Use of the 2015 CCHS - Nutrition to estimate dairy intake by Canadians:

Implications for nutrition and environmental sustainability

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Outline

1. Introduction

2. Methodology

3. Findings

4. Conclusion

1. Introduction:

Nutrition, Trends, and Environmental Impact of Dairy Consumption

Sources

- Milk
- Cheese
- Yogurt
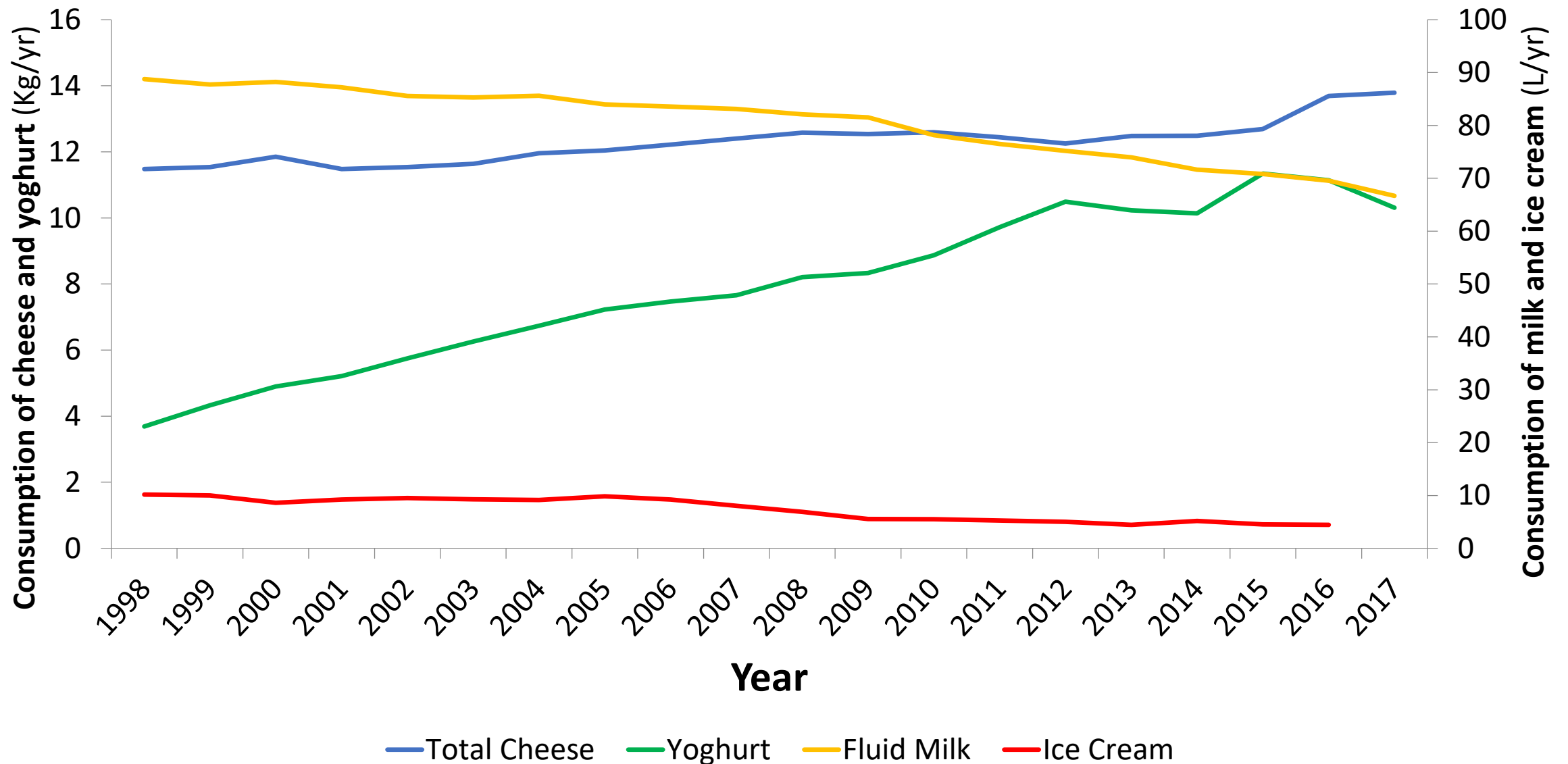- Frozen dairy
- Kefir
- Butter
- Cream

Dairy Nutrition

- Nutrient-dense
  - ✓ Rich in nutrients relative to calories
  - ✓ Source of 16 essential nutrients

- High-quality protein
  - ✓ All essential amino acids
  - ✓ Highly digestible

Consumption of Dairy Products in Canada

Source: Canadian Dairy Information Center. (2017). Per Capita Consumption of Milk and Cream.

Canada's Food Guide 2007

Recommended Number of Food Guide Servings per Day

	Children			Teens		Adults			
Age in Years	2-3	4-8	9-13	14-18		19-50		51+	
Sex	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

What is One Food Guide Serving?
Look at the examples below.

Vegetables and Fruit

Fresh, frozen or canned vegetables
125 mL (½ cup)

Leafy vegetables
Cooked: 125 mL (½ cup)
Raw: 250 mL (1 cup)

Fresh, frozen or canned fruits
1 fruit or 125 mL (½ cup)

100% Juice
125 mL (½ cup)

Grain Products

Bread
1 slice (35g)

Bagel
½ bagel (45 g)

Flat breads
½ pita or ½ tortilla (35 g)

Cooked rice, bulgur or quinoa
125 mL (½ cup)

Cereal
Cold: 30 g
Hot: 175 mL (¾ cup)

Cooked pasta or couscous
125 mL (½ cup)

Milk and Alternatives

Milk or powdered milk (reconstituted)
250 mL (1 cup)

Canned milk (evaporated)
125 mL (½ cup)

Fortified soy beverage
250 mL (1 cup)

Yogurt
175 g (¾ cup)

Kefir
175 g (¾ cup)

Cheese
50 g (1 ½ oz.)

Meat and Alternatives

Cooked fish, shellfish, poultry, lean meat
75 g (2 ½ oz.)/125 mL (½ cup)

Cooked legumes
175 mL (¾ cup)

Tofu
150 g or 175 mL (¾ cup)

Eggs
2 eggs

Peanut or nut butters
30 mL (2 Tbsp)

Shelled nuts and seeds
60 mL (¼ cup)

The chart above shows how many Food Guide Servings you

Canada's Food Guide 2019

Have plenty of vegetables and fruits

Eat protein foods

Make water your drink of choice

Choose whole grain foods

Environmental Impact of the Dairy Industry

Greenhouse gas emissions[1]

- Livestock management (48%)
  - Enteric fermentation

Water footprint

- Feed production (68%)
  - Feed crop irrigation

Land use

- Feed production (99%)

1 kg of fat- and protein-corrected milk

Carbon Footprint	0.92 kg CO_2e
Water Footprint	25.8 L
Land Use	17 m^2y

[1]Groupe AGECO. (2018). *Environmental Life Cycle Assessment of Canadian Milk Production: 2016 Data and Results Update.*

2. Methodology:

2015 Canadian Community Health Survey – Nutrition

Research Objectives

1. Estimate the **intake of dairy products** by Canadian adults.

2. Associations between **dairy intake** and **demographic characteristics, food group intake, nutrient adequacy,** and **diet quality.**

Canadian Community Health Survey (CCHS)

- Series of cross-sectional surveys
  - CCHS – Annual component (n = 65,000)
  - Focused survey every 3 years (n = 35,000)

- 2015 CCHS – Nutrition
  - 24-hour recalls (24HR)
  - Food and nutrient intakes
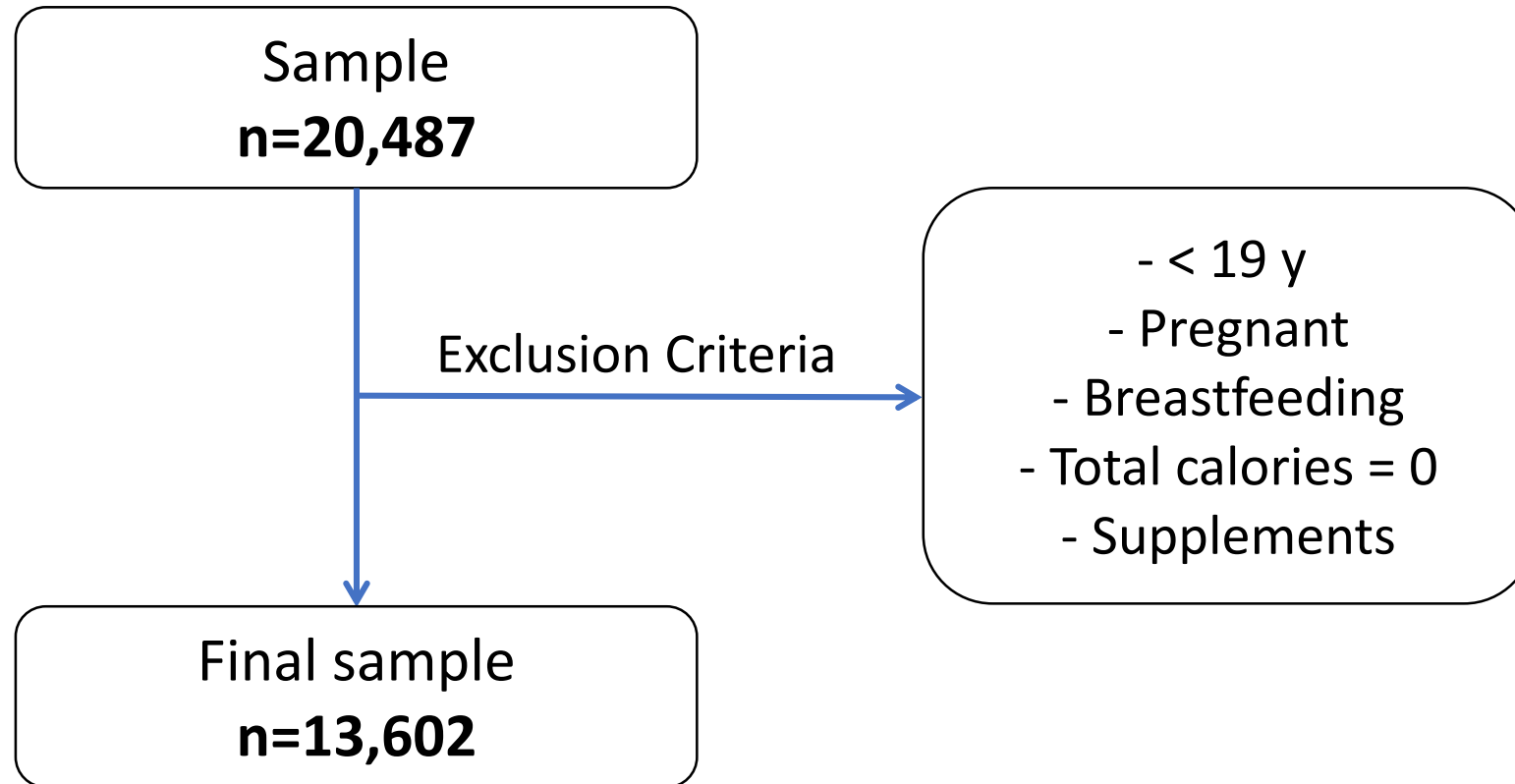 - Socio-economic and demographic information

24-Hour Dietary Recalls

- Dietary assessment tool
- Automated Multiple-Pass Method
  - Questionnaire to optimize respondents' recollection and reporting of foods consumed in the past 24 hours
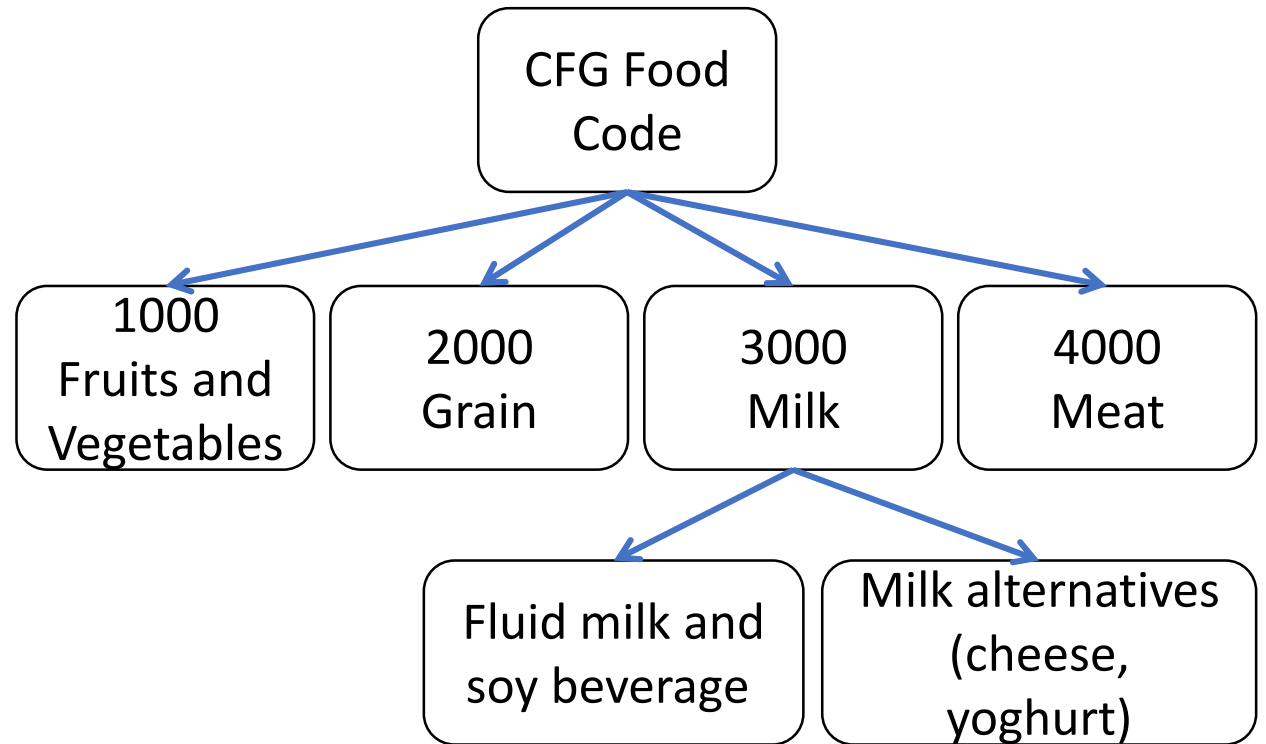- Prone to bias and misreporting

Study Population

Food Classification

- Used for:
  - Identifying all dairy and dairy-containing foods
  - Splitting respondents into dairy consumers and non-consumers
  - Classifying foods into foods groups
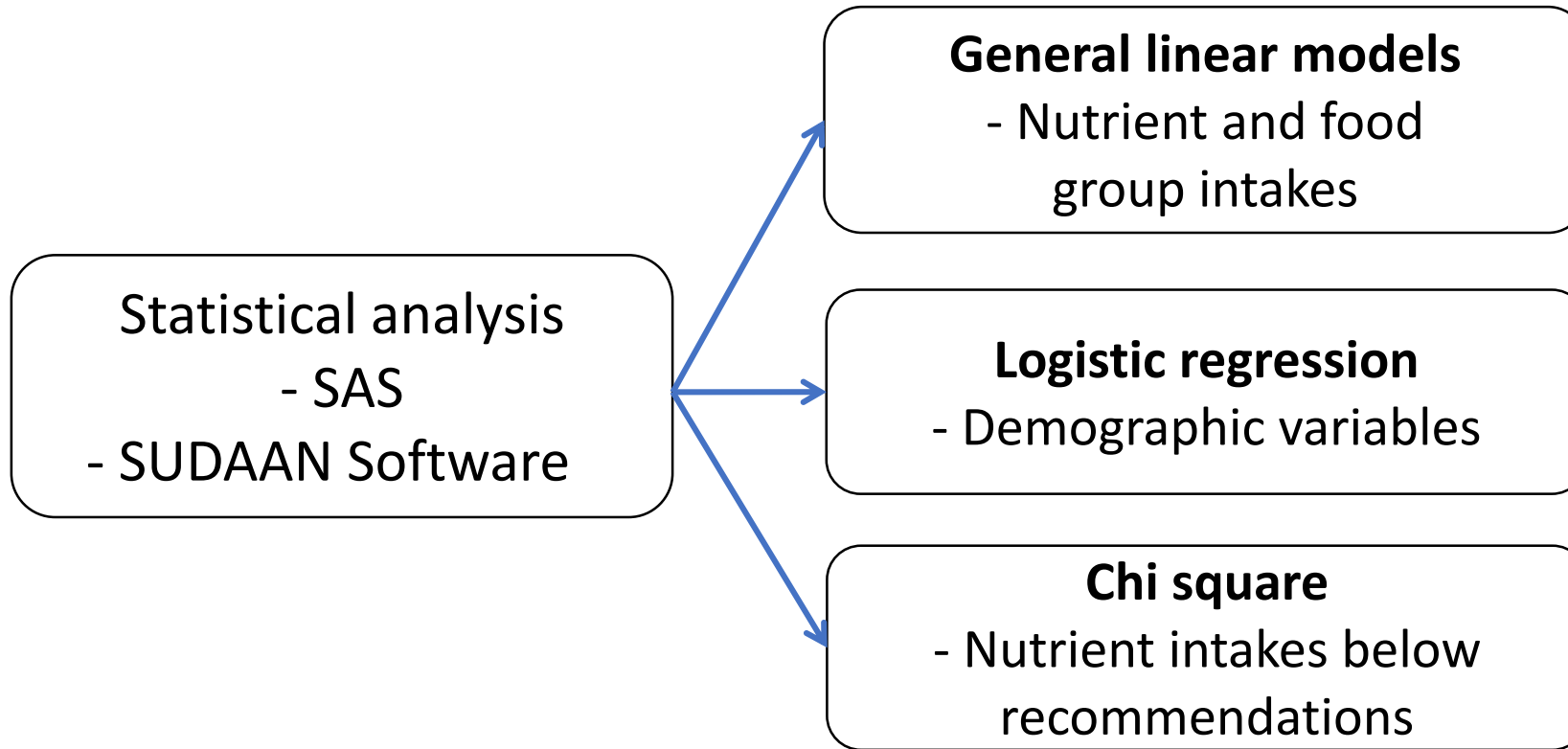 - Calculating the Healthy Eating Index – Canada

CFG Food Code

1000 Fruits and Vegetables

2000 Grain

3000 Milk

4000 Meat

Fluid milk and soy beverage

Milk alternatives (cheese, yoghurt)

Healthy Eating Index - Canada (HEI-C)

Component	Max Points	Standard for Max Score	Standard for Min Score (0)
Adequacy Sub-Score	**60**		
Total fruits and vegetables	10	4-10 servings	No servings
Whole fruit	5	0.84-2.1 servings	No servings
Greens and beans	5	0.42-1.05	No servings
Whole grains	10	1.5-4 servings	No servings
Dairy	10	2-4 servings	No dairy
Total protein foods	5	1-3 servings	No servings
Seafood and plant proteins	5	0.32-0.96 servings	No servings
Fatty acids	10	(PUFA+MUFA)/SFA >= 2.5	(PUFA+MUFA)/SFA <=1.2
Moderation Sub-Score	**40**		
Refined grains	10	< 50% of grains refined	>= 50% of grains refined
Sodium	8-10	AI-UL	2x UL
Empty calories	20	<= 19% of energy	>= 50% of energy
Total HEI-C	**100**		

Source: Jessri, M., Ng, A. P., & L'Abbé, M. R. 2017 *Nutrients* 9:910.

Statistical Analyses

Statistical analysis
- SAS
- SUDAAN Software

General linear models
- Nutrient and food group intakes

Logistic regression
- Demographic variables

Chi square
- Nutrient intakes below recommendations

3. Findings

Demographic characteristics

Predictor	Level	Proportion of Consumers (%)	OR [95% CI][1]	Dairy intake (g)[2]
Age	19-30 y	92.52	Reference	287.09±16.32
	31-50 y	90.21	0.69[0.47,1]	234.73±7.17
	51-70 y	91.01	0.71[0.49,1.02]	225.12±6.33
	71+ y	93.94	1.25[0.81,1.94]	233.51±6.89
Education	<Secondary	87.81	Reference	215.14±8.54
	Secondary	89.92	1.36[0.92,2]	232.83±7.96
	Some post-secondary	93.4	2.03[1.29,3.19]	248.71±8.7
	Post-secondary	91.76	1.68[1.04,2.71]	246.61±8.05
Ethnicity	Caucasian	93.83	Reference	249.47±4.99
	Non-Caucasian	84.37	0.4[0.3,0.52]	210.76±9.38
Reporter status	Plausible reporter	94.54	Reference	261.85±5.78
	Under-reporter	84.75	0.35[0.27,0.46]	167.39±5.41
	Over-reporter	97.15	1.96[0.9,4.26]	365.34±19.48

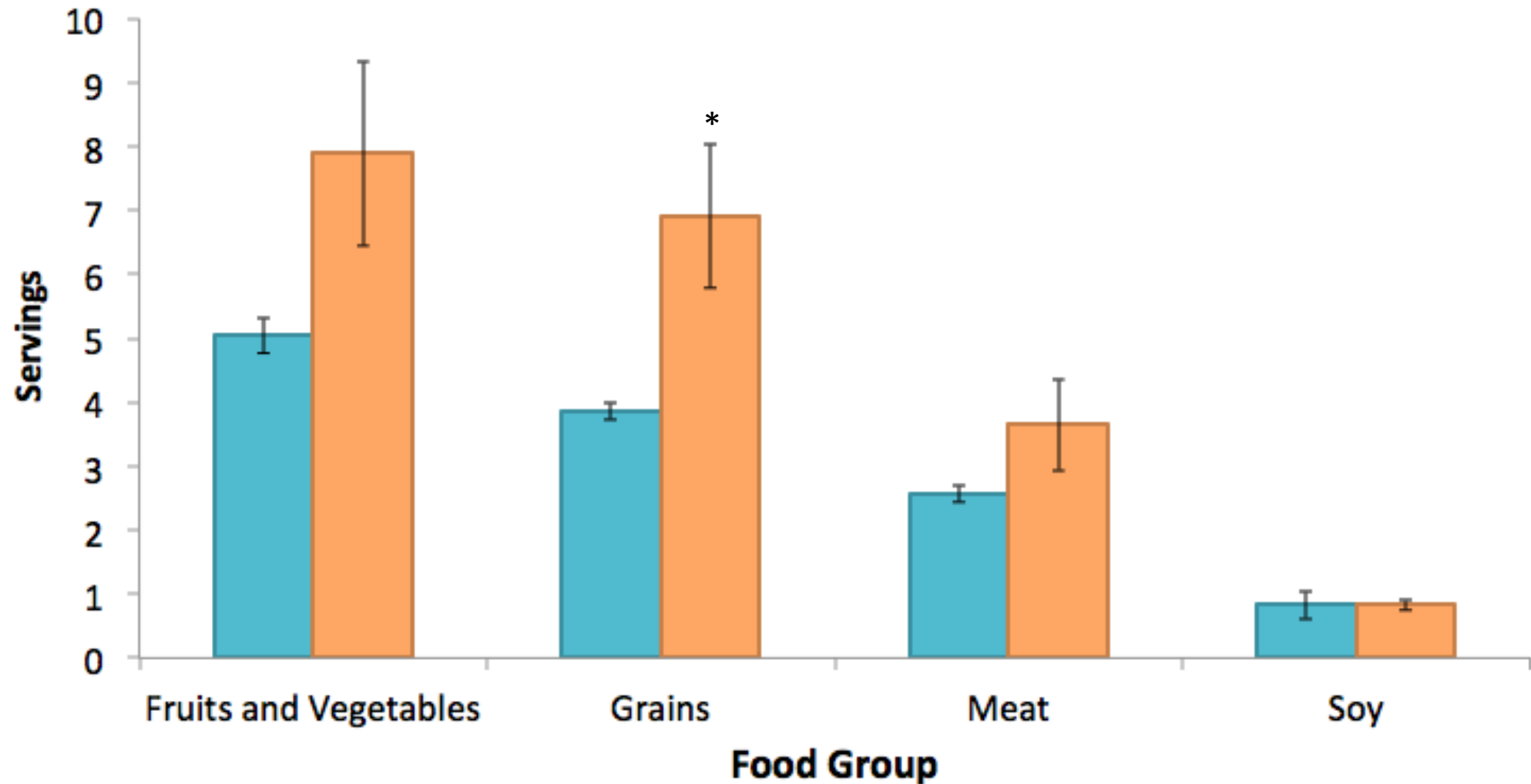[1] Odds ratio [95% confidence interval]. [2] Data are mean ± SE.

Consumption of Dairy Products in Canada[1,2]

Association between Dairy Intake and Food Groups[1,2]
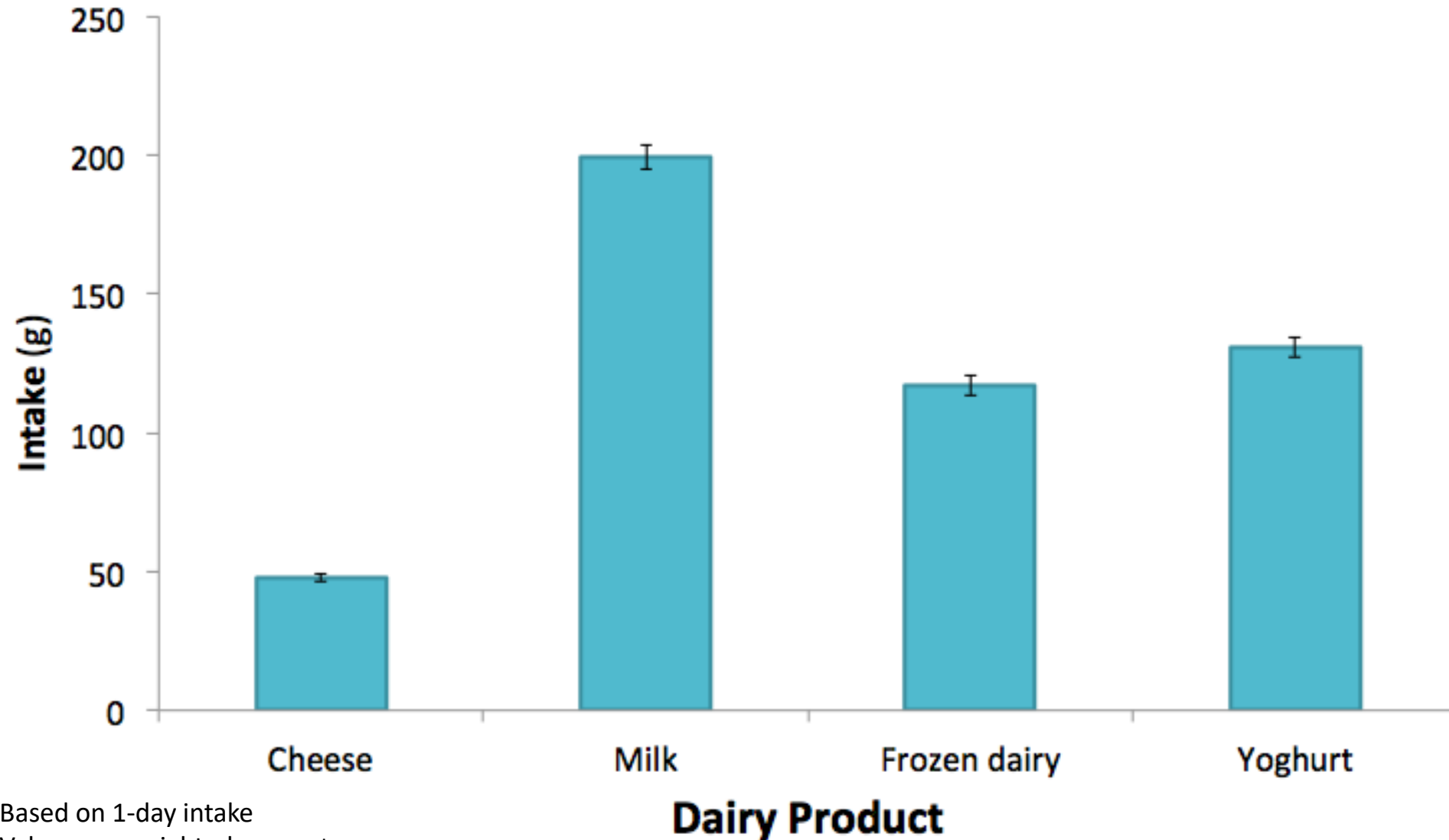
[1]Based on 1-day intake
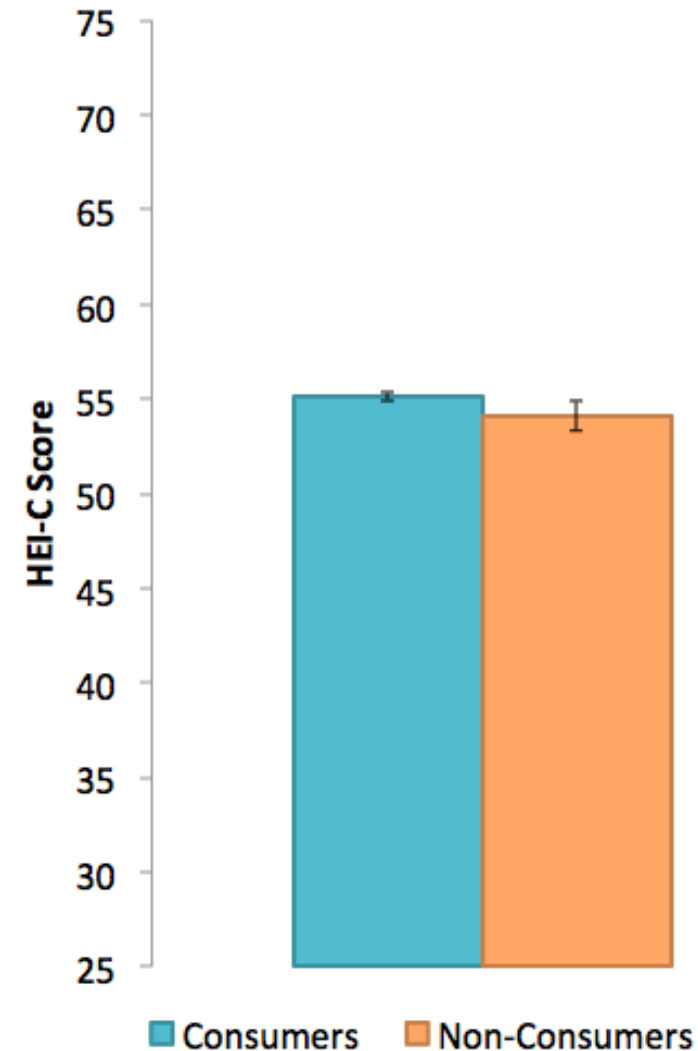[2]Values are weighted means±se
*Significant difference (P=0.02)

Association between Dairy Intake and Nutrient Adequacy

| Nutrient	Consumers	Non-Consumers	P-Value
Carbohydrates		↑	0.0006
Fibre		↑	<0.0001
Total fat	↑		<0.0001
Saturated fat	↑		<0.0001
Docosahexaenoic acid		↑	0.014
Eicosapentaenoic acid		↑	0.0086
Docosapentaenoic acid		↑	0.0217
Vitamin C		↑	0.001
Vitamin B2	↑		0.0007
Vitamin B3		↑	<0.0001
Vitamin B6		↑	<0.0001
Calcium	↑		<0.0001
Phosphorus	↑		0.0159
Magnesium		↑	<0.0001
Iron		↑	0.0001
Zinc		↑	0.0095
Potassium		↑	<0.0001

Association between Dairy Intake and Diet Quality

- Overall average HEI-C score: 55.02±0.23

- No significant difference among HEI-C score (p=0.2632)

- No association between dairy consumption and HEI-C score

¹Values are weighted means±se

Association Between Dairy Intake and Diet Quality

¹Values are weighted means±se
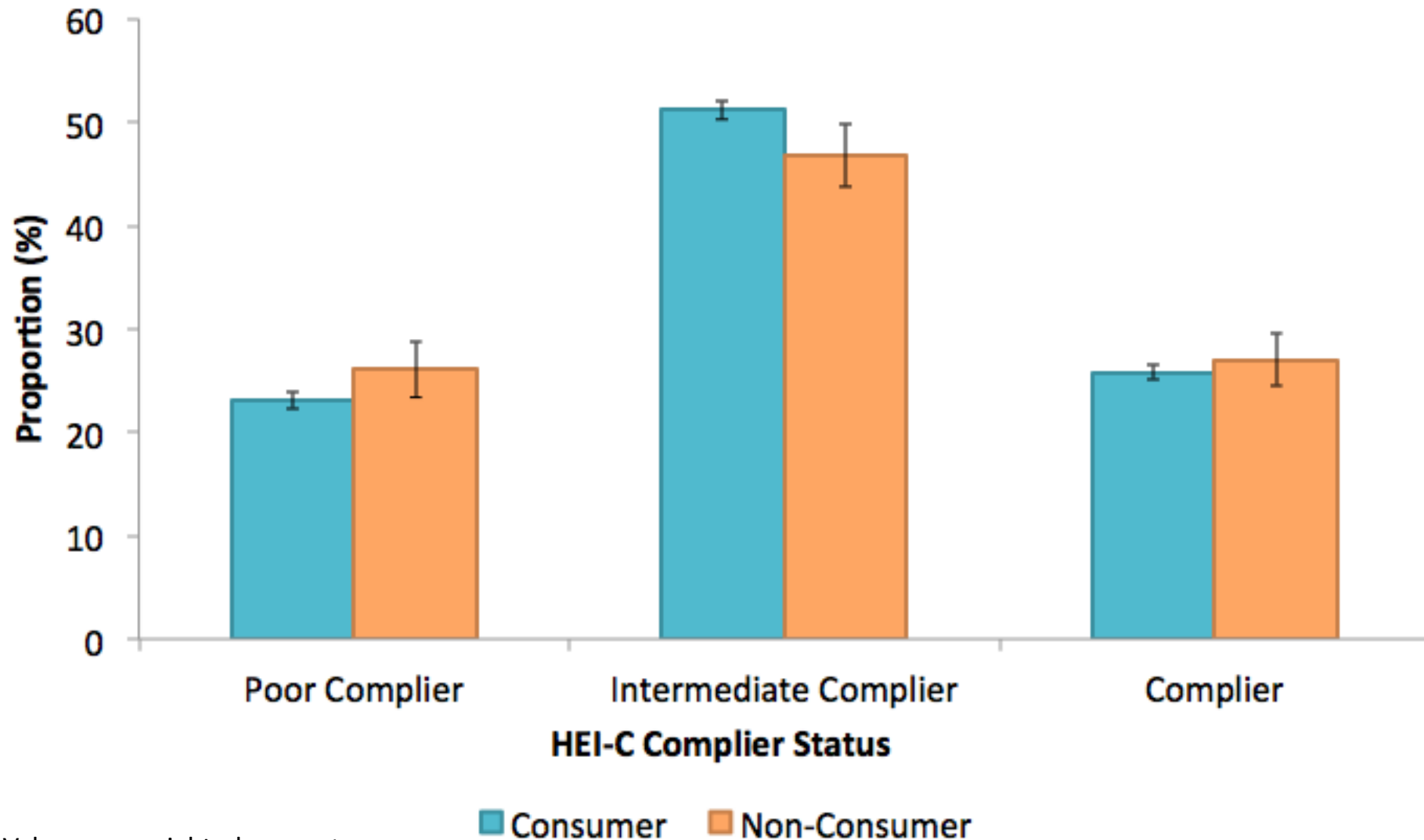
4. Conclusion

Conclusion

- Dairy is a staple within Canadian diets
- Milk is the most widely consumed dairy product
- Associated with age, ethnicity, education, and reporter status
- Not associated with diet quality
- Non-consumers have higher intakes of a wider range of nutrients

Strengths & Limitations

Strengths:

• Nationally-representative sample

• Detailed food descriptions

Limitations:

• 1-day intakes vs. usual intakes

• CFG classification

• HEI-C

Future Directions and Implications

- Sustainable diets
  - Encompassing nutrition, environment, economic, and socio-cultural dimensions

- Comparison of bovine milk with plant-based beverages
  - Nutrition
  - Environment

Willett, W., et al., *Summary Report of the EAT-Lancet Commission.* The Lancet, 2019. **393**(10170): p. 447-492.

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Questions?