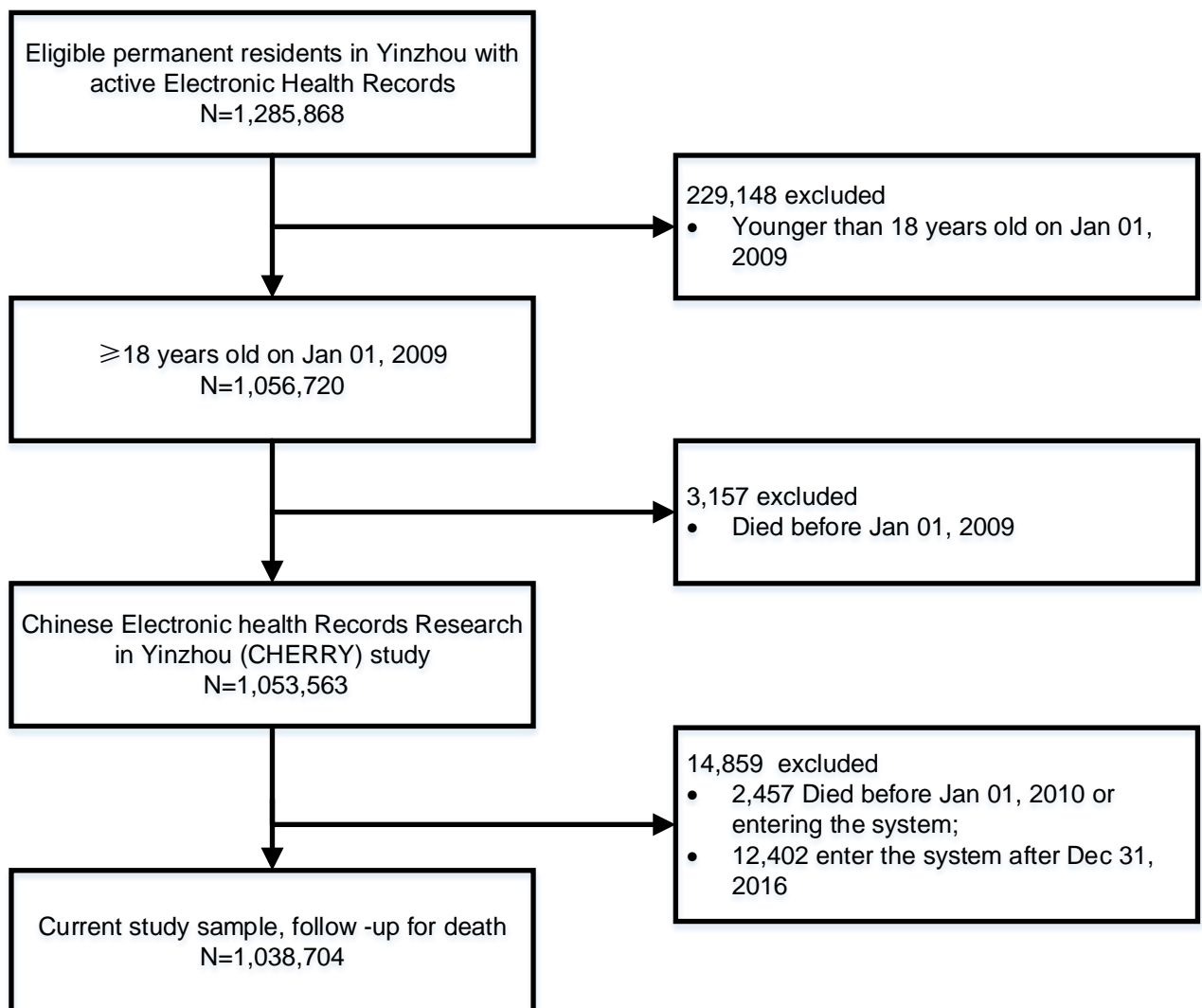


Supplementary Material

Multimorbidity of cardiometabolic diseases: Prevalence and Risk of Mortality from One Million Chinese Adults in a Longitudinal Cohort Study

eFigure 1. Flow chart of inclusion of participants in CHERRY study.	2
eTable 1. Standardized prevalence of cardiometabolic multimorbidity at baseline (age \geq 40 years). 3	3
eTable 2. Standardized prevalence of cardiometabolic multimorbidity at baseline (age \geq 60 years). 4	4
eTable 3. Evolution of cardiometabolic disease status during follow-up.	5
eTable 4. Age- and sex-adjusted HRs (95%) for all-cause mortality by cardiometabolic multimorbidity at baseline according to individuals' subgroups.	6
eTable 5. Age- and sex-adjusted HRs (95%) for all-cause mortality by cardiometabolic multimorbidity at baseline exclude follow-up less than one year.	8
eTable 6. HRs (95%) for all-cause mortality in participants with full information on cardiovascular risk factors and other characteristics (\geq 18 years, baseline vs repeat exclude diseases in 30 days of death).....	9

eFigure 1. Flow chart of inclusion of participants in CHERRY study.



eTable 1. Standardized prevalence of cardiometabolic multimorbidity at baseline (age≥40 years).

	Overall (N=545,632)		Male (N=275,382)		Female (N=270,250)	
	No. of cases	% (95% CI)	No. of cases	% (95% CI)	No. of cases	% (95% CI)
One disease	82,589	16.82 (16.72-16.92)	39,133	15.54 (15.40-15.68)	43,456	18.11 (17.96-18.26)
HT	67,505	13.81 (13.71-13.90)	31,512	12.58 (12.46-12.71)	35,993	15.05 (14.91-15.19)
DM	13,041	2.59 (2.55-2.64)	6,481	2.50 (2.44-2.57)	6,560	2.68 (2.62-2.75)
CVD	2,043	0.42 (0.40-0.44)	1,140	0.45 (0.43-0.48)	903	0.38 (0.35-0.40)
Two diseases	22,405	4.69 (4.65-4.75)	10,065	4.09 (4.01-4.16)	12,340	5.31 (5.22-5.40)
HT+DM	10,966	2.33 (2.28-2.36)	4,656	1.90 (1.85-1.96)	6,310	2.76 (2.69-2.82)
HT+CVD	11,186	2.31 (2.27-2.36)	5,268	2.12 (2.07-2.18)	5,918	2.50 (2.44-2.57)
DM+CVD	253	0.05 (0.05-0.06)	141	0.06 (0.05-0.07)	112	0.05 (0.04-0.06)
Three diseases	2,185	0.47 (0.45-0.49)	828	0.34 (0.32-0.37)	1,357	0.60 (0.57-0.64)

HT, hypertension; DM, diabetes mellitus; CVD, cardiovascular disease.

eTable 2. Standardized prevalence of cardiometabolic multimorbidity at baseline (age≥60 years).

	Overall (N=61,339)		Male (N=28,431)		Female (N=32,908)	
	No. of cases	% (95% CI)	No. of cases	% (95% CI)	No. of cases	% (95% CI)
One disease	45,083	31.90 (31.65-32.14)	21,351	30.06 (29.72-30.40)	23,732	33.66 (33.31-34.01)
HT	37,777	26.77 (26.54-27.00)	17,807	25.12 (24.80-25.44)	19,970	28.36 (28.02-28.70)
DM	5,833	4.12 (4.02-4.23)	2,733	3.84 (3.70-3.98)	3,100	4.39 (4.24-4.54)
CVD	1,473	1.00 (0.95-1.06)	811	1.10 (1.03-1.18)	662	0.91 (0.84-0.98)
Two diseases	14,597	10.41 (10.25-10.57)	6,448	9.11 (8.90-9.33)	8,149	11.65 (11.41-11.90)
HT+DM	7,398	5.32 (5.20-5.44)	3,057	4.33 (4.18-4.49)	4,341	6.26 (6.08-6.45)
HT+CVD	7,005	4.96 (4.84-5.07)	3,288	4.64 (4.48-4.79)	3,717	5.27 (5.10-5.44)
DM+CVD	194	0.13 (0.11-0.15)	103	0.14 (0.11-0.17)	91	0.12 (0.10-0.15)
Three diseases	1,659	1.20 (1.14-1.26)	632	0.89 (0.82-0.96)	1,027	1.49 (1.40-1.58)

HT, hypertension; DM, diabetes mellitus; CVD, cardiovascular disease.

eTable 3. Evolution of cardiometabolic disease status during follow-up.

Number of disorders at baseline	Number of disorders at last visit										Total
	None	One disease	HT	DM	CVD	Two diseases	HT+DM	HT+CVD	DM+CVD	Three diseases	
None	854,643 (92.1%)	60,668 (6.5%)	47,903 (5.2%)	8,388 (0.9%)	4,377 (0.5%)	9,931 (1.1%)	4,322 (0.5%)	2,798 (0.3%)	2,811 (0.30%)	2,704 (0.3%)	927,946 (89.3%)
One disease		61,643 (71.9%)				18,266 (21.3%)				5,775 (6.7%)	85,684 (8.2%)
HT			53,093 (76.5%)				3,602 (5.2%)	9,279 (13.4%)		3,432 (4.9%)	69,406 (6.7%)
DM				6,962 (49.3%)			1,779 (12.6%)		3,121 (22.1%)	2,265 (16.0%)	14,127 (1.4%)
CVD					1,588 (73.8%)			437 (20.3%)	48 (2.2%)	78 (3.6%)	2,151 (0.2%)
Two diseases						15,006 (65.6%)				7,865 (34.4%)	22,871 (2.2%)
HT+DM							4,539 (41.0%)			6,534 (59.0%)	11,073 (1.1%)
HT+CVD								10,292 (89.2%)		1,248 (10.8%)	11,540 (1.1%)
DM+CVD									175 (67.8%)	83 (32.2%)	258 (0.0%)
Three diseases										2,203 (0.2%)	2,203 (0.2%)
Total	854,643 (82.28%)	122,311 (11.78%)	100,996 (9.72%)	15,350 (1.48%)	5,965 (0.57%)	43,203 (4.16%)	14,242 (1.37%)	22,806 (2.20%)	6,155 (0.59%)	18,547 (1.79%)	1,038,704

HT, hypertension; DM, diabetes mellitus; CVD, cardiovascular disease.

eTable 4. Age- and sex-adjusted HRs (95%) for all-cause mortality by cardiometabolic multimorbidity at baseline according to individuals' subgroups.

Subgroup		Number of disorders	n (total)	n (death)	HR (95% CI)
Gender	Men	0	452,452	7,390	1
		1	40,883	3,481	1.38 (1.32-1.43)
		2	10,349	1,316	1.68 (1.58-1.78)
		3	841	155	2.01 (1.71-2.36)
	Women	0	475,494	5,641	1
		1	44,801	3,176	1.39 (1.33-1.45)
		2	12,522	1,363	1.78 (1.67-1.88)
		3	1,362	228	2.44 (2.14-2.78)
Age groups	<40 years	0	489,493	391	1
		1	3,095	22	4.74 (3.06-7.33)
		≥2	484	2	1.91 (0.47-7.67)
	40-59 years	0	356,879	2,856	1
		1	37,506	538	1.10 (1.00-1.21)
		2	7,808	157	1.32 (1.13-1.56)
		3	526	16	1.87 (1.14-3.05)
	≥60 years	0	81,574	9,784	1
		1	45,083	6,097	1.22 (1.18-1.26)
		2	14,597	2,520	1.50 (1.44-1.57)
		3	1,659	367	1.91 (1.72-2.12)
	BMI (kg/m2 Asian-specific cutoffs)	<23 (Normal)	0	520,434	6,971
1			33,112	3,407	1.18 (1.13-1.23)
2			7,879	1,223	1.47 (1.38-1.56)
3			681	141	1.79 (1.51-2.11)
23-<25 (Overweight)		0	187,405	2,617	1
		1	23,757	1,490	0.98 (0.92-1.04)
		2	6,294	588	1.16 (1.06-1.27)
		3	563	94	1.61 (1.31-1.98)
≥25 (Obese)		0	89,870	1,430	1

		1	26,650	1,266	0.98 (0.90-1.05)
		2	8,404	705	1.32 (1.21-1.45)
		3	938	132	1.85 (1.55-2.21)
BMI (kg/m²)	<25 (Normal)	0	707,839	9,588	1
		1	56,869	4,897	1.10 (1.07-1.14)
		2	14,173	1,811	1.34 (1.28-1.41)
		3	1,244	235	1.71 (1.50-1.94)
	25-<30 (Overweight)	0	84,326	1,325	1
		1	23,991	1,132	0.97 (0.90-1.05)
		2	7,459	612	1.30 (1.18-1.43)
		3	804	115	1.86 (1.53-2.25)
	≥30 (Obese)	0	5,544	105	1
		1	2,659	134	1.01 (0.78-1.31)
		2	945	93	1.55 (1.17-2.06)
		3	134	17	1.79 (1.07-3.00)
Smoking status	Current smoker	0	162,325	1,762	1
		1	9,186	615	1.27 (1.15-1.39)
		2	2,411	236	1.50 (1.31-1.72)
		3	162	30	2.81 (1.96-4.04)
	Non-current smoker	0	650,393	10,132	1
		1	73,932	5,914	1.16 (1.12-1.20)
		2	20,400	2,433	1.45 (1.39-1.52)
		3	2,040	352	1.83 (1.64-2.03)
Region	Rural	0	638,725	10,421	1
		1	53,347	5,343	1.39 (1.35-1.44)
		2	15,043	2,015	1.57 (1.50-1.65)
		3	1,527	295	2.01 (1.79-2.25)
	Urban	0	279,407	2,521	1
		1	29,368	1,267	1.30 (1.21-1.39)
		2	7,468	628	2.06 (1.89-2.25)
		3	657	84	2.54 (2.04-3.15)

eTable 5. Age- and sex-adjusted HRs (95%) for all-cause mortality by cardiometabolic multimorbidity at baseline exclude follow-up less than one year.

Diseases at baseline	No. of Participants	No. of deaths	HR (95% CI)
None	916,681	10,941	1
One diseases	82,959	5,945	1.46 (1.42-1.51)
HT	67,560	4,767	1.35 (1.31-1.40)
DM	13,443	729	1.83 (1.70-1.97)
CVD	1,956	449	3.10 (2.82-3.40)
Two diseases	22,393	2,394	1.82 (1.74-1.90)
HT+DM	10,848	1,024	1.75 (1.64-1.87)
HT+CVD	11,317	1,331	1.85 (1.74-1.95)
DM+CVD	228	39	3.07 (2.24-4.20)
Three diseases	2,142	343	2.36 (2.12-2.63)

HT, hypertension; DM, diabetes mellitus; CVD, cardiovascular disease

eTable 6. HRs (95%) for all-cause mortality in participants with full information on cardiovascular risk factors and other characteristics (≥18 years, baseline vs repeat exclude diseases in 30 days of death).

	No. of Participants	No. of Deaths	Model 1 Age and Sex	Model 2 Age, Sex and BMI	Model 3 Age, Sex and Smoking	Model 4 Age, Sex, Smoking and BMI	Model 5 Age, Sex, Smoking, BMI, Education and Region
Comorbidity at baseline							
0	687,478	10,607	1	1	1	1	1
1	77,125	6,019	1.04 (1.01, 1.07)	1.03 (0.99, 1.06)	1.08 (1.04, 1.11)	1.06 (1.03, 1.10)	1.09 (1.06, 1.13)
2	21,945	2,470	1.26 (1.21, 1.32)	1.25 (1.19, 1.31)	1.33 (1.28, 1.40)	1.32 (1.26, 1.38)	1.35 (1.29, 1.41)
3	2,155	363	1.64 (1.48, 1.82)	1.63 (1.47, 1.81)	1.77 (1.60, 1.97)	1.76 (1.58, 1.95)	1.79 (1.61, 1.98)
Comorbidity during follow-up							
0	617,490	7,743	1	1	1	1	1
1	111,227	5,872	0.96 (0.93, 1.00)	0.95 (0.92, 0.98)	1.00 (0.97, 1.04)	0.99 (0.95, 1.02)	1.02 (0.98, 1.06)
2	41,634	4,330	1.38 (1.32, 1.43)	1.37 (1.31, 1.42)	1.46 (1.40, 1.51)	1.45 (1.39, 1.50)	1.46 (1.40, 1.51)
3	18,352	1,514	1.43 (1.35, 1.51)	1.41 (1.33, 1.49)	1.56 (1.47, 1.65)	1.53 (1.45, 1.62)	1.57 (1.48, 1.66)