



Best Practice

Body Mass Index and Nutrition Screening

NUTRITION CONNECTION

How to properly
use BMI
measurements
for appropriate
nutrition care



Body mass index (BMI) has become a common measurement in nutrition screening and assessment tools and is generally used to determine if an individual has a healthy weight. The BMI allows the review of any health risks associated with either having excess weight or a weight that is too low. As healthcare providers we must know how to properly use this measurement for appropriate nutrition care and services. So what does the BMI really tell us, and how do we consider BMI in nutrition screening and/or assessment of various age categories? This article presents an overview of what BMI means and provides recommendations for use of BMI with various age groups for best practice.

BODY MASS INDEX OVERVIEW

In general, body mass index—or BMI—is a measure of body size which combines a person's weight with their height. The results of a BMI measurement can give an idea about whether a person has the correct weight for their height. It is important to remember that BMI does not measure body fat directly, and it does not account for age, sex, ethnicity, or muscle mass in adults.

The BMI does appear, however, to be strongly correlated with various metabolic and disease outcomes and is an excellent screening measurement that can be used across populations. It can also help in identifying potential nutrition-related issues.



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BMI used in a screening tool can indicate whether a person is underweight or if they have a healthy weight, excess weight, or obesity. If a person's BMI is outside of the healthy range, their health risks may increase significantly. A BMI outside of the healthy range can be a risk factor for overweight individuals, leading to conditions such as type 2 diabetes, high blood pressure, and cardiovascular problems. On the other hand, having a weight that is too low can increase the risk of malnutrition, osteoporosis, anemia, and other poor outcomes.

In general, BMI is an inexpensive and easy-to-perform method of screening for weight categories such as underweight, normal or healthy weight, overweight, and obesity.

HOW BMI IS DETERMINED

Calculating BMI involves a mathematical formula measuring a person's height and body weight, and is determined using either metric or imperial units.

How to Calculate an Adult's BMI

When using **metric** units to calculate BMI, the formula is **BMI = kg/m²**. Divide the person's weight in kilograms (kg) by the square of their height in meters (m²). Since most people measure height in centimeters (cm), divide height in cm by 100 to get height in meters.

When using **imperial** units to calculate BMI, the formula is **BMI = lbs x 703/in²**. Multiply the person's weight in pounds (lbs) by 703. Then divide by their height in inches, squared (in²).

For optimal efficiency and accuracy, a calculator or chart is often used to determine an individual's BMI. See sidebar for some great resources.

BMI for Children and Teens

BMI is interpreted differently for children and teens, even though it is calculated using the same formula that is used for adult BMI. Children and teen's BMI are age- and sex-specific because the amount of body fat changes with age and differs between girls and boys. Children cannot be categorized using healthy weight ranges because:

- They change with each month of age.
- Male and female body types change at different rates.
- They change as the child grows taller.

The Centers for Disease Control and Prevention (CDC) has developed Clinical Growth Charts that consist of a series of percentile curves illustrating the distribution of selected body measurements in children. The Body Mass Index-for-Age Percentiles charts incorporate these differences and visually show BMI as a percentile ranking. Clinical Growth Charts for infants and older children were published in two sets and are available at https://www.cdc.gov/growthcharts/clinical_charts.htm

Obesity among 2- to 19-year-olds is defined as a BMI at or above the 95th percentile of children of the same age and sex in this 1963 to 1994 reference population. For example, a 10-year-old boy of average height (56 inches) who weighs 102 pounds would have a BMI of 22.9 kg/m². This would place the boy in the 95th percentile for BMI—meaning that his BMI is greater than that of 95 percent of similarly-aged boys in this reference population—and he would be considered to have obesity.

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BMI Ranges for Adults

The following table shows standard weight status categories from the CDC associated with BMI ranges for adults. The BMIs in this table for adults are not linked to age and are the same for both sexes.

BMI	Weight Status
Below 18.5	Underweight
18.5-24.9	Normal or Healthy Weight
25.0-29.9	Overweight
30.0 and Above	Obese

Source: CDC: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

As with all ages, to determine if a BMI is a health risk a healthcare provider would need to perform further assessments. These assessments might include skinfold thickness measurements, evaluations of diet, physical activity, family history, and other appropriate health screenings.

What About Adults Over Age 65?

In the past few years there has been more research about BMI in adults over the age of 65 to consider the influence of aging and the association of BMI with mortality. Based on research, we are now seeing recommendations that when using BMI as an indicator of being underweight, a higher BMI range should be recommended for older adults based on mortality.

One study assessed BMI range with the lowest mortality for those aged <65 years and those >65 years, utilizing studies spanning the entire adult age range. In the older age group, mortality risk increased at BMIs lower than 22, which was not seen in younger adults. In the older group, mortality did not tend to increase significantly in the older group at BMIs above 23. (Reference: The influence of age on the BMI and all-cause mortality

association: A meta-analysis, The journal of nutrition, health & aging, 2017, Volume 21, Number 10, Page 1254, J.E. Winter, R.J. MacInnis, C.A. Nowson)

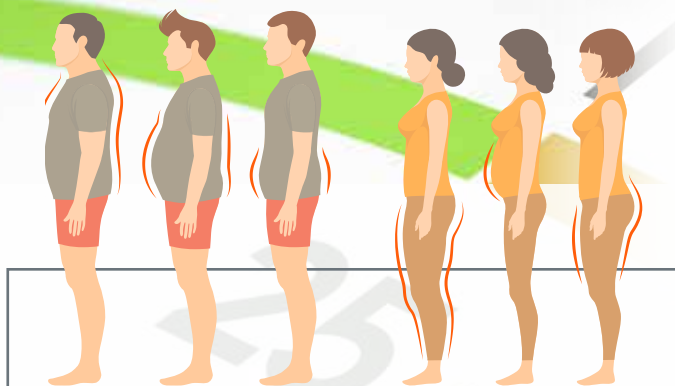
An article from the National Institutes of Health's website MedlinePlus, includes the recommendation that for older adults it is often better to have a BMI between 25 and 27, rather than under 25. If you are older than 65, for example, a slightly higher BMI may help protect you from thinning of the bones (osteoporosis). <https://medlineplus.gov/ency/article/007196.htm>

Another consideration for "best practice" use of BMI with adults over age 65

ADDITIONAL RESOURCES

Some great information and BMI calculators and charts can be found at:

- U.S. Department of Health & Human Services; National Heart, Lung and Blood Institute "Calculate Body Mass Index:" https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm
- Centers for Disease Control and Prevention: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html#InterpretedAdults
- Body Mass Index Table provided by the National Heart, Lung, and Blood Institute. Locate height in inches on the side of the chart, then look across to find body weight in pounds. Scan to the top to see if the result corresponds to a normal weight, overweight, or obesity. https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi_tbl.htm



WHEN USED CORRECTLY, BMI is an excellent screening measurement that can be used across all populations and help identify potential nutrition-related issues.

comes from the National Quality Forum (NQF). NQF measures have undergone careful evaluation by expert committees made up of doctors, hospitals and other healthcare providers, employers, health plans, public agencies, community coalitions, and patients. As medical evidence evolves, NQF-endorsed measures undergo routine maintenance to ensure that they are still the best-available measures and reflect current standards of care. BMI is addressed in NQF #0421 which is the Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up Plan which was updated and endorsed in March 2018. The steward for this measure is the Centers for Medicare & Medicaid Services, which incorporates NQF measures into many of the federal programs for quality measures.

The Normal Parameters in NQF #0421 includes:

- Age 18–64 years BMI ≥ 18.5 and < 25 kg/m²
- Age 65 years and older BMI ≥ 23 and < 30 kg/m²

This stresses the importance of BMI measurement and follow-up when the measurement is outside of normal parameters. Both obesity and underweight continue to have a negative impact on the health and well-being of adults. Losing weight involuntarily can lead to muscle wasting, decreased immunity, depression, increased rate of disease complications, and ultimately death—especially in elderly patients.

CONCLUSION

The Association of Nutrition & Foodservice Professionals (ANFP) includes in the Practice Standard for Documenting in the Medical Record that the certified dietary manager, certified food protection professional (CDM, CFPP) shall ensure that nutritional screening data is accurately obtained and recorded in the medical record in accordance with state

and federal regulations and facility policy. It is important to understand what body mass index means and know how to use BMI with nutrition screening for an individual. The BMI measurement can give an idea about whether a person has the correct weight for their height. While the BMI does not measure body fat directly, and does not account for age, sex, ethnicity, or muscle mass in adults, it does appear to be strongly correlated with various metabolic and disease outcomes.

When used correctly, BMI is an excellent screening measurement that can be used across all populations and help identify potential nutrition-related issues. We must keep current with “best practice” guidelines for BMI parameters for nutritional care and services to support wellness, prevention and management of chronic disease, and overall quality of life. ■



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This Level II article assumes that the reader has a foundation of basic concepts of the topic. The desired outcome is to enhance knowledge and facilitate application of knowledge to practice.

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- Body mass index (BMI) is a measure of body size which combines a person's _____ with their _____.
 A. Weight, age
 B. Weight, sex
 C. Weight, height
- BMI is strongly correlated with various _____ and _____ outcomes.
 A. Metabolic, disease
 B. Intake, output
 C. Income, expense
- BMI can be calculated using _____ or _____ measurement units.
 A. One, multiple
 B. Metric, imperial
 C. Individual, group
- BMI is interpreted differently for children and teens and incorporates specific age and sex information. This is because children and teens:
 A. Change each month of age, and male and female body types change at different rates
 B. Change as they grow taller
 C. Both A and B
- Research is not supporting BMI for adults 65 years of age and older that incorporate the influence of _____ and the association of BMI with _____.
 A. Aging, mortality
 B. Skinfold measurements, diet
 C. Calories, food insecurity
- The National Institutes of Health recommends that for older adults it is often better to have a BMI between _____ kg/m² and _____ kg/m².
 A. 25, 27
 B. 19, 21
 C. 20, 21
- The National Quality Forum measure #0421 states that a normal BMI parameter for adults 65 and older is between _____ kg/m² and _____ kg/m².
 A. 23, 27
 B. 23, 30
 C. 23, 25

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- Centers for Disease Control and Prevention (CDC)*: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html#InterpretedAdults
- Body Mass Index Table/Chart provided by the National Heart, Lung, and Blood Institute*: https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi_tbl.htm
- Association of Nutrition & Foodservice Professionals, Documenting in the Medical Record Practice Standard*: <http://www.anfponline.org/news-resources/standards-of-practice/practice-standard-documenting-in-the-medical-record> (accessed 1/23/19)