# Dairy Products and Consumer Demand for Health Foods

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## ■ Take Home Message

‣ Consumers are subjected to a wide variety of both positive and negative messages regarding the health effects of dairy consumption.

‣ Much of the research suggests that the demand for dairy products has largely benefited from health concerns in the past.

‣ In Canada, there is evidence that dairy consumption patterns have reflected an increased concern about dietary fat.

‣ Canadian demand for dairy products has been shown to be influenced both positively and negatively by health information.

‣ Future demand for dairy products will continue to be affected by health concerns, both because of consumer perceptions as well as government responses to obesity-related issues.

## ■ Introduction

In recent years, the linkages between diet and health have received increasing public attention, especially in popular media.  Although dairy products, especially fluid milk, have historically enjoyed a widespread perception of being healthy food products, consumers have more recently been subjected to a wide variety of both negative and positive messages regarding the health effects of dairy consumption.  In the past few years, consumers have turned on their televisions to see hip teenagers telling them to "Grow all ways" with Alberta Milk, and have also been confronted with billboards asking, "Got prostate cancer?"  Internet surfers can visit neverstopmilk.ca or the Dieticians of Canada website to learn of the health benefits of milk products, or can stop in at www.notmilk.com to read about possible concerns associated with dairy consumption, from "acid blood" to "zits."

The influences of health concerns on dairy consumption extend well beyond the carefully chosen social marketing messages of government, industry and advocacy groups. The current perception of an epidemic of obesity has the potential to promote the consumption of low-fat dairy products, while at the same time making consumers more wary of the consumption of cheese and cream. A variety of dairy substitutes designed to serve lactose-intolerant and vegan consumers may also attract some consumers who otherwise are not averse to consuming dairy products. This barrage of conflicting messages provides a challenge both to health-conscious consumers, as well as to the producers and marketers of dairy products.

The question of interest here is whether health concerns are having an effect on dietary consumption. We first note some of the medical findings regarding linkages between dairy products and the obesity-related diseases. We then review the literature on how health-related media information impacts the demand for dairy products, and present recent results from Canada. Finally, we discuss the role of dairy products in Canada's Food Guide, and the potential implications of this for dairy consumption.

## ◼ Dairy and Obesity-Related Diseases

Dairy has long been promoted for its contributions to good health, particularly for certain groups of consumers, such as children, pregnant women, and women past menopause. As suggested above, there have also been negative findings regarding dairy consumption, some of which have been promoted heavily by groups that are opposed to dairy production on animal-welfare grounds. The positive and negative links to diseases may become even more salient in the current atmosphere of concern about obesity-related diseases. Below we briefly summarize some of the recent research regarding the linkages between dairy fat consumption and the incidence of the two obesity-related diseases that contribute most highly to Canadian health care expenses: coronary heart disease and stroke.

Given its saturated fatty acid content and the fact that it contains cholesterol, many researchers regard milk as a promoter of atherosclerosis and coronary heart disease (CHD). Although there is evidence that supports a correlation between milk and butterfat intake and CHD mortality, information from Finland and France appears to counter this evidence (Artaud-Wild et al., 1993). This "French Paradox," as it is commonly known, indicates that in France, individuals have a low risk of CHD, despite the fact that they consume a diet high in saturated fatty acids and cholesterol. There is no positive correlation between CHD risk and animal fat intake (Fehily et al., 1993), and high milk intake is reported to be associated with a decreased ischemic heart disease risk (Shaper et al., 1991). This raises the possibility that milk may have components that negate the effects of saturated fatty acids and cholesterol.

According to a review by Pfeuffer and Schrezenmeir (2000) of 47 articles investigating cardiovascular diseases, milk and milk products should be a part of a healthy diet that emphasizes cereals and vegetables.

In 2001, Massey reviewed the literature on the association between dairy food consumption and stroke incidence (Massey, 2001). Two studies had previously examined this association, and both reported a decreased risk of stroke connected with higher intakes of dairy foods. The first was a longitudinal study with 22 years of follow-up, conducted by Abbott and colleagues (1996), which found that men of Japanese ancestry with a baseline age of $55 - 68$ years who did not drink milk had twice the rate of thromboembolic stroke as men who consumed two or more 240 mL glasses per day. Additionally, Iso and colleagues (1999) examined the association between the intake of calcium, potassium, and magnesium, three minerals abundant in milk, and stroke incidence. The study reported that participants in the Nurses' Health Study who were in the highest quintiles of calcium, potassium, and magnesium consumption had, respectively, 28%, 29%, and 27% decreased risks of ischemic stroke as compared to those in the lowest quintile of consumption. This inverse association was stronger for dairy calcium intake than for non-dairy calcium intake.

The studies reviewed above suggest that dairy consumption, on the whole, may provide benefits that help reduce the incidence of stroke and heart disease, even if the fat and cholesterol content of certain dairy products may, in isolation, increase the incidence of these diseases. In contrast, dairy milk consumption, especially in children, has been linked to increased incidence of a third important obesity-related illness: diabetes. Two meta-analyses covering thirty studies suggest that young children exposed to cow's milk are at least 1.5 times as likely to develop type I (early-onset) diabetes (Gerstein, 1994; Norris and Scott, 1996). There is also limited evidence linking childhood milk consumption to an increased incidence of type II (adult-onset) diabetes (Pettitt et al., 1997).

## ■ Effects of Health Information on Demand

Are health concerns and health messages having an impact on dairy consumption? Much of the research suggests that the effects are neutral or have promoted the consumption of dairy. Zandstra et. al. (2001) undertook research on the influence of health attitudes on consumption of low and high fat foods. They found that a high general interest in health was associated with an increased consumption of vegetables and fruit and a lower intake of fat. However, they also found that a high level of general interest in health was not associated with decreased consumption of dairy products. Jensen and Kesevan (1993) found that nutrient content advertising, such as messages emphasizing the influence of calcium, had a significant impact on consumers'

awareness of and attitudes towards health. Stronger attitudes towards nutrients had a positive effect on dairy product consumption. Raats et al. (1993) found that perceived obligations to one's family's health was an important predictor of consumption of whole milk and semi-skimmed milk, but less so for skim milk. The perceived obligation to one's family's health was also an important predictor of attitudes towards consumption of each type of milk.

In Australia, a study of consumer's knowledge of the health attributes of milk resulted in the following conclusions:

> This study suggests that shoppers widely perceive milk's health effects to fit into five themes related to bone health, weight control, disease prevention, and causation of allergy and disease. Generally, whole milk was perceived more negatively than soy milk or reduced fat milk. The widespread knowledge of milk's health attributes across demographic categories suggests that past education campaigns have had a measure of success. However, the prevalence of uncertainty and false beliefs across all demographic groups remains a challenge for public health education (Bus and Worsley, 2003).

Kim and Douthitt (2004) examined the effects of diet information on whole and low fat milk choices. They found that "women's diet-health attitudes and their food label use contributed to reduced whole milk consumption and increased low-fat milk consumption. Because low-fat milk is higher in calcium with less fat and cholesterol, food labels may be useful in helping women choose healthy eating. Rather than diet-health awareness, food label use appears to be effective "at the point of choice." Chung and Kaiser (2000) found that consumers' fat concerns, while not affecting the demand for milk directly, significantly and negatively affected the rate of consumer response to fluid milk advertising. Thus fat concerns reduced the effectiveness of generic advertising aimed at increasing milk consumption, largely funded by producers.

Chern (2003) reported a positive link between a health information index related specifically to fat and cholesterol media coverage and increased dairy and related product consumption in the United States. However, given that this study lumped together all dairy products, the effect found may be masking a decrease in higher fat dairy products offset by an increase in the consumption of lower fat dairy products, such as yoghurt and skim milk. A contemporaneous study on food demand in France illustrated that a fat and cholesterol information index had a significantly positive effect on milk and yoghurt consumption and a negative impact on butter consumption, but failed to find any significant impact on cheese (Nichele, 2003).

## ■  Health Concerns and Canadian Demand for Dairy

### Trends in Canadian Consumption of Milk and Dairy Products

It is interesting to note that dairy consumption in Canada has shown patterns over the past 25 years that apparently reflect a growing concern with obesity and fat intake.  Figure 1 shows the per capita sales of fluid milk in Canada from 1977 to 2003 (Statistics Canada and authors' calculations).  The primary trend over this time has been a steady decrease in the per capita consumption of standard (whole) milk over this period, from 43.1 litres per capita in 1977 to 13.5 litres per capita in 2003.  Some of this consumption was apparently shifted to skim and 2% milk through the 1980s.  After the introduction of 1% milk in Canada in 1990, consumption of 2% milk declined as well.  Total fluid milk consumption across these four categories (not shown) has dropped from a high of 98.5 litres per capita in 1980 to under 80 litres per capita in 2003.
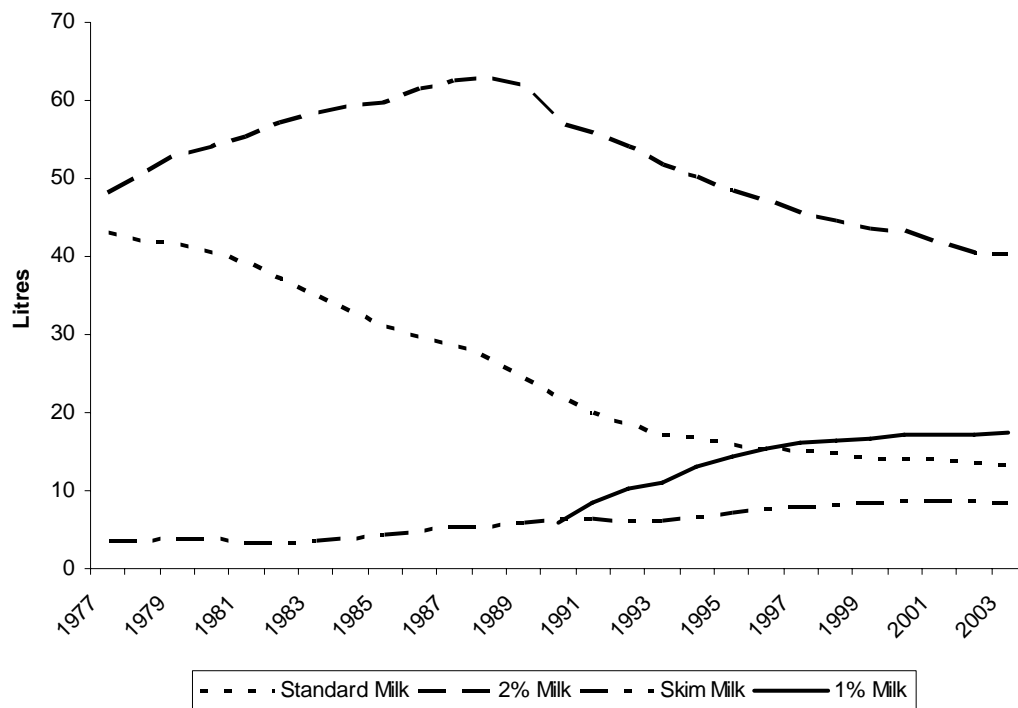


**Figure 1:  Per Capita Fluid Milk Sales in Canada by Category, 1977 – 2003**

The trends across various dairy products during the same time period are shown in Figure 2 (Statistics Canada and authors' calculations).  This graph traces out the annual per capita disappearance of cheddar cheese, cottage cheese, process cheese, variety cheese, butter, and total cream.[1]  The disappearance of butter exhibits a noticeable downward trend, from 4.52 kilograms per capita in 1977 to 2.94 kilograms per capita in 2003.  In contrast, the disappearance of other cheese varieties and total cream both exhibit a marked increase over this period.  Much of the doubling in total cream disappearance shown here is likely due to the increased use of dairy cream in a wide variety of processed foods.  The sizeable increase in the disappearance of other cheese varieties, from 2.78 kilograms per capita in 1977 to 6.49 kilograms per capita in 2003, parallels the increased variety of specialty cheese offered during this time.  These changes may also reflect some substitution of cheese for meat products in Canadians' dietary choices.

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[1] "Disappearance" is a useful proxy for domestic food consumption. It is calculated for a given period of time by adding initial food stocks, domestic production, and imports, and subtracting exports and food stocks at the end of the period.  Although it does not account for food spoilage and other wastage, it does incorporate away-from-home consumption and the content of processed foods in a way that is difficult to measure from other data, such as retailer scanner data, expenditure surveys and food dairy studies.
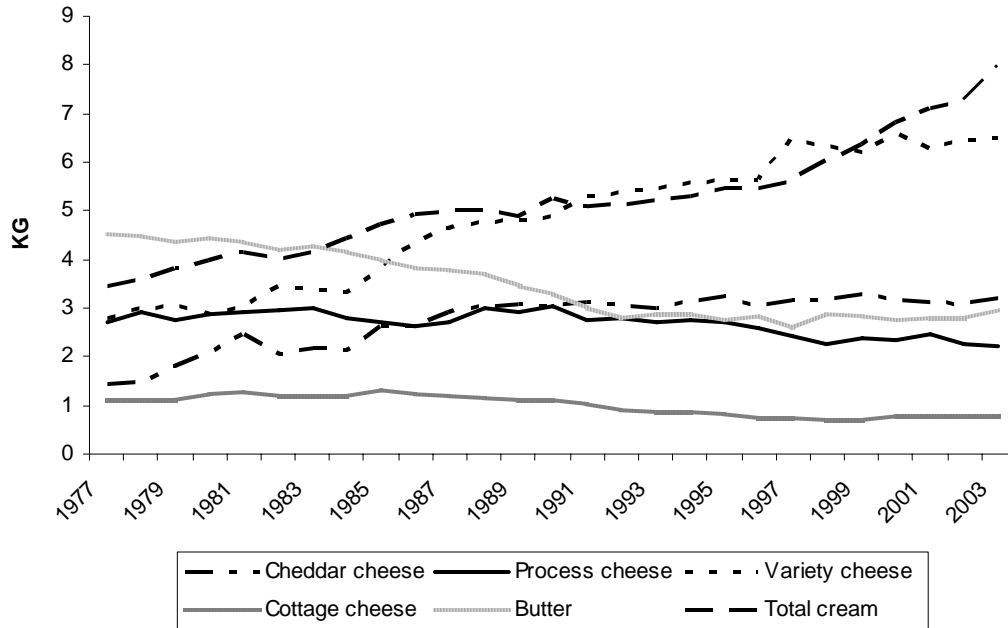
**Figure 2: Per Capita Disappearance of Dairy Products by Category, 1977 – 2003**

It is also important to recognize that these consumption patterns show considerable regional variations. Figure 3 illustrates how the consumption of different categories of fluid milk has differed between Quebec and Manitoba in 1990 and 2003, as measured by the percentage of total fluid milk consumed in each region (Zhang and Goddard, 2004). While both provinces have exhibited a decrease in whole milk consumption in favour of skim and 1% milk during this time, Quebec still consumes relatively more whole milk, and far less skim milk. Moreover, consumers in Manitoba have exhibited a marked decrease in 2% milk in favour of lower fat varieties, while the percentage of 2% milk consumed in Quebec has remained relatively unchanged between 1990 and 2003.
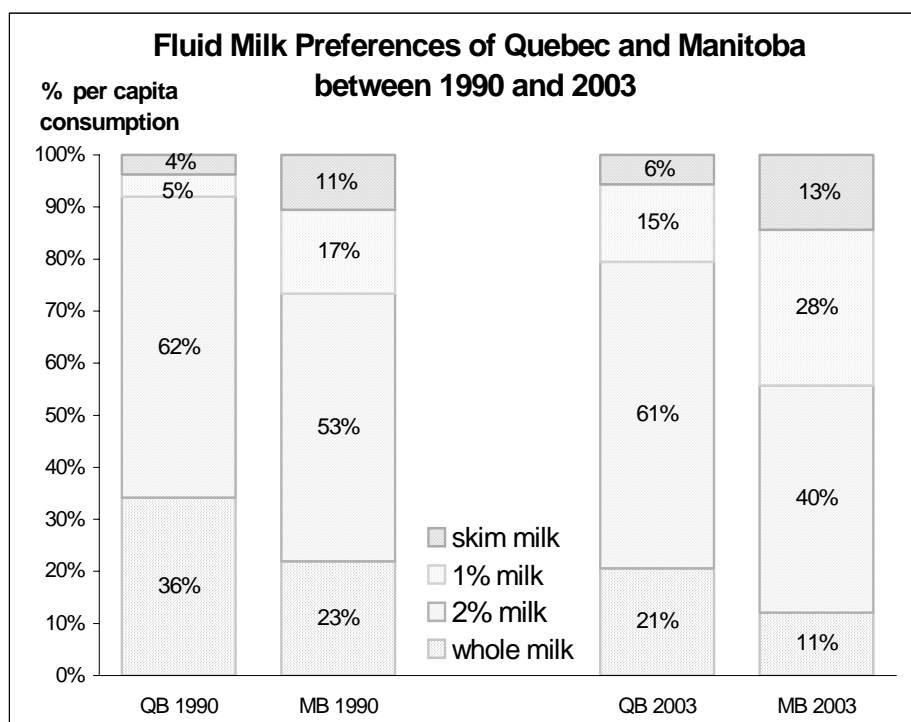
**Figure 3: Fluid Milk Preferences in Quebec and Manitoba in 1990 and 2003 (Source: Zhang and Goddard, 2004).**

## The Effect of Health Information on Milk Consumption

Wang (2005) investigated the demand for milk consumption in the context of the demand for all non-alcoholic beverages in Canada, using data from the 1996 and 2001 Family Food Expenditure Surveys. In order to explore the impacts of various types of health information on beverage demand, she constructed several indices, including a positive milk health information index and a negative milk health information index. These health indices were constructed by searching for articles in major Canadian newspapers through electronic databases, and compiling counts of articles linking milk consumption to either positive or negative health outcomes.

Her results suggest that positive milk information has a mixed effect on the demand for milk. When fluid milk is considered as an aggregated category, the results for the 1996 sample exhibited a positive and significant effect for the impact of positive milk information, whereas the effect of positive health information across all milk categories was *negative* in the 2001 sample. The

latter finding reflects the fact that most of the articles published in 2001 specifically promoted the health benefits of skimmed milk and partly skimmed milk. This type of information may not strengthen consumers' confidence in the health benefits of milk in general. More consistent patterns were apparent when the effects of positive health information on the substitution between specific categories of fluid milk were examined. In both the 1996 and 2001 samples, positive health information decreased the demand for whole milk consumption in favour of lower-fat categories of fluid milk.

Negative milk health information was examined separately in this study. It was found to have a significant negative impact on overall milk consumption for 1996, and no significant impact on milk consumption in the 2001 sample. When looking across disaggregated milk categories, the negative milk information apparently encouraged some switching across milk types, but in both years leaves 2% milk demand unaffected. In 1996, it may have prompted switching from other milks to whole milk, whereas in 2001, as negative health information increased, the switch appears to have been from whole milk to other milk categories.

Wang also investigated the effects of milk advertising on demand in Canada. She found that generic milk advertising increased both aggregate milk consumption, as well as the consumption of 2% milk in the disaggregated models. Branded milk advertising was found to have a significant positive affect on aggregate milk consumption in 1996, and no effect on aggregate milk consumption in the 2001 sample. In the disaggregated milk models, branded milk advertising effects were positive and significant for 2% milk in the 1996 sample, and positive and significant for whole milk in the 2001 sample.

What is clear from these results is that overall milk consumption does appear to be linked to many forms of media information. Consumers' concerns about their diet, and specifically about dietary fat, have apparently resulted in changing milk demands as more information appears in the media. Advertising does seem to have some effect on mitigating the impact of media coverage. The fact that negative media coverage can affect milk consumption suggests that the industry will need to be proactive in following major nutritional research in order to anticipate future shifts in demand.

■  **Dairy Products in Canada's Food Guide**

Given that health information does seem to have a noticeable influence on Canadians' consumption of milk, it is also of interest to reflect on how dairy products are represented in government recommendations. In 1992, after two years of development, Health and Welfare Canada released the then new "Canada's Food Guide to Healthy Eating." When it was released, the Acting Minister of Health, Fred A. Stewart, highlighted the government's effort to

provide a guide that reflected changing eating habits and nutritional knowledge. Some of the advice encouraging such a diet included choosing lower-fat foods across all products more often and, specifically, choosing lower-fat milk products more frequently (Health Canada, 2003).

Lomeli (2004) investigated the evolution of the dairy recommendations over time.  Figures 4 and 5 below are based on data available in a summary of Canada's Food Guide recommendations prepared by Health Canada (Health Canada, 2002).  They show significant increases over time in the total food servings (i.e., across all categories) recommended by Canada's Food Guide. The data presented have been corrected as much as possible to provide for consistency in the sizes of servings over time.  The numbers shown here represent the upper end of the recommended number of servings ranges for adults, and exclude those dairy recommendations that were specifically targeted to pregnant or lactating women. On this basis, the figures suggest that the number of recommended servings of milk and dairy products has grown remarkably between 1942 and 1992.
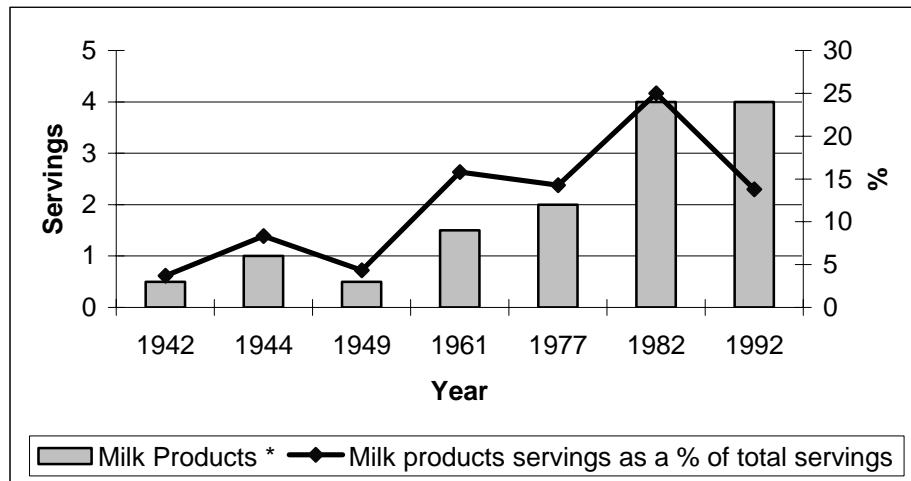


**Figure 4:  Recommended Dairy Servings in Canada's Food Guide, 1942 – 1992 (Source: Lomeli, 2005).**
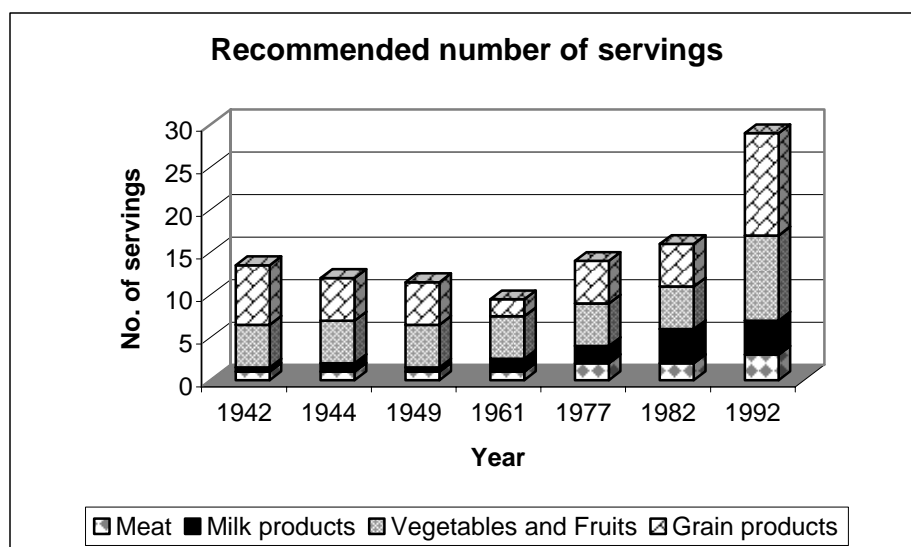
**Recommended number of servings**



**Figure 5: The relative importance of dairy in Canada's Food Guide has increased over time (Source: Lomeli, 2005).**

This points to two important issues. One is that in order to accommodate change, the total number of servings of all foods has risen markedly over time. At a time when a range of national and international groups have identified obesity as a major health issue, this may be surprising to some. This concern is especially salient when one considers that consumers are not always aware of what nutritionists consider an appropriate serving size. Although the number of recommended dairy servings has increased over the life of the program and hasn't changed in the last 20 years, the increase in total recommended servings of other products means that the *relative* importance of dairy in the recommendations is lower in the 1992 Food Guide then it had been in previous years.

A second issue is a generally increased weighting of the Food Guide toward high-fat foods rather than high-fibre foods when one compares the early Food Guide recommendations to those of the 1970s and 1980s. Recent commentators such as Nestle (2002) attribute some of this trend (which has also been exhibited in the United States) to the influence that favoured commodity groups have on the establishment of food recommendations. Other historical factors may also play a role in this, however. For example, early iterations of the Food Guide reflected not only the nutritional concerns of the era, but also a national wartime policy of rationing some food items. Conversely, one might also assert that Food Guide recommendations needed to reflect the greater access and affordability of food items in recent decades,

lest consumers dismiss the guidelines as wholly irrelevant to their lives and eating habits.

As a basis for comparison it is useful to illustrate the changes in recommendations in the U.S. dietary guidelines that have been evolving over the last 15 years. The USDA Food Pyramid in 1992 suggested between 2 and 3 servings of milk, yoghurt and cheese. The 1997 recommendations were similar, but included the recommendation that these products preferably be fat free or low fat. By 2005, the guidelines had evolved to recommend the consumption of 3 cups per day of fat-free or low-fat milk, or equivalent milk products (Center for Nutrition Policy and Promotion). The clear trend is that U.S. recommendations with respect to dairy have become much more specific, and have increasingly targeted the consumption of lower fat products.

The recent announcement that Canada's Food Guide is to be updated presents an opportunity to reconsider the overall number of recommended servings, as well as the role of dairy products within these guidelines. It will be interesting to see if the revised Food Guide also makes further recommendations about the types of dairy products to be consumed.

# ◼ Discussion

People are increasingly health conscious, and health information can be effective in altering consumers' demand for milk and dairy products. Milk is largely promoted as a healthy drinking choice, but this perception is sometimes challenged, both in the popular media as well as by the social marketing campaigns of certain advocacy groups. Dairy products are also seen as a major source of dietary fat, and this is a concern which may become even more important over the next few years.

It is also interesting to speculate on some of the possible changes in the demand for dairy products that may arise as Canada begins to address what has often been proclaimed as an obesity epidemic. While it is true that the information available to the public is evolving in ways that can both promote and discourage dairy consumption, of equal importance are potential changes in how the government regulates food production and marketing. For example, a banning of trans-fats in processed foods may lead to increased opportunities for dairy inputs in goods that are currently using hydrogenated vegetable oils. "Fat taxes" that target candy bars and potato chips may make some dairy-based snacks relatively more attractive if they were to be excluded from any such schemes. Attempts to remove soft drinks from elementary and secondary schools may result in increased demand for fluid milk among school-aged children.

The linkages between dietary choice and health outcomes are becoming an increasingly important part of public debate. This will influence food choices both through changes in individual behaviour and in the regulatory structures within which all players operate. Producers of all types of food products will continue to respond through both the development and reformulation of products, as well as through attempts to influence consumer perceptions. What any of this ultimately means for the types of dairy products consumed, the financial return to producers and sellers, or on public health remains to be seen.

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