TORONTO **STAFF REPORT**

September 1, 2004

To: Board of Health

From: Dr. Barbara Yaffe, Acting Medical Officer of Health

Subject: Nutrition Recommendations for Canadians

Purpose:

This report informs the Board of Health about proposed changes to Health Canada's Nutrition Recommendations for Canadians and outlines Toronto Public Health's response to Health Canada regarding the proposed changes.

Financial Implications and Impact Statement:

There are no financial implications associated with this report.

Recommendations:

It is recommended that:

(1) the Board of Health request Health Canada to:

(a) rescind the draft Nutrition Recommendations for Canadians, and prepare a policy statement indicating that the Nutrition Recommendations for Canadians (1990) have been replaced by the Academy of Sciences' Dietary Reference Intake (DRI) reports;

(b) develop a comprehensive, user-friendly summary of the DRI reports which include a Canadian interpretation of the DRIs and position the DRIs in the context of Canadian dietary patterns;

(c) provide an interpretation and application of the DRIs by way of revised key messages (Canada's Guidelines for Healthy Eating) and a revised food guide (Canada's Food Guide to Healthy Eating) for Canadians; and

(2) the Board of Health communicate to the Federal Minister of Health its support for the adoption of the Academy of Sciences' Dietary Reference Intake (DRI) reports as the basis for Nutrition Recommendations for Canadians;

(3) the appropriate City Officials be authorized and directed to take the necessary action to give effect thereto.

Background:

The overall purpose of dietary guidance is to identify and promote a pattern of eating that meets nutrient needs for healthy growth and development and reduces the risk of chronic disease. Health Canada's dietary guidance includes several components (see Glossary of Terms, Attachment 1 for more details):

(a) Nutrition Recommendations for Canadians
(b) Canada's Guidelines for Healthy Eating
(c) Canada's Food Guide to Healthy Eating

Nutrition Recommendations for Canadians are a set of scientific statements published by Health Canada that outline the desired characteristics of the Canadian diet. Nutrition Recommendations for Canadians form the basis for Canada's Food Guide to Healthy Eating and Canada's Guidelines for Healthy Eating; consumer-oriented resources that translate complex nutrition information into key messages and practical food-based advice.

Health Canada initiated a review of its dietary guidance in 2002. Once the Nutrition Recommendations for Canadians are revised, revisions to Canada's Guidelines for Healthy Eating and Canada's Food Guide to Healthy Eating will follow.

The last version of Nutrition Recommendations for Canadians was published in 1990. During the 1990s Health Canada joined efforts with the National Academy of Sciences in the United States, to establish a process for reviewing and updating nutrition recommendations. Dietary Reference Intakes (DRI) were adopted as a framework for describing nutrition requirements that can be used for assessing and planning diets and for many other purposes such as nutrition labelling. The DRIs include a set of at least four nutrient based reference values for each nutrient (for more detail on the DRIs see Glossary of Terms, Attachment 1). The new terminology replaces the former Recommended Nutrient Intake (RNI) in Canada. Since 1997, the National Academy of Sciences has published 11 Dietary Reference Intake Reports.

Health Canada has used the DRI reports as a basis for its proposed changes to the Nutrition Recommendations for Canadians.

A. Canadian Nutrition Recommendations

The 1990 Nutrition Recommendations for Canadians are:

(a) The Canadian diet should provide energy consistent with the maintenance of body weight within the recommended range.
(b) The Canadian diet should include essential nutrients in amounts specified in the Recommended Nutrient Intakes.
(c) The Canadian diet should include no more than 30% of energy as fat (33 g/1000 kcal or 39 g/5000 kJ) and no more than 10% as saturated fat (11 g/1000 kcal or 13 g/5000 kJ).
(d) The Canadian diet should provide 55% of energy as carbohydrates (138 g/1000 kcal or 165 g/5000 kJ) from a variety of sources.
(e) The sodium content of the Canadian diet should be reduced.
(f) The Canadian diet should include no more than 5% of total energy as alcohol, or two drinks daily, whichever is less.
(g) The Canadian diet should contain no more caffeine than the equivalent of four cups of regular coffee per day.
(h) Community water supplies containing less than 1 mg/litre should be fluoridated to that level.

Health Canada has proposed that the following new set of Nutrition Recommendations for Canadians replace those published in 1990:

Recommendation on Energy:

(i) Canadian adults and children should accumulate 60 minutes of moderate physical activity per day in order to optimize health.
(ii) Canadians should consume a nutrient-dense diet providing energy consistent with the achievement and maintenance of body weight within the normal range.

Recommendation on Carbohydrates:

(i) Canadian adults and children should have 45-65% of total energy intake as carbohydrates.
(ii) A dietary fibre intake of 14g/1000 kcal/day is recommended for Canadian adults and children.
(iii) Fruit, vegetables, whole grain products and legumes should be the primary sources of carbohydrates and fibre in the diet. Dietary sources of added sugars should be limited.

Recommendation on Fat:

(i) Intakes of trans fatty acids, saturated fatty acids, and dietary cholesterol should be minimized as much as possible while consuming a nutritionally adequate diet.
(ii) Dietary fat should primarily consist of mono- and polyunsaturated fatty acids and polyunsaturated fatty acids should provide an appropriate amount of essential fatty acids (linoleic and alpha linolenic acid).

(iii) Canadian children aged 1 to 3 years should have a total fat intake between 30-40% of total energy intake. Canadian children aged 4 to 18 years should have a total fat intake between 25-35% of total energy intake.
(iv) Canadian adults should have a total fat intake between 20-35% of total energy intake.

Recommendation on Essential Nutrients:

(i) Canadian adults and children should meet the Recommended Dietary Allowance (RDA) or the Adequate Intake (AI) for essential nutrients by consuming a variety of nutrient dense foods.
(ii) In addition to consuming a variety of nutrient dense foods, individuals within the following sub-populations may need to add a vitamin and/or mineral supplement or foods fortified with vitamins and/or minerals to their diet in order to achieve recommended levels of intake for certain nutrients: breastfed infants, women of child-bearing age, pregnant women, adults over the age of 50 years and individuals consuming only foods of plant origin.
(iii) Care should be taken to avoid usual consumption of nutrients in amounts exceeding the Tolerable Upper Intake Level (UL).

The full text of the draft Nutrition Recommendations for Canadians, with the accompanying rationale, is attached as Attachment 2. Toronto Public Health staff have reviewed these draft recommendations and have provided Health Canada with feedback (Attachment 3).

Comments:

Although TPH has concerns about the present draft Nutrition Recommendations for Canadians, the basis for the recommendations come from The National Academy of Sciences' DRI reports, which are well researched and referenced documents based upon the latest scientific information.

A. Toronto Public Health Concerns with the Draft Recommendations

Toronto Public Health supports Health Canada's adoption of The National Academy of Sciences Dietary Reference Intakes (DRIs). However, staff have several concerns with the draft Nutrition Recommendations for Canadians. These are outlined below.

1. Individual vs. Population Approach

The approach taken in the draft Nutrition Recommendations for Canadians is one that is focussed on the individual. For example, the draft recommends that "Canadian adults and children should meet the Recommended Dietary Allowance (RDA) or the Adequate Intake (AI) for essential nutrients." The RDA and AI are appropriate for planning and assessing diets of individuals, but not for planning and assessing diets of groups/populations. The Estimated Average Requirement (EAR) is the appropriate value to plan and assess diets of groups/populations. By recommending the RDA or AI for essential nutrients instead of the EAR, the draft Nutrition Recommendations for Canadians become inappropriate to use for public health practice, which requires a population health approach. The draft Nutrition Recommendations for Canadians do not take

into account the new paradigm of a population health approach that was used to set the DRIs (see Attachment 1, Glossary of Terms for an explanation of the RDA, AI and EAR).

2. Context

The draft Nutrition Recommendations for Canadians are without any context. Health Canada should include an explanation of the DRIs, the process used to set nutritional requirements, and the appropriate application of the DRIs. Furthermore, the Nutrition Recommendations must be delivered within the context of balance, variety, and overall dietary patterns. Health Canada has provided specific recommendations for planning individual diets, but has missed the "bigger picture" of healthy eating patterns for groups and populations. Also missing is information about the present nutrient intake of the Canadian population in relationship to the Recommendations and directional statements to guide the population in achieving the Recommendations. For example, many Canadians currently consume too many Calories from fat, and specifically from saturated and trans fatty acids. While the draft Nutrition Recommendations indicates that an Acceptable Macronutrient Distribution Range for total fat intake is 20-35% of energy and to limit intakes of saturated and trans fatty acids, they do not indicate what the current intakes of these nutrients are in the Canadian diet.

3. Inaccessibility of DRI reports

The process of developing and publishing the DRIs has not been well understood by nutrition and other health professionals for many reasons (e.g., sequencing of reports, lack of communication). To add to this, the DRI reports are long, cumbersome and expensive and are therefore not easily accessible to community nutrition professionals working in public health, community health centres and non-governmental organizations for whom budgetary constraints have limited the purchasing of these publications. To effectively utilize DRIs, Health Canada must support nutrition practitioners by developing an accessible and comprehensive summary report that will provide guidance on the interpretation and application of the DRIs for Canadians. This may also help prevent misuse and incorrect application of the DRIs.

4. Completeness of Information

(a) Alcohol, Caffeine and Sodium:

The draft Nutrition Recommendations for Canadians does not provide guidance with regard to alcohol, caffeine and sodium, as was the case in the 1990 version of Nutrition Recommendations for Canadians. The understanding of the relationship between these dietary components and health has changed since 1990. For example: moderate consumption of alcohol reduces the risk of cardiovascular disease but increases the risk of some cancers; previously accepted amounts of caffeine are no longer considered safe for some subpopulations, including pregnant and breastfeeding women; and some individuals may benefit from reducing their sodium intake while other individuals will not. While earlier advice for Canadians to consume alcohol, caffeine and sodium in moderation may not change, Health Canada should include information on these dietary components.

(b) Protein:

Protein, like the other macronutrients (fat and carbohydrates), should have its own section. As all three are essential nutrients, it is misleading to describe protein in the Essential Nutrient section but not fat and carbohydrates. In light of the current high protein/low carbohydrate diet "craze", it becomes even more important to provide clear information on appropriate macronutrient distribution in a way that is not subject to misinterpretation. To clarify the issue further the Essential Nutrient Section could be retitled Essential Vitamins and Minerals.

5. Readability

The draft Nutrition Recommendations for Canadians must be reviewed for consistency and clarity of language and format. There are many examples where this has not been accomplished. Furthermore, there should be consistency in the order in which information is presented within the different documents (e.g., Definition of nutrient, role of nutrient, requirement of nutrient) and each section should include a glossary of terms.

6. Target Audience

The intended target audience for the draft Nutrition Recommendations for Canadians is unclear. If it is meant for use by a variety of health professionals, policy makers, scientists and the food industry, the current draft is not suitable for many of these audiences. It provides an overly simplified account of current dietary requirements with insufficient depth for nutrition professionals and scientists; yet many sections of the document are highly technical with insufficient background information for health professionals and policy makers who do not have a nutrition background.

7. Purpose

The intended purpose of the draft Nutrition Recommendations for Canadians is unclear. As stated previously, if the documents are intended to serve as a condensed version of the DRI reports, they do not provide sufficient information to ensure appropriate application of the concepts explained in the DRI reports. Furthermore there has been no attempt in the draft to provide a Canadian interpretation of the DRIs or to put the DRI recommendations into the context of Canadian dietary patterns.

For further details on Toronto Public Health's response to Health Canada, see the letter in Attachment 3.

B. Positive Aspect of the DRI Reports

There are, however, some positive changes from the DRI reports that do relate to current public health nutrition issues and trends. The DRIs are a set of nutrient reference values for assessing and planning diets of individuals and populations. They are both more comprehensive and more current than the Recommended Nutrient Intakes that Health Canada published as part of the 1990 Nutrition Recommendations for Canadians.

1. More Emphasis on Physical Activity and Energy Balance

The DRI reports recommend that for children and adults "to prevent weight gain as well as to accrue additional, weight-independent health benefits of physical activity, 60 minutes of daily moderate intensity physical activity (e.g., walking/jogging at 4 to 5 miles per hour) is recommended, in addition to the activities required by a sedentary lifestyle." Although Health Canada has already set similarly high standards for physical activity in "Canada's Physical Activity Guide", the DRI reports have re-emphasized the synergy that occurs with being physically active and eating well in relation to reducing the risk of chronic diseases and obesity.

2. Use of a Range of Healthy Intakes for Carbohydrate, Fat and Protein

While the 1990 Nutrition Recommendations proposed set levels of fat and carbohydrate (e.g., no more than 30% of energy as fat), the DRI report concludes that there is a range of intakes of carbohydrate, fat and protein that are associated with reduced risks of chronic disease while providing adequate intakes of essential nutrients. This is called an Acceptable Macronutrient Distribution Range (AMDR, see Glossary of Terms, Attachment 1) and is expressed as a percentage of energy intake. AMDRs allow some flexibility in dietary patterns through the life cycle and in the prevention of disease and provide guidance to professionals as they advise the consumer on the latest fad diets. For example, some low-carbohydrate diets recommend intakes of fat and protein that are well above, and intakes of carbohydrate that are well below the AMDRs set out in the DRI report. While there is some flexibility in what is considered to be a healthy intake of macronutrients, the AMDRs provide evidence that diets that essentially eliminate carbohydrate-containing foods in favour of foods that contain mostly fat and protein are not safe for long term use.

3. More Specificity Regarding Types of Dietary Fat

The DRIs recognize that some types of fat are healthier than others and should be increased (e.g., essential fatty acids) while others should be decreased or avoided (e.g., trans fatty acids, saturated fatty acids, cholesterol). This is in contrast to previous messages to reduce fat without enough specificity on the types of fat. This has resulted in consumer confusion about the use of healthier oils such as olive and canola oils and contributed to the over-consumption of non-nutritious albeit "low-fat" foods that contain unhealthy trans fatty acids. Research has shown that both saturated and trans fatty acids have negative impacts on health, and that trans fatty acids are even more detrimental to health than saturated fatty acids. Canadians are among the highest consumers of trans fatty acids in the world due to the use of partially hydrogenated vegetable oils by food manufacturers in processed, packaged foods and commercial baked goods. Health Canada should encourage food manufacturers to show leadership and produce healthier processed foods and be more specific about the types of fat to restrict and those that can be increased. Health Canada's mandatory nutrition labels on food packages will further encourage food manufacturers to produce healthier foods since the standardized Nutrition Facts panel placed on food products shows the amount of fat and the amount of saturated and trans fatty acids in almost all packaged food products.

4. More Emphasis on Dietary Fibre

Research has shown many health benefits associated with diets rich in dietary fibre. In the past there was no set recommendation for dietary fibre intake in Canada (although it was generally accepted that 25-35 grams of dietary fibre per day was a healthy range for adults). The belief that diets rich in "complex carbohydrates" would lead to diets rich in dietary fibre has not been substantiated in practice, since many people consume refined grain products that are relatively low in dietary fibre. The DRIs set specific recommendations for dietary fibre intake, which were translated in the draft Nutrition Recommendations for Canadians to be 14 grams of dietary fibre per 1000 Calories of energy. The draft Nutrition Recommendations also explicitly state that carbohydrate-containing foods that are rich in dietary fibre (i.e. fruit, vegetables, whole grain products and legumes) should be the primary sources of carbohydrates in the diet.

5. Recommendation to Limit Added Sugars

The topic of added sugars remains controversial. Added sugars include all sugar, corn syrups, honey, and maple syrup added to foods. It does not include sugars that naturally occur in fruits, vegetables and dairy products. In the past, Health Canada's nutrition guidance has not recommended a limit on added sugars. The DRI report concluded "based on the data available on dental caries, behaviour, cancer, risk of obesity and risk of hyperlipidemia, there is insufficient evidence to set a Tolerable Upper Intake Level (see Attachment 1 for Glossary of Terms) for… added sugars." The DRI report also showed that increased intakes of added sugars are associated with decreased intakes of certain micronutrients, such as calcium, zinc, folate, riboflavin, and vitamins A, C and E. This occurs because added sugars are abundant in energy dense, nutrient poor foods (e.g., soft drinks, cakes, candy, fruit drinks) whereas naturally occurring sugars are primarily consumed from fruits, milk and dairy products that also contain essential micronutrients.

The DRI report recommends that no more than 25% of total energy should come from added sugars. While no national nutrition survey data exist that measure intakes of added sugars in Canada, the Canadian Sugar Institute estimates that the average Canadian consumes about 60 g of added sugars per person per day, which is approximately 12% of energy from added sugars. While it appears that current intakes of added sugars are at an acceptable level, a person who eats an average 2000 Calorie diet would be obtaining just over the recommended allowance (26% of energy as added sugar) by consuming one cup of frosted oat cereal (12 g of added sugars), 2 coffees with two teaspoons of sugar in each (16 g of added sugars), one chocolate glazed doughnut (22 g of added sugars), a 12-inch turkey submarine sandwich (16 g of added sugars), one 355 mL can of cola (40g of added sugar), a chocolate chip granola bar (7 g of added sugars), and one cup of chocolate milk (about 17 g of added sugars). Though the DRIs and draft Nutrition Recommendations caution against high intakes of added sugars, consumers will have difficulty deciphering the amount of added sugars from naturally occurring sugars as both items are counted together as "Sugars" on the standardized Nutrition Facts panel.

C. Implications for Toronto Public Health

The lack of a current, user-friendly resource for nutrition and other health professionals in public health outlining the most recent dietary recommendations for Canadians, makes it more difficult for Toronto Public Health staff to provide sound nutrition advice to the public. The scientific analyses in the DRI reports will be very helpful once they are appropriately summarized for health professionals. The DRI reports will assist in providing sound advice to the consumer in light of emerging research and in light of the tremendous popularity and promotion of dietary regimes that may not be scientifically sound or healthy.

Conclusions:

Health Canada's role is to set national nutrition policy and provide leadership in the area of dietary guidance. The adoption of the National Academies of Sciences' Dietary Reference Intakes has been an important step forward in this policy development. The draft Nutrition Recommendations for Canadians as written are not a suitable replacement for the 1990 Nutrition Recommendations for Canadians, which although outdated, provided more in-depth scientific rationale for the recommendations.

Toronto Public Health has encouraged Health Canada to rescind the draft Nutrition Recommendations for Canadians, and instead, prepare a policy statement indicating that Nutrition Recommendations for Canadians (1990) has been replaced by the Academy of Sciences' Dietary Reference Intake (DRI) reports.

In addition, Health Canada should develop a comprehensive, user-friendly summary of the DRI reports which will include Canadian interpretation of the DRIs and position the DRIs in the context of Canadian dietary patterns as well as provide an interpretation and application of the DRIs by way of revised key messages (Canada's Guidelines for Healthy Eating) and a revised food guide (Canada's Food Guide to Healthy Eating) for Canadians.

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List of Attachments:

Attachment 1: Glossary of Terms

Attachment 2: Draft Nutrition Recommendations for Canadians (2004)

pdf versions can be obtained at the following links:
2 a) Recommendation on Energy
http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/comment_period_rec_on_energy_e.pdf
2 b) Recommendation on Fat
http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/comment_period_rec_on_fat_e.pdf
2c) Recommendation on Carbohydrate
http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/comment_period_rec_on_carbs_e.pdf
2d) Recommendation on Essential Nutrients
http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/comment_period_rec_on_ess_nut_e.pdf

Attachment 3: Toronto Public Health's response to Health Canada's draft Nutrition Recommendations for Canadians (July 15, 2004)

References:

Canadian Sugar Institute. [On-line website]. www.sugar.ca .

Health and Welfare Canada (1990). Nutrition recommendations: The report of the scientific review committee. Ottawa, ON: Minister of Supplies and Services Canada.

Health Canada (1998). Canada's Physical Activity Guide to Healthy Active Living.

Institute of Medicine (2000). Dietary Reference Intakes: applications in dietary assessment. Washington, DC: National Academy Press.

Institute of Medicine (2002). Dietary Reference Intakes: energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids. Washington, DC: National Academy Press.

Institute of Medicine (2003). Dietary Reference Intakes: applications in dietary planning. Washington, DC: National Academy Press.

Attachment 1
Glossary of Terms

Nutrition Recommendations for Canadians:

A set of scientific statements outlining the desired characteristics of the Canadian diet. Released in 1990, they were based on a review of the literature on nutrient requirements and on the relationships linking nutrition and disease. These 1990 recommendations have not been updated based upon current scientific literature; the draft Nutrition Recommendations for Canadians (2004) are being proposed as a replacement. This literature review informed the development of the Recommended Nutrient Intakes (RNIs).

Recommended Nutrient Intakes (RNIs):

RNIs were published in 1990 and outlined recommended intakes of essential nutrients. The RNIs have now been replaced by the Dietary Reference Intakes (DRIs).

Dietary Reference Intakes (DRIs):

A comprehensive set of nutrient reference values that can be used in planning and assessing diets with the aim of reducing the risk of chronic diseases. DRIs are established by Canadian and American scientists through an extensive review of scientific literature in a process overseen by the National Academy of Sciences. The DRIs are published as a series of reports. Eleven reports have been published between 1997 and 2004. The DRIs include AMDR, RDA, AI, UL, EAR, EER, see DRI Terminology below.

Canada's Guidelines for Healthy Eating:

Key messages to be communicated to healthy Canadians over two years of age with a level of language easily understood by the majority of Canadians.

Canada's Food Guide to Healthy Eating:

A key nutrition education tool for Canadians, it recommends a pattern for selecting foods to meet energy and nutrient needs while reducing the risk of chronic diseases. The Food Guide is based on the Nutrition Recommendations for Canadians and Canada's Guidelines for Healthy Eating.

<u>DRI Terminology</u>:

The DRIs for macronutrients are comprised of a set a reference values, that are defined as follows:

Acceptable Macronutrient Distribution Ranges (AMDR):

A range of intakes (represented as percent of energy intake) for a particular energy source that is associated with reduced risk of chronic disease while providing adequate intakes of essential nutrients.

Recommended Dietary Allowance (RDA):

The average daily dietary nutrient intake level sufficient to meet the nutrient requirement of nearly all (97-98%) healthy individuals in a particular life stage and gender group.

Adequate Intake (AI):

The recommended average daily intake level based on observed or experimentally determined approximations or estimates of nutrient intake by a group (or groups) of apparently healthy people that are assumed to be adequate – used when an RDA cannot be determined.

Tolerable Upper Intake Level (UL):

The highest average daily nutrient intake level that is likely to pose no risk of adverse health effects to almost all individuals in the general population. As intake increases above the UL, the potential risk of adverse effects may increase.

Estimated Average Requirement (EAR):

The average daily nutrient intake level estimated to meet the requirement of half the healthy individuals in a particular life stage and gender group.

Estimated Energy Requirement (EER):

The average dietary energy intake that is predicted to maintain energy balance in a healthy adult of a defined age, gender, weight, height and level of physical activity, consistent with good health.

Nutrition Labelling Standards:

% Daily Value (%DV):

A standard used on the Nutrition Facts panel on food packages to show if the food has a little or a lot of a given nutrient. Consumers can use the %DV as a benchmark, whether their individual requirements are more or less than the Daily Value or whether or not they know their nutrient requirements.

Attachment 2a

NUTRITION RECOMMENDATIONS FOR CANADIANS
DRAFT RECOMMENDATION ON ENERGY[1]

♦RECOMMENDATION

• Canadian adults and children should accumulate 60 minutes of moderate physical activity per day in order to optimize health.
• Canadians should consume a nutrient-dense diet providing energy consistent with the achievement and maintenance of body weight within the normal range [2]

♦ RATIONALE

Role of energy

Dietary energy is needed to sustain body mass, to fuel metabolic functions and to perform physical activity. Energy balance is achieved when energy intake is equal to energy expenditure. Body weight provides each individual with a readily available indicator of the energy balance.

Energy Requirement

The requirement for energy varies between individuals due to factors such as body size, lifestyle, and life-stage. The Dietary Reference Intakes reports define the Estimated Energy Requirement (EER) as: "the dietary energy intake that is predicted to maintain energy balance in a healthy adult of a defined age, gender, weight, height and level of physical activity, consistent with good health" (1). In children and pregnant or lactating women, the EER includes the energy needs associated with the deposition of tissues or the secretion of milk at rates consistent with good health. Equations to estimate the amount of energy required to maintain body weight have been developed according to age group, gender, body weight, and activity level classification (1) [A table with formulas will be included in the final version of the recommendation]. These equations estimate the average energy need for individuals with specified characteristics. The estimated EER does not represent the exact dietary energy intake needed to maintain energy balance for a specific individual, instead, it reflects the average needs for those with specified characteristics. By definition, the EER would be expected to underestimate the true energy need 50 percent of the time and to overestimate need 50 percent of the time leading to corresponding changes in body weight. Monitoring body weight provides

[1] The Nutrition Recommendations for Canadians are based on the Dietary Reference Intakes Reports , Institute of Medicine of the National Academies (1).
[2] The normal body weight range is defined in the Canada's Guidelines for Body Weight Classification in Adults. It is defined as a BMI between 18.5 and 24.9 inclusively (2).

the best guidance in adjusting the energy intake or expenditure of an individual to enable the achievement and maintenance of body weight within the normal range.

Relationship of energy balance to health and diseases

Energy intake

Energy is consumed in the form of food sources of carbohydrates, fat and protein. Alcohol also provides energy. If the energy derived from carbohydrates, protein, fat, or alcohol is consumed in excess of that utilized, the excess is stored in the body as fat and consequently can lead to weight gain. To achieve adequate intakes of essential nutrients while maintaining energy balance, micronutrient-dense foods must be selected.

The energy intake of an individual may vary considerably from day to day, and when averaged over a period of weeks has a coefficient of variation of 15 to 23 %. Energy intake is not closely synchronized with energy expenditure in the short term, but over the longer term of weeks and months, energy balance tends to be maintained. For most individuals, gains or losses of adipose tissue are less than 1 to 2 kg over a year.

An increase in body weight is the result of an energy imbalance (energy intake in excess of energy expenditure). On a population basis, overweight and obesity are associated with increased risk for type 2 diabetes, hypertension, coronary heart disease, stroke, gallbladder disease, osteoarthritis and some types of cancer. In adults, the risks to health increase with body mass index (BMI) of 25 kg/m^2 or greater. Moreover, abdominal obesity is highly correlated with the presence of insulin resistance and is considered to be one of the clinical components of the metabolic syndrome (a syndrome characterized by central obesity, insulin resistance/glucose intolerance, atherogenic dyslipidemia, high blood pressure, prothrombotic state, and proinflammatory state.). A BMI lower than 18.5 kg/m^2 may also be associated with health problems such as undernutrition and osteoporosis.

Energy expenditure

Energy expenditure is the sum of the energy needed to sustain basal metabolism, the energy cost associated with the thermic effect of food and the energy used in physical activity. Inactivity is a contributing factor to energy imbalance and weight gain.

Men and women with moderate to high levels of physical activity have lower mortality rates as compared to sedentary individuals. Regular physical activity reduces the risk of chronic disease development by favourably altering blood lipid profiles, enhancing insulin sensitivity, decreasing blood pressure, and changing body composition (decreasing body fat and increasing muscle mass). Moreover, regular exercise has been associated with vigor and overall well-being.

Maintaining an active lifestyle provides an important means for individuals to achieve energy balance. Canadian adults should accumulate 60 minutes of moderate physical activity daily (e.g., brisk walking) in order to improve overall health and maintain energy balance. Canada's Physical Activity Guides to Healthy Active Living (3,4,5) provides more information on the benefits of regular physical activity, the risks associated with inactivity, and makes specific recommendations to improve fitness and achieve particular outcomes of benefit to health.

Main message

Recommendation for adults

Sixty minutes of moderate physical activity should be accumulated per day in order to optimize health. There are significant health benefits to maintaining body weight within the normal range (normal BMI range for adults: 18.5-24.9 kg/m^2). Therefore, dietary energy intake should consist of micronutrient-dense foods and should be balanced with energy expenditure to enable the achievement and maintenance of a body weight within the normal range. Overweight (overweight BMI range for adults: 25-29.9 kg/m^2) and obese (obese BMI range for adults: ≥30 kg/m^2) individuals should make food choices that limit energy intake, without compromising micronutrient intake, and increase energy expenditure to stop weight gain and/or lose weight.

Recommendation for children

Canadian children should consume a diet providing energy consistent with optimal growth while maintaining a normal body weight. The Institute of Medicine recommends that children spend 60 minutes or more per day being physically active.

Recommendation for pregnant and lactating women

During pregnancy, energy intake and expenditure should be adjusted as necessary to establish and maintain desirable patterns of weight gain. During the first trimester, the EER for pregnant women is similar to the EER of non-pregnant women. Additional energy intake is recommended during the second and third trimesters because total energy expenditure is significantly increased due to the metabolic requirements of the uterus and the fetus and increased work of the heart and lungs. It is estimated that pregnant women require an additional 340 kcal/d during the second trimester and 450 kcal/d during the third trimester in addition to the EER for non-pregnant women, or as required to maintain an appropriate rate of weight gain. During lactation, additional energy is required for milk production. Accordingly, it is estimated that lactating women require an additional 330 kcal/d for the first six months postpartum and 400 kcal/d for the second 6 months postpartum in addition to the EER for non-pregnant women.

References:

1) Dietary Reference Intake for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (prepublication). Institute of Medicine of the National Academies Chapter 5, 936 pages, 2002. http://books.nap.edu/books/0309085373/html/1.html#pagetop

2) Canada's Guidelines for Body Weight Classification in Adults. Health Canada, 2003. http://www.healthcanada.ca/nutrition

3) Canada's Physical Activity Guide to Healthy Active Living. Health Canada, 1998.

4) Canada's Physical Activity Guide for Children. Health Canada, 2002.

5) Canada's Physical Activity Guide for Youth. Health Canada, 2002. http://www.heatlhcanada.ca/paguide

Attachment 2b

NUTRITION RECOMMENDATIONS FOR CANADIANS
DRAFT RECOMMENDATION ON DIETARY FAT[1]

♦ RECOMMENDATION

• Intakes of *trans* fatty acids, saturated fatty acids, and dietary cholesterol should be minimized as much as possible while consuming a nutritionally adequate diet.
• Dietary fat should primarily consist of mono- and polyunsaturated fatty acids and polyunsaturated fatty acids should provide an appropriate amount of essential fatty acids (linoleic and α-linolenic acid).
• Canadian children aged 1 to 3 years should have a total fat intake between 30-40% of total energy intake. Canadian children aged 4 to 18 years should have a total fat intake between 25-35% of total energy intake.
• Canadian adults should have a total fat intake between 20-35% of total energy intake.

♦RATIONALE

Definition of dietary fat

Dietary fat is composed of triglycerides, phospholipids, sterols and associated minor lipid-soluble components. Triglycerides are the major component of dietary fats. Chemically, triglycerides consist of glycerol and fatty acids, the latter of which can be classified into the following categories: saturated (SFA), cis-monounsaturated (MUFA), cis-polyunsaturated (PUFA) and *trans* fatty acids.

Two of the PUFA are essential and must be consumed in the diet: linoleic acid (of the ω-6 series) and α-linolenic acid (of the ω-3 series). Docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), two fatty acids derived from the elongation and desaturation of α-linolenic acid, are also of nutritional significance.
Cholesterol is a sterol found only in tissues of animal origin that plays an important role in steroid hormone and bile acid biosynthesis and the structure and function of membranes.

Monounsaturated fatty acids, saturated fatty acids, and cholesterol can be synthesized by the body as needed, provided there is sufficient energy, and consequently are not essential in the diet.

[1] The Nutrition Recommendations for Canadians are based on the Dietary Reference Intakes Reports, Institute of Medicine of the National Academies.

Role of fat

Dietary fat is a major source of energy for the body. It is required for the absorption of fat soluble vitamins (vitamins A, D, E and K) and carotenoids, and provides essential fatty acids. The main biological roles of essential fatty acids are as precursors of eicosanoids; regulators of gene expression; and as structural components of cell membranes, particularly in nerve tissue and the retina.

Fat requirement

Total fat

No Dietary Reference Intakes (DRIs) were set for total fat because there were insufficient data to identify a defined level of fat intake at which risk of inadequacy or prevention of chronic disease occurs (1).

Essential fatty acids

The Institute of Medicine of the National Academies has set Adequate Intakes (AIs) for linoleic acid and α-linolenic acid based on the median intakes of these fatty acids consumed in the United States where ω-6 and ω-3 fatty acid deficiencies are almost non-existent in healthy individuals (1) (ω-6 and ω-3 reference values will be available in a table in the final version of the recommendation on fat).

Relationship of fat to health and diseases

Total Fat

The Acceptable Macronutrient Distribution Range (AMDR) for total fat intake is 20-35% of total energy intake for adults. This range allows for sufficient intakes of essential nutrients while keeping the intake of saturated fatty acids at moderate levels. Total energy intake is the key factor in regards to weight control regardless of the proportion of protein, fat and carbohydrate in the diet. It has been shown that at isocaloric intakes, low fat diets do not produce weight loss. However, under *ad libitum* conditions, higher fat diets are moderately hypercaloric when compared with diets containing less fat.

Saturated fatty acids, trans fatty acids, and cholesterol

Intakes of saturated fatty acids, *trans* fatty acids and dietary cholesterol have each been independently and positively associated with recognized blood lipid biomarkers of heart disease risk. Any increase in the intake of these types of fat increases the risk of coronary heart disease in a linear fashion. However, it is neither possible nor advisable to achieve zero percent of energy from either saturated fatty acids or *trans* fatty acids in typical whole-food diets. The extraordinary dietary adjustments required to achieve zero percent of energy from these types of fat may introduce undesirable effects, such as inadequate intakes of micronutrients, and unknown and unquantifiable health risks. Nonetheless, by

making judicious dietary choices, it is possible to have a nutritionally adequate diet that is low in saturated fatty acids, *trans* fatty acids and dietary cholesterol.

Monounsaturated and Polyunsaturated fatty acids

Given the recommendation to minimize intakes of saturated and *trans* fatty acids, the majority of fat intake should consist of monounsaturated and polyunsaturated fatty acids.

Ratio of ω-6:ω-3 polyunsaturated fatty acids

The ω-6 and ω-3 polyunsaturated fatty acids are metabolized using the same series of enzymes and the balance of linoleic and α-linolenic acids is important in determining the amounts of elongated fatty acids in tissue lipids. The *Institute of Medicine of the National Academies* did not establish a recommendation about the ω-6:ω-3 ratio except for pregnant and lactating women (a ratio below 5:1 may be associated with impaired growth in infants). Further consideration is needed before a recommendation about the ω-6:ω-3 ratio and its impact on health can be established.

Essential fatty acids

The Acceptable Macronutrient Distribution Range (AMDR) for linoleic acid is 5-10% of total energy intake while that for α-linolenic acid is 0.6-1.2% of total energy intake. The lower boundaries of these ranges are based on the amounts needed to meet the Adequate Intakes (AIs) for adults and children for these nutrients.

The upper boundary for linoleic acid was set based on: the highest intakes of ω-6 PUFA in the North American population; the general lack of evidence demonstrating the safety of long-term intakes greater than 10% of energy; and evidence demonstrating that high intakes of linoleic acid create a pro-oxidant state that may predispose individuals to several chronic diseases.

The upper boundary for α-linolenic acid corresponds to the highest levels of this fatty acid consumed from foods by individuals in North America. Consumption of EPA and DHA at moderate levels may provide beneficial health effects. Up to 10% of the AMDR for α-linolenic acid can be consumed as EPA and/or DHA.

Main message

Recommendation for adults

Canadian adults should have a total fat intake within the Acceptable Macronutrient Distribution Range (20-35% of total energy intake). Food sources of *trans* fatty acids, saturated fatty acids and cholesterol that are poor sources of essential nutrients should be minimized as much as possible. Dietary sources of monounsaturated and polyunsaturated fatty acids should be preferred.

Recommendation for children

Since children have high-energy needs during growth and development, it is important to include sources of fat in their diet to meet this requirement, especially during the transition from a diet high in milk to a mixed diet of milk and other foods. A restricted fat intake may result in reduced intakes of essential fatty acids and certain micronutrients which could lead to possible nutrient deficiencies. As the requirement for energy to support growth decreases, there should be a transition from the high-fat diet of infancy to a diet where total fat intake is within the AMDR for adults. Children 1 to 3 years of age should have a total fat intake between 30-40% of total energy intake. Children 4 to 18 years of age should have a total fat intake between 25-35% of total energy intake. The recommendations relative to monounsaturated, polyunsaturated, saturated, and trans fatty acids are the same as those for adults.

Reference:

1) Dietary Reference Intake for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (prepublication). Food and Nutrition Board, Institute of Medicine of the National Academies, Chapter 8, 936 pages, 2002. http://books.nap.edu/books/0309085373/html/1.html - pagetop

Attachment 2c

NUTRITION RECOMMENDATIONS FOR CANADIANS DRAFT RECOMMENDATION ON CARBOHYDRATES [1]

♦ RECOMMENDATION

• Canadian adults and children should have 45-65% of total energy intake as carbohydrates.
• A dietary fibre intake of 14g/1000 kcal/day is recommended for Canadian adults and children.
• Fruit, vegetables, whole grain products and legumes should be the primary sources of carbohydrates and fibre in the diet. Dietary sources of added sugars should be limited.

♦ RATIONALE

Definition of carbohydrates

Carbohydrates can be classified according to the number and type of simple sugar units present. Monosaccharides (glucose, fructose, galactose) consist of 1 simple sugar unit. Disaccharides (sucrose, lactose, maltose) contain 2 sugar units linked by a chemical bond. Oligosaccharides, such as raffinose and stachyose, contain 3 to 10 sugar units while polysaccharides such as starch and glycogen have more than 10 units of sugar. Most digestible carbohydrates are broken down to monosaccharides in the intestine. Monosaccharides that are absorbed in the small intestine may be metabolized and stored as glycogen in liver or muscle cells or oxidized to give metabolically usable energy. Sugar alcohols are alcohol forms of monosaccharides and disaccharides (e.g., sorbitol and mannitol).

Sugars

"Sugars" is a term traditionally used to describe monosaccharides and disaccharides. Foods may contain naturally-occurring and/or added sugars and the total sugar content is the sum of these two. Naturally occurring and added sugars are indistinguishable chemically and physiologically. Added sugars are frequently abundant in energy dense and/or nutrient poor foods (e.g., soft drinks, cakes, cookies, pies, fruit drinks and candy), whereas naturally occurring sugars are present in foods which also provide important micronutrients (e.g., fruit, milk and other dairy products).

[1] The Nutrition Recommendations for Canadians are based on the Dietary Reference Intakes Reports, Institute of Medicine of the National Academies.

Dietary Fibre

Many carbohydrate-containing foods such as fruit, vegetables, whole grain products and legumes also contain non-digestible compounds. These compounds are included in the term dietary fibre which can be defined as the non-digestible carbohydrate and lignin that are intact and intrinsic material in plant foods. Dietary fibres are not digested by the enzymes of the small intestine and are not absorbed in this portion of the gastrointestinal tract. Consequently, they pass relatively intact into the large intestine.

Roles of carbohydrates

The primary role of carbohydrates in the body is as an energy source. Glucose is an important carbohydrate source of energy in the body and is essential for the brain, which is the only truly carbohydrate-dependent organ.

Carbohydrate requirement

The Institute of Medicine of the National Academies has set a Recommended Dietary Allowance of 130 g/day of non-dietary fibre and non-sugar alcohol carbohydrate for both adults and children based on the glucose needs of the brain. The RDA for pregnant women is 175 g/day of carbohydrate in order to ensure adequate glucose provision to the foetal brain in addition to meeting the needs of the mother. Similarly, to ensure the replacement of the carbohydrate secreted in human milk, the RDA for lactating women is 210 g/day of carbohydrate (1).
The Adequate Intake (AI) for dietary fibre for all age groups is set at 14g/1000 kcal of fibre per day based on the dietary fibre level associated with the lowest risk of coronary heart disease observed in large prospective studies (1).

Relationship of carbohydrate to health and disease

Total carbohydrate

The Acceptable Macronutrient Distribution Range (AMDR) for carbohydrate is 45-65% of total energy intake. In a sedentary population that tends to be overweight and obese, an intake of carbohydrate above the AMDR can induce a lipoprotein pattern called the atherogenic lipoprotein phenotype (characterized by high triglycerides, low high-density-lipoprotein cholesterol, and small low-density-lipoprotein cholesterol particles) that is associated with a high risk of coronary heart disease.

Dietary Fibre

Ingestion of dietary fibre is associated with various physiological effects such as delayed gastric emptying, enhanced laxation, attenuation of blood glucose response and normalization of blood lipid concentrations.

There is a strong relationship between fibre-containing foods such as whole grain products, fruit, and vegetables and reduced risk of coronary heart disease. Fruit, vegetables and whole grain products are important sources of dietary fibre and are sources of other nutrients. While establishing the Dietary Reference Intakes for nutrients, the Institute of Medicine of the National Academies found that data on the consumption of these foods, as opposed to individual nutrients present in them, showed an inverse relationship to chronic disease risk (1,2,3).

Added sugars

Based on a review by the Institute of Medicine of the National Academies of the data available on dental caries, behaviour, cancer, risk of obesity and risk of hyperlipidemia, it was considered that the evidence is insufficient to set a Tolerable Upper Intake Level (UL) for total or added sugars. However, it has been shown that increasing intakes of added sugars can result in decreased intakes of certain micronutrients in United States subpopulations. At added sugar intakes exceeding 25% of total energy, some groups are at risk of ingesting insufficient amounts of micronutrients, thus it is recommended that added sugars should be limited.

Glycemic Index

The Glycemic Index (GI) is a classification system that quantifies the relative blood glucose response to carbohydrate-containing foods. Although there is preliminary evidence suggesting that the consumption of foods with a low Glycemic Index (i.e. those that induce a relatively low rise in blood glucose concentrations) may have beneficial metabolic and disease prevention effects, further studies are needed before a recommendation in relation to the GI of carbohydrates can be confidently made for the general healthy population.

Main message

Recommendation for adults

Canadian adults should consume a nutrient dense diet providing energy consistent with the achievement and maintenance of body weight within the normal range. Forty-five to sixty-five percent of total energy intake should come from carbohydrates. More specifically, the primary sources of carbohydrates in the diets of Canadians should come from fruits, vegetables, whole grains and legumes. Dietary sources of added sugars should be limited to prevent the risk of micronutrient inadequacy. A dietary fibre intake of 14g/1000 kcal/day is recommended.

Recommendation for children

The recommendations for children are consistent with those made for adults.

References:

1) Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (prepublication). Food and Nutrition Board, Institute of Medicine of the National Academies, Chapter 6, 936 pages, 2002. http://books.nap.edu/books/0309085373/html/1.html#pagetop

2) Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids. Food and Nutrition Board, Institute of Medicine of the National Academies, Chapter 5, 529 pages, 2000. http://www.nap.edu/books/0309069351/html/

3) Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (prepublication). Food and Nutrition Board, Institute of Medicine of the National Academies, Chapter 7, 936 pages, 2002. http://books.nap.edu/books/0309085373/html/1.html#pagetop

Attachment 2d

NUTRITION RECOMMENDATIONS FOR CANADIANS
DRAFT RECOMMENDATION ON ESSENTIAL NUTRIENTS[1]

♦ RECOMMENDATION

• Canadian adults and children should meet the Recommended Dietary Allowance (RDA) or the Adequate Intake (AI) for essential nutrients by consuming a variety of nutrient dense foods.

• In addition to consuming a variety of nutrient dense foods, individuals within the following sub-populations may need to add a vitamin and/or mineral supplement or foods fortified with vitamins and/or minerals to their diet in order to achieve recommended levels of intake for certain nutrients: breastfed infants, women of child-bearing age, pregnant women, adults over the age of 50 years and individuals consuming only foods of plant origin.

• Care should be taken to avoid usual consumption of nutrients in amounts exceeding the Tolerable Upper Intake Level (UL).

♦ RATIONALE

Definition and role

Protein, fat, carbohydrates, fibre, vitamins, minerals and water are the major nutritional constituents of foods. These nutrients support normal growth and development as well as maintain health. Some nutrients are essential because they cannot be synthesized by the body at all or not in sufficient amounts to meet the body's needs (e.g., vitamins, minerals, essential fatty acids[2] and indispensable amino acids). These nutrients must be obtained through the diet. Other nutrients are non-essential, (e.g., cholesterol, some amino acids) because they can be produced in sufficient quantities by the body.

Water is the largest single constituent of the human body and is essential for cellular homeostasis and life. Water provides the solvent for biochemical reactions, is the medium for material transport and has unique physical properties to absorb metabolic heat. Water is essential to maintain vascular volume, to support supply of nutrients and to remove waste via cardiovascular system and renal and hepatic clearance (1).

[1] The Nutrition Recommendations for Canadians are based on the Dietary Reference Intakes reports, Institute of Medicine of the National Academies.

[2] Details on the recommended intake of essential fatty acids can be found in the recommendation on Dietary Fat.

Protein is the major functional and structural component of all cells in the body. Proteins are made of amino acids which act as precursors of many coenzymes, hormones, nucleic acids and other molecules essential for life. Thus, an adequate supply of dietary protein is essential to maintain cellular integrity and function, and for health and reproduction.

Nutrient requirements

Nutrient requirements vary among individuals based on age, gender and growth status, in addition to individual genetic variability. Physiological states such as pregnancy, lactation, specific health conditions (e.g., burns, disease states), drug and tobacco use also influence the body's needs. The Recommended Dietary Allowance (RDA) for each nutrient, established by the Institute of Medicine of the National Academies in the Dietary Reference Intakes (DRI) reports, represents the quantity that is sufficient to meet the nutrient requirements of nearly all (97-98 %) healthy individuals in a particular life stage and gender group. Where an RDA is not available, an Adequate Intake (AI) has been set based on intakes of healthy people or experimentally derived estimates. The RDA, or AI, is the nutrient intake goal for individuals [A table with nutrients reference values will be available in the final version of the Recommendation on essential nutrients] [More details about the application of the DRIs will be found in the general introduction of the final report].

Protein requirement

The Estimated Average Requirement (EAR) and RDA for protein are based on previous careful analyses of available nitrogen balance studies. The protein requirements for the different gender and age groups can be found in Appendix… [A table including the recommended intake of all macronutrients will be added to the final report]. In addition to the quantity, the quality of dietary protein is an important factor in meeting the protein requirement. The quality of a source of protein is an expression of its ability to provide the nitrogen and amino acid requirements for growth, maintenance and repair.

EARs and RDAs were derived for each of the indispensable amino acids for the different gender and age groups. The EARs for individual indispensable amino acids and for total protein were used to develop the amino acid scoring patterns for various age groups [A table with the scoring pattern will be included in the final report]. This scoring pattern serves to evaluate the quality of food proteins or their capacity to efficiently meet both the nitrogen and indispensable amino acid requirements of the individual.

Relationship of essential nutrients to health and disease

Intakes of nutrients at the level of the RDA reduce the risk of inadequacy for an individual to less than 3%. Intakes that meet the RDA thus exceed the actual requirements of most of the population, and not only prevent deficiency but achieve a defined level of tissue stores. Although the requirement distribution is not known for nutrients with an AI, intake at the level of the AI is presumed to meet the needs of most individuals within defined population groups. The Tolerable Upper Intake Level (UL) is not a target for intake but rather a level of intake above which the risk of adverse effects increases.

Certain groups of the population (breastfed infants, lactating women, women of child-bearing age, pregnant women, adults over 50 years old and individuals consuming only foods of plant origin) have nutritional needs that may not be met by diet alone; therefore vitamin and/or mineral supplements or fortified foods should be included in the diet of these individuals. When selecting vitamin and/or mineral supplements, informed choices should be made because the risk of adverse health effects increases with intakes above the UL.

Water

An Adequate Intake (AI) for total water (drinking water, water in other beverages and foods) is set based on the median intake of the general population (from U.S. NHANES III survey) and to prevent effects of dehydration. On a day-to-day basis, water intake is driven by thirst and allows maintenance of hydration status and total body water at normal levels (1). There is insufficient evidence to establish a recommendation for water intake as a mean to reduce chronic disease.

Protein

There was insufficient data to establish a UL for total protein intake based on chronic disease risk. To complement the Acceptable Macronutrient Distribution Range (AMDR) for fat (20-35% of total energy) and carbohydrate (45-65% of total energy) for adults, the suggested AMDR for protein is 10-35% of total energy to ensure a nutritionally adequate diet.

Groups with special needs

Breastfed infants

Vitamin D

The administration of a daily vitamin D supplement of 400 IU is recommended for all breastfed full-term infants until the child's diet includes at least 400 IU of vitamin D from other dietary sources (2). This recommendation is based on the current prevalence of rickets due to vitamin D deficiency, the northern geographic latitude of Canada at which sunlight exposure and hence cutaneous vitamin D synthesis is limited in winter, current practices related to sun safety for infants, and a history of safe and effective use of vitamin D supplementation in Canada.

Women of child-bearing age

Folic Acid

Scientific and medical evidence inversely correlates folic acid intake of women in the periconceptional period and the risk of having an infant born with neural tube defects. The evidence of a protective effect from folic acid supplements is much stronger than that of food folate. It is important to have an adequate intake of folic acid prior to pregnancy. Therefore, it is recommended that all women of child-bearing age who may become pregnant consume 400 µg of folic acid from a supplement of multi-vitamins and -minerals in addition to dietary folate from a varied diet (3,4). When choosing a supplement containing folic acid, care should be taken to

avoid consuming quantities of other nutrients above the ULs. In particular, vitamin A intakes should not exceed 10,000 IU/d, or 3, 000 µg/d because of its teratogenic effects.

Pregnant women

Folic Acid

The requirement for folate increases substantially during pregnancy because of the high rate of DNA synthesis and cell division that occurs at the beginning of the pregnancy, and later to support the needs of the growing fetus and related tissues. Pregnant women are encouraged to continue taking a supplement containing 400 µg /day of folic acid, in conjunction with a healthy eating pattern, to meet the increased need.

Iron

The requirement for iron increases during pregnancy to support the maternal red blood cell mass expansion and the needs of the growing fetus and related tissues. The RDA was established by using estimates for the third trimester to build iron stores during the first trimester of pregnancy. It is unlikely that the RDA can be achieved from food sources alone. Therefore, in addition to a folic acid supplement, an iron supplement is suggested to ensure that the RDA for iron is met during pregnancy (5).

Adults over 50 years of age

Vitamin B12

It is estimated that 10-30% of adults over 50 years of age have reduced gastric acidity and may not readily absorb the protein-bound form of vitamin B12 that is found naturally in foods. However, the bioavailability of the synthetic form of vitamin B12 is not altered. Consequently, it is recommended that adults over 50 years of age consume the RDA for vitamin B12 from synthetic sources (either in a supplement or in fortified foods) (6). Currently, very few foods in the Canadian food supply are fortified with synthetic vitamin B12.

Vitamin D

The requirement for dietary intake of Vitamin D increases notably with age. As the body ages, the capacity of the skin to produce vitamin D decreases, and this is often accompanied by a decreased exposure to sunlight. Thus, adults over 50 years of age are prone to hypovitaminosis D and associated bone abnormalities. Few foods contain vitamin D naturally, and at present only milks and margarine are fortified with vitamin D in Canada. Therefore, Canadians over 50 years of age are unlikely to consume the recommended amount of vitamin D from diet alone. Consequently, individuals over 50 years of age may require a supplement of vitamin D (7).

Smokers

Vitamin C

Because smoking increases oxidative stress and metabolic turnover of vitamin C, the requirement for smokers is increased by 35 mg/d (8).

Individuals who consume only foods of plant origin

Amino Acids

The RDA for individuals who consume only foods of plant origin is not different than the RDA for those consuming diets containing mixed plant and animal protein sources. However, individuals consuming only plant-based foods may be at risk of not getting adequate amounts of certain indispensable amino acids. More precisely, the concentrations of lysine, sulfur amino acids and threonine are lower in the protein of plant-based foods than in animal-based foods (9). Thus, individuals consuming only foods of plant origin should eat a variety of foods and make appropriate complementary food choices to ensure that they consume adequate amount of all the essential amino acids.

Of all the indispensable amino acids, lysine is the most likely to be limiting, particularly in diets where the predominant source of protein is cereals. Diets containing only plant-based foods that meet the RDA for total protein may not necessarily also meet the RDA for lysine. The risk of a lysine inadequacy is essentially removed by consuming a moderate to high proportion of other vegetable proteins, such as those from lysine-rich legumes (beans and peas) (10).

Other nutrients

It may be difficult to achieve adequate quantities of certain nutrients when consuming only foods of plant origin. Due to reduced bioavailability, the recommended intakes of iron and zinc are higher for this group of the population than for those consuming mixed diets. In addition, plant-based diets may not contain sufficient quantities of calcium, vitamin D and vitamin B12. Further details are presented in Table 1.

Table 1. Special considerations for individuals restricting their diet to plant-based foods only.

Nutrients	Special considerations
Iron	Recommended intake is 1.8 times higher compared to that for individuals eating animal foods, because the bioavailability of iron in plant foods is lower than in meat, fish and poultry (5). Individuals consuming plant-based foods only should take care to include sources of vitamin C to facilitate intestinal absorption of non-heme iron in foods of plant origin.
Zinc	Recommended intake may be 1.5 times higher compared to that for individuals eating animal foods, if the diet is high in inhibitors of zinc absorption such as phytate, fibre and calcium (5).
Vitamin D	Individuals consuming only plant-based foods should take care to include sources of vitamin D to ensure they meet the recommended intake (7).
Calcium	Individuals consuming only plant-based foods should take care to include food sources of calcium to ensure that they meet the recommended intake because most unfortified plant-based foods contain only modest amounts of calcium. Furthermore, the high content of oxalate and phytate in many vegetarian diets reduces the bioavailability of calcium (11). Vitamin D facilitates calcium absorption.
Vitamin B12	A synthetic source of vitamin B12 (either a supplement or fortified foods) is needed to meet the recommended intake because vitamin B12 is found only in foods from animal sources (6).

Main message

Canadian adults and children should consume a diet that provides essential nutrients in amounts sufficient to meet the RDA or AI while not exceeding the UL [Reference values will be included in a table for the final version]. Specific groups of the population may require supplements or fortified foods in addition to a healthy diet to meet recommended levels of intake: vitamin D for full-term breastfed infants, folic acid for women who may become pregnant, iron and folic acid throughout pregnancy, vitamin D and vitamin B12 for adults over 50 years of age, and vitamin B12 for individuals eating a diet consisting of plant-based foods only. Individuals should avoid usual intake of nutrients at levels above the UL.

References:

1) Dietary Reference Intakes for Water, Potassium, Sodium, Chloride and Sulfate (prepublication copy). Food and Nutrition Board, Institute of Medicine of the National Academies, chapter 4, 450 pages, 2004.

2) Vitamin D for breastfed infant, 2004 Health Canada recommendation (in preparation)

3) Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline. Food and Nutrition Board, Institute of Medicine of the National Academies, 592 pages, chapter 8, 2000.

4) Van Allen MI, McCourt C, Lee NS. Preconception Health, Folic Acid for the Primary Prevention of Neural Tube Defects. A resource document for health professionals, Ottawa, Ontario: Minister of Public Works and Government Services Canada. 2002. (Cat. Number H39-607/2002E).

5) Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Food and Nutrition Board, Institute of Medicine of the National Academies, chapter 9, 800 pages, 2002.

6) Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline. Food and Nutrition Board, Institute of Medicine of the National Academies, 592 pages, chapter 9, 2000.

7) Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride. Food and Nutrition Board, Institute of Medicine of the National Academies, chapter 7, 448 pages, 1999.

8) Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids. Food and Nutrition Board, Institute of Medicine of the National Academies, Chapter 5, 529 pages, 2000.

9) Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (prepublication). Food and Nutrition Board, Institute of Medicine, chapter 10, 936 pages, 2002. http://books.nap.edu/books/0309085373/html/1.html#pagetop

10) Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (prepublication). Food and Nutrition Board, Institute of Medicine of the National Academies, chapter 13, 936 pages, 2002. http://books.nap.edu/books/0309085373/html/1.html#pagetop

11) Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride. Food and Nutrition Board, Institute of Medicine of the National Academies, chapter 4, 448 pages, 1999.

Attachment 3

TORONTO

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July 15, 2004

Ms. Sylvie St-Pierre
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Dear Ms. St-Pierre:

RE: Toronto Public Health's response to Health Canada's draft Nutrition Recommendations for Canadians

Thank you for inviting stakeholder comments on the draft Nutrition Recommendations for Canadians. Toronto Public Health supports Health Canada's adoption of The National Academy of Sciences Dietary Reference Intakes (DRIs) and makes the following overall comments on the draft Nutrition Recommendations for Canadians:

1. Population Approach vs. Individual Approach

The approach taken in the draft Nutrition Recommendations for Canadians is one that is focussed on the individual. The most obvious example of this is in choosing the Recommended Dietary Allowance (RDA) or the Adequate Intake (AI) as the reference value for Essential Nutrients and not the Estimated Average Requirement (EAR). In assessing and planning diets for populations, the EAR is the appropriate reference value to use. By using the RDA and AI, the Nutrition Recommendations for Canadians become an inappropriate tool to use for public health practice and do not take into account the new paradigm that was used to set the DRIs.

2. Context

The draft Nutrition Recommendations for Canadians is without any context. Health Canada should include an explanation of the DRIs, the process used to set nutritional requirements, and the appropriate application of the DRIs. Furthermore, the Nutrition Recommendations must be delivered within the context of balance, variety, and overall dietary patterns. These concepts are addressed in Chapter 11 of the DRI Macronutrient report, but are absent from the current draft. In doing so, Health Canada has provided specific recommendations for planning individual diets, but has missed the "bigger picture" of healthy eating patterns for individuals and groups. Also missing is information about where the Canadian

population is with respect to the recommendations and where the population needs to move.

3. Inaccessibility of DRI reports

The process of developing and publishing the DRIs has not been well understood by nutrition and other health professionals for many reasons (e.g. sequencing of reports, lack of communication). To add to this, the DRI reports are long and cumbersome and are not easily accessible to community nutrition professionals working in public health, community health centres and non-governmental organizations for whom budgetary constraints have limited the purchasing of these publications. This is particularly the case with the "pre-publication" version of the Macronutrient and Applications reports, which are so critical to this stakeholder consultation. We feel that this may reduce the number and quality of comments to Health Canada regarding the draft Nutrition Recommendations for Canadians from the public health/NGO sectors. Unfortunately, this creates an uneven playing field when it comes to stakeholder feedback, as those organizations with greater resources (e.g. the food industry) do not face this barrier. If Health Canada is committed to the DRIs, it must support nutrition practitioners by developing an accessible and comprehensive summary report that will provide guidance on the interpretation and application of the DRIs for Canadians. This may help to prevent misuse and incorrect application of the DRIs.

4. Completeness of Information

a) Alcohol, Caffeine and Sodium:

The draft Nutrition Recommendations for Canadians does not provide guidance in regards to alcohol, caffeine and sodium, as was the case in the 1990 version of Nutrition Recommendations for Canadians. Health Canada should include information on these dietary components.

b) Protein:

It is misleading to not have a separate recommendation on Protein. By placing information on protein in with the Essential Nutrients section, there could be the perception that protein is an essential dietary component while carbohydrate and fat are not essential. In light of the current high protein/low-carbohydrate diet "craze", it becomes even more important to provide clear information on appropriate macronutrient distribution in a way that is not subject to misinterpretation.

5. Readability

The draft Nutrition Recommendations for Canadians must be reviewed for consistency of language, format and for clear language. There are many examples where this has not been accomplished. For instance, the 4 documents switch literacy levels throughout and need a more consistent writing style. Some places are more detailed and scientific while in other places the content seems superficial; some sections give food examples (e.g. simple sugars), while others do not (e.g. trans fats, essential fatty acids). Furthermore, there should be consistency in the order in which information is presented within the different documents (e.g. Definition of nutrient, role of nutrient, requirement of nutrient, etc.) and each section should include a glossary of terms.

6. Target Audience

The intended target audience for the draft Nutrition Recommendations for Canadians is unclear. If they are meant for use by a variety of health professionals, policy makers, scientists and food industry, the current draft is not suitable for many of these audiences. It provides an overly simplified account of current dietary requirements that does not provide enough depth for nutrition professionals and scientists; yet many sections of the document are highly technical with insufficient background information for health professionals and policy makers who do not have a nutrition background. Furthermore, the targets set for nutritional adequacy (i.e. RDA or AI) may lead to inappropriate application of the recommendations by the food industry. The current draft seems somewhat suitable for only one audience – Registered Dietitians who are assessing and planning diets of individual clients – and even then, they do not provide sufficient background information on the appropriate application of the DRIs.

7. Purpose

The intended purpose of the draft Nutrition Recommendations for Canadians is unclear. As stated previously, if the documents are intended to serve as a condensed version of the DRI reports, they do not provide sufficient information to ensure appropriate application of the concepts explained in the DRI report. Furthermore there has been no attempt in these documents to provide a Canadian interpretation of the DRIs or to put the DRI recommendations in the context of Canadian dietary patters.

As such, we recommend that Health Canada prepare a one-page policy statement indicating that:

a) Nutrition Recommendations for Canadians (1990) has been replaced by the Academy of Sciences' Dietary Reference Intake (DRI) reports; and
b) Health Canada will develop a comprehensive, user-friendly summary of the DRI reports which will include a Canadian interpretation of the DRIs and position the DRIs in the context of Canadian dietary patterns; and
c) Interpretation and applications of the DRIs will be translated into revised key messages (Canada's Guidelines for Healthy Eating) and a revised food guide (Canada's Food Guide to Healthy Eating) for Canadians.

Thank you again for providing Toronto Public Health with the opportunity to comment on the draft Nutrition Recommendations for Canadians. Please see the attached notes for specific comments related to each of the four draft recommendations.

Sincerely,

Original signed

Dr. Barbara Yaffe
Acting Medical Officer of Health

Cc: Mary Bush, Director, Office of Nutrition Policy and Promotion, Health Canada

Toronto Public Health's Response to Health Canada on
Draft Nutrition Recommendations for Canadians
July 16, 2004

Toronto Public Health makes the following specific comments and recommendations for each of the draft Recommendations:

Draft Recommendation on Energy

- Canadian adults and children should accumulate 60 minutes of moderate physical activity per day in order to optimize health.

- Canadians should consume a nutrient-dense diet providing energy consistent with the achievement and maintenance of body weight within the normal range[2]

1. There needs to be consistency between Health Canada's existing documents and what is recommended in this document. For instance:
   - This document refers to the Institute of Medicine's recommendation that children spend 60 minutes or more per day being physically active while *Canada's Physical Activity Guide for Children* recommends 90 minutes per day. Although Canada's Physical Activity Guides are referenced in the document, there could be confusion as to the amount of physical activity needed.
   - This document references Health Canada's *Canadian Guidelines for Body Weight Classification in Adults* and correctly defines a normal body weight range as a BMI between 18.5 and 24.9 inclusively. However, although the document refers to abdominal obesity as a risk factor for insulin resistance and the metabolic syndrome, it fails to define sex-specific cut-off points for Waist Circumference as published in the *Guidelines*.

2. We recommend that the energy recommendations be separated for adults and children, as the focus is slightly different in terms of achieving and maintaining a body weight within the normal range for these two groups. For adults, this often means weight loss while for children, it usually means weight gain during the period of growth and development. The point that energy is needed to enable growth and development is missing from this document. The document should therefore define "optimal growth" for children by referring readers to the U.S. Centers for Disease Control and Prevention BMI-for-age growth charts. Furthermore, we recommend clarifying what ages are being referred to as "children".

3. In order to make the Acceptable Macronutrient Distribution Ranges (AMDRs) more meaningful, it would be helpful to have information about the caloric density of macronutrients (e.g. 1 gram of carbohydrate provides 4 kcal) and an example of what the AMDRs would translate into based on a 2000 kcal diet.

4. This document does not refer to recommended ranges and rates of weight gain during pregnancy. While this information can be found in *Nutrition for a Healthy Pregnancy*, we recommend that Health

Canada review *Nutrition for a Healthy Pregnancy* to ensure consistency with the DRIs.

Draft Recommendation on Carbohydrate

- Canadian adults and children should have 45-65% of total energy intake as carbohydrates.
- A dietary fibre intake of 14g/1000 kcal/day is recommended for Canadian adults and children.
- Fruit, vegetables, whole grain products and legumes should be the primary sources of carbohydrates and fibre in the diet. Dietary sources of added sugars should be limited.

1. The definition for carbohydrate is lacking. More should be said about carbohydrate being the preferred fuel for the body during energy expenditure. Although there is some mention of using monosaccharides to give "metabolically usable energy", this could be stated more simply and could emphasize the increased need for carbohydrate intake in highly active individuals.

2. As part of the rationale for the recommendation of 14g/1000 kcal for fibre, it would be helpful to have a range of grams for daily intake and the average intake for healthy males, females, and children. As well, the description on fibre should be expanded to explain the types of dietary fibre with examples provided on where they can be found and what their varying roles are in the body.

3. Much controversy exists on the topic of added sugars. In light of this, we recommend the following:
   - The recommendation on limiting added sugars should be stated separately as its own recommendation. In the current draft, one element of the recommendation is positive ("Fruit, vegetables, whole grain products and legumes should be the primary sources of carbohydrates…") while the other element is more negative ("Dietary sources of added sugars should be limited"). To be clear, these two points should be separated out.
   - Provide more clarity on the relationship between obesity and foods that are energy dense due to addition of sugars such as high-fructose corn syrup.
   - While the draft states "…it has been shown that increasing intakes of added sugars may result in decreased intakes of certain micronutrients…" this implies causation when only an association has been shown. In light of this, the wording "may be associated with" should be used.
   - Health Canada should clarify which "subpopulations" are being referred to in the study cited.

4. We recommend placing the emphasis on vegetables rather than fruit by listing vegetables prior to fruit in both the recommendation and the rationale.

5. More detail and clarification are needed as to the recommendations for fibre intake for children (i.e. what are the relationships between fibre intake, nutritional adequacy and risk of chronic diseases in children). One concern is that a high fibre intake in diets of children less than 3 years old might displace intake of other key nutrients, or reduce the bioavailability of certain minerals (e.g., iron, zinc, calcium).

Draft Recommendations on Dietary Fat

- Intakes of trans fatty acids, saturated fatty acids, and dietary cholesterol should be minimized as much as possible while consuming a nutritionally adequate diet.
- Dietary fat should primarily consist of mono- and polyunsaturated fatty acids and polyunsaturated fatty acids should provide an appropriate amount of essential fatty acids (linoleic and - linolenic acid).
- Canadian children aged 1 to 3 years should have a total fat intake between 30-40% of total energy intake. Canadian children aged 4 to 18 years should have a total fat intake between 25-35% of total energy intake.
- Canadian adults should have a total fat intake between 20-35% of total energy intake.

1. The draft does not use strong enough language for the elimination of sources of trans fatty acids from the Canadian diet. While there are naturally occurring trans fatty acids in some foods (e.g. meat and dairy) the majority of trans fatty acids in the Canadian diet come from processed foods containing partially hydrogenated vegetable oils and shortening. In this document, Health Canada does not point out the major food sources of trans fatty acids, does not emphasize the adverse impacts of trans fatty acids on health, and does not clearly state that a safe intake level of trans fatty acids from processed foods is zero. Furthermore, in the rationale, there should be some reference to the fact that Canadians intakes of trans fatty acids are among the highest in the world. This could include examples of average trans fatty acid intakes found in the typical Canadian diet compared to a more acceptable amount.

2. In this document there is no discussion of the risk associated with dietary cholesterol compared to trans or saturated fatty acids. We recommend discussion of population attributable risks so that health professionals can put this information into context and can place the emphasis on minimizing trans and saturated fatty acid intake instead of focussing on dietary cholesterol.

3. It would be helpful to have more information on the relationships between saturated and monounsaturated fatty acids and risks of chronic diseases. The document should be very clear about why is there no AMDR, AI, EAR, or RDA (as it is stated in the DRI report), what levels of these fatty acids are acceptable and what levels of these fatty acids are currently found in the diets of Canadians.

4. The importance and role of omega-3 (DHA and EPA) fatty acids in the diet is understated in the draft Recommendations. There should be a greater discussion of the role of DHA and EPA, as well as the dietary sources of DHA and EPA.

5. The clarity, readability and consistency of this document can be improved by making the following changes:
   - Include a glossary of terms for the different types of fatty acids with food source examples given.

- Include a table outlining the composition of various fats and oils.
- Provide more detailed information on monounsaturated fatty acids.
- Refer to essential fatty acids by both their name and configuration (i.e. when discussing linoleic acid, put "omega-6" in brackets and when discussing α-linolenic acid, put "omega-3" in brackets).
- Provide the AMDR for total fat intake for children whenever the AMDR for total fat intake is given for adults.
- Provide more information from the DRI reports on low fat diets. The text is confusing and ambiguous.
- Provide more information on higher-fat diets in light of current low-carbohydrate diet trends that are often very high in fat.

Draft Recommendations on Essential Nutrients

- Canadian adults and children should meet the Recommended Dietary Allowance (RDA) or the Adequate Intake (AI) for essential nutrients by consuming a variety of nutrient dense foods.

- In addition to consuming a variety of nutrient dense foods, individuals within the following sub-populations may need to add a vitamin and/or mineral supplement or foods fortified with vitamins and/or minerals to their diet in order to achieve recommended levels of intake for certain nutrients: breastfed infants, women of child-bearing age, pregnant women, adults over the age of 50 years and individuals consuming only foods of plant origin.

- Care should be taken to avoid usual consumption of nutrients in amounts exceeding the Tolerable Upper Intake Level (UL).

1. As previously discussed, we are concerned that Health Canada is recommending that Canadian adults and children should meet the RDA or the AI for essential nutrients. In order for Nutrition Recommendations for Canadians to be an appropriate planning tool for populations, Health Canada should use the Estimated Average Requirement (EAR) as the nutrient reference value for essential nutrients.

2. As previously discussed, this document should not include protein, rather, there should be a separate recommendation on protein, with rationale provided. This recommendation could include information on plant-based diets and adequacy of indispensable amino acids in plant-based diets.

3. The second recommendation is too general and tries to lump together too many different groups. It is not clear whether individuals within the stated "sub-populations" could meet their increased nutrient needs with diet instead of supplementation and fortified of foods. Furthermore, some of these individuals may benefit from a multi-vitamin (e.g. pregnant women, vegans), others may require a single-nutrient supplement (e.g. women of child-bearing years) and yet others can likely meet their nutritional needs by diet alone (e.g. smokers). Clarification is required about which groups can meet their needs by diet alone and don't require supplementation.

4. This document speaks to the nutritional deficits of plant-based diets; however plant-based diets that are carefully planned, and diets that emphasize plant foods over animal products can be nutritionally adequate and associated with a reduced risk of chronic diseases. We suggest that the recommendations recognize the healthfulness of diets that emphasize plant foods over those that emphasize animal products, provided they contain sufficient lysine. In the section on *Individuals who consume only foods of plant origin*, food examples should be added to the table to reinforce food sources of missing nutrients. In the table, the calcium section refers to "vegetarian diets" however throughout the rest of this document, they are referred to as "plant-based diets". We recommend using consistent terminology, and specifying when the type of diet referred to is lacto-ovo vegetarianism.

5. This document does not mention fluoridated water and risk of dental caries in children due to consumption of bottled water. We recommend adding information on this topic.

6. The document states that for women of child-bearing age, folic acid should be taken "…from a supplement of multi-vitamin and minerals…" and warns against supplements with high doses of vitamin A. However, the section on pregnant women recommends "…taking a supplement containing 400 µg/day of folic acid…" We recommend the latter wording as there is no need for all women of child-bearing age to be taking a multi-vitamin and mineral preparation. Furthermore, the section on pregnant women should also caution against high intakes of vitamin A from supplements.

7. Consider the following areas of potential confusion in the section on *Individuals with special needs*:
   - There is no mention of lactating women; however, the RDA for folate is higher for lactating women who also may become pregnant during this period. It may be prudent to recommend that lactating women consume a diet rich in folate.
   - For pregnant women, individual supplements of folate and iron appear to be recommended, however it is in this group that a multi-vitamin mineral preparation would most likely be taken.
   - The section on iron does not specify the increase in women's iron needs during pregnancy and how much iron should be in a prenatal supplement.