

Online Supplemental Material

Supplemental Table 1 Bland-Altman analysis in the validation sample according to BMI status and age groups.

Equation	Subjects	Mean difference (%)	<i>P</i>	Mean difference \pm 2SD
General equation	BMI \geq 24 kg/m ² , <i>n</i> = 513	0.39	<0.001	(-5.94, 6.71)
General equation	BMI < 24 kg/m ² , <i>n</i> = 637	0.72	0.006	(-6.44, 7.89)
General equation	Age \geq 60 years, <i>n</i> = 506	0.45	0.004	(-6.49, 7.39)
General equation	Age < 60 years, <i>n</i> = 644	0.67	<0.001	(-6.03, 7.37)
Gender specific equation	BMI \geq 24 kg/m ² , <i>n</i> = 513	0.22	0.109	(-6.00, 6.45)
Gender specific equation	BMI < 24 kg/m ² , <i>n</i> = 637	0.35	0.014	(-6.85, 7.56)
Gender specific equation	Age \geq 60 years, <i>n</i> = 506	0.05	0.743	(-6.92, 7.03)
Gender specific equation	Age < 60 years, <i>n</i> = 644	0.49	<0.001	(-6.12, 7.10)

Supplemental Table 2 Bland-Altman analysis for BF% equations derived from other population.

Equation	Mean difference (%)	<i>P</i>	Mean difference ± 2SD
$BF\% = 1.20 \times BMI + 0.23 \times age - 10.8 \times sex - 54$ ⁽¹⁾	4.56	<0.001	(-2.99, 12.11)
$BF\% = 1.294 \times BMI + 0.20 \times age - 11.4 \times sex - 8.0$ ⁽²⁾	2.18	<0.001	(-5.30, 9.66)
$BF\% = 10.558 \times sex + 0.069 \times age + 0.667 \times BMI + 0.314 \times WC - 35.881$ ⁽³⁾	-1.24	<0.001	(-8.95, 6.47)
$BF\% = -44.988 + 0.503 \times age + 10.689 \times sex + 3.172 \times BMI - 0.026 \times BMI^2 + 0.181 \times BMI \times sex - 0.02 \times BMI \times age - 0.005 \times BMI^2 \times sex + 0.00021 \times BMI^2 \times age$ ⁽⁴⁾	0.78	<0.001	(-6.49, 8.06)

Supplemental Table 3 cardiometabolic risk factors of subjects in NHAPC study at baseline and 6 years *

	Men					Women				
	Baseline		6 years		<i>P</i> †	Baseline		6 years		<i>P</i> †
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
	or median	or IQR	or median	or IQR	or median	or IQR	or median	or IQR		
Glucose (mmol/L)	5.24	0.52	6.28	1.10	<0.001	5.18	0.48	6.29	0.99	<0.001
Triglycerides (mmol/L)	0.91	0.69, 1.44	1.62	1.00, 1.87	<0.001	1.07	0.76, 1.51	1.52	1.07, 2.15	<0.001
HDL cholesterol (mmol/L)	1.21	0.32	1.36	0.41	<0.001	1.32	0.32	1.52	0.44	<0.001
SBP (mmHg)	134.0	19.0	136.1	18.2	0.043	135.1	21.8	136.7	21.0	0.056
DBP (mmHg)	80.6	10.2	81.6	10.4	0.073	77.2	10.0	81.1	10.7	<0.001
CRP (mg/L)	0.51	0.26, 1.10	0.82	0.38, 2.04	<0.001	0.47	0.27, 0.94	1.06	0.39, 2.53	<0.001
UA (U/L)	330.5	74.3	375.0	83.3	<0.001	271.6	73.6	314.6	77.3	<0.001

CRP, C-reactive protein; DBP, diastolic blood pressure; SBP, systolic blood pressure; UA, Uric acid.

*Data are means (SD) or medians (IQR). $n = 293$ for men $n = 487$ for women, except for CRP, $n = 282$ for men and $n = 460$ after excluding those with CRP levels above 10 mg/L, for UA, $n = 288$ for men and $n = 483$ for women because of missing data.

† P values were calculated using paired t -test.

Supplemental Table 4 β coefficients of BF%-CGS and BF%-DXA from the multivariate linear regression on metabolic risk factors at baseline ^{*}, [†]

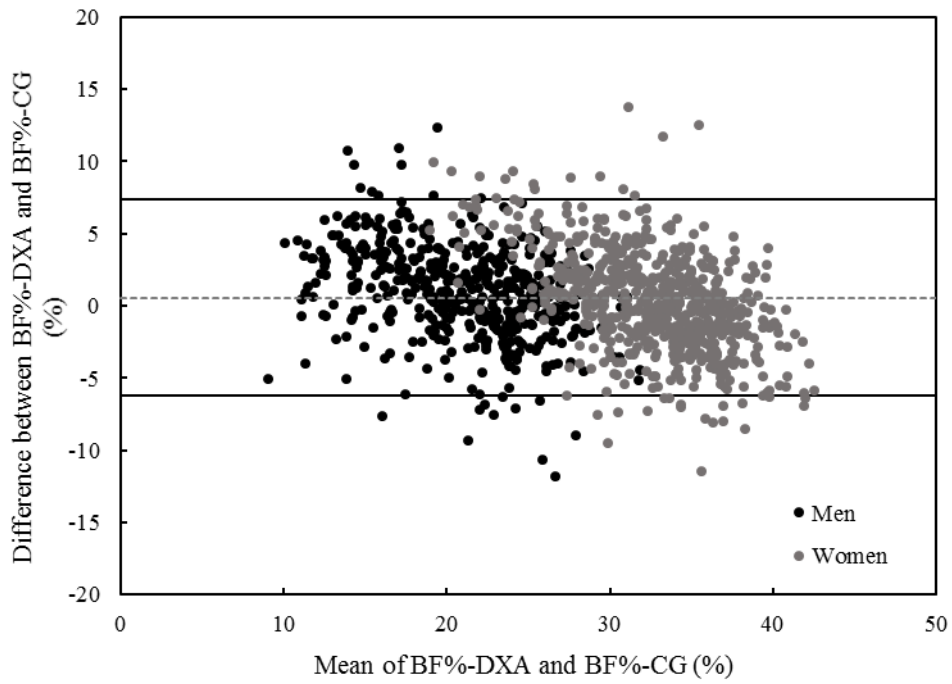
	Men							Women						
	BF%-CGS			BF%-DXA			P^{\dagger}	BF%-CGS			BF%-DXA			P^{\dagger}
	β	SE	P	β	SE	P		β	SE	P	β	SE	P	
Glucose	0.035	0.007	<0.001	0.016	0.006	0.008	0.002	0.009	0.006	0.133	0.002	0.004	0.603	0.138
Triglycerides	0.074	0.016	<0.001	0.062	0.013	<0.001	0.756	0.057	0.009	<0.001	0.037	0.006	<0.001	0.411
HDL cholesterol	-0.029	0.004	<0.001	-0.019	0.003	<0.001	0.071	-0.036	0.004	<0.001	-0.021	0.003	<0.001	0.033
SBP	0.841	0.273	0.002	0.715	0.219	0.001	0.791	1.591	0.258	<0.001	0.802	0.187	<0.001	0.009
DBP	0.560	0.139	<0.001	0.441	0.112	<0.001	0.872	1.012	0.121	<0.001	0.568	0.088	<0.001	0.012
CRP	0.041	0.019	0.035	0.048	0.016	0.002	0.113	0.079	0.014	<0.001	0.057	0.010	<0.001	0.891
UA	3.427	1.054	0.001	2.882	0.846	<0.001	0.793	5.084	0.886	<0.001	3.299	0.633	<0.001	0.469

CRP, C-reactive protein; DBP, diastolic blood pressure; SBP, systolic blood pressure; UA, Uric acid.

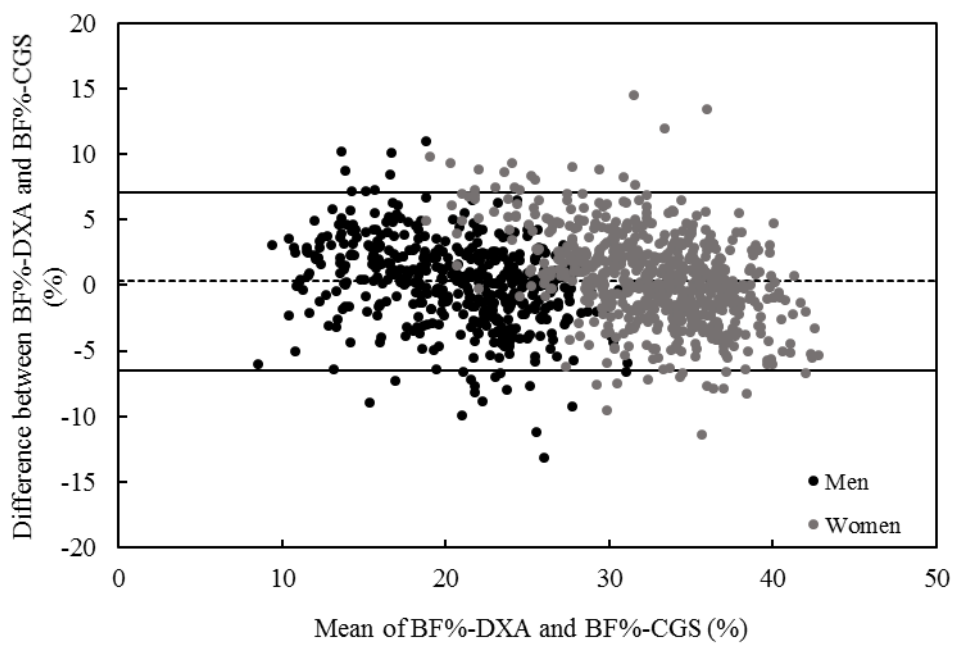
^{*} $n = 293$ for men $n = 487$ for women, except for CRP, $n = 292$ for men and $n = 483$ after excluding those with CRP levels above 10 mg/L, for UA, $n = 288$ for men and $n = 483$ for women because of missing data.

† Adjusted for age, residence, education, drinking, smoking and physical activity, having CHD, stroke, and cancer.

‡ Comparison between β coefficients for BF%-CGS and BF%-DXA.

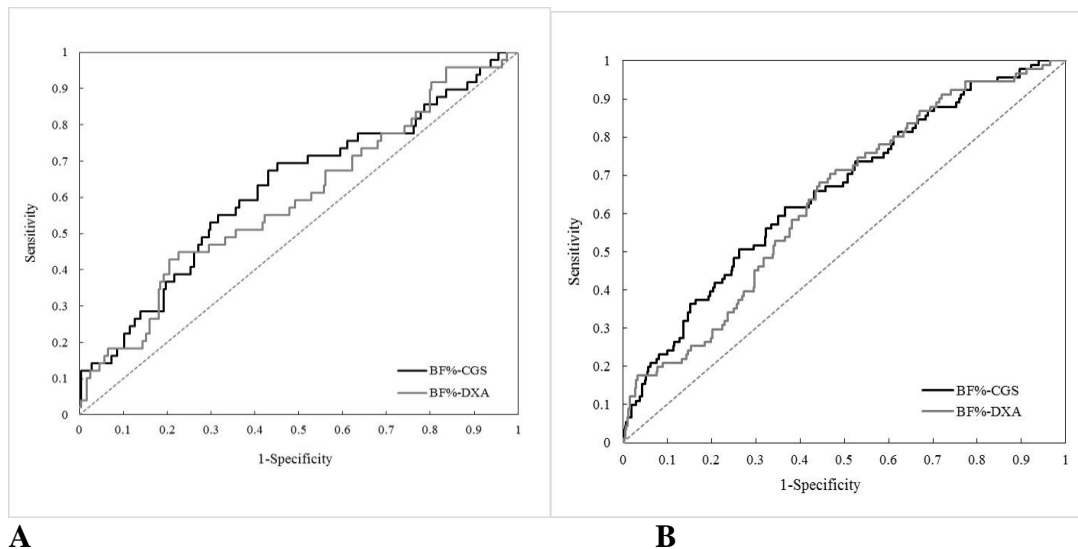


A



B

Supplemental Figure 1 Bland-Altman plots for the general equation (A) and gender-specific equations (B).



Supplemental Figure 2 Receiver operating characteristic curves for relative risk of 6-year incident T2D. Graphs show curves for men (A, BF%-CGS: AUC=0.62, 95%CI 0.53 to 0.71; BF%-DXA: AUC = 0.59, 95%CI 0.50 to 0.68, $P = 0.327$ for comparison) and women (B, BF%-CGS: AUC = 0.66, 95%CI 0.59 to 0.72; BF%-DXA: AUC = 0.64, 95%CI 0.58 to 0.70, $P = 0.159$ for comparison) adjusted for age, residence, smoking, alcohol drinking, physical activity, having CHD, stroke, or cancers and family history of diabetes.

References of supplemental materials

1. Deurenberg P, Weststrate JA, Seidell JC (1991) Body mass index as a measure of body fatness: age- and sex-specific prediction formulas. *Br J Nutr* **65**, 105-114.
2. Deurenberg P, Yap M, van Staveren WA (1998) Body mass index and percent body fat: a meta analysis among different ethnic groups. *Int J Obes Relat Metab Disord* **22**, 1164-1171.
3. Minematsu K, Takamura N, Goto K *et al.* (2011) A proposed method for the evaluation of body fat in Japanese adults that predicts obesity. *Nutr Res* **31**, 113-121.
4. Gomez-Ambrosi J, Silva C, Catalan V *et al.* (2012) Clinical usefulness of a new equation for estimating body fat. *Diabetes Care* **35**, 383-388.