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The 100 Mile Diet: Is it healthier and safer for the population?

The concept of the 100 Mile Diet, eating locally produced foods, is inspiring to many people. Some claim following a diet of foods raised and produced within closer proximity to their home provides a way to eat more nutritious and safer food while helping the environment and supporting the local economy. Strengthening our capacity to sustain our communities through local agriculture enables a sustainable system. This is at the core of what the 100 Mile Diet advocates.

What does the evidence tell us? While there is an abundance of information about the 100 Mile (160km or 100km) Diet in the popular media and on the internet, the difficulty is sorting the facts from the altruistic appeals. Dietitians need to critically appraise the benefits of locally produced foods.

This *Current Issue* focuses on the following aspects of the 100 Mile Diet:

- Are locally produced foods more nutritious?
- Are locally produced foods safer?
- How do locally produced foods compare in cost with foods imported from longer distances?

Resources are also provided for dietitians who may wish to explore other perspectives and methods for supporting the concept of the 100 Mile Diet or eating locally.

Are locally produced foods more nutritious?

Evidence shows that locally grown and produced vegetables and fruits can be more nutritious than those transported from longer distances. However, there is only limited evidence supporting a higher nutritional value for locally produced meats and grains.

The Center for Health and the Global Environment at Harvard Medical School identifies seven factors, in addition to transportation, that determine how nutritional quality of local conventionally grown and organic produce compares with that from longer distances (1).

- **Specific variety:**
Crop breeders have focused on developing varieties that produce higher yields. Many varieties of supermarket vegetables and fruits, such as tomatoes, have been chosen for higher yield, faster growth rate, ability to withstand long distance transport versus nutrient content (1). Some research indicates higher yielding varieties are lower in nutrients (2).
- **Growing method:**
Evidence indicates that production methods that improve the soil, for example cover crops and composted manure tend to yield crops with higher nutrient content (2).
- **Ripeness when harvested:**
Total vitamin C content of some produce such as red peppers, tomatoes, apricots, peaches and papayas has been shown to be higher when these crops are picked ripe from the plant (3). Generally, the more mature the product when harvested, the shorter the post harvest life. So in order to withstand mechanical harvesting and long distant transport, produce may be harvested as soon as possible after reaching physiological maturity (1).
- **Handling post harvest:**
Careless handling may chemically alter plant structure, often resulting in diminished nutrient quality. The maintenance of nutrient quality after harvest requires: immediate chilling to remove field heat, preventing bruising, plus the maintenance of specific temperatures and humidity during storage and distribution (1). Mechanical harvesting methods may also

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damage the crop resulting in accelerated loss of nutrients such as vitamin C (4). Bulk handling of apples after picking can contribute to crop injury (5). Delicate berries and tomatoes are easily affected or bruised (6).

- **Processing and packaging:**

Fresh cut produce such as bagged salads, baby carrots and cut fruit have seen extraordinary growth as consumers see them as convenience products. This kind of additional processing and packaging injures plant tissue. This can promote loss of nutrients and increase susceptibility to microbial spoilage (1).

- **Storage before it reaches the market:**

The most important factor in maintaining quality and minimizing postharvest losses including nutritional quality is keeping vegetables and fruits within their optimum ranges of temperature and relative humidity (4). The distribution chain rarely has the facilities to store each produce item at its optimum temperature and humidity to preserve quality including nutrients so compromises are made. These compromises can cause loss of shelf life and quality (7). According to Kader (4), in a review of the factors that affect the quality and nutritional value of fresh produce, the nutritional quality of produce is usually optimal immediately after harvest. The longer it is stored, the greater the loss of nutrients (4).

- **Transportation:**

Most produce transported over long distances is carefully packed, handled and temperature-controlled to minimize damage which reduces profit margins. However, there can be some nutrient loss during transportation from distant growing areas. Losses accelerate if temperature control is faulty during transportation or there is bruising due to high speed and bumpy roads (1). Thus foods grown locally are less likely to be subject to such loss of nutrients. But, locally transported produce can also be exposed to room temperature/heat for longer periods which hastens deterioration. When transportation and processing of vegetables and fruits are

minimized, freshness, flavour, and nutrient retention can be maximized (1).

In a literature review on Local Food Procurement Policies prepared for the Nova Scotia government, Macleod (8) cited evidence that suggests that certain vegetables and fruits produced locally have greater nutritional value than the same foods imported from longer distances. For example broccoli, green beans and kale are more susceptible to nutrient loss over long periods of storage. Therefore they are bad candidates for transporting long distances. Apples, carrots, grapefruit and oranges are more likely to preserve nutritive value over long storage periods (8). Therefore they are good candidates for transporting long distances. As the length of time between harvest and consumption increases, vitamins A and C are most likely to decline. Also somewhat susceptible to nutrient loss are riboflavin and vitamin E (9). An example of nutrient loss is a 2001 study of green beans that showed a 10 per cent loss of vitamin C when stored at 10° C for 24 hours. A loss of 24 per cent occurred when stored at room temperature for 24 hours (9). The literature review cites Jones' conclusion that the evidence is not complete, but findings do suggest that the lengthening of the food chain from the farm to the consumer can lead to a decrease in nutritional value.

Locally produced meat may also be more nutritious than that imported from longer distances because locally produced meat may be grass fed and advocates claim grass fed meat has nutritional benefits. Some preliminary studies have shown that grass fed beef has elevated levels of vitamins A and E, omega-3 fatty acids and conjugated linoleic acid (CLA). More research is required to determine whether these increased levels are high enough to provide positive health benefits (10).

One health advantage of the 100 Mile diet is that the consumer who would choose to use this diet would be more likely to prepare foods from scratch and less likely to use pre-packaged convenience foods. Homemade alternatives can be made lower in salt and unhealthy fats and higher in whole grains making the diet more wholesome.

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Are locally produced foods safer?

A web-based survey of 750 U.S. consumers conducted by the Leopold Center for Sustainable Agriculture at Iowa State University indicated that consumers are clearly concerned about where their food has been produced and think locally produced food is safer (11). Only 15 percent of respondents viewed a global food supply chain system as safe, compared to 74 percent a local system and 73 percent a regional system (11). There is a consumer perception supporting the idea that food produced locally is safer. Large grocery chains frequently require third-party food safety audits of the large producers who supply their products (12). While some small producers may have food safety documentation, others may have good food safety practices but haven't documented their compliance to food safety standards with third-party audits.

In Canada locally produced food may not be subject to federal standards, but are usually subject to provincial or local standards. For example, the Canadian Food Inspection Agency (CFIA) is responsible for verifying that meat and poultry products leaving federally-inspected establishments or being imported into Canada are safe and that they comply with Canadian regulations. Provincial meat inspection standards, vary from province to province, and in some cases municipal regulations, come into play (13). The patchwork of inspection systems within the provinces often discourages retailers and foodservice distributors from dealing with smaller local processors (14). The Canadian Food Inspection System (CFIS) is a federal-provincial-territorial initiative working to facilitate national harmonization, streamline the inspection process, and reduce regulatory pressures on industry. This initiative is managed by the Canadian Food Inspection System Implementation Group (CFSIG) which has membership representing the federal government (Health Canada and CFIA) as well as the governments of the provinces and territories" (15). Also some retailers are learning and willing to work with processors to ensure locally produced products are available.

Produce grown locally often on smaller farms may not be harvested by industrial machinery and may be handled by fewer people, reducing the risk of damage and bacterial contamination (1).

How do locally produced foods compare in cost with foods imported from longer distances?

Evidence on this issue is limited. Locally grown produce may be grown on a smaller scale. So except for the peak of the season, the prices at farmers' markets may be higher than supermarket equivalents that may have been imported from longer distances (16). Limited access to markets hinders the development of local food systems in Canada. Large retail establishments generally do not deal with small local farmers because they cannot ensure adequate volumes and quality control. Large retailers who want to supply their consumers with local food face huge challenges (17). In the UK Tesco, one of the world's most successful retailers, is limited by the complexity of efficiently coordinating the delivery and sale of hundreds of local items to differing arrangements in their hundreds of stores (14). Often it is cheaper for large retail stores to import food from other areas where labour costs are cheaper and government subsidies may be higher (17). These factors highlight other issues, related to choosing foods that are grown more locally, but are beyond the scope of this background. Examples of other issues are the North American Free Trade Agreement (NAFTA) which seeks to reduce barriers to imports and the decrease of land devoted to agriculture (17).

A public opinion poll of 1,000 residents of central Ontario conducted by Environics Research Group pre-recession in the summer of 2007 showed that 72 per cent of respondents were willing to pay more for local vegetables and fruits. Seventy per cent were willing to pay more for locally raised meat (17). Among 3174 shoppers interviewed in 70 farmers' markets in 10 provinces for the 2009 National Farmers' Market Impact Study, low price was cited as the least important factor when shopping at farmers' markets. This study was commissioned by Farmers Markets Canada, a new national organization dedicated to furthering the viability, growth and prosperity of Canadian farmers' markets (18).

Are there other factors to consider?

Although there are consumers willing to and who can afford to purchase locally produced food, they may find doing so difficult in many parts of Canada due to a limited choice of foods grown each season. Because of limited

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growing climates and agricultural access, Canada presently imports 80 % of vegetables and fruits (19). Some foods such as coffee, some spices and olive oil are not produced in Canada, or in the case of many grain products cannot be produced locally. Depending on the locale, with the limited choice of foods raised and produced within 100 miles, it would be difficult to follow the advice in Canada's Food Guide to "Enjoy a variety of foods from the four food groups" (20) unless locally produced food has been preserved in season.

Notwithstanding the available evidence with respect to food safety and nutritional quality of locally grown foods and factors affecting costs, other considerations are at play in the desire to choose a diet that is grown closer to home – factors such as sustainability, control over our own food supply, protection of the environment, economic growth locally and in the community.

There are environmental costs to be considered. The Sierra Club Canada suggests a reduction of "food miles" as a compelling reason for buying locally produced foods. They state the transportation of food from farm to fork is responsible for the release of tonnes of greenhouse gases each year (21). Desrochers and Shimizu disagree and indicate that "The largest greenhouse gas impact of food transportation can be attributed to individual families making many small volume shopping trips by car to transport food from retail stores to their homes" (19). They point out that moving produce in super-efficient diesel powered container ships, airplanes or trucks requires less energy per lamb chop or apple even if the distance is greater (22). Any realistic assessment of environmental costs must include total energy consumption and greenhouse gas emissions associated with all stages of food production. Canada's heavy reliance on greenhouse or cold storage technologies that extend the length of availability of produce such as potatoes and apples entail much greater energy consumption than open air production in more favourable growing regions (22).

Money spent on locally produced foods stays in the community longer, creating jobs and supporting farmers. It also preserves local crop varieties (23). In a 2006 study conducted by Michigan State University and the Michigan Land Use Institute, it was estimated that nearly 1,900 new jobs would be created in the state if Michigan farmers were to sell two to three times more fresh vegetables and

fruits into direct or wholesale markets such as farmers' markets (23).

Moreover going to the farm or the farmer's market to collect food reinforces the link to the food source. Some people don't realize that cucumbers are fruits and tomatoes come from a vine not a jar or can.

According to The National Farmers' Market Impact Study 2009 commissioned by Farmers Markets Canada with the help of Agriculture and Agri-Food Canada, the farmers' market industry produces \$1.03 billion in annual sales (18). Farmers' Markets were the number two source for groceries for 62 per cent of shoppers surveyed while shopping at farmers' markets. Fresh, in season products (77 percent) and locally produced products (68 percent) topped the list of what was wanted by those surveyed (18).

There is evidence indicating a growing consumer demand for farmers' markets, however there is limited scientific evidence that the 100 Mile Diet or the concept of eating locally produced foods is more nutritious, safer and cheaper than foods brought in from longer distances.

For decades dietitians have urged consumers to eat fresh vegetables and fruits as part of a healthful diet (24). Therefore, the concept of localized eating is not new to dietitians and they are increasingly recognizing the connection between food and the environment and how important it is to incorporate issues of sustainability into nutrition practice (25). Strategies that affect food availability, accessibility and quality are incorporated in a localized food system approach (25).

What steps can you take to support the concept of the 100 Mile Diet?

There are dietitians working to improve access to locally produced food and thus achieve food security among Canadians. See the Dietitians of Canada Public Policy Statement Community Food Security which is available from:

http://www.dietitians.ca/news/frm_resource/imageserver.asp?id=887&document_type=document&popup=true&contentid=8737 .

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Examples of food security initiatives involving dietitians who are working to increase access to vegetables and fruit (often local) for low income individuals and families include: Growing Food Security in Alberta, Food Security Saskatchewan and Foodlink-Waterloo Region.

For other dietitians it doesn't have to be an all or nothing proposition. Dietitians can support the concept of eating locally grown foods central to the 100 Mile Diet by making changes in food buying practices themselves and by suggesting others do the same.

- ✓ Cut back on out of season foods which are shipped long distances such as New Zealand strawberries in December, fresh asparagus from Peru in January and Florida corn-on-the-cob in February.
- ✓ Get to know local seasons and buy locally when economically feasible and local foods are available.
- ✓ Look for local suppliers. Even some large supermarket chains are adding local produce in season and meat. Shop at Farmer's Markets or at the farm gate. Visit U-pick farms. Many provincial governments publish directories of these.
- ✓ Plant a vegetable garden and fruit producing bushes and trees.
- ✓ In season preserve, can and freeze foods to use when fresh local foods are not available.
- ✓ Investigate a Community Supported Agriculture (CSA) partnership which is a mutual commitment between a farm and a community of supporters providing a direct link between the production and consumption of food. Supporters share in the costs of production and the harvest (21).
- ✓ Support restaurants which feature locally grown and produced foods.
- ✓ Influence institutions like hospitals and university food services to source their food from local suppliers as much as possible

For dietitians who may wish to explore other aspects of the 100 Mile Diet or ways to support the concept of eating locally, here are some recommended resources:

Farmers Markets Canada, related links to provincial associations. (accessed 2009 24 Sept) <http://www.farmersmarketscanada.ca/Links.cfm>

100 Mile Diet, Local eating for global change. (accessed 2009 24 Sept) <http://100milediet.org>

Community Supported Agriculture (CSA) partnership between a farm and a community of supporters providing a direct link between the production and consumption of food. Supporters share in the costs of production and the harvest Organic Agriculture Centre of Canada, Community Supported Agriculture, (CSA). (accessed 2009 24 Sept) http://www.organicagcentre.ca/Consumers/cons_cs_a.asp

Online Certificate course Sustainable Local Food for All Canadians. (accessed 2009 24 Sept) <http://www.sl.on.ca/parttime/OnlineCredit-SustFood.htm>

Ryerson University Certificate in Food Security. (accessed 2009 24 Sept) <http://www.ryerson.ca/foodsecurity/certificate/>

Dietitian Practice Points

- There is no conclusive evidence to support the claim that locally grown foods are more nutritious than foods produced and imported from longer distances. There is limited evidence that suggests certain locally produced vegetables and fruits have greater nutritional value than the same foods imported from greater distances. For example broccoli, green beans, kale, red peppers, tomatoes, apricots, peaches are more susceptible to nutrient loss when harvested and transported from longer distances. Locally produced meat may also be more nutritious than that imported from longer distances because locally produced meat may be grass fed and advocates claim grass fed meat has nutritional benefits. But more research is required to determine whether these increased levels are high enough to provide positive health benefits. There is also no

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conclusive evidence to support the claim that locally grown food is safer.

- Evidence on the affordability of the 100 Mile Diet is limited. Due to the smaller scale and often less efficient nature of local production, prices of locally produced food may be higher than their imported equivalents creating a challenge for those on limited incomes.
- Limited growing seasons and agricultural access in Canada make it difficult to follow the 100 Mile Diet while eating a variety of foods as suggested in Canada's Food Guide.

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