

**DR MARGARET ASHWELL OBE, DSC, EDD, HON FNS, FAFN  
RNUTR (PUBLIC HEALTH); AND PROF BEN RICKAYZEN PHD,  
FIA, CITY UNIVERSITY OF LONDON – SUPPLEMENTARY  
WRITTEN EVIDENCE (FDO0057)**

Submission to The House of Lords Select Committee on Food, Diet and Obesity

By *Dr Margaret Ashwell OBE, DSc, EdD, Hon FNS, FAFN,  
RNutr(Public Health)*

*Honorary Senior Visiting Fellow, Bayes Business School (formerly  
Cass), City, University of London.*

*and Professor Ben Rickayzen PhD, FIA*

*Professor of Actuarial Science, Faculty of Actuarial Science and  
Insurance, Bayes Business School (formerly Cass), City, University  
of London.*

Re:

*1.Key trends in food, diet and obesity, and the evidential base for  
identifying these trends.*

*3.The impacts of obesity on health, including on children and adolescent  
health outcomes.*

*11.The impact of recent policy tools and legislative measures intended to  
prevent obesity.*

*12.Policy tools that could prove effective in preventing obesity amongst  
the general population, including those focussed on the role of the food  
and drink industry in tackling obesity.*

**Government should encourage the universal adoption of Waist-To-Height Ratio for children and adults of all ethnic groups to replace the BMI because it is a better indicator of unhealthy adiposity, and it is linked more strongly to health risks and mortality (first suggested by Ashwell,1996 and endorsed by NICE,2022). Waist-to-height ratio Charts should be widely available throughout the NHS, pharmacies, and other relevant places. The simple string test**

## **to check if children are "Keeping their waist to less than half their height" should be adopted in all schools and clinics.**

### Summary

1. There is overwhelming scientific evidence that waist-to-height ratio is better than BMI for assessing and predicting health risk and mortality because WHtR is a good proxy for the harmful central adiposity .
2. The WHtR boundary values of 0.4, 0.5 and 0.6 can be displayed on a simple chart which is suitable for children, men and women of all ages and ethnicities. Increased risk starts at WHtR above 0.5. A simple chart is available to check risk category.
3. The simple public health message is "Keep your waist to less than half your height". This can be checked with a simple piece of string.

### Introduction

In April 2022, the UK's National Institute for Health and Care Excellence (a government body) proposed new guidelines (1). which suggested that all adults "ensure their waist size is less than half their height in order to help stave off serious health problems". In September 2022, NICE formally adopted this guideline (2).

More than twenty-five years ago, waist-to-height ratio (WHtR) was first suggested as a simple health risk assessment tool because it is a proxy for 'harmful' central adiposity (3) and a boundary value of 0.5 proposed to indicate increased risk (4, 5).

### Definition

A person's "waist-to-height ratio" ("WHtR") is defined as their waist circumference divided by their height, both measured in the same units.

### Measurement of waist circumference to use for WHtR

Waist is usually measured at the WHO defined site of midway between the lower rib and the iliac crest (6). NICE has endorsed this measurement(2).

### Scientific evidence supporting WHtR as a public health tool

WHtR is a proxy for central (visceral or abdominal) adiposity

Values of WHtR are significantly correlated with direct measures of central (visceral or abdominal) adiposity using techniques such as CT, MRI or DEXA(5, 7-9).

WHtR is an indicator of 'early health risk'

Several **systematic reviews and meta-analyses** of data in adults of all ages (10-13) and in children and adolescents (14, 15) have supported the superiority of WHtR over the use of Body Mass Index (BMI) and waist circumference in predicting early health risk.

**Cross-sectional studies** in many different global populations have supported the premise that WHtR is a simple and effective anthropometric index to identify health risks in adults of all ages (11, 12, 16-28) and in children and adolescents(29-34).

**Prospective studies** in many adult populations have also lent further support to the premise that WHtR is a simple and effective anthropometric index to predict health risks in adults of all ages (35) (36) (37) (38, 39) (40) (40) (41) (42) (43) (44) (45) (46). Further, prospective data from the ALSPAC study in UK has shown that WHtR in children aged 7-9 y predicts adolescent cardiometabolic risk better than BMI (47).

In a comprehensive narrative review, Yoo (48) concluded that "additional use of WHtR with BMI or WC may be helpful because WHtR considers both height and central obesity. WHtR may be preferred because of its simplicity and because it does not require sex- and age-dependent cut-offs".

WHtR is an indicator of mortality and years of life lost

Not only does WHtR have a close relationship with morbidity, it also has a clearer relationship with mortality than BMI.

Mortality risk associated with BMI in the British HALS survey was similar to that found in US studies. However, WHtR was a better predictor of mortality risk. Years of life lost were quantified for different values of WHtR. This was done for both sexes separately and for three representative ages (43, 49, 50).

A recent analysis of NHANES cohort data has shown that use of waist-to-height ratio can resolve the obesity paradox whereby obese (by BMI) individuals have lower mortality than their normal-weight counterparts. The association between body mass index (BMI) and mortality risk was inversely J-shaped, whereas the association between waist-to-height ratio (WHtR) and mortality risk was positively J-shaped. There was a progressive increase in the association between the WHtR category and mortality risk (51).

#### WHtR can indicate normal weight central adiposity

Many cross-sectional studies have shown that, even within the normal BMI range, many adults have WHtR which is above 0.5 (52, 53) (28). Many children show the same phenomenon (54, 55). Risk factors for metabolic diseases (53, 56) and mortality (57-59) are raised in these subjects.

#### Suggested boundary values for WHtR

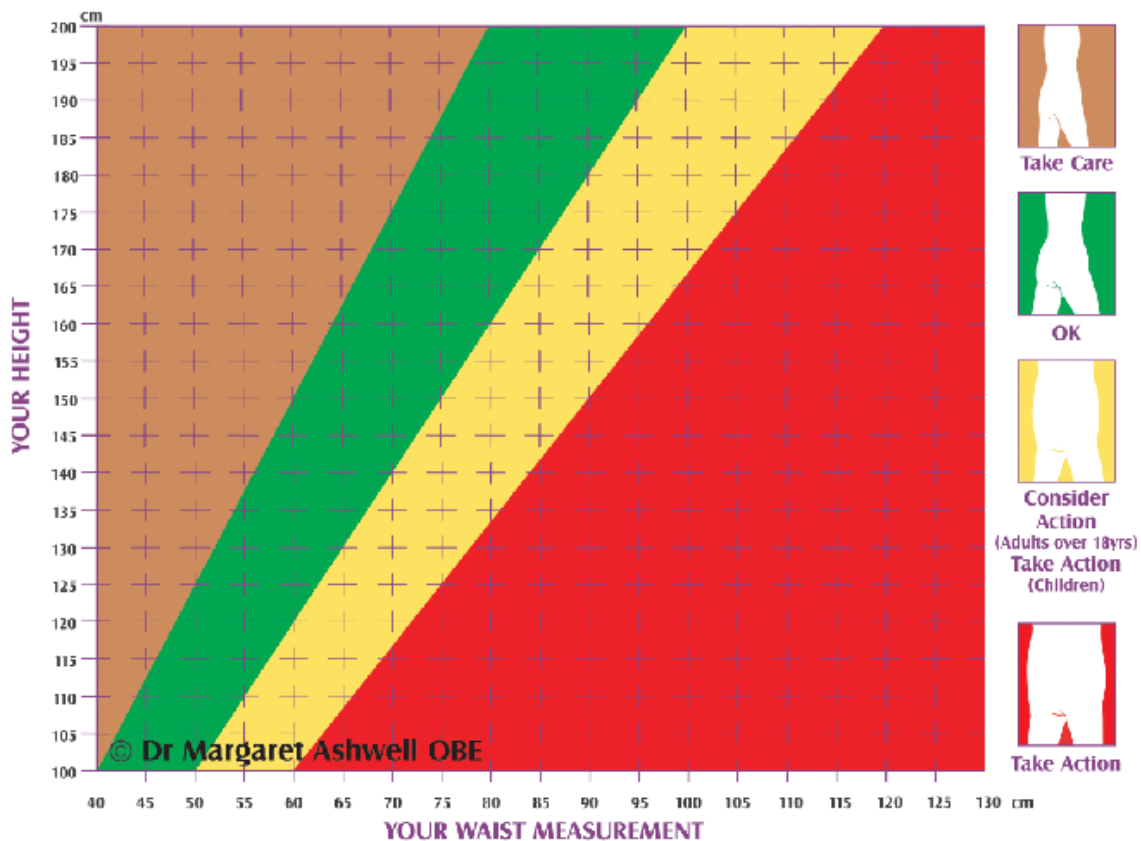
The recent NICE guidelines(2) have suggested boundary values for WHtR (defining the degree of central adiposity) as follows:

- healthy central adiposity: waist-to-height ratio 0.4 to 0.49, indicating no increased health risks
  - increased central adiposity: waist-to-height ratio 0.5 to 0.59, indicating increased health risks
  - high central adiposity: waist-to-height ratio 0.6 or more, indicating further increased health risks.

NICE say that these classifications can be used for people with a BMI under 35 kg/m<sup>2</sup> of both sexes and all ethnicities, including adults with high muscle mass. The health risks associated with higher levels of central adiposity include type 2 diabetes, hypertension and cardiovascular disease. NICE have proposed the same boundary values for children of 5 y and over (60).

Boundary values were first suggested for WHtR in 1996 to reflect health implications and were portrayed on a simple chart of waist circumference against height. The boundary value of WHtR =0.4 was suggested to indicate the start of the 'OK' range. The 0.5 boundary value was

suggested to indicate the start of the 'Take Care' range with the 0.6 boundary value indicated the start of the 'Take Action' range(61).



Simple Communication of waist-to-height ratio for public health using a piece of string

The first boundary value for increased risk of WHtR 0.5 translates into the simple message "Keep your waist to less than half your height" (62, 63). The updated NICE guideline (2) says "When talking to a person about their waist-to-height ratio, explain that they should try and keep their waist to half their height (so a waist-to height ratio of under 0.5)".

Another great advantage of using WHtR as a primary screening tool is that a simple piece of string can be used to indicate early risk (20, 64). A person's height can be measured with string; the string is then cut or folded in half. If this does not fit around the person's waist, then that person has WHtR of more than 0.5. Further screening would be indicated.

## Further reading

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