

Supporting Information

Supplementary Table 1 Univariate analysis of the association between continuous variables and SLD before removing collinear variables

Continuous variables	SLD(n=273)	Non-SLD(n=244)	<i>P</i>	<i>T/U</i>
Age*, median(IQR)	32.00(27.00-39.00)	31.00(26.25-39.00)	0.806	32890.500
BMI, median(IQR)	30.71(28.24-34.14)	24.69(20.78-28.20)	<0.0001	111013.000
NC, means(SE)	40.03(3.63)	34.66(4.27)	<0.0001	15.445
Upper arm circumference without fat, means(SE)	27.70(2.45)	23.93(2.77)	<0.0001	16.453
Body fat percentage *, median(IQR)	36.90(33.16-41.50)	31.47(23.51-36.69)	<0.0001	20017.000
Waist-to-hip ratio, means(SE)	0.98(0.06)	0.89(0.07)	<0.0001	15.013
WHtR*, median(IQR)	0.62(0.58-0.67)	0.52(0.46-0.58)	<0.0001	11380.000
TyG, means(SE)	8.95(0.53)	8.37(0.49)	<0.0001	12.901
TyG-WHtR*, median(IQR)	5.57(5.09-6.01)	4.34(3.79-4.95)	<0.0001	8275.000
COI, means(SE)	1.33(0.07)	1.24(0.07)	<0.0001	14.157
HSI, means(SE)	44.11(7.08)	33.94(7.66)	<0.0001	15.497
CVAI*, median(IQR)	145.31(107.11-191.65)	63.45(33.44-98.05)	<0.0001	8993.000

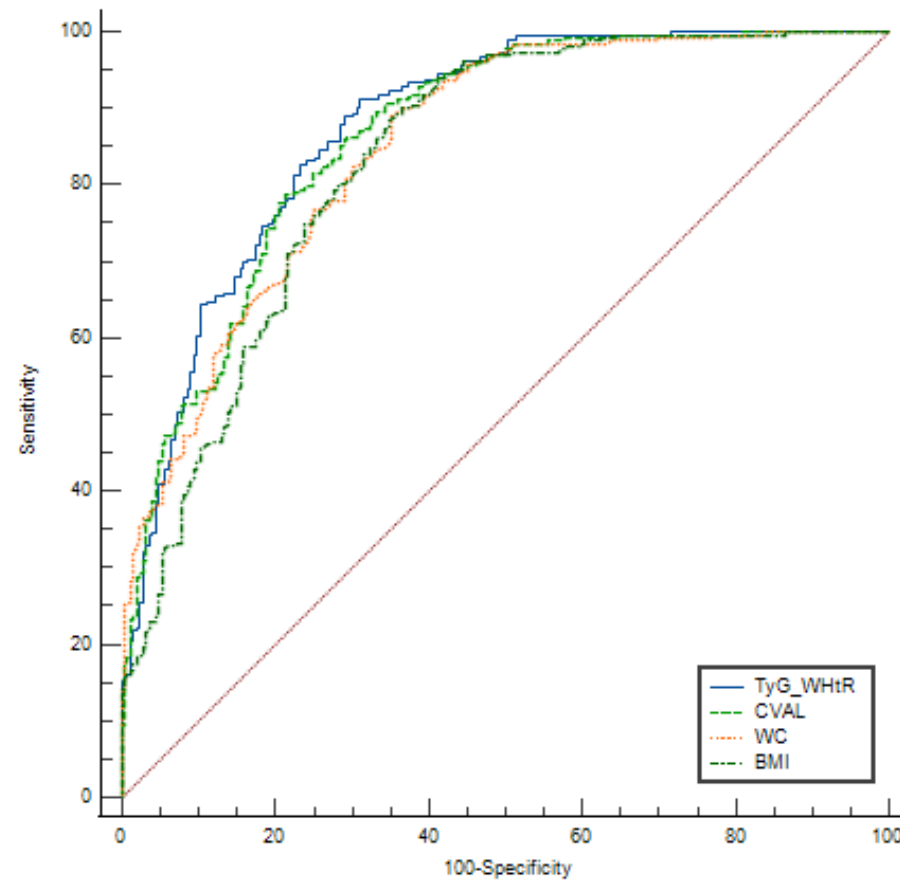
ALM, means(SE)	0.77(0.14)	0.78(0.18)	0.329	-0.976
ZJU, means(SE)	43.85(5.64)	35.75(5.85)	<0.0001	15.922
Thigh circumference *, median(IQR)	59.70(56.03-63.50)	52.28(48.10-56.98)	<0.0001	12359.500
ALM%, means(SE)	463.93(56.28)	405.13(56.20)	<0.0001	11.866

* Because it does not conform to the normal distribution, the Mann-Whitney Test is used

Supplementary Table 2 Screening performance metrics of TyG-WHtR and CVAI at optimal cutoffs under varying SLD prevalence scenarios.

Prevalence scenario	Indicators	PPV (%)	NPV (%)	NNS	Clinical positioning
General Community (20%)	TyG-WHtR ≥ 4.787	42.3	96.9	5.5	Initial screening
	CVAI ≥ 101.9	48.6	94.2	6.2	Diversion
Physical examination population (30%)	TyG-WHtR ≥ 4.787	55.7	94.8	3.7	Initial screening
	CVAI ≥ 101.9	61.8	90.4	4.1	Diversion
High-risk outpatient clinics (50%)	TyG-WHtR ≥ 4.787	74.6	88.7	2.2	Single-use
	CVAI ≥ 101.9	79.1	80.1	2.5	Single-use

PPV, positive predictive value; NPV, negative predictive value; NNS, number needed to screen (calculated as $1 \div [\text{prevalence} \times \text{sensitivity}]$). The 30% prevalence assumption is based on recent nationwide health check-up data in Chinese adults [6].



Supplementary Figure 1 Comparison of the AUC of TyG-WHtR and CVAI with traditional anthropometric indicators (BMI and WC).

Supplementary Table 3 The results of logistic regression analysis showed three parameters that were significantly associated with SLD (cohort diagnosed solely by ultrasound)

	B	S.E.	Wald	df	P	Exp(B)	95% EXP(B)	
Gender	1.506	0.501	9.034	1	0.003	4.510	1.689	12.044
Diabetes	0.927	0.689	1.811	1	0.178	2.577	0.655	9.750
NC	-0.182	0.125	2.123	1	0.145	0.834	0.653	1.065
TyG-WHtR	1.919	0.471	16.579	1	<0.001	6.816	2.706	17.169
CVAI	0.020	0.003	34.752	1	<0.001	1.020	1.014	1.027
HSI	0.089	0.046	3.784	1	0.052	1.093	0.999	1.196
Thigh circumference	-0.106	0.052	4.171	1	0.041	0.900	0.813	0.996
Waist-to-hip ratio	3.880	4.499	0.744	1	0.389	48.421	0.007	327346.612
ALM%	0.009	0.006	2.602	1	0.107	1.009	0.998	1.020
Constant	-10.734	2.915	13.564	1	<0.001	0.000		

Supplementary Table 4 The AUCs of TyG-WHtR and CVAI in sensitivity analysis limited to ultrasound-diagnosed participants (n=462)

	AUC	95% EXP(B)	
TyG-WHtR	0.889	0.859	0.918
CVAI	0.875	0.844	0.906