Recommendations

Most individuals can meet their vitamin and mineral needs by healthy eating using Canada's Food Guide.

The following strategies can help an individual achieve appropriate intakes of vitamins and minerals:

- Choosing a variety of foods from all four food groups of Canada's Food Guide every day and eating the recommended number of servings from each food group every day.
- Choosing meals that include at least three of the four food groups.
- For adults: Eating three regular meals, and snacks if needed, throughout the day.
- For children: Providing three regular meals and two to three snacks every day. Provide snacks that include foods from Canada's Food Guide.
- Considering taking a vitamin or mineral supplement if you are not meeting the recommended number of servings of each food group from Canada's Food Guide. Ask for advice from your physician or health care provider. The following people need to take vitamin or mineral supplements:
  - Women who are pregnant, breastfeeding, or who could become pregnant, need a multivitamin containing folic acid and vitamin B_{12} every day.
  - Pregnant women need to ensure that their multivitamin contains iron.
  - Refer to the guideline *Calcium and Vitamin D* for recommendations about vitamin D supplementation
- Recognizing that single-nutrient supplements carry a higher risk of adverse reactions. Seek referral to a physician or Registered Dietitian if you are considering taking one.
- Notifying your physician or Registered Dietitian if you take a multivitamin-mineral, herbal or any other type of nutrition supplement.
- Asking your physician for a referral to a Registered Dietitian if you have questions about nutrition supplements or are wondering if you need one.

Note: *For recommendations and discussion about* ***calcium and vitamin D*** *refer to the Guideline:* Calcium and Vitamin D

Health Benefits

Vitamins and minerals are essential for many biochemical and physiologic functions in our bodies. Vitamins and minerals do not provide calories; rather, they work with each other and with other essential nutrients (carbohydrates, protein, fats) to start (or "trigger") many chemical processes for growth, maintenance of well-being, and possibly, prevention of disease.[1]

Appropriate intake of vitamins and minerals:

- Helps maintain normal metabolic functions (e.g. energy production, hormone synthesis).[1,2,3]
- Prevents or repairs damage to cells and tissues.
- Promotes optimal growth and development in children and adolescents.[4]
- May decrease the risk of nutrient-related chronic diseases, such as: Type 2 diabetes mellitus, obesity, rickets, osteoporosis, hypertension, cardiovascular diseases (CVD) and certain cancers.[1,2]

In certain cases, an individual may need to take a specific mineral and vitamin supplement if he/she is unable to obtain it from food.

Key Questions

What is a vitamin?

Vitamins are fat-soluble or water-soluble organic compounds essential for normal biochemical and physiological functions. Vitamins are multi-functional. They may serve as structural components in the body, act as co-enzymes in multiple metabolic pathways, and/or act as antioxidants.[1,2,5]

For optimal health, we require the following 13 vitamins:[5]

Water-soluble vitamins:

- Thiamin (B_1)*
- Riboflavin (B_2)*
- Niacin (B_3)*
- Vitamin B_6
- B_{12}*
- Biotin
- Folate (folic acid)*
- Pantothenic acid
- Vitamin C (ascorbic acid)*

Fat-soluble vitamins:

- Vitamin A (retinol; beta-carotene)*
- Vitamin D*
- Vitamin E*
- Vitamin K*

** Of the vitamins, the ones indicated (*) are a common concern throughout life and will be discussed in this guideline.*

What is a mineral?

Minerals are inorganic elements that are essential to body functions such as maintenance of acid-base balance, normal hemoglobin levels and osmotic pressure. Minerals are components of vitamins, hormones, enzymes and many stable complexes in bone and tissues.[1,2,5]

For optimal health, we require the following 15 minerals:[5]

- Calcium*
- Chloride
- Chromium
- Copper
- Fluoride
- Iodine
- Iron*
- Magnesium*
- Manganese
- Molybdenum
- Phosphorus*
- Potassium*
- Selenium
- Sodium*
- Zinc*

** Of the minerals listed, the ones indicated (*) are of concern throughout the life cycle; these ones will be discussed in this guideline.*

What are the functions and food sources of some key vitamins and minerals?

The following table lists the functions of key vitamins and minerals in the body. It also indicates what foods each vitamin or mineral can be obtained from.

Vitamin	Function in the body	Food Sources[1,6]
B vitamins: Thiamin (B_1) Riboflavin (B_2) Niacin (B_3)	• Are co-enzymes involved in energy metabolism (carbohydrate, fat, and protein) and energy production • Needed for functioning and maintenance of the nervous system and muscle tissue • Supports growth and tissue repair[1]	• Meat (all kinds), fish, poultry • Whole grains and fortified grain products (breads, cereals and pasta) • Milk products (milk, yogurt, cheese) • Legumes (dried beans, peas and lentils) • Nuts • Eggs
B_{12}	• Is a co-enzyme involved in DNA, RNA and myelin synthesis • Needed for development and maintenance of the red blood cells • Required for amino acid production (helps converts homocysteine into methionine)[1,7]	• Meat (all kinds) • Seafood (fish, clams, crabs) • Milk products (milk, yogurt, cheese) • Fortified soy beverages • Eggs
Folate (folic acid)	• Plays an important role in DNA, RNA and red blood cell synthesis • Needed for metabolism and maintenance of homocysteine levels • Vital for producing and maintaining cells especially during periods of rapid cell growth and division (babies, children, adolescents) • Essential for women who are or may become pregnant. Adequate intake of folate reduces risk of neural tube defects[1,8]	• Fortified and whole grain products like bread, cereals and pasta • Dark green leafy vegetables (spinach, romaine, broccoli) • Milk products (milk; cheese, yogurt) • Legumes (dried beans, peas and lentils) • Oranges • Grapefruit • Bananas
Vitamin A (commonly referred to retinol; beta-carotene)	• Plays an important role in vision and reproduction • Needed for formation and maintenance of mucous membrane, skin and bone • Supports the immune system (helps make white blood cells)[1,9]	• Liver • Milk Products (milk, cheese) • Eggs • Carrots, sweet potatoes, red pepper • Papaya, apricot, cantaloupe • Kale, spinach, turnip and collard greens • Butter, margarine

Vitamin	Function in the body	Food Sources[1,6]
Vitamin C (ascorbic acid)	• Needed for formation and maintenance of collagen, neurotransmitters and hormone synthesis • Acts as an antioxidant; protects cells from damage and thereby may reduce the risk of cardiovascular disease and some cancers[1]	• Citrus fruits (oranges, grapefruit) • Strawberries • Green peppers • Broccoli, cauliflower, cabbage • Tomato • Fortified juices
Vitamin D	• Essential for calcium and phosphorous absorption in the intestine and bones • Needed for the delivery and utilization of calcium and phosphorous in teeth/bone formation and nerve/muscle activity • Supports bone growth • Plays an important role in fighting infections and controlling blood pressure and insulin production[1,10]	• Vitamin D-fortified drinks such as milk, soy and rice drinks, and orange juice • Eggs • Vitamin D-fortified cereals • Vitamin D-fortified yogurt (not all are fortified; read labels) • Margarine • Fatty fish such as salmon, herring, sardines, halibut

Vitamin E	• Acts as an antioxidant; protects cells from damage and thereby may reduce the risk of cardiovascular disease and some cancers
	• Has a role in immune function and DNA repair[1,11]
	• Acts as a natural anti-inflammatory
		• Fats and oils such as
		  o Vegetable oils
		  o Olive oil
		  o Margarine
		  o Salad dressings
		  o Mayonnaise
		• Nuts (almond; hazelnuts; peanuts)
		• Seeds (sunflower)
		• Wheat germ/ wheat germ oil
		• Eggs

Vitamin K	• Plays an essential role in formation and regulation of blood clotting proteins
	• Supports the utilization of calcium in teeth/bone formation[1]
		• Dark green leafy vegetables
		  o Spinach, Swiss chard, turnip greens
		  o Kale
		  o Brussels sprouts
		  o Broccoli

Mineral	Function in the body	Food Sources[1,6]
Calcium	• Structural component of teeth and bone • Needed for functioning and maintenance of muscle contractions, nerve activity, hormone and enzyme secretions and blood clotting[1,12]	• Milk products (milk, yogurt, cheese) • Fortified soy beverages and juices • Soybeans • Fortified tofu • Canned salmon with bones • White beans, navy beans, and soybeans • Cooked bok choy
Iron	• Component of hemoglobin needed to deliver oxygen to the tissues in the body • Needed for cell growth and differentiation • Component of muscle protein (myoglobin)[1,13]	• Red meats (liver, beef, pork) • Oysters and clams • Legumes (dried beans, peas, lentils) • Fortified and whole grain products like bread, cereals and pasta • Spinach, Swiss chard • Tofu • Dried fruits (figs, prunes, raisins) • Blackstrap molasses
Magnesium	• Structural component of teeth and bone • Needed for functioning and maintenance of muscles, immune system and nerve and enzyme activity • Plays an important role in energy metabolism/production and protein synthesis • Helps regulate blood sugar levels[1,14]	• Spinach, broccoli, potatoes • Legumes (dried beans, peas, lentils) • Whole grain products like bread, cereals and pasta • Milk, yogurt • Fortified soy beverages • Seeds (pumpkin, sunflower; sesame), nuts • Tofu
Phosphorus	• Structural component of teeth and bone • Plays an important role in acid-base balance • Component of certain enzymes involved in energy production[1]	• Milk products (milk, yogurt, cheese) • Meat, fish, poultry • Seeds and nuts • Whole grains

Mineral	Function in the body	Food Sources[1,6]
Potassium	• Plays an important role in acid-base balance • Helps regulate osmotic pressure within body compartments • Needed for functioning and maintenance of muscles and nerve activity[5]	• Squash, potatoes, beets, broccoli • Legumes (dried beans, peas and lentils) • Bananas, apricots • Oranges, orange juice • Milk products (milk, yogurt, cheese) • Nuts • Whole grain breads and cereals • Wheat germ
Sodium	• Plays an important role in acid-base balance • Helps regulate osmotic pressure within body compartments • Needed for functioning and maintenance of muscles and nerve activity[5]	• Processed foods • Cured meat (ham; corned beef; bacon) • Pickles • Table salt; sea salt • Bread • Cheese • Salted and seasoned nuts and seeds
Zinc	• Plays an important role in protein and DNA synthesis • Needed for functioning and maintenance of the immune system • Supports wound healing, growth and development[5,15] • Structural component of insulin[16,17]	• Meat, fish, poultry • Grains and grain products (breads, cereals and pasta) • Milk products (milk, yogurt, cheese) • Nuts and seeds

What are the recommended intakes of vitamins and minerals?[18]

Health Canada, in partnership with The Food and Nutrition Board of the Institute of Medicine, has established Dietary Reference Intakes (DRIs). These include the Estimated Average Requirement (EAR), Recommended Dietary Allowance (RDA), Adequate Intake (AI), and Tolerable Upper Intake Level (UL) for vitamins and minerals. DRIs are the amounts needed to prevent deficiencies and reduce risk of developmental abnormalities and chronic diseases.

Most vitamin and mineral recommended values are reported as a RDA. The RDA is intended to be used as a goal for daily intake by individuals, as this value estimates an intake level that is sufficient to meet the requirement of 97 to 98% of healthy individuals.

However, when there is insufficient scientific evidence to establish a RDA, an Adequate Intake *(*AI) is provided instead. Adequate Intake is expected to meet or exceed the required amount needed to maintain a defined nutritional state in an apparently healthy population without causing adverse health effects.

The UL is the maximum amount of a nutrient an individual can take that is likely to pose no risk of adverse health effects for most people.

In general, the RDA, AI and UL values for vitamins and minerals changes throughout the life cycle. The following tables list the DRIs (RDA or AI) and UL of the vitamins and minerals in the body:

Note: For recommendations and discussion about calcium and vitamin D refer to the *Nutrition Guideline: Calcium and Vitamin D*

Dietary Reference Intake Table for Vitamins A, C, E, K, Thiamin, Riboflavin and Niacin[19,20,21]

Life Stage Group	Vit A (µg/d)		Vit C[a] (mg/d)		Vit E[b] (mg/d)		Vit K (µg/d)		Thiamin (mg/d)		Riboflavin (mg/d)		Niacin[c] (mg/d)	
	DRI	UL	DRI	UL	DRI	UL	DRI	UL	DRI	UL	DRI	UL	DRI	UL
Children														
1-3 y	300	600	15	400	6	200	30	ND	0.5	ND	0.5	ND	6	10
4-8 y	400	900	25	650	7	300	55	ND	0.6	ND	0.6	ND	8	15
Males														
9-13 y	600	1700	45	1200	11	600	60	ND	0.9	ND	0.9	ND	12	20
14-18 y	900	2800	75	1800	15	800	75	ND	1.2	ND	1.3	ND	16	30
19-50 y	900	3000	90	2000	15	1000	120	ND	1.2	ND	1.3	ND	16	35
>50 y	900	3000	90	2000	15	1000	120	ND	1.2	ND	1.3	ND	16	35
Females														
9-13 y	600	1700	45	1200	11	600	60	ND	0.9	ND	0.9	ND	12	20
14-18 y	700	2800	65	1800	15	800	75	ND	1.0	ND	1.0	ND	14	30
19-50 y	700	3000	75	2000	15	1000	90	ND	1.1	ND	1.1	ND	14	35
>50 y	700	3000	75	2000	15	1000	90	ND	1.1	ND	1.1	ND	14	35
Pregnancy														
≤18 y	750	2800	80	1800	15	800	75	ND	1.4	ND	1.4	ND	18	30
19-50 y	770	3000	85	2000	15	1000	90	ND	1.4	ND	1.4	ND	18	35
Lactation														
≤18 y	1200	2800	115	1800	19	800	75	ND	1.4	ND	1.6	ND	17	30
19-50 y	1300	3000	120	2000	19	1000	90	ND	1.4	ND	1.6	ND	17	35

ND = No data available; insufficient scientific evidence available to establish a value. Intake should be from food only to prevent any potential adverse effects of high intakes.

[a] Smokers have a higher requirement for vitamin C. Health professionals recommend an additional intake of 35 mg of vitamin C every day for individuals who smoke.

[b] The UL values for vitamin E are based on pharmacological/synthetic sources, fortified foods or the combination of each.

[c] The UL values for niacin are based on pharmacological (supplement) sources, fortified foods or the combination of each.

For recommended intakes refer to Guidelines: Sodium; Vegetarian Eating; Pregnancy; Calcium and Vitamin D; Iron

Dietary Reference Intake Table for Folate, Vitamin B_{12}, Magnesium, Phosphorus, Potassium and Zinc[19,20,22,23]

Life Stage Group	Folate[a] (µg/d)		Vitamin B_{12} (µg/d)		Magnesium[b] (mg/d)		Phosphorus[c] (mg/d)		Potassium (mg/d)		Zinc[d] (mg/d)	
	DRI	UL	DRI	UL	DRI	UL	DRI	UL	DRI	UL	DRI	UL
Children												
1-3 y	150	300	0.9	ND	80	65	460	3000	3000	ND	3	7
4-8 y	200	400	1.2	ND	130	110	500	3000	3800	ND	5	12
Males												
9-13 y	300	600	1.8	ND	240	350	1250	4000	4500	ND	8	23
14-18 y	400	800	2.4	ND	410	350	1250	4000	4700	ND	11	34
19-30 y	400	1000	2.4	ND	400	350	700	4000	4700	ND	11	40
31-50 y	400	1000	2.4	ND	420	350	700	4000	4700	ND	11	40
>50 y			2.4	ND	420	350	700	4000	4700	ND	11	40
Females												
9-13 y	300	600	1.8	ND	240	350	1250	4000	4500	ND	8	23
14-18 y	400	800	2.4	ND	360	350	1250	4000	4700	ND	9	34
19-30 y	400	1000	2.4	ND	310	350	700	4000	4700	ND	8	40
31-50 y	400	1000	2.4	ND	320	350	700	4000	4700	ND	8	40
>50 y	400	1000	2.4	ND	320	350	700	4000	4700	ND	8	40
Pregnancy												
≤18 y	600	800	2.6	ND	400	350	1250	3500	4700	ND	12	34
19-30 y	600	1000	2.6	ND	350	350	700	3500	4700	ND	11	40
31-50 y	600	1000	2.6	ND	360	350	700	3500	4700	ND	11	40
Lactation												
≤18 y	500	800	2.8	ND	360	350	1250	4000	5100	ND	13	34
19-30 y	500	1000	2.8	ND	310	350	700	4000	5100	ND	12	40
31-50 y	500	1000	2.8	ND	320	350	700	4000	5100	ND	12	40

ND = No data available; insufficient scientific evidence available to establish a value. Intake should be from food only to prevent any potential adverse effects of high intakes.

[a] Health Canada recommends a folic acid supplement of 400 µg/day for all women of child bearing age to reduce the risk of neural tube defects in infants.

[b] The UL values for magnesium are based on a pharmacological source only and do not include intake from food and water.

[c] The UL values for phosphorus for males and females >70 years are 3000 mg/day.

[d] Vegetarians may have an increased requirement for zinc (as much as 50% greater) due to lower bioavailability of zinc in vegetarian food sources, such as grains and legume

Can individuals get just as many nutrients from a vitamin and/or mineral supplement as from food?

No, individuals cannot get as many nutrients from supplements as from food.

Vitamin and mineral requirements for an individual depend on many factors, including the individual's medical status, age, gender, body size, and activity level. Eating a variety of foods within each of Canada's Food Guide's four food groups will help most people get the nutrients they need from food.

- Choose meals that include at least three of the four food groups.[24]
- For adults: Eat three regular meals, and snacks if needed, throughout the day.
- For children: Provide three regular meals and two to three snacks every day. Provide snacks that include foods from Canada's Food Guide.[25,26]

Eating a wide variety food from the Food Guide provides many nutrients, phytonutrients, energy or carbohydrates, protein, essential fats, and fibre that are not available in any mineral or vitamin pill. Phytonutrients occur naturally in vegetables, fruits, and whole grains. Some function as antioxidants which help maintain health and prevent chronic disease.[27,28]

Refer to Guidelines: General Healthy Eating For Children and Adults; Planning Healthy Meals and Snacks; Vegetable and Fruit Intake

When should an individual take a vitamin and/or mineral supplement?

Individuals can generally meet their vitamin and mineral needs by following Canada's Food Guide healthy eating guidelines. However, there are cases when supplements are needed.

Vitamin D

There is recent evidence that vitamin D deficiency exists in some Canadians, partly because of low levels of sun exposure.[29] As well, it is widely agreed that consuming adequate amounts of vitamin D from dietary sources is difficult.[29,30]

In view of low levels of vitamin D intake from food and probable low levels from sun exposure, Nutrition Services, Alberta Health Services recommends that healthy individuals include food sources of vitamin D in their diet, and supplement their intake.

For complete vitamin D recommendations refer to the Calcium and Vitamin D Nutrition Guideline.

Other nutrients

- Women who are pregnant, breastfeeding, or who could become pregnant should take a daily multivitamin supplement containing 400 mcg (0.4 mg) of folic acid, and also contains vitamin B_{12}.[31]
- Pregnant women should also ensure their daily multivitamin supplement contains 16 to 20 mg of iron.[32]
- The individuals listed below should talk to a physician or Registered Dietitian about whether or not they need to take a vitamin and mineral supplement:
  - Adults over the age of 50 years - should take 400 IU of vitamin D daily;[3] however, additional vitamin D and vitamin B_{12},[33,34] may also be needed.
  - Individuals who avoid whole food groups of Canada's Food Guide.[28,29]

- Vegetarians who do not eat any animal foods.[29]
- Smokers.[29]
- Individuals who drink alcohol in high amounts
- Individuals with a medical concern that increases their nutrient needs or decreases their nutrient intake. [28,29]

Individuals should check with their health care provider before taking any vitamin or mineral supplements, especially when combining them with medications, or substituting them for foods.

For specific dietary advice, consult a Registered Dietitian.

Refer to Guidelines: Calcium and Vitamin D; Iron; Vegetarian Eating; Seniors Health Overview; Pregnancy; General Healthy Eating for Children and Adults

Are there any potential risks associated with taking vitamin and mineral supplements?

Although supplementation of certain vitamins and minerals might be helpful for some individuals, there are circumstances when these pills may pose risks. Taking a combination of vitamin and mineral supplements, using these products together with medicine, or substituting them in place of prescribed medicines could lead to harmful, even life-threatening results. Furthermore, individuals taking vitamin and/or mineral supplements may unknowingly exceed the Tolerable Upper Intake Level (UL) recommendations, leading to toxicity and associated harmful effects.[6,28]

Calcium

There have been questions about a possible link between calcium supplements and an increased risk of heart disease for adults (≥ 19 years). Data from some clinical trials suggest that calcium supplementation (≥1000mg/day) may modestly increase the risk of cardiovascular events.[5,35,36,37,38,39] There does not seem to be a risk or concern with calcium from food sources.[38] Health risks are associated with intakes either below or above the RDA.[36,37] Adults should aim for a total calcium intake from food sources that meets the RDA for their age and gender (see the *Recommendations* section above). Those people unable to meet their calcium requirements with dietary sources should discuss supplement use with their health care provider.

Tips to follow when considering taking a vitamin and/or mineral or multivitamin/mineral supplement:

- Individuals should check with their health care provider before taking any vitamin or mineral supplements, especially when combining with medicine, or substituting them for foods.
- Individuals should recognize that single-nutrient supplements carry a higher risk of adverse reactions and seek referral to a physician or Registered Dietitian if considering taking one.
- Individuals should work with their qualified health professional (physician, dietitian or pharmacist) to make certain the vitamin and/or mineral supplement does not exceed the UL and cause health problems.
- Individuals need to always let their physician and other health professionals know about the vitamins, minerals, botanicals, and other products they are taking, especially before surgery or other medical treatments, or if they have other medical conditions.

- Vitamin and mineral supplements can be especially harmful for children and should be kept out of their reach at all times.
- Vitamin and mineral supplements are not intended to treat, diagnose, alleviate, prevent, or cure disease.
- Vitamin and mineral supplements cannot replace the variety of foods important to a healthful diet.
- Individuals should not self-diagnose any health condition; they need to work with their health care providers to determine how best to achieve optimal health.

What should an individual look for in a vitamin and mineral supplement?

If an individual, in consultation with their healthcare provider, has decided to take a single or multivitamin and/or mineral supplement, they should follow the tips below for buying and taking supplements:

- Make sure that the vitamin and mineral pill has a Drug Identification Number (DIN) or Natural Product Number (NPN),[40] or Homeopathic Medicine Number (DIN-HM).[41] This means that Health Canada has approved the product.
- Ask a pharmacist which multivitamin or vitamin and mineral pills are good choices. Store brands or generic pills are fine to use.[30]
- Check the expiry date on the bottle. Don't take pills that are past the expiry date.
- Read labels to make sure you aren't allergic to any of the ingredients. Ask the pharmacist when not sure.
- Take only the dose stated on the label. More is not better.[30]

Are there any handouts on vitamins and minerals that I can use with my clients?

Refer to approved provincial Alberta Health Services bariatric nutrition handouts to support patient education. For more information, contact Nutrition.Resources@albertahealthservices.ca

References

1. Duyff RL. American Dietetic Association. Complete Food and Nutrition Guide. 4th ed. Hoboken: John Wiley & Sons; 2012.
2. LeMone P. Vitamins and Minerals. J Obstet Gynecol Neonatal Nurs. 1999;28(5):520-33.
3. Health Canada. Eating Well with Canada's Food Guide [document on internet]. 2007 [cited 2009 Jan 7]. Available from: http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html
4. American Heart Association. Dietary recommendations for children and adolescents: A guide for practitioners. Pediatrics. 2006;117:544-59.
5. Brown JE. Basic Nutrition. In: Howe E, Michel L, Feldman E, editors. Nutrition through the life cycle. 2nd ed. Belmont: Thomson Wadsworth; 2004. p. 2-27.
6. Health Canada. Canadian Nutrient File 2010 [database on the internet]. [Updated 2012 Apr 26; cited 2012 Oct 10]. Available from: http://webprod3.hc-sc.gc.ca/cnf-fce/index-eng.jsp
7. National Institutes of Health: Office of Dietary Supplements [homepage on internet]. Dietary Supplement Fact Sheet: Vitamin B_{12} [about 10 screens]. [Reviewed: 2011June 24] [cited 2012 Oct 11]. Available from: http://dietary-supplements.info.nih.gov/factsheets/vitaminb12.asp.
8. National Institutes of Health: Office of Dietary Supplements [homepage on internet]. Dietary Supplement Fact Sheet: Folate [about 12 screens] 2004 Aug 3 [updated 2005 Aug 22] [cited 2009 Feb 5]. Available from: http://dietary-supplements.info.nih.gov/factsheets/folate.asp
9. National Institutes of Health: Office of Dietary Supplements [homepage on internet]. Dietary Supplement Fact Sheet: Vitamin A [about 13 screens] 2005 Jun 22 [updated 2006 Apr 23] [cited 2009 Feb 5]. Available from: http://dietary-supplements.info.nih.gov/factsheets/vitamina.asp
10. National Institutes of Health: Office of Dietary Supplements [homepage on internet]. Dietary Supplement Fact Sheet: Vitamin D [about 16 screens]. 2008 Apr 18 [updated 2008 Dec 11] [cited 2009 Feb 5]. Available from: URL:http://dietary-supplements.info.nih.gov/factsheets/vitamind.asp
11. National Institutes of Health: Office of Dietary Supplements [homepage on intent]. Dietary Supplement Fact Sheet: Vitamin E [about 15 screens]. 2004 Oct 7 [updated 2007 Jan 23] [cited 2009 Feb 5]. Available from: URL:http://dietary-supplements.info.nih.gov/factsheets/vitamine.asp
12. National Institutes of Health: Office of Dietary Supplements [homepage on internet]. Dietary Supplement Fact Sheet: Calcium [about 18 screens] 2004 July 12 [updated 2008 Dec 4] [cited 2009 Jan 29]. Available from: http://dietary-supplements.info.nih.gov/factsheets/calcium.asp
13. National Institutes of Health: Office of Dietary Supplements [homepage on internet]. Dietary Supplement Fact Sheet: Iron [about 16 screens] 2004 July 28 [updated 2007 Aug 24] [cited 2009 Jan 29]. Available from: http://dietary-supplements.info.nih.gov/factsheets/iron.asp
14. National Institutes of Health: Office of Dietary Supplements. Dietary Supplement Fact Sheet: Magnesium [about 15 screens]. 2005 Jan 30 [updated 2005 Dec 5] [cited 2009 Jan 30]. Available from: http://dietary-supplements.info.nih.gov/factsheets/magnesium.asp
15. National Institutes of Health: Office of Dietary Supplements [homepage on internet]. Dietary Supplement Fact Sheet: Zinc [about 14 screens]. 2005 Jun 22 [updated 2006 Apr 23] [cited 2009 Jan 30]. Available from: http://dietary-supplements.info.nih.gov/FactSheets/Zinc.asp
16. Chausmer AB. Zinc, insulin and diabetes. J Am Coll Nutr. 1998;17(2):109-15.

17. Dunn MF. Zinc-ligand interactions modulate assembly and stability of the insulin hexamer - A review. Biometals 2005;18(4):295-303.

18. Otten JJ, Hellwig JP, Meyers LD, editors. Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. Washington (DC): The National Academies Press; 2006.

19. Institute of Medicine. Dietary reference intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin, and Choline [document on the internet]. Washington (DC): National Academies Press. 1998 [cited 2012 Oct 11]. Available from: https://download.nap.edu/catalog.php?record_id=6015.

20. Institute of Medicine. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc [document on the internet]. Washington (DC): National Academies Press. 2001 [cited 2012 Oct 11]. Available from: http://www.nap.edu/catalog.php?record_id=10026.

21. Institute of Medicine. Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids [document on the internet]. Washington (DC): National Academies Press. 2000 [cited 2012 Oct 11]. Available from: http://www.nap.edu/catalog.php?record_id=9810.

22. Institute of Medicine. Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate [document on the internet]. Washington (DC): National Academies Press. 2005 [cited 2012 Oct 11]. Available from: http://www.nap.edu/catalog.php?record_id=10925.

23. Institute of Medicine. Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride [document on the internet]. Washington (DC): National Academies Press. 1998 [cited 2012 Oct 11]. Available from: http://www.nap.edu/catalog.php?record_id=5776

24. Government of Alberta. Alberta Nutrition Guidelines for Adults [document on the internet]]. 2012 [cited 2012 Nov 19]. Available from: URL: http://www.health.alberta.ca/documents/Nutrition-Guidelines-Adults-AB-2012.pdf.

25. Government of Alberta. Healthy U. Healthy Eating and Active Living for Your 1 to 4 year old [document on the internet]. 2012 [cited: 14 Nov 2012]. Available from: http://www.healthyalberta.com/23283_HEAL_1_to_4_2012_web.pdf

26. Government of Alberta. Healthy U. Healthy Eating and Active Living for Your 5 to 11 year old [document on the internet]. 2012 [Cited: 2012 Nov 14]. Available from: http://www.healthyalberta.com/23283_HEAL-5_to_11_2012_web.pdf

27. Sylvia Escott-Stump. Nutrition and diagnosis-related care. Lippincott Williams & Wilkins; 2002. p. 520.

28. Yao LH, Jiang YM, Tomás-Barberán FA, Datta N, Singanusong R, Chen SS. Flavonoids in food and their health benefits. Plant Foods Hum Nutr. 2004; 59:113-22.

29. Hanley, DA, Cranney A, Jones G, Whiting SJ, Leslie WD, Cole DEC, et.al. Vitamin D in adult health and disease: a review and guideline statement from Osteoporosis Canada. Canadian medical Association Journal 2010; 182(12): 610-8.

30. Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP et al. Evaluation, treatment, and prevention of vitamin D deficiency: an endocrine society clinical practice guideline. J Clin Endocrinol Metab 2011 July;96(7):1-19.

31. Health Canada. Prenatal nutrition guidelines for health professionals - folate contributes to a healthy pregnancy [document on the Internet]. Minister of Health Canada; 2009 [cited 2010 Jul 16]. Available from: http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/folate-eng.php

32. Health Canada. Prenatal nutrition guidelines for health professionals - iron contributes to a healthy pregnancy [document on the Internet]. Minister of Health Canada; 2009 [cited 2010 Jul 16]. Available from: http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/iron-fer-eng.php.

33. American Dietetic Association. Position of the American Dietetic Association: Fortification and Nutritional Supplements. JADA. 2005;105(8):1300-1310

34. Dietitians of Canada. Do I need a vitamin or mineral supplement? 2010 Sept 1 [cited 2012 Dec 11]. Available from: http://www.dietitians.ca/Nutrition-Resources-A-Z/Factsheets/Miscellaneous/Do-I-Need-a-Supplement-.aspx

35. Dietitians of Canada. Cardiovascular Disease Evidence Summary. In: Practice-based Evidence in Nutrition [PEN]. 2012 Aug 29 [cited 2013 Feb 4]; Available from: http://www.pennutrition.com/KnowledgePathway.aspx?kpid=2671&trid=3489&trcatid=42. Access only by subscription.

36. Xiao Q, Murphy RA, Houston DK et al. Dietary and Supplemental Calcium Intake and Cardiovascular Disease Mortality. The National Institutes of Health–AARP Diet and Health Study JAMA Intern Med. 2013;E1-E8.

37. Michaëlsson K, Melhus H, Warensjö Lemming E, Wolk A, Byberg L. Long term calcium intake and rates of all cause and cardiovascular mortality: community based prospective longitudinal cohort study. BMJ 2013;346:f228. Available from: http://www.bmj.com/content/346/bmj.f228

38. Li K, Kaaks R, Linseisen J, Rohrman S: Associations of dietary calcium intake and calcium supplementation with myocardial infarction and stroke risk and overall cardiovascular mortality in the

39. Heidelberg cohort of the European Prospective Investigation into Cancer and Nutrition study (EPIC-Heidelberg). BMJ Heart. 2012;98: 920-925.

40. Bolland MJ, Grey A Avenell A et al. Calcium supplements with or without vitamin D and risk of cardiovascular evens: reanalysis of the Women's Health Initiative limited access dataset and metaanalysis. BMJ 2011;342:d2040. Available from: http://www.bmj.com/content/342/bmj.d2040.

41. Dietitians of Canada. How to Choose a Multivitamin [Internet]. 2012 Apr 10 [cited 2012 Oct 12]. Available from: http://www.dietitians.ca/Nutrition-Resources-A-Z/Factsheets/Supplements/Choose-a-Multivitamin.aspx

42. Health Canada. Licensed Natural Health Products Database (LNHPD) – terminology guide [Online]. 2008 Sept 5 [cited 2013 Jan 30]; Available from: http://www.hc-sc.gc.ca/dhp-mps/pubs/natur/lnhpd_term_bdpsnh-eng.php