INTRODUCTION: Body Mass Index (BMI) is traditionally used as a measure of overall obesity. Increasing evidence suggests that central obesity is a more important cardiometabolic risk factor. Despite recommendations that waist circumference (WC) should be a routine measure in clinical practice, there is no international consensus regarding measurement protocol. Our aim was to compare associations and discriminatory abilities of BMI and a variety of WC measurements with metabolic features and type 2 diabetes (T2DM) to address the hypothesis that WC is superior to BMI in the classification of cardiometabolic risk and should more commonly be used for screening purposes.

METHODS: BMI and WC measurements including WC measured between the lowest rib and iliac crest (WC midway), below the lowest rib (WCR), WCR/height ratio, WCR/hip ratio and WCR/pelvis ratio were determined in the cross-sectional Cork and Kerry Diabetes and Heart Disease Study of middle-aged adults ($n = 2,047$). Logistic regression and area under the receiver operating characteristic curve (AUC) analyses were used to evaluate the ability of each of these measures to predict metabolic risk and T2DM.

RESULTS: WCR, and rib derived indices, displayed the strongest associations for T2DM and metabolic risk phenotypes in non-stratified and gender specific regression models. In particular, WCR/height ratio (AUC) = 0.76 [CI 0.72–0.81] males, (AUC) = 0.78 [CI 0.71–0.85] females, and WCR/pelvis ratio (AUC) = 0.77 [CI 0.73–0.82] males, (AUC) = 0.78 [CI 0.71–0.84] females, showed significantly greater discriminatory abilities for T2DM when compared to BMI, WC midway and other measures of adiposity.

CONCLUSIONS: The clinical utility of WCR and rib derived indices as potentially more accurate predictors of metabolic risk and T2DM, compared to WHO recommended WC midway measurement, requires further investigation.