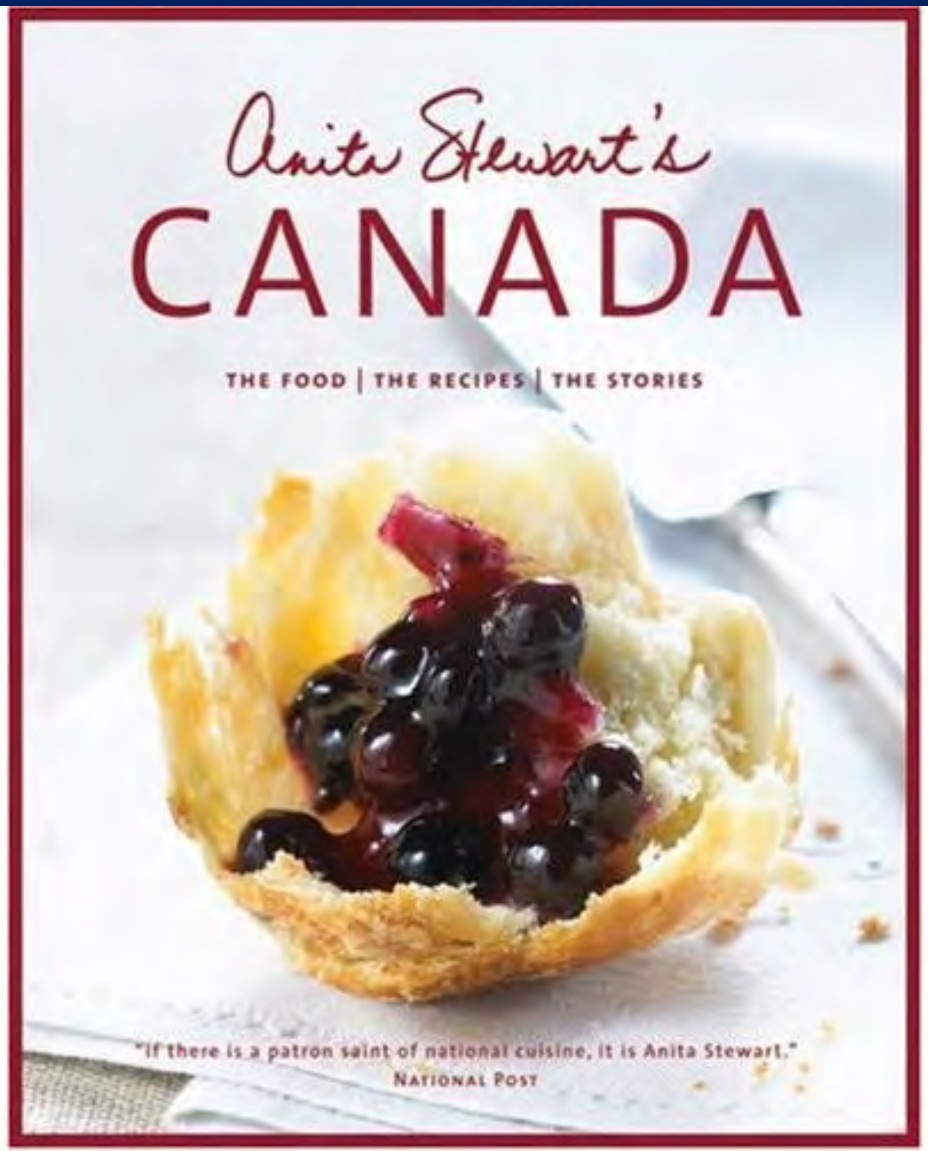



Source: American Heart Association

# Our Food System and Chronic Disease

1. The agri-food system has been the major contributor to prevention of disease since the industrial revolution, but needs to take new approach to chronic disease
2. Canadian solutions to chronic disease need to be developed by Canadians based on our climate, crops, culture and health system. Why?
3. The solution resides in a “whole of society” approach the integrates the agri-food and health systems.

# The Canadian Diet Solution?



# Canadian Foods: Our Climate Advantage


**BC**
-Fish, seafood
-Berries
-Apples
-Potatoes
-Tomatoes
-Milk & Eggs
-Wine

**Prairies**
-Pulses
-Flax
-Canola
-Wheat, Oats & Barley
-Beef, Pork, Eggs, Milk
-Mustard Seeds
-Potatoes

**Atlantic Canada**
-Fish, seafood
-Potatoes
-Berries
-Apples

**Central Canada**
-Pulses -Tomatoes - mushrooms
-Apples -Squash/Pumpkin -wine-
Berries -Potatoes
-Soy -Fish, seafood
-Beef, Pork, Poultry, Eggs, Milk

Anita Stewart's Canada, 2008

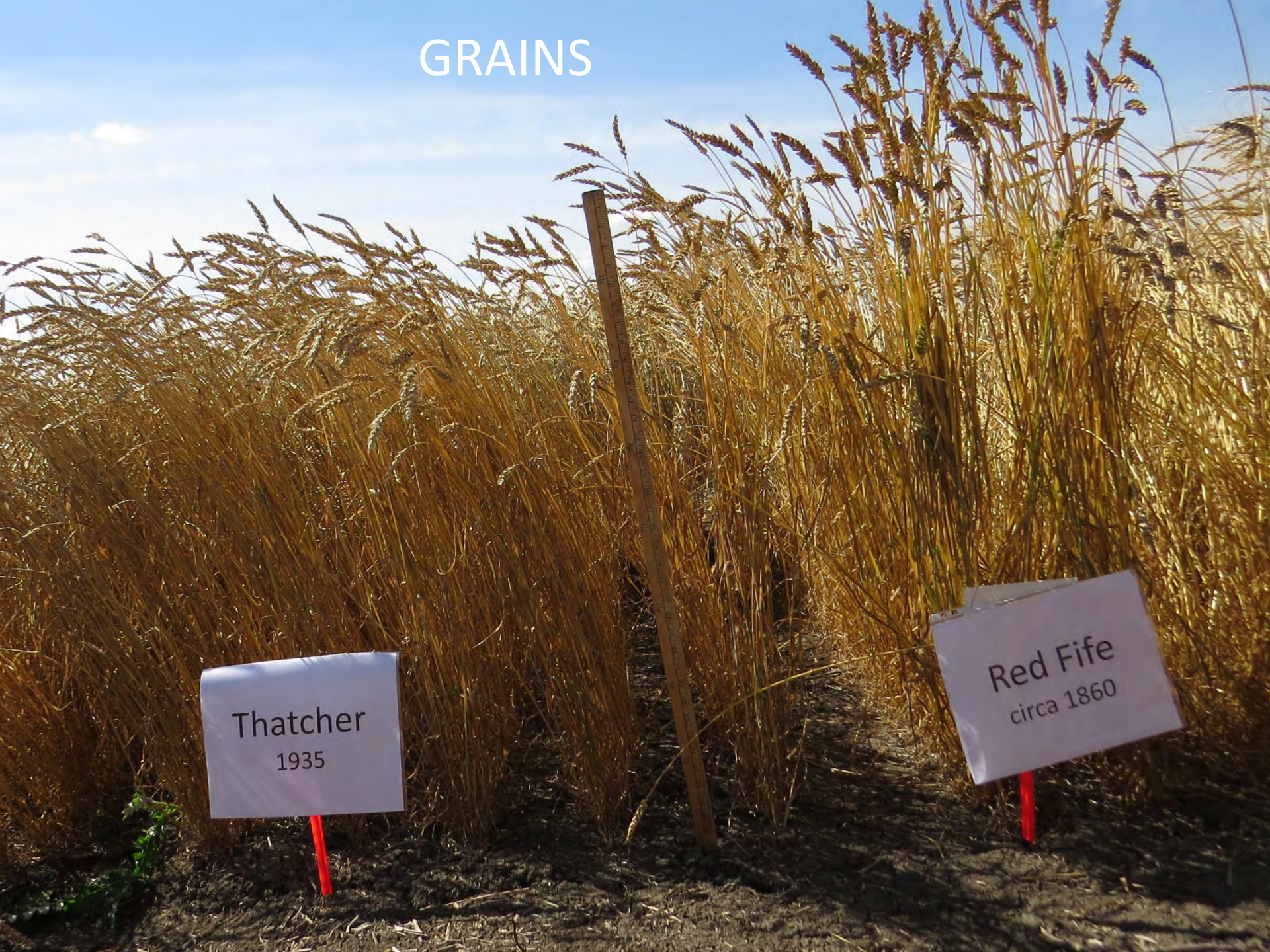
Statistics Canada


WHERE AG'S AT
Top commodities by province and territory
NORTHWEST TERRITORIES
YUKON
NUNAVUT
NEWFOUNDLAND AND LABRADOR
QUEBEC
PRINCE EDWARD ISLAND
NEW BRUNSWICK
NOVA SCOTIA
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
LEGEND
forage
greenhouse crops
eggs
horticulture
caribou, musk ox
wild berries
dairy
cattle
grains and oilseeds
hogs
poultry

# Wheat is consumed as diverse regional and ethnic products


The Myths: Gluten Protein has increased in grain and the cause of multiple diseases. (Wheat Belly, Brain Drain, etc)

# GRAINS



# Grain Research in Canada

Ravindra Chibbar
Professor & Canada Research Chair
Crop Quality (Molecular Biology & Genetics)

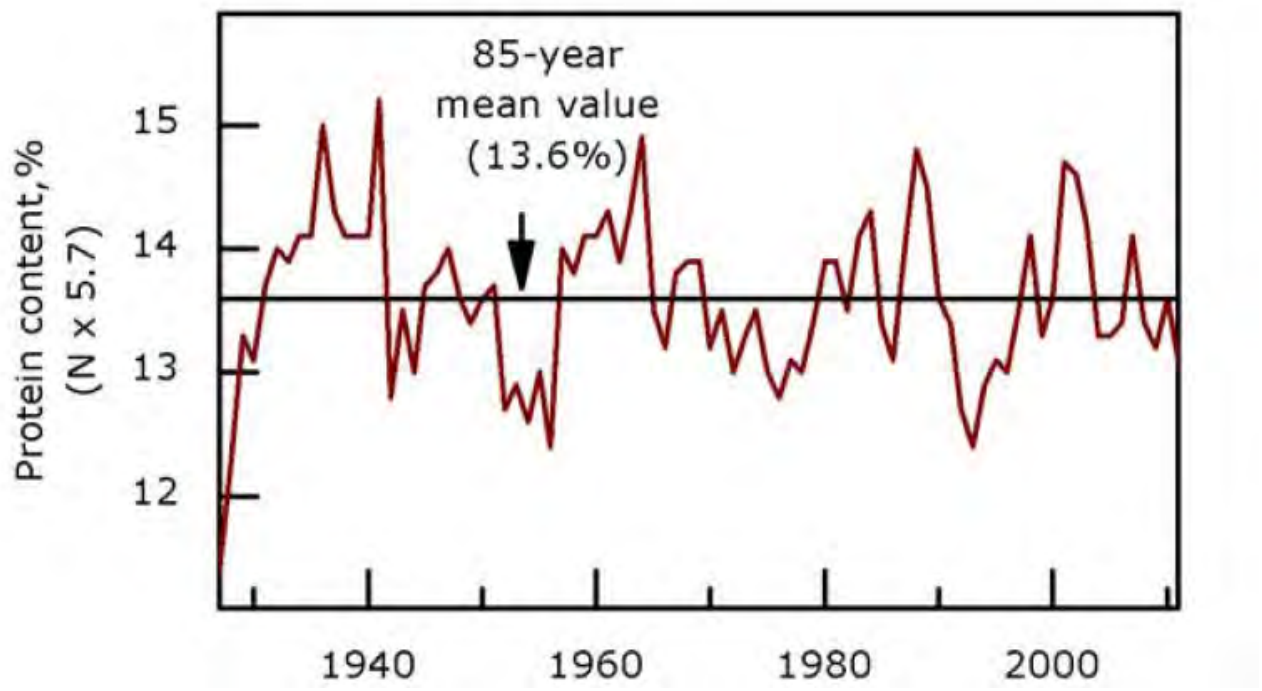
ravi.chibbar@usask.ca

Conflict: Member Science Advisory Committee, Healthy Grains Institute, Toronto, Ontario, Canada

*Department of Plant Sciences*

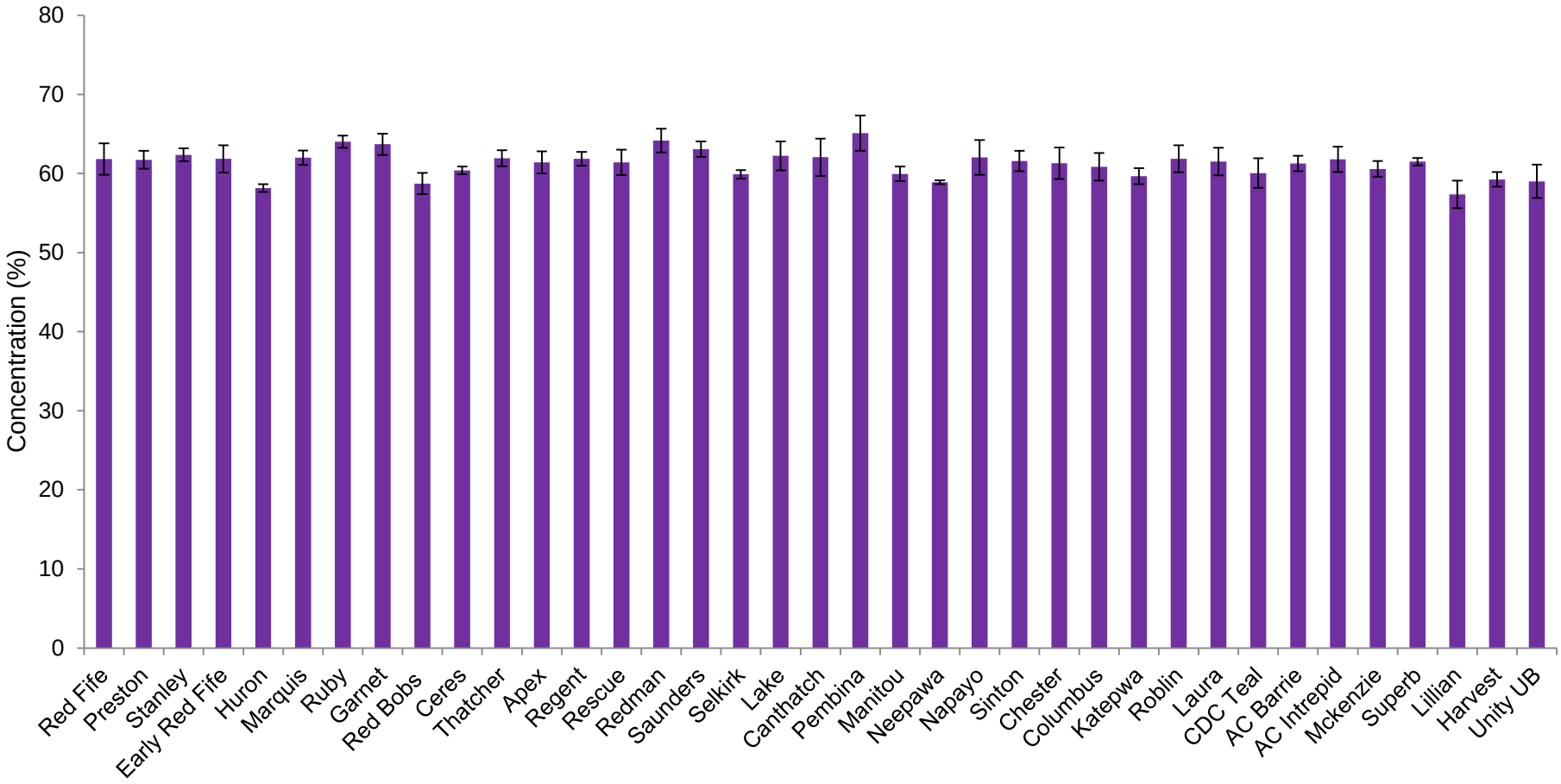
# University of Saskatchewan Wheat Research

# Mean protein content of Canada Western Red Spring wheat (1927 – 2011)




*Edwards, N.M., Hatcher, D.W., Fu, B.X. (2012, Quality of Western Canadian wheat 2011, Canadian Grain Commission, Winnipeg, ISSN 498-9654, pp12.*

# Polymeric Protein Concentration in Total Wheat Proteins

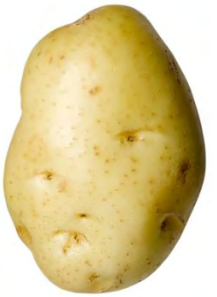


# Canola Oil

- Developed by plant breeders Keith Downey in Saskatchewan and Baldur Stefansson in Manitoba during the 1960s and 70s.
- Through traditional cross-breeding they minimized the undesirable compounds (erucic acid and glucosinolate) in rapeseed oil to produce a food-grade oil.
- Now a 6 billion dollar industry in Canada
- A healthy oil-balanced in fatty acids

Source:
Stewart, A. Anita Stewart's Canada, 2008

# Potatoes




- Florenceville, NB, is home of McCain Foods, the world's largest and most successful French fry processor
- McCain, a Cdn company, sells more frites in France than any company
- It produces almost 1/3 of the worlds supply with 30 plants globally
- Nutrient dense, and misunderstood vegetable

# Yukon Gold Potatoes

- Developed by Gary Johnston at the University of Guelph
- A graduate student introduced him to a Peruvian variety that was small, rough, with yellow flesh and a distinct delicious flavour
- Through innovative breeding techniques created a larger, smoother version named and marketed as YUKON GOLD (for Yukon River and for gold rush county)
- Yukon Gold potatoes are famous in Canada and in menus around the world

# Flax

- Flax contains :
  - **Omega-3 fatty acid:** About 42% of flax seed is oil, and more than 70% of that oil is PUFA. Flax also contains 57% of the important omega-3 fatty acid, alpha-linolenic acid (ALA).
  - **Soluble and insoluble fibre**: Soluble fibre can lower blood cholesterol levels, while insoluble fibre moves the stool through the colon more quickly, helping bowel movements.
  - **Lignans:** One of the richest plant sources of lignans, which are phytoestrogens – compounds that have been shown in laboratory studies of animals to help protect against certain kinds of cancer, particularly cancers of the breast and colon, by blocking tumour formation

Source:
Flax Council of Canada

# Pulses: A Canadian Advantage

## The Ideal Food for Satiety, Weight Management and Blood Glucose Control?

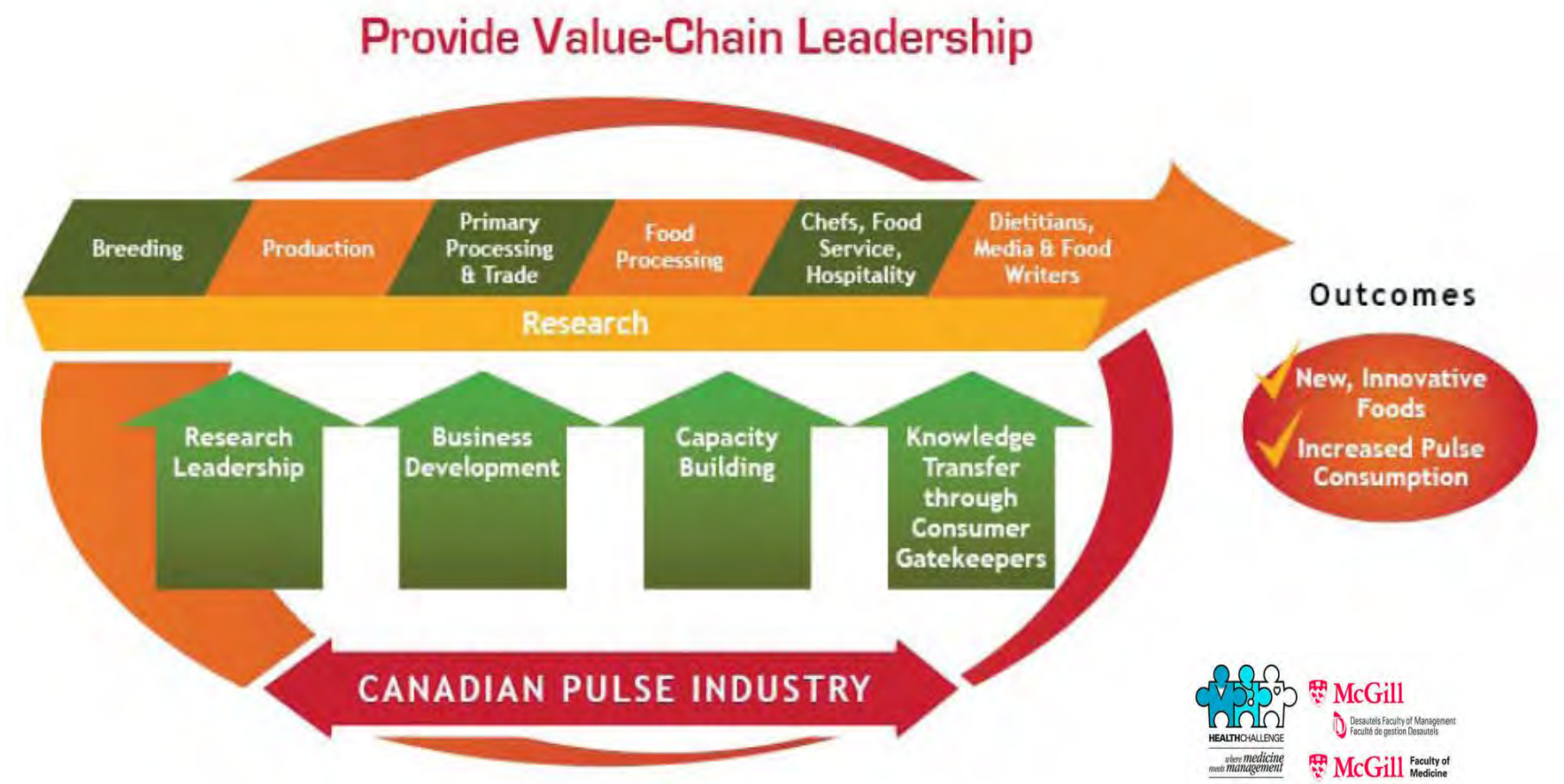
- Pulses are the edible seeds of legumes

e.g. lentils, beans, peas and chickpeas

- Solid food
- Low energy density
- Low GI
- High Fiber
- High Protein

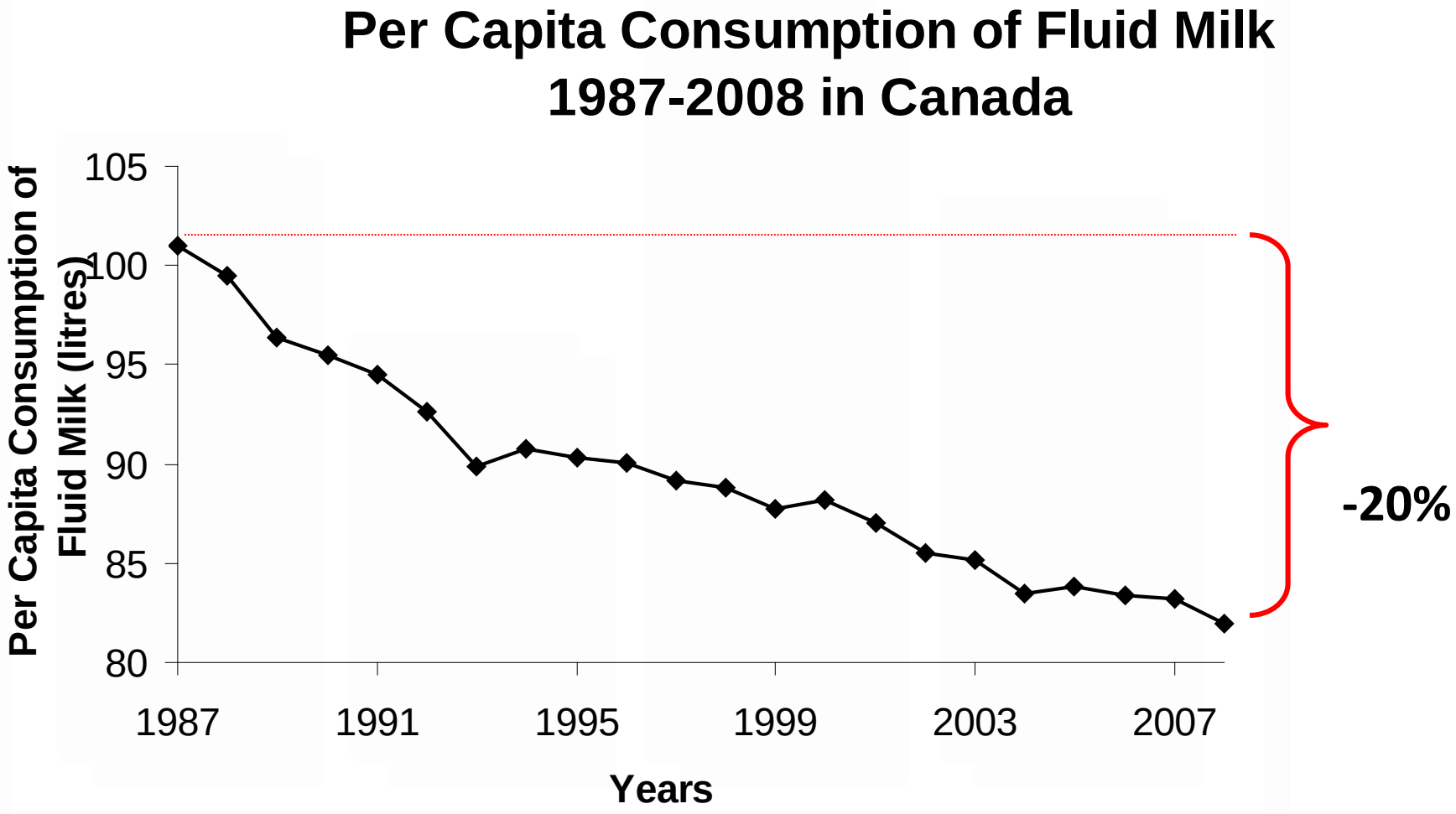
# The Food Value Chain for Health: Example - Pulses

Agriculture → Food and Health Research → Reduced Chronic Disease




UN has declared 2016 The International Year of Pulses

# Role of Milk in the Health of Canadians (Milk Consumption)




Source:
Statistic Canada, Table 003-0012 and 051-0005

# Why the Decline in Milk Consumption?

- The easy explanation? The soft drink industry
- The real explanation? Epidemiology and dietary guidelines. 1960 +

–*Saturated fat causes heart disease?*

–Perceived lactose intolerance?

–Fattening (milk products full of fat and sugar

– The problem?

–Few studies on metabolic functions of milk and dairy products per se, as consumed.

–Consumer communication nutrient oriented.

- The solution? 2014 Harvard epidemiologists change their mind. Saturated fat not all bad.

# Health Benefits of Dairy-Beyond Nutrients

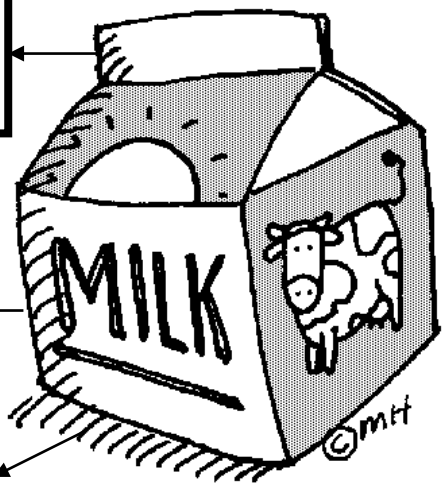
- Regular consumption of dairy is associated with healthier body weight and composition as well as lower incidences of T2D and obesity

- Experimental studies of the effect of dairy foods show that the physiologic functionality of dairy beyond its nutrient value may account for many positive outcomes associated with its consumption, including improved glucose metabolism and appetite suppression.

# Function of Foods Beyond Nutrients for Health Needs to be Elucidated and Communicated

Whole milk vs. Milk Components?

What role does milk play in weight management?




Varying fat content?
**Omega 3 innovation UoG**

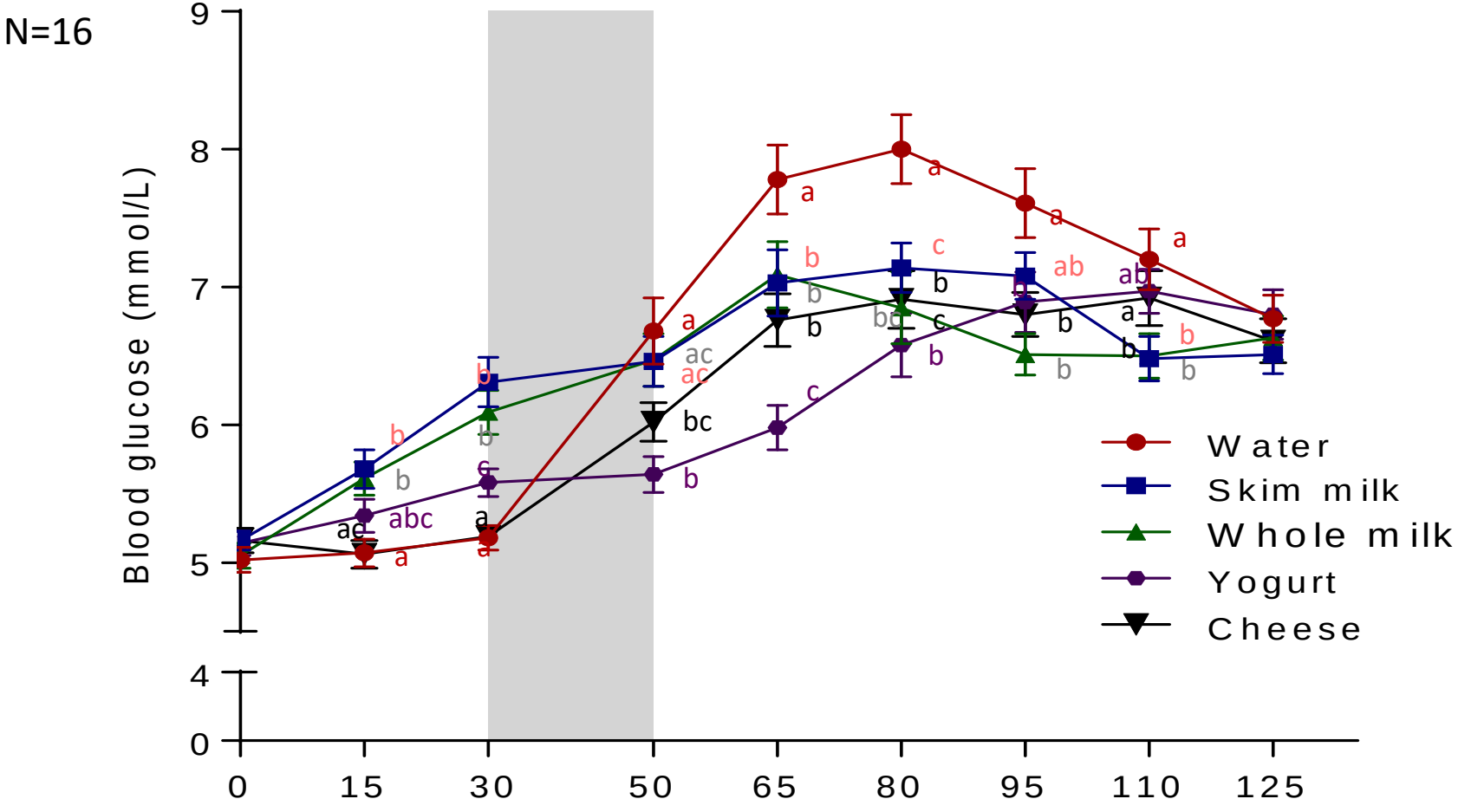
Effect on regulating satiety and food Intake?

Consumption before or with a meal?

Effect of daily consumption over weeks/months?

Mechanism by which milk reduces risk for
-insulin resistance?
-risk of type 2 diabetes?
-CVD?
-metabolic syndrome?

# Pre-meal Dairy Reduces Post-prandial Blood Glucose



# AAFC: Eye on the Future

- **Atlantic Canada –** short-season soybeans
- **Quebec –** Getting Proactive on Probiotics, Protective coatings
- **Ontario –** Thinking Outside the Beehive, Biopesticides
- **Prairies –** Turning Straw into Paper
- **British Columbia –** Breaking New Ground, Reducing Nitrates
- **The North –** Cold Climate Cultivation

# The Canadian Food Supply

- The Canadian food supply, combined with our health care system has served us well
- We  have, and are, taking advantage of the Canadian climate in developing crops with health unique health benefits
- We are putting more resources into understanding health benefits of Canadian foods beyond their provision of nutrients
- So why is the agri-food system seen to be the problem/cause of chronic disease?  How can the perception be corrected?

# Our Food System and Chronic Disease

1. The agri-food system has been the major contributor to prevention of disease since the industrial revolution, but needs to take new approach to chronic disease
2. Canadian solutions to chronic disease need to be developed by Canadians based on our climate, crops, culture and health system
3. The solution resides in a “whole of society” approach the integrates the Canadian agri-food and health systems

# Creating Two Silos in 1919

Agriculture and Health have an intimate linkage, and Canada's strategies and policies need to align in these sectors**. Prior to 1919, the *British North America Act* recognized this link by having the Federal Department of Agriculture in charge of federal health responsibilities**. After 1919 and the establishment of the Department of Health this formal link eroded. Much good has come from these separate departments, with AAFC supporting research providing us with unique, healthy and prosperous crops, and Health Canada assuring all Canadians of medical treatment and access to safe drugs and food. While both our agriculture and health departments have had a tremendous impact on the health of Canadians they have become two separate silos

# Creating a Federal Department of Health, 1919

When the President of the Privy Council, **the Honourable Newton Wesley Rowell, rose in the House of Commons in March 1919 to open the debate on Bill 37, *An Act Respecting the Department of Health*,** he argued that "the powers of the minister . . . extend to and include all matters and questions relating to the promotion of the health and social welfare of the people of Canada over which the Parliament of Canada has jurisdiction." (Canada, House of Commons Debates, *Hansard* [March 26, 1919, p. 843])……. **He recognized the justice of the demands by the National Council of Women of Canada, the Trades and Labour Congress and Canadian farmers for a federal health department whose main goal would be "the conservation of the health of the people."** (Canada, House of Commons Debates, *Hansard* [April 4, 1919, p. 1174])

# AAFC Research Priorities Moving Forward (2006)

1. Enhancing human health and wellness through food, nutrition and innovative products
2. Enhancing the quality of food and the safety of the food system
3. Enhancing the security and protection of the food supply
4. Enhancing economic benefits for all stakeholders
5. Enhancing environmental performance of the Canadian agricultural system
6. Enhancing understanding of Canadian bioresources and protecting and conserving their genetic diversity
7. Developing new opportunities for agriculture from bioresources

# Canadian Agric-Food Policy Instiute

- CAPI is a catalyst

- By working with partners, CAPI is focusing on long-term issues facing the agriculture and agri-food sector, notably:
  - Competitiveness, profitability and productivity
  - Environmental sustainability
  - **The link between health and food**

CAPI
THE CANADIAN AGRI-FOOD POLICY INSTITUTE

ICPA
L'INSTITUT CANADIEN DES POLITIQUES AGRO-ALIMENTAIRES

# Building Convergence

## Toward an Integrated Health & Agri-Food Strategy for Canada

**August 2009**

**A discussion paper**

**by Laurette Dubé, Paul Thomassin and Janet Beauvais**
**of the McGill World Platform for Health and Economic Convergence**

# Building Convergence

- *"the food industry is not necessarily the evil to avoid, but rather can be a powerful ally in achieving the changes needed to combat obesity, chronic disease, and other challenges related to food and diet."*

- *"The industry can be a particularly strong ally if its power of innovation, technology, and logistics is harnessed"*

# Food and Health Systems Summary Points

1. The agri-food system has been the major contributor to prevention of disease and advancement of health since the industrial revolution, but needs to take a new approach to chronic disease
2. Solutions to chronic disease need to be developed within countries based on their, climate, crops, culture and health system and knowledge of foods.
3. The solution resides in a “whole of society” approach the integrates the agri-food and health systems. **Partnerships for health need to be created with a country specific focus to develop evidence based food policies and regulations**

# Strengthening Agriculture-Health linkages-Moving Forward



December 2017. Program in Food Safety, Nutrition and Regulatory Affairs, UofT sent letter to the Ministries with offer to form a platform for discussion.

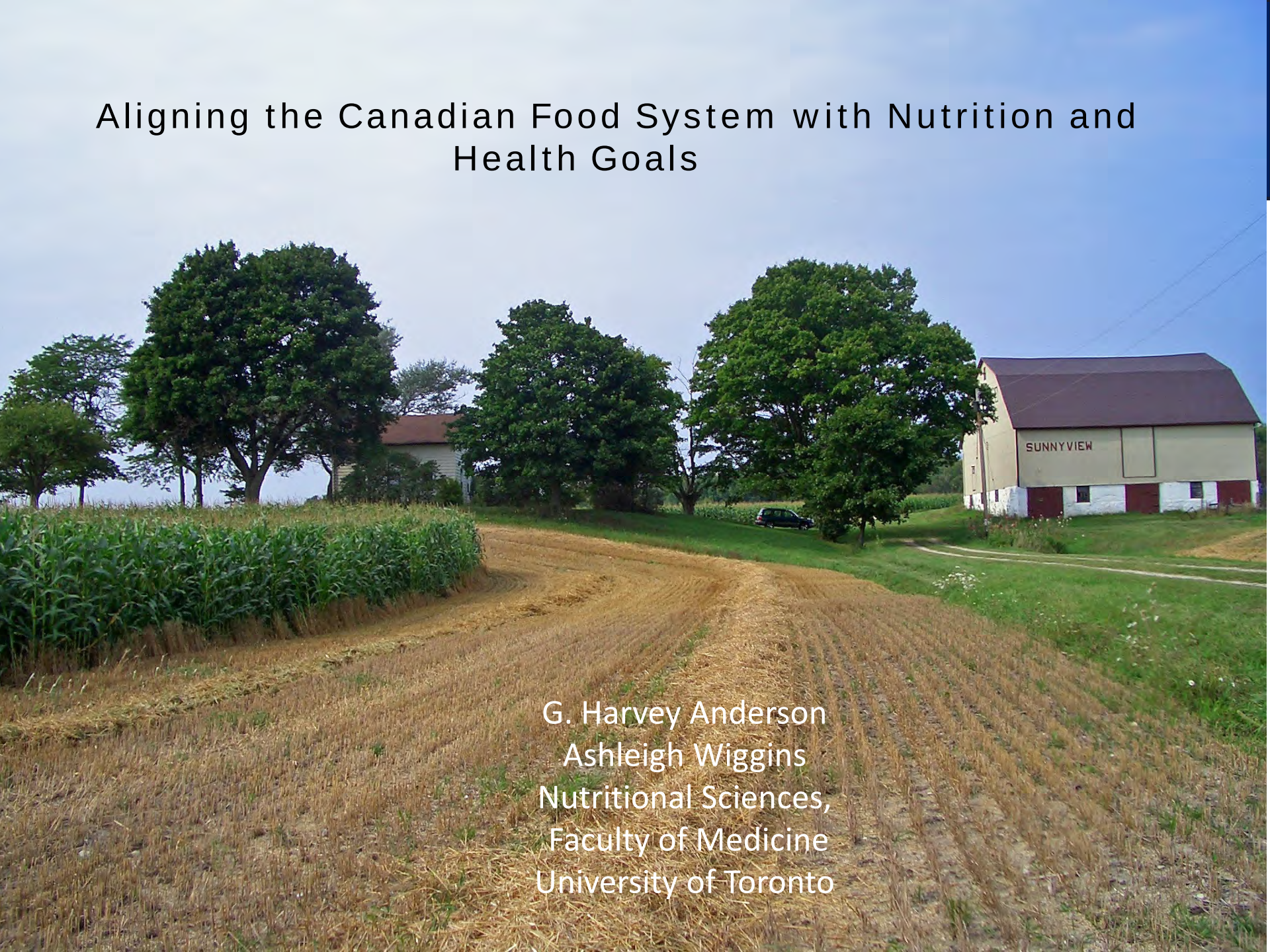
# First Step – Let's Talk March 15

- Open discussion with PFSNRA, Health Canada and AAFC
  - What are some opportunities to strengthen partnerships?
  - What are the barriers to health and agriculture partnerships? Why have these linkages eroded?
  - What work is already being done in this area? Who are the players?
  - Would an external/arms length council help to facilitate partnerships?
    - If yes, who should lead and who should be involved?
    - Funding?
- Agreed to explore examples of greater integration, e.g Finland, Demark, Netherlands.

# Elements of an Integrated Health and Agri-Food Strategy for Canada

- Integrated agri-food food and health policies
- Integrated Research investment-Federal and Provincial Ministries of Agriculture and Health, Health Research Agencies (CIHR) and Foundations (H&S), Industry
- Integration of health research into the value added food production chain
- Partnerships and respect across sectors-a place for all
- Regulatory reform to encourage innovation and effective health communication
- Integrated leadership from Faculties of Medicine and Agriculture

# Aligning the Canadian Food System with Nutrition and Health Goals

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Faculty of Medicine
University of Toronto