

Report from:

THE ELEVENTH ANNUAL NUTRITION AND HEALTH SYMPOSIUM

THIS IS A REPORT ON ONE OF THE FOUR SYMPOSIA HELD IN EDMONTON, TORONTO, MONTREAL AND MONCTON.

Emerging Perspectives on Cardiometabolic Health



This report summarizes the four presentations and includes highlights from the lively Q&A period that capped off the event in each city.

THE FULL SYMPOSIUM IS AVAILABLE IN WEBCAST AT www.dairynutrition.ca/symposium

This meeting coverage from Dairy Farmers of Canada Symposium is printed as a service to health professionals and is supported by an educational grant from Dairy Farmers of Canada.

Dairy Farmers of Canada (DFC) held its 11th annual symposium in Edmonton, Toronto, Montreal and Moncton. Following the symposium's traditional format, DFC invited four key opinion leaders to present groundbreaking research and public policy developments in nutrition.

The event attracted large audiences of health professionals invested in the field of nutrition. For the first time ever, people had the opportunity to attend the symposium – and ask questions – via the Web.

Moderated by Jennifer Sygo, MSc, RD (in Edmonton and Toronto) and Martine Pageau, RD, MA (in Montreal and Moncton), the symposium began with a brief introductory talk that questioned the focus on single nutrients as a pathway to better health, paving the way for the thought-provoking presentations to follow. The guest speakers ranged far and wide in their discussions, covering such topics as nontraditional determinants of obesity, the flavoured milk controversy, the link between dairy consumption and cardiometabolic health, and the perks and perils of nutritional labeling.

THE ROLE OF TASTE AND NUTRITION IN CONSUMER FOOD CHOICES



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As health professionals, we all share a concern about the cardiometabolic health – a term that takes obesity, diabetes, hypertension, and cardiovascular diseases into account – of Canadians. It's not news that lifestyle plays a key role in addressing these health conditions. What's new – and encouraging – is that consumer interest in diet and nutrition has surged in recent years. In my career as a dietitian, I've had the opportunity to witness this sea change first-hand.

For a variety of reasons, however, the

foods that consumers ultimately put in their grocery carts don't reflect their theoretical interest in nutrition. For better or worse, research shows that taste trumps nutritional value in guiding food selection.

In restaurants today, caloric values are often listed beside the menu offerings. This trend raises the question: Can the value of a food be reduced to its caloric content? A disproportionate interest in calories at the expense of nutrients may lead consumers to favour diet soft drinks over milk – an arguably misguided choice.

Nutrient profiling systems rate foods based on their content of macro- or micro-nutrients. An as-yet-unpublished meta-analysis revealed that consumers are more likely to check out these labeling systems when evaluating foods they already consider healthy.

While helpful in theory, these systems often falter in the details. The Traffic Light system, in use in the U.K., for example, uses saturated fat, sugar and salt as a basis for rating foods. For all its simplicity and visual appeal, the system fails to capture

the overall nutritional value of many specific foods and goes seriously astray in giving diet soft drinks a more positive rating than salmon.

The NuVal system gives foods a score between 1 and 100 depending on how they stack up against a list of more than 30 specific nutrients. A great idea on the face of it, the system falls flat in practice. Iceberg lettuce, for example, gets a much higher NuVal score than haddock, chicken breast or 2% milk. Then there's the Guiding Stars system, which assigns stars to foods based on nutritional parameters. Under this system, packaged dry macaroni and cheese mix gets a star, while cheddar cheese and mozzarella – even the reduced-fat versions – get none. Such examples lead me to wonder: do the systems in current use align with the health messages we want to convey to the public?

I believe it is important to examine whether currently used nutrition classifications may carry unintended consequences that could thwart, rather than promote, optimal nutrition and health.

Supported by an educational grant from Dairy Farmers of Canada

BEYOND INACTIVITY AND UNHEALTHY DIET: NEW DETERMINANTS OF OBESITY



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In attempting to explain the global increase in obesity, researchers and policymakers have fixated on two culprits: inactivity and unhealthy eating. While there's no denying the role of these factors, recent research – including our own – has uncovered a constellation of nontraditional determinants of obesity.

Over the past 40 years, we have lost an average of one to two nightly hours of sleep. This trend parallels the rise in obesity over this time period, which our research suggests is no coincidence. The Québec en Forme project, for example, linked short sleep duration to a 3.45-fold greater risk of obesity in

children aged five to 10 – an odds ratio that exceeded the corresponding numbers for TV-watching and physical inactivity. The Québec Family Study found a similar odds-adjusted risk (3.81) in adults sleeping less than six hours per night. As a point of interest, the odds ratio for low calcium intake was 2.88 (see Table 1).

How might a lack of sleep induce weight gain? Experimental studies have linked sleep deprivation to a decrease in leptin (an appetite-controlling hormone), an increase in ghrelin (an appetite-stimulating hormone) and a rise in the stress hormone cortisol. The net effect: a hunger for calorie-dense foods and decrease in glucose tolerance. To compound the problem, when we sleep less we feel more tired, leaving us with less inclination to go to the gym or exercise on our own. Our own research has shown that increasing sleep duration puts the brakes on weight gain in short-sleeping adults.¹

When you concentrate on a mentally challenging task, you're doing more than giving your body a rest: you may be packing on the pounds. In one of our studies, we discovered that mental work leads to spontaneous extra eating compared to simple resting.² The subjects in the study, who were tasked with reading and writing challenging

TABLE 1 Risk factors for overweight and obesity

Adult (Québec Family Study)		Childhood (Québec en Forme project)	
Factor	RR	Factor	RR
• Short sleep duration	3.81	• Short sleep duration	3.45
• High disinhibition behaviour	3.8	• Parental obesity	2.39
• Low calcium intake	2.88	• Watching TV	2.08
• High hunger behaviour	2.2	• Low parental education	1.69
• Lack of vigorous physical activity	2.03	• Physical inactivity	1.45
• High restraint behaviour	2.01	• Low familial income	1.41
• Nonconsumption of vitamins	1.86		
• High lipid intake	1.64		
• High alcohol intake	1.37		

material, ate more than the resting control group and didn't compensate for those extra calories during the remainder of the day. Analysis of their blood samples revealed increased plasma glucose instability, increased plasma insulin instability, and higher cortisol levels. In a similar vein, we have shown that an hour of video game-playing increases food intake compared to an hour of rest.

Lack of calcium has emerged as an important risk factor for obesity. A systematic review of randomized clinical trials, reported in *Nutrition Reviews* in 2011, concluded that calcium supplementation could help manage overweight and obesity. Along similar lines, milk was found to facilitate

appetite control in obese women on a weight-loss regimen. In addition to calcium, the protein, vitamin D and low-glycemic-index carbohydrates in dairy products may play a role in energy metabolism.

Finally, chemical pollutants in the environment may affect the bathroom scale. Often soluble in fat tissue (lipophilic), these compounds reach higher concentrations in obese individuals and can predict weight regain in individuals who have lost weight.

1. Chaput JP *et al.* Longer sleep duration associates with lower adiposity gain in adult short sleepers. *Int J Obes* 2011;doi:10.1038/ijo.2011.110
2. Chaput JP *et al.* Glycemic instability and spontaneous energy intake: association with knowledge-based work. *Psychosomatic Medicine* 2008;70:797.

CHILDHOOD OBESITY AND FLAVOURED MILK: DOES IT FIT?



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Robert L. Bickford, Jr. Green and Gold Professor of Nutrition
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The global epidemic of childhood obesity has set off alarm bells among all stakeholders. This "Generation XL" will, in all likelihood, be the first generation of children that does not live as long as their parents.

One U.S. nation-wide survey revealed that, on average, nearly 40% of the total calories American children consume, nearly 800 calories, comes from empty calories in the form of added sugars and added fats.¹ On average, Americans are consuming 475 calories per person per day of added sugars; the equivalent of 30 teaspoons of sugar daily or two and a half 12-ounce soft drinks.

Canadian children and teens, meanwhile, "spend" 20% of their daily caloric requirements on beverages, loading up on fruit drinks and soft drinks while drinking less and less milk as they get older. As a result, a majority of adolescent boys and girls do not come close to meeting their calcium recommendations.

Almost half of all added sugars in the U.S. diet come from beverages, but these

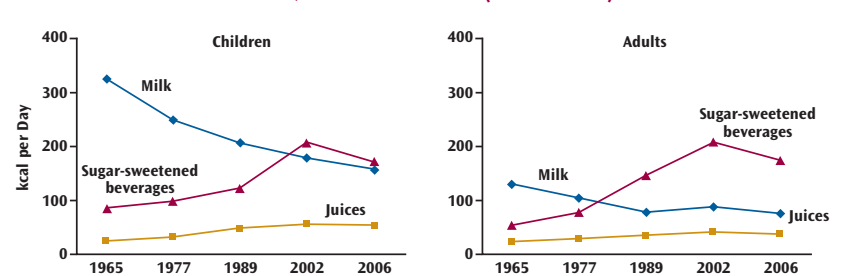
sugars also lurk in "healthy" foods, such as granola bars. A tip for food label readers: by listing different types of added sugars separately, companies can avoid having sugar as the first ingredient on their nutritional ingredient lists.

Evidence supports the conclusion that sugar-sweetened beverages have contributed to the obesity epidemic in young people,² and NHANES data have linked consumption of added sugars to increased cardiovascular disease risk factors in adolescents.

Could flavoured milk, which most schoolchildren prefer to plain milk, be part of the problem? Not according to the U.S. 2010 Dietary Guidelines Advisory Committee, which cited research demonstrating that children who consume flavoured milk have higher milk intakes overall, lower soft drink and fruit drink intakes, and no excess intake of added sugars. What's more, drinking flavoured milk does not appear to increase children's BMI.³ According to the American Heart Association's scientific statement on sugars and cardiovascular health, when sugars are added to otherwise nutrient-rich foods such as sugar-sweetened dairy products like flavoured milk and yogurt and sugar-sweetened cereal, the quality of children's and adolescents' diets improves, and in the case of flavoured milks, no adverse effects on weight status were found.⁴ Thus, it makes sense to use one's daily added sugars allowance to sweeten already nutritious foods, such as yogurt and whole grain, high-fibre cereals.

Some U.S. schools have removed flavoured milk from their cafeterias because of concerns about added sugars and calories. The problem with this approach, which according to surveys, most

FIGURE 1 Trends in beverage consumption in children and adults, 1965 – 2006 (U.S. data)



Adapted from: Brownell KD *et al.* *NEJM* 2009;361(16):1599–1605.

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parents do not endorse, is that it leads to a significant drop in overall milk consumption. In a cohort of 58 U.S. schools, children served only plain milk consumed 35% less milk than they did when flavoured milk was served. Replacing the essential nutrients such as calcium, vitamin D and potassium poses a particular challenge because of the rich nutrient package milk provides.

Food modelling shows that three to four additional foods and beverages are needed to replace the nutrients lost by removing flavoured milk. Rather than eliminating flavoured milk completely, many U.S. schools are serving reformulated, lower calorie, lower added sugars, flavoured milk which new research shows children accept.⁵

1. Reedy J, Krebs-Smith S. Dietary sources of energy, solid fats, and added sugars among children and adolescents in the United States. *J Am Diet Assoc* 2010;110:1477–1484.
2. Woodward-Lopez G *et al.* To what extent have sweetened beverages contributed to the obesity epidemic? *Pub Health Nutr* 2011;14(3):499–509.
3. Murphy M *et al.* Drinking flavored or plain milk is positively associated with nutrient intake and is not associated with adverse effects on weight status in US children and adolescents. *J Am Diet Assoc* 2008;108(4):631–639.
4. Johnson RK *et al.* AHA Scientific Statement. Dietary sugars intake and cardiovascular health. *Circulation* 2009;120:1011–1020.
5. Yon BA, Johnson RK, Stickle TR. School children accept lower-calorie flavored milk; a plate waste study. *J Acad Nutr Diet* 2012; 112(2):132-136.

CONTRIBUTION OF DAIRY TO NUTRIENT ADEQUACY AND HEALTH



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North Americans have often been called “overweight and undernourished.” In other words, they consume an abundance of food, but a dearth of nutrients. To improve the nutrient density of the North American diet, we need first to establish the meaning of “nutrient dense” – a slippery term that eludes easy definition. Some of us may view iceberg lettuce as nutritious, for example, while others don’t endorse it and champion olives or fruit juice instead.

In recent years, government authorities have been educating Americans about nutrition by telling them what *not* to eat. Judging from the rising tide of obesity and persistent nutritional inadequacies found in young people, this approach has not worked especially well. More than 50% of all nine-to-18-year-olds fall short in vitamin D and magnesium consumption, and a sizable proportion also fail to meet vitamin A and vitamin C requirements. On the flip side, just about all children meet (or exceed) their sodium requirements.

With a high content of several key nutrients, including calcium, magnesium and potassium, dairy products pack a strong nutritional punch. In fact, milk is the number one ranked food source of potassium among U.S. children aged two to 18 years – the principal reason that the U.S. dairy allowance has been raised from 2 to 3 servings a day. (The alternative would have been to increase daily fruit consumption by 159%, vegetable consumption by 52%, and whole grains by 251%.)

DAIRY, CALCIUM AND WEIGHT LOSS: THE EVIDENCE

As of 2004, Canadians were still not meeting their dairy intake requirements. As it happens, dairy product consumption may help keep the pounds off. Out of 19 clinical trials examining the influence of dairy and/or calcium on body composition during weight loss, seven found a beneficial effect and none uncovered any negative effect (i.e., gain in weight or fat).¹

Randomized controlled trials have shown similar results. In 2004, a group of U.S. researchers reported on the effect of dairy and calcium on body weight and fat loss in 32 obese adults.² The subjects, who followed balanced weight-loss regimens (a deficit of 500 calories/day) for 24 weeks, were randomized to one of the following three study arms:

- A standard diet (400 to 500 mg dietary calcium per day supplemented with placebo),

- A high-calcium diet (standard diet plus 800 mg calcium/day),
- A high-dairy diet (with the same amount of total calcium as the high-calcium diet, supplemented with placebo).

Subjects assigned to the standard diet lost an average of 6.4% of their body weight, while those on the high-calcium diet lost 8.6% to 26% more than those who followed the standard diet. Those on the high-dairy diet showed an even more striking weight drop: 10.9%, or 70% more than with the standard diet (see Figure 2). Subjects in the high-calcium and high-dairy diets also lost a greater proportion of fat from their trunk region than those on the standard diet.

What might account for these effects? In a subsequent review article, the study’s lead investigator noted that dietary calcium modulates circulating vitamin D levels, which regulate intracellular calcium, which in turn has an effect on fat metabolism in human adipocytes.³ The calcium-independent weight-loss boost from dairy products, in turn, can be traced to their ACE-inhibitory activity and rich concentration of branched chain amino acids.³

In a similar study, 29 obese African-Americans were placed on a calorie-restricted diet and randomized to low-dairy and high-dairy groups. The high-dairy group lost twice as much weight and body fat as the low-dairy group (which consumed less than a serving of dairy per day).⁴ Of course, findings from small clinical trials must be interpreted with caution, and larger trials are needed to confirm this effect. In the meantime, we can reasonably state that three dairy servings per day form part of a balanced, nutrient-rich diet and may play a role in maintaining a healthy weight.

DAIRY CONSUMPTION AND CARDIOMETABOLIC HEALTH

A growing body of research has linked dairy product consumption with a decreased risk of hypertension and type 2 diabetes. In one meta-analysis, subjects who consumed the most dairy had a 13% reduction in hypertension risk compared to those consuming

Foods/nutrients we're consuming too little		Foods/nutrients we're consuming too much	
Dietary Factor	% Recommended Intake	Dietary Factor	% Recommended Intake
• Whole grains	15%	• Calories from solid fat & added sugar ("SoFAS")	280%
• Vegetables	59%	• Added sugars	242%
• Fruits	42%	• Solid fats	281%
• Milk	52%	• Refined grains	200%
• Oils	61%	• Sodium	229%
• Fibre	40%	• Saturated fats	158%
• Potassium	56%		
• Vitamin D	42%		
• Calcium	75%		

the least.⁵ Results from several prospective studies suggest that the bulk of this effect comes from consumption of low-fat dairy foods and yogurt and milk. High-fat dairy foods, meanwhile, don’t appear to push blood pressure in either direction.

Cohort studies have revealed an intriguing link between dairy consumption and reduced risk of type 2 diabetes. A meta-analysis of such studies determined that dairy product consumption reduced the risk of type-2 diabetes by 14%.⁶ Consumption of dairy products with a low fat content yielded a risk reduction of 18%, while high-fat dairy foods had no effect on risk.

MANAGING LACTOSE INTOLERANCE

While about 12% of individuals perceive themselves to be lactose intolerant, research shows that most individuals who hold this belief don’t actually suffer from the condition.

People with self-reported lactose intolerance tend to limit dairy – or avoid it entirely – as a strategy to control their symptoms, thereby reducing their intake of calcium and other health-promoting nutrients. In my research, I have found a higher percentage of individuals with self-perceived lactose intolerance have reported physician-diagnosed diabetes or hypertension.

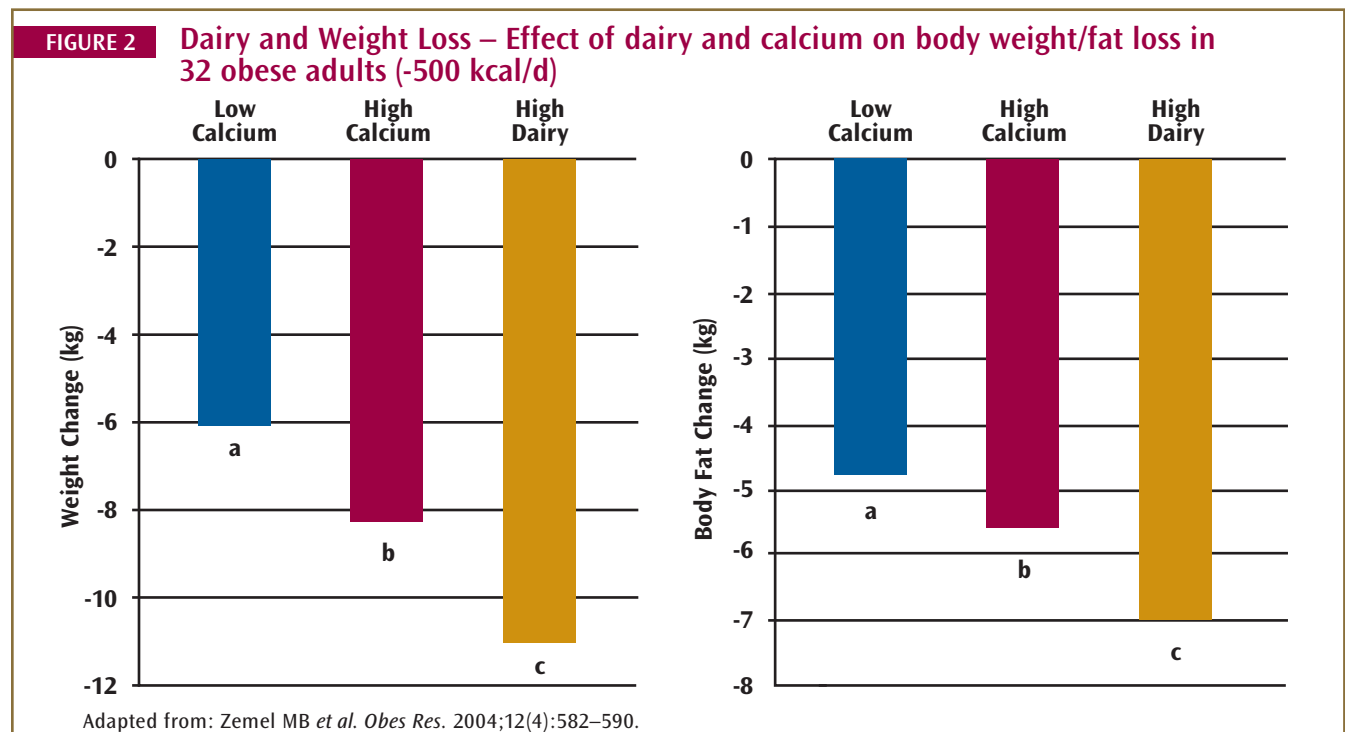
The National Institutes of Health has issued a position paper stating that most people with lactose intolerance need not resort to avoiding dairy. Effective approaches for managing lactose intolerance symptoms include:

gradually increasing dairy consumption; eating yogurt, which appears to help with lactose digestion; consuming hard, aged cheeses and lactose-free milk; and supplementing with the enzyme lactase prior to dairy product consumption.

THE NEXT GENERATION

In summary, the evidence suggests that dairy products have several health benefits and deliver a nutrient package that is difficult to replace. Strategies to increase dairy consumption in children include making dairy products more available in the home, giving dairy-positive messages, modeling dairy product consumption, engaging children in dairy food preparation, and restricting the availability of unhealthy foods that “compete” with dairy for children’s attention.

1. Heaney RP, Rafferty K. Preponderance of the evidence: an example from the issue of calcium intake and body composition. *Nutr Rev* 2009;67(1):32–39.
2. Zemel M *et al.* Calcium and dairy acceleration of weight and fat loss during energy restriction in obese adults. *Obes Res* 2004;12(4):582–590.
3. Zemel M. The role of dairy foods in weight management. *J Am Coll Nutr* 2005;24 (6 Suppl):537S–46S
4. Zemel MB *et al.* Effects of calcium and dairy on body composition and weight loss in African-American adults. *Obes Res* 2005;13(7):1218–25.
5. Ralson RA *et al.* A systematic review and meta-analysis of elevated blood pressure and consumption of dairy foods. *J Hum Hypertens* 2012;26(1):3–13.
6. Tong X *et al.* Dairy consumption and risk of type 2 diabetes mellitus: a meta-analysis of cohort studies. *Eur J Clin Nutr* 2011;65(9):1027–31.



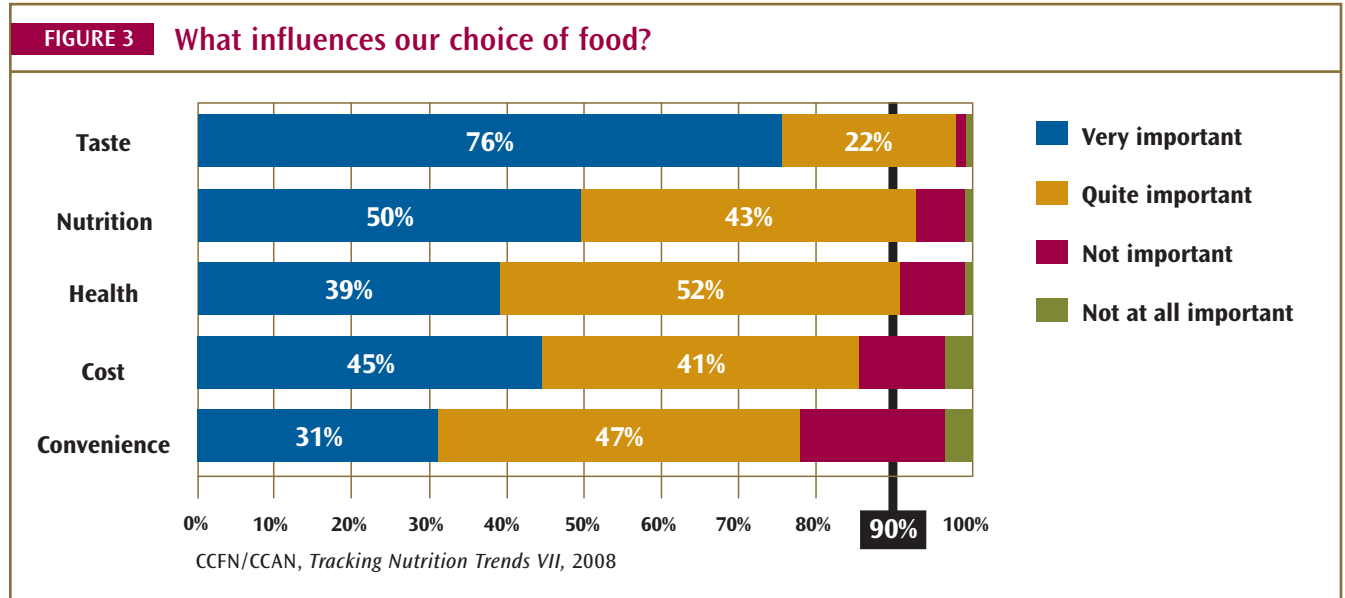
IMPACT OF NUTRITION CLAIMS AND FOOD PERCEPTIONS ON CONSUMER BEHAVIOUR



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Assistant Professor
Laval University

Taste is a factor that has a significant influence on peoples' choice of food. However, nutrition and health are also important factors in determining choice (see Figure 3). How consumers evaluate food and factors they take into account to make their decisions about food are important areas of research.

The most accessible source of consumer information about food, nutrition labels typically list ingredients, nutritional content, and health claims. While 57% of Canadians claim to read these labels, research suggests the actual figure may be lower. Consumer engagement with these labels depends on several factors, including health literacy, interest in nutrition, confidence in the information presented, and motivation (e.g., to lose weight). Health literacy varies widely: to the Canadian Council on Learning, 60% of adult Canadians do not have the minimal level (level 3) of literacy in their maternal language to take adequate care of their health. More vulnerable groups include seniors, immigrants, and



people with a low educational level.

In an attempt to reach a broader spectrum of consumers, some authorities have developed simplified labels that virtually all shoppers can interpret with ease. The Traffic Light system used in the U.K. serves as a good example of this simplification. However, consumers are capable of assessing the health value of different foods even in the absence of such illustrations, so their incremental value remains uncertain. What's more, seeing one or more green traffic lights may lead consumers to make snap judgments about a food's nutritional value and disregard the subtleties.¹

When people perceive a food as healthy, they tend to underestimate its caloric content, while they overestimate the calories in foods perceived as unhealthy.

The word "organic" carries a strong positive charge for many consumers. When a food item is described as organic, people give it a higher health rating (and lower caloric estimate) than when the same food is described in conventional terms. The same bias colours the word "healthy." In our study, female university students consumed 35% more calories when offered an oat and raisin cookie described as a healthy snack than when the very same cookie was described as being made with butter and brown sugar.² To put it another way, a healthy food label may provide a false sense of security and lead some consumers to draw misleading inferences from the nutrition claims.

We should view healthy eating as a whole, taking into account the nutritional, gastronomical, cultural and emotional aspects. In the context of

obesity prevention, we need to guard against an overemphasis on "nutrients to avoid," which could have the unintended consequence of increasing the intake of foods with dubious nutritional value. Eating healthy is not always easy for consumers. We must therefore think about the ways in which we interact with the public in order to be sure that we are really helping to promote healthy eating habits. Knowing that people often find an excess of information overwhelming, we must take care to keep our messages as simple and as objective as possible to avoid misinterpretation.

1. Kelly B *et al.* Consumer testing of the acceptability and effectiveness of front-of-pack food labelling systems for the Australian grocery market. *Health Promot Int.* 2009;24(2):120-129.
2. Provencher V *et al.* Perceived healthiness of food. If it's healthy, you can eat more! *Appetite* 2009;52(2):340-344.

TOP QUESTIONS AND ANSWERS OF THE DAY Panel Discussion

Do vegetable sources of calcium offer the same weight-loss benefits as dairy sources?

Dr. Chaput: While they both have weight-loss benefits, milk products have other components that may work synergistically for weight loss. When we compare calcium capsules to yogurt or milk, the milk products yield a greater weight loss than the capsules. Also, it is easier to meet calcium requirements through animal sources than through vegetable sources. Bottom line, we shouldn't restrict our food intake to a few specific items – we need to be diverse.

How do dairy alternatives such as soy beverages stack up against dairy products?

Dr. Johnson: You have to look at the fortification levels to make sure they're equivalent in terms of calcium and vitamin D. A recent study also found

that the calcium and vitamin D added to soy beverages were not well emulsified and tended to remain at the bottom of the container. So your clients really need to shake up these products to get the nutrients featured on the label, which may be hard to do once the container is open.

How do you view the role of nutritional information at the point of purchase, whether for food products or in restaurants?

Dr. Provencher: With food labels, I believe we should be as objective as possible in our messaging and focus on foods rather than nutrients (milk vs. calcium, for example), using images of foods as illustration. To date, no studies have confirmed the link between calorie lists in restaurants and healthier choices or weight loss, so more research is needed in this area.

How would you respond to Health Canada's recommendation for two servings of milk in children and adults?

Dr. Nicklas: I would recommend data analysis and modeling to gauge the impact of changing the recommendation to three servings. It's hard to meet potassium requirements with less than that, which is why we went up to three servings in the U.S.

Do added-sugar recommendations for adults apply to children?

Dr. Johnson: Children's allowances for added sugars don't differ very much from the adult figures. Overall, added sugars should be used in otherwise healthy foods such as breakfast cereals and milk products, to help increase their acceptance when needed.

Dr. Nicklas: Twenty-five percent of total calories is the maximum. If the percentage goes any higher, getting all the required daily nutrients can be problematic.

What single message about nutrition and health would you like to convey?

Dr. Nicklas: Eat less, move more.

Dr. Johnson: Sleep well.

Dr. Chaput: We're doing a lot of good science, but we need to do a better job conveying our messages.

Dr. Provencher: Analyze your behaviours surrounding food to get the "bigger picture" behind your food choices.

This educational supplement is designed to provide Canadian physicians with the latest in clinical thinking and therapeutic practice. The information and opinions contained herein do not necessarily reflect those of the sponsor.

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