Supplementary files

Table S1 Study participants before and after multiple imputation

		Multiple imputation	
	before	**data**	**P-value**
	(N=20538)	(N=20888)	
Age (years)	56.3±13.1	56.3±13.1	0.852
Sex			0.639
men	9502 (46.3%)	9713 (46.5%)	
women	11036 (53.7%)	11175 (53.5%)	
Region (n%)			0.918
East	8355 (40.7%)	8478 (40.6%)	
Central	8617 (42.0%)	8804 (42.1%)	
West	3566 (17.4%)	3606 (17.3%)	
Area(n%)			0.816
urban	9166 (44.6%)	9347 (44.7%)	
rural	11372 (55.4%)	11541 (55.3%)	
Education level(n%)			0.999
Middle school or below	16370 (79.7%)	16650 (79.7%)	
High school or vocational school	2872 (14.0%)	2922 (14.0%)	
College and above	1296 (6.3%)	1316 (6.3%)	
Smoking status (n%)			0.85
No	15808 (77.0%)	16060 (76.9%)	
Yes	4730 (23.0%)	4828 (23.1%)	
Alcohol consumption (n%)			0.767
No	16501 (80.3%)	16757 (80.2%)	
Yes	4037 (19.7%)	4131 (19.8%)	
Total Cholesterol(mmol/L)	4.81±0.97	4.82±0.97	0.547
LDL Cholesterol (mmol/L)	2.82±0.812	2.82±0.814	0.607
BMI (kg/m2)	24.6±3.48	24.6±3.48	0.911
Family history of cardiovascular disease (n%)			0.874
No	17758 (85.0%)	17448 (85.0%)	
Yes	3130 (15.0%)	3090 (15.0%)	

Table S2 Association of MetS Components defined by different criteria with the risk of cardiovascular events.

	Revised ATP III	*P*	IDF	*P*	JCDCG	*P*
CVD						
Central obesity	1.20(1.04, 1.38)	0.015	1.20(1.04, 1.38)	0.015	1.13(0.98, 1.29)	0.092
Low HDL cholesterol	1.08(0.93, 1.26)	0.292	1.08(0.93, 1.26)	0.323	1.12(0.93, 1.35)	0.227
Elevated blood pressure	1.76(1.49, 2.07)	<0.001	1.76(1.49, 2.07)	<0.001	1.76(1.49, 2.07)	<0.001
High triglycerides	0.87(0.74, 1.02)	0.082	0.87(0.74, 1.02)	0.084	0.86(0.73, 1.01)	0.068
Elevated glucose	1.23(1.08, 1.41)	0.002	1.24(1.09, 1.42)	0.001	1.39(1.20, 1.60)	<0.001
Stroke						
Central obesity	1.15(0.96, 1.39)	0.128	1.15(0.96, 1.39)	0.129	1.06(0.89, 1.27)	0.500
Low HDL cholesterol	1.11(0.92, 1.35)	0.271	1.12(0.93, 1.36)	0.239	1.09(0.86, 1.38)	0.481
Elevated blood pressure	1.89(1.53, 2.35)	<0.001	1.89(1.53, 2.35)	<0.001	1.91(1.54, 2.36)	<0.001
High triglycerides	0.91(0.74, 1.11)	0.340	0.91(0.74, 1.11)	0.333	0.92(0.75, 1.13)	0.439
Elevated glucose	1.26(1.07, 1.50)	0.007	1.25(1.06, 1.49)	0.009	1.36(1.13, 1.63)	0.001
CHD						
Central obesity	1.27(0.98, 1.65)	0.072	1.27(0.98, 1.66)	0.070	1.25(0.97, 1.61)	0.080
Low HDL cholesterol	0.92(0.70, 1.22)	0.580	0.90(0.68, 1.19)	0.454	1.05(0.75, 1.47)	0.778
Elevated blood pressure	1.77(1.31, 2.40)	<0.001	1.77(1.30, 2.40)	<0.001	1.75(1.29, 2.37)	<0.001
High triglycerides	0.91(0.68, 1.21)	0.509	0.92(0.69, 1.22)	0.545	0.86(0.64, 1.15)	0.305
Elevated glucose	1.40(1.10, 1.79)	0.006	1.41(1.11, 1.80)	0.005	1.62(1.25, 2.10)	<0.001

HDL, high-density lipoprotein; IDF, International Diabetes Federation; Revised ATP III, the revised US National Cholesterol Education Program Adult Treatment Panel III; JCDCG, the Joint Committee for Developing Chinese Guidelines.

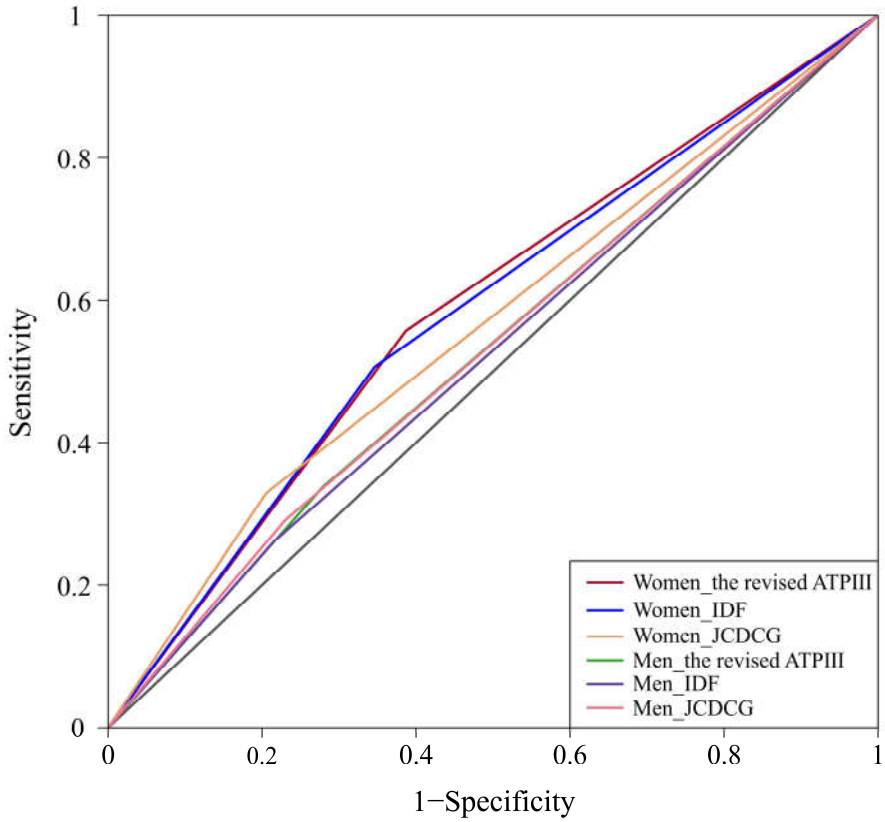
Table S3 Comparison of AUC with different MetS definitions

	Revised ATP III	IDF	JCDCG	*P*[a]
Total				
CVD	0.547(0.531-0.563)	0.540 (0.524-0.556)	0.545(0.530 -0.560)	<0.001
Stroke	0.552(0.531-0.573)	0.544(0.523-0.564)	0.543(0.523-0.562)	<0.001
CHD	0.557(0.528-0.587)	0.547(0.518-0.575)	0.560(0.531-0.588)	<0.001
Men				
CVD	0.529 (0.509 -0.550)	0.523 (0.504 -0.542)	0.531 (0.511 -0.550)	<0.001
Stroke	0.536 (0.510 -0.563)	0.527 (0.502 -0.552)	0.536 (0.510 -0.561)	0.007
CHD	0.544 (0.506 -0.581)	0.529 (0.494 -0.564)	0.538 (0.502 -0.573)	0.110
Women				
CVD	0.585 (0.560 -0.610)	0.580 (0.555 -0.605)	0.562 (0.538 -0.585)	<0.001
Stroke	0.586 (0.555 -0.618)	0.582 (0.550 -0.614)	0.549 (0.520 -0.578)	0.003
CHD	0.595 (0.549 -0.641)	0.593 (0.546 -0.639)	0.588 (0.543 -0.633)	0.455

AUC, Area Under Curve; MetS, metabolic syndrome; IDF International Diabetes Federation; The revised ATP III, the revised US National Cholesterol Education Program Adult Treatment Panel III; JCDCG, the Joint Committee for Developing Chinese Guidelines; CVD, cardiovascular disease; CHD, coronary heart disease.

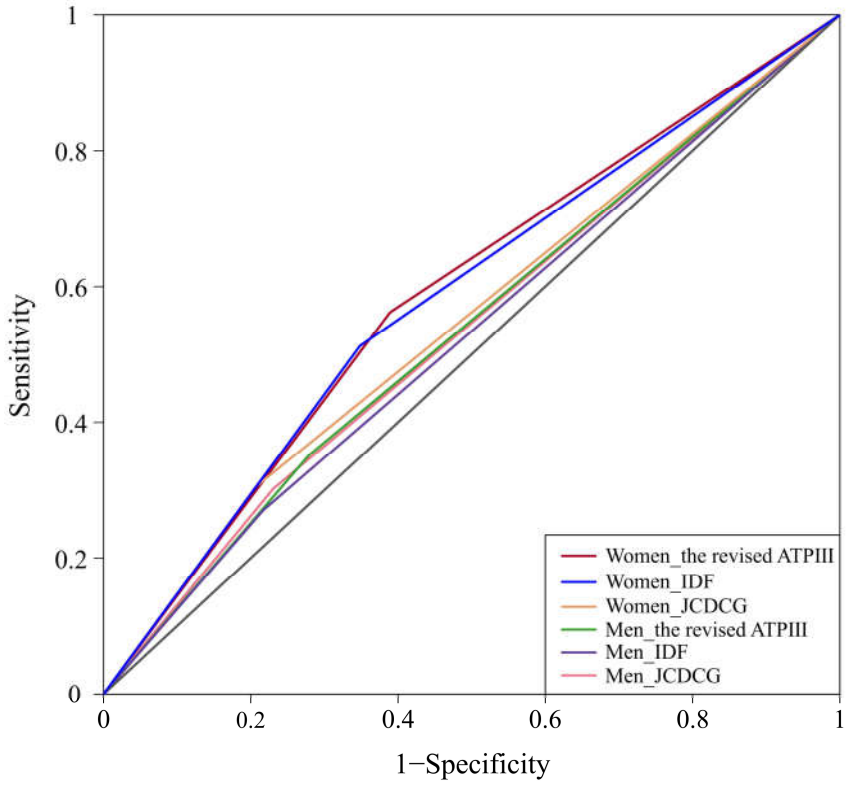
a: AUC comparison (DeLong, DeLong and Clarke-Pearson, 1988)

Figure S1 – ROC curves for IDF, revised ATPIII and JCDCG definitions as MetS diagnostic tests for cardiovascular disease



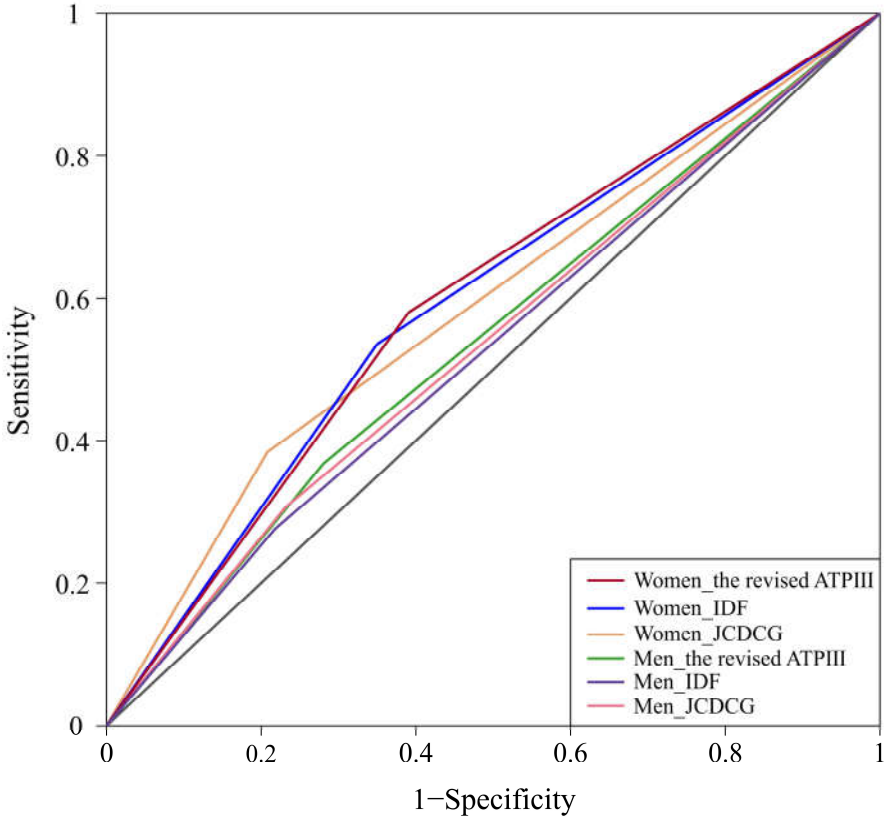
IDF International Diabetes Federation; The revised ATP III, the revised US National Cholesterol Education Program Adult Treatment Panel III; JCDCG, the Joint Committee for Developing Chinese Guidelines

Figure S2– ROC curves for IDF, revised ATPIII and JCDCG definitions as MetS diagnostic tests for stroke



IDF International Diabetes Federation; The revised ATP III, the revised US National Cholesterol Education Program Adult Treatment Panel III; JCDCG, the Joint Committee for Developing Chinese Guidelines

Figure S3– ROC curves for IDF, revised ATPIII and JCDCG definitions as MetS diagnostic tests for coronary heart disease.



IDF International Diabetes Federation; The revised ATP III, the revised US National Cholesterol Education Program Adult Treatment Panel III; JCDCG, the Joint Committee for Developing Chinese Guidelines

Text S2: Weights calculation in the Study

1. Sampling Unit Sampling Weight

The weight w_i of the observed individual i is the reciprocal of the individual's sampling probability, that is $w_i = 1/\pi_i$. According to the sampling design of this survey, the construction method of the basic sampling weight is as follows:

The first stage:

The sampling weight of sample city/county in each province is the reciprocal of sampling probability of sample city/county under stratified PPS sampling. Urban and rural stratification needs to be calculated separately. The calculation formula is as follows:

$$w_1 = \frac{\text{Urban/rural population in the provinces where the individual i located}}{\text{Population size of city/county where the individual i located} * 4}$$

The second stage:

$w_{2|1}$ is the sampling weight of the sample district/township, and its value is the reciprocal of the simple random sampling probability of the district/township. Its calculation formula is as follows:

$$w_{2|1} = \frac{\text{Total number of the district/town in the city/county where the individual i located}}{\text{Sample number of the district/town in the city/county where the individual i located}}$$

The third stage：

$w_{3|2,1}$ is the sampling weight of sample communities/villages, and its value is the reciprocal of simple random sampling probability of communities/villages. The calculation formula is as follows:

$$w_{3|2,1} = \frac{\text{Total number of the community/village in the district/town where the individual s i located}}{\text{Sample number of the community/village in the district/town where the individual s i located}}$$

The fourth stage：

$w_{4|3,2,1}$ is the sampling weight of the sample individual, and its value is the reciprocal of the simple random sampling probability of the sample individual. The weight of this stage should be calculated by sex and age, and the formula is as follows:

$$w_{4|3,2,1} = \frac{\text{Total number of male/female population in a certain age group of the community/village where individual i located}}{\text{Sampling number of male/female population in a certain age group of the community/village where individual i located}}$$

According to the sampling weights of the above stages, the basic sampling weights of individual

samples are as follows:

$$w_{base} = w_1 \times w_{2|1} \times w_{3|2,1} \times w_{4|3,2,1}$$

2. Non-response Adjustment Weight

Individuals who make no response and individuals who participated in the survey but were missing in key variables are treated as non-responder. The population structure of the missing population was adjusted according to sex and age group of one year per 10 years old. The method is shown in the below Table ST1.

Table ST1 Construction of Adjustment Weight for Non-response

Sex	Age group (years)			
	15～24	25～34	…	≥75
Men	$\sum_{i=1}^{n_{11}} w_i \Big/ \sum_{i=1}^{n'_{11}} w_i$	$\sum_{i=1}^{n_{12}} w_i \Big/ \sum_{i=1}^{n'_{12}} w_i$	$\sum_{i=1}^{n_{1(c-1)}} w_i \Big/ \sum_{i=1}^{n'_{1(c-1)}} w_i$	$\sum_{i=1}^{n_{1c}} w_i \Big/ \sum_{i=1}^{n'_{1c}} w_i$
Women	$\sum_{i=1}^{n_{21}} w_i \Big/ \sum_{i=1}^{n'_{21}} w_i$	$\sum_{i=1}^{n_{22}} w_i \Big/ \sum_{i=1}^{n'_{22}} w_i$	$\sum_{i=1}^{n_{2(c-1)}} w_i \Big/ \sum_{i=1}^{n'_{2(c-1)}} w_i$	$\sum_{i=1}^{n_{2c}} w_i \Big/ \sum_{i=1}^{n'_{2c}} w_i$

$$w'_{adj} = \frac{\sum_{i=1}^{n_{rc}} w_i}{\sum_{i=1}^{n'_{rc}} w_i}$$

$\sum_{i=1}^{n_{rc}} w_i$ is the sum of the basic sampling weights of all the people who fall in row R and column C, $\sum_{i=1}^{n'_{rc}} w_i$ is the sum of the basic sampling weights of all respondents in the sample population who fall in line R and in line C.

3. Demographic Adjustment Weight

Overall, the total population over 18 years old in 2010 was used. The data came from the 2010 National Bureau of Statistics census. The sum of the basic weights of all observed individuals in the sample is the estimated total number of people over 18 years old in 31 provinces (autonomous regions or municipalities). The adjustment method is shown in Table ST2.11.

Table ST2 Construction of Demographic Adjustment Weight

Sex	Age group (years)			
	18-24	25-34	…	≥75
Men	$N_{11} \Big/ \sum_{i=1}^{n_{11}} w_i$	$N_{12} \Big/ \sum_{i=1}^{n_{12}} w_i$	$N_{1(c-1)} \Big/ \sum_{i=1}^{n_{1(c-1)}} w_i$	$N_{1c} \Big/ \sum_{i=1}^{n_{1c}} w_i$
Women	$N_{21} \Big/ \sum_{i=1}^{n_{21}} w_i$	$N_{22} \Big/ \sum_{i=1}^{n_{22}} w_i$	$N_{2(c-1)} \Big/ \sum_{i=1}^{n_{2(c-1)}} w_i$	$N_{2c} \Big/ \sum_{i=1}^{n_{2c}} w_i$

$$w_{adj} = \frac{N_{rc}}{\sum_{i=1}^{n_{rc}} w_i}$$

N_{rc} is the number of natural population in line R and column C, $\sum_{i=1}^{n_{rc}} w_i$ is the sum of basic sampling weights of all sample population in line R and column C.

4．Survey Design Weight

The weights of survey design for observing individuals are as follows:

$$w_i = w_1 \times w_{2|1} \times w_{3|2,1} \times w_{4|3,2,1} \times w'_{adj} \times w_{adj}$$