

# Functional Foods for Healthy Aging

## A Toolkit for Registered Dietitians

September 2012

*This toolkit provides guidance and materials to assist Registered Dietitians in communicating with older adults about functional foods for healthy aging.*



### Toolkit Overview

- Background information about functional foods.
- Background information about older adults and how functional foods would benefit their health.
- Results from a University of Guelph research study designed to explore functional food consumption in a sample of older adults.
- Educational resources to facilitate interaction with older adults about functional foods.



## Functional Foods for Healthy Aging: A Toolkit for Registered Dietitians

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### Request for Feedback

The research team that developed this resource would like to gather feedback from those using it to assess how it is being used and applied in practice. The information will help to inform future knowledge translation and transfer initiatives.

If you are interested in providing feedback, please follow the link below to complete a short (5 minute) anonymous survey:

[www.surveymonkey.com/s/ZGQQSBS](http://www.surveymonkey.com/s/ZGQQSBS)

If you have any questions regarding this survey, please contact:

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# Table of Contents

<b>Executive Summary</b> .....	1
<b>Section 1: Understanding Functional Foods</b> .....	2
1.1. Functional Foods Defined .....	3
1.2. Functional Food Product Guidance .....	11
1.3. Functional Food Product Examples .....	23
1.3a. Product Example: Cereal.....	23
1.3b. Product Example: Juice.....	27
1.3c. Product Example: Margarine .....	31
1.3d. Product Example: Milk.....	35
1.3e. Product Example: Yogurt .....	38
1.4. Functional Foods in the Canadian Marketplace .....	44
<b>Section 2: Relevance of Functional Foods for Healthy Aging</b> .....	46
2.1. The Role of Functional Foods in Canada’s Aging Demographic .....	47
2.2. The Role of the Registered Dietitian in Considering Functional Foods in Practice .....	52
<b>Section 3: Summary and Results of University of Guelph Research Study on Functional Foods and Older Adults</b> .....	55
3.1. Summary of Research Rationale and Methods .....	56
3.2. Summary of Study Results .....	57
<b>Acknowledgements</b> .....	60
<b>Appendices: Resource and Educational Materials</b> .....	61
A. University of Guelph Research Study Information Sheet: Functional Food DEFINITION .....	62
B. University of Guelph Research Study Information Sheet: Functional Food BIOACTIVES.....	69
C. University of Guelph Research Study Information Sheet: Functional Food FOOD FORMS..	72
D. University of Guelph Research Study Information Sheet: Functional Food CLAIMS .....	76
E. Functional Food Bioactives for Healthy Aging Resource Sheet: ANTIOXIDANTS .....	79
F. Functional Food Bioactives for Healthy Aging Resource Sheet: DIETARY FIBRE .....	80
G. Functional Food Bioactives for Healthy Aging Resource Sheet: OMEGA-3 FATTY ACIDS ....	81
H. Functional Food Bioactives for Healthy Aging Resource Sheet: PLANT STEROLS .....	82
I. Functional Food Bioactives for Healthy Aging Resource Sheet: PREBIOTICS .....	83
J. Functional Food Bioactives for Healthy Aging Resource Sheet: PROBIOTICS .....	84

# Executive Summary

Various organizations have proposed functional food definitions and although there is no universally accepted definition, common themes have emerged. Functional foods are commonly described as being in a food form, containing a bioactive that provides a health benefit beyond basic nutrition, and are intended to be consumed as part of the regular diet (Section 1).

Functional foods are regulated as a food under the Food and Drug Regulations. The information found on functional food packaging (including the Ingredient List, Nutrition Facts Table and various food- and health-related claims) are regulated both by Health Canada and the Canadian Food Inspection Agency (CFIA) (Section 1).

It has been documented that functional foods have experienced considerable economic and innovative expansion in the Canadian food industry (Section 1); however, research into consumer acceptability of functional foods has not kept pace. This is especially true for the older adult population in Canada, who have a lot to benefit from functional foods (Section 2).

Functional foods are an exciting potential strategy to help address the challenges associated with Canada's aging demographic. The proportion of Canadians  $\geq 65$  is predicted to reach nearly 25% by 2041 and the prevalence of age-related chronic diseases is expected to increase and consequently increase health care costs. Functional foods can help to address these challenges by reducing disease risk, promoting healthy aging and reducing economic burden on health care (Section 2).

Before potential benefits of functional foods can be realized for older adults, it is important to consider older adults' attitudes toward functional foods, including their food forms, bioactives and health benefits. This toolkit summarizes results from a University of Guelph research study that examined functional food consumption among a sample of older adults (Section 3).

Overall, this toolkit contains background information on functional foods and related results of a University of Guelph research study that can provide Registered Dietitians with information and guidance to facilitate discussion about functional foods with their older adult clients. This is of particular value since it has been documented that Registered Dietitians are best suited to communicate with consumers about functional food use and are also interested in gaining more knowledge.

# Section I: Understanding Functional Foods

I.1. Functional Foods Defined

I.2. Functional Food Product Guidance

I.3. Product Examples

- A. Cereal
- B. Juice
- C. Margarine
- D. Milk
- E. Yogurt

I.4. Functional Foods in the Canadian Marketplace

# I.I. Functional Foods Defined

## Functional Food Definitions

Although the term ‘functional food’ is commonly used, it is not a regulatory term and there is no universal common definition<sup>1</sup>. However, specific definitions have been put forward by many organizations and are listed in the following table.

Functional Food Definitions		
Organization	Year	Definition
Japanese Ministry of Health, Labour and Welfare - Foods for Specified Health Uses (FOSHU)	1991	“Foods for Specified Health Uses (FOSHU) refers to foods containing ingredient with functions for health and officially approved to claim its physiological effects on the human body. FOSHU is intended to be consumed for the maintenance/promotion of health or special health uses by people who wish to control health conditions.” <sup>2</sup>
Health Canada	1998	“A functional food is similar in appearance to, or may be, a conventional food, consumed as part of a usual diet, and is demonstrated to have physiological benefits and/or reduce risk of chronic disease beyond basic nutritional functions.” <sup>1</sup>
Food and Agricultural Organization (FAO) of the United Nations	2007	“Functional foods should be a food similar in appearance to a conventional food (beverage, food matrix), consumed as part of the usual diet which contains biologically active components with demonstrated physiological benefits and offers the potential of reducing the risk of chronic disease beyond basic nutritional functions.” <sup>3</sup>
Academy of Nutrition and Dietetics (formerly the American Dietetic Association)	2009	“All foods are functional at some physiological level, but it is the position of the Academy of Nutrition and Dietetics that functional foods that include whole foods and fortified, enriched, or enhanced foods have a potentially beneficial effect on health when consumed as part of a varied diet on a regular basis, at effective levels.” <sup>4</sup>
Dietitians of Canada (DC)	2010	“Functional foods are foods that offer unique health benefits that go beyond simply meeting basic nutrient needs. Many also help to reduce chronic disease risk. Functional foods contain...“bioactive compounds,” or naturally occurring chemicals that act on our bodies. It is these bioactive compounds that offer the health and wellness benefits that have been linked to functional foods.” <sup>5</sup>

### Dietetic

#### Practice Point:

Functional foods are not a regulated term in Canada. Functional foods describe foods that offer a health-related benefit beyond serving basic nutritional needs.

## Common Components of Functional Food Definitions

The functional food definitions proposed by various organizations have common themes:

- Functional foods are part of the usual diet.
  - o Health Canada, DC, the Academy of Nutrition and Dietetics, and FAO describe functional foods as being part of the usual or regular diet<sup>1,3,4,5</sup>. According to the Academy of Nutrition and Dietetics, functional foods must be consumed on a regular basis in order to be effective, and that consuming a functional food only once is unlikely to provide the associated health benefit<sup>4</sup>.
- Functional foods are in food forms.
  - o Each definition specifies that functional foods exist in food forms. Health Canada and FAO provide an easy rule of thumb by stating that functional foods are ‘similar in appearance’ to conventional foods<sup>1,3</sup>.
- Functional foods contain an ingredient or bioactive which provides a health benefit.
  - o Health Canada, DC and FAO specify that functional foods, and the bioactives they contain, provide health benefits beyond basic nutritional needs<sup>1,3,4</sup>. This is reflective of the evolution in nutrition research over the past few decades<sup>4,6</sup>. The focus has switched from identifying essential nutrients to treat deficiency diseases to investigating the potential of bioactives to reduce chronic disease risk, manage disease symptoms and improve overall well-being<sup>4,6</sup>.

### Dietetic

#### Practice Point:

Functional foods are defined in various ways by different organizations but often have the common criteria of being part of the usual diet, being in a food form and containing a bioactive that provides a health benefit.

## Food Forms as They Relate to Functional Foods

The **food form** refers to the matrix or vehicle in which the functional food exists. As described by Health Canada, a food form is “a format and serving size consistent with food use”<sup>7</sup>, as opposed to a pill, tablet or capsule.

- There are many food forms in which functional foods can exist, some of which include beverages, yogurt, margarine, milk, juice and cereal.
- The form or matrix in which the functional food exists is relevant to consider from multiple perspectives, one of which includes consumer acceptance. Research indicates that the food form can influence consumer acceptance of functional foods.
  - o Dean et al. (2007) investigated Europeans’ perception of functional foods, where the bioactive was incorporated into different grain products. Consumers viewed functional foods in “staple” food forms (e.g. bread) more favourably than functional foods in “fun” food forms (e.g. cookies)<sup>8</sup>.
  - o Van Kleef et al. (2005) surveyed Dutch consumers and found functional foods were viewed more positively if they were in a food form perceived as healthy (e.g. yogurt, margarine, brown bread)<sup>9</sup>.

**Dietetic****Practice Point:**

Functional foods exist in many different food forms. Research indicates that food form can influence consumer acceptance. Therefore, this is an important concept to consider when interacting with older adults about functional foods.

- o Although not specific to functional foods, Balasubramanion and Cole (2002) found consumers paid more attention to the nutritional information of foods they perceived as healthy compared to foods they perceived as unhealthy<sup>10</sup>.
- o Bech-Larsen and Grunert (2003) found that consumers perceive a greater benefit in adding bioactives to food forms perceived as unhealthy, as opposed to adding bioactives to food forms perceived as already healthy<sup>11</sup>.
- o Ares and Gambaro (2007)<sup>12</sup> found that the combination of the food form and constituent bioactive can influence consumers' perceptions of healthiness of and willingness to try functional foods (e.g. yogurt with calcium was rated more positively than yogurt with antioxidants). These results were confirmed by Ares et al. (2008)<sup>13</sup>, suggesting that both the food form and bioactive contribute toward consumer acceptance.
- o Krutulyte et al. (2008) focused specifically on omega-3 fatty acids in their interview of Dutch participants and found that addition of omega-3 fatty acids to fish balls, tuna salad and rye bread was perceived to be more appropriate compared to yogurt or sports nutrition bars<sup>14</sup>.
- These studies provide evidence that the functional food form can influence consumer acceptance. Perceptions of food forms as 'healthy' or 'unhealthy' is clearly a factor; however, there is also the consideration of the bioactive, the health benefit of interest and the interactions among them that will collectively influence consumer acceptance of the functional food.
- In addition to influence on consumer perception, it is also important to consider the food form in relation to its influence on the bioavailability and effectiveness of the constituent bioactive<sup>3</sup>.
  - o FAO documents that the effect of the food form on the bioactive it contains must be considered during food processing, storage, preparation and consumption<sup>3</sup>. If the food form can maintain the activity of the bioactive until the time of consumption and deliver the bioactive to the target area after consumption, it is an appropriate food form for the functional food<sup>3</sup>.
    - ◆ An example of this can be found in a meta-analysis by AbuMweis et al. (2008) that focused on the effectiveness of plant sterols in reducing LDL cholesterol and found that they are most effective when incorporated into foods containing fats<sup>15</sup>. Specifically, plant sterols incorporated into fat spreads, mayonnaise, salad dressings, milk and yogurt more effectively lowered LDL cholesterol compared to plant sterols incorporated into croissants, muffins, orange juice, non-fat beverages, cereal bars and chocolate<sup>15</sup>.



Overall, food form is a major concept of functional foods and warrants attention when considering the intended health effect (with respect to behaviour of the bioactive) and consumer acceptance (with respect to perception of the food form and consumer interest in the intended health effect).

### Bioactives as they Relate to Functional Foods

**Bioactives** are constituents that exist naturally in or are added to the food matrix of functional foods. Bioactives are described by Agriculture and Agri-Food Canada as “naturally occurring chemical compounds contained in, or derived from, a plant, animal or marine source, that exert the desired health/wellness benefit”<sup>16</sup>.

- There are many types of functional food bioactives, some of which include antioxidants, dietary fibre, omega-3 fatty acids, plant sterols, prebiotics and probiotics.
- Health Canada acknowledges that essential nutrients (e.g. vitamins and minerals) and “non-nutrients” (e.g. plant sterols) can have an effect on disease risk<sup>1</sup>, and therefore both nutrients and “non-nutrients” can be considered bioactives<sup>1,7</sup>.
- Consumer knowledge of bioactives and their relevance to health is important to consider when discussing functional foods. Research indicates that there is consumer confusion about the health benefits that specific bioactives can provide. This is best exemplified in the University of Guelph research study reported (see Appendices E - J) in which older adults were asked to indicate the health areas they address or would consider addressing using functional foods containing common bioactives (antioxidants, dietary fibre, omega-3 fatty acids, plant sterols, prebiotics and probiotics).

Bioactives are a crucial component of functional foods as they are responsible for the associated health benefits. It is important to consider that consumer acceptance of functional foods may vary depending on the type of bioactive, and that the efficacy of bioactives may be dependent on the food form.

### Categorization of Functional Foods

Although there are many ways in which functional foods can be categorized, it is worthwhile to consider how Agriculture and Agri-Food Canada has divided functional foods into three categories based on how the bioactives are incorporated into, or found in, food forms<sup>16</sup>. The following table defines each category and provides examples.

#### Dietetic

##### Practice Point:

Bioactives can be described as the component of the functional food that is specifically linked to the proposed health benefits.

### Functional Food Categories

Category	Definition	Examples
<b>Basic foods</b>	<ul style="list-style-type: none"> <li>The food or food product naturally contains the bioactive.</li> </ul>	<ul style="list-style-type: none"> <li>Carrots naturally contain beta-carotene.</li> <li>Oat bran cereals naturally contain beta-glucan.</li> </ul>
<b>Processed foods with added bioactives</b>	<ul style="list-style-type: none"> <li>The bioactive does not exist naturally in the food and is added during processing.</li> </ul>	<ul style="list-style-type: none"> <li>Orange juice with added calcium.</li> <li>Milk with added omega-3 fatty acids.</li> </ul>
<b>Foods enhanced to have more of a bioactive</b>	<ul style="list-style-type: none"> <li>The bioactive exists naturally in the food but the level of the bioactive is modified or concentrated (e.g. by traditional breeding, special livestock feeding or genetic engineering).</li> </ul>	<ul style="list-style-type: none"> <li>Yogurt with increased levels of probiotics.</li> <li>Tomatoes with increased levels of lycopene.</li> <li>Eggs with increased levels of omega-3 fatty acids.</li> </ul>

Table adapted from Agriculture and Agri-Food Canada (2009).

#### Dietetic

##### Practice Point:

Functional foods can be defined and categorized differently. Therefore, conventional foods may not always be categorized as a functional food.

- As mentioned above, functional foods are defined in different ways, thus resulting in different categorizations. For example, conventional (or basic) foods (e.g. carrots) are not always categorized as a functional food. The International Longevity Centre in the United Kingdom defines functional foods as conventional foods that have been modified, and therefore excludes conventional fruits and vegetables<sup>6</sup>. For the purpose of the University of Guelph research study on functional foods and older adults reported in Section 3, functional foods were defined as having increased health promoting or disease preventing properties and having undergone processing or manipulation, and therefore excluded conventional foods.
- Consumer attitudes towards different categories of functional foods are important to consider since research has demonstrated that acceptance may vary depending on how functional foods are produced.
  - Ares et al. (2007) investigated Uruguayan consumers' attitudes towards different types of functional foods<sup>12</sup>. Functional foods containing bioactives that were considered inherent in the product (e.g. calcium in milk, antioxidants in honey) were rated more positively in terms of healthiness and willingness to try compared to, for example, calcium in honey and antioxidants in yogurt<sup>12</sup>.

**Dietetic****Practice Point:**

Consumer attitudes are a key consideration in whether a functional food will be accepted and therefore consumed by various sub-groups, including older adults.

**Dietetic****Practice Point:**

Functional foods commonly exist in food forms and it is therefore important to distinguish them from natural health products (NHPs) which commonly exist in concentrated or extracted forms.

- o Dean et al. (2007) found that Europeans favoured enrichment and traditional cross-breeding as processing methods to create functional food grain products while genetic modification was viewed least favourably<sup>8</sup>.
- o In the 2007 Consumers' Attitudes toward Functional Foods/Foods for Health report commissioned by the International Food Information Council, two thirds of Americans listed fruits and vegetables as the top functional foods of choice<sup>17</sup>.

### Functional Foods in Relation to Natural Health Products (NHPs)

It can sometimes be challenging to distinguish functional foods from natural health products (NHPs), as both provide health benefits and can be in food forms. NHPs are defined by Health Canada as "naturally occurring substances that are used to restore or maintain good health"<sup>18</sup>. NHPs are available in a variety of forms, including tablets, capsules, solutions, creams, beverages and bars, and are often marketed to prevent or treat an illness or condition, or reduce health risks<sup>18</sup>.

- Health Canada has developed specific guidelines to categorize whether a product will be regulated as a food under the *Food and Drug Regulations* or as a NHP under the *Natural Health Products Regulations*.
  - o Health Canada considers the product composition, product representation, product format, public perception and history of use to determine the classification of that product<sup>7</sup>. The full Health Canada document explaining the classification process (Classification of Products at the Food-Natural Health Product Interface: Products in Food Formats) can be accessed at: <http://www.hc-sc.gc.ca/dhp-mps/prodnatur/legislation/docs/food-nhp-aliments-psn-guide-eng.php><sup>7</sup>.
- Once Health Canada has determined a product to be a NHP, it is given an eight digit product license number, either a Natural Product Number (NPN) or a Homeopathic Medicine Number (DIN-HM)<sup>18</sup>. Functional foods do not have product license numbers as they are considered foods and regulated as such.

### Closing Notes

There is no universally accepted definition for functional foods, although various organizations have proposed definitions, and common themes have emerged. Functional foods are described as being in a food form, containing a bioactive that provides a health benefit beyond basic nutrition, and are intended to be consumed as part of the regular diet. Functional foods can be categorized in various ways and may or may not include conventional foods.

**Dietetic****Practice Point:**

Functional foods may be defined in various ways but have common themes of being part of the usual diet, being in a food form and containing a bioactive or ingredient that is linked to a health benefit. There is a lot of potential for functional foods to contribute toward improved health, particularly for older adults.

It is important to consider consumers' attitudes toward food forms and their perceived healthiness, as well as bioactives and their health benefits. It is also important to consider how processing methods affect consumer acceptance of functional foods.

Functional foods differ from NHPs in that they do not have a product license number and are regulated as a food under the *Food and Drug Regulations*. The following section will elaborate on Canadian regulations governing the information found on functional food packaging.

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## I.2. Functional Food Product Guidance

The food label is a major source of dietary guidance for Canadians<sup>1,2</sup>. Federal responsibility for Canadian food labelling is shared between Health Canada and the Canadian Food Inspection Agency (CFIA)<sup>3</sup>. Health Canada, under the *Food and Drugs Act*, is responsible for the establishment of policies and standards relating to the health, safety, and nutritional quality of food sold in Canada, while CFIA is responsible for enforcement of the *Food and Drugs Act* and all associated regulations (e.g. *Food and Drug Regulations*)<sup>3</sup>.

Despite the wealth of regulated information available on food labels, studies have reported that some of the information can be challenging for consumers to understand<sup>2</sup>. To address this challenge, educational interventions have proven to be effective<sup>2</sup> and Registered Dietitians are frequently cited as the most trusted source for nutritional information<sup>1</sup>.

To help Registered Dietitians inform and guide older adults on how to navigate functional food packaging, the following table describes the mandatory and optional information that can be found on functional food labels, how the information is regulated, and examples of how the information can be utilized.

## Functional Food Guidance Table

*What information will/may appear on the label to inform consumers about functional foods?*

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>List of Ingredients</b>	<ul style="list-style-type: none"> <li>• Ingredients and their components (i.e. ingredients of ingredients) must be listed in descending order of proportion by weight, as determined before they are combined to make the food<sup>3</sup>.</li> <li>• Exceptions include spices, seasonings and herbs (except salt), natural and artificial flavours, flavour enhancers, food additives, and vitamin and mineral nutrients and their derivatives or salts, which may be shown at the end of the List of Ingredients in any order<sup>3</sup>.</li> <li>• Foods that do not require a List of Ingredients include<sup>3</sup>:               <ul style="list-style-type: none"> <li>○ products packed from bulk at retail;</li> <li>○ individual portions of food served with meals or snacks (e.g. coffee creamers, ketchup);</li> <li>○ individual servings of food prepared by commissaries and sold in mobile canteens or vending machines;</li> <li>○ meats and poultry prepared on retail premises;</li> <li>○ alcoholic beverages and vinegars.</li> </ul> </li> <li>• Effective August 4, 2012, Enhanced Allergen Labelling regulations require food allergens, gluten sources (e.g. barley, oats, rye, triticale or wheat), and sulphites to be stated in or at the end of the List of Ingredients (e.g. if a prepackaged food contains the ingredient "spices", that food will be required to list any allergens, gluten sources, or sulphites present in the spices). The list of priority food allergens in Canada includes: peanuts, eggs, milk, tree nuts, wheat, soy, sesame seeds, seafood (fish, crustaceans and shellfish), sulphites, and mustard<sup>6</sup>.</li> </ul>
	<p><b>Dietetic Practice Points:</b></p> <ul style="list-style-type: none"> <li>• The List of Ingredients may be found anywhere on the food label; however, most often close to Nutrition Facts Table<sup>4</sup>.</li> <li>• The List of Ingredients can help consumers:               <ul style="list-style-type: none"> <li>○ find out if a food product has a specific ingredient;</li> <li>○ avoid certain ingredients in case of a food allergy or intolerance.</li> </ul> </li> </ul>

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Nutrition Facts Table</b>	<ul style="list-style-type: none"> <li>• Provides information on energy (kilocalories) and 13 nutrients, based on serving of stated size<sup>3</sup>.</li> <li>• Nutrients that are required to be listed include: fat, saturated fatty acids, <i>trans</i> fatty acids, cholesterol, sodium, carbohydrates, dietary fibre, sugar, protein, vitamin A, vitamin C, calcium and iron<sup>3</sup>.</li> <li>• Additional nutrients may also be listed, either voluntarily or made mandatory when triggered by a Nutrient Content Claim (e.g. it is mandatory to provide information on omega-3 fatty acids in the Nutrition Facts Table if mentioned in a claim)<sup>7</sup>.</li> <li>• Percent (%) Daily Value (DV) is based on a 2,000 kilocalorie diet and is<sup>3</sup>: <ul style="list-style-type: none"> <li>◦ mandatory for fat, the sum of saturated fatty acids and <i>trans</i> fatty acids, sodium and carbohydrate;</li> <li>◦ optional for cholesterol;</li> <li>◦ not listed for sugar and protein.</li> </ul> </li> <li>• Almost all pre-packaged foods have a Nutrition Facts Table. Exceptions include<sup>5,7</sup>: <ul style="list-style-type: none"> <li>◦ fresh fruit and vegetables;</li> <li>◦ raw meat (except ground meat, which must be labelled), poultry, fish and seafood;</li> <li>◦ foods prepared or processed in-store (e.g. bakery items, sausage, salads);</li> <li>◦ foods with very few nutrients (e.g. coffee beans, tea leaves, spices);</li> <li>◦ alcoholic beverages.</li> </ul> </li> <li>• The nutrient information presented in the Nutrition Facts Table is based on a specific amount of the food (edible portion). Ranges for acceptable serving sizes for 153 different food categories is provided in Chapter 6 of the CFIA's <i>Guide to Food Labelling and Advertising</i>. A range is provided to allow manufacturers flexibility when determining serving sizes for products of varying density and size (e.g. cookies, bread slices). Serving sizes must remain consistent whenever mentioned in multiple locations on a food label, and the units for the metric serving size must be consistent with the units used to declare the net quantity of the food on the label. Serving sizes are based on Reference Amounts as laid out in Schedule M of the <i>Food and Drug Regulations</i>. These Reference Amounts serve as the basis of compositional criteria for Nutrient Content Claims and Health Claims<sup>3</sup>.</li> </ul>

**Dietetic Practice Points:**

- The Nutrition Facts Table includes information that will enable consumers to<sup>5</sup>:
  - compare similar foods to determine which one may be a better choice;
  - choose foods that have more of a desired, or less of an undesired, nutrient;
  - select foods for special diets (e.g. some individuals who manage their diabetes may want to use the Nutrition Facts Table to keep track of the amount of carbohydrates they are consuming).
- The % DV can be used in accordance to Health Canada's recommendation of 5% DV or less is a little, and 15% DV or more is a lot<sup>5</sup>.
- It is helpful to note the specified serving size when considering energy and nutrient density in relation to portion size, as serving sizes can vary between similar products.



Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Nutrient Content Claims</b>	<ul style="list-style-type: none"> <li>• Directly, or indirectly, describes the content level of a nutrient in a food or a group of foods<sup>3</sup>.</li> <li>• Compositional criteria for Nutrient Content Claims are based on regulated standardized Reference Amounts as well as the serving of stated size for the particular food. These Reference Amounts are based on average quantities of food consumed at a single eating occasion. This provides a uniform basis for claims for any specific category of food<sup>3</sup>.</li> <li>• In order for vitamins and minerals to be eligible for a Nutrient Content Claim, the food must contain a minimum of 5% DV per serving of stated size for the vitamin or mineral that is the subject of the claim<sup>3</sup>.</li> <li>• Only the wording permitted in the regulations may be used<sup>3</sup>.</li> <li>• Specific nutrient compositional criteria govern statements that identify the content amount of a nutrient in a food (e.g. “source”, “high or good source” and “very high or excellent source”), as well as comparative Nutrient Content Claims (e.g. “free”, “low”, “reduced” and “light”)<sup>5,7</sup>.</li> <li>• Examples include: <ul style="list-style-type: none"> <li>○ Very high source of fibre;</li> <li>○ Excellent source of vitamin C;</li> <li>○ Free of <i>trans</i> fatty acids;</li> <li>○ Low sodium.</li> </ul> </li> <li>• Includes quantitative declarations of nutrients made outside the Nutrition Facts Table (e.g. “4 Calories per 250 ml serving” or “316 mg of calcium per bar (40 g)”). These statements must be made on the basis of a serving of stated size in the units specified within Chapter 7 of the CFIA’s <i>Guide to Food Labelling and Advertising</i><sup>3</sup>.</li> <li>• Includes comparative claims, which are claims that compare the nutritional properties of two or more foods (e.g. “3 grams more fibre than 1 slice of brand X bread,” or “3x more calcium than most regular yogurts”)<sup>3</sup>.</li> </ul>
	<p><b>Dietetic Practice Point:</b></p> <ul style="list-style-type: none"> <li>• Nutrient Content Claims provide consumers with accurate, easy to understand, statements that allow them to select foods based on more positive or less negative nutritional attributes.</li> </ul>

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Additional Food-Related Claims</b>	<ul style="list-style-type: none"> <li>• Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product<sup>3,7</sup>. These include:               <ul style="list-style-type: none"> <li>◦ Negative claims about the absence or non-addition of a particular ingredient (e.g. “no preservatives added”);</li> <li>◦ Statements involving “Fresh”, “Homemade”, “Natural” or “Whole grain”;</li> <li>◦ Organic products;</li> <li>◦ Product of Canada, Made in Canada statements.</li> </ul> </li> <li>• Varying regulatory requirements apply; however, all must be truthful and not misleading.</li> <li>• Chapter 4 of the CFIA’s <i>Guide to Food Labelling and Advertising</i> provides expanded guidance on the use of these additional claims.</li> </ul> <div data-bbox="191 708 1997 902" style="border: 1px solid black; background-color: #e6e6fa; padding: 10px; margin-top: 10px;"> <p><b>Dietetic Practice Points:</b></p> <ul style="list-style-type: none"> <li>• Additional food-related claims:               <ul style="list-style-type: none"> <li>◦ can provide quantitative and qualitative dietary guidance for consumers;</li> <li>◦ may require help from a Registered Dietitian for proper interpretation by consumers.</li> </ul> </li> </ul> </div>
<b>Health Claims</b>	<ul style="list-style-type: none"> <li>• A Health Claim is any representation in labelling or advertising that states, suggests, or implies that a relationship exists between consumption of a food, or an ingredient in the food, and health. Health Claims may be stated explicitly with words, or implied through symbols, graphics, logos, or other means such as a name, trade mark or seal of approval.</li> <li>• While the term “Health Claim” is not formally defined in Canadian food regulations, Health Claims have been classified into the following categories<sup>3</sup>:               <ul style="list-style-type: none"> <li>• Disease Risk Reduction Claims</li> <li>• Therapeutic Claims</li> <li>• Function Claims including:                   <ul style="list-style-type: none"> <li>◦ Nutrient Function Claims</li> <li>◦ Probiotic Claims</li> </ul> </li> <li>• General Health Claims including:                   <ul style="list-style-type: none"> <li>◦ Front-of-Package Labelling</li> </ul> </li> </ul> </li> </ul>

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Disease Risk Reduction Claims</b>	<ul style="list-style-type: none"> <li>• Statements that link a food or a constituent of a food to reducing the risk of developing a diet-related disease or condition (e.g. osteoporosis, cancer, hypertension) in the context of the total diet<sup>3</sup>.</li> <li>• Formerly known as “Diet-Related Health Claims.”</li> <li>• Section 3 of the <i>Food and Drugs Act</i> makes it an offence to advertise or sell a food to the general public as a treatment, preventative or cure for any of the diseases referred to in Schedule A. However, since 2002, amendments to the <i>Food and Drug Regulations</i> have allowed for specific Disease Risk Reduction Claims to be made on foods.</li> <li>• Health Canada has a regulatory framework to consider the approval of Disease Risk Reduction Claims and all new proposed Disease Risk Reduction Claims must be submitted to Health Canada for review<sup>3</sup>. Claims are approved based on sound scientific evidence that has established the proposed relationship between the specific constituent(s) of a healthy diet and modulation of risk of a specific disease.</li> <li>• There are currently 5 permitted Disease Risk Reduction Claims in Canada: <ul style="list-style-type: none"> <li>◦ A diet low in sodium and high in potassium, and reduced risk of hypertension;</li> <li>◦ A diet adequate in calcium and vitamin D, and reduced risk of osteoporosis;</li> <li>◦ A diet low in saturated fat and <i>trans</i> fat, and reduced risk of heart disease;</li> <li>◦ A diet rich in vegetables and fruits, and reduced risk of some types of cancer; and</li> <li>◦ Maximal fermentable carbohydrates in gum, hard candy or breath-freshening products, and reduced risk of dental caries.</li> </ul> </li> <li>• Foods that carry a Disease Risk Reduction Claim must comply with the following Health Canada regulations<sup>3,5</sup>: <ul style="list-style-type: none"> <li>◦ The food that carries the claim must contribute to a dietary pattern associated with the claimed benefit;</li> <li>◦ Specific nutrient compositional criteria associated with the claim must be met;</li> <li>◦ Wording of the claim must be consistent and not misleading;</li> <li>◦ Only the wording approved by Health Canada can be used, and therefore cannot be modified, and no intervening information, graphic sign or symbol may come between parts of the claim.</li> </ul> </li> </ul>
	<p><b>Dietetic Practice Points:</b></p> <ul style="list-style-type: none"> <li>• Disease Risk Reduction Claims can: <ul style="list-style-type: none"> <li>◦ provide a level of guidance for consumers that goes beyond the content and function of a nutrient in a food;</li> <li>◦ inform consumers about how specific constituents in foods may reduce their risk of certain diseases.</li> </ul> </li> </ul>

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Therapeutic Claims</b>	<ul style="list-style-type: none"> <li>• Claims about the treatment or mitigation of a health-related disease or condition, or restoration, correction or modification of body function<sup>3</sup>.</li> <li>• Health Canada has a regulatory framework to consider the approval of Therapeutic Claims that follows a similar process as Disease Risk Reduction Claims.</li> <li>• Permitted Therapeutic Claims in Canada currently include: <ul style="list-style-type: none"> <li>◦ Plant sterols in foods and blood cholesterol lowering;</li> <li>◦ Oat products and blood cholesterol lowering;</li> <li>◦ Psyllium and blood cholesterol lowering;</li> <li>◦ Replacement of saturated fat with mono- and polyunsaturated fat and blood cholesterol lowering; and</li> <li>◦ Barley products and blood cholesterol lowering.</li> </ul> </li> <li>• The above claims were submitted for approval to Health Canada’s Food Directorate between 2007 and 2009 and approved between May 2010 and July 2012 as the first Therapeutic Claims allowed to be made on foods in Canada. Prior to this, any product claiming to lower blood cholesterol was considered as a drug. Upon review of the submitted applications, amendments have since been made to the <i>Food and Drug Regulations</i> to allow certain foods to make these claims.</li> <li>• Health Canada has established specific nutritional criteria the food must meet in order to make the claims, as well as minimum and maximum amounts of the bioactive per serving and specific wording that must be used in the claim<sup>9-13</sup>.</li> <li>• The five permitted Therapeutic Claims also have prescribed wording that can be used to associate the lowering of blood cholesterol to the reduction of heart disease risk. As such, these claims can also be considered Disease Risk Reduction claims.</li> <li>• Foods that carry a Therapeutic Claim must comply with the following Health Canada regulations<sup>3,5,10</sup>: <ul style="list-style-type: none"> <li>◦ The food that carries the claim must contribute to a dietary pattern associated with the claimed benefit;</li> <li>◦ Specific nutrient compositional criteria associated with the claim must be met;</li> <li>◦ Wording of the claim must be consistent and not misleading;</li> <li>◦ Only the wording approved by Health Canada can be used, and therefore cannot be modified, and no intervening information, graphic sign or symbol may come between parts of the claim.</li> </ul> </li> </ul>










**Dietetic Practice Point:**

- Therapeutic Claims are specific to treatment or mitigation of a specific health area and therefore warrant particular individualized attention for clients of Registered Dietitians.

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Function Claims</b>	<ul style="list-style-type: none"> <li>• Claims about the specific beneficial effects that the consumption of a food or a constituent of a food (i.e. nutrient or other component) has on normal functions or biological activities of the body. Relates to a positive contribution to health and to the maintenance of a physiological function or to physical or mental performance<sup>3</sup>.</li> <li>• Based on the role that the food or the food constituent plays when consumed at levels consistent with normal dietary patterns<sup>3</sup>.</li> <li>• While not required by the <i>Food and Drug Regulations</i>, it is strongly recommended that when a Function Claim is made a quantitative declaration of the amount of the food constituent (per serving of stated size) appear on the label<sup>3</sup>.</li> <li>• CFIA provides a summary table (Table 8-2) of acceptable Function Claims in their <i>Guide to Food Labelling and Advertising</i><sup>3</sup>, which include: <ul style="list-style-type: none"> <li>◦ Coarse wheat bran and laxation or regularity;</li> <li>◦ Green tea and antioxidant capacity in the blood;</li> <li>◦ Psyllium and laxation or regularity.</li> </ul> </li> <li>• For new Function Claims, Health Canada recommends, but does not require pre-market approval<sup>7</sup>. However, for a new Function Claim to be acceptable<sup>3</sup>: <ul style="list-style-type: none"> <li>◦ Standards of evidence, which are applicable to the target group for the claim, need to be met;</li> <li>◦ It should be feasible for the target population to consume the amount of food required to achieve the effect as part of a healthy, balanced diet;</li> <li>◦ The physiological effect must be clearly stated;</li> <li>◦ It should not give the impression that the food is “healthier” than, or “nutritionally superior” to, other similar foods not bearing the claims.</li> </ul> </li> <li>• The term “Function Claim” is used in line with terminology adopted in the <i>Codex Guidelines for Use of Nutrition and Health Claims</i>, and is similar to “Structure-Function” claims used in the United States.</li> </ul>
	<p><b>Dietetic Practice Points:</b></p> <ul style="list-style-type: none"> <li>• Function Claims provide consumers with health-related information about foods or food constituents.</li> <li>• Registered Dietitians can assist consumers in making deductions regarding the relevance of Function Claims to a particular area of health and disease.</li> </ul>

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Nutrient Function Claims</b>	<ul style="list-style-type: none"> <li>• Categorized by Health Canada as a subset of Function Claims, and formerly known as “Biological Role Claims”<sup>3</sup>.</li> <li>• Describes the well established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development<sup>3</sup>.</li> <li>• As a general rule, whenever a Nutrient Function Claim is made, the amount of the nutrient present in a serving of the food must be provided.</li> <li>• CFIA provides a summary table (Table 8-3) of examples of acceptable Nutrient Function Claims in their <i>Guide to Food Labelling and Advertising</i><sup>3</sup>, which include: <ul style="list-style-type: none"> <li>○ Protein helps build and repair body tissues;</li> <li>○ Vitamin A aids in the development and maintenance of night vision;</li> <li>○ Vitamin E is a dietary antioxidant;</li> <li>○ Calcium aids in the formation and maintenance of bones and teeth;</li> <li>○ Iron is a factor in red blood cell formation.</li> </ul> </li> <li>• There are also two general claims that can be made for any nutrient when conditions for their use are followed (e.g. Calcium is a factor in the maintenance of good health).</li> <li>• For new Nutrient Function Claims, Health Canada recommends, but does not require pre-market approval<sup>7</sup>. However, for a new Nutrient Function Claim to be acceptable<sup>3</sup>: <ul style="list-style-type: none"> <li>○ The nutrient must have an established Recommended Dietary Allowance (RDA), Adequate Intake (AI), or Acceptable Macronutrient Distribution Range (AMDR);</li> <li>○ The function must reflect consensus among the broad scientific community.</li> </ul> </li> </ul>
	<p><b>Dietetic Practice Points:</b></p> <ul style="list-style-type: none"> <li>• Nutrient Function Claims provide consumers with health-related information that goes beyond nutrient content but does not specifically mention a disease.</li> <li>• Registered Dietitians can assist consumers in making deductions regarding the relevance of a Nutrient Function Claim to a particular area of health and disease.</li> </ul>

Guidance Tool	Regulatory Notes and Dietetic Practice Points
<b>Probiotic Claims</b>	<ul style="list-style-type: none"> <li>• Categorized by Health Canada as a subset of Function Claims.</li> <li>• Claims about the benefits of probiotic microorganisms<sup>7</sup>.</li> <li>• Two types of Probiotic Claims can be made on food in Canada<sup>3</sup>:               <ul style="list-style-type: none"> <li>◦ <b>Strain-specific claims:</b> Claims about the health benefits or effects of specific strains of probiotics. At the present time, no strain-specific claims have been accepted by Health Canada;</li> <li>◦ <b>Non-strain-specific claims:</b> Statements about the nature of probiotics. There is a closed list of non-strain-specific probiotic claims that are acceptable without the need for the manufacturer to conduct a detailed review of the scientific basis for the claim (e.g. Provides live microorganisms that contribute to healthy gut flora).</li> </ul> </li> </ul> <div data-bbox="191 737 1997 886" style="border: 1px solid black; background-color: #e6e6fa; padding: 5px; margin-top: 10px;"> <p><b>Dietetic Practice Point:</b></p> <ul style="list-style-type: none"> <li>• The uniqueness of Probiotic Claims provides an opportunity for Registered Dietitians to help consumers understand their relevance and therefore maximize their value.</li> </ul> </div>
<b>General Health Claims</b>	<ul style="list-style-type: none"> <li>• Broad claims that provide dietary guidance<sup>3</sup>.</li> <li>• Do not refer to a health effect, disease, or health condition<sup>3</sup>.</li> <li>• Can relate to educational material, third-party endorsements and logos, heart symbols, and guidance for healthy eating<sup>3</sup>.</li> <li>• Pre-market approval is not required, and no specific regulations govern the use of General Health Claims; however, they must not be false, misleading or deceptive<sup>7,8</sup>.</li> <li>• Includes implied health claims, as well as claims made through association (e.g. website addresses on food packaging)<sup>8</sup>.</li> </ul> <div data-bbox="191 1292 1997 1451" style="border: 1px solid black; background-color: #e6e6fa; padding: 5px; margin-top: 10px;"> <p><b>Dietetic Practice Points:</b></p> <ul style="list-style-type: none"> <li>• General Health Claims are broad, depend on context and therefore are often open to interpretation by consumers.</li> <li>• Registered Dietitians can provide guidance to consumers to maximize use of General Health Claims.</li> </ul> </div>

Guidance Tool	Regulatory Notes and Dietetic Practice Points				
<b>Front-of-Package (FOP) Labelling</b>	<ul style="list-style-type: none"> <li>• Categorized by Health Canada as a subset of General Health Claims.</li> <li>• Promote some facet of the nutritional quality and/or potential health value of the food and include<sup>5,8</sup>: <ul style="list-style-type: none"> <li>◦ simple graphics and icons (e.g. hearts, bones, check marks) or multiple graphics used in combination;</li> <li>◦ symbols suggesting “healthy choice”;</li> <li>◦ slogans (e.g. “healthy choice,” “nutritionists recommend,” “good for you”);</li> <li>◦ endorsements and logos made by third party organization and corporations, for example:</li> </ul> </li> </ul> <div data-bbox="772 609 1470 844" style="text-align: center; border: 1px solid black; padding: 10px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center; border-right: 1px solid black; padding: 5px;">by third party organizations</td> <td style="width: 50%; text-align: center; padding: 5px;">by corporations</td> </tr> <tr> <td style="text-align: center; border-right: 1px solid black; padding: 10px;">  </td> <td style="text-align: center; padding: 10px;">   </td> </tr> </table> </div> <ul style="list-style-type: none"> <li>• Adept wording and images may suggest stronger links to health than can be substantiated and may reduce the use of detailed back-of-package information such as the Nutrition Facts Table. As a result, consumers<sup>8</sup>: <ul style="list-style-type: none"> <li>◦ may not be able to easily compare one product to another based solely on the different symbols because they may use different criteria in their FOP labelling;</li> <li>◦ may misinterpret similar FOP labelling on different products as representing the same nutritional attributes, when in fact different criteria have been used;</li> <li>◦ may view these products as “healthier” than those without any type of FOP labelling, and may be drawn away from less expensive, equally healthy products since they do not carry a FOP label.</li> </ul> </li> </ul>	by third party organizations	by corporations		 
by third party organizations	by corporations				
	 				
	<b>Dietetic Practice Points:</b> <ul style="list-style-type: none"> <li>• FOP labels: <ul style="list-style-type: none"> <li>◦ provide consumers with a quick visual indication of nutritional quality of the food product;</li> <li>◦ vary in criteria used to highlight nutritional attributes and can therefore generate consumer confusion;</li> <li>◦ have great potential as part of the food label’s dietary guidance provided to consumers.</li> </ul> </li> </ul>				



## References

1. Canadian Council of Food and Nutrition (CCFN). Tracking Nutrition Trends VII; 2008 Mississauga, Ontario, Canada: CCFN.
2. Campos S, Doxey J, Hammond D. Nutrition labels on pre-packaged foods: a systematic review. *Public Health Nutrition* 2011;14:496-506.
3. Canadian Food Inspection Agency (CFIA). Guide to Food Labelling and Advertising; 2010 [cited 2011 July 6]. Available from: <http://www.inspection.gc.ca/english/fssa/labeti/guide/toce.shtml>.
4. Health Canada. The Nutrition Facts Table – Consumers – Nutrition Labelling; 2008 [cited 2011 July 6]. Available from: <http://www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/cons/index-eng.php>.
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12. Food Directorate, Health Products and Food Branch, Health Canada. Summary of Health Canada's Assessment of a Health Claim about the Replacement of Saturated Fat with Mono- and Polyunsaturated Fat and Blood Cholesterol Lowering; 2012 [cited 2012 June 22]. Available from: <http://www.hc-sc.gc.ca/fn-an/label-etiquet/claims-reclam/assess-evalu/sat-mono-poly-fat-gras-eng.php>.
13. Food Directorate, Health Products and Food Branch, Health Canada. Summary of Health Canada's Assessment of a Health Claim about Barley Products and Blood Cholesterol Lowering; 2012 [cited 2012 July 12]. Available from: <http://www.hc-sc.gc.ca/fn-an/label-etiquet/claims-reclam/assess-evalu/barley-orge-eng.php>.

## I.3a. Product Example: CEREAL

### Front View

#### Front-of-Package Label

##### *Dietetic Practice Points:*

- Includes endorsements and logos made by third party organizations and corporations.
- The symbol shown here is used by a corporation (General Mills) to highlight that the product contains whole grains.

**Food-Related Claims:** “Whole Grain” and “Made with whole grain oats.”

##### *Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.
- The second statement appears beneath “Cheerios”.

**Nutrient Content Claim:** “Source of Fibre.”

##### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim “Source of Fibre” (must contain at least 2 g of fibre per serving).

**Therapeutic Claim:** “Oat fibre helps lower cholesterol” and “1 cup (27 g) of Cheerios cereal made with oats provides 30% of the daily amount of fibres shown to help lower cholesterol.”

##### *Dietetic Practice Points:*

- Claims about the treatment or mitigation of a health-related disease or condition, or restoration, correction or modification of body function.
- Health Canada regulations specify the criteria a food must meet before a Therapeutic Claim can be made. The wording of the claim cannot be modified.
- The second statement appears in the bottom left hand corner and is required by Health Canada in addition to the claim “Oat fibre helps lower cholesterol”.

**General Health Claim:** Heart shaped bowl.

##### *Dietetic Practice Points:*

- Broad claims that provide dietary guidance. Includes implied health claims, which are open to interpretation by the reader.
- In this case, the heart shaped bowl implies that the cereal is potentially beneficial for heart health.
- Health Canada does not encourage using heart symbols unless the product has an associated Disease Risk Reduction Claim, which does appear on Side View 1 for this cereal product.



## Top View

### Front-of-Package Label: "Goodness Corner."

#### *Dietetic Practice Points:*

- Includes endorsements and logos made by third party organizations and corporations.
- The phrase "Goodness Corner" shown here is used by the corporation (General Mills) to highlight the product's nutrient content and potential health benefits.

### Nutrient Content Claim: "Low Fat."

#### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim "Low Fat" (must contain 3 g or less of fat per serving).



### Nutrient Content Claim: "1 g sugar."

#### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- In this case, there is a need to orient the client to the serving size on the Nutrition Facts Table which for this product is 1 cup (27 g).

### Food-Related Claim: "Whole Grain."

#### *Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.

### Nutrient Content Claim: "110 calories per serving."

#### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- In this case, there is a need to orient the client to the serving size on the Nutrition Facts Table which for this product is 1 cup (27 g).

### Nutrient Content Claim: "Source of Fibre."

#### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim "Source of Fibre" (must contain at least 2 g of fibre per serving).

## Side View 1

### List of Ingredients

#### *Dietetic Practice Points:*

- Ingredients must be listed in descending order of proportion by weight.
- “Whole grain oat” is the first ingredient listed.

### Front-of-Package Label: “Health Check.”

#### *Dietetic Practice Points:*

- Includes endorsements and logos made by third party organizations and corporations.
- The symbol shown here is used by a third party organization (Heart and Stroke Foundation of Canada) to indicate that the product meets the specific nutrient criteria of the Health Check program.



**Disease Risk Reduction Claim:** “A healthy diet, low in saturated and trans fat may reduce the risk of heart disease. Cheerios is low in saturated and trans fats.”

#### *Dietetic Practice Points:*

- Claims that link a food or a constituent of a food to reducing the risk of developing a diet-related disease or condition.
- Health Canada regulations specify the criteria a food must meet before a Disease Risk Reduction claim can be made. The wording of the claim cannot be modified.

**General Health Claim:** “Whole grain packs a powerful punch. The fibre, vitamins & minerals and phytonutrients all contribute to healthy eating.”

#### *Dietetic Practice Points:*

- Broad claims that provide dietary guidance.
- Health Canada requires these claims to be truthful and not misleading.

### Front-of-Package Label

#### *Dietetic Practice Points:*

- Includes endorsements and logos made by third party organizations and corporations.
- The symbol shown here is used by the corporation (General Mills) to indicate that the product contains whole grains.

## Side View 2



### Nutrition Facts Table

#### *Dietetic Practice Points:*

- Provides information on energy (kilocalories) and 13 nutrients based on a specific serving size. The Nutrition Facts Table is mandatory with few exceptions.
- Includes the % Daily Value (% DV) for the majority of nutrients listed.
- Health Canada recommends a guidance tool of 5% DV or less as a little and 15% DV or more as a lot.
- For this cereal product, a 1 cup (27 g) serving contains a lot of iron and magnesium and a little of total fat, saturated fat and calcium.

## I.3b. Product Example: JUICE

### Front View

**General Health Claim:** Heart shaped orange.

*Dietetic Practice Points:*

- Broad claims that provide dietary guidance. Includes implied health claims, which are open to interpretation by the reader.
- In this case, the heart shaped orange implies that the juice is potentially beneficial for heart health.
- Health Canada does not encourage using heart symbols unless the product has an associated Disease Risk Reduction Claim, which does appear on Side View 1 for this juice product.

**Nutrient Content Claim:** “120 calories/250 mL.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A serving size of this juice is equal to 250 mL.



**Therapeutic Claim:** “Plant sterols help lower cholesterol” and “250 mL of Heart Wise provides 50% of the daily amount of plant sterols shown to help lower cholesterol in adults.”

*Dietetic Practice Points:*

- Claims about the treatment or mitigation of a health-related disease or condition, or restoration, correction or modification of body function.
- Health Canada regulations specify the criteria a food must meet before a Therapeutic Claim can be made. The wording of the claim cannot be modified.
- Health Canada requires the second statement to appear on the packaging in addition to the claim “Plant sterols help lower cholesterol”.

**Food-Related Claim:** “100% Orange Juice from concentrate with added plant sterols.”

*Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.

## Top View

**Nutrient Content Claim:** “Per 250 mL Source of: Vitamin C, Folic Acid, Potassium, Magnesium, Thiamine, 2 Fruit Servings.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim “Source of Vitamin C, Folic Acid, Potassium, Magnesium, Thiamine, 2 Fruit Servings” (must contain at least 5% of the DV for vitamin C, folic acid, potassium, magnesium and thiamine).



**Food-Related Claims:** “No Added Preservatives” and “No Sugar Added.”

*Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.



## Side View 1

### List of Ingredients

#### *Dietetic Practice Points:*

- Ingredients must be listed in descending order of proportion by weight.
- “Filtered water” is the first ingredient listed. “Plant sterols” are the final ingredient listed. It is also specified that the plant sterols are “derived from highly refined vegetable oils such as soybean or peanut”.



### Nutrition Facts Table

#### *Dietetic Practice Points:*

- Provides information on energy (kilocalories) and 13 nutrients based on a specific serving size. The Nutrition Facts Table is mandatory with few exceptions.
- Includes the % Daily Value (% DV) for the majority of nutrients listed.
- Health Canada recommends a guidance tool of 5% DV or less as a little and 15% DV or more as a lot.
- For this juice product, a 250 mL serving contains a lot of vitamin C and folate and a little of sodium.



## Side View 2

**Therapeutic Claim:** “High cholesterol is a risk factor for heart disease. Plant sterols help lower cholesterol. 250 mL of Heart Wise orange juice provides 50% of the daily amount of plant sterols shown to help lower cholesterol in adults.”

*Dietetic Practice Points:*

- Claims about the treatment or mitigation of a health-related disease or condition, or restoration, correction or modification of body function.
- Health Canada regulations specify the criteria a food must meet before a Therapeutic Claim can be made. The wording of the claim cannot be modified.



**Disease Risk Reduction Claim:** “A healthy diet containing foods high in potassium and low in sodium may reduce the risk of high blood pressure, a risk factor for stroke and heart disease. Heart Wise orange juice is high in potassium and is low in sodium and it tastes great!”

*Dietetic Practice Points:*

- Claims that link a food or a constituent of a food to reducing the risk of developing a diet-related disease or condition.
- Health Canada regulations specify the criteria a food must meet before a Disease Risk Reduction claim can be made. The wording of the claim cannot be modified.

## I.3c. Product Example: MARGARINE

### Front View

**General Health Claim:** Heart shaped logos.

*Dietetic Practice Points:*

- Broad claims that provide dietary guidance. Includes implied health claims, which are open to interpretation by the reader.
- In this case, the heart shaped logos (which appear in the Becel logo and on the bottom left side of the container) imply that the margarine is potentially beneficial for heart health.
- Health Canada does not encourage using heart symbols unless the product has an associated Disease Risk Reduction Claim, which does appear on Top View and Side View 2 for this margarine product.

**Nutrient Function Claim:** “DHA + EPA + ALA: 3 important omega-3 fats to help maintain good health.”

*Dietetic Practice Points:*

- Describes the well-established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development.
- When a Nutrient Function Claim is made, Health Canada requires that the amount of the nutrient present in a serving of the food be stated on the packaging or in the Nutrition Facts Table. In this case, DHA and EPA content does appear on Side View 2.



**Nutrient Content Claim:** “No Trans Fat.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim “No Trans Fat” (must contain less than 0.2 g of *trans* fat per serving and 2 g or less of saturated and *trans* fat combined).

**Food-Related Claim:** “Non Hydrogenated.”

*Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.

**Nutrient Content Claim:** “Low in Saturated Fat.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim “Low in Saturated Fat” (must contain 2 g or less of saturated fat per serving and 15% or less of energy from saturated and *trans* fat combined).

## Top View

### Front-of-Package Label: “Health Check.”

#### *Dietetic Practice Points:*

- Includes endorsements and logos made by third party organizations and corporations.
- The symbol shown here is used by a third party organization (Heart and Stroke Foundation of Canada) to indicate that the product meets the specific nutrient criteria of the Health Check program.

### General Health Claim: Heart shaped logo.

#### *Dietetic Practice Points:*

- Broad claims that provide dietary guidance. Includes implied health claims, which are open to interpretation by the reader. In this case, the heart shaped logo implies that the margarine is potentially beneficial for heart health.
- Health Canada does not encourage using heart symbols unless the product has an associated Disease Risk Reduction Claim, which does appear on Top View and Side View 2 for this margarine product.



### Nutrient Function Claim: “DHA + EPA + ALA: 3 important omega-3 fats to help maintain good health.”

#### *Dietetic Practice Points:*

- Describes the well-established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development.
- When a Nutrient Function Claim is made, Health Canada requires that the amount of the nutrient present in a serving of the food be stated on the packaging or in the Nutrition Facts Table. In this case, DHA and EPA content does appear on Side View 2.

### Food-Related Claim: “90% canola and sunflower oils, 8% vegetable oils, 2% fish oils.”

#### *Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.

### Disease Risk Reduction Claim: “A healthy diet, low in saturated fat and trans fats may reduce the risk of heart disease. Becel Omega3plus margarine is low in saturated and trans fats.”

#### *Dietetic Practice Points:*

- Claims that link a food or a constituent of a food to reducing the risk of developing a diet-related disease or condition.
- Health Canada regulations specify the criteria a food must meet before a Disease Risk Reduction claim can be made. The wording of the claim cannot be modified.

## Side View 1

### List of Ingredients

#### *Dietetic Practice Points:*

- Ingredients must be listed in descending order of proportion by weight.
- “Canola and sunflower oils 72%” is the first ingredient listed. “Fish Oil 2%” is the fourth ingredient listed.



### Front-of-Package Label: “MEG-3.”

#### *Dietetic Practice Points:*

- Includes endorsements and logos made by third party organizations and corporations.
- The symbol shown here is used by a third party organization (Ocean Nutrition Canada) to indicate the source of omega-3 fish oil used in the product.

## Side View 2

### Nutrition Facts Table

#### *Dietetic Practice Points:*

- Provides information on energy (kilocalories) and 13 nutrients based on a specific serving size. The Nutrition Facts Table is mandatory with few exceptions.
- Includes the % Daily Value (% DV) for the majority of listed nutrients.
- Health Canada recommends a guidance tool of 5% DV or less as a little and 15% DV or more as a lot.
- For this margarine product, a 2 tsp (10 g) serving contains a lot of vitamin D and E and a little of saturated fat and sodium.



**Nutrient Content Claim:** “Sum of DHA + EPA is 50 mg/10 g serving.”

#### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- This statement supports the product’s Nutrient Function Claim since DHA and EPA are not included in the Nutrition Facts Table.

**Disease Risk Reduction Claim:** “A healthy diet, low in saturated fat and trans fats may reduce the risk of heart disease. Becel Omega3plus margarine is low in saturated and trans fats.”

#### *Dietetic Practice Points:*

- Claims that link a food or a constituent of a food to reducing the risk of developing a diet-related disease or condition.
- Health Canada regulations specify the criteria a food must meet before a Disease Risk Reduction claim can be made. The wording of the claim cannot be modified.

## I.3d. Product Example: MILK

### Front View

**Nutrient Function Claim:** “DHA, an omega-3 fatty acid, supports normal development of the brain!”

*Dietetic Practice Points:*

- Describes the well-established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development.
- When a Nutrient Function Claim is made, Health Canada requires that the amount of the nutrient present in a serving of the food be stated on the packaging or in the Nutrition Facts Table. In this case, DHA content does appear on the Front View and Side View 1.



**Food-Related Claim:** “1% M.F.”

*Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- This claim indicates that the product contains 1% milk fat.

**Nutrient Content Claim:** “0.01 g (10 mg) of DHA per 250 mL serving.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- This statement supports the product’s Nutrient Function Claim since DHA is not included in the Nutrition Facts Table.

## Side View 1

**Nutrient Function Claim:** “Neilson Dairy Oh! is a healthy choice for your body because it has DHA, an omega-3 fatty acid that supports the normal development of the brain, eyes and nerves.”

*Dietetic Practice Points:*

- Describes the well-established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development.
- When a Nutrient Function Claim is made, Health Canada requires that the amount of the nutrient present in a serving of the food be stated on the packaging or in the Nutrition Facts Table. In this case, DHA content does appear on the Front View and Side View 1.



**General Health Claims:** “Neilson Dairy Oh! is a healthy choice for your body because it has DHA...” and “Drinking Dairy Oh! is an easy way to include DHA in your diet.”

*Dietetic Practice Points:*

- Broad claims that provide dietary guidance.
- Health Canada requires these claims to be truthful and not misleading.

**Nutrient Content Claim:** “Each delicious glass of Dairy Oh! provides 0.01 grams (10 mg) of DHA per serving and is a source of 9 essential nutrients including calcium and vitamin D.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim “Source of 9 essential nutrients including calcium and vitamin D” (must contain at least 5% of the DV for all 9 essential nutrients).
- The statement “0.01 grams (10 mg) of DHA per serving” supports the product’s Nutrient Function Claim since DHA is not included in the Nutrition Facts Table.

## Side View 2

### Nutrition Facts Table

#### *Dietetic Practice Points:*

- Provides information on energy (kilocalories) and 13 nutrients based on a specific serving size. The Nutrition Facts Table is mandatory with few exceptions.
- Includes the % Daily Value (% DV) for the majority of listed nutrients.
- Health Canada recommends a guidance tool of 5% DV or less as a little and 15% DV or more as a lot.
- For this milk product, a 1 cup (250 mL) serving contains a lot of calcium, vitamin D, riboflavin, vitamin B<sub>12</sub>, phosphorus and magnesium and a little of total fat, carbohydrates and sodium.



### List of Ingredients

#### *Dietetic Practice Points:*

- Ingredients must be listed in descending order of proportion by weight.
- “Microfiltered partly skimmed milk” is the first ingredient listed.



## I.3e. Product Example: YOGURT

### Front View

#### Front-of-Package Label

##### *Dietetic Practice Points:*

- Includes endorsements and logos made by third party organizations and corporations.
- The symbol shown here is used by a corporation (Ultima Foods Inc.) to highlight the product's nutrient content and potential health benefits. Check marks are used to indicate what the product contains.

**Nutrient Content Claim:** "3x more calcium than most regular yogurts."

##### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- Comparative Nutrient Content Claims can be made when a nutrient contains 25% or more of a nutrient compared to the reference food.



**Nutrient Content Claim:** "Good source of Vitamin D."

##### *Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim "Good Source of Vitamin D" (must contain at least 15% of the DV for vitamin D).

**Food-Related Claim:** "✓ Milk Proteins MBP."

##### *Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.
- Check mark is used to indicate that the product contains "Milk Proteins MBP (Milk Basic Protein)".

## Front View continued

**Nutrient Function Claim:** “Good source of Calcium and Vitamin D for strong bones.”

*Dietetic Practice Points:*

- Describes the well-established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development.
- When a Nutrient Function Claim is made, Health Canada requires that the amount of the nutrient present in a serving of the food be stated on the packaging or in the Nutrition Facts Table. In this case, calcium and vitamin D are in the Nutrition Facts Table.



**Food-Related Claim:** “2% M.F.”

*Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.
- This claim indicates that the product contains 2% milk fat.

**Nutrient Content Claim:** “Good source of Calcium and Vitamin D.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim “Good Source of Calcium and Vitamin D” (must contain at least 15% of the DV for calcium and vitamin D).

**Food-Related Claim:** “Probiotic Yogurt.”

*Dietetic Practice Points:*

- Claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.

## Top View

**Nutrient Content Claim:** “Good source of Calcium and Vitamin D.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A product must meet specific nutrient compositional requirements put forth by Health Canada in order to use the claim “Good Source of Calcium and Vitamin D” (must contain at least 15% of the DV for calcium and vitamin D).



**Nutrient Function Claim:** “Good source of Calcium and Vitamin D for strong bones.”

*Dietetic Practice Points:*

- Describes the well-established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development.
- When a Nutrient Function Claim is made, Health Canada requires that the amount of the nutrient present in a serving of the food be stated on the packaging or in the Nutrition Facts Table. In this case, calcium and vitamin D are in the Nutrition Facts Table.

## Side View 1



**Disease Risk Reduction Claim:** “A healthy diet with adequate calcium and vitamin D, and regular physical activity, help to achieve strong bones and may reduce the risk of osteoporosis. Yoplait Asana is a good source of calcium.”

**Dietetic Practice Points:**

- Claims that link a food or a constituent of a food to reducing the risk of developing a diet-related disease or condition.
- Health Canada regulations specify the criteria a food must meet before a Disease Risk Reduction Claim can be made. The wording of the claim cannot be modified.

## Side View 2

**General Health Claim and Food-Related Claim:** “Yoplait Asana’s unique recipe contains three complementary ingredients: calcium, vitamin D and selected milk proteins (MBP) which are exclusive to Yoplait.”

*Dietetic Practice Points:*

- This statement includes both a General Health Claim, which provides broad dietary guidance, and a Food-Related Claim, which makes claims about the ingredient(s) (composition, quality, quantity) or origin of the food product.
- Health Canada requires these claims to be truthful and not misleading.



**Nutrient Function Claim:** “This delicious probiotic yogurt is a good source of calcium and vitamin D, which help build and maintain strong bones.”

*Dietetic Practice Points:*

- Describes the well-established roles of energy or known nutrients that are essential for the maintenance of good health or for normal growth and development.
- Whenever a Nutrient Function Claim is made, Health Canada requires that the amount of the nutrient present in a serving of the food be stated on the packaging or in the Nutrition Facts Table. In this case, calcium and vitamin D are in the Nutrition Facts Table.

**Nutrient Content Claim:** “175 g = 50% of calcium based on the daily recommended intake.”

*Dietetic Practice Points:*

- Directly, or indirectly, describes the level of a nutrient in a food or a group of foods.
- A serving size of this yogurt is equal to 175 g.

## Back View

### List of Ingredients

#### *Dietetic Practice Points:*

- Ingredients must be listed in descending order of proportion by weight.
- “Skim milk” is the first ingredient listed.



### Nutrition Facts Table

#### *Dietetic Practice Points:*

- Provides information on energy (kilocalories) and 13 nutrients based on a specific serving size. The Nutrition Facts Table is mandatory with few exceptions.
- Includes the % Daily Value (DV) for the majority of nutrients listed.
- Health Canada recommends a guidance tool of 5% DV or less as a little and 15% DV or more as a lot.
- For this yogurt product, a 175 g serving contains a lot of calcium and vitamin D and a little of total fat, vitamin A, vitamin C and sodium.

**Probiotic Claim:** “More than 1 billion of each probiotic per serving, that contribute to healthy digestive tract flora.”

#### *Dietetic Practice Points:*

- A subset of Function Claims about the benefits of probiotic microorganisms.
- There is a closed list of non-strain-specific probiotic claims that are acceptable without the need for the manufacturer to conduct a detailed review of the scientific basis for the claim.

# I.4. Functional Foods in the Canadian Marketplace

Consideration of food and nutrition for health and disease has evolved over the past century from the prevention of nutrient deficiency diseases to the prevention of chronic disease and optimization of health<sup>1</sup>. In response to the growing consumer interest in enhancing personal health, the food industry has introduced functional foods<sup>2</sup>.

The functional foods industry is advancing rapidly within the Canadian marketplace. Related to this, the following information highlights results from the Functional Foods and Natural Health Products Survey conducted by Statistics Canada in 2007<sup>3</sup>:

**Dietetic Practice Point:**  
The rapid expansion in functional foods in Canada reflects an evolution in how food and nutrition are linked to health and disease.

- Sales from functional foods and natural health products (FFNHP) firms in Canada totalled \$21.5 billion, of which \$3.7 billion was generated specifically from FFNHP activities.
- The functional foods industry experienced a 28% increase in revenue from 2004 to 2007.
- A total of 689 firms were active in the field of FFNHP, employing 13,975 individuals.
- Expenditure by FFNHP firms on research and development increased by 98% from 2004 to 2007.

The following table from the 2007 FFNHP Survey indicates the growth of the functional foods industry from 2004 to 2007:

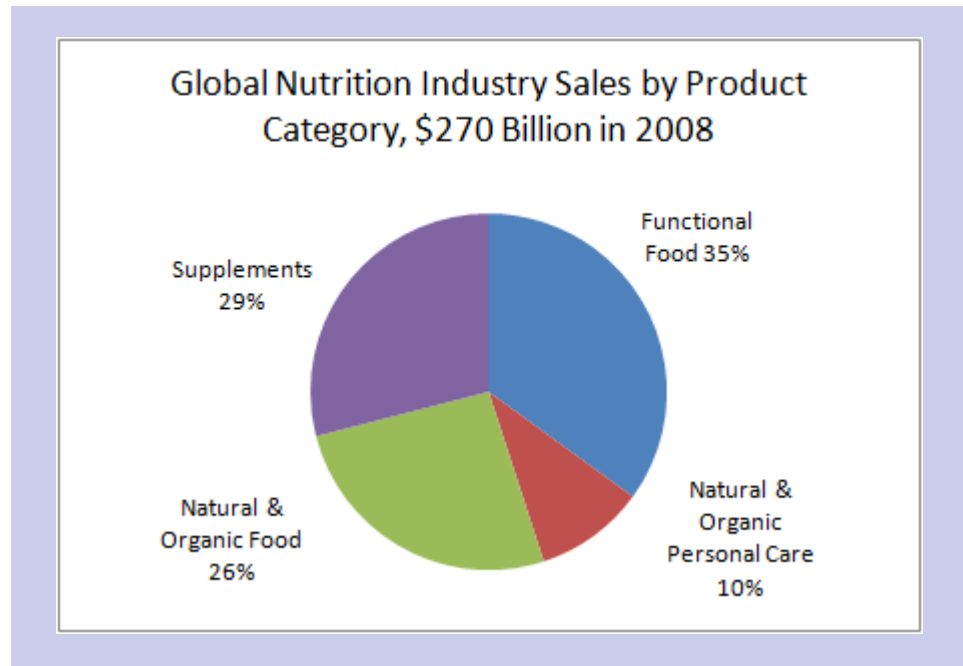
**A comparison of functional food and natural health product key indicators, 2004 and 2007**

	2004	2007	Percentage increase
	number		percent
Functional foods and natural health products			
Firms	389	689	77
Employment	12,872	13,975	9
	thousands of dollars		
Revenue	2,886,538	3,691,831	28
Research and development	74,554	147,955	98
Exports	545,013	731,631	34

**Note(s):** Totals may not add up due to rounding.

**Source(s):** Statistics Canada, The Functional Foods and Natural Health Products Survey, 2004 and 2007.

The functional food industry is not only expanding in the Canadian marketplace, but on a global scale as well. As depicted in the following figure from the Nutrition Business Journal, functional foods generated 35% of the global nutrition industry sales in 2008.



#### Dietetic

##### Practice Point:

Functional foods comprised the majority of global nutrition industry sales in 2008.

The Statistics Canada FFNHP survey also reported that in 2007, Canadian firms exported \$731 million worth of FFNHP products (of which \$296,502 was functional food products), providing evidence of Canada's role in the global functional foods marketplace<sup>3</sup>.

#### Dietetic

##### Practice Point:

Consumer acceptability of functional foods is an area in need of research, particularly for older adults.

Although these data illustrate considerable economic and innovative expansion of the functional food industry in Canada, research into consumer acceptability of functional foods has not kept pace<sup>1</sup>. This is especially true for the older adult population in Canada, a consumer segment that is poised to benefit from the health promoting and disease preventing properties of functional foods with respect to healthy aging.

### References

1. Paulionis L. The changing face of food and nutrition in Canada and the United States: Opportunities for older adults. *J Nutr Elder*. 2008; 27(3-4): 277-295.
2. Agriculture and Agri-food Canada. Market analysis report, consumer trends, functional foods; 2009 [cited 2011 June 13]. Available from: [http://www.gov.mb.ca/agriculture/statistics/pdf/marketanalysis%20report\\_functionalfoods-en.pdf](http://www.gov.mb.ca/agriculture/statistics/pdf/marketanalysis%20report_functionalfoods-en.pdf).
3. Cinnamon B. Results from the functional foods and natural health products survey – 2007; 2009 [cited 2011 June 13]. Available from: <http://www.statcan.gc.ca/pub/88f0006x/2009001/part-partie1-eng.htm>.



## **Section 2: Relevance of Functional Foods for Healthy Aging**

- 2.1. The Role of Functional Foods in Canada's Aging Demographic
- 2.2. The Role of the Registered Dietitian in Considering Functional Foods in Practice

## 2.1. The Role of Functional Foods in Canada's Aging Demographic

### Canada's Aging Demographic

It has been well documented that Canada's population is aging at a rapid rate<sup>1-3</sup>. Currently, there are more Canadians 65 years of age and older than ever before, and the numbers are predicted to continue to increase in the coming decades<sup>2,3</sup>, as evident from the following statistics:

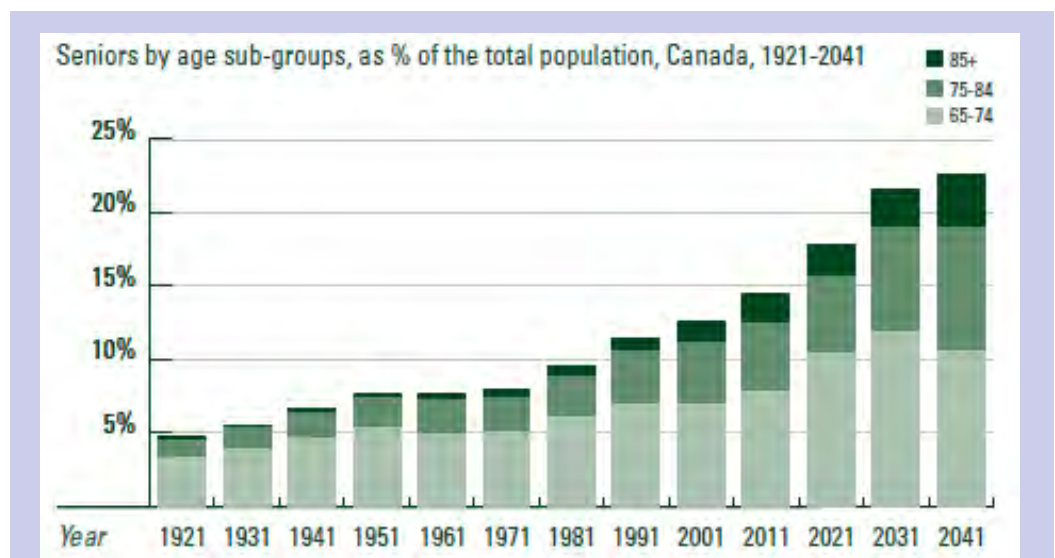
### Current Look at Canada's Aging Demographic

- The median age of Canadians is 39.5, according to the 2006 Census, rising from 37.6 in 2001<sup>2</sup>.
- The number of Canadians who are ≥65 years old rose from 2.4 million in 1981 to 4.2 million in 2005<sup>3</sup>.
- According to the 2006 Census data, the proportion of Canadians ≥65 years old increased by 11.5% from 2001<sup>2</sup>.
- Adults ≥65 years old currently comprise 13.2% of the Canadian population, rising from 8% in the 1950s and 60s<sup>3</sup>.

### Future Predictions for Canada's Aging Demographic

- The median age of Canadians is expected to reach 44 by 2031<sup>2</sup>.
- The number of Canadians ≥65 years old is predicted to reach 9.8 million by 2036, rising to 11.3 million by 2056<sup>3</sup>.
- Health Canada projects that adults ≥65 years old will represent nearly 25% of the Canadian population by 2041 as summarized in this figure<sup>1</sup>:

**Dietetic Practice Point:**  
Older adults are a growing segment of the population. Currently, adults ≥65 years old comprise 13.2% of the Canadian population. It is projected that by 2041, this value will increase to nearly 25%.



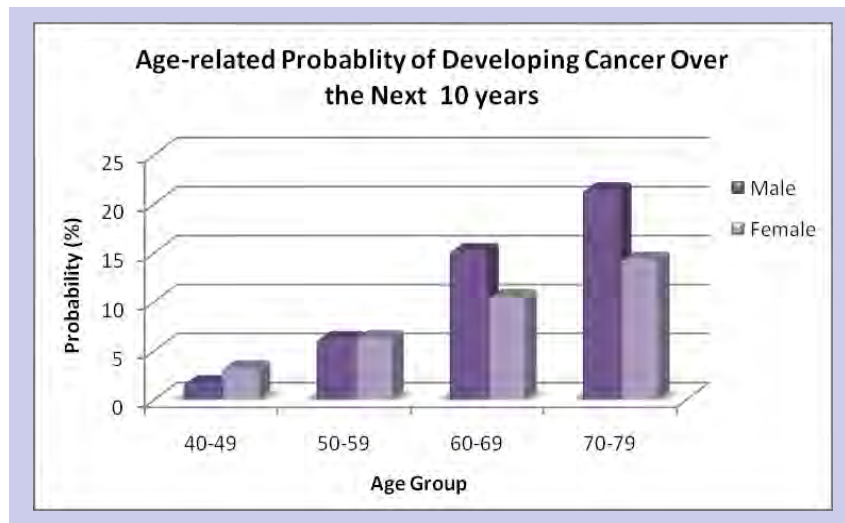
Source: Health Canada, Canada's Aging Population (2002).

## Aging and Increased Disease Risk

There are many societal consequences of an aging population, one of which is the health status of older adults<sup>1,3</sup> as it is well known that age increases risk of chronic diseases<sup>3,6</sup>. The fact that major age-related chronic diseases such as cancer, cardiovascular disease and type 2 diabetes are increasing as Canada's population ages is supported by the following data from Canadian health organizations:

### Cancer:

- According to the Canadian Cancer Society's 2011 report, cancer primarily affects those 50 years of age and older, and the risk of developing cancer increases with age<sup>4</sup>. The following figure depicts that the probability of developing cancer over the next 10 years is influenced by age<sup>4</sup>.



Source: Canadian Cancer Society, Canadian Cancer Statistics 2011.

### Cardiovascular Disease:

- In 2009, the Public Health Agency of Canada (PHAC) reported that 14.8% of Canadians between the ages of 65-74 had heart disease, and the statistic increased to 22.9% for those over the age of 75<sup>5</sup>.
  - o In 2007, 25.5% of Canadians between the ages of 45-64 had three risk factors for cardiovascular disease<sup>5</sup>.
  - o PHAC predicted that cardiovascular disease rates will only increase with Canada's aging population and parallel the observed increased rates of hypertension and diabetes<sup>5</sup>.

### Type 2 Diabetes:

- Based on data from 2006-2007, PHAC reported 15.7% of Canadians between the ages of 60-64 had diabetes, rising to 19.5% for those 65-69 years old, and 22.2% for those 70-74 years old<sup>6</sup>. Although these values include type 1 and 2 of diabetes, it is noteworthy that type 2 represents 90-95% of cases<sup>6</sup>.

**Dietetic Practice Point:**  
Older adults are at increased risk for many chronic diseases. This is exemplified in the statistics on rates of cancer, cardiovascular disease and type 2 diabetes reported by major Canadian health organizations.

Although it is important to note that the prevalence of cancer, cardiovascular disease and type 2 diabetes is projected to increase, there are many other age-related diseases and conditions that can also affect the health of older adults, including:

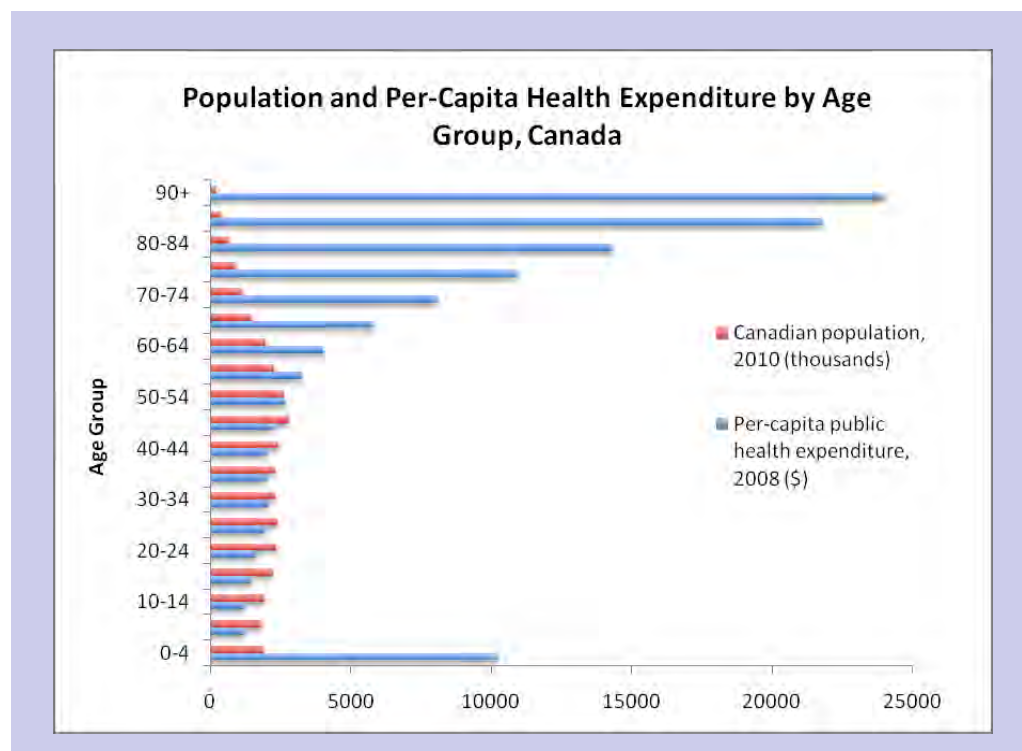
- Arthritis/Rheumatism<sup>1,3</sup>
- Age-related Macular Degeneration<sup>7</sup>
- Cataracts<sup>1,3</sup>
- Glaucoma<sup>3</sup>
- Dementia/Alzheimer Disease<sup>3,7</sup>
- Hypertension<sup>1,3</sup>
- Osteoporosis<sup>7</sup>
- Sarcopenia<sup>8</sup>

Given the number of age-related diseases and conditions, and Canada's aging demographic, it is important to consider impact on the health care system.

### Aging and Increased Health Care Expenditure

Another consequence of an aging demographic that has an increased prevalence of chronic disease is a burdened health care system<sup>4</sup>. According to a 2006 PHAC report, 44% of all provincial health care spending was allocated to the needs of adults  $\geq 65$  years old<sup>9</sup>. This is illustrated in the following figure that depicts Canada's per-capita health care spending by age group.

**Dietetic Practice Point:**  
There are many age-related diseases and conditions that are of concern to older adults. This has a natural consequence on health care expenditures and calls for numerous solution strategies, one of which can be functional foods.



Source: Data from Statistics Canada (2010) and the Canadian Institute for Health Information (2008).

It is evident by this figure that health care costs increase with age. Both Health Canada and PHAC acknowledge that the aging population, and subsequent increase in prevalence of chronic diseases, could cause significant strain on the health care system<sup>1,9</sup>. Therefore, to improve the health status of older adults and minimize the impact on health care services, it is important to consider the role of nutrition and specifically functional foods in healthy aging.

## Potential for Functional Foods to Contribute to Healthy Aging

Nutrition is recognized as one of the determinants of successful aging<sup>10,11</sup>. It is widely accepted that nutrition plays an important role in reducing the risk of chronic diseases such as cancer, heart disease, diabetes and osteoporosis<sup>7,10,11</sup>. It has also been reviewed by Dietitians of Canada<sup>12</sup> and the Academy of Nutrition and Dietetics<sup>10</sup> that functional foods can mitigate disease risk.

As older adults are at an increased risk for developing chronic disease, they are in need of preventative strategies<sup>11</sup>. Functional foods are an exciting solution strategy for older adults to not only address their elevated disease risk<sup>10,12</sup>, but also compensate for age-related physiological changes that challenge adequate nutrient intake, such as taste changes, absorption changes and changes in ability to prepare foods<sup>8</sup>.

Consumption of functional foods may also minimize the economic burden of age-related increases in chronic disease on Canada's health care system, as evident from a research study by Gyles et al. (2010) that investigated the potential reduction in health care expenditures on coronary heart disease if Canadians consumed functional foods containing plant sterols<sup>13</sup>.

- The research examined impact on annual health care savings from four scenarios of varied success rates with success defined as the percent of the Canadian population consuming functional foods containing plant sterols in adequate amounts (1-3 g/day) to reduce circulating cholesterol.
- The varying degrees of success included: 'ideal' (47%), 'optimal' (17%), 'pessimistic' (10%) and 'very pessimistic' (5%).
- Results of the economic analysis showed that annual health care savings ranged from \$2.45 billion for the 'ideal' scenario to \$38 million for the 'very pessimistic' scenario.

Although this study focused on functional foods containing plant sterols, this approach exemplifies the potential economic benefit that functional food consumption can have on health care expenditures in Canada.

### Closing Notes

Canada's population is aging, and this is causing an increased prevalence of age-related chronic diseases and a consequent increase in health care costs. There is exciting potential for functional foods to help address these challenges by reducing disease risk, promoting healthy aging and reducing economic burden on health care. The next section will discuss the important role of the Registered Dietitian in helping older adults to make the most of functional foods for their health.

#### Dietetic

##### Practice Point:

Functional foods are an exciting preventative strategy to reduce the risk of chronic disease in older adults and also minimize the rising health care costs associated with an aging population.

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### Dietetic

#### Practice Point:

Functional foods contain numerous bioactives relevant to healthy aging. Appendices E-J contain Resource Sheets that summarize the health benefits of functional food bioactives, including antioxidants, dietary fibre, omega-3 fatty acids, plant sterols, prebiotics and probiotics.

## 2.2. The Role of the Registered Dietitian in Considering Functional Foods in Practice

It is important that older adults have access to information about functional foods considering their potential benefits (reduction in disease risk and economic strain on the healthcare system). Registered Dietitians are well suited to inform older adults about functional foods as they are specifically trained to provide scientific-based dietary guidance. This has been documented by the Academy of Nutrition and Dietetics in their position paper on functional foods in which they identified Registered Dietitians as the bridge that connects consumers to evidence-based research for improving health<sup>1</sup>.

Research has demonstrated that Registered Dietitians recognize the importance of incorporating functional foods into evidence-based dietetic practice<sup>1</sup>, but that they require more information:

- De Jong et al. (2004) investigated Dutch dietitians' knowledge of and attitudes toward functional foods in a survey of 238 Registered Dietitians<sup>2</sup>. They found that of the 90% who indicated they were in regular contact with clients, 71% reported that they did advise their clients about functional food use. Most of the dietitians surveyed (69% of 238) felt functional foods could benefit health. However, many of them were uncertain about the safety (42%) and efficacy (70%) of functional foods, as well as functional food doses (89%) and target groups (90%). The majority of dietitians (87% of 238) stated they would appreciate more information about functional foods, preferably from scientists. The following table indicates the study's results on the dietitians' perceived knowledge of functional foods and need for further education about functional foods.

	Much (%)	Limited (%)	Little (%)
Education received at school†	3	23	74
Current knowledge	21	57	23
Educational need	50	42	9
Opportunities for supplemental education in current job	33	48	19
Knowledge sufficient for counselling	53	28	19
Questions from patients about functional foods	27	42	32
Influence of colleagues on counselling behaviour	51	29	20

\*Percentages based on number of valid responses; i.e. missing values excluded.

†Education of those who received their training while functional foods were already on the market ( $n = 72$ ).

**Dietetic Practice Point:**  
Registered Dietitians are best suited to communicate evidence-based information about functional foods to older adults.

Source: De Jong et al. 2004.



- Lee et al. (2000) interviewed 162 Registered Dietitians practicing in Oregon and found that more than 80% believed functional foods were beneficial for maintaining good health and preventing or treating chronic disease<sup>3</sup>. The majority of dietitians reported that they recommended functional foods to clients within the last year, mainly for preventative purposes. Although dietitians felt knowledgeable about functional foods, 75% were “strongly interested” in receiving more training<sup>3</sup>.
- Sheeshka and Lacroix (2008) from the University of Guelph surveyed 151 Canadian Registered Dietitians to determine their attitudes toward functional foods and the idea of recommending them to clients<sup>4</sup>. Most (81%) felt Registered Dietitians were the most suitable health professionals to be recommending functional foods, and the majority felt that making this recommendation would not adversely affect their credibility, particularly if dietitians became more knowledgeable about functional foods and health claims<sup>4</sup>. Respondents felt it was important for Registered Dietitians to learn more about functional foods; the average response was 9.5 out of 10 with 10 being extremely important<sup>4</sup>.

Research has also indicated that consumers are willing to change their consumption of functional foods after their interactions with Registered Dietitians:

- Pelletier et al. (2002) provided Registered Dietitians with educational packages about functional foods developed as part of the University of Illinois Functional Foods for Health Program<sup>5</sup>. Registered Dietitians used the educational package to interact with consumer groups and consumers completed post-program questionnaires to measure their intent to change behaviour. It was found that less than 10% of participants consumed adequate amounts of functional foods prior to the intervention. However, after interaction with the Registered Dietitian, most participants intended to increase their intake of specific functional foods, namely:
  - o 79% of participants intended to consume more tomatoes and tomato products;
  - o 75-77% of participants intended to consume more red grapes/grape juice, oats and broccoli; and
  - o 65-67% of participants intended to consume more fish, yogurt and garlic.

Overall, functional foods are an important component of dietetic practice<sup>1</sup>. Registered Dietitians are best suited to communicate with consumers about functional food use<sup>1</sup> and are also interested in gaining more knowledge<sup>2-4</sup>. This toolkit contains background information on functional foods and results from a University of Guelph study on functional food consumption among older adults that can provide Registered Dietitians with information and guidance to facilitate discussion about functional foods with their older clients.

### Dietetic

#### Practice Point:

Research has indicated that Registered Dietitians require more information about functional foods. This toolkit provides background information on functional foods and results of a University of Guelph study to guide Registered Dietitians in communicating about functional foods with older adults.



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## **Section 3:**

# **Summary and Results of University of Guelph Research Study on Functional Foods and Older Adults**

3.1. Summary of Research Rationale and Methods

3.2. Summary of Study Results

## 3.1. Summary of Research Rationale and Methods

It is evident that the older adult segment of the Canadian population is rapidly increasing, which could lead to elevated health care costs<sup>1</sup>. The functional foods industry in Canada is also experiencing rapid economic and innovative expansion, with great potential to improve health and reduce the risk of chronic disease<sup>2</sup>.

Research pertaining to consumer perceptions, attitudes, and receptivity towards functional food products is extremely limited. This is particularly true for the older adult population in Canada, which is a consumer segment that is generally under-researched but could arguably benefit most from the incorporation of functional foods into their diets due to multiple age-related issues that pertain to food and health<sup>3</sup>.

This study addresses the need for a comprehensive exploration of the consumption, awareness, perceptions and motivating factors related to functional foods in Canadian older adults. The information generated will help Registered Dietitians to better navigate their interactions with older adults with respect to functional foods and their potential to promote improved health.

A total of 200 community-dwelling older adults ( $\geq 60$  years of age) were recruited to participate in the study. Participants completed a comprehensive, researcher-administered questionnaire designed to gather information related to functional food consumption. To increase participants' awareness of key concepts related to functional foods and the study questionnaire, information sheets were presented to describe and establish the definition of functional foods (Appendix A), bioactives (Appendix B), food forms (Appendix C) and health claims (Appendix D). Study appointments were held at the Human Nutraceutical Research Unit at the University of Guelph. The research was cleared by the University of Guelph Research Ethics Board (REB#10SE012).

### References

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## 3.2. Summary of Study Results

The results of the study “**Exploration of the consumption, awareness, understanding and motivating factors related to functional foods in older adults**” were presented at the Canadian Nutrition Society Annual Meeting in May 2012 and the Dietitians of Canada Annual Conference in June 2012, as summarized in the following abstracts. The results will be fully presented in forthcoming manuscripts which upon publication will be linked to the Agri-food for Healthy Aging website ([www.aha.the-ria.ca](http://www.aha.the-ria.ca)).

### **Oral Presentation at the Canadian Nutrition Society 2012 Annual Meeting (May 2012):**

#### **Exploration of functional food consumption in older adults in relation to food matrices, bioactive ingredients and health areas**

**Meagan N. Vella<sup>1</sup>, Laura M. Stratton<sup>1</sup>, Judy Sheeshka<sup>2</sup> and Alison M. Duncan<sup>1</sup>.**

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The functional food industry has experienced substantial innovative and economic expansion, yet research pertaining to consumer awareness, perceptions, and attitudes towards functional foods is limited. Among the Canadian population, the older adult segment is the most rapidly growing and could benefit from the incorporation of functional foods into their diets due to multiple age-related issues that pertain to food and health. The purpose of this research was to generate information related to the consumption and perception of functional foods among older adults ( $\geq 60$  years old). Community-dwelling older adults ( $n=200$ ;  $70.8 \pm 7.17$  years old; 70% females, 30% males) completed a researcher-administered questionnaire designed to collect information about current consumption patterns, preferred food matrices and bioactive ingredients for functional foods, health areas addressed through functional food consumption, as well as lifestyle, medical and demographic information. The prevalence of functional food consumption was 93.0%, with 75.3% of participants consuming functional foods daily. The functional food products participants reported consuming most often were yogurt with probiotics (55.5%), eggs with omega-3 fatty acids (37.0%) and cereal with added fibre (22.0%). The primary functional food matrices currently consumed were yogurt (51.5%), bread (44.0%) and cereal (40.0%), while bread (31.0%), pasta (28.5%) and cheese (27.0%) were the primary food matrices participants would consider consuming as a functional food. The predominant bioactive currently consumed in functional foods was dietary fibre (79.5%), while antioxidants were reported as the predominant bioactive participants would consider consuming in a functional food (53%). The majority of participants (86.2%) indicated that they consume functional foods to improve their health, and the primary health areas they address or...

...would address by consuming functional foods were osteoporosis/bone health (67.5%), heart disease (61.0%), and arthritis (55.0%). It is evident that the prevalence of functional food consumption among this sample of older adults is high (93.0%), and that they are motivated to address health concerns through the consumption of functional foods. These results provide valuable information to health professionals and other stakeholders regarding the potential of functional foods to support improved health among the older adult population. (Supported by the Canadian Foundation for Dietetic Research)

### **Poster Presentation at the Canadian Nutrition Society 2012 Annual Meeting (May 2012):**

#### **Food neophobia is significantly related to factors associated with functional food consumption in older adults**

**Laura M. Stratton<sup>1</sup>, Meagan N. Vella<sup>1</sup>, Judy Sheeshka<sup>2</sup> and Alison M. Duncan<sup>1</sup>**

*Departments of <sup>1</sup>Human Health and Nutritional Sciences and <sup>2</sup>Family Relations and Applied Nutrition, University of Guelph, Guelph, ON N1G 2W1*

An abundance of functional food products with specific bioactive ingredients and/or increased nutrient density have emerged to target prevention and management of diet-related chronic disease. Older adults can particularly benefit from functional foods due to their multiple health concerns and growing proportion of the Canadian population. However, little is known about older adults' acceptance of and willingness to consume functional foods. The purpose of this study was to relate the degree of food neophobia to factors associated with functional food consumption in a sample of Canadian older adults. A total of 200 community dwelling older adults ( $70.8 \pm 7.17$  years old) completed a researcher-administered questionnaire exploring functional food consumption, attitudes towards functional foods, general health, medical and demographic data, and degree of food neophobia, which was assessed through completion of the 10-question Food Neophobia Scale (Pliner and Hobden, 1992). Cronbach's alpha for the Food Neophobia Scale was 0.85, indicating a high degree of internal reliability. Participants were divided into food neophobia score groups according to tertiles (low 10-23 (n=68), medium 24-31 (n=67), high 32-63 (n=65) degrees of food neophobia). Participants within the high food neophobia group reported the least willingness to try a new functional food ( $p=0.05$ ), were the least likely to report having confidence in the safety of functional foods ( $p=0.06$ ), and reported the greatest number of barriers to consuming functional foods ( $p=0.007$ ). Among the barriers to functional food consumption, cost was more frequently identified by participants within the high food neophobia group ( $p=0.02$ ), consistent with their reporting of the lowest annual household income ( $p=0.03$ ). The high food neophobia group also had a greater number of participants who reported taking prescription medications regularly ( $p=0.04$ ) and worried about functional foods interacting with their medications ( $p=0.05$ ). There were no other differences in factors related to consumption of functional foods or demographics among food neophobia groups. This research demonstrates that food neophobia is related to factors associated with functional food consumption and rationalizes the consideration of food neophobia in the advance of functional foods. (Supported by the Canadian Foundation for Dietetic Research)

**Poster Presentation at the Dietitians of Canada Annual 2012 Conference  
(June 2012):**

**Functional food awareness and perceptions in relation to information sources in older adults**

**Meagan N. Vella<sup>1</sup>, Laura M. Stratton<sup>1</sup>, Judy Sheeshka<sup>2</sup> and Alison M. Duncan<sup>1</sup>.**

*<sup>1</sup>Departments of Human Health and Nutritional Sciences and <sup>2</sup>Family Relations and Applied Nutrition, University of Guelph, Guelph, ON N1G 2W1*

The functional food industry has experienced innovative and economic expansion, yet research into consumer awareness and perceptions of functional foods and their associated health claims is limited. Older adults are particularly under-researched in this respect, and could benefit from incorporation of functional foods into their diets due to age-related issues pertaining to food and health. The purpose of this research was to identify perceived need for information related to functional foods among older adults ( $\geq 60$  years old), and to assess awareness and perceptions of health claims on functional food packages. Community-dwelling older adults ( $n=200$ ) completed a researcher-administered questionnaire about functional foods including current consumption, motivating factors, perceived need for information and awareness of health claims. Prevalence of functional food consumption was 93.0%. An increased awareness and knowledge was the most frequently reported factor that would promote functional food consumption (85.5%). Related to this, 63.5% of participants indicated that they needed more information about functional foods with preferred sources being newspapers/magazines/books (68.5%) and food labels (66.1%). When asked about health claims on functional food packages, 93.5% of participants indicated that they were aware of them and those with more education were more likely to report being aware ( $p=0.05$ ). Although functional food consumption among this sample of older adults is high, there is a need for further information regarding functional foods. These results provide information for registered dietitians and other stakeholders to inform development of strategies to promote health among older adults through consumption of functional foods. (Supported by Canadian Foundation for Dietetic Research)

# Acknowledgements

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# Appendices: Resource and Educational Materials

## University of Guelph Research Study Information Sheets:

- A. Functional Food Definition
- B. Functional Food Bioactives
- C. Functional Food Food Forms
- D. Functional Food Claims

## Functional Food Bioactives for Healthy Aging Resource Sheets:

- E. Antioxidants
- F. Dietary Fibre
- G. Omega-3 Fatty Acids
- H. Plant Sterols
- I. Prebiotics
- J. Probiotics



## Functional Food Definition

### Definition of a Functional Food

“A functional food is similar in appearance to.....  
a conventional food that is consumed as part of a usual diet, and is demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions, i.e. they contain bioactive compound.”

-Health Canada, 1998

### For the purposes of this questionnaire, a functional food

- has undergone processing or manipulation
- has increased health promoting, or disease preventing properties
- does NOT include conventional foods that have not been manipulated

The following pages offer examples of functional foods as defined for this questionnaire. Feel free to refer to these examples throughout the process, and ask questions of the researcher if needed.

## Types of Functional Foods

### Foods with added bioactives:

A food with a bioactive ingredient not naturally present added to the product.

E.g. Milk with Omega-3 fatty acids



### Foods with enhanced bioactives

A food that has been produced to increase the level of a bioactive naturally found in the product.

E.g. Yogurt with increased Probiotics



## Functional Food Examples: Eggs and Dairy

- Eggs with Omega-3 fatty acids
- Cheese with Probiotics
- Yogurt products with added Antioxidants, Prebiotics and Probiotics, Omega-3 fatty acids, Dietary fibre



## Functional Food Examples: Grain Products

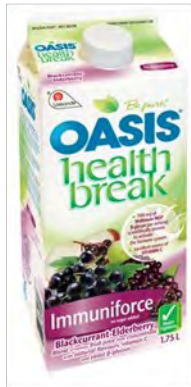
- Pasta with added Dietary fibre
- Cereal with added Omega-3 fatty acids, Dietary fibre, Prebiotics
- Bread with added Omega-3 fatty acids





## Functional Food Examples: Beverages

- Fruit or vegetable juice with added Antioxidants, Dietary fibre
- Soymilk with Omega-3 fatty acids
- Milk with Omega-3 fatty acids



## Functional Food Examples: Snacks

- Cookies with added Dietary fibre, Omega-3 fatty acids
- Granola bars or energy bars with added Omega-3 fatty acids, Dietary fibre
- Crackers with Omega-3 fatty acids, Dietary fibre



## Functional Food Examples: Condiments

- Margarine with added Omega-3 fatty acids
- Margarine with added Phytosterols
- Salad dressing with Omega-3 fatty acids
- Salad dressing with added Prebiotics



## Functional Food Bioactives

Ingredients, called bioactives, can be added to a food product, or their levels enhanced, to increase the health promoting, or disease preventing properties of the product, thus creating a functional food.

Below are some examples of bioactives and the products they are found in. Note that this is not an exhaustive list of bioactives that may be found in functional foods.

**Antioxidants (e.g. beta-carotene, lutein, lycopene), found in:**





**Dietary Fibre (e.g. beta-glucan, flax, psyllium, wheat bran), found in:**



**Omega-3 Fatty Acids (e.g. fish oil, flax), found in:**



### Plant Sterols, found in:



### Prebiotics, found in:



### Probiotics, found in:



## Functional Food Food Forms

Functional foods may come in different food forms. Below are some examples of food forms, and some products within them.

### Beverages:



### Breads:





**Cereals:**



**Cheese:**



**Crackers/Cookies:**



### Eggs:



### Granola Bars:



### Margarine:



**Pasta:**



**Yogurt and Yogurt Beverages:**



**Salad Dressing:**

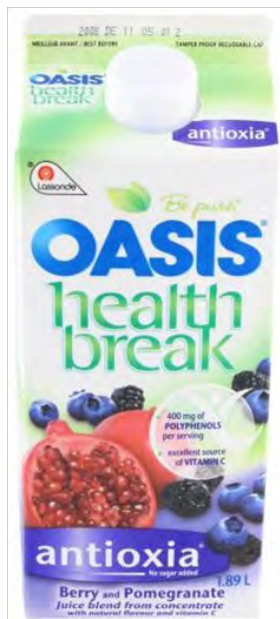




## Functional Food Claims

### Nutrient Content Claims

Claims on food packaging that indicate the presence of a specific nutrient, but do NOT relate the nutrient to health.



**“Excellent source of vitamin C.”**

**“No cholesterol  
No trans fat.”**



**“Very high source of fibre.”**



**“Low sodium.”**

## Nutrient Function Claims

Health claims on food packaging that link a component of the product to the maintenance of a physiological function or to physical or mental performance. Does NOT make reference to a disease.

**“DHA, an omega-3 fatty acid, supports normal development of the brain!”**



**“This delicious probiotic yogurt is a good source of calcium and vitamin D, which help build and maintain strong bones.”**



## Disease Risk Reduction Claims

Health claims on food packaging that link a component of the product to a reduced risk of a diet related disease or condition.

**“A healthy diet low in saturated and trans fats may reduce the risk of heart disease. Life cereal is free of saturated and trans fats.”**



**“A healthy diet with adequate calcium and vitamin D, and regular physical activity, helps to achieve strong bones and may reduce the risk of osteoporosis. Minute Maid is a good source of calcium.”**

## Antioxidants and Healthy Aging

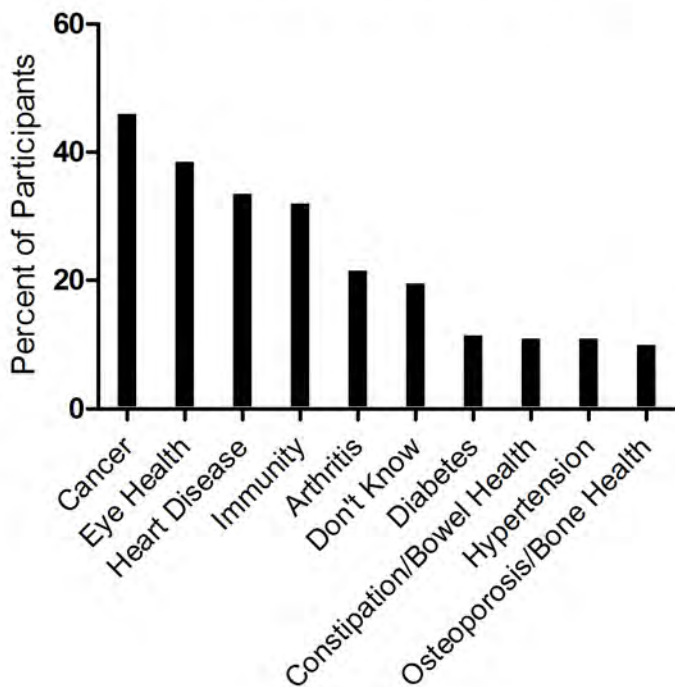
### What are they and what do they do?

- Antioxidants are defined as compounds that inhibit or delay oxidation of a substrate and therefore minimize the production of reactive oxygen species (ROS) which can cause damage to DNA, protein and lipids<sup>1-3</sup>.
- Increased production of ROS and increased oxidative stress have been associated with aging and also many chronic diseases (e.g. cardiovascular disease<sup>1-3</sup>, cancer<sup>1-3</sup> and Alzheimer's disease<sup>1,2</sup>).
- Diet is the most important source of antioxidants<sup>1,3</sup> providing vitamin C<sup>1-3</sup> and E<sup>1-3</sup>, carotenoids<sup>1-3</sup>, copper and selenium<sup>3</sup>, flavonoids<sup>2,3</sup> and many other phytochemicals<sup>2,3</sup>.
- Research suggests a diet rich in antioxidants reduces the risk of cardiovascular disease<sup>1,2</sup>, certain types of cancer<sup>1-3</sup> and neurodegenerative disorders including Alzheimer's disease<sup>1,2</sup>. Studies involving supplementation with antioxidants are often inconclusive<sup>1-3</sup>.
- It is important to note that some antioxidants (e.g. vitamin C, E, and some polyphenols) may also act as pro-oxidants under certain conditions<sup>1,2</sup>.

### What health areas do older adults address by consuming functional foods with antioxidants?

A University of Guelph study that explored functional food consumption in a sample of 200 older adults asked participants to indicate the health areas that they do address or would consider addressing by consuming functional foods containing antioxidants (see following figure).

Health areas addressed through the consumption of **antioxidants** in functional foods



#### Antioxidant Review References:

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## Dietary Fibre and Healthy Aging

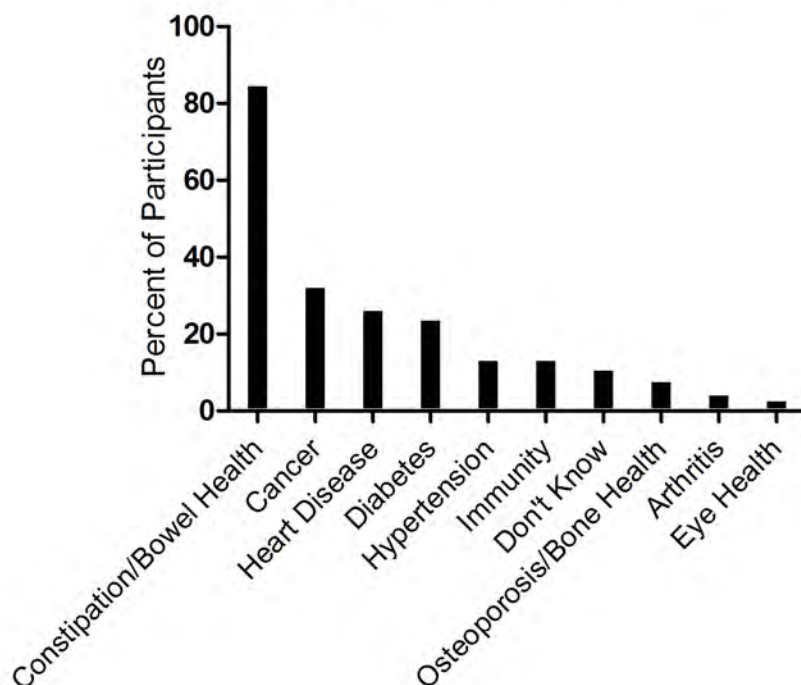
### What is it and what does it do?

- Dietary fibre can be defined as polysaccharides that are resistant to hydrolysis by digestive enzymes<sup>1,3</sup> (e.g. cellulose, pectin, gums, beta-glucans, inulin, oligosaccharides, fructans, lignin).
- The average intake of fibre in North America is approximately 15 g/day, however, to provide health benefits it is recommended that women consume 25 g/day and men consume 38 g/day<sup>1,2</sup> or 14 g/1000kcal<sup>1</sup>.
- Increased intake of dietary fibre has been associated with improvements in bowel function (e.g. decreased transit time and improved feces consistency), fermentability of colonic microbioata<sup>2</sup> and a reduced risk of gastrointestinal disorders<sup>1-3</sup>.
- Dietary fibre has been associated with a reduced risk of cardiovascular disease<sup>1-3</sup> and may reduce blood pressure<sup>1,2</sup>, improve lipid levels<sup>1,2</sup> and reduce inflammation<sup>1</sup>.
- Dietary fibre has also been associated with improved glycemic control<sup>1</sup> and a reduced risk of type 2 diabetes<sup>1-3</sup>, a reduced risk of certain types of cancer<sup>1-3</sup> (e.g. colon and colorectal<sup>3</sup>), and has also been recommended to help with weight loss<sup>1,2</sup> as it can increase satiety and reduce absorption time<sup>1</sup>.

### What health areas do older adults address by consuming functional foods with dietary fibre?

A University of Guelph study that explored functional food consumption in a sample of 200 older adults asked participants to indicate the health areas that they do address or would consider addressing by consuming functional foods containing dietary fibre (see following figure).

Health areas addressed through the consumption of **dietary fibre** in functional foods



### Dietary Fibre Review References:

1. Position of the American Dietetic Association: Health Implications of Dietary Fiber. *J Am Diet Assoc.* 2008;108:1716-1731.
2. Anderson JW, Baird P, David Jr RH, Ferreri S, Knudtson M, Koraym A, Waters V, Williams CL. Health benefits of dietary fiber. *Nutr Rev.* 2009;67: 188-205.
3. Raninen K, Lappi J, Mykkänen H, Poutanen K. Dietary fiber type reflects physiological functionality: comparison of grain fiber, inulin, and polydextrose. *Nutr Rev.* 2011;69: 9-21.

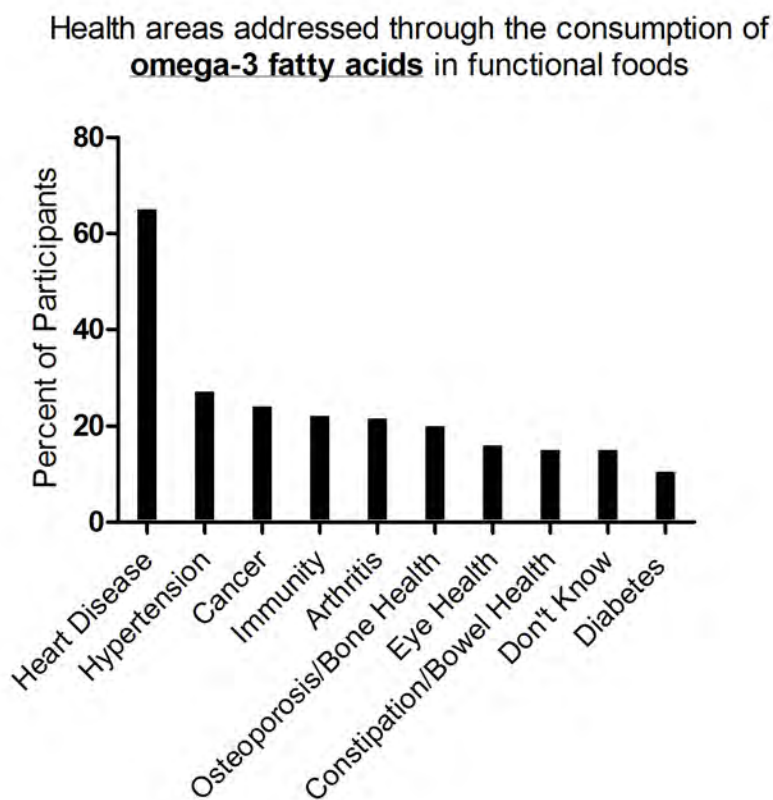
## Omega-3 Fatty Acids and Healthy Aging

### What are they and what do they do?

- Omega-3 fatty acids are long-chain polyunsaturated fatty acids<sup>4</sup> that are incorporated into cell membranes and affect membrane fluidity<sup>1,3,4</sup>, enzyme activity<sup>1,3,4</sup>, cell signaling<sup>3,4</sup>, gene expression<sup>1,3,4</sup> and eicosanoid production<sup>1,3,4</sup> which is involved in regulating inflammation<sup>1</sup>, platelet aggregation<sup>1</sup> and vasodilation/constriction<sup>1</sup>.
- The three major dietary omega-3 fatty acids are  $\alpha$ -linolenic acid (ALA), eicosapentanoic acid (EPA) and docosahexanoic acid (DHA)<sup>1-4</sup>, which is a major component of synaptic membranes<sup>2</sup>.
- EPA and DHA are found predominately in fish and fish oils<sup>2,3,4</sup>, where as ALA is found in plants (e.g. flax, walnuts, canola oil)<sup>4</sup>. ALA can be made into EPA and DHA, but the conversion rate in humans is low (<5%)<sup>2</sup>.
- Omega-3 fatty acids have been associated with improved cardiovascular health<sup>1-4</sup> (e.g. lowering triglyceride levels<sup>1,4</sup>, improving endothelial relaxation<sup>4</sup>, and reducing inflammation<sup>4</sup>).
- Omega-3 fatty acids have also been associated with a reduced risk of cognitive decline<sup>1,2</sup>, including dementia<sup>1</sup>, a reduced risk of certain cancers and also management of rheumatoid arthritis<sup>1</sup>.

### What health areas do older adults address by consuming functional foods with omega-3 fatty acids?

A University of Guelph study that explored functional food consumption in a sample of 200 older adults asked participants to indicate the health areas that they do address or would consider addressing by consuming functional foods containing omega-3 fatty acids (see following figure).



### Omega-3 Fatty Acid Review

#### References:

1. Riediger ND, Othman RA, Suh M, Moghadasian MH. A systemic review of the roles of n-3 fatty acids in health and disease. *J Am Diet Assoc.* 2009;109:668-679.
2. Plourde M. Omega-3 PUFA in aging. *Lipid Technol.* 2011;23:32-34.
3. Stark AH, Crawford MA, Reifen R. Update on alpha-linolenic acid. *Nutr Rev.* 2008;66:326-332.
4. Holub BJ. Clinical Nutrition: Omega-3 fatty acids in cardiovascular care. *Can Med Assoc J.* 2002;166:608-15.

## Plant Sterols and Healthy Aging

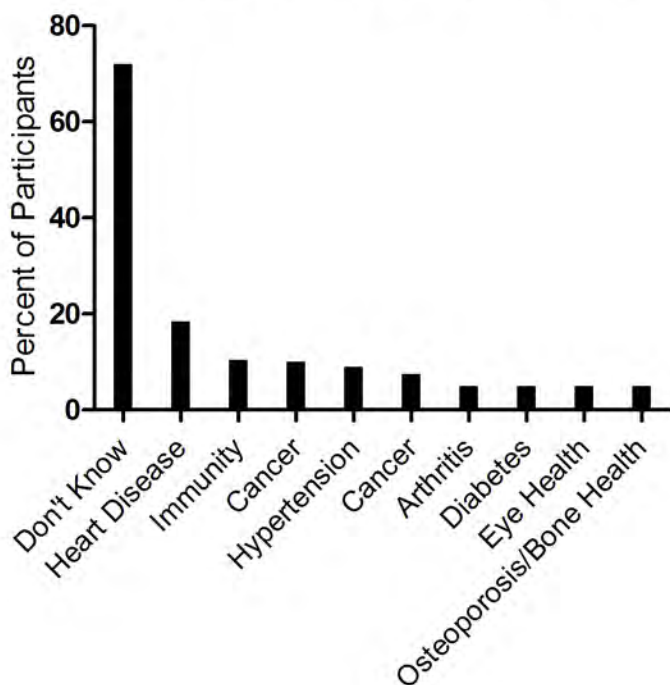
### What are they and what do they do?

- Plant sterols (or phytosterols) are phytochemicals found naturally in plants, including fruits, vegetables, nuts, seeds, grains, and legumes<sup>1,3</sup>.
- Plant sterols are structurally similar to cholesterol but are not readily absorbed<sup>1-3</sup>.
- Plant sterols compete and interfere with dietary and endogenous cholesterol absorption and effectively reduce circulating LDL and total-cholesterol, thereby reducing cardiovascular disease risk, at doses of 2 g/day<sup>1-3</sup>.
- Plant sterols have also been linked to reduced risk of numerous cancers (lung<sup>3</sup>, stomach<sup>3</sup>, colon<sup>2,3</sup>, breast<sup>2,3</sup>, and prostate<sup>2,3</sup>) and have demonstrated antioxidant, anti-inflammatory, and anti-atherogenic properties<sup>3</sup>.
- In May 2010, Health Canada approved a therapeutic claim for certain foods containing at least 0.65 g of free plant sterols per serving and blood cholesterol lowering. These claims can also state that high cholesterol is a risk factor for heart disease.

### What health areas do older adults address by consuming functional foods with plant sterols?

A University of Guelph study that explored functional food consumption in a sample of 200 older adults asked participants to indicate the health areas that they do address or would consider addressing by consuming functional foods containing plant sterols. Of note is that 72% of participants responded that they did not know (see following figure).

Health areas addressed through the consumption of **plant sterols** in functional foods



#### Plant Sterol Review References:

1. AbuMweis SS, Jones PJ. Cholesterol-lowering effect of plant sterols. *Curr Atheroscler Rep.* 2008;10:467-472.
2. Jones PJ, AbuMweis SS. Phytosterols as functional food ingredients: linkages to cardiovascular disease and cancer. *Curr Opin Clin Nutr.* 2009;12:147-151.
3. Rudkowska I. Plant Sterols and stanols for healthy ageing. *Maturitas.* 2010;66:158-162.



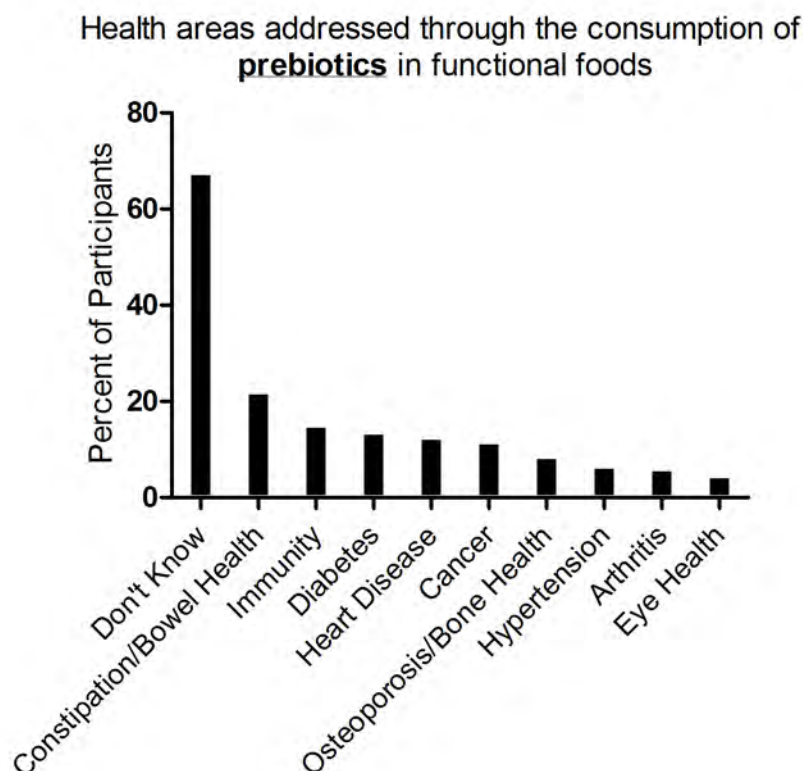
## Prebiotics and Healthy Aging

### What are they and what do they do?

- Prebiotics are defined as non-digestible food ingredients that stimulate the growth and/or activity of bacteria in the colon, conferring a benefit to the host<sup>1-3</sup>.
- Prebiotics may be a beneficial strategy for older adults as increased age may modify the composition and diversity of the gut microbiota<sup>3</sup>.
- The majority of prebiotics are oligosaccharides or short polysaccharides<sup>2</sup>. The prebiotics most commonly studied are inulin-type fructans (e.g. inulin, oligofructose) and galacto-oligosaccharides<sup>2,3</sup>.
- Prebiotic use has been associated with the following health benefits: improvement of intestinal functions (stool bulking, regularity and consistency)<sup>2,3</sup>; regulation and modulation of immune functions<sup>1,3</sup>, including reduced risk of infections (particularly for those who may be more susceptible)<sup>1</sup>; increase in bone calcium content and bone mineral density<sup>2,3</sup>; reduced risk of obesity<sup>3</sup>, type 2 diabetes<sup>3</sup>, metabolic syndrome<sup>3</sup>, coronary heart disease<sup>2</sup>, and colon cancer<sup>2,3</sup> and reduced risk and/or improved management of intestinal inflammation<sup>3</sup> and inflammatory bowel conditions<sup>1</sup>.
- Consumption of inulin and oligofructose at doses of 4-15 g/day have been shown to modify intestinal microbiota<sup>2</sup>.
- It is important to note that prebiotics and probiotics may work together to benefit the host (also referred to as synbiotics). For more information on probiotics see Appendix J.

### What health areas do older adults address by consuming functional foods with prebiotics?

A University of Guelph study that explored functional food consumption in a sample of 200 older adults asked participants to indicate the health areas that they do address or would consider addressing by consuming functional foods containing prebiotics (see following figure).



#### Prebiotics Review References:

1. Lomax AR, Calder PC. Prebiotics, immune function, infection and inflammation: a review of the evidence. *Br J Nutr.* 101;5:633-658.
2. Tuohy KM. Inulin-type fructans in healthy aging. *J Nutr.* 2007;137 (11 Suppl):2590S-2593S.
3. Roberfroid M, Gibson GR, Hoyles L, McCartney AL, Rastall R, Rowland I, Wolvers D, Watzl B, Szajewska H, Stahl B et al. Prebiotic effects: metabolic and health benefits. *Br J Nutr.* 2010;104(Suppl 2):S1-S63.

## Probiotics and Healthy Aging

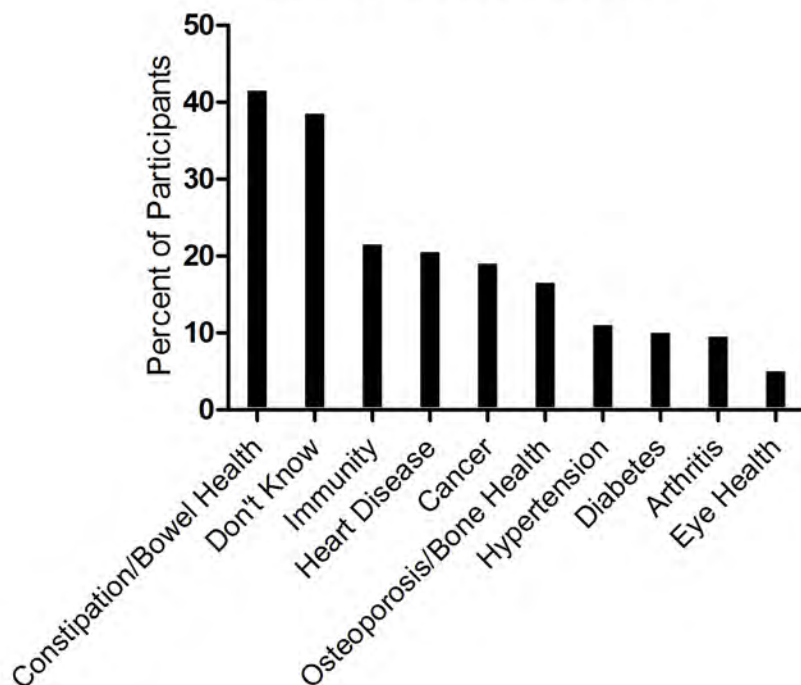
### What are they and what do they do?

- Probiotics are defined as live microorganisms which when administered in adequate amounts can alter intestinal microbiota and confer a health benefit to the host<sup>1-3</sup>.
- Probiotics may be a beneficial strategy for older adults as increased age may modify the composition and diversity of the gut microbiota<sup>1</sup>.
- The most common probiotics include strains of *Lactobacillus* and *Bifidobacterium*<sup>2,3</sup>. It is important to note that the health benefits associated with a specific strain of probiotics may not necessarily be extrapolated to another<sup>1</sup>.
- Probiotic use has been associated with the following health benefits: Improved immune function<sup>1-3</sup>; treatment of gastrointestinal disorders<sup>1-3</sup> (e.g. alleviating constipation<sup>1</sup>, treating diarrhea<sup>2,3</sup>, managing Crohn's Disease<sup>2,3</sup>, IBS<sup>3</sup>, IBD<sup>2,3</sup>, and diverticular disease<sup>3</sup>); increased eradication of *H. pylori* when probiotics are included as part of anti-*H. pylori* therapy<sup>2</sup>; reduced risk of colon cancer<sup>2,3</sup>, UTIs<sup>2</sup>, and hypertension<sup>2</sup>; cholesterol lowering properties<sup>2</sup> and prevention and treatment of allergies<sup>2,3</sup>.
- The recommended dose of probiotics to obtain health benefits is  $5 \times 10^9$  CFU/day for 5 days<sup>3</sup>.
- It is important to note that prebiotics and probiotics may work together to benefit the host (also referred to as synbiotics). For more information on prebiotics see Appendix I.

### What health areas do older adults address by consuming functional foods with probiotics?

A University of Guelph study that explored functional food consumption in a sample of 200 older adults asked participants to indicate the health areas that they do address or would consider addressing by consuming functional foods containing probiotics (see following figure).

Health areas addressed through the consumption of **probiotics** in functional foods



#### Probiotics Review References:

1. Tiihonen K, Ouwehand AC, Rautonen N. Human intestinal microbiota and healthy ageing. *Ageing Res Rev.* 2010;9:107-116.
2. Kaur IP, Kuhad A, Garg A, Chopra K. Probiotics: delineation of prophylactic and therapeutic benefits. *J Med Food.* 2009;12:219-235.
3. Iannitti T, Palmieri B. Therapeutical use of probiotic formulations in clinical practice. *Clin Nutr.* 2010;29:701-725.