Large supermarkets in Canada routinely stock thousands of products, with “nutritionally enhanced” and “better for you” products constituting an increasing share of the market (Canada, AgCan 2011). This expansion can in part be attributed to technological advances that have enabled the manufacture of foods with increased concentrations of desirable (marketable) components such as fibre, probiotics, and micronutrients and with reduced amounts of undesirable substances such as fat, sugar, and salt. The growth in sales also speaks to the competitive advantage afforded to manufacturers of these products. Food manufacturing is a fiercely competitive industry, and nutrition-related marketing sells foods.

The increasing prominence of “nutritionally enhanced” and “better for you” products in Canadian supermarkets also reflects a fundamental shift in our regulatory system. Recent changes in food regulations are designed to facilitate consumer choice and product innovation and to support the harmonization of fortification and labelling practices with those of our major trading partners. Whereas food fortification in Canada has historically been a tool for public health intervention, the addition of nutrients to foods is increasingly being permitted at the discretion of food manufacturers, and regulatory oversight is defined by a focus on consumer safety and risk management. This new era of food policy places the onus on
consumers to make informed choices and manage their own health and nutrition needs, but this in turn raises questions about the information available to Canadians. With so many products adorned with health and nutrition messaging, weighing the nutritional merits of existing options is complicated both by the ways in which food manufacturers have taken up the concept of nutrition in product formulations and labelling and by the paucity of standardized nutrition information available.

I begin this chapter with a discussion of the emergence of manufacturer-driven food fortification in Canada and the increasing use of nutrition-based food marketing, as evidenced by the communications regarding nutrition that appear on food packages. I then juxtapose these trends to current nutrition-labelling regulations and practices in order to critically examine the potential for informed consumerism to enable healthy food choices within the current food environment.

FOOD FORTIFICATION POLICY IN CANADA: AN EVOLVING CONCEPT

Historically, the addition of vitamins and minerals to foods in Canada was a tightly controlled public health measure, invoked to address demonstrated problems of nutrient insufficiency in the population (Sacco 2013). It required the identification of a serious public health problem and the amassing of evidence that this problem could be ameliorated by adding more of a particular nutrient to our food supply. When food fortification was considered to be warranted, both the levels of addition and the “food vehicles” for these mandatory additions were carefully determined to ensure maximal benefit and minimal risk to the population. Examples of such regulatory action include the mandatory iodization of table salt to prevent goitre, the addition of vitamin D to milk and margarine to prevent rickets, and the fortification of enriched flour and grain products with folic acid to reduce the incidence of neural tube defects (Sacco 2013, 60–64).

We now appear to have embarked on a new era of food fortification, with regulatory changes enabling more nutrient additions to occur at the discretion of manufacturers, whether or not there is a demonstrable public health need for increased nutrient levels in our food supply. The addition of select nutrients to breakfast cereals at the discretion of the manufacturer has long been permitted, but in the 1990s, products like calcium-fortified orange juice began appearing on store shelves. An even wider array of
products became the subject of discretionary fortification when Natural Health Products (NHP) regulations were introduced in 2004 (Canada, Department of Justice 2003). This regulatory framework also granted manufacturers more liberty in product marketing and exempted them from the nutrition-labelling requirements applied to packaged food products. The first food product to be approved for sale as a Natural Health Product was the energy drink, Red Bull. Several other highly fortified products followed, including more energy drinks, vitamin waters and other nutritionally enhanced beverages and energy bars. The regulatory oversight of these products is now shifting from the Natural and Non-prescription Health Products Directorate (formerly the NHP Directorate) to the Food Directorate, so that they will be regulated as foods. This means that all products will be required to comply with food-labelling regulations, but it does not necessarily spell an end to discretionary fortification. A special market authorization process has been introduced to handle products that are not compliant with Food and Drug Regulations (Canada, Health Canada 2013b).

Since the introduction of “novel beverages” into the Canadian marketplace, sales have grown rapidly (Canada, AgCan 2011), suggesting that they are part of the dietary intake of an increasing number of Canadians. Sometimes described as functional beverages, these products include energy drinks, sports drinks, vitamin waters, and novel juices. Product formulations variously include caffeine, herbal substances, and a variety of vitamins and minerals. These products are not unique to Canada but reflect a global trend (Burrows et al. 2013; Heckman, Sherry, and Gonzalez de Mejia 2010; Zucconi et al. 2013). Most of these beverages are manufactured or distributed by Coca-Cola or PepsiCo (Dachner et al. 2015, 193), and it can be no coincidence that their proliferation comes at a time when the health effects of sugar-sweetened beverages are under increasing scrutiny. The promotion of vitamin waters and nutrient-enhanced juices on the basis of unique health benefits attributed to their nutrient content implies that these are healthy alternatives to the more conventional beverages now under attack by health advocates.

A detailed examination of the nutrient content of sixty-six novel beverages brought to market under the NHP regulations and sold in Toronto supermarkets in 2011 (Tarasuk 2014) provides a graphic illustration of the principles of discretionary food fortification in practice. The sample of novel
beverages analyzed included energy drinks, vitamin waters, and nutrient-enhanced fruit beverages—products sold alongside conventional beverages on store shelves. Most of the novel beverages contained four or more vitamins and minerals. The most common additions were B vitamins: niacin, riboflavin, pantothenic acid, and vitamins B6 and B12. In most instances, a single serving of the beverage provided a greater amount of the nutrients than most people would require in an entire day in order to meet their body’s needs. When compared to the Estimated Average Requirements (EAR) for an adult man (the age and sex group with the highest requirement for almost all nutrients), eighteen beverages contained, in a single serving, more than six times the EAR for vitamin B12; twenty-five contained more than triple the EAR for vitamin B6 (with three beverages containing more than seven times the EAR); thirteen contained more than three times the EAR for niacin; and fourteen contained more than three times the EAR for riboflavin (with two products containing more than six times the EAR; Tarasuk, 2014, 4423–24). The nutrient loads would be even higher if these beverages were consumed as directed, since most labels included recommendations for the consumption of at least two containers per day.

Not only are the nutrient levels of many novel beverages well in excess of human nutrient requirements, but the nutrients most commonly found in these beverages are not ones lacking in the diets of most Canadians. Although there is some indication of inadequate intake of vitamins B6 and B12 among older adults, the text and imagery on the products examined suggest that the target market is younger adults, and there is little evidence to support the need for more B vitamins among this demographic (Canada, Health Canada and Statistics Canada 2008b). Contrary to the labels on these bottles, which suggest the drinks will “replenish” or “restore” missing nutrients (Dachner et al. 2015, 196), the young Canadians who most often consume these products stand to derive no benefit from most of the added nutrients.

If there is no possibility of benefit, is there a potential for harm from the nutrients being added by novel beverage manufacturers? Nutrient toxicity is a nascent field of research in the nutritional sciences, necessitated by the potential for people to ingest nutrients from supplements and fortified food products in doses not possible by the consumption of natural food sources (Institute of Medicine 1998a). In affluent countries, it is not uncommon for people to consume diets that provide some nutrients in excess of their
requirements, but much higher levels of nutrient exposure have been documented recently in conjunction with the consumption of highly fortified foods and nutrient supplements (Sacco et al. 2013; Shakur et al. 2012). A joint Canada-US scientific review was undertaken to determine Tolerable Upper Intake Levels (ULs) for nutrients, but this process was limited by the paucity of data, yielding only crude estimates of safe upper ranges of intake for some nutrients and no estimate whatsoever for others (Taylor and Meyers 2012). Yet these reference standards constitute the only available evaluative framework against which to assess the potential for risk of excessive nutrient exposures in this new era of discretionary food fortification.

Dachner et al.’s (2015) comparison of the nutrient content of novel beverages with the available ULs revealed excessive levels only for retinol (vitamin A) and niacin. Three products were found to provide retinol at or above the UL, if consumed at recommended levels. The consequences of excessive retinol exposure are well established; they include liver toxicity and birth defects (Institute of Medicine 2002). One Coca-Cola product that contained 3,000 micrograms of retinol (the UL for adults) in a single serving at the time of our study was subsequently reformulated, apparently in response to publicized complaints by a nutritional scientist and a medical expert (Schmidt 2011). So far, this appears to be an isolated case, but it illustrates the potential for risk when manufacturers are given free rein to fortify products. The case also highlights the challenges of effective regulatory oversight in the context of manufacturer-driven fortification.

One-quarter of the novel beverages examined by Dachner et al. provided niacin in amounts above the Institute of Medicine’s ULs for adolescents and/or adults. This reference standard does not differentiate forms of niacin, but scientific reviews in some other jurisdictions have proposed much higher ULs for nicotinamide, the form of niacin found in novel beverages, arguing that there is no evidence of harm with lower intakes of this compound (EVM 2003; European Commission, Scientific Committee on Food 2002). In its risk assessment of caffeinated energy drinks, Health Canada drew on this literature to conclude that the beverages “would be unlikely to pose a health risk in the short term,” at the same time acknowledging “uncertainty in the safety of life-long consumption at this level” (Rotstein et al. 2013, 24). These comments point to what is by far the most worrisome aspect of Canada’s current directions in food fortification policy. By permitting manufacturers to add nutrients at levels unrelated to human
requirements, Health Canada has essentially engaged the Canadian population in a natural experiment. The health effects of chronic exposure to such high levels of nutrients are unknown. For some consumers, the level of exposure is likely to be substantial, as the nutrient loads delivered by highly fortified “novel” food products are added to already high nutrient levels resulting from the daily use of vitamin and mineral supplements (Shakur et al. 2012). If such high nutrient loads have adverse consequences for health, they remain to be discovered.

Concerns about the potential adverse effects of the caffeine in energy drinks have recently prompted Health Canada to issue interim guidelines to bring the products more in line with food regulations, capping caffeine additions and requiring nutrition labelling consistent with other foods (Canada, Health Canada 2013a). Yet there is no indication that the discretionary fortification of these products will be halted. The interim guidelines for energy drinks prohibit additions of folic acid and vitamin A in the form of retinol because of safety concerns, but the guidelines include maximum permissible levels of addition for eleven nutrients (Canada, Health Canada 2013a). In seven cases, these levels are several times higher than the nutrient requirements of healthy adults, with the most dramatic discrepancy for niacin. Nicotinamide can be added to a daily maximum of 450 mg; this is thirty-eight times the average niacin requirement for men and forty-one times the average requirement for women (Institute of Medicine 1998b).

Setting aside the question of why regulators in Canada and many other countries are permitting such high levels of nutrient addition in the absence of any evidence of public health need or benefit, manufacturers’ reasons for wanting to add vitamins in these quantities are also unclear. Whatever marketing advantage is gleaned from the promotion of products with added nutrients could surely be achieved without such extreme nutrient concentrations. Rotstein et al. (2013) speculate that niacin is being added because of its role in energy metabolism, but a recent review of the scientific literature found no evidence that the addition of B vitamins to these beverages enhances their effects on physical or mental performance—the primary benefits asserted in product advertising (McLellan and Lieberman 2012). Whatever manufacturers’ reasons are for such high levels of micronutrient fortification in novel beverages, these amounts cannot be defended in light of the current science on the nutrient requirements of human beings.
Responsibility for navigating the current food landscape to procure healthy foods rests with the consumer. This task is complicated not only by the thousands of products from which to choose but also by the changing nature of the regulations governing this system. As processed food manufacturers are given increasing latitude over nutrient additions, consumers can no longer take for granted that the nutrients being promoted on product labels are necessary or beneficial to them. Yet there is very little standardized nutrition information available to enable Canadians to critically appraise new products and make informed decisions.

The Nutrition Facts Table

The only mandatory nutrition labelling on food products in Canada is the Nutrition Facts table (Canada 2003). Typically found on the side or back of food packages, this boxed text displays the content of thirteen nutrients plus energy (calories) on a per serving basis. The Nutrition Facts table is meant to help consumers compare the nutrient content of different food products and to provide information about the relative contributions of a food to an overall health-promoting diet. Nutrient content is expressed as a percent of a Daily Value (DV), but the reference values currently in use are largely based on the 1983 Recommended Nutrient Intakes.¹

The greatest discrepancy between current requirement estimates and the DVs in use on the Nutrition Facts table is for sodium. The sodium DV is set at 2,400 mg, which is 900 mg more than the amount most adults are estimated to need for good health. The DV also exceeds the UL of 2,300 mg/day, a level associated with increased risk of high blood pressure among healthy adults (Institute of Medicine 2005). Lowering the DV for sodium has been identified as critical to reducing the prevalence of excessive sodium intake in the Canadian population (Canada, Health Canada 2010), but to date, there has been no change to the food label. Education campaigns have been mounted by Health Canada and some nongovernmental health organizations to help Canadians understand how to use the Nutrition Facts table, but outdated DVs remain a serious obstacle to informed food selection.²

In addition to outdated science on which the DVs are based, the relevance of the particular nutritional attributes included in the Nutrition Facts table to the health concerns of the contemporary population is questionable, as
are the merits of expressing nutrient content in relation to a single standard. As it is currently designed, the Nutrition Facts table communicates nothing about whether prospective consumers would benefit by adding more of the particular nutrients supplied by a particular product to their diets. Yet this information is critical in evaluating one’s need for highly fortified products. Practically, it is impossible for individuals to monitor the adequacy of their vitamin and mineral intakes. Population-level dietary assessment surveys have furnished detailed information on the prevalence of inadequate intakes for many nutrients for different population subgroups defined by age, sex, and province (Canada, Health Canada and Statistics Canada 2008a, 2008b), but this information is not common knowledge. Only a few results, such as the findings that most Canadians consume excessive amounts of sodium and insufficient amounts of vitamin D, have made their way into the popular media. Thus, most consumers lack the knowledge and information necessary to critically appraise the micronutrient content of products.

Voluntary Nutrition Labelling
The provision of all other nutrition information on food labels is voluntary, provided at the discretion of the food manufacturer. This includes regulated statements such as nutrient content claims (“a good source of calcium”) and diet-related health claims (“A healthy diet low in saturated and trans fats may reduce the risk of heart disease”), for which the wording is prescribed and specific compositional criteria must be met. Such discretionary provision of information also includes a plethora of unregulated text and graphics, including quantitative statements about nutritional content (“x grams of fibre”), the inclusion of nutritional attributes in product names, and a variety of health endorsement symbols (such as the Heart and Stroke Foundation’s Health Check or the Whole Grain Council’s stamp). The scale and complexity of the nutrition information presented on food packages cannot be overstated. A recent survey of front-of-package nutrition marketing in three Canadian supermarkets documented thirty different ways in which manufacturers highlighted the fibre content of products, including the use of terms like inulin, psyllium, prebiotics, beta glucan, and soluble fibre (Sacco, Sumanac, and Tarasuk 2013).

While almost half of processed foods sold in major Canadian supermarkets bear regulated nutrient-content claims (Schermel et al. 2013), the
prevalence of unregulated nutrition-promotion material on food labels has yet to be comprehensively quantified. However, an examination of front-of-package references to fibre on foods sold in supermarkets indicated that 31 percent of the references used unregulated language (Sacco, Sumanac, and Tarasuk 2013). A closer look at the implications of this practice for breads revealed that unregulated references to fibre were associated with systematically lower fibre content than regulated claims (Sacco, Sumanac, and Tarasuk 2013). This finding might be interpreted as signalling a role for education campaigns to help consumers differentiate regulated from unregulated nutrition labelling, but such efforts would be thwarted by the sheer volume of nutrition messaging on food labels. Rather than pointing to the need for more consumer education, these findings with respect to fibre speak to the futility of using voluntary nutrition labelling as a guide to healthier food choices.

Consumers do not have to rely on voluntary, front-of-package labelling to make food selections based on attributes like fibre that are listed in the mandatory Nutrition Facts table, but voluntary labelling is critical to the identification of foods with nutritional characteristics not included in that table. Consider the case of whole grains. Whole grain foods are now recognized as an essential component of a healthy diet, yet whole grain labelling is entirely unregulated. It is impossible to discern the whole grain content of foods from an ingredient list or Nutrition Facts table, so consumers who cannot independently identify whole grain foods in the supermarket are completely reliant on the declarations made by product manufacturers (Sumanac, Mendelson, and Tarasuk 2013).

While whole grain labelling is an example of the potential for voluntary labelling to compensate for limitations in the Nutrition Facts table and positively influence food selection, a more systematic examination of manufacturers’ uptake of regulated nutrient content claims suggests limited congruence with current priorities for population health. The most prevalent claims on processed foods relate to fat and trans fat, with comparatively few foods displaying content claims related to sodium, saturated fat, or added sugar (Schermel et al., 2013). Moreover, voluntary nutrition labelling is more often found on processed foods than on whole foods, raising the question of whether this practice risks obscuring the inherent nutritional value of whole foods. For example, while half of the breakfast cereals we found for sale in Toronto supermarkets bore front-of-package
references to fibre, such references were absent from 51 percent of canned and dry beans, 95 percent of nuts and seeds, and 96 percent of frozen and canned fruits and vegetables—all foods that are excellent natural sources of fibre (Sacco, Sumanac, and Tarasuk 2013, 520). The prominence of nutrition-related marketing on foods that are considered “foods to limit” on Canada’s Food Guide because of their low nutritional value also raises questions about the healthfulness of the food selections being promoted by voluntary nutrition labelling.

In sum, the one mandatory piece of nutrition labelling on food packages, the Nutrition Facts table, is based on outdated science and provides insufficient information to support healthy food choices in the context of such a complex food supply. The selective nature of voluntary nutrition labelling, in terms of both which foods are subject to such labelling and which food attributes manufacturers choose to highlight, means that this too is of very limited value as a source of nutrition information or guide to healthier food choices.

CONSIDERATIONS FOR CANADIAN SHOPPERS: THE PROBLEM OF CONSUMER CHOICE

The task of grocery shopping is complicated by the vast array of options available in supermarkets now, and by the ways in which processed food manufacturers have taken up nutrition. The regulatory oversight of our food supply is increasingly directed toward product innovation and toward what is often presented as the facilitation of consumer choice. Emphasis is on consumer safety and risk management, not on health promotion. With the expansion of discretionary fortification, the risks to be managed are those associated with chronically high nutrient exposures, but the nascent science of nutritional toxicology provides a very weak foundation upon which to mount such regulatory action. In this context, the onus is clearly on consumers to make informed food choices and manage their own nutritional health, but the volume and complexity of nutrition information required to navigate our food system is arguably beyond consumers’ reach.

The criticisms of voluntary and mandatory nutrition labelling expressed here could be interpreted as a call for improved nutrition labelling. In recent years, several composite nutrition-rating schemes have been proposed as a means to simplify and standardize the communication of nutrition
information on food packages (Institute of Medicine 2011; UK Food Standards Agency 2007). However, simplified rating systems typically offer little guidance to help consumers differentiate the presence of valuable micronutrients from gratuitous fortification. In part, this reflects concerns about the interrelation between nutrition-labelling and food-manufacturing practices. While nutrition-labelling regulations can exert a positive influence on food-manufacturing practices, the opposite is also true. Consider, for example, the Institute of Medicine’s decision to not include an assessment of micronutrients in its recommendation for standardized front-of-package nutrition labelling so as not to encourage more discretionary food fortification and increase the risk of excessive nutrient intakes (Institute of Medicine 2010, 84–85). A compelling alternative, put forward by Marion Nestle and David Ludwig (2010), is to eliminate all front-of-package nutrition claims and enhance the mandatory Nutrition Facts table so that it provides more effective guidance.

Evidence continues to mount that the health of many Canadians is compromised by what they are eating. Population health surveys have revealed a high prevalence of inadequacy for some nutrients, such as magnesium, calcium, and vitamin A (Canada, Health Canada 2012; Canada, Health Canada and Statistics Canada 2008a, 2008b), along with excessive sodium intakes (Canada, Health Canada 2010) and growing problems of overweight and obesity (Shields 2005; Tjepkema 2005). A regulatory framework that better supports Canadians in making healthy food choices needs to be seen as a population health imperative. This means placing the nutritional needs of the population at the forefront of policy related to nutrition labelling and food fortification.

NOTES

1 Many DVs on US food labels date even further back, to the 1969 Recommended Dietary Allowances (Institute of Medicine 2003).
3 The most recent edition of Canada’s Food Guide recommends that Canadians make half of the grain products they consume whole grains as a means to achieve adequate intakes of fibre and magnesium (Canada, Health Canada 2007).
An example of a positive influence is the incentive that the mandatory inclusion of trans fat content in the Nutrition Facts table created for manufacturers to lower the amount of trans fat in foods.

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