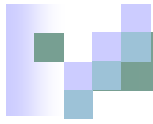




Nutritional Attributes of Red Meat



Presentation Outline

- Putting red meat intake into perspective
 - Canadian Community Health Survey
- Nutrients of concern for Canadians
- Satiety and weight management
- New areas of research and development
 - Conjugated linoleic acid; vaccenic acid
 - Selenium enrichment
 - Omega-3 enhanced meat
 - Sodium reduced process meats



Red meat intake

- Canadian Community Health Survey 2.2
 - 2004 across Canada
 - Excludes: members of the Canadian Forces, people living in the territories, on Indian reserves, in institutions, remote areas, pregnant women, women breastfeeding and 4 year old children being breastfed
 - 24 hour recall completed by 35,107 Canadians
 - A sub-sample of 10,786 completed a second recall 3-10 days later
 - Additional analysis completed by Statistics Canada and commissioned by Beef Information Centre and Canada Pork

Meat and alternatives

Meat Category	Intake (grams/day)			
	Adult Males (≥19 years)	Adult Females (≥19 years)	Average Adult (≥19 years)	Average Canadian
Meat and Alternatives Food Group	189 - 254	140 - 174	203	153
Total Meat (includes beef, pork, lamb, poultry, fish, processed meats)	174.93	114.15	144.00	135.10
Total red meat (sum of fresh red meat including ground meat and processed red meat)	100.24	55.08	77.26	73.69
Fresh red meat including ground meat	72.66	39.90	55.99	51.90
Processed red meat only	27.58	15.18	21.27	21.79



Red meat intake and food guide servings

Meat Category	Intake (grams/day)			
	Adult Males (≥19 years)	# Food Guide Serving	Adult Females (≥19 years)	# Food Guide Serving
Fresh red meat	73	<1	40	<1
Process red meat	28	<1/2	15	<1/4
Total Meat	101	1 _a	55	<1

Food Guide recommendations:

- 2 servings or 150 g of M&A for females
- 3 servings or 225 g of M&A for males

WCRF recommendations:

- Public goal of 300 grams per week
- Personal goal of 500 grams per week

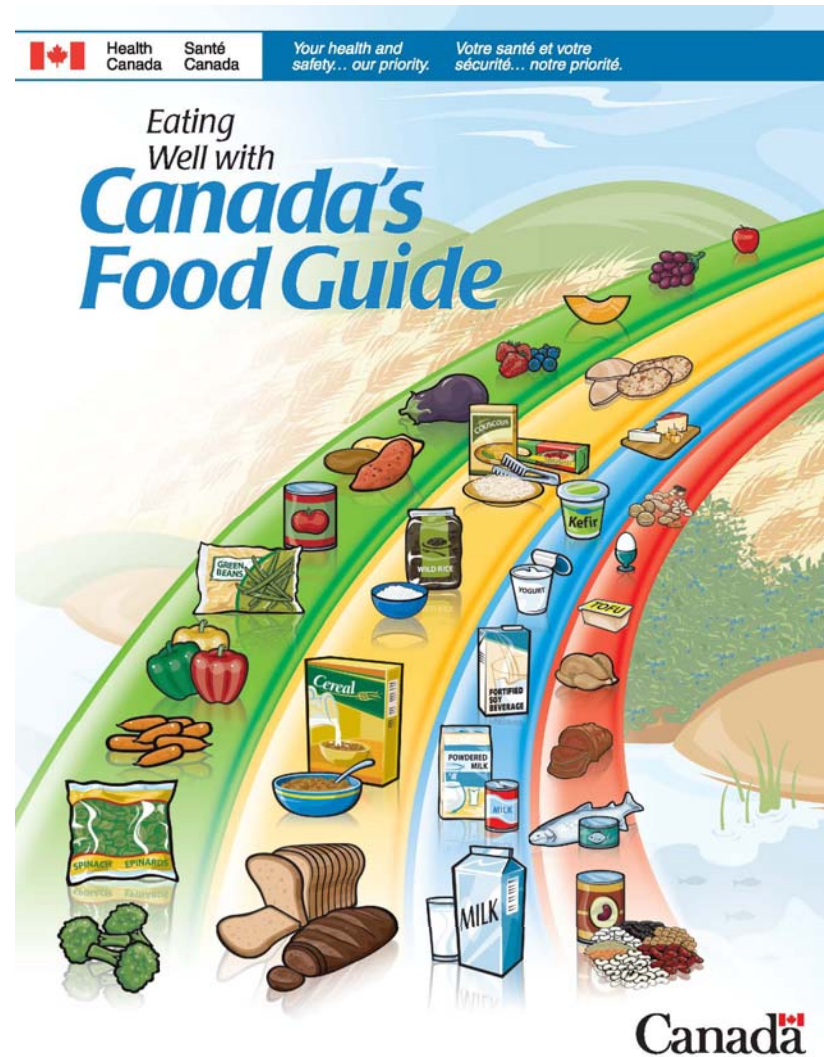
Nutrients of concern for Canadians

Minerals

- Calcium, Iron,
Magnesium, Zinc

Vitamins

- Vitamin B₁₂ vitamin B₆,
Vitamin C and Folate
- Vitamin D in winter
months





Nutrients of concern:

Males consuming lean meat vs. no lean meat

Nutrients with p-value ≤ 0.01	With lean meat	Without lean meat	% difference
Protein (g/d)	111.0	84.9	31
Iron (mg/d)	16.7	15.4	8
Magnesium (mg/d)	372	353	5
Zinc (mg/d)	14.7	11.4	29
Vitamin B ₁₂ (μ g/d)	5.7	4.4	29
Vitamin B ₆ (mg/d)	2.4	1.9	28



Nutrients of concern:

Females consuming lean meat vs. no lean meat

Nutrients with p-value ≤ 0.01	With lean meat	Without lean meat	% difference
Protein (g/d)	80.7	63.3	27
Iron (mg/d)	12.5	11.9	5
Zinc (mg/d)	10.4	8.54	22
Vitamin B ₁₂ (μ g/d)	4.11	3.27	7
Vitamin B ₆ (mg/d)	1.8	1.4	24



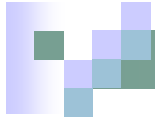
Iron

- Up to 39% of teenage girls may be at risk of inadequate iron intakes
- Vegetarians (no meat, fish, poultry) need 1.8 times more iron
- Heme iron more bioavailable



Zinc

- 19-51% of adults over 50 years of age have intake below EAR for zinc
- >75% adolescent males living in Ontario consumed inadequate amounts of zinc
- Intake of zinc a challenge without foods of animal origin



Magnesium

- 75% of adolescents in Ontario consumed inadequate magnesium
- Intake below EAR by 50% of the sample in the PEI provincial survey
- Red meat is a source of magnesium



Vitamin B₁₂

- Only available in foods of animal origin
- Between 11-36% of women ages 19-50 have inadequate intakes of B₁₂
- RDA is twice the previous RNI (2.4 μg/d)



Vitamin D

Adult males (years)	Vitamin D intake (IU/d)	Contribution Milk Products (%)	Contribution Meat & Alternatives (%)
19-30	234.8	55.3	26.5
31-50	220.0	43.6	34.8
51-70	281.6	33.4	50.1
71 +	267.2	41.8	38.1

Adult females (years)	Vitamin D intake (IU/d)	Contribution Milk Products (%)	Contribution Meat & Alternatives (%)
19-30	185.6	56.8	24.0
31-50	206	45.8	34.6
51-70	200.4	41.7	36.6
71 +	234.6	39.0	43.9



Protein

- Red meat is an excellent source of protein
- Foods of animal origin provide “complete protein”
- Role of protein in satiety and weight management



Satiety and weight management

Research studies comparing protein intakes:

- 15% → 30% protein
 - Energy intake decreased by 441 kcal/day
 - Body weight decreased by 4.9 kg
- 25% vs. 12% protein
 - Average weight loss 8.9 kg vs. 5.1 kg
 - % subjects that lost >10 kg: 35% vs. 9%
- 18% vs. 15% protein
 - Weight regain 1 kg vs. 4 kg after one year



Labelling opportunities

- Nutrient content claims

- Excellent source of protein, vitamin B12, zinc and selenium
- Source of iron, thiamin, riboflavin, vitamin B6, phosphorous, pantothenic acid, magnesium and copper



Labelling opportunities

- Function claims (biological role claims)
examples

- Protein

- helps build and repair body tissues
- helps build antibodies

- Vitamin B12

- aids in red blood cell formation

- Zinc

- factor in energy metabolism and tissue formation



More research and development

- Ruminant trans fatty acids
- Product enhancement
 - Omega-3 fatty acids
 - Selenium
- Product adjustment
 - Sodium reduction



Ruminant trans fatty acids

- Conjugated linoleic acid
- Trans vaccenic acid
- Found in ruminant animals, primarily dairy and beef and lamb products



Conjugated linoleic acid

- Primarily animal model research
 - Reduce growth and formation of cancer
 - Benefits on cardiovascular disease measures (e.g. reduces LDL levels) compared to trans fatty acids from partially hydrogenated oils;
 - Reduce body fat and increased energy expenditure
 - Benefits in diabetes—normalized glucose metabolism



Trans vaccenic acid

- Precursor of CLA
- Contribute 80-90% of the naturally occurring trans fat in the human diet
- Animal models show a reduction in triglycerides and total cholesterol in both a short and longer term feeding studies

“Not all trans fats are bad for your heart, new research from the University of Alberta has found.

In fact, natural trans fats found in yogurt, cheese, milk and your favourite cut of beef or lamb chop may actually lower your cholesterol and help reduce your risk of cardiovascular disease, obesity and diabetes, says Flora Wang, a PhD student in the U of A's agricultural, food and nutritional science department.”

Edmonton Journal April 8, 2008

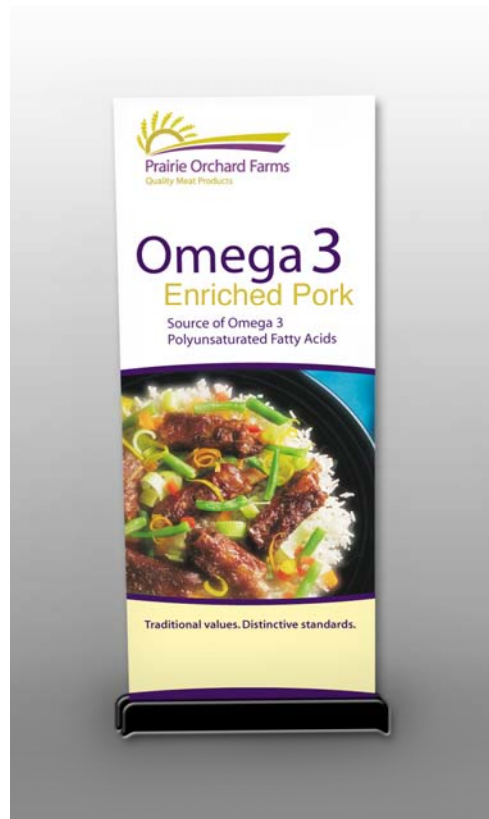


Labelling opportunities

- CLA omitted from trans fat total in Nutrition Facts table
- Trans vaccenic acid—included or not?

Omega-3 enrichment

- Naturally occurring in fatty fish and flaxseed
- Reduce the risk of heart disease
- Nutrient content claim--"source of"



Selenium enriched pork

- Building block of antioxidant enzymes
- Protects body from free radicals
- Hogs fed diet containing selenium enhanced grains

The image shows a product label for Verdancia Farms Pork Loin. The label includes the company logo, a 'Tender and Juicy' seal, and the product name 'Natural* Pork Loin (Boneless Center Cut)'. It highlights '1.0 grams of Omega-3 Fatty Acids per serving' and 'Excellent Source of Selenium'. A 'Keep Refrigerated' instruction is present. At the bottom, there is a U.S. Department of Agriculture inspection seal and the website 'www.verdanciafarms.com'. A note states '*minimally processed - No Artificial Ingredients'. To the right of the label is a Nutrition Facts table. The table lists serving size as 4.0 oz (112g) and servings per container as varied. It details the amount per serving for various nutrients, including Total Fat (27g, 42%), Saturated Fat (11g, 55%), Cholesterol (85mg, 28%), Sodium (70mg, 2%), Total Carbohydrate (0g, 0%), Protein (17g), Vitamin A (2%), Vitamin C (0%), Calcium (0%), Iron (4%), and Selenium (50%). The Selenium value is circled in red.

Verdancia Farms™
Quality Meat Products

*Natural**
Pork Loin
(Boneless Center Cut)

1.0 grams of Omega-3 Fatty Acids per serving

Excellent Source of Selenium

Keep Refrigerated

U.S. INSPECTED AND PASSED BY DEPARTMENT OF AGRICULTURE EST. 1812

Prepared for: Verdancia Farms,
Trademark of Prairie Orchard Farms Inc.
Winnipeg, Manitoba R3J 3K4 Canada

www.verdanciafarms.com
*minimally processed - No Artificial Ingredients

Tender and Juicy

Nutrition Facts
Serving Size 4.0 oz (112g)
Servings per container varied

Amount Per Serving	
Calories 320	Calories from Fat 250
% Daily Value**	
Total Fat 27g	42%
Saturated Fat 11g	55%
Trans Fat 0g	
Polyunsaturated Fat 2.5g	
Monounsaturated Fat 12g	
Cholesterol 85mg	28%
Sodium 70mg	2%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Sugars 0g	
Protein 17g	
Vitamin A 2%	Vitamin C 0%
Calcium 0%	Iron 4%
Selenium 50%	

** Percent Daily values are based on a 2,000 calorie diet.

Sodium in meat products

- Fresh red meat is naturally low in sodium
 - Pork ~ 57 mg / 100 g
 - Beef ~ 63 mg / 100 g
- Salt and sodium compounds (sodium lactate, sodium diacetate, sodium nitrate) used to prevent the growth of spoilage organisms and bacteria (e.g. *C. botulinum*, *Listeria*) in cured and ready-to-eat meats
 - Ham ~ 1400 mg / 100 g
 - Back bacon ~ 1500 mg / 100 g
 - Beef pastrami ~ 1200 mg / 100 g
- Low-sodium products
 - Lower sodium ham ~ 900 mg / 100 g





Why reduce sodium?

- Health—hypertension
- 77% sodium intake from processed foods
- WCRF recommendation to have little if any processed meat (cured, smoked or salted)
- Sodium Working Group
 - Blood Pressure Canada recommendations
 - Reduce intake from 3500 mg to 2400 mg
 - UK program



UK Foods Standards Agency Program

Meat product	Sodium targets per 100g
Bacon (all types)	1.4 g
Ham/other cured meats	1.0 g
Sausages (fresh, chilled and frozen pork, beef, chicken, turkey)	550 mg
Cooked sausages and sausage meat products (e.g. stuffing)	700 mg
Burgers, grillsteaks, etc.	400 mg



Conclusion

- Consumption is within recommended levels
- Red meat is a key source of important nutrients—must be part of a healthy diet
- New research and feeding regimens can enhance the benefits of red meat



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