Potential Savings in Health Care Costs from Trans Fat Free Canola Oil

Stavroulla Malla, University of Lethbridge
Jill E Hobbs, University of Saskatchewan
Orsolya Perger, University of Lethbridge

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Introduction

- Growing awareness of link between diet and health
- New opportunities for the food industry
  - ➢ product differentiation
  - ➢ new R&D applications
- New challenges for regulators
  - ➢ labelling
  - ➢ regulating claims for ‘healthy’ foods
  - ➢ regulating ‘unhealthy’ foods

The Latest Evil….Trans Fats

- Long term concern over saturated fatty acids
- New evidence that **trans fatty** acids elevate bad cholesterol levels and lead to cardiovascular disease
- Trans fats are part of our everyday diet (present in dairy products, meat products) BUT the main source is hydrogenated vegetable oils

Responding to Trans Fats

- Demand for trans fat free products from some consumers
- Agricultural R&D on new seed varieties (e.g. Nexera Canola); oilseed processing & food industry innovations
- New labelling rules: Canada & US
- Discussions of a trans fat ban
- Potential for policy to stimulate R&D into healthier foods

Assessing Economic Impacts

- Evaluate the potential magnitude of health care savings associated with the development of healthier foods
- Example: Nexera canola
- Analysis:
  - ➔ evaluate potential reduction in trans fat consumption
  - ➔ impact on cholesterol levels
  - ➔ reduction in coronary heart disease
  - ➔ health care cost savings
- Policy implications

Nexera Canola seed/ Natreon Canola oil

- DOW Agroscience Inc. developed Nexera canola seed
- **Nutritional Benefits:**
  - Lowest saturated fat content of all vegetable oils
  - High oleic content (monounsaturated) makes it stable without hydrogenation
  - Contains linolenic acid, a polyunsaturated omega-3 fatty acid not present in most partially hydrogenated oils
  - **Virtually trans fat-free (less than 1%)**

Nexera canola seed / Natreon canola oil

- Not genetically modified
- Over 50% of Nexera volume is sold in **North America** to food services and food manufacturing industries; remaining is exported to **Japan**
- **Cargill Limited** has developed a low linolenic canola oil from InterMountain Canola (IMC), which is trans fat free

Market Failures from consumption of TFA

- **Negative externality** due to health care costs not being (fully) paid by the individual in a public health care system
- Individuals may overconsume products with adverse health effects
- **Information asymmetry**
- Trans fatty acids are a credence attribute
- Providing information (labelling) should reduce demand for foods high in TFA ➔ reducing the size of the negative externality

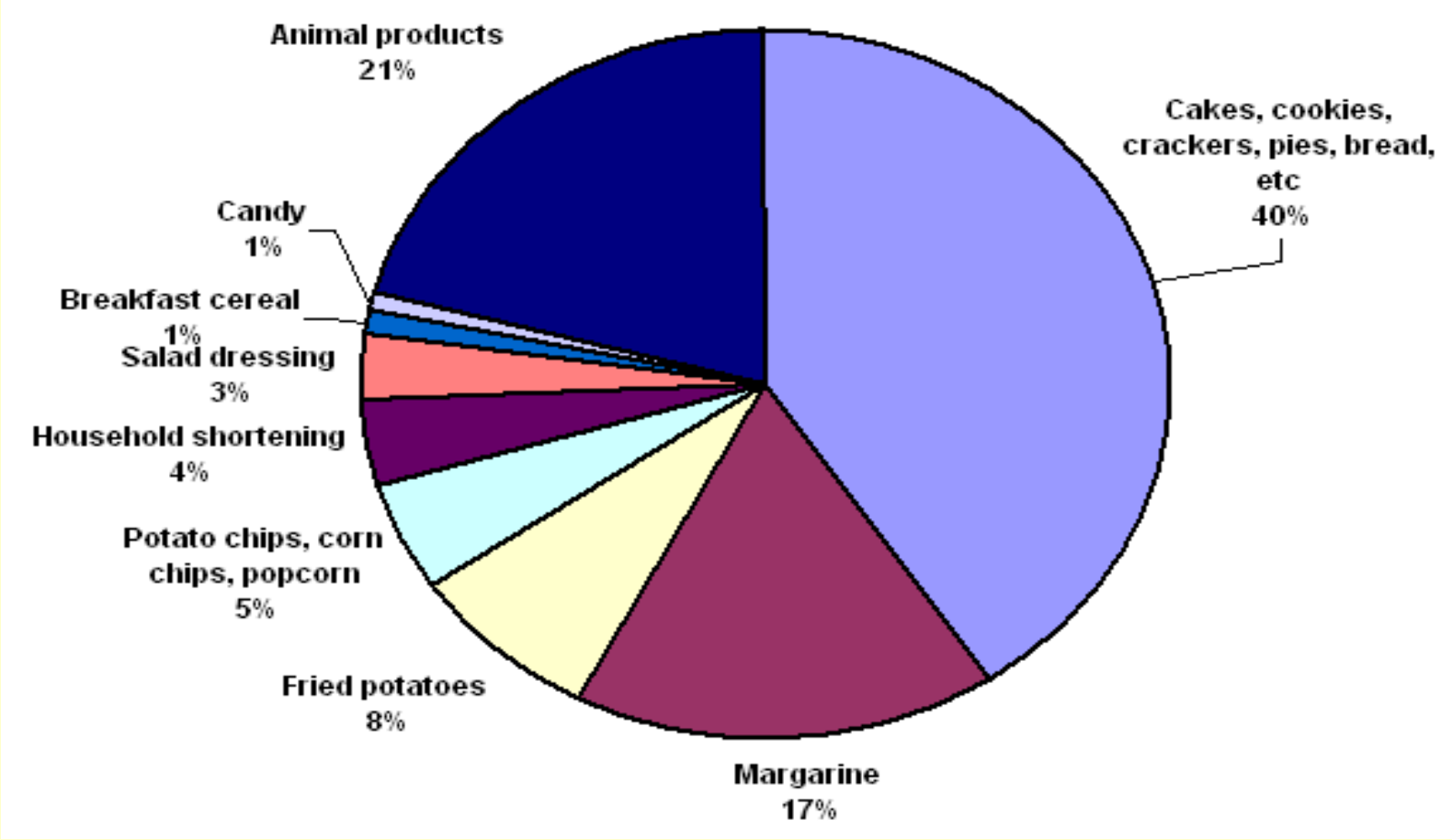
Cholesterol 101 . . .

- Fats are an important energy source
- But fats (food lipids) can also raise cholesterol levels, leading to coronary heart disease
- “Bad cholesterol”: LDL (low-density lipoproteins)
- “Good cholesterol”: HDH (high-density lipoproteins) eliminates excess cholesterol in the blood
- Trans fatty acids lurk in many places ...

The Good, The Bad and the Ugly

- **The Good:** Lowers LDL & raises HDL
  Monounsaturated & polyunsaturated fatty acids (olive oil, canola oil, peanut oil, cashews; corn, soybean, safflower, cottonseed oils, fish)
- **The Bad:** Raises both LDL and HDL. Saturated fatty acids (whole milk, butter, cheese, ice cream, red meat, chocolate, coconuts)
- **The Ugly:** Raises LDL & lowers HDL. Trans Fats (most margarine, vegetable shortening, partially hydrogenized vegetable oil, most fast food, most commercial baked goods, ...fish n' chips...

Major sources of Trans Fat for American Adults



Source: FDA Consumer Magazine, 2003

Calculating Potential Health Care Savings from Trans-Fat free canola

- **Step 1:** Estimate potential daily **trans fat intake reduction** due to 'trans fat free" Canola oil
- **Step 2:** Calculate **cholesterol change** (LDL & HDL) due to reduced trans fat consumption
- **Step 3:** Calculate **coronary heart disease (CHD) risk reduction** due to changes in cholesterol profile
- **Step 4:** Calculate health care **cost changes** related to CHD risk reduction

Step 1: Potential Red'n in Trans Fat Intake

- Estimated Trans Fat Consumption in Canada, 2001

	Total Annual Cons. (Tonnes)	Individual Daily Fat Cons. (Grams)	TFA content	Individual Daily TFA Consumption (grams)	30% Intake (grams)
Shortening	360,986	32.97	19.84%	6.54	**1.96**
Salad	617,944	56.43	4%	2.26	**0.68**
Margarine	128,736	11.76	20.14%	2.37	0.71
Lard	12,980	1.19	3.50%	0.04	0.01
Total	1,120,646	102.34	9.21%	11.21	**3.36**

Source: "Novel Functional Foods: Health Care Cost Savings due to Trans Fat Free Nexera Canola Consumption in Canada". Stavroula Malla. 2004.

Scenarios for TFA Reduction

SCENARIOS	Total Short'ng Oil Market (gms)	Assume redn in short'ng oil (%)	Total salad oil market (gms)	Assume redn in salad oil	Total Trans Fat Redn (gms)
Base	1.96	80%	0.68	50%	**1.91**
High	1.96	80%	0.68	80%	**2.11**
Low	1.96	50%	0.68	20%	**1.12**
Extreme Low	1.96	50%	0.68	0%	**0.98**

Step 2: Effect on cholesterol levels of reduced TFA intake

- Extensive review of scientific literature
- Controlled diets measuring impact of TFA consumption on LDL and HDL levels
- On average:
  - A 1g increase in TFA increases LDL (bad cholesterol) by 1.9%
  - A 1g increase in TFA reduces HDL (good cholesterol) by 0.2%
  - A 1g increase in TFA worsens the LDL/HDL ratio by 0.82%
  - **For every 1g reduction in TFA, total cholesterol is reduced by 0.55%**

Step 3: Effect of changes in cholesterol levels/ratio on coronary heart disease

- Review of scientific literature
- US National Cholesterol Education Expert Panel
- A 1% reduction in serum cholesterol levels reduced risk of CHD by **2%** (Used in Base, Low and Extreme Low scenarios)
- Long run: a 1% reduction in serum cholesterol levels reduced risk of CHD by **3%** (used in High scenario)

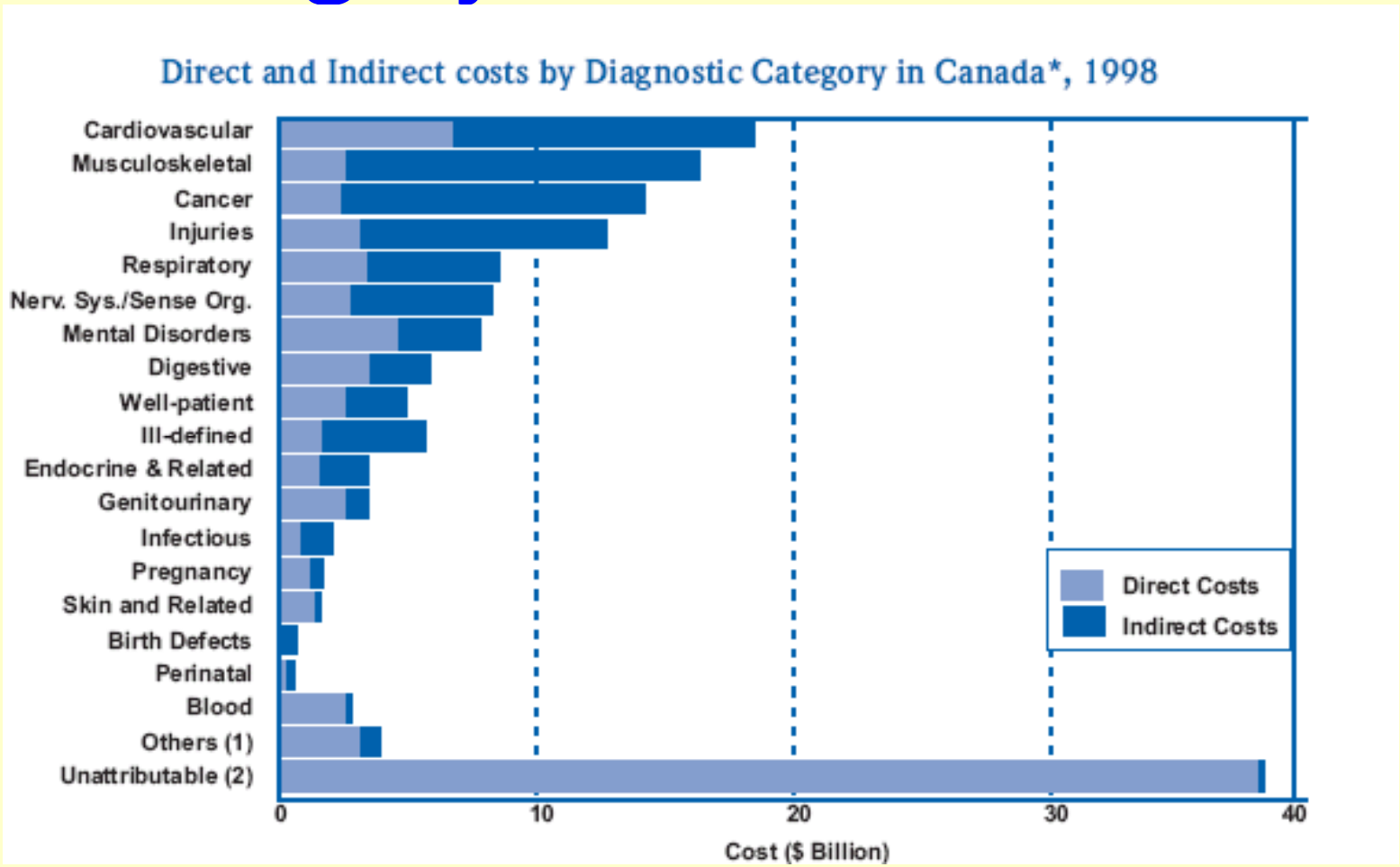
Step 4: Calculating the Potential Health Care Cost Savings

- Limited to cardiovascular disease
- Base, High and Low scenarios: assumed a 1:1 relationship: if CHD risk reduced by 1%, cost reduced by 1%
- Extreme Low scenario: assume if CHD risk reduced by 1%, cost reduced by 0.5%

Putting it all together ...

- Reduction in daily TFA intake ranges from 0.98-2.11 grams depending on extent to which consumers switch
- For a 1g reduction in TFA, total cholesterol is reduced by 0.55%
- A 1% reduction in serum cholesterol levels reduced risk of CHD by **2%** (3% High)
- If CHD risk reduced by 1%, health care costs are reduced by 1% (0.5% Extreme Low)
- Total annual CHD costs Cdn$18,473 million

Health care costs by Diagnostic category in Canada, 1998



Results

		Annual Health care savings
Base	80% shortening; 50% salad oil	**$1,094 million**
High	80% shortening; 80% salad oil; higher CHD redn	**$1,819 million**
Low	50% shortening; 20% salad oil	**$639 million**
Extreme Low	50% shortening; 0% salad oil; lower cost ratio	**$280 million**

Policy Implications

- Non-trivial potential savings in health care costs even under conservative assumptions
- Mandatory labelling, accompanied by consumer education should address the information asymmetry problem
- Stronger economic incentives could include subsidizing the consumption of healthier foods (TFA-free foods) or taxing unhealthy foods (a TFA tax)
- Administrative/monitoring costs & risk of substitution to ingredients high in saturated fat
- R&D into new (healthier) varieties: whose role?

Conclusions

- Many economic implications arise from the relationship between diet and health
- An under-researched area
- Important policy implications for methods to encourage healthier food choices
- Economic motivations include the need to reduce the future burden of health care costs
- Policy instruments deserve closer attention: Labelling, externality tax/subsidy, support for functional food R&D . . .

Thank you