

**Supplementary Table 1: Partial correlation coefficients among anthropometric indicators and biochemical indicators (adjusted for age and sex).**

Variables	BMI-WHO	WHR	BMI	TMI
WHR	0.853*			
BMI	0.953*	0.883*		
TMI	0.936*	0.882*	0.961*	
SBP	0.334*	0.273*	0.330*	0.275*
DBP	0.157*	0.136*	0.140*	0.136*
TC	0.053	0.089 <sup>†</sup>	0.066 <sup>‡</sup>	0.068 <sup>‡</sup>
TG	0.272*	0.325*	0.283*	0.261*
HDL-C	-0.302*	-0.322*	-0.313*	-0.288*
LDL-C	0.213*	0.259*	0.228*	0.230*
FPG	0.064 <sup>‡</sup>	0.086 <sup>†</sup>	0.054 <sup>‡</sup>	0.042

BMI:Body mass index;DBP: Diastolic blood pressure;FPG:Fasting plasma glucose;HDL-C:High-densitylipoprotein cholesterol;LDL-C:Low-densitylipoprotein cholesterol;SBP:Systolic blood pressure; TC:Totalcholesterol;TG:Triglyceride;TMI:Tri-ponderal mass index; WHR:Waist-to-height ratio.

\* $P<0.001$ ; † $P<0.01$ ; ‡ $P<0.05$ .

**Supplementary Table 2: Association between BMI, TMI and each CMRF in each age group.**

3-6-year-old	3.10 (2.47, 3.89) *	3.69 (2.83, 4.80) *	3.89 (2.87, 5.27) *	2.64 (2.17, 3.22) *	2.85 (2.29, 3.54) *	3.14 (2.41, 4.08) *
7-12-year-old	2.29 (2.00, 2.63) *	3.05 (2.51, 3.71) *	3.62 (2.68, 4.90) *	3.05 (2.56, 3.64) *	3.11 (2.59, 3.72) *	3.45 (2.68, 4.43) *
13-17-year-old	2.37 (2.00, 2.80) *	2.49 (2.08, 2.97) *	2.84 (2.12, 3.81) *	3.39 (2.70, 4.25) *	3.53 (2.79, 4.47) *	4.20 (2.87, 6.13) *
Clustered CMRFs						
3-6-year-old	1.60 (1.26, 2.03) *	1.65 (1.25, 2.16) *	-	1.76 (1.30, 2.38) *	1.77 (1.29, 2.42) *	-
7-12-year-old	1.31 (1.18, 1.45) *	1.39 (1.23, 1.56) *	1.53 (1.27, 1.84) *	1.56 (1.32, 1.85) *	1.57 (1.32, 1.87) *	1.76 (1.37, 2.26) *
13-17-year-old	1.23 (1.15, 1.32) *	1.24 (1.16, 1.33) *	1.25 (1.11, 1.41) *	1.37 (1.22, 1.54) *	1.40 (1.24, 1.57) *	1.42 (1.16, 1.73) †

Model1:crude model;Model2:adjusted for age and sex; Model3:adjusted for age,sex,ethnic groups,socialeconomic status,passive smoking and family history of hypertension.CMRFs: Cardio-metabolic risk factors; IFG:Impaired fasting glucose;Clustered CMRFs:Satisfy three or more of the four items of hypertension,dyslipidemia,impaired fasting glucose, and abdominal obesity.\* $P<0.001$ ;† $P<0.01$ ;‡ $P<0.05$ .

**Supplementary Table 3: The FPRs, FNRs and TRs of identifying CMRFs by four indicators in different age groups when setting overweight or obesity as thresholds.**

### **(1) Setting overweight as thresholds**

Variables	3-6-year-old				7-12-year-old				13-17-year-old				3-17-year-old				
	TR		P-value	FPR (95% CI)	TR		P-value	FPR (95% CI)	TR		P-value	FPR (95% CI)	TR		FPR (95% CI)	FNR (95% CI)	TR (95% CI)
	FPR	FNR		(95% CI)	(95% CI)	(95% CI)		FPR	FNR	(95% CI)		(95% CI)	(95% CI)				
<b>Hypertension</b>																	
BMI-WHO	11.8 (8.6, 15.6)	78.2 (68.9, 85.8)	26.4 (22.5, 30.8)	Ref	13.6 (10.5, 17.2)	73.9 (67.3, 79.8)		32.9 (29.2, 36.7)	10.0 Ref	55.9 (45.7, , 13.4)	19.5 (16.2 , 65.7)					Ref	
BMI-Chin	17.9 (14.1, a 22.3)	62.4 (52.2, 71.8)	27.7 (23.7, 32.1)	0.71	35.8 (31.3, 40.5)	43.3 (36.4, 50.5)		38.2 (34.4, 42.1)	0.053	28.1 (23.7, , 32.9)	33.3 (24.3 , 42.4)	29.2 (25.2 , 33.5)				<0.001*	

BMI	12.0 (8.86, 15.9)	78.2 (68.9, 85.8)	26.6 (22.7, 31.0)	<0.001 *	11.8 (8.9, 15.2)	79.8 (73.6, 85.1)	33.5 37.3)	(29.9, 0.858	8.5 (5.9, 11.7)	63.4 (53.2 72.7)	19.8 (16.4 23.7)
TMI	9.0 (6.2, 12.4)	78.2 (68.9, 85.8)	24.2 (20.4, 28.5)	0.494	12.0 (9.1, 15.4)	75.9 (69.4, 81.6)	32.4 36.2)	(28.8, 0.905	11.0 (8.1, 14.5)	60.8 (50.6 70.3)	21.3 (17.8 25.2)
Dyslipidemia											
BMI-WHO	16.9 (11.9, 23.1)	80.0 (65.4, 90.4)	29.1 (23.4, 35.4)	Ref	16.8 (13.5, 20.4)	80.3 (73.0, 86.3)	32.1 35.9)	(28.5, Ref	13.5 (10.3 17.3)	67.7 (57.4 76.9)	24.2 (20.5 28.3)
BMI-Chin a	24.4 (18.4, 31.1)	66.7 (51.0, 80.0)	32.5 (26.6, 38.9)	0.483	39.2 (34.8, 43.7)	48.7 (40.5, 56.9)	41.5 45.5)	(37.6, <0.001*	32.4 (27.8 37.3)	48.5 (38.2 58.8)	35.6 (31.4 40.0)

BMI	15.9 (11.0, 21.9)	77.8 (62.9, 88.8)	27.8 (4.4, 11.6)	13.6 0.838 (10.7, 17.0)	82.9 (76.0, 88.5)	30.4 34.2) 0.543	(26.8, 15.4) (8.8, 83.3)	11.8 ,	75.0 (65.1 1	24.3 (20.6 ,	
TMI	15.3 (10.5, 21.3)	77.8 (62.9, 88.8)	27.4 (21.8, 33.6)	15.3 0.758 (12.2, 18.9)	82.9 (76.0, 88.5)	31.6 35.5) 0.903	(28.0, 17.3) (10.3 79.0)	13.5 ,	70.1 ,	24.7 (21.0 28.9)	0.896
IFG											
BMI-WHO	17.2 (12.6, 22.6)	0 (0, 97.5)	17.1 (12.6, 22.7)	17.4 Ref (14.5, 20.7)	80.8 (60.6, 93.4)	20.0 23.4) Ref	(17.0, ,	17.3 ,	83.1 ,	26.8 (23.0 31.1)	Ref
BMI-Chin	25.8 a (20.3, 31.9)	0 (0, 97.5)	25.6 (11.5, 21.3)	42.1 0.032 (38.1, 46.2)	57.7 (36.9, 76.6)	42.8 46.7) <0.001*	(38.9, ,	36.1 ,	63.4 ,	40.1 (35.7 44.6)	<0.001*

BMI	17.2 (12.6, 22.6)	100 (2.5, 100)	17.5 (13.0, 23.1)	1	14.6 (11.9, 17.7)	88.5 (69.8, 97.6)	17.6 20.9) (14.8, 22.3)	0.313	15.2 , 19.0)	90.1 , 95.9)	26.1 , 30.3)
TMI	16.3 (11.8, 21.7)	0 (0, 97.5)	16.2 (11.9, 21.7)	0.901	15.6 (12.8, 18.7)	80.8 (60.6, 93.4)	18.3 21.6) (15.4, 23.3)	0.474	17.2 , 21.2)	85.9 , 93.0)	27.2 , 31.4)
Abdominal obesity											
BMI-WHO	3.3 (1.7, 5.9)	56.9 (47.7, 65.8)	17.8 (14.5, 21.7)	Ref	0.7 (0.1, 2.0)	44.1 (37.0, 51.4)	14.0 17.0) (11.4, 16.3)	Ref	0.6 , 2.0)	41.0 (32.7, 49.7)	12.0 (9.3, 15.3)
BMI-Chin a	7.3 (4.7, 10.6)	36.6 (28.1, 45.7)	15.2 (12.1, 18.9)	0.326	18.1 (14.7, 22.1)	2.6 (0.8, 5.9)	13.4 (10.9, 16.3)	0.807	13.0 (9.7, 16.9)	5.0 (2.0, 10.1)	10.8 (8.2, 13.9)
BMI	2.4 (1.0, 53.7)	16.3	0.597	0.2 (0,	53.3	16.5 (13.8, 0.242	0.6	51.1	14.9	0.215	

	4.7)	(44.4,	(13.1,	1.3)	(46.1,	19.7)	(0,	(42.5	(11.9					
		62.7)	20.1)		60.5)		2.0)	,	,					
								59.6)	18.4)					
								51.1	14.9					
TMI	2.4 (1.0, 4.7)	53.7 (44.4, 62.7)	16.3 (13.1, 20.1)	0.2 (0, 1.3)	53.3 (46.1, 60.5)	16.5 (13.8, 19.7)	0.242	0.6 (0, 2.0)	(42.5 (11.9 , 59.6) 18.4)	0.215				
Clustered CMRFs														
BMI-WHO	16.1 (11.5, 21.5)	16.7 (0.4, 64.1)	16.1 (11.7, 21.6)	15.9 Ref (13.1, 19.1)	35.0 (15.4, 59.2)	16.5 (13.8, 19.7)	Ref	13.4 (10.4 , 16.9)	32.4 (17.4 , 50.5)	14.8 (11.8 , 18.3)	15.1 Ref (13.2, 17.1)	31.7 (20.3, 45.0)	15.8 (13.9, 17.9)	
BMI-Chin a	25.0 (19.5, 31.2)	16.7 (0.4, 64.1)	24.8 (19.4, 31.0)	40.2 0.028 <sup>‡</sup> (36.3, 44.2)	0 (0, 16.8)	39.0 (35.1, 42.9)	<0.001 <sup>*</sup>	32.1 (27.8 , 36.6)	8.8 (26.5 , 23.7)	30.5 (1.9, 34.8)	34.7 <0.001 <sup>*</sup> (32.1, 37.4)	6.7 (1.8, 16.2)	33.5 (31.0, 36.1)	
BMI	15.6	16.7	15.7	1	13.3	50.0	14.5 (11.9, 0.35)	11.9	52.9	14.8	1	13.2	48.3	14.8

	(11.3, 21.1)	(0.4, 64.1)	(11.3, 21.1)	(10.7, 16.3)	(27.2, 72.8)	17.5		(9.1, 15.3)	(35.1 ,	(11.8 ,	(11.4, 15.2)	(35.2, 61.6)	(13.0, 16.8)	
									70.2)	18.4)				
	15.6	33.3	16.1	14.1	35.0			14.1	47.1	16.4		14.4	41.7	15.6
TMI	(11.1, 21.1)	(4.3, 77.7)	(11.7, 21.6)	(11.5, 17.1)	(15.4, 59.2)	14.8 17.9)	(12.2, 0.438	(11.0 ,	(29.8 ,	(13.2 ,	0.546	(12.5, 16.4)	(29.1, 55.1)	(13.7, 17.7)
								17.6)	64.9)	20.0)				

## (2) Setting obesity as thresholds

Variables	3-6-year-old			7-12-year-old			13-17-year-old			3-17-year-old			
	FPR (95% CI)	FNR (95% CI)	TR (95% CI)										
<b>Hypertension</b>													
BMI-WHO	3.4 (1.7,	89.1 (81.2,	22.3 (18.6,	Ref	2.1 (1.0,	92.6 (88.1,	31.0 (27.4,	Ref	2.3 (1.1,	87.3 (79.2,	19.9 (16.5,	Ref	

	5.8)	94.4)	26.4)	3.9)	95.8)	34.8)	4.3)	93.0)	23.7)	
	6.4	78.2	22.3	18.7	63.1	32.9	9.7	53.9	18.9	
BMI-China	(4.1,	(68.9,	(18.6,	1	(15.1,	(56.0,	(29.2,	0.508	(7.0,	(43.8,
	9.5)	85.8)	26.4)	22.7)	69.7)	36.7)	13.1)	63.8)	22.7)	0.747
	2.2	89.1	21.4	1.8	91.6	30.5	2.3	86.3	19.7	
BMI	(1.0,	(81.3,	(17.8,	0.81	(0.8,	(86.9,	(27.0,	0.903	(1.1,	(78.0,
	4.4)	94.4)	25.5)		3.6)	95.0)	34.3)	4.3)	92.3)	23.5)
	1.4	91.1	21.2		4.6	93.1	32.9	4.6	87.3	21.7
TMI	(0.5,	(83.8,	(17.6,	0.789	(2.8,	(88.7,	(29.2,	0.508	(2.8,	(79.2,
	3.2)	95.8)	25.3)		7.0)	96.2)	36.7)	7.2)	93.0)	25.7)
<b>Dyslipidemia</b>										
	7.4	88.9	23.1		3.6	95.4	25.8	3.3	90.7	20.7
BMI-WHO	(4.1,	(75.9,	(17.9,	Ref	(2.1,	(90.7,	(22.4,	Ref	(1.8,	(83.1,
	12.1)	96.3)	29.1)		5.6)	98.1)	29.4)	5.6)	95.7)	24.6)
	14.3	80.0	26.9		24.3	75.7	36.7	13.8	68.0	28.6
BMI-China	(9.6,	(65.4,	(21.5,	0.393	(20.5,	(68.0,	(33.0,	<0.001*	(10.5,	(57.8,
	20.1)	90.4)	33.2)		28.4)	82.2)	40.6)	17.6)	77.1)	32.9)

	6.3	91.1	22.6	3.8	95.4	25.9	3.1	88.7	20.0		
BMI	(3.3, 10.8)	(78.8, 97.5)	(17.6, 28.7)	1 5.9)	(2.3, 98.1)	(90.7, 29.6)	(22.6, 5.3)	(1.6, 94.2)	(80.6, 23.9)	(16.6, 21.7)	0.834
	4.8	91.1	21.4	4.8	92.8	26.1	5.1	88.7	21.7		
TMI	(2.2, 8.8)	(78.8, 97.5)	(16.4, 27.3)	0.739 7.1)	(3.1, 96.3)	(87.4, 29.7)	(22.7, 7.8)	(3.1, 94.2)	(80.6, 25.6)	(18.2, 21.7)	0.754
IFG											
	8.2	100	8.5	4.0	100	7.9	4.8	97.2	18.2		
BMI-WHO	(5.0, 12.4)	(2.5, 100)	(5.4, 13.1)	Ref 5.9)	(2.6, 100)	(86.8, 10.4)	(6.0, 7.3)	(2.9, 99.7)	(90.2, 22.0)	(14.9, 27.4)	Ref
	15.5	100	15.8	24.2	73.1	26.2	17.7	84.5	27.4		
BMI-China	(11.1, 20.7)	(2.5, 100)	(11.5, 21.3)	0.024 <sup>‡</sup> 27.8)	(20.8, 88.4)	(52.2, 29.9)	(22.9, 21.7)	(14.2, 92.0)	(74.0, 31.6)	(23.5, 18.8)	<0.001 <sup>*</sup>
	6.9	100	7.3	4.1	100	8.1	5.3	98.6	18.8		
BMI	(4.0, 10.9)	(2.5, 100)	(4.4, 11.6)	0.732 6.1)	(2.7, 100)	(86.8, 10.6)	(6.2, 7.9)	(3.3, 100)	(92.4, 22.6)	(15.5, 20.4)	0.869
TMI	5.6	100	6.0	0.373	5.6	100	9.5	0.369	7.2	98.6	0.418



	(4.5, 11.9)	(22.3, 95.7)	(5.9, 13.8)	(1.9, 4.8)	(50.9, 91.3)	(3.8, 7.5)	(2.0, 5.6)	(65.5, 93.2)	(6.7, 12.0)	(3.0, 5.3)	(65.8, 87.9)	(6.0, 8.9)
BMI-China	13.8 (9.6, 19.1)	16.7 (0.4, 64.1)	13.9 (9.8, 19.2)	22.7 0.144 (19.4, 26.2)	25.0 (8.9, 49.1)	22.7 (19.6, 26.3)	13.8 <0.001* (10.8, 17.4)	35.3 (19.7, 53.5)	15.3 (12.3, 18.9)	18.0 0.003 (15.9, 20.2)	30.0 (18.8, 43.2)	18.5 (16.5, 20.7)
BMI	6.3 (3.5, 10.3)	66.7 (22.3, 95.7)	7.8 (4.8, 12.3)	3.3 0.738 (2.0, 5.0)	75.0 (50.9, 91.3)	5.6 (4.0, 7.7)	3.5 1 (2.0, 5.6)	79.4 (62.1, 91.3)	8.8 (6.5, 11.7)	3.9 1 (2.9, 5.1)	76.7 (64.0, 86.7)	7.1 (5.8, 8.7)
TMI	4.9 (2.5, 8.6)	66.7 (22.3, 95.7)	6.5 (3.8, 10.7)	4.9 0.385 (3.3, 7.0)	80.0 (56.3, 94.3)	7.3 (5.5, 9.7)	5.7 0.204 (3.8, 8.3)	85.3 (68.9, 95.0)	11.2 (8.7, 14.5)	5.2 0.289 (4.1, 6.6)	81.7 (70.0, 90.5)	8.6 (7.2, 10.3)

Clustered CMRFs: Satisfy three or more of the four items of hypertension, dyslipidemia, impaired fasting glucose, and abdominal obesity; CMRFs: Cardiometabolic risk factors; FNR: False negative rate; FPR: False positive rate; IFG: Impaired fasting glucose; *P*-value: compare the TRs among indicators, BMI z score was set as reference; TR: Total misclassification rate; Ref: reference. hen overweight is used as the diagnose threshold, division criteria of each anthropometric indicators are as follows:  $1 \leq \text{BMI-WHO} < 2$ , ccording to WHO 2007 growth standard; BMI-China: according to age- and sexspecific thresholds of overweight based on 2009 BMI curves for Chinese pediatric population; BMI: 85th age- and gender-specific BMI percentiles  $\leq \text{BMI} < 95$ th age- and gender-specific BMI percentiles; TMI: 85th gender-specific TMI percentiles  $\leq$

TMI < 95th gender-specific TMI percentiles. When obesity is used as the diagnose threshold, division criteria of each anthropometric indicators are as follows: BMI-WHO  $\geq 2$ , according to WHO 2007 growth standard; BMI-China: according to the age- and sex-specific thresholds of obesity based on 2009 BMI curves for Chinese pediatric population; BMI: BMI  $\geq$  95th age- and gender-specific BMI percentiles; TMI: TMI  $\geq$  95th gender-specific TMI percentiles. \* $P < 0.001$ .

**Supplementary Table 4: The ORs and TRs of combined use of TMI and WHtR in identify CMRFs.**

Combination of TMI and WHtR	3–6 years		7–12 years		13–17 years		3–17 years	
	OR (95% CI)	TR (95% CI)	OR (95% CI)	TR (95% CI)	OR (95% CI)	TR (95% CI)	OR (95% CI)	TR (95% CI)
<b>Hypertension</b>								
$P_{85} + \text{WHtR}$	2.48 5.06) <sup>‡</sup>	(1.22, (20.6, 24.5 28.7)	(1.52, 3.84)*	(28.6, 36.0)	32.2 11.63)*	(3.74, 23.3)	19.5 4.43)*	(2.39, 28.3) 26.0 25.6
$P_{95} + \text{WHtR}$	9.61 34.13)*	(2.70, (17.4, 21.0 3.67)	(0.84, 25.0)	(29.1, 26.5)	32.7 9.96)*	(1.96, 24.8)	20.9 4.96)*	(1.92, 27.9) 3.08 25.6

Dyslipidemia

$P_{85}$ + WHTR	1.54 3.96)	(0.60, 3.96)	24.8 (19.5, 30.9) 2.16)	1.30 2.16)	(0.78, 34.3)	30.5 (27.0, 34.3)	2.97 5.25)*	(1.68, 27.2)	23.1 (19.5, 27.2)	1.80 2.54)†	(1.27, 2.54)†	26.8 (24.5, 29.3)
$P_{95}$ + WHTR	2.40 8.66)	(0.67, 8.66)	20.9 (16.0, 3.59) 26.8)	1.68 3.59)	(0.79, 30.0)	25.9 (22.6, 30.0)	2.91 6.52)†	(1.30, 24.8)	20.9 (17.4, 24.8)	2.16 3.56)†	(1.31, 2.56)†	23.2 (21.0, 25.6)

IFG

$P_{85}$ + WHTR	-		12.0 17.0)	(8.2, 3.57)	1.15 3.57)	(0.37, 20.4)	17.2 0.57 1.37)	(0.24, 29.3)	25.2 (21.4, 29.3)	0.70 1.40)	(0.35, 21.4)	19.2 (17.1, 21.4)	
$P_{95}$ + WHTR	-		5.6 9.5)	(3.1, -	-	9.4 12.0)	(7.3, 1.66)	0.22 1.66)	(0.03, 23.5)	19.6 (16.3, 23.5)	0.15 1.11)	(0.02, 14.3)	12.4 (10.7, 14.3)

Abdominal Obesity

$P_{85}$ + WtHR	76.22	(17.99, 322.99)*	18.9 (15.5, 22.9)	88.83	(31.85, 247.77)*	17.4 (14.6, 20.7)	-	15.2 (12.2, 18.8)	134.12 (58.84, 305.75)*
	17.34	(3.74, 80.48)*	25.1 (21.2, 29.4)			25.5 (22.2, 29.1)	-	22.7 (19.1, 26.7)	104.05 (25.38, 426.49)*
$P_{95}$ + WtHR	17.39	(2.98, 101.58)†	10.9 (7.3, 15.8)	7.97	(3.17, 20.08)*	14.0 (11.4, 17.0)	7.36 (3.51, 15.44)*	13.5 (10.7, 16.9)	8.06 (4.69, 13.85)*
	11.79	(1.84, 75.67)†	6.1 (3.5, 10.2)	4.78	(1.47, 15.56)†	7.2 (5.3, 9.5)	3.85 (1.33, 11.15)‡	10.4 (7.9, 13.6)	4.42 (2.17, 8.99)*
Clustered CMRFs									
$P_{85}$ + WtHR	11.79	(1.84, 75.67)†	6.1 (3.5, 10.2)	4.78	(1.47, 15.56)†	7.2 (5.3, 9.5)	3.85 (1.33, 11.15)‡	10.4 (7.9, 13.6)	4.42 (2.17, 8.99)*
	11.79	(1.84, 75.67)†	6.1 (3.5, 10.2)	4.78	(1.47, 15.56)†	7.2 (5.3, 9.5)	3.85 (1.33, 11.15)‡	10.4 (7.9, 13.6)	4.42 (2.17, 8.99)*

ORs were calculated after adjusted for age and sex. CMRFs: Cardiometabolic risk factors; IFG: Impaired fasting glucose; Clustered CMRFs: Satisfy three or more of the four items of hypertension, dyslipidemia, impaired fasting glucose, and abdominal obesity; WtHR: Weight-to-height ratio; TR: Total misclassification rate.  $P_{85}$  and  $P_{95}$  refers to those TMI were higher than sex-specific 85th and 95th percentiles. WtHR refers to those WtHR  $\geq 0.5$ . \* $P < 0.001$ ; † $P < 0.01$ ; ‡ $P < 0.05$ .