Supplemental Materials

Table S1 Spearman correlations among different predicted body composition parameters

	WC	HC	WHR	BMI	FM	LM	PF
Men							
WC	1.00	0.77	0.80	0.79	0.98	0.52	0.97
HC		1.00	0.28	0.76	0.82	0.71	0.69
WHR			1.00	0.51	0.72	0.15	0.84
BMI				1.00	0.88	0.69	0.75
FM					1.00	0.66	0.92
LM						1.00	0.35
PF							1.00
Women							
WC	1.00	0.83	0.74	0.76	0.83	0.62	0.84
HC		1.00	0.28	0.79	0.87	0.74	0.78
WHR			1.00	0.39	0.42	0.29	0.53
BMI				1.00	0.94	0.63	0.95
FM					1.00	0.83	0.89
LM						1.00	0.51
PF							1.00

BMI, body mass index; FM, fat mass; HC, hip circumference; LM, lean mass; PF: percent fat; WC, waist circumference; WHR, waist-hip ratio

All correlations were significant with $p < 0.05$.

Table S2 Category boundaries of all the body composition parameters

	Men (n = 399)			Women (n = 288)		
	Tertile 1 (n = 132)	Tertile 2 (n = 131)	Tertile 3 (n = 136)	Tertile 1 (n = 95)	Tertile 2 (n = 95)	Tertile 3 (n = 98)
FM (kg)	< 11.088	11.088 - 15.650	> 15.650	< 17.478	17.478 - 21.573	> 21.573
LM (kg)	< 46.377	46.377 - 50.377	> 50.377	< 32.867	32.867 - 35.735	> 35.735
PF (%)	< 20.622	20.622 - 23.304	> 23.304	< 35.402	35.402 - 37.630	> 37.630
BMI (kg/m^2)	< 21.800	21.800 - 24.500	> 24.500	<22.200	22.200 - 24.700	> 24.700
WC (cm)	< 75.000	75.000 - 82.000	> 82.000	< 71.000	71.000 -76.000	> 76.000
HC (cm)	< 90.000	90.000 - 94.000	> 94.000	< 90.000	90.000 - 95.000	> 95.000
WHR	< 0.841	0.841 - 0.879	> 0.879	< 0.773	0.773 - 0.814	> 0.814

BMI, body mass index; FM, fat mass; HC, hip circumference; LM, lean mass; PF: percent fat; WC, waist circumference; WHR, waist-hip ratio

Table S3 Univariable Cox regression analysis for DM

Variable	Change	HR	95% CI	p
Men				
Age (years)	1-SD increment	1.05	0.996-1.10	0.072
Smoking (%)	Yes vs no	0.79	0.44-1.45	0.448
Hypertension (%)	Yes vs no	1.36	0.66-2.81	0.406
DM family history (%)	Yes vs no	0.44	0.14-1.40	0.163
SBP (mm Hg)	1-SD increment	1.02	0.998-1.036	0.076
DBP (mm Hg)	1-SD increment	1.02	0.998-1.052	0.234
FPG (mmol/L)	1-SD increment	1.78	1.26-2.52	0.001
TC (mmol/l)	1-SD increment	1.15	0.79-1.66	0.476
TG (mmol/L)	1-SD increment	1.16	0.91-1.47	0.248
HDL-C (mmol/L)	1-SD increment	0.57	1.16-2.00	0.376
LDL-C (mmol/L)	1-SD increment	1.04	0.73-1.48	0.818
Height (cm)	1-SD increment	1.01	0.96-1.06	0.834
Weight (cm)	1-SD increment	1.07	1.04-1.11	< 0.001
BMI (kg/m^2)	1-SD increment	1.23	1.13-1.33	< 0.001
WC (cm)	1-SD increment	1.09	1.05-1.13	< 0.001
HC (cm)	1-SD increment	1.09	1.05-1.14	< 0.001
WHR	0.01-SD increment	1.09	1.04-1.15	< 0.001
FM (kg)	1-SD increment	1.16	1.09-1.22	< 0.001
LM (kg)	1-SD increment	1.10	1.04-1.17	0.002
PF (%)	1-SD increment	1.23	1.13-1.34	< 0.001
Women				
Age (years)	1-SD increment	1.04	0.98-1.11	0.161
Smoking (%)	Yes vs no	20.306	--	0.771

Hypertension (%)	Yes vs no	2.00	0.84-4.76	0.116
DM family history (%)	Yes vs no	0.57	0.17-1.88	0.353
SBP (mm Hg)	1-SD increment	1.02	0.999-1.04	0.062
DBP (mm Hg)	1-SD increment	1.03	0.99-1.07	0.111
FPG (mmol/L)	1-SD increment	1.86	1.14-3.03	0.013
TC (mmol/l)	1-SD increment	1.67	1.12-2.50	0.012
TG (mmol/L)	1-SD increment	1.46	1.26-1.69	< 0.001
HDL-C (mmol/L)	1-SD increment	0.081	0.01-0.54	0.009
LDL-C (mmol/L)	1-SD increment	1.05	0.67-1.65	0.824
Height (cm)	1-SD increment	0.91	0.84-0.98	0.009
Weight (cm)	1-SD increment	1.04	0.986-1.09	0.156
BMI (kg/m^2)	1-SD increment	1.27	1.10-1.46	0.001
WC (cm)	1-SD increment	1.11	1.06-1.17	< 0.001
HC (cm)	1-SD increment	1.08	1.01-1.16	0.019
WHR	0.01-SD increment	1.17	1.09-1.25	< 0.001
FM (kg)	1-SD increment	1.11	1.02-1.21	0.013
LM (kg)	1-SD increment	0.99	0.89-1.12	0.912
PF (%)	1-SD increment	1.38	1.19-1.60	< 0.001

BMI, body mass index; DBP, diastolic blood pressure; DM, diabetes mellitus; FPG, fasting plasma glucose; FM, fat mass; HC, hip circumference; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; LM, lean mass; SBP, systolic blood pressure; PF, percent fat; TC, total cholesterol; TG, triglyceride; WC, waist circumference; WHR, waist-hip ratio.

Table S4 Multivariable Cox regression models of commonly used obesity indicators for DM

	Case (%)	Multivariable hazards regression *	
		HR (95% CI)	p
For men			
BMI			
per 1-SD increase		1.27 (1.16-1.380	< 0.001
T1 (reference)	9 (6.87%)	1	-
T2	10 (7.75%)	1.09 (0.44-2.69)	0.856
T3	29 (20.86%)	3.90 (1.81-8.37)	< 0.001
p for trend			< 0.001
WC			
per 1-SD increase		1.10 (1.07-1.14)	< 0.001
T1 (reference)	5 (4.03%)	1	-
T2	17 (12.78%)	3.24 (1.19-8.78)	0.021
T3	26 (18.31%)	5.97 (2.27-15.71)	< 0.001
p for trend			< 0.001
HC			
per 1-SD increase		1.11 (1.06-1.16)	< 0.001
T1 (reference)	9 (7.03%)	1	-
T2	11 (9.40%)	1.19 (0.49-2.88)	0.701
T3	28 (18.18%)	2.87 (1.35-6.08)	0.006
p for trend			0.004
WHR			
per 0.01-SD increase		1.09 (1.04-1.15)	< 0.001
T1 (reference)	5 (3.82%)	1	-

T2	18 (13.85%)	3.65 (1.35-9.83)	0.011
T3	25 (18.12%)	5.42 (2.07-14.18)	0.001
p for trend			< 0.001
Women			
BMI			
per 1-SD increase		1.23 (1.07-1.42)	0.005
T1 (reference)	4 (4.40%)	1	-
T2	8 (8.33%)	1.50 (0.44-5.07)	0.515
T3	14 (13.86%)	1.64 (0.50-5.36)	0.413
p for trend			0.712
WC			
per 1-SD increase		1.10 (1.04-1.16)	0.001
T1 (reference)	4 (4.26%)	1	-
T2	4 (4.60%)	0.77 (0.18-3.18)	0.712
T3	18 (16.82%)	2.54 (0.83-7.78)	0.104
p for trend			0.051
HC			
per 1-SD increase		1.06 (0.99-1.14)	0.114
T1 (reference)	4 (5.06%)	1	-
T2	8 (8.33%)	1.26 (0.37-4.33)	0.718
T3	14 (12.39%)	1.52 (0.47-4.92)	0.481
p for trend			0.768
WHR			
per 0.01-SD increase		1.16 (1.07-1.25)	< 0.001
T1 (reference)	1 (1.06%)	1	-
T2	5 (5.21%)	4.54 (0.53-38.91)	0.168

T3	20 (20.41%)	15.91 (2.10-120.52)	0.007
p for trend			< 0.001

*, adjusted for hypertension (yes/no), DM family history (yes/no), smoking (yes/no), alcohol (yes/no), activity (yes/no), TG, TC, HDL-C, LDL-C, and FPG in men; DM family history (yes/no), smoking (yes/no), alcohol (yes/no), activity (yes/no), SBP, TG, TC, HDL-C, and FPG in women

BMI, body mass index; DM, diabetes mellitus; FPG, fasting plasma glucose; HC, hip circumference; HDL-C, high-density lipoprotein cholesterol; HR, hazard ratio; LDL-C, low-density lipoprotein cholesterol; SBP, systolic blood pressure; SD, standard deviation; T, tertile; TC, total cholesterol; TG, triglyceride; WC, waist circumference; WHR, waist-hip ratio

Figure S1 Associations of three novel predicted body composition with risk of DM for men

Restricted cubic splines were used to flexibly models and visualize the relations of different parameters with risk of DM. Hazard ratios are indicated by solid lines and 95% CIs by shaded areas. Reference points were the medians for FM (A; 13.61 kg), LM (B; 48.27 kg), and PF (C; 22.04%), respectively. The dotted line represents HR = 1. Confounders in Table 2 were adjusted.

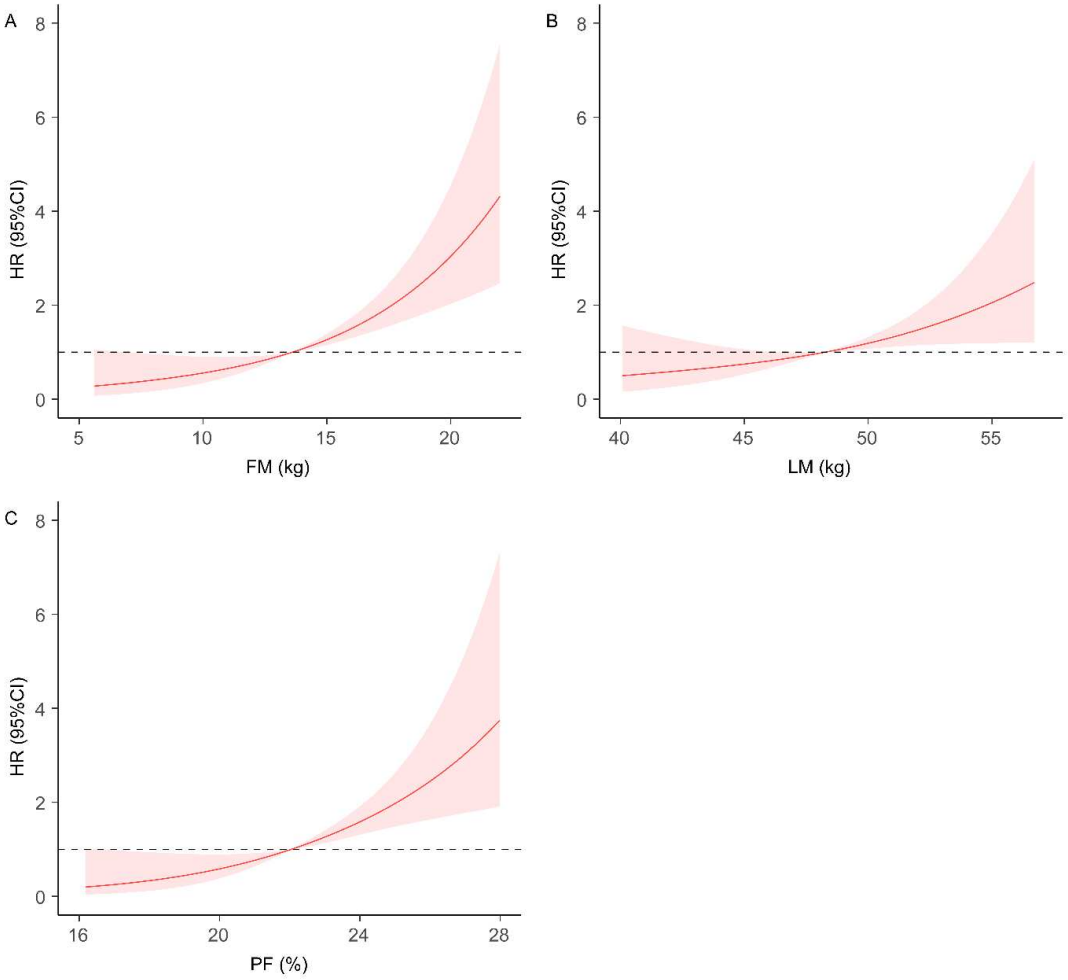

Figure S2 Associations of three novel predicted body composition with risk of DM for women

Restricted cubic splines were used to flexibly models and visualize the relations of different parameters with risk of DM. Hazard ratios are indicated by solid lines and 95% CIs by shaded areas. Reference points were the medians for FM (A; 19.45 kg), LM (B; 34.38 kg), and PF (C; 36.39%), respectively. The dotted line represents HR = 1. Confounders in Table 2 were adjusted.