

Using Body Mass Index

Body mass index (BMI) classifications were developed based on associations between BMI and chronic disease and mortality risk in healthy populations. Other anthropometric measures (e.g. waist circumference) may be a better indicator of chronic disease risk¹.

IMPORTANT:

- BMI classifications were developed for use at the population level. Therefore, care should be taken when applying to individuals.
- In acutely ill patients, BMI classifications may not accurately indicate health risk, as BMI reflects long term morbidity and mortality from chronic disease.
- There is convincing evidence that mortality and morbidity risk significantly increases as BMI decreases below 18.5 kg/m², particularly in the elderly (see over page).

Classification of adult underweight, overweight and obesity according to BMI

Classification	BMI (kg/m ²)	Chronic disease risk
Underweight	<18.5	Low (but increased mortality and morbidity from other causes)
Severe thinness	<16.0	
Moderate thinness	16.0 - 16.9	
Mild thinness	17.0 - 18.5	
Normal range	18.5 - 24.9	Average
Overweight	≥25.0	
Pre-obese	25.0 - 29.9	Increased
Obese	≥30.0	
Obese class I	30.0 – 34.9	Moderate
Obese class II	35.0 - 39.9	Severe
Obese class III	≥40.0	Very Severe
Cut offs may not be appropriate for >65 year olds, see page over for further detail.		

Source: World Health Organisation (WHO)²

Waist circumference^{1,3}

There is increased risk of developing obesity related chronic diseases for men with a waist circumference ≥94 cm, and women with a waist circumference ≥80 cm.

Risk of chronic disease	Waist circumference (cm)	
	Men	Women
Increased risk	≥94	≥80
Substantially increased risk	≥102	≥88

Using BMI in older adults ≥ 65 years

There are no existing evidence-based practice guidelines to assist clinicians in classifying BMI for elderly populations. However, there is strong emerging evidence that WHO cut-offs may not be appropriate in increasing age.

Recent meta-analysis of 32 cohort studies⁴ (level II and III, $n=197940$) of community-dwelling elderly people aged ≥ 65 years found a U-shaped association between all-cause mortality, with mortality risk lowest at BMI 24 – 31 kg/m^2 . This relationship remained when adjusting for smoking status, early death, pre-existing disease and geographical location.

Therefore, in practice, it may be appropriate to adjust BMI classifications for people aged ≥ 65 years to:

- Underweight $<23 \text{ kg/m}^2$
- Healthy weight 24-30 kg/m^2
- Overweight $>30 \text{ kg/m}^2$

CAUTION: Intentional weight loss should only be considered for elderly people on an individual basis with careful attention to maintenance of lean mass (particularly where co-morbidities are present which

may compromise nutritional status and/or muscle mass). The above recommendations are supported by the Australia & New Zealand Society for Geriatric Medicine⁸.

Using BMI in ethnic groups⁹

While there is some evidence that BMI differs according to ethnicity, WHO maintains that these cut-offs are not significantly different and, therefore, the standard WHO BMI classifications should be used in Asian, African American and Polynesian populations.

Limitations associated with BMI³

- Fat mass is not distinguished from lean body mass, and may be underestimated for older adults, and overestimated for those with a muscular build (e.g. athletes)
- Fat distribution and physical disabilities are not taken into account
- There is a reliance on the accuracy of reported height
- Affected by shifts in fluid weight
- BMI is influenced by age and gender
- Not suitable for pregnant women and children



References:

1. World Health Organisation (2011) "Waist Circumference and Waist-Hip Ratio. Report of a WHO Expert Consultation"
http://whqlibdoc.who.int/publications/2011/9789241501491_eng.pdf
2. World Health Organisation (2006) "BMI Classifications"
http://www.who.int/bmi/index.jsp?introPage=intro_3.html
3. National Health and Medical Research Council (2013) Australian Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults.
4. Winter JE et al. (2014) "BMI and all-cause mortality in older adults: a meta-analysis." *Am J Clin Nutr*, available ahead of print: doi:10.3945/ajcn.113.068122.
8. Australian and New Zealand Society for Geriatric Medicine. (2011). Position Statement No 19, Obesity and the older person.
<http://www.anzsgm.org/documents/ObesityandtheOlderPerson11Sept113.pdf>.
9. WHO expert consultation (2004) "Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies." *Lancet*, 363: 157-63.