# Waist circumference: A marker of risk and a motivational tool

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My "Waist Watcher" tape measure, with embarrassingly colour-coded thresholds, is one of my favourite tools. But what is the evidence that measuring and recording waist circumference (WC) helps in risk assessment or diabetes care?

NICE (2006) recommends the measurement of WC in people who are overweight (BMI 25–29.9 kg/m$^2$) and obese (30–34.9 kg/m$^2$), and uses it to assess risks and make recommendations for intervention.

When defining the metabolic syndrome, the International Diabetes Federation has published single WC cut-offs for men (≥ 94 cm for Europid and ≥90 cm for south Asian and Chinese people) and women (≥80 cm for Europid, south Asian and Chinese people) (Alberti et al, 2005).

## Accurately measuring waist circumference

WC should be measured over bare skin, in expiration, with the tape placed around the body parallel to the ground (Klein et al, 2007). Five sites can be chosen for measurement – below the lowest ribs, above the iliac crest, umbilicus, narrowest waist and midpoint between lowest ribs and iliac crest (Klein et al, 2007). The latter three are most commonly correlated with health risk and some argue that all sites correlate with morbidity and mortality (Ross et al, 2008). Narrowest waist is my preference as it is fastest and easy for self-measurement, but all are reproducible (Wang et al, 2003). After training, self-measurement correlates well with the healthcare professional's measurement, although there is otherwise a tendency for underestimation (Klein et al, 2007).

## A marker of risk

Having a large WC almost doubles the risk of premature death, even in those with normal BMI. In adults aged 51 with similar BMI, each 5 cm increase in WC increased mortality risk by 17% in men and 13% in women (Pischon et al, 2008). WC is also a stronger predictor of diabetes risk than BMI in men (Wang et al, 2005) and women (Carey et al, 1997), and of coronary heart disease risk (de Koning et al, 2007).

A 1 cm increase in WC correlates with a 2% increased risk of cardiovascular events, and this was consistent in men and women (de Koning et al, 2007). Furthermore, a 2 cm increase in WC increases colorectal cancer risk by 4% (Moghaddam et al, 2007). Central obesity, as measured by WC, increases the risk of breast cancer independent of BMI in pre-menopausal women (Harvie et al, 2003), while in post-menopausal women, smaller WC correlates with lower risk through lower BMI. Each 1 cm increase in WC is associated with approximately 13 mL decrease in forced vital capacity and 11 mL decrease in forced expiratory volume in 1 second (Chen et al, 2007) but no correlation with BMI. Requirement for knee or hip joint replacement correlates with both BMI and WC, suggesting both mechanical and metabolic mechanisms (Wang et al, 2009).

WC correlates well with visceral fat accumulation, aiding identification of those with atherogenic lipid profiles, insulin resistance and metabolic syndrome (de Koning et al, 2007; Klein et al, 2007). A recent study in Leicester confirmed that WC ≥88 cm was 94.9% sensitive and 52% specific in white European women and 90.7% sensitive and 52.7% specific in south Asian women for predicting metabolic syndrome (Khunti et al, 2010).

## A motivational tool

Dietary induced weight loss may result in relatively larger losses of visceral than subcutaneous fat (van der Kooy et al, 1993). As a result, WC reductions tend to begin early and be more motivational than smaller weight reductions. Providing individuals with tape measures empowers them to monitor their own progress.

Weighing people meets our QOF obesity responsibility, but measuring WC, linking it to health risk and using it to motivate people to achieve "waist loss" empowers them to monitor and improve their own health. If each of us did that with just one individual each surgery, I believe we could make a bigger impact on the health of our patients with little extra work. ■