



**Estimation of fat and fatty acid
intake from dietary and dairy sources
from 2015 CCHS- Nutrition:
Potential implications for chronic disease**

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Outline

1. Overview of fat

- Fat
- Fatty acid
- Fat intake and chronic diseases
- Canada's Food Guide and fat intake
- Dairy as source of fat

2. My research

| **Section 1**

Overview of fat



Dietary fat

- Dense source of energy
- Energy reservoir
- A healthy body need fat!
- Good fat vs. Bad fat



Fatty acids

- Types of fatty acid (FA)
 - Saturated FA (SFA)
 - Trans FA (TFA)
 - Monounsaturated FA (MUFA)
 - Polyunsaturated FA (PUFA)
 - Odd chain FA (OCFA)
 - Pentadecanoic acid (15:0)
 - Heptadecanoic acid (17:0)
 - Trans-palmitoleic acid (trans 16:1n-7)
- Essential fatty acids:
 - omega-3 & omega-6

SFA



Trans



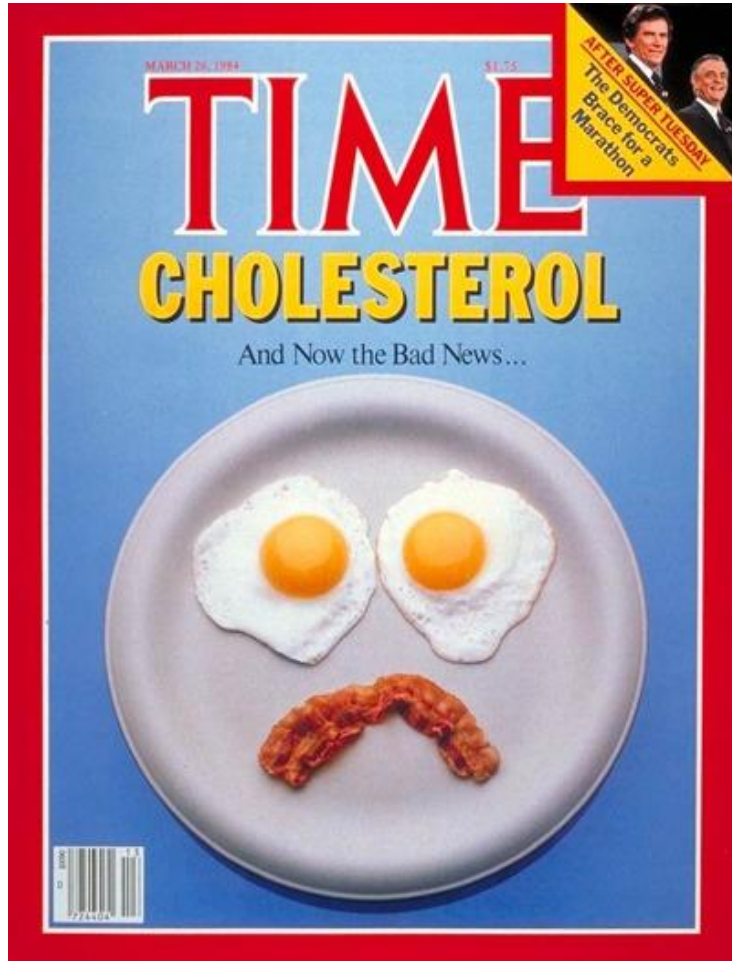
MUFA



PUFA



Fat intake and chronic disease



1984



2014

Dietary guidance on fat intake

2007-2019

*Eating
Well with*
**Canada's
Food Guide**



▶ **Drink skim, 1%, or 2% milk each day.**

- Have 500 mL (2 cups) of milk every day for adequate vitamin D.
- Drink fortified soy beverages if you do not drink milk.

▶ **Select lower fat milk alternatives.**

- Compare the Nutrition Facts table on yogurts or cheeses to make wise choices.

2019 – present

Canada's
food guide

Healthy food choices

Saturated fats

Saturated fats are found in foods such as:

- dairy products, including butter, cheese and whole milk
- animal-based foods, including beef, chicken, lamb, pork and veal

- **Choose foods with healthy fats instead of saturated fat**

Dairy as source of fat

- Nutrient-dense
- Rich in nutrients
relatives to calories
- Biomarkers of dairy fat intake
 - Odd chain fatty acid
 - Trans 16-1n-7

High level of circulating biomarkers of dairy fat associated with a reduced risk of type 2 diabetes.

	Cohort-specific fatty acid quartiles				P for trend [*]
	1	2	3	4	
15:0, pooled	Reference	1.03 (0.70–1.52)	0.96 (0.66–1.41)	0.56 (0.37–0.86)	0.01
17:0, pooled	Reference	0.79 (0.57–1.11)	0.66 (0.46–0.94)	0.57 (0.39–0.83)	<0.01
t-16:1n-7, pooled	Reference	0.75 (0.52–1.07)	0.67 (0.48–0.94)	0.48 (0.33–0.70)	<0.001

|Section 2

My research



| **Research questions**

1. Quantify intake of total fat and fatty acids in the diets of Canadian adults ≥ 19 years old
2. Assess dietary sources of fat and fatty acids with a focus on dairy products
3. How fat and fatty acid intakes of dairy consumers differ from that of the non-consumers?

Dataset 1: Canadian Community Health Survey (CCHS)

- General Canadian population survey
- Objective: collect information regarding Canadians' health determinants, health status, and health system utilization
- 2015 CCHS – Nutrition
 - Focus on food using **24-hour dietary recall**

| 24-hour dietary recall

- *Subjective* dietary assessment method
- Collect information about all food and beverages a respondent consumed during the **previous 24 hour**
- Include detailed information (recipe, eating location, time, food description)

Dataset 2: Canadian Nutrient File (CNF)

- Acquired from Health Canada
- Bilingual food database
- Nutrient content of **most foods** available in Canada
- Some data derived from United States Department of Agriculture food database

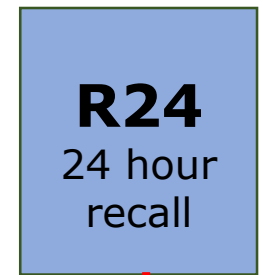
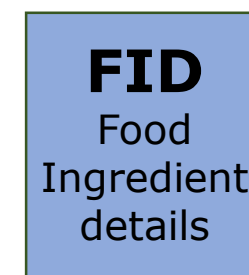
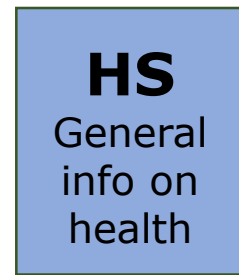
Linking datasets

External dataset from Health Canada



**Food
Code**

CCHS Nutrition file structure



**Linked by
SampleID**

Data analysis

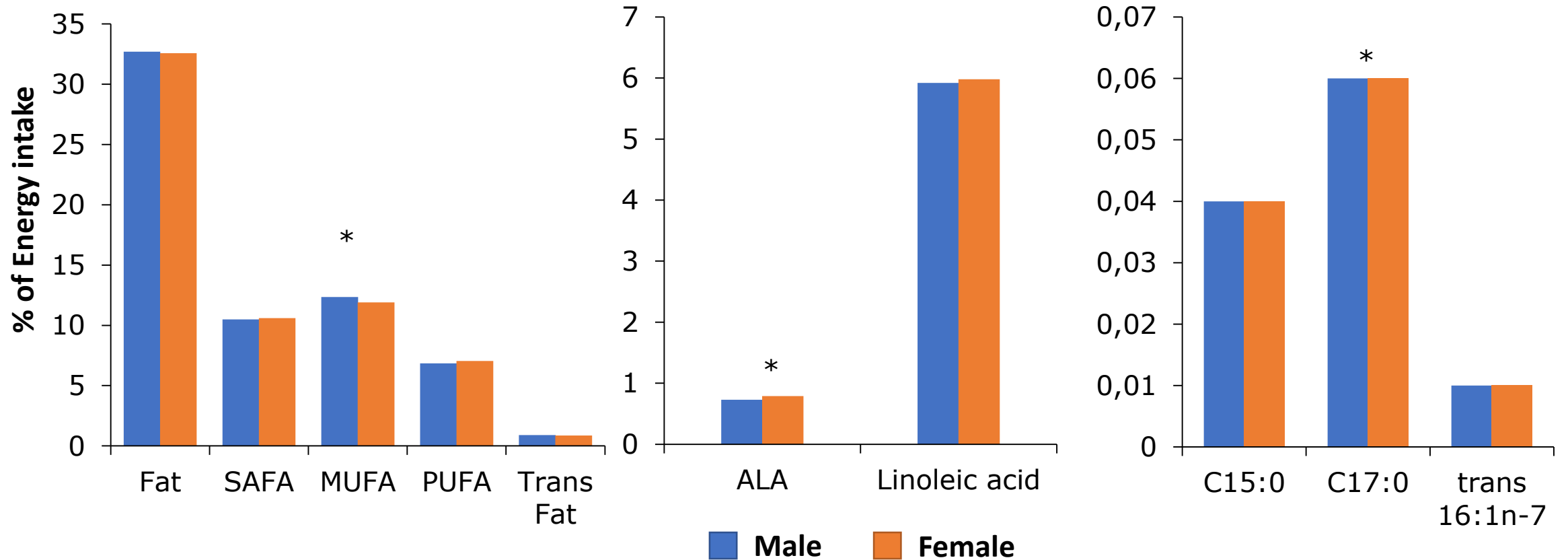
- 1 Weight and bootstrap variables using SUDAAN
- 2 Classify food into food groups based on Bureau of Nutritional Sciences (BNS) codes and description
- 3 Calculate percentage contributions of food groups to intakes fatty acid by age and sex
- 4 Pairwise comparison, Regression
Level of significance: $p < 0.01$

Fat
Saturated FA
Monounsaturated FA
Polyunsaturated FA
Trans fat
Odd chain fatty acid
Trans-palmitoleic acid

Findings

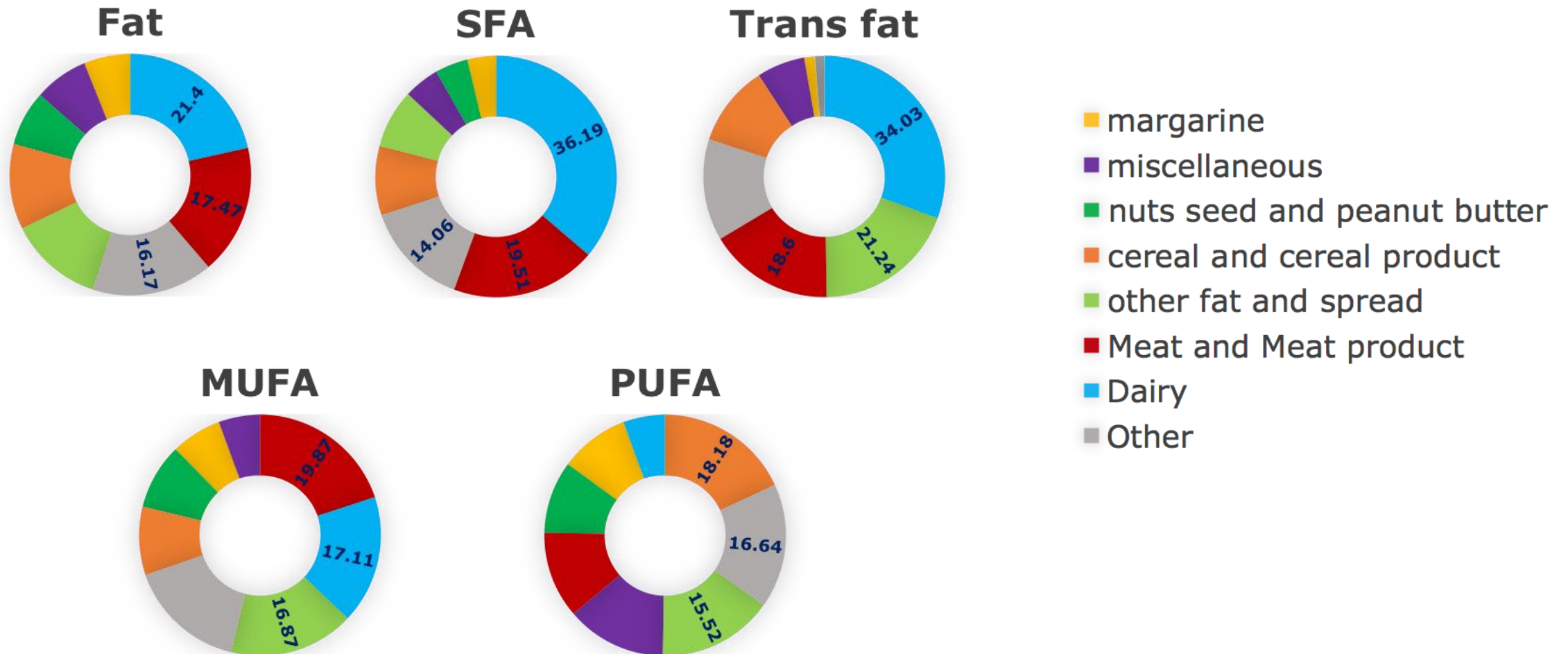


Fat and fatty acid intake by sex



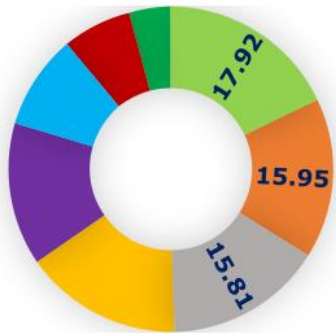
* Male vs. female differ at P<0.01

Major dietary contributors of fat and fatty acid intake

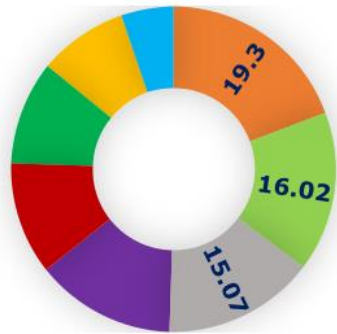


Major dietary contributors of EFA, OCFA, trans 16:1n-7 intake

ALA

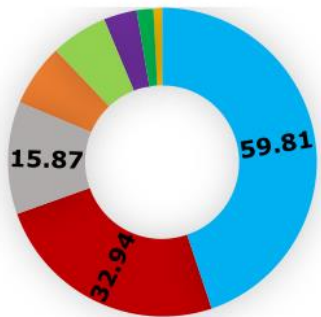


Linoleic acid

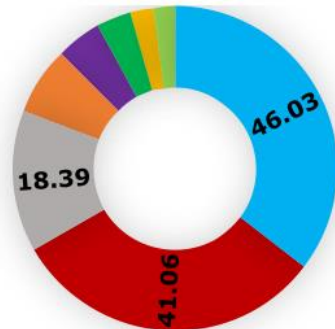


- margarine
- miscellaneous
- nuts seed and peanut butter
- cereal and cereal product
- other fat and spread
- Meat and Meat product
- Dairy
- Other

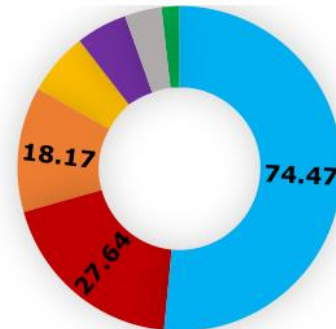
C15:0



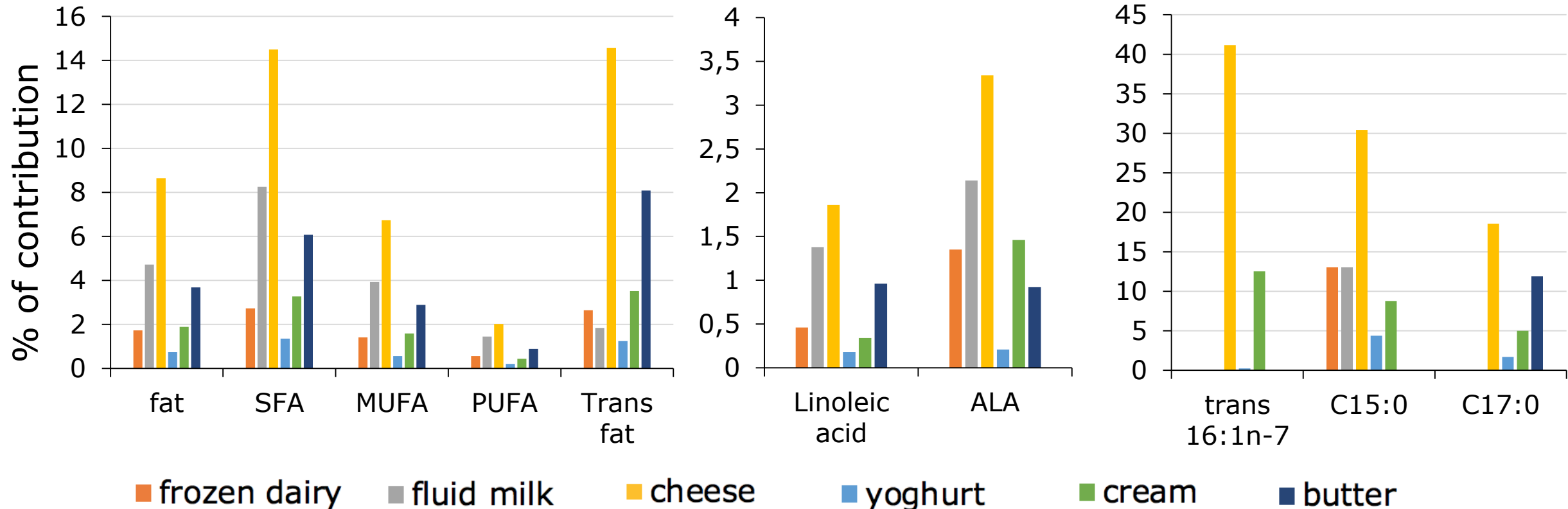
C17:0



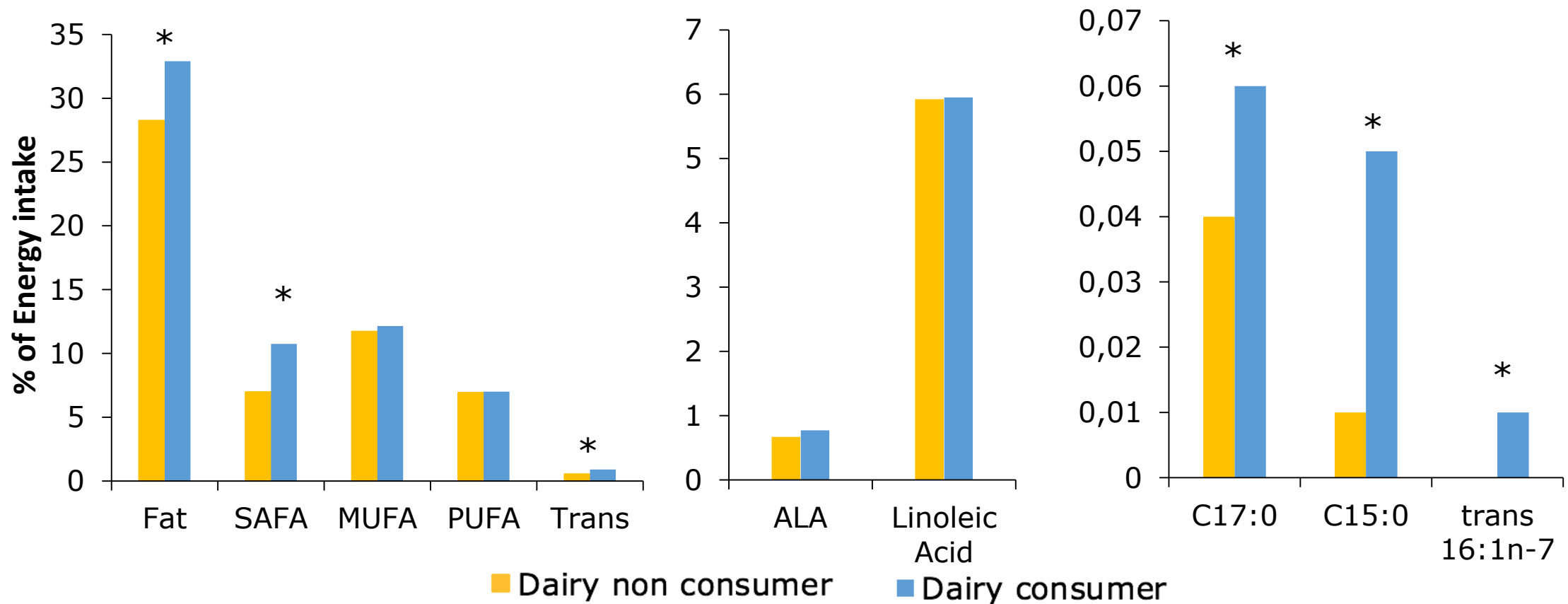
Trans 16:1n-7



Major dairy contributor to fat and fatty acid intake



Fat and fatty acid intake by dairy consumer



* Significance level: $P < 0.01$

Predictor of dairy fat intake

Predictors	Level	B coefficient	P-Value
Age	50+ years old	-2.47	<0.0001
Sex	female	-3.09	<0.0001
Ethnicity	Chinese, Japanese, Korean, Filipin, Southeast Asian	-8.77	<0.0001
	South Asian (India), Arab, West Asian	-2.86	0.0023
	Minority (black, latin american, other)	-3.23	0.0063
Province	Prince Edward Island	-2.76	0.0051
Reporter status	Under-reporter	-8.65	<0.0001
	Over-reporter	15.50	<0.0001

Reference level: age: <50 y.o.; sex: male; ethnicity: Caucasian; province: Quebec; reporter status: plausible reporters

Preliminary interpretation

- Dairy products are major contributors of fat and fatty acid intake among Canadians
- Dairy consumers have significantly higher intake of fat, SFA, trans fat, OCFA and trans-palmitoleate
- Cheese was the primary contributor of total fat, SAFA, MUFA, trans-fat, ALA, linoleic acid, OCFA and trans-palmitoleate acid among dairy products

Strengths and limitations

Strengths

- Nationally representative survey
- Weighing and bootstrapping
- Use of CNF

Limitation

- 24-hour recall
- 1-d intakes
- Completeness of CNF database

Future direction

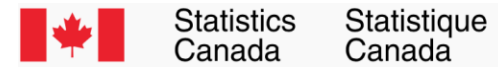
- Determine association between dairy intake and health measurement included in CCHS data
- Look at association of dairy fat intake with CVD and T2D

Acknowledgements

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Question?

