Teaching Nutrition in Saskatchewan: Health Science 20

Developed by: Public Health Nutritionists of Saskatchewan

*Photo retrieved from the Regina Qu’Appelle Health Region’s Medical Media Services.

The purpose of *Teaching Nutrition in Saskatchewan: Health Science 20* is to provide credible Canadian based nutrition information and resources to support the Saskatchewan Health Science 20 Curriculum (2016), accessed from www.curriculum.gov.sk.ca.

The Nutrition Concepts, Related Indicators and Suggested Resources section, found on pages 3-9 in this document identifies nutrition concepts and resources relating to the curriculum outcomes. These lists only refer to the curriculum outcomes that have an obvious logical association to nutrition. They are only suggestions and not exclusive. Suggested resources are mostly Canadian websites with information, activities, handouts and *videos*.

*All videos and other resources have been reviewed for quality and accuracy by Registered Dietitians.

The Nutrition Background Information section found on pages 9-34, provides educators with current and reliable Canadian nutrition and healthy eating information.

The Public Health Nutritionists of Saskatchewan work together to promote, support and protect the nutritional health of people living in Saskatchewan.

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**NOTE:** Although every effort has been made to ensure the web links in this document are updated and accurate, due to the dynamic nature of the internet, some hyperlinks may no longer be active. If this has occurred, try searching for the resource on the internet through a search engine such as Google.

To provide feedback about this resource please complete this short survey: www.surveymonkey.com/r/JL3D78M
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# CAREER EXPLORATION

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| HS20-CE1 Analyze and explore health-science related occupations in Saskatchewan, Canada and the world. | a – i  
(See curriculum for full indicators) | What is a Registered Dietitian (RD)?  
- *Dietitians*. Dietitians of Canada; [www.dietitians.ca](http://www.dietitians.ca)  
- *Is there a difference between a Dietitian and a Nutritionist?* Dietitians of Canada [www.dietitians.ca](http://www.dietitians.ca)  
- *Dietitian vs. Nutritionist vs. Holistic Nutritionist*. Dietetic Directions [dieteticdirections.com](http://dieteticdirections.com) (Note: This blog written by an Ontario RD, some differences in SK, namely not all insurance covers private RD services).  

**Becoming an RD**  
- *Become a Dietitian*. Dietitians of Canada [www.dietitians.ca](http://www.dietitians.ca)  
- *Becoming an RD in Saskatchewan*. Saskatchewan Dietitians Association [www.saskdietitians.org](http://www.saskdietitians.org)  
- *Nutrition Program information*. University of Saskatchewan [explore.usask.ca](http://explore.usask.ca)  

**Where do RDs Work?**  
- *Dietitians Make a Difference*. Dietitians of Canada. [www.dietitians.ca](http://www.dietitians.ca)  
- *The Dietitian Workforce in Canada*. Dietitians of Canada. [www.dietitians.ca](http://www.dietitians.ca)  
- *About Dietetics; Why Choose a RD; Where do RDs Work*. Saskatchewan Dietitians Association [www.saskdietitians.org](http://www.saskdietitians.org)  

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<th>Curriculum Outcome</th>
<th>Indicators</th>
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| HS20-HB1 Analyze the anatomy and physiology of a healthy human. | Indicators:  
b. Describe the anatomy (structure) and physiology (function) of at least five human body systems (i.e., cardiovascular, endocrine, lymphatic, digestive, urinary, muscular, nervous, respiratory, reproductive, integumentary and skeletal).  
h. Investigate the benefits of normal flora, or normal microbiota on | Videos  
- Crash Course Anatomy and Physiology: [www.youtube.com](http://www.youtube.com)  

**Digestive System**  
- Part 1: Crash Course A&P #33 [www.youtube.com](http://www.youtube.com)  
- Part 2: Crash Course A&P #34 [www.youtube.com](http://www.youtube.com)  
- Part 3: Crash Course A&P #35 [www.youtube.com](http://www.youtube.com)  

**The Excretory System**  
- From Your Heart to the Toilet – Crash Course Biology #29 [www.youtube.com](http://www.youtube.com)  

**The Urinary System**  
- Crash Course A&P #38 Part 1 [www.youtube.com](http://www.youtube.com)  
- Crash Course A&P #39 Part 2 [www.youtube.com](http://www.youtube.com)  

**Blood Pressure**  
- How Blood Pressure Works [ed.ted.com](http://ed.ted.com)
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<td>HS20-HB2</td>
<td>Indicators: c. Research the symptoms, possible causes, stages and scope (e.g., cells, tissues, organs and/or systems) of a pathology that affects one or more body systems.&lt;br&gt;e. Outline the history of a *disease or illness and its causes, including societal and cultural perspectives&lt;br&gt;*Nutrition-related diseases and conditions: – Diabetes&lt;br&gt;– Heart Disease&lt;br&gt;– Blood Pressure&lt;br&gt;– Kidney Disease&lt;br&gt;– Some types of cancer&lt;br&gt;– Osteoporosis&lt;br&gt;– Celiac Disease&lt;br&gt;– Food Allergies and Intolerances</td>
<td>Nutrition-Related Diseases&lt;br&gt;<strong>Backgrounder: Nutrition Related to Diabetes and Heart Disease p. 9</strong>&lt;br&gt;<strong>Diabetes</strong>&lt;br&gt;- Diabetes Canada: <a href="http://www.diabetes.ca">www.diabetes.ca</a>&lt;br&gt;- History of Diabetes. Diabetes Canada <a href="http://www.diabetes.ca">www.diabetes.ca</a>&lt;br&gt;- Canadian Clinical Practice Guidelines. Diabetes Canada guidelines.diabetes.ca&lt;br&gt;- Teachers’ Guide grade 9-12. Kids’ Health classroom.kidshealth.org - (This website has basic health information, however, is based in the United States (US) so refers to the US food guide and food labeling laws which are not appropriate to teach in Canada. Also note in the Diabetes ‘Quiz,’ Question 9 makes it seem as though all people who are overweight will get diabetes, which is not true. A better way to word this question is that ‘being overweight is a risk factor for developing type 2 diabetes. Or alternatively could be ‘Only overweight individuals get diabetes.’ Answer: False).&lt;br&gt;Diabetes in Indigenous populations&lt;br&gt;- Diabetes in the Aboriginal Community. Diabetes Canada. <a href="http://www.diabetes.ca">www.diabetes.ca</a>&lt;br&gt;- Type 2 Diabetes in Aboriginal Peoples. Diabetes Canada: Clinical Practice Guidelines. guidelines.diabetes.ca/browse/chapter38&lt;br&gt;- Diabetes in Canada: Facts and Figures - Diabetes among First Nations, Inuit, and Métis populations. Public Health Agency of Canada. <a href="http://www.phac-aspc.gc.ca">www.phac-aspc.gc.ca</a>&lt;br&gt;- Video: Diabetes epidemic in Indigenous populations' highlights disparity. CBC News. <a href="http://www.cbc.ca">www.cbc.ca</a>&lt;br&gt;Videos (diabetes)&lt;br&gt;- Understanding Type 2 diabetes. Animated Diabetes Patient <a href="http://www.youtube.com">www.youtube.com</a>&lt;br&gt;- Diabetes mellitus (type 1, type 2) &amp; diabetic ketoacidosis (DKA) - causes &amp; symptoms. Osmosis <a href="http://www.youtube.com">www.youtube.com</a>&lt;br&gt;- Personal Stories. Teens Health – Diabetes Centre kidshealth.org&lt;br&gt;<strong>Heart Disease</strong>&lt;br&gt;For more information about heart disease and its risk factors:&lt;br&gt;- Canadian Heart and Stroke Foundation <a href="http://www.heartandstroke.com">www.heartandstroke.com</a>&lt;br&gt;- Hypertension Canada <a href="http://www.hypertension.ca">www.hypertension.ca</a>&lt;br&gt;Videos (high blood pressure)&lt;br&gt;- Hypertension. Osmosis <a href="http://www.youtube.com">www.youtube.com</a> Advanced animation of basics of hypertension&lt;br&gt;- High blood pressure the basics. Centers for Disease Control and Prevention (CDC) <a href="http://www.youtube.com">www.youtube.com</a>&lt;br&gt;- Treating High Blood Pressure. CDC <a href="http://www.youtube.com">www.youtube.com</a>&lt;br&gt;Fact Sheets&lt;br&gt;- Sodium Sense Fact Sheets. Dietitians of Canada <a href="http://www.dietitians.ca">www.dietitians.ca</a>&lt;br&gt;<strong>Kidney Disease</strong>&lt;br&gt;- Nutrition and kidney disease. The Kidney Foundation of Canada</td>
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<td>Curriculum Outcome</td>
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<td>- <em>Kidney disease information</em>. Teens Health. <a href="http://kidshealth.org">kidshealth.org</a></td>
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<td><strong>Osteoporosis</strong></td>
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<td><a href="http://www.osteoporosis.ca">www.osteoporosis.ca</a></td>
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<td><strong>Cancer</strong></td>
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<td><a href="http://www.dietitians.ca">www.dietitians.ca</a></td>
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<td>- <em>Nutrition for people with Cancer</em>. Canadian Cancer Society. <a href="http://www.cancer.ca">www.cancer.ca</a></td>
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<td><strong>Celiac Disease</strong></td>
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<td><a href="http://www.celiac.ca">www.celiac.ca</a></td>
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<td>- <em>Celiac Disease</em>. Teens Health <a href="http://kidshealth.org">kidshealth.org</a></td>
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<td>- Video: <em>Celiac Disease: how it’s caused and how it’s treated</em>. Ted-Ed <a href="http://ed.ted.com">ed.ted.com</a></td>
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<td>- Video: <em>What’s the big deal with gluten anyways</em>. Ted-Ed <a href="http://www.youtube.com">www.youtube.com</a></td>
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<td><strong>Food Allergies and Intolerances</strong></td>
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<td><a href="http://foodallergycanada.ca">foodallergycanada.ca</a></td>
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<td>- <em>Food Allergies and Intolerances</em>. Eat Right Ontario <a href="http://www.eatrightontario.ca">www.eatrightontario.ca</a></td>
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<td>- Video: <em>Understanding Food Allergies</em>. The National Institute of Allergy and Infectious Diseases <a href="http://www.youtube.com">www.youtube.com</a></td>
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<td>- Video: <em>What is the difference between food allergies and intolerance?</em>. Allergy Scope <a href="http://www.youtube.com">www.youtube.com</a></td>
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**NUTRITION**

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<tr>
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<th>Concepts and relevant indicators (indicator letter in brackets)</th>
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<tr>
<td><strong>HS20-NU1 Assess the importance of macronutrients (i.e., carbohydrates, proteins and fats) and micronutrients (e.g., vitamins, minerals and phytochemicals) in maintaining human health.</strong></td>
<td>Macronutrients: fat, protein, carbohydrates</td>
<td>- <a href="http://www.youtube.com">Video: Biological Molecules - You Are What You Eat: Crash Course Biology #3</a></td>
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<td><a href="http://www.youtube.com">Video: Biological Molecules - You Are What You Eat: Crash Course</a></td>
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<td><a href="http://www.youtube.com">Calories</a></td>
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<td><a href="http://www.dietitians.ca">Micronutrients: Vitamins and Minerals</a></td>
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<td><a href="http://www.hc-sc.gc.ca">Consumer’s Guide to the DRIs</a></td>
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<td><a href="http://www.dietitians.ca">Functions and Food Sources of some Common Vitamins</a></td>
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<td><a href="http://www.youtube.com">Video: Summary of vitamin functions and sources</a></td>
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**Macronutrients: fat, protein, carbohydrates**

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<tr>
<td>- Video: <em>Biological Molecules - You Are What You Eat: Crash Course Biology #3</em>. Crash Course <a href="http://www.youtube.com">www.youtube.com</a></td>
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**Fats**

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<td>- <a href="http://www.eatrightontario.ca">Fats</a></td>
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**Sugar**

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<th>Resources: Background Information, Online Resources, Videos, Sample Activities, etc.*</th>
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<td>- <a href="http://www.who.int">WHO Sugar Intake Recommendations</a></td>
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**Calories**

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<th>Resources: Background Information, Online Resources, Videos, Sample Activities, etc.*</th>
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<td>- Video: <em>What is a calorie?</em>. Ted – Ed <a href="http://ed.ted.com">ed.ted.com</a></td>
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**Micronutrients: Vitamins and Minerals**

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<td>- <a href="http://www.canada.ca">Dietary Reference Intakes</a></td>
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<td>- <a href="http://www.dietitians.ca">Functions and Food Sources of some Common Vitamins</a></td>
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Background Information

Nutrition Related to Diabetes and Heart Disease

Diabetes (1)

Diabetes is a chronic disease in which the body cannot properly use and store food for energy. This happens when the body cannot produce insulin or cannot use the insulin it produces. Insulin is a hormone that controls the amount of sugar (glucose) in the blood. The body needs insulin to use sugar as an energy source. Diabetes leads to high blood sugar levels, which can damage organs, blood vessels and nerves.

The fuel that your body needs is glucose, which is a form of sugar. Glucose comes from foods that naturally contain sugar such as fruit, milk, some vegetables and grain products, as well as foods in which sugar and other sweeteners such as honey, molasses and concentrated fruit juice are added. To control blood glucose (sugar), it is important to eat healthy and be active. Medication may need to be taken also. A variety of high fibre foods from all of the food groups of Canada’s Food Guide are important for adequate nutrition. Limiting foods with added sugar such as pop, candies, and baked goods is helpful since these foods can increase blood sugar levels significantly, but do not offer many vitamins and minerals.

There are 2 main types of diabetes:

- **Type 1 diabetes** occurs when no, or very little, insulin is released into the body. As a result, sugar builds up in the blood instead of being used as energy. About five to 10 per cent of people with diabetes have type 1 diabetes. Type 1 diabetes generally develops in childhood or adolescence, but can develop in adulthood. Type 1 diabetes is always treated with insulin. Meal planning, physical activity and stress management also help with keeping blood sugar at the right levels.

- **Type 2 diabetes** occurs when the body can’t properly use the insulin that is released (called insulin insensitivity) or does not make enough insulin. As a result, sugar builds up in the blood instead of being used as energy. About 90 per cent of people with diabetes have type 2 diabetes. Type 2 diabetes develops more often in adults, but children can be affected. Depending on the
severity of type 2 diabetes, it may be managed through physical activity and meal planning, or may also require medications and/or insulin to control blood sugar more effectively.

Because diabetes is a complex disease it is imperative that individuals manage the disease with support from a medical team including a physician, diabetes nurse and registered dietitian.

Eating healthy and being physically active may help to maintain a healthy body weight, and in turn, reduce the risk of getting diabetes; however, there are many risk factors for the condition other than weight. For example, having a family history of diabetes, being over the age of 40, being a member of a high-risk group (Aboriginal, Hispanic, South Asian, Asian, or African descent), or taking certain medications increases a person’s risk of getting diabetes.

Heart Disease (2)

Heart disease describes several different heart conditions. **Coronary artery disease (CAD)**, the most common of these conditions, occurs when blood vessels in the heart become blocked or narrowed. This prevents the oxygen-rich blood from reaching the heart. It can cause chest pain (called angina) or even a heart attack.

CAD is caused by plaque building up along the interior walls of arteries. **Plaque** is a sticky, yellow substance made of fatty substances like cholesterol, as well as calcium and waste products from your cells. It narrows and clogs the arteries, slowing the flow of blood. This condition is called **atherosclerosis**, which may begin as early as childhood. It can occur anywhere in the body, but it usually affects large and medium-sized arteries.

Early symptoms of CAD can include: fatigue, chest pain and dizziness. If left untreated, this disease can lead to other serious problems such as **heart attack, stroke** or even death.

There are various risk factors for coronary artery disease including diabetes, high blood pressure (hypertension) and high cholesterol (hyperlipidemia).

- **Hypertension**: Blood pressure is a measure of the pressure or force of blood against the arterial walls when the heart contracts or when it is at rest. High blood pressure, also called hypertension, can be caused by factors such as smoking, inactivity and poor eating habits. Research has shown that hypertension risk can be reduced by following an eating pattern rich in vegetables, fruit, low fat dairy products whole grains, protein from plant sources (lentils and beans) and low in saturated fat. There is some evidence that indicates that eating less than 2300mg of sodium a day helps to lower blood pressure. Sodium is found in most foods, however, is especially high in convenience and fast foods, smoked and cured meat.

- **Blood cholesterol**: Cholesterol is a fat found in the blood. It is naturally made and used by the body; however, it is also influenced by foods consumed. There are two main types of blood cholesterol:
  - **HDL cholesterol**: referred to as ‘good’ cholesterol because it helps to remove excess cholesterol from the body.
  - **LDL cholesterol**: referred to as ‘bad’ cholesterol that can form plaque or fatty deposits on your artery walls. If your LDL level is high it can block blood flow to the heart and brain.

Foods that contain saturated fat (processed foods, fatty meat and dairy products, butter, lard) and trans fat (partially hydrogenated margarine, deep fried foods and packaged and baked goods) impact blood cholesterol more than foods that contain cholesterol.

References:
The overall pattern of food that a person eats is more important to a healthy diet than focusing on single foods or individual nutrients (1). Dietary patterns characterized by: higher consumption of vegetables, fruits, whole grains, low-fat dairy, and seafood; and lower consumption of red and processed meats, refined grains, and sugar-sweetened foods and beverages - have been linked to positive cardiovascular disease outcomes, show some protection against certain types of cancer, can help reduce the risk of developing type 2 diabetes, and can impact mental health and mood (2)(3).

All foods are okay to have sometimes, it just depends how often and in what quantities we eat them, and what other foods we eat with them that has the greatest impact on our health. It is also important to remember that our health is not determined by food alone, but also by how often we move throughout the day, if we get enough sleep, if we use strategies to reduce stress, etc.

Trans fats

**Recommendation:** Trans-fat is not needed for a healthy diet and in fact can be harmful. You should aim to eat as little trans-fat as possible (4)(5)(6).

Trans fats...
- are a type of fat found in foods that are known to raise bad (LDL) cholesterol and lower good (HDL) cholesterol in the blood. This effect on cholesterol increases the risk for developing heart disease (5).
- occur naturally in small amounts in some meat and dairy products, including beef, lamb and butterfat. There have not been sufficient studies to determine whether these naturally occurring trans-fats have the same negative effects on cholesterol levels as trans-fats that have been industrially manufactured (7).

Health Canada is proposing new regulations that will ban the use of partially hydrogenated oils in foods sold in Canada, stay tuned...(8).

Saturated Fats

**Recommendation:** Replace saturated fat and trans-fat with unsaturated fat (9)(6).

- Saturated fats are naturally found in meat, chicken, fish, dairy products and some plant products such as coconut and palm oil.
- Recent research (2016) has found that "Eating more saturated fats raises risk of early death," and “swapping saturated fat and/or trans-fats for polyunsaturated fat such as olive oil could reduce the risk of dying by 27% (9)(10).” This is in contrast to a 2015 rigorous summary of research which found no link between saturated fats and death (11) - The difference in the conclusions could be because the 2015 previous summary of research could not say what people who ate less saturated fat ate instead. In a Western diet people who eat less saturated fat might eat more sugar or refined carbohydrates, which are known to be linked to type 2 diabetes and cardiovascular disease. The 2016 study allowed researchers to calculate the effects of swapping one type of fat for another (9)(10).
- Eating a diet that is high in saturated fat can raise the level of cholesterol in the blood by increasing the formation of LDL in the plasma compartment and by decreasing LDL turnover by decreasing LDL receptor activity. Having high cholesterol increases the risk of developing heart disease (12).

Excess sodium

**Recommendation:** Because our diets in North America are generally so high in salt, everybody – even those with normal blood pressure – can benefit from reducing salt intake (13)(14).

- People do need small amounts of sodium for proper body functioning, but eating too much sodium can increase the risk for high blood pressure, heart disease, and stroke. When there’s extra sodium in your bloodstream, it pulls water into your blood vessels, increasing the total amount (volume) of blood inside your blood vessels. With more blood flowing through your blood vessels, blood pressure increases (13)(14)(15)(16).
- High intakes of sodium can also reduce bone mineral density in adult men and women (17), increasing the risk for developing osteoporosis.
Excess Sugar

**Recommendation:** World Health Organization (WHO) Guidelines - For general health, it is recommended to reduce daily intake of free sugars to less than 10% of total energy intake; For additional health benefits: Reduce daily intake to below 5% or roughly 25 grams (6 teaspoons) per day (18).

- There is increasing concern that intake of free sugars, particularly in the form of sugar-sweetened beverages, increases overall energy intake and may reduce the intake of foods containing more nutritionally adequate calories, leading to an unhealthy diet, weight gain, and increased risk of obesity and type 2 diabetes (18)(19).
- Another concern is the association between intake of free sugars and dental caries (18).

*Free sugars* comprises all monosaccharides (glucose and fructose) and disaccharides (sucrose) added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and unsweetened fruit juices. Under this definition lactose (the sugar in milk) when naturally present in milk and milk products and the sugars contained within the cellular structure of foods (particularly fruits and vegetables) are excluded.

Red and Processed Meat

**Recommendations:** Limit consumption of red meat and save processed meats for special occasions. Reducing consumption of these foods can reduce the risk of colorectal cancer, and help reduce sodium intake (6)(20)(21)(22).

- There is now a large body of evidence that bowel cancer is more common among people who eat the most red and processed meat. Processed meat is more strongly linked to bowel cancer than red meat. The results from a recent study showed that those who ate the most processed meat had around a 17% higher risk of developing bowel cancer, compared to those who ate the least (23).

How does red and processed meat increase the risk of getting cancer?

- The evidence so far suggests that it is probably the processing of the meat, or chemicals naturally present within it, that increases cancer risk (23)(6), but the exact mechanisms are still unclear. Some of these chemicals include:

**N-Nitroso Compounds**

- Haem, part of the red pigment in the blood, is broken down in our gut to form a family of chemicals called N-nitroso compounds. These have been found to damage the cells that line the bowel, so other cells in the bowel lining have to replicate more in order to heal. And it’s this ‘extra’ replication that can increase the chance of errors developing in the cells’ DNA – the first step on the road to cancer (24).
- As well as being made from red meat, processed meats also contains added nitrates and nitrates which become nitrosamines in the gut (24).

**Heterocyclic Amines (HCAs) and Polycyclic Aromatic Hydrocarbons (PAHs)**

- Cooking meat at high temperatures, such as grilling or barbequing, can also create chemicals (HCAs and PAHs) in the meat that may increase the risk of cancer. In laboratory experiments, HCAs and PAHs have been found to be mutagenic—that is, they cause changes in DNA that may increase the risk of cancer. These chemicals are generally produced in higher levels in red and processed meat compared to other meats (24).

The risk

- Research results showed that those who ate the most processed meat had **around a 17 per cent higher** risk of developing bowel cancer, compared to those who ate the least (23). What that means is that among 1000 people who eat the most processed meat, you’d expect 66 to develop bowel cancer at some point in their lives – 10 more than the group who eat the least processed meat (25).
- There are several factors that increase the risk of a person developing cancer, including smoking, obesity and inactivity. Red and processed meat presents a relatively **lower risk** in comparison to these other factors.

For more information about cancer and nutrition visit: [www.cancer.ca/en/?region=sk](http://www.cancer.ca/en/?region=sk)

Alcohol

Possible Harms

Depending on how much you drink, alcohol can be linked to both chronic and acute alcohol-related harms.

- Chronic overconsumption of alcohol is associated with numerous health effects that include: brain damage; reduced immunity, as a result of either alcohol itself or its metabolites; central nervous system degeneration; dementia, as a result of the toxic effects of alcohol on the brain; coronary heart disease; certain cancers including breast cancer; Wernicke-Korsakoff syndrome; hepatic encephalopathy; pellagra; chronic pancreatitis; and secondary osteoporosis (26).

- Acute alcohol-related harms include alcohol poisoning, physical and (or) verbal fights and accidents (27).

- Alcohol consumption during pregnancy results in damage to the developing fetal brain resulting in neuron loss that ultimately affects behaviour, learning and memory as well as defects across a range of cells resulting in central nervous system dysfunction, growth restriction, cardiac problems, the development of characteristic craniofacial features and other issues. Alcohol can cause fetal harm by producing oxidative stress on cells, disrupting and damaging key developmental processes, interference with growth factor signalling and routine cell interactions, and altering the expression of genes and inducing cell death (28).

It is not recommended that people under the legal drinking age consume alcohol.

References:


Foods and Eating Habits Linked to Good Health

Eating Patterns

The overall pattern of food that a person eats is more important to a healthy diet than focusing on single foods or individual nutrients (1). Dietary patterns characterized by: higher consumption of vegetables, fruits, whole grains, low-fat dairy, and seafood; and lower consumption of red and processed meats, refined grains, and sugar-sweetened foods and beverages - have been linked to positive cardiovascular disease outcomes, shows some protection against certain types of cancer, and can help reduce the risk of developing type 2 diabetes (2). It is these combinations and quantities in which foods and nutrients are consumed that may have synergistic and cumulative effects on health and disease including mood and mental health” (3).

Where do the recommendations in Canada’s Food Guide come from?

MEAT AND MEAT ALTERNATIVES

Meat alternatives

Recommendation: Canada’s Food Guide recommends that people regularly choose beans and other meat alternatives such as lentils and tofu (4).

– The reason for this recommendation is that consuming meat alternatives more often helps to minimize the amount of saturated fat* in the diet. Also, diets rich in plant-based protein has been shown to help lower blood pressure in individuals with hypertension (4).

*See page 11 on Sat fats and health

Tofu, tempeh, soy nuts and soy* beans

– Research has consistently shown that dietary soy protein* can help to lower LDL cholesterol levels in adults, but the exact mechanism is not known** (5)[6][7][8].

Note: In the media in the past there have been claims that too much soy can increase risk of developing breast cancer and can decrease testosterone levels in men causing infertility, but these claims have not been proven true. Research has found no effect of the above claims on soy consumption (9).

*Foods and ingredients eligible for the claim include soy beverages, tofu, miso, tempeh, nattō, soy cheese, soy nuts, isolated soy protein (ISP), soy protein concentrate (SPC), textured soy protein (TSP) and soy flour (SF) (6).

Pulses (dried beans, chickpeas, lentils, peas)

– Pulses are sources of folate and fibre. They have a low glycemic index* and are nutrient-dense. Pulses provide significant amounts of protein for those who limit or avoid animal proteins. Pulses are affordable and diverse foods that grow in a range of climates. There is growing research supporting the role of pulses in the management various health conditions including cardiovascular health, diabetes, and weight management (10).

*The Glycemic Index (GI) is a scale that ranks carbohydrate-rich foods by how much they raise blood glucose (sugar) levels compared to a standard food. Research has shown that eating mostly high GI foods increases the risk of type 2 diabetes. To help prevent diabetes, try to make a point of choosing lower GI foods more often. For more information visit: www.eatrightontario.ca/en/Articles/Carbohydrate-and-Sugar/Getting-to-know-the-Glycemic-Index.aspx

– Pulses and Cardiovascular health: Regular consumption of a variety of pulses contributes to lower total and LDL cholesterol, lower triglycerides, maintaining HDL cholesterol levels, and reduced blood pressure.

– Approximately 90% of the fibre in pulses is insoluble fibre and 10% is soluble fibre. Regular intake of foods containing soluble fibre, such as pulses, can reduce serum total and LDL cholesterol in adults (11).”

Nuts (almonds, peanuts, pecans, walnuts)

– Consuming nuts regularly throughout the week helps to decrease total and LDL cholesterol in individuals (12)(13).

– Nuts contain unsaturated* fatty acids; fibre; micronutrients** including potassium, calcium, magnesium, and tocopherols; and phytochemicals such as antioxidants and phytosterols (see info on phytonutrients p.16), phenolic compounds, resveratrol, and arginine which all play a role in protective heart health (13).

* Replacing saturated fats in the diet with unsaturated fats can help reduce the risk for cardiovascular disease and related deaths (14).

**A high intake of calcium, magnesium and potassium, together with a low sodium intake, is associated with protection against bone demineralization, arterial hypertension, insulin resistance, and overall cardiovascular risk (15).
**Seeds** *(flax, chia, hemp hearts, sunflower seeds, etc.)*

- Flax seed consumption can reduce total and LDL cholesterol levels, particularly in adults with high cholesterol (16).
- Flax helps protect against CVD by altering the omega-3 fat content of cell membranes (17), by improving blood lipids and endothelial function and by exerting antioxidant, anti-inflammatory, anti-thrombotic effects (18).
- Seeds are good sources of fibre and unsaturated fatty acids (e.g. omega-6 and omega-3s) which can reduce the risk of cardiovascular disease and some cancers (5).

**Fish**

*Recommendation:* Eat at least 2 food guide servings of fish each week (4).

- Many fish are a good source of omega-3 fatty acids
  - The regular consumption of omega-3s (Eicosapentanoic acid – EPA; and Docosahexanoic acid – DHA) from fish reduces serum triglyceride levels and blood pressure, improves arterial stiffness and endothelial function, and inhibits inflammatory processes.
  - More consistent results found from consuming fish over fish oil supplements. (19).
  - In Western diets the ratio of omega-6-omega-3 fatty acids is about 15/1 - A lower ratio of omega-6/omega-3 fatty acids is more desirable in reducing the risk of many of the chronic diseases (20).
  - Replacing saturated fats in the diet with unsaturated fats can help reduce the risk for cardiovascular disease and related deaths (14).
- It is likely that not only the omega-3 fats, but also the other nutrients found in fish and the displacement of high fat foods, contribute to cardiovascular benefits. (4).
- Some fish are good, natural food sources of vitamin D, important for bone health and immunity.

*For information on fish that are more of a concern for high mercury levels visit: [www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/mercur/cons-adv-etud-eng.php](http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/mercur/cons-adv-etud-eng.php)*

**GRAIN PRODUCTS**

*Recommendation:* Make at least half of your grain products whole grain each day (4).

- Whole grains:* Evidence is generally consistent for a protective effect of foods containing dietary fibre (notably grain products) against colorectal cancer (21).
  *Whole grains and whole grain foods are composed of all three edible layers of the grain seed or kernel. Each layer provides a unique combination of nutrients. The outer bran layer provides all of the fibre as well as B vitamins, minerals such as magnesium, iron and zinc, phytochemicals and some protein. The middle endosperm layer accounts for the majority of the weight of the grain and is composed mostly of carbohydrate and protein. The inner germ layer provides B vitamins, unsaturated fats, vitamin E, minerals and phytochemicals (22).*
  - Oats: There is data that indicates that oats, as a form of whole grain, are associated with lower risk factors for CHD such as total cholesterol and LDL (22).

**VEGETABLES AND FRUIT**

- We require the most servings from the vegetables and fruit food group each day out of all the food groups. Canada’s Food Guide recommends we eat at least one dark green and one orange vegetable each day to help ensure we get enough of the specific nutrients found in those vegetables (folate and vitamin A)(4).
- For hypertension, CHD, and stroke, there is convincing evidence that increasing the consumption of vegetables and fruit reduces the risk of disease. There is probable evidence that the risk of cancer in general is inversely associated with the consumption of vegetables and fruit. In addition, there is possible evidence that an increased consumption of vegetables and fruit may prevent body weight gain. As overweight is the most important risk factor for type 2 diabetes mellitus, an increased consumption of vegetables and fruit therefore might indirectly reduce the incidence of type 2 diabetes mellitus (23).
Vegetables and fruit contain many antioxidants and phytochemical, which help protect against certain types of cancers. (see info on antioxidants below)

**Phytonutrients**

A wide variety of compounds produced by plants. Each phytonutrient has a different proposed effect on and benefits for the body.

- **Antioxidants** are naturally found in foods. An antioxidant can be:
  - A vitamin such as vitamins A, C or E
  - Plant chemicals like flavonoids and carotenoids
  - A mineral such as selenium

Cell damage happens naturally as you age and when you are exposed to things like pollution or cigarette smoke and stress. Cell damage caused by unstable molecules known as free radicals can lead to common diseases like heart disease, diabetes and cancer. Antioxidants interact with and stabilize free radicals and may prevent some of the damage free radicals otherwise might cause. A diet rich in antioxidants can help lower your risk of these diseases (24).

You can get all the antioxidants you need from eating a variety of antioxidant rich foods like vegetables, fruit, whole grain bread, pasta and cereal, beans, lentils, nuts, seeds, vegetable oils, garlic and green tea.

- **Plant sterols**: Foods enriched with plant stanol or sterol esters can lower LDL cholesterol levels (25) - greater effect with multiple daily intakes than single doses. Most current guidelines recommend for cholesterol lowering that plant sterols be added to the diet (~2 g/day) (26). Wheat germ, wheat bran, peanuts, vegetable oils (corn, sesame, canola and olive oil), almonds, Brussels sprouts and broccoli contain plant stanols and sterols. Smaller amounts are found in other vegetables and some fruits. Because it’s hard to get enough plant sterols/stanols from foods, food companies have begun to add plant sterols or stanols to some of their food products, such as vegetable oil spreads, mayonnaise, yogurt, milk, orange juice, cereals and snack bars (27).

- **Fibre**

  Fibre includes all parts of plant foods that your body can’t digest or absorb. There are two main types of fibre:
  - Insoluble fibre: helps to keep your bowels regular, can improve constipation, and promotes a healthy digestive system. Insoluble fibre is found in some vegetables and fruit, whole grains and wheat bran (28).
  - Soluble fibre: helps to lower cholesterol* and control blood glucose by slowing down how quickly it is absorbed into the blood stream. Soluble fibre is found in some fruits like apples and oranges, vegetables like carrots, okra and eggplant, oats, barley, psyllium, and legumes like beans and lentils (28).
  - It is important to eat a variety of fibre-rich foods to get the health benefits of both types of fibre.
  - Research shows that fibre may also help you maintain a healthy body weight and lower your risk of heart disease and some cancers like colon cancer (28).

**DAIRY PRODUCTS AND MILK ALTERNATIVES**

**Recommendation**: Drink milk or fortified soy beverage each day as it provides calcium, vitamins A, D, and B12, riboflavin, zinc and magnesium, potassium, protein and fat (4).

- Meeting the recommended intake of milk products while limiting soft drink intake is important to promote optimal bone health (29). Individuals, particularly children and adolescents, should be encouraged to follow Eating Well with Canada’s Food Guide (4).
- Soy milk can help reduce cholesterol (6).
- Probiotics found in yogurt, cheese and milk are healthy or good bacteria that multiply in the colon and help to keep a balance between the good and bad bacteria that live there (30).

**OTHER**

**Oil**

**Recommendation**: Include a small amount of unsaturated fat each day (4).
− Oils and fats supply calories and essential fats that help our bodies absorb fat-soluble vitamins.
− Good sources of unsaturated fatty acids include olive, canola, walnut, sunflower, safflower, avocado, etc.
− Replacing saturated fats in the diet with unsaturated fats can help reduce the risk for cardiovascular disease and related deaths (14).

Water

**Recommendation:** Satisfy your thirst with water. Drinking water regularly can satisfy thirst and promote hydration without adding calories.
− Water makes up 60% of human body weight. Water is a structural component to all cells and is essential to all bodily fluids such as blood, urine, and sweat. Water helps to transport nutrients and remove wastes from the body (4).
− Without adequate fluid intake, people can become dehydrated. This can lead to fatigue, weakness, headache, irritability, dizziness and even impaired physical performance (4).

**Other Eating Habits Linked to Good Health**

**Family Meals**

**Recommendation:** Enjoy Meals together with family and friends (4).

Family Meals Benefits: Children and Adolescents who more frequently eat together with their family (31)(32):
− avoid risky behaviours (drugs, alcohol, smoking, early sexual activity)
− have better social adjustment (e.g. fewer fights)
− are less likely to be overweight, obese, or to develop disordered eating patterns
− eat better
− learn better
− learn more words
− read better
− have increased self-esteem and sense of well-being, and
− have stronger family connections.

References:


Accessing Health Information On-Line

We often get health information from the internet through social media and websites. It is hard to know which source is the best. It is important to inform students of ways to ensure the information from the website can be trusted.

Below are a few tips when looking for health information online.

1. **Who hosts the website?**
   - Look for information from government authorities such as Health Canada, health authorities, or from national charities such as the Heart and Stroke Foundation, Canadian Cancer Society, or Diabetes Canada. These sources report reliable health information.
   - Be wary of websites advertising or selling things that are supposed to improve your health. Many of these companies include false or misleading scientific claims to encourage you to buy their product.

2. **Is the information reliable?**
   - Check the author’s credentials. Not all information is written by qualified health professional. There are many phony health professionals making false claims on the Internet.
   - Some qualified health professionals may also reference poor scientific studies with misleading information. It can be important to take a closer look at the articles backing up their claims (see backgrounder Reading Health Studies p. 20)
   - Health information should be unbiased and based on solid evidence. The author should refer to and provide the specific links to this evidence.
   - Be cautious about personal stories and opinions. They are not always objective or based on evidence.

Some websites may even have a cautionary note or full disclaimers that the information provided is purely based on opinion and not on scientific evidence.

3. **When was the information written?**
   - Look for websites with current health information. The date of the information is often at the bottom of the page. Look for information from the last 5 to 10 years.

4. **Does the website offer quick and easy solutions to your health problems?**
   - Be careful of health information that claims that one pill or food will cure a lot of different illnesses.
   - Be cautious of articles that try to make people fearful or recommends therapies which produce amazing or ‘miracle’ cures. Look for other reliable websites to see if they provide the same information.
   - Talk with a trusted health care professional about what you learn online before making any changes in your health care or eating plan.
The study of how food and nutrition impacts human health is a fast growing field of science. As the popularity of nutritional science increases, so does the amount of inaccurate nutrition and health claims. These claims are often loosely based on poorly designed studies and distorted research findings.

To be able to find and interpret accurate nutrition and health information make sure to:

1. evaluate the evidence behind a specific nutrition or health claim,
2. while identifying poor science reporting

### 4 Red Flags When Reading Health Studies (1)

1. **Sensationalized headlines and misinterpreted results:** Media headlines are used to catch the attention of viewers and often to elicit an emotional response, not necessarily to provide an accurate scientific report. Intentionally or not, some reporters can over simplify or misinterpret the finding of studies for the sake of a good storyline. Not only is the media to blame, the scientific community of researchers and journal editors have also been known to sensationalize media releases and misinterpreted results in an effort to fund journals and research(2). It is important to interpret the original study with a critical eye to identify potential conflict of interest and sensationalized conclusions.

   Example: In 1998, a study in which a vaccine was allegedly linked to autism. Later it was noted that the study was funded by families who wanted lawsuits against the vaccine company, and that the research was full of study flaws, so did not actually prove that link. The journal later removed the study and 10 out of 12 of the study researchers noted the interpretation of the results was wrong (2).

2. **Conflict of interest:** Food companies and other industries will employ researchers to conduct and publish studies. Although this does not automatically indicate that the study will not be based on sound evidence, it is important to be cautious reading the study, since the research can be misrepresented for personal or financial gain.


3. **Correlation instead of causation:**

   Watch out for studies confusing a correlation with a cause. When researchers say they have found a correlation it means they have found a relationship between two or more variables. This means when one thing changes, the other things change as well, but there is no way to tell one change caused the other changes.

   Example: researchers have found a correlation between divorce rates in Maine and the consumption of margarine. Divorces are not influenced by margarine consumption; it is just that there seem to be similar fluctuations in the data (3). When a study indicates there is causation, this means that changes in one variable directly caused changes in the other. For example, jumping off a cliff can cause injury. Researchers can assign people to jump off a cliff and others to jump off a side walk and measure the number of injuries that are occurred in both groups. When they find out jumping off the clip causes more injuries, they can say, jumping off the cliff causes more injuries than jumping off a side walk.

4. **Unrepresentative samples**

   Often news headlines and self-identified health gurus reference studies to support their claims. Unfortunately, these studies often have been done on animals, and don’t necessarily mean the same thing as if they were done with humans. Even if the study was done with humans, the subjects selected may be different than the population at hand.

   Example: rats may respond to a certain chemical differently than humans. If this is true, using a study of rats to support a claim is useless. Also, if a small group of males in Africa respond to an intervention, it doesn’t mean it will work for Canadian women.

   For more red flags and information see the Spotting Bad Science infographic on the next page.

### References

A Rough Guide to
SPOTTING BAD SCIENCE

Being able to evaluate the evidence behind a scientific claim is important. Being able to recognise bad science reporting, or faults in scientific studies, is equally important. These 12 points will help you separate the science from the pseudoscience.

1. SENSATIONALISED HEADLINES

Article headlines are commonly designed to entice viewers into clicking on and reading the article. At times, they can over-simplify the findings of scientific research. At worst, they sensationalise and misrepresent them.

2. MISINTERPRETED RESULTS

News articles can distort or misinterpret the findings of research for the sake of a good story, whether intentionally or otherwise. If possible, try to read the original research, rather than relying on the article based on it for information.

3. CONFLICTS OF INTEREST

Many companies will employ scientists to carry out and publish research - whilst this doesn’t necessarily invalidate the research, it should be analysed with this in mind. Research can also be misrepresented for personal or financial gain.

4. CORRELATION & CAUSATION

Be wary of any confusion of correlation and causation. A correlation between variables doesn’t always mean one causes the other. Global warming increased since the 1800s, and pirate numbers decreased, but lack of pirates doesn’t cause global warming.

5. UNSUPPORTED CONCLUSIONS

Speculation can often help to drive science forward. However, studies should be clear on the facts their study proves, and which conclusions are as yet unsupported ones. A statement framed by speculative language may require further evidence to confirm.

6. PROBLEMS WITH SAMPLE SIZE

In trials, the smaller a sample size, the lower the confidence in the results from that sample. Conclusions drawn can still be valid, and in some cases small samples are unavoidable, but larger samples often give more representative results.

7. UNREPRESENTATIVE SAMPLES USED

In human trials, subjects are selected that are representative of a larger population. If the sample is different from the population as a whole, then the conclusions from the trial may be biased towards a particular outcome.

8. NO CONTROL GROUP USED

In clinical trials, results from test subjects should be compared to a ‘control group’ not given the substance being tested. Groups should also be allocated randomly. In general experiments, a control test should be used where all variables are controlled.

9. NO BLIND TESTING USED

To try and prevent bias, subjects should not know if they are in the test or the control group. In ‘double blind’ testing, even researchers don’t know which group subjects are in until after testing. Note, blind testing isn’t always feasible, or ethical.

10. SELECTIVE REPORTING OF DATA

Also known as ‘cherry picking’, this involves selecting data from results which supports the conclusion of the research, whilst ignoring those that do not. If a research paper draws conclusions from a selection of its results, not all, it may be guilty of this.

11. UNREPLICABLE RESULTS

Results should be replicable by independent research, and tested over a wide range of conditions (where possible) to ensure they are consistent. Extraordinary claims require extraordinary evidence - that is, much more than one independent study!

12. NON-PEER REVIEWED MATERIAL

Peer review is an important part of the scientific process. Other scientists appraise and critique studies, before publication in a journal. Research that has not gone through this process is not as reputable, and may be flawed.
Evolution of the Food Guide

In the Beginning (1, 2)

Ever since the 1940’s a food guide has existed in Canada to direct Canadians toward healthy food choices and promote their nutritional health.

- In 1942, Canada’s first food guide called ‘Canada’s Official Food Rules’ was introduced. At that time, it focused on rationing and preventing nutrition deficiencies during World War II. Over time, it became a tool to teach Canadians about balancing their overall food choices to attain their required nutrients. There have been many changes to Canada’s Food Guides since 1942.
- The guide started out giving many direct rules as noted in the first title of ‘Canada’s Food Rules’. Later on, recommendations became guidelines to follow.
- Along with name changes, the number of food groups evolved from 5 to 4 in the 1977 version because vegetables and fruit offer similar nutrients so they were combined to form one group.
- The 1982 version was the start of educating the public about making food choices to decrease risk of chronic disease rather than merely prevent nutrient deficiencies. It included the concept of moderation.
- The 1992 version included stakeholder input, using feedback from experts, consumers, literature reviews, food consumption surveys, consumer research, and commissioned scientific reviews. Consultation was an integral part of the process. The guide changed from a circle to a rainbow in this version to visually represent the higher recommended number of Servings from the grain products and vegetable and fruit food groups.
- Experts’ input to the guide’s messages became increasingly important. Today, the input process into developing the Food Guide is very structured and involves many practitioners with various backgrounds, such as experts in nutrition, anaphylaxis, agriculture, food and consumer associations, environmental health, food science, and food industry representatives.
- The evolution continues. In 2016, as part of their Healthy Eating Strategy, Health Canada started to revise their nutrition recommendations and food guide (for more see: www.canada.ca/en/health-canada/services/canada-food-guides/revision-process.html).

The Controversy (2, 3)

- The 2007 version remains controversial as the food industry was an integral part of the 12-member Food Guide Advisory Committee involved in its creation. Dairy, vegetable oil and consumer product manufacturers (including Pepsi-Co, Frito-Lay and Coca-Cola) were represented in the consultation process. Some feel their *involvement may have swayed some of the recommendations on the guide. (*Note: for the current consultations, they will not be meeting with food industry representatives.)
- The food guide continues to promote foods to meet nutrient needs, with the recommended number of servings per age and gender stemming from 500 simulated diets based on different patterns of eating. Opponents of the guide feel it is time to base recommendations on overall eating practices rather than on nutrients, like the recent Brazilian dietary guidelines www.foodpolitics.com/wp-content/uploads/Brazilian-Dietary-Guidelines-2014.pdf
- Canada’s Food Guide continues to be a popular document that Canadians turn to for guidance about the types and how much food is recommended to be consumed.

Refer to the following page for images of Canada’s Food Guide Over the Years

References

Food Tracking for Youth

Food tracking and analyzing involves having students record everything they ate or drank in a day, count how many servings of each food group they consumed, and then compare it to the recommendations in Canada’s Food Guide (CFG) or to the Recommended Daily Intake (RDI) values for macronutrients and personal estimated energy requirements. This activity helps students become more aware of their eating habits and the factors that may affect what and how much they eat. Comparing students’ eating patterns with those outlined in CFG or the DRIs not only helps to affirm healthy eating behaviours, but also helps to identify how eating habits may be improved. When assigning students to track the food they eat, it is important to note that complete accuracy and perfect eating habits likely will not occur, and should not be the primary goal of the activity. And remember that youth do not need to count calories or develop strict meal plans in their everyday living. This activity is more to get them to understand that food has calories that come from macronutrients, and our bodies burn them and store them for energy for later use. Focusing too strictly on calories and macronutrient distribution can have a negative impact on youth’s relationship with food and can even lead to disordered eating.

Remind students that one day of recording what they eat does not necessarily reflect usual eating habits. Eating habits vary from day to day. Several factors can influence a person’s daily intake, such as special occasions, after school activities, how active they are throughout the day, and their genetic make-up. Eating patterns that happen over a number of days reflect more usual eating patterns. Tracking what is eaten for a few days allows students to see current eating habits, without the task becoming too overwhelming. Although the purpose of this activity is to look at the macronutrient make-up and calories provided by the foods they eat, it is also important to emphasize that the overall patterns of eating is what is most important when it comes to healthy eating, not just individual nutrients or foods. Also make note that eating habits include not only the types of food we eat, but also the social aspects of eating, such as enjoying meals as a family and with friends. Recent evidence suggests that when families regularly eat together at mealtimes, youth eat better and are healthier (1-8).

Creating a non-judgmental climate when doing food tracking activities will encourage students to be honest when recording their intake. Remind students that there is no right or wrong answer, and the goal of the activity is not to portray perfect eating patterns. The goal is also not about achieving a certain size, weight or shape. The goal rather is to get a closer look at what our foods are made up of, how those components can fuel our bodies, and what amounts have been estimated we eat each day to stay strong and healthy. It is important to be supportive of all youth by keeping the focus on health and wellness and off size and shape.

By completing the activity with the students, the teacher models how to do the activity accurately.

Be sensitive about the possibility that some families may not be able to provide enough nutritious foods at home. Also some students may eat cultural foods that are different than their Canadian born peers. Students may feel embarrassed or ashamed to share their food tracking results if their eating patterns are not similar to those reflected in CFG or those of their peers. You may want to assign the food tracking activity on days that the students can participate in a snack or meal program at school or in the community. This will help the students record more healthy food choices on their food tracking activity sheets if they are not getting them at home and reflect a healthier eating pattern. Alternatively you could have students plan out meals for a day and calculate the macronutrient and calorie content of those meals, then compare to their calculated recommended intake. That way they have the sense of what macronutrients are in food and could compare it to the DRIs.

References:

Planning a Healthy Menu

Planning meals and snacks for a few days at a time can help to save time and money. With a plan, you will buy fewer food items that you don’t need and make fewer trips to the store. Invite students to make a week’s worth of dinner menus for themselves or a family of four based on their personal lifestyle choices (e.g. how active they are; level of cooking skills; are there any cultural, biological (allergies or diabetes) or other (vegetarian) food restrictions or preferences; etc.) Planned menus could also be used to calculate their macronutrient and caloric make-up and then compared to recommended intake (RDI) values.

Note: All students need to be physically active, eat well, and have positive mental health regardless of their weight, size and shape. It is important to be supportive of all youth by keeping the focus on health and wellness and off size and shape.

Below are suggested menu planning steps that you could review with your students.

Follow these steps to make a menu.

1. Prepare your workspace.
   - Gather favourite recipes and search new meal ideas they would like to try. Talk about incorporating leftovers on a night or two but remind them that they will need to plan for extra servings to make sure there is enough for more meals.
   - Get a copy of Canada’s Food Guide (CFG) online or download My Food Guide Mobile App. Each meal needs to include servings from all four food groups of CFG. The menu template below can help with this.

2. Fill in the menu.
   - Choose the main family meal first. Sitting down and eating together as a family is really important for youth. It provides an opportunity to share experiences from the day and also helps to ensure a variety of foods are available and enjoyed. Planning main family meals first will help to make sure these meals occurs. Keep food from the 4 food groups in mind when planning meals and snacks. A good rule of thumb is to have food from 3 - 4 food groups at each meal. Plan to have vegetables or fruit and a serving from another food group for snacks. When making a menu it is important to include favourite meals and try out new recipes and foods.
   - Fill in breakfast and lunch. Often students are surrounded by food choices in their school and other places they have activities and live. Planning which meals will be eaten away from home, and keeping nutrition in mind, helps students make sure they choose a balanced meal and have extra food from home to supplement what is purchased. For example, if there is a canteen at school, students could plan to have lunch from the canteen knowing what is usually available, and then packing extra vegetables or fruit if this isn’t available at school.

3. Review the menu and think about the following things:
   - Spice it up with variety. Encourage students to use a variety of ingredients, flavours, colours and textures. This will make meals more interesting and appealing. Combine old favourite foods with a few new dishes.
   - What is going on in the week? Suggest students think about their families’ schedules. A busy week filled with activities could mean planning fast and easy meals rather than food that will take longer to prepare.

4. Estimate the amount of food needed.
   - Estimate the amount of food to buy and make. Students need to think about the number of people who will be eating and how much they may eat.

5. Make the grocery list
   - Looking over the menu, students should think about what food they may already have on hand in order to decide what they will need to buy.
   - Flip through grocery store flyers to take advantage of specials and use coupons to save money. For a homework project, you could have them compare the list to their pantry at home, then go to the store with a parent to price all the items they’d have to buy to make their menu.
   - Consider giving your students a budget to work with so that they need to consider the cost of the meals they have developed.

For more recipe and menu ideas check out Eat Right Ontario (www.eatrightontario.ca), Dietitians of Canada (www.dietitians.ca) or download the Cookspiration mobile app from www.cookspiration.com.
# Healthy Menu Template

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Afternoon snack</strong></td>
<td>✓ V.  f.</td>
<td>✓ O. f. g.</td>
<td>✓ O. f. g.</td>
</tr>
<tr>
<td><strong>Evening Snack</strong></td>
<td>✓ V.  f.</td>
<td>✓ O. f. g.</td>
<td>✓ O. f. g.</td>
</tr>
<tr>
<td></td>
<td>✓ O. f. g.</td>
<td>✓ O. f. g.</td>
<td>✓ O. f. g.</td>
</tr>
</tbody>
</table>

**Calculate Daily...**

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</thead>
<tbody>
<tr>
<td>Total Calories</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>% from Protein</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% from Carbs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% from Fat</td>
<td></td>
<td></td>
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</tbody>
</table>


**Calculation examples:** [faculty.mccneb.edu/CVanRiper/Unit%201/Nutrition%20Calculations%20Information%20Sheet.pdf](http://faculty.mccneb.edu/CVanRiper/Unit%201/Nutrition%20Calculations%20Information%20Sheet.pdf)

**References:**


Healthy Eating for Active Youth

Proper nutrition is important for all people, but is crucial for the health of youth who are still growing, developing, and using a lot of energy in their activities. It is important for youth to learn which foods provide energy for the physical activities they do (1).

Nutrients and fluids to fuel our bodies

It is important to eat healthy foods on a regular basis. Eating specific foods when doing physical activity can help with growth and performance. Carbohydrates, proteins, fats, vitamins, minerals and water all provide important nutrition to help fuel our bodies for physical activities and normal body functioning. Since active youth are still growing, and are being active, it is crucial to provide high quality food choices. This means choosing wholesome rather than processed foods to provide sufficient vitamins, minerals and macronutrients.

- **Carbohydrates**: Carbohydrates are the most important fuel source for active individuals. These nutrients break down to glucose, which is used as energy by the body. Glucose is stored in the muscles as glycogen. Muscle glycogen is the most readily available energy source for working muscle and can be released more quickly than other energy sources. Carbohydrates are also the main fuel source for the brain. Good sources of carbohydrates include whole grain bread, pasta, cereal, and crackers.

- **Proteins**: Proteins have a variety of roles in the body, including building, repairing and maintaining muscle. Protein breaks down into amino acids, which are the building blocks for other proteins. Many amino acids can be made by the body, while some are considered essential, meaning we can only get them from food. Active youth need a little more protein than sedentary youth (about 1½–2 times that of sedentary individuals), but they can easily get that protein from food alone. Good sources of protein include eggs, nuts and nut butters, legumes (such as chickpeas, beans and lentils), fish, beef, chicken, and pork.

- **Fats, Vitamins, and Minerals**:
  - **Fats** provide energy for sustained physical activity as well as protection around vital organs.
  - **Vitamins and minerals** support all of the processes our bodies do to break down food for energy and building block materials (2).
  - **Iron** is important for carrying oxygen through the blood to all cells in the body. Iron requirements are higher during periods of rapid growth such as adolescence as well as during regular intense exercise, making it an important mineral for active youth (5).

- **Fluids and water**: Fluids help to regulate body temperature and replace sweat losses during physical activity. It is important for youth to stay hydrated for better mental and physical performance in the activities they do.
  - **Water** helps carry nutrients around in the body, get rid of wastes, regulate body temperature, and stay hydrated. Plain, cool water is usually all youth need for activities lasting one hour or less. Youth should consume plenty of plain, cool water before, during and after physical activities. Additional fluid is needed in warmer conditions.
  - **Sports Drinks**: The key ingredients in most sports drinks are water, sugar, and electrolytes (sodium and potassium). Most youth who participate in physical activity and sport do not need the extra sugar and electrolytes provided by these beverages. Although these beverages are marketed and sold to the general public as part of a healthy lifestyle, they are only useful in very specific circumstances such as if the activity is vigorous for longer than one hour, is intense, or if the activity is a prolonged competitive game that requires repeated intermittent activity (2, 3). In most cases, water is the best choice.
  - **Energy drinks**: Energy drinks are NOT the same as sports drinks. Energy drinks can actually decrease sports performance because they contain large amounts of sugar, caffeine and carbonation, which can cause an upset stomach during activity and dehydration. These drinks are not recommended for children, pregnant women and those sensitive to caffeine (5).

Supplements

- **Creatine**: Creatine supplements should not be used by anyone under age 18 (2).

- **Protein Supplements**: Protein supplements should not be used by youth; they can displace high quality food choices and may be high in sugar salt or low in other nutrients or fibre. There is also not enough research on their use with youth to know their safety or helpfulness.

What to Eat and Drink Before, During and after Physical Activity

- **Before Activity**: It is important to eat enough food before activity to fuel muscles and the brain for good mental and physical performance. High carbohydrate foods digest quickly and should be the main source of fuel within 2-3 hours before activity, with a medium amount of protein. High fat and/or fibre foods should be limited right before activity as they take longer to digest and can cause gas or upset stomachs during activity (1). Examples of high quality pre-activity choices include oatmeal, low fat yogurt and fruit, pasta with tomato sauce, or an egg and toast.

- **During Activity**: Plain cool water is usually all that is needed for activities lasting one hour or less. For vigorous activity lasting longer than one hour, or activity in hot temperatures, 100% juice, a store-bought or homemade sport drink or may be beneficial.

- **After Activity**: Youth should drink plenty of water after activity. Recovery foods are those that are eaten right after activity. A mixture of carbohydrate and protein within 30 minutes of the activity has been shown to be the best kind of recovery food to replenish energy stores and
repair lean tissue (muscle) (1). Examples of high quality recover foods include chocolate milk, fruit and yogurt smoothies, cottage cheese and crackers, or homemade whole grain muffins.

**NOTE:** Youth do NOT need to count calories or follow strict meal plans to meet their physical activity needs. It is more important that they understand the general types of foods that can be included in their meals and snacks before during and after physical activity to help them feel good and perform their best. Focusing too strictly on portion sizes and macronutrient distribution can have a negative impact on youth’s relationship with food and can even lead to disordered eating.

**Making the healthy choice the easy choice**

Since carbohydrates are the main fuel for activity, it is important for young athletes to eat a high carbohydrate diet along with enough protein to build and repair body tissues as well as support their growth (4). Young athletes need frequent healthy meals and snacks to ensure energy requirements can be sustained (4).

To help support active youth to make healthy food and beverage choices before, during and after activity, it is important to have healthy options available in recreation facilities, at tournaments, and at sporting events. Watch this short video to find out more: www.youtube.com/watch?v=3ENmGpUKH0M.

**References**

Opportunities and Barriers to Healthy Eating

Opportunities and Barriers to Healthy Eating for Youth

At a young age, adults provide all meals and snacks for children. As they get older, youth tend to shop for and prepare more of their own foods and beverages. Depending on what is available at home, in their neighbourhoods, in and around schools, and in recreation facilities, this will greatly influence what youth eat and drink.

When healthy food and beverage options are the easy choice, youth will be more likely to choose them. When youth have few healthy food and beverage options, they often end up choosing those foods which are high in sugar, salt, and fat.

At Home

Youth learn what and how to eat from their parents and families. Influences on eating habits at home can include whether families have:

- **Access** to healthy foods and beverages in the community or transportation to get it somewhere else. In neighbourhoods where there is limited access to affordable nutritious food and an easy access to unhealthy foods, it is difficult for families to purchase healthy food to eat.
- **Enough income** to be able to afford to get enough acceptable and nutritious foods and beverages. When high fat, salt, and sugar foods and beverages are priced lower than nutrient rich foods, it can be difficult to purchase healthy options. When healthy foods and beverages are affordable, accessible and appealing, it becomes easier to make healthy choices.
- **Food skills** such as being able to plan and prepare healthy and tasty meals. There has been a decrease in food skills over the years, resulting in many families and youth relying on less healthy pre-packaged and convenience foods (1). In addition, there is the concern that opportunities for youth to gain 'traditional', basic or 'from scratch' cooking skills from family members may be limited. When Youth are involved in food preparation and cooking, it encourages healthy habits that can last a lifetime.
- **Time** to grocery shop, plan, and prepare a meal. As families become busy with activities and responsibilities there may be less time to plan, prepare and eat healthy meals and snacks.
- **Proper kitchen equipment**, such as a stove and refrigerator, to prepare and store healthy foods.
- **Family Meals** – Children and youth who participate in family meals on a regular basis tend to eat better than those who do not. Enjoying regular family meals is associated with a higher consumption of vegetables and fruits, milk products and overall nutrients (2). In addition, family meals have been associated with enhancing family relationships, supporting healthy choices and improving literacy levels and school performance (3). It is also a way to pass on cultural and traditional knowledge.
- **Multiple stressors** such as difficulty paying rent, finding a place to live, finding employment or caring for ill family members.

Outside the Home

**Schools and surrounding area**

Youth may rely on the foods and beverages available at school to provide or supplement their meals and snacks provided at home. The implementation of nutrition policies and guidelines in schools can make the healthy choice the easy choice for students and is associated with healthier eating patterns (4). Unfortunately, fast-food restaurants and convenience stores commonly surround schools. Youth often walk to and eat at such establishments during their free time.

**Peer influence**

Youth are also influenced by what their peers eat and drink, and in order to fit in, they may feel they need to eat the same things their friends do.

**Recreation facilities and involvement in sport**

Recreation facilities provide a space for physical activity, but unhealthy food and beverage choices are often readily available (5). The food and beverage options available may not be what are recommended before, during and after physical activity.

Participation in sports and other physical activities can influence youth’ eating habits. As they learn about the role of healthy eating and exercise, youth may choose healthier food options (if they are available!). Unfortunately, many unnecessary products such as energy drinks and soft drinks are marketed by professional athletes or promoted by some coaches, and can influence teen eating habits.
In addition, sports such as wrestling, football, gymnastics and dance in which body size plays a role also affect teen eating habits.

**Food marketing**

Advertising which targets youth often promotes low nutrient foods and beverages, while rarely promoting healthy items such as vegetables and fruit. Studies show that youth are more likely to request, buy or consume foods that are heavily advertised (6). Often food and beverage marketing provides misleading or incomplete information about products, which can lead to youth misunderstanding the nutritional value of foods that are marketed.

**Body image**

Media images of unrealistic body sizes and shapes along with comments from family, friends, role models and peers about weight can influence youth’ body image and can in turn increase the risk of unhealthy dieting behaviours. Adult role models who are dieting or have poor body image may also influence the emergence of dieting and unhealthy weight control practices. Talking about healthy eating and physical activity for health benefits without focusing on weight, size and shape can promote a positive body image in Youth.

**References**

Activity: Food Environment Assessment

**Purpose:** To help identify the influence the environment has on our food choices.

There are many reasons why we choose to eat the foods we do. Some are more obvious like hunger and taste, while others can be less obvious invitations to eat like smells of food nearby, advertising and marketing, or just because the food was there. This activity will help students identify some of the reasons we eat what we eat and the role the environment may have on our food choices.

Take Home Assignment – Fill out the following chart:

<table>
<thead>
<tr>
<th></th>
<th>What did you feel? Experience?</th>
<th>Did it have an influence on what you ate? Bought?</th>
<th>How did that influence what you ate? Bought?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>How many food advertisements did you see during your favourite TV show or in a magazine?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>On your way home from school, count the number of places that you pass that sells food.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>How many steps does it take to get from the TV, computer, or desk at work to get something to eat?</td>
<td></td>
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<tr>
<td>4.</td>
<td>Notice how much you eat from a large bulk package versus a smaller package of food?</td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Notice how much food you would put on a large plate versus a small plate or beverages in glasses?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Do you often buy foods in meal deals, or because of a sale or special offer (e.g. 3 for $10)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>How do you feel when you see or smell food? (e.g. vending machine right by the school gym, desk with candies in a dish, passing by and smelling the KFC at lunch time).</td>
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</tbody>
</table>

Processed Foods

What do whole grain breads, orange slices and potato chips have in common? They are all processed foods. Processed foods have received a bad reputation over the years. Often these foods are blamed for the increased number of people with chronic disease and weight issues. It is important to know that processed foods are more than potato chips and TV dinners. Although we need to be cautious of some processed foods, many can be part of a positive healthy eating pattern.

What is a processed food?

Almost all of the food and beverages we consume have been processed to some degree. Changing foods in any way from how they are found in nature is food processing. Peeling, chopping, cooking, and pasteurizing are all food processing methods, so it is almost impossible to find many foods in our diet that have not been processed in some way. Foods are processed for many reasons. Milk is pasteurized to destroy harmful bacteria, fresh vegetables are frozen to preserve them for another time, and grains are milled into flour to make various breads. Some foods are fortified to enhance or replace vitamins lost in processing such as Vitamin D which is added to low fat milk. Food processing itself is not an issue and can actually be the healthiest option, the concern is the amount of processing and what other ingredients are added during the processing. Typically processed foods are grouped in categories similar to those below (1).

1. **Minimally processed**: These foods have had some processing but it does not significantly change the nutritional makeup of the food. The processing makes these foods more accessible, convenient and often safer to eat. Examples of minimally processed foods would be chopping vegetables to make a salad, butchering an animal to make fresh meat, freezing vegetables to store for later, and pasteurizing milk to kill bacteria. These foods do not have the addition of additives such as sugar, flour or salt.

2. **Processed ingredients**: Some foods are processed to create food ingredients such as flour, sugar, salt and oil. These ingredients are not consumed as is but are added to foods. For example, wheat is processed into whole wheat flour to make bread. Oil is extracted to be used in foods such as baked goods and salad dressing.

3. **Ultra-processed** (also called highly processed): These foods are created when minimally processed foods are combined with processed ingredients. They do not have any resemblance to the food they are made from. Examples of these foods include chicken nuggets, hot dogs, fruit snacks, ice cream, and some breakfast cereals.

Ultra-processed, or highly processed foods, are the items of most concern. Highly processed foods tend to be high in fat, sugar, salt and calories while contain few vitamins, minerals or fibre. They are often designed to be “ready to eat”, reheated or be portable. These foods are highly marketed and are often easily accessible in convenience stores and schools. This availability enables them to be consumed at anytime, anywhere and while doing other things such as driving a vehicle, working on a computer or watching television. These types of eating behaviours lead to mindless eating and can cause over consumption of these foods. Research has shown that our modern excess eating is a normal response to an over accessible and marketed food environment. It is inappropriate to consider that eating habits are simply a matter of personal choice.

Reference:

Weight Bias

Weight bias refers to negative attitudes towards people due to their weight. These negative attitudes result in stereotypes, prejudice and unfair treatment towards these people. Weight bias can be expressed in multiple forms, such as name-calling, teasing, physical aggression, cyber bullying, rumors, and social exclusion (1, 2, 4, 5, 7, 8). Not only can this be embarrassing for a child or youth, it can also have serious consequences on their physical, social and psychological health (4, 5, 8). Weight bias towards Youth most often occurs at school and at home (5, 8).

Why does weight bias happen?

Weight bias occurs because we live in a culture where there is a perception that being thin is desirable (but not too thin, because these people may be stigmatized as well) (1). Our culture also tends to believe that people are responsible for their life situation and “get what they deserve”. Despite research suggesting that body weight is determined by a complex interaction of genetic, biological and environmental factors, most people believe that weight gain or loss is under personal control (2, 3).

We are exposed to misleading messages about weight from various means such as television, movies, books, magazines, social media and websites. A consequence of these messages is that it is thought to be socially acceptable to judge people’s characters, personalities and behaviours based on weight. When family members, friends, and education professionals reinforce these false messages, individuals are stigmatized (1).

How does weight bias affect students?

Students who experience teasing or discrimination because of their weight can have low self-esteem, poor body image, and are more likely to experience symptoms of depression and anxiety (1, 5, 8). These students are also more socially isolated, less likely to be chosen as friends, and more likely to engage in suicidal thoughts and behaviours (5, 8). Youth who experience weight biases are more likely to try unhealthy weight control measures, binge eat, and avoid physical activities (4, 5, 8). Research shows that Youth who have been victimized because of their weight report missing more days of school, and experiencing lower expectations by their teachers, which can result in poorer academic performance (4, 6, 7, 8).

Taking Action

All people deserve safety, respect, and acceptance in their community and classroom. Just as we should not tolerate racial or gender bias toward others, we should not tolerate weight bias (1). If you witness weight bias occurring in your school, intervene right away.

To learn how to address weight bias within your classroom and school, refer to the resources found at www.uconnruddcenter.org/weight-bias-stigma-schools-and-educators

References

2. Canadian Obesity Network. It's time to end the last form of socially acceptable prejudice. [Cited 2015 Dec 7]. Available from: www.obesitynetwork.ca/weight-bias
Body Composition and Health Risks in Youth

Weighing and measuring students in schools

Measuring youth within the school setting can be more harmful than beneficial. Youth are often teased about their size and shape. Measuring weight or body composition at school can increase the amount of teasing youth may already be receiving. Regardless of their size or shape, youth may be pressured to try harmful diets. Body composition can influence health but research has shown that shaming people for their size does not improve their health (1).

All students need to be physically active, eat well, and have positive mental health regardless of their size and shape. It is important to be supportive of all youth by keeping the focus on health and wellness and off size and shape.

There are a number of measures that can be used to estimate body composition in relation to health risks.

BMI for Age

BMI (Body Mass Index) for Age is the recommended way for health care providers to assess growth and estimate body composition in youth. Research has linked childhood BMI to health quality in adulthood (2). The calculation below is used to determine BMI.

\[
\text{BMI} = \frac{\text{weight in kilograms}}{\text{height in metres}^2}
\]

BMI for youth MUST be interpreted differently than BMI for adults. Because youth are growing and developing, their body composition changes frequently. As a result, BMI for youth MUST be interpreted by using the appropriate BMI for Age charts and NOT adult BMI charts. When health care providers assess growth, several measurements over a period of time are used instead of one measurement at one point in time.

Skin fold thickness measurements

Skin fold thickness measurements are not recommended for use in schools and fitness facilities. There is a high potential for error due to the difficulty in obtaining accurate measurements. Most importantly, skin fold calipers measure subcutaneous fat (fat that is found under the skin). Subcutaneous fat, although still part of overall weight, is not the most concerning fat for health. Visceral fat (fat stored in the abdomen), found close to internal organs, is the type of fat that is associated with health risks and often cannot be measured using skin fold measurements (3).

Regardless of the technique used, body composition should only be measured and used by a trained healthcare provider as part of a total health assessment to accurately evaluate disease risk.

References