Plant versus Animal Protein
WHY THE DEBATE?

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INTRODUCTION

From both the perspective of an individual's health as well as the environmental impacts of our food systems, the benefits of plant versus animal sourced protein foods has often been a topic of debate and will likely gain momentum as Health Canada releases a revised Food Guide this year.

In October 2016, Health Canada announced a Healthy Eating Strategy which included revising Canada's Food Guide, a document that is used to shape public policy recommendations and education for healthy eating. There are two primary concerns with the proposed new Food Guide:

1. The guiding principle[1] that encourages intake of a primarily plant-based diet with a focus on increased reliance on plant protein and less on animal based protein.
2. The consideration of environmental benefits in shifting towards diets higher in plant-based foods.

While traditionally, the primary focus of public health dietary strategies has been to develop recommendations that promote health and well-being, recent global dietary strategies are also including controls of environmental impacts on the food system. This trend is seemingly driving Health Canada's decision to include the assumed environmental benefits of increasing plant-based foods in the diet as a Food Guide consideration.

As part of Health Canada's public consultation process for the Food Guide, Canada Beef provided input on the Guide considerations (see Appendix for detail).

BACKGROUND

Protein is important for healthy growth, maintenance and repair throughout all life stages, especially for infants, children, aging adults and physically active individuals. Protein can be sourced from plant sources such as cereals, legumes, nuts and pulses – e.g. whole wheat bread, lentils, beans and almonds, as well as animal sourced proteins such as dairy (milk, yogurt and cheese) and poultry, fish, pork and beef for example. As such, Canada's Food Guide has traditionally had Meat and Alternatives as one of the four recommended daily food groups.

The environmental impacts of dietary patterns is complex and not well supported by evidence for sound policy development and nutritional recommendations. Based on an extensive literature review, researchers conclude that although the number of journal articles on the subject of environment and diet has grown enormously in recent years, this remains a relatively new area of research and the evidence base to inform dietary interventions for reduced environmental impact is incomplete and scant.[2]

BEEF FOR HEALTH

There are four food groups in Canada's Food Guide: Meat and Alternatives, Dairy, Fruits and Vegetables and Grains.

The contributions of these food groups to the diet vary, each bringing their own unique set of nutrient benefits. It is important to consider that it is not a matter of 'either/or' when it comes to plant or animal sources of protein, but rather fitting a combination of the foods from each food group as part of meals for optimal nutrition.

As recently as 2015, the World Health Organization cites that meat provides a number of essential nutrients and, when consumed in moderation, has a place in a healthy diet.[3]

The many essential nutrients found in meat include: high quality protein, highly bioavailable iron and zinc, riboflavin, thiamine, niacin, vitamins B_6 and B_{12}.

Canadians are consuming red meat in moderate amounts. On average, Canadians consume 288 grams of fresh red meat per week.[4] That is less than 1 portion of red meat per day. Dietary advice to to reduce red meat consumption could put some Canadians at risk of iron, zinc, vitamin B_{12} deficiencies and inadequate protein intake which contributes to sarcopenia, an age-related loss of muscle mass, strength and function.

- Meat provides high nutritional quality with all nine indispensable amino acids in proportions that closely match human needs. Plant proteins tend to have a limited amount of one or more of the indispensable (essential) amino acids.
- Many plant-based proteins, particularly nuts, seeds and legumes, do not meet the conditions for any protein claim (e.g., excellent, high, source, contains) as stated in the Food and Drug Regulations and can not be referred to as "protein-rich" foods.
- Plant-based protein sources are less protein-dense per serving and calorie contribution. For example, one 75 gram serving of beef, the size of the palm of your hand, has 28 grams of protein (at 184 calories). To get this same amount of protein, you would need to eat 2.5 servings of black beans, about 1 3/4 cups at 420 calories, or 3.5 servings of peanut butter, about 7 tablespoons, at 644 calories.[5]
- The absorption of the essential minerals iron and zinc is superior from meat compared to absorption from plant sources.
- Meat enhances the absorption of iron from vegetable, grain and pulse sources, a phenomenon called the 'meat factor.'
- Canadians are not over-consuming red meat. On average, Canadians consume 288 grams of fresh red meat per week. Even men, who we typically consider heavier red meat consumers, on average eat 366 grams a week; women far less at 212 grams. More than 56% of adolescent males and 48% of women 31 to 50 years of age consume less than the 2 to 3 recommended daily servings of Meat and Alternatives.[6]
- Many Canadians are undernourished or overfed. Whereas red meat consumption has declined 24% over the last four decades, according to government statistics, obesity doubled in 30 years and diabetes tripled in 20 years.[6,7]
- In relation to heart disease, the Heart and Stroke Foundation of Canada recommends that Canadians eat a healthy, balanced diet and not focus only on any one nutrient as a concern such as saturated fat. Rather enjoy more vegetables and fruit, a variety of protein sources (including lean meat), whole grains, fewer highly processed foods, preparing foods at home as often as possible, and watching portion sizes.[8]
- A simple way to have optimal healthy meal patterns is follow the Healthy Plate Model: For each meal, dedicate 1/2 the plate to Fruits & Vegetables, 1/4 to Whole Grains/starches, ¼ to high quality protein like Meats and Alternatives and include a serving of Dairy.[9]

BEEF, FOOD SYSTEMS AND ENVIRONMENTAL IMPACTS

The way our food is produced, processed, distributed, and consumed – including the losses and waste of food – can have environmental implications, such as greenhouse gas emissions (GHG), soil degradation, decreases in water quality and availability, and wildlife loss. As such, Health Canada and international governments are considering the integration of food choice patterns as part of their healthy eating recommendations such as Canada's Food Guide.

A recent literature review study published by Australian researchers of Commonwealth Scientific and Industrial Research Organisation (CSIRO), demonstrated a lack of evidence to support this approach. This research cites a disconnect between the science informing strategic climate action in the agricultural sector and the science informing public health nutrition."Taking all of the available evidence, there is little that can be concluded, at this time, about dietary strategies to reduce environmental impact".[2,10]

Other important strategies identified to effect environmental impacts from food systems include:

- Efficiencies in production and food transportation
- Reductions in food waste
- Sourcing food locally[10]

BEEF AND ENVIRONMENTAL ISSUES

Cattle in Canada are raised primarily on a grass-based pasture system (80% of their feed comes from forage over their lifetime). Typically, cattle are then finished in a feedlot where they are fed a high-energy diet including grains for about 90 to 120 days (3 to 4 months).[11]

- Cattle production utilizes marginal land that is not suitable for growing other food crops. In many areas in many areas across Canada it is not feasible, or friendly to the environment, especially in native grasslands, to grow food other than livestock. Cattle graze this land, and turn it into high quality protein. In Canada, cattle are typically raised on marginal lands and soils that can't be used to grow other crops. 70% of Canada's native grasslands have been cultivated or developed, with only 30% left. Cattle are the main users of these grasslands and help preserve their ecosystem function and health, including soil carbon storage, biodiversity, wildlife habitat and migration, water filtration, and nutrient recycling.[12,13]
- Canadian beef production accounts for only 0.04% of global Greenhouse Gas (GHG) emissions. In Canada, livestock represent about 3.6% of Canada's total GHG's, while transportation accounts for 28%.[14]
- Land used for cattle production represents 33% of agricultural land in Canada, while creating 68% of the wildlife habitat capacity.[15,16]
- Canadian beef production helps preserve 1.5 billing tonnes of carbon in Canada. If regulatory frameworks were to put a dollar value on this carbon storage, it would be approximately $82.5 billion.[15,16]
- Cattle grazing keeps grasslands healthy by reducing invasive plant species and providing nutrients for soil.
- Grazing lands helps to preserve wildlife biodiversity and helps to maintain bird migratory patterns.
- Manure is a very important source of fertilizer to grow crops and replenish soils. Without it, more chemical fertilizer would need to be manufactured, which increases the carbon footprint of crop production. Manure is well managed in Canada under strict regulations to prevent and minimize runoff and eutrophication into water. Environmental Farm Plans and nutrient management plans help beef ranchers and farmers to maintain healthy soils and healthy stream systems.
- Only 9% of annual cropland is used for growing cattle feed in Canada. Much of the grain or other forage used in feeding cattle was intended for human use, but doesn't meet the standards necessary for human consumption, a secondary benefit of helping to control food waste. Cattle are also fed the by-products, essentially waste, from human food processing, such as pea screenings and distiller's grains.[17]
- Environmental footprint research showed that there was a 15% reduction GHGs between 1981 and 2011, and carbon footprint from beef production is 24% lower due to research innovation and improved production practices. Improved efficiencies also improved land use, with 25% less land being used to produce the same amount of beef.[18]
- Similar research shows that the amount of water required to produce one kilogram of beef in Canada has decreased 17% over 30 years, from 1981 to 2011.[19] This positive change is attributed to improved cattle management, genetics and crop yields. The majority of water from precipitation and groundwater is used for crops and pasture, with less than a quarter for cattle to consume, and only 1% for beef processing.

INDIVIDUAL EATING HABITS THAT CAN MAKE A DIFFERENCE TO ENVIRONMENTAL IMPACTS

Here are some mindful habits individuals can make to adjust their eating habits and make a difference to environmental impacts:

Eat recommended serving sizes

- Over-eating is a form of food waste. Data suggests that GHG are positively correlated with total energy intake – that is, the larger the portion size, the higher the greenhouse gas emissions.
- 'Super-sizing' can considerably impact the environmental footprint and doesn't do any good for your body either. It's time to re-think the value and amount of resources that go into our food.[10]

Eat real foods and reduce ultra-processed foods

- In addition to negative health impacts, consumption of discretionary foods impact the environment negatively from a need for resource development input.
- Canadian Heart and Stroke Association insights reveal that half our daily calories come from ultra-processed and discretionary foods, and that kids ages 9 to 13 are the biggest consumers, with over 57% of their calories coming from these low-nutrient, high-calorie food sources – across ALL socio-economic brackets. The more processing involved in food production, the more pronounced environmental impacts from the food system. As a personal control measure, choose to eat real foods – those minimally processed/closest to their natural state, and reduce 'discretionary' food consumption.[8]
- Many developed countries' dietary patterns have changed to incorporate a higher proportion of discretionary foods as part of the daily diet with a growing proportion of calories coming from these empty-nutrient foods: such as alcohol, chocolate and baked goods, cakes and biscuits, savoury snacks like potato chips and French fries, sugar sweetened beverages, snack bars, ice cream. Choose foods that contribute to health and well-being so their production impacts count as a benefit.[20]
- Enrich food skills, such as planning meals and cooking know-how to take advantage of basic foundational foods that are better for health and the environment.

Buy What You Need And Use What You Buy

- Food waste directly relates to environmental impacts. In 2014, the value of food waste and loss in Canada was estimated at $31 billion. Reducing food waste is an immediate way to ensure we aren't wasting resources.[21]
- When grocery shopping, buy what you can use so you don't have food spoil. Some handy tips are to plan your meals, and use a shopping list when going to the grocery store.
- When eating out order what you can reasonably eat, split meals or take home what you can't eat in order to eat it later

WRAP UP:

It's important to remember no one food is the panacea of all nutrients. Beef should be consumed and valued for its high quality protein, content of zinc, iron, selenium, B-vitamins and more. Beef is lean when trimmed, satiating (fills you up with high quality nutrients for very few calories), delicious and fits into a heart- healthy diet. But we should enjoy eating other sources of protein for their unique package of nutrients as well. Healthy eating is truly a matter of balance and moderation.

As Canadians, we are lucky to have a variety of choices in the marketplace when it comes to the foods we have available. We encourage you to make your own decisions about what foods you eat for health, but remember that variety and moderation are key!

Appendix:

Canada Beef Guidance on Public Consultative Input to Canada's Food Guide 2017:

1. Plant vs Animal Proteins and Health

To promote legumes, nuts and seeds as the rich sources of protein is incorrect and misleading information, as these foods provide less and lower quality protein than do animal foods, often with higher calories per serving needed.

There is no need to promote/encourage eating plant based proteins vs animal based proteins as both can be part of a healthy diet. It seems to be a disservice to our health to insinuate that beans or tofu are equivalent to meat and meat products from a nutrition and health perspective because they just simply are not. The availability of iron and zinc and the quality of protein in plant based protein sources is inferior or not as accessible to our bodies as the same nutrients found in beef. I would worry that certain demographics would be at risk of being deficient in iron and zinc by being encouraged to reduce the amount of red meat they eat.

2. Plant vs Animal Proteins and Environmental Impacts

The environmental impacts of growing food would be best to focus on reducing food waste, which will have the most significant impact both for the environment and for individuals. The sustainability data on foods grown is not proven or measurable and can help perpetuate misinformation. Grazing livestock helps preserve Canada's grassland habitats, sequester carbon and promote biodiversity. There is also a large difference in the types of foods that can be sustainably grown in Canada vs other parts of the world, and the Food Guide should promote Canadian foods wherever possible. It is important to consider the unique nature of Canada's landscape and population and not define sustainability or healthfulness on data from other countries.

Links:

[1]https://www.foodguideconsultation.ca/guiding-principles-detailed

Austrailian Blog post Ridoutt: https://blogs.csiro.au/ecos/low-environmental-impact-diet/?utm_source=ECOS-2017-11&utm_medium=newsletter&utm_campaign=ECOS

Water use intensity of Canadian beef production in 1981 as compared to 2011, GetahunLegessea1Marcos R.C.Cordeirob1Kim H.OminskiaKaren A.Beauchem-inbRolandKroebelbEmma J.McGeoughaSarahPoguebTim A.McAllisterb, Science of the Total Environment, Volumes 619–620, 1 April 2018, Pages 1030-1039 https://doi.org/10.1016/j.scitotenv.2017.11.194. Link for water study: https://www.sciencedirect.com/science/article/pii/S0048969717332527

References:

[1]Source: https://www.foodguideconsultation.ca/guiding-principles-detailed

[2]Dietary Strategies to Reduce Environmental Impact: A Critical Review of the Evidence Base, Bradley G Ridoutt,1,2 Gilly A Hendrie,3 and Manny Noakes3, 2017 American Society for Nutrition. Adv Nutr 2017;8:933–46; https://doi.org/10.3945/an.117.016691

[3]Source: http://www.who.int/mediacentre/news/statements/2015/processed-meat-cancer/en/

[4]Red Meat Nutrition Brief. January 2018. Data derived from the 2015 Canadian Community Health Survey – Nutrition

[5]Source of nutrient values: Health Canada, Canadian Nutrient File, 2015, food codes: Beef 6172, Peanut Butter 6289, Black Beans 3377

[6]Source: Evidence Review for Dietary Guidance, Technical Report, 2015, Health Canada https://www.canada.ca/en/health-canada/services/publications/food-nutrition/evidence-review-dietary-guidance-summary-results-implications-canada-food-guide.html

[7]Canadian Standing Senate Committee on Social Affairs, Science and Technology. Obesity in Canada. A Whole-of-Society Approach for a Healthier Canada. Ottawa: The Standing Senate Committee on Social Affairs, Science and Technology; 2016. 56p.

[8]Source: https://www.heartandstroke.ca/-/media/pdf-files/canada/position-statement/saturatedfat-eng-final.ashx

[9]Source: http://www.diabetes.ca/diabetes-and-you/healthy-living-resources/diet-nutrition/basic-meal-planning

[10]Source: https://blogs.csiro.au/ecos/low-environmental-impact-diet/?utm_source=ECOS-2017-11&utm_medium=newsletter&utm_campaign=ECOS

[11]Source:Commission for Envrionmental Cooperation (CEC) 2015

[12]Statistics Canada. Human Activity and the Environment: Annual Statistics 2009. Table 1.2. Global availability of agricultural and arable land, 2005.http://www.statcan.gc.ca/pub/16-201-x/2009000/t230-eng.htm

[13]Canadian Roundtable for Sustainable Beef (CRSB). (2016). National Beef Sustainability Assessment and Strategy Summary Report. https://crsb.ca/assets/Uploads/About-Us/Our-ork/NBSA/290ae9c611/NBSA_and_Strategy_summary_report_web1.pdf

[14]Environment Canada. (2015). National Inventory Report: Greenhouse Gas Sources and Sinks in Canada Executive Summary, 1990-2013; The Canadian Government's Submission to the UN Framework Convention on Climate Change. Government of Canada, Environment Canada. Gatineau: Her Majesty the Queen in Right of Canada. Retrieved from www.ec.gc.ca: https://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=5B59470C-1&printfullpage=true

[15]Canadian Roundtable for Sustainable Beef. (2016). National Beef Sustainability Assessment and Summary Report. Calgary: CRSB

[16]Canadian Roundtable for Sustainable Beef (CRSB). (2016). National Beef Sustainability Assessment and Strategy Summary Report. https://crsb.ca/assets/Uploads/About-Us/Our-ork/NBSA/290ae9c611/NBSA_and_Strategy_summary_report_web1.pdf

[17]Source: CRSB 2016 https://crsb.ca/about-us/our-work/sustainability-benchmark/

[18]Source: http://www.beefresearch.ca/blog/our-environmental-hoofprint-is-shrinking-but-our-reach-is-growing/

[19]Source: http://www.beefresearch.ca/blog/the-canadian-beef-industrys-water-footprint-is-shrinking

[20] Time to curb our appetite for ultra-processed food. Heart & Stroke Foundation News Release. Dec. 5, 2017.

[21]Source: http://www.cbc.ca/news/business/canada-food-waste-1.3813965

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