

# Nutrition Guideline

## Body Measurements

For Professional Reference Only

Applicable to: Nurses, Physicians, and Other Health Professionals

### Recommendations

- Standard body measurements include height, weight, and waist circumference.
- Measure the height and weight of adult *and* pediatric patients.
- Measure waist circumference of *only* adult patients.
- Use of estimated or self-reported data is not recommended.
- Body mass index (BMI) should be calculated from measured height and weight.
- In adults (>18 years of age) BMI and waist circumference are used together to help estimate health risk. **Health risk should not be based on BMI and waist circumference alone but should be components of a more complete health assessment.**
- In children and adolescents, BMI should be plotted on the age- and gender-specific World Health Organization (WHO) Growth Charts for Canada, Set 2, to obtain BMI percentile, which should then be used to determine potential health risk. **Health risk should not be based on BMI percentile and serial growth measurements alone but should be components of a more complete health assessment.**
- Dialogue can help support patients comfort with physical measurements.
- This guideline is intended for children ages 2 and older and adults. For health professionals looking for guidance on measurement of children under age 2, refer to the *AHS Childhood Growth Measurement Protocol – Public Health and Clinical Settings*.

### Health Benefits

Along with a complete health assessment, body measurements provide important data about general health, risk of chronic disease, and progression of pre-existing health problems. <sup>(1)</sup>

### Key Questions

#### How should height be measured?

##### Adults

Height is measured with the individual wearing no shoes, standing in an erect position, looking straight ahead, with feet together, heels against a wall or measuring board. A horizontal bar or a similar device should be lowered so that it rests flat on the top of the person's head. Height should be recorded to the nearest 0.5 cm.<sup>(1)</sup>

Some people may not be able to place their heels against the wall due to body shape. The person should stand erect with contact of the buttocks against the wall. To ensure the person is standing in an erect position, align the earlobe, shoulder, hip and ankle in a straight line.

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### Children and Youth

Children or youth aged 2 to 19 years should be measured without shoes or bulky clothing, standing with heels, calves, buttocks, shoulder blades, and back of the head touching the measuring board.<sup>(2)</sup> Remove or undo hair styles and hair accessories that interfere with taking a measurement. Ask the child to stand against the stadiometer with heels together, legs straight, arms and sides and shoulders relaxed. Measure the child standing with heels, buttocks, shoulders, and head touching a flat upright surface. This may be difficult for very young children or those with different body shapes. Help the child to stand with two contact points touching the board with the trunk balanced over the waist. Record the points of contact. The child should be looking straight ahead. Bring the perpendicular headpiece down to touch the crown of the head. The parent or childcare provider can help to align a young child. Measure to nearest 0.1 cm.

- If child is 2 years or older and cannot stand, measure recumbent length and subtract 0.7 cm to convert it to height.
- Upper arm length (UAL) can be used to estimate height in children who have significant lower leg involvement or have their knee, hip, or ankle at a 90-degree angle, and therefore, cannot be measured in a recumbent position.
- For guidance on these special considerations, refer to *AHS Childhood Growth Measurement Protocol – Public Health and Clinical Settings* available at: <https://www.albertahealthservices.ca/info/Page9810.aspx>

### How should weight be measured?

The scale should be located in an area that provides privacy for the measurement and permits individuals to remove excess clothing. Appropriate seating should be located in the area to permit individuals to sit comfortably to remove footwear.

### Adults

An appropriate weigh scale should be used in a clinical setting. Ideally, weigh scale features such as a large low profile base, wheelchair accessible (ramp or level access), with a capacity of 364 kg (800 lbs) or greater are available. Weight should be measured with shoes off, single layer of light clothing, and with pockets emptied. Measurement should be to the nearest 0.2 kg.<sup>(1)</sup>

### Children and Youth

Children and youth age 2 to 19 years who can stand without assistance should be weighed using either a calibrated beam balance or electronic scale. The child or adolescent should be weighed without shoes and wearing only lightweight undergarments or a gown. If it is too cold or socially unacceptable to undress a child, or the child resists being undressed, remove as much clothing as able and note in the chart that the child was clothed when weighed. Record weight to the nearest 0.1 kg or to the nearest ½ ounce.

For more information, refer to *AHS Childhood Growth Measurement Protocol – Public Health and Clinical Settings* available at: <https://www.albertahealthservices.ca/info/Page9810.aspx>

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### What is body mass index?

Body mass index (BMI) is a useful screening tool used to classify a patient's weight according to risk of developing health problems.<sup>(1-3)</sup> The risk of developing weight-related health problems increases when BMI falls outside the 'normal weight' classification.

BMI is calculated as follows: weight in kilograms (kg) divided by height in meters squared (m<sup>2</sup>), or kg/m<sup>2</sup>.<sup>(1,3)</sup>

**Clinic measurements of height and weight are recommended as self-reported height and weight have been found to be inaccurate which may lead to inaccurate BMI calculations.** <sup>(1,2,4)</sup>

BMI does not provide information regarding the distribution of body fat or body composition.<sup>(1,3)</sup> Distribution of body fat has an effect on health risk. Waist circumference (WC) may help with understanding the distribution of body fat.

### Adults

**Table 1. Canadian Guidelines for Body Weight Classification in Adults 18 Years to 64 Years Old** <sup>(1)</sup>

Classification	BMI (kg/m <sup>2</sup> )	Risk of Developing Health Problems
Underweight	<18.5	Increased
Normal weight	18.5-24.9	Least
Overweight	25.0-29.9	Increased
Obese Class I	30.0-34.9	High
Class II	35.0-39.9	Very high
Class III	≥40.0	Extremely high

The BMI is not for use with pregnant or lactating women; health risk can be determined using pre-pregnant BMI values. The ideal BMI for adults 65 years and older is a range from 22 to 29.9 kg/m<sup>2</sup>.

For more information, refer to Nutrition Guidelines: *Seniors Health Overview (65 Years and Older), Adult Weight Management, and Pregnancy.*

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### Children and Youth

For children and youth aged 2 to 19 years, BMI-for-age is determined by plotting calculated BMI on the BMI-for-age gender-specific WHO Growth Charts for Canada, Set 2 (2010).<sup>(5)</sup> A healthy body weight is defined as a BMI-for-age equal to or greater than the 5<sup>th</sup> percentile and less than the 85<sup>th</sup> percentile. <sup>(1,2,6)</sup>

**Table 2. BMI-for-age Percentiles for Children and Youth Aged 2 to 19 years**

Growth Indicator	2 – 5 Years	5 – 19 Years	Growth Concern
BMI-for-age	<3 <sup>rd</sup> percentile	<3 <sup>rd</sup> percentile	Wasting
BMI-for-age	>85 <sup>th</sup> percentile	-	Risk of overweight
BMI-for-age	>97 <sup>th</sup> percentile	>85 <sup>th</sup> percentile	Overweight
BMI-for-age	>99.9 <sup>th</sup> percentile	>97 <sup>th</sup> percentile	Obese
BMI-for-age	-	>99.9 <sup>th</sup> percentile*	Severely obese

Body mass index is a screening tool for identifying children who may be at risk, not a diagnostic tool; a BMI percentile that falls outside of the “healthy” range indicates the need for a more thorough medical assessment of the child, including assessment of lifestyle habits.<sup>(6)</sup> For more information, refer to *Nutrition Guideline: Pediatric Weight Management*.

### Why measure waist circumference?

Waist circumference (WC) is an indicator of abdominal fat and is an independent indicator of health risk.<sup>(1)</sup> WC in adults is an indicator of health risk associated with excess abdominal fat (subcutaneous and visceral). Excessive abdominal fat (regardless of total fat mass) is an independent predictor of disease risk and morbidity.<sup>(7,8)</sup> Adults with a high WC are at an increased risk of developing health problems such as type 2 diabetes, cardiovascular disease, and high blood pressure.<sup>(1)</sup>

Adults with a BMI over 35 are already categorized as very high risk for health conditions due to obesity; therefore, WC does not provide additional information regarding level of risk.<sup>(1,2)</sup> WC can be used to monitor body composition changes during weight management treatment. The WC cutoff values listed below are recommended by Health Canada.

**Table 3. Health Risk Classification in Adults According to Waist Circumference <sup>(1)</sup>**

Waist circumference cutoff points <sup>†</sup>	Risk of developing health problems*
Men ≥102 cm (40 inches)	Increased
Women ≥88 cm (35 inches)	Increased

Not for use with pregnant or lactating women.

<sup>†</sup> Increased WC can also be a marker for increased risk for developing diabetes and other chronic diseases, even in persons with normal weight.<sup>(9)</sup>

\* Risk for type 2 diabetes, heart disease, and hypertension.

Research indicates WC cutoffs may be different in certain ethnic or racial populations.<sup>(1)</sup> As a result, the International Diabetes Federation has proposed ethnic-specific WC cutoff values (refer to Table 4). These values have not been fully validated against outcomes of chronic disease; however, they are presently recommended for study purposes and may be used in clinical assessment for individuals of the specified ethnic groups.<sup>(3)</sup>

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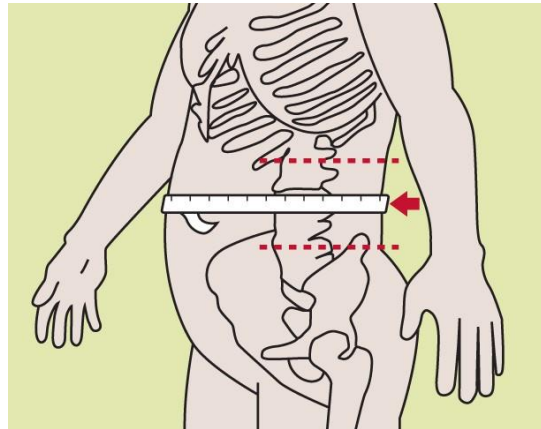
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**Table 4. Ethnic-Specific Values for Adult Waist Circumference** <sup>(10)</sup>

Country or ethnic group		
Europid	≥94 cm	≥80 cm
South Asian, Chinese, Japanese	≥90 cm	≥80 cm
South and Central American	Use South Asian cutoff points until more specific data are available	
Sub-Saharan African	Use Europid cutoff points until more specific data are available	
Eastern Mediterranean and Middle East (Arab)	Use Europid cutoff points until more specific data are available	

### How should waist circumference be measured? <sup>(11,12)</sup>

1. Identify the midpoint between the bottom of the individual's rib cage and the top of the iliac crest. It is helpful to have the individual assist in finding the midpoint.
  - Palpate on yourself to show the individual what you are trying to find and have them mimic your hands to find the top of the iliac crest.
  - If instructing the individual to do the measurement independently, ask him/her to use a mirror to ensure that the tape is parallel to the floor all the way around.
  - If you cannot find the midpoint, then find the top of the iliac crest and measure. Document where the measurement was taken.



2. Have the individual stand with feet 25 to 30 cm (10 to 12 inches) apart, arms relaxed at sides.
3. Place a non-stretch measuring tape horizontal to the floor and around the abdomen at the identified midpoint.
4. Apply sufficient tension to maintain tape position without indenting the skin.
5. Ask the patient to inhale and then exhale. On the exhale, measure only once to the nearest 0.1 cm and record.
6. Clean the tape before and after each use.

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Other suggestions:

- Ask the individual to undo his/her belt and pants/skirt to remove any pressure in the abdomen.
- The measurement should be taken on bare skin, not over clothing.
- If the individual has a skin fold, ensure the measurement is taken on the exterior of the fold.
- Have at least a 2-metre tape measure available.
- If using a retractable tape measure that makes noise when pulling out, pull the tape out before doing the measurement.

### Should waist circumference be measured in children and adolescents? <sup>(3,13,14)</sup>

For children and adolescents, WC is able to predict adiposity and risk for heart disease. Reference data for WC in children and adolescents have been developed for several countries, including Canada, but not for all age groups. As well, WC is highly age-, sex-, and ethnicity-specific; therefore, one set of reference data may not be suitable for all children and youth. Further research is needed to determine the best use of WC in the clinical setting and its association with health risks independent of BMI in the overweight pediatric population.

Use in clinical practice is recommended only as a monitoring tool by health professionals for individual children until WC measurement protocols and health-related classification criteria for children and adolescents are developed.

### How are BMI and waist circumference combined to assess health risk for adults? <sup>(1)</sup>

For adults, BMI and WC measurements can be combined to help assess health risk for individuals. Health risk should not be based on BMI and WC alone but should be components of a more complete health assessment.

**Table 5. Combined BMI and WC from the Canadian Guidelines for Weight Classification in Adults**

		Body Mass Index (BMI)		
		Normal	Overweight	Obese Class I
Waist Circumference (WC)	< 102 cm (Males) < 88 cm (Females)	Least risk	Increased risk	High risk
	≥ 102 cm (Males) ≥ 88 cm (Females)	Increased risk	High risk	Very high risk

### How often should BMI and waist circumference be measured in adult patients?

BMI and WC should be measured as part of any routine health assessment. Other determinants of health risk, including presence or absence of obesity-related disease and lifestyle habits, should also be considered to establish the individual's overall health risk.

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### How often should measurements be taken and BMI plotted on a growth chart for children and youth? <sup>(6)</sup>

Growth monitoring and promotion of optimal growth are essential for determining the health and nutritional status of children and adolescents. Accurate, reliable measurements are fundamental to growth monitoring and to making sound clinical judgements on the appropriateness of a child's growth pattern. Appropriate techniques for each measure should be utilized. A child's measurements should be consistently and accurately recorded in an age and gender appropriate growth record, carefully plotted and analyzed. The frequency of measurements are as suggested:

- At each outpatient appointment or as per clinic protocol.
- Annually at minimum.

Refer to *AHS Childhood Growth Measurement Protocol – Public Health and Clinical Settings* available at: <https://www.albertahealthservices.ca/info/Page9810.aspx>

### How can one measure and talk about body measurements in a respectful and sensitive manner? <sup>(15)</sup>

Physical exams can be sensitive or uncomfortable for the patient. Dialogue with the patient can facilitate the process of gathering accurate data. Communication with the patient can prepare them for the experience, inform them about the exam process and help make them feel more comfortable.

Always ensure measurements take place in a private location to protect confidentiality of the individual. Consider having the individual face away from the scale if she or he shows anxiety about being weighed. Record the measurements without judgment or comments. Offer the individual the choice of seeing or not seeing the result.

When communicating with children and families, the terms “weight” and “unhealthy weight” are more desirable. Avoid undesirable terms such as “fatness”, “heaviness”, “excess fat”, “unhealthy BMI/body weight”, “large size”, “weight problem”, and “obesity”.<sup>(16)</sup>

For additional guidance on how to discuss growth with parents/caregivers of children and youth, refer to [Pediatric Growth Discussions: A Tool for Health Professionals](#).

### Are there any handouts on body measurements I can use with my patients?

Refer to approved provincial Alberta Health Services nutrition handouts to support patient education. For more information, contact [Nutrition.Resources@albertahealthservices.ca](mailto:Nutrition.Resources@albertahealthservices.ca)

Access to referenced Nutrition Guidelines can be found at: <https://www.albertahealthservices.ca/info/Page3505.aspx>

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