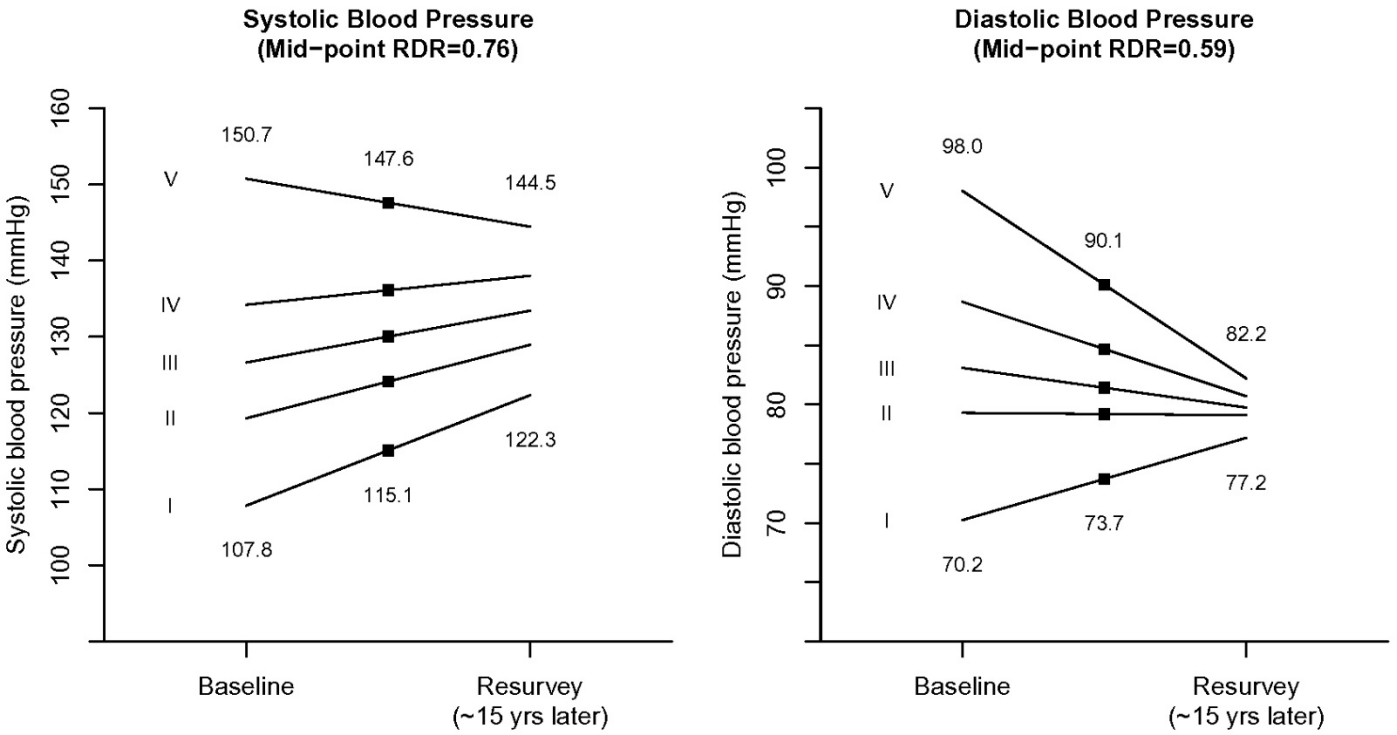
Supplementary Online Content

Tapia-Conyer R, Alegre-Díaz J, Gnatiuc L, et al. Association of blood pressure with cause-specific mortality in Mexican adults. *JAMA Netw Open*. 2020;3(9):e2018141. doi:10.1001/jamanetworkopen.2020.18141

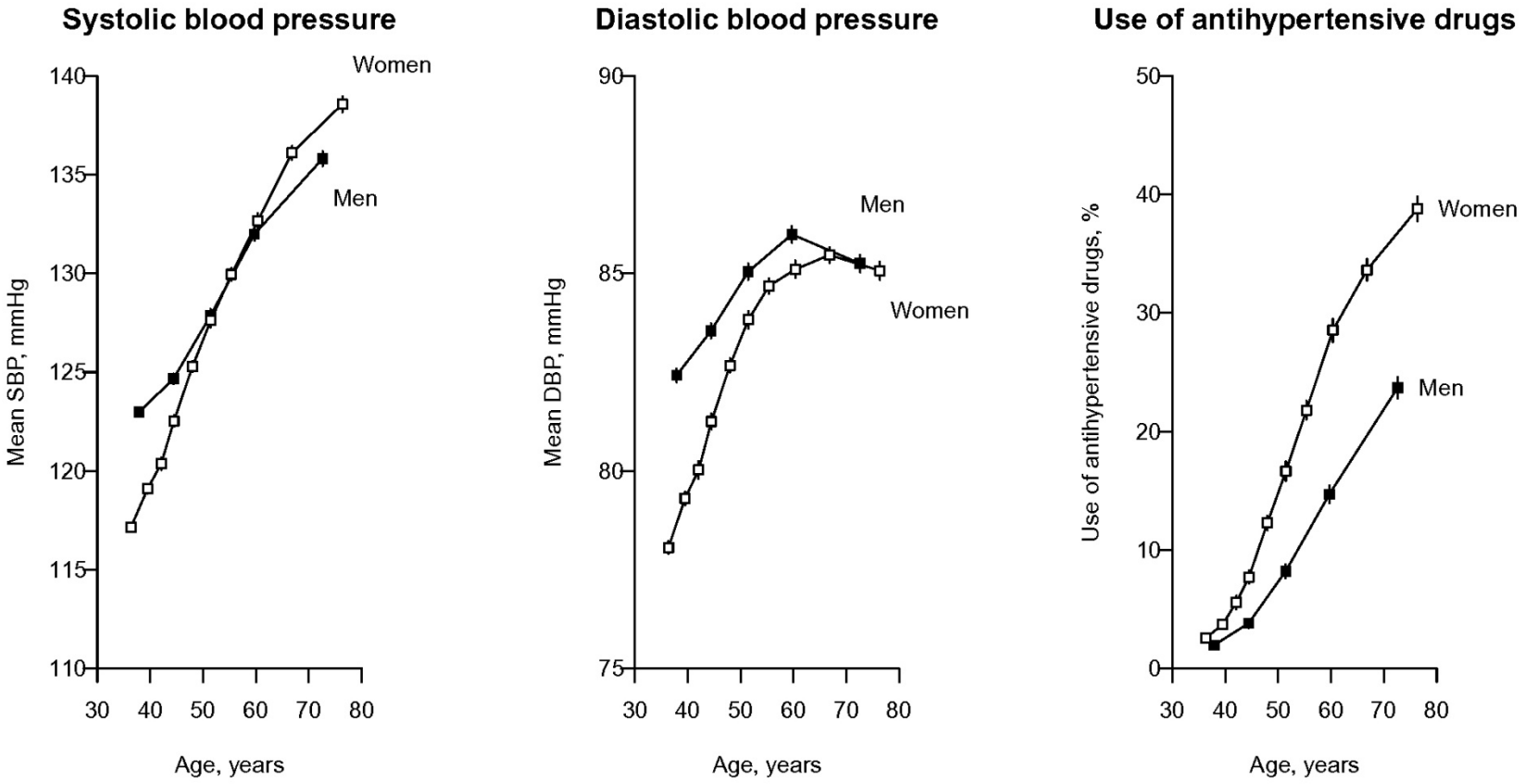
This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure 1: Extent of Regression to the Mean in SBP and DBP Between Baseline and Resurvey, for each Fifth of the Baseline Distribution



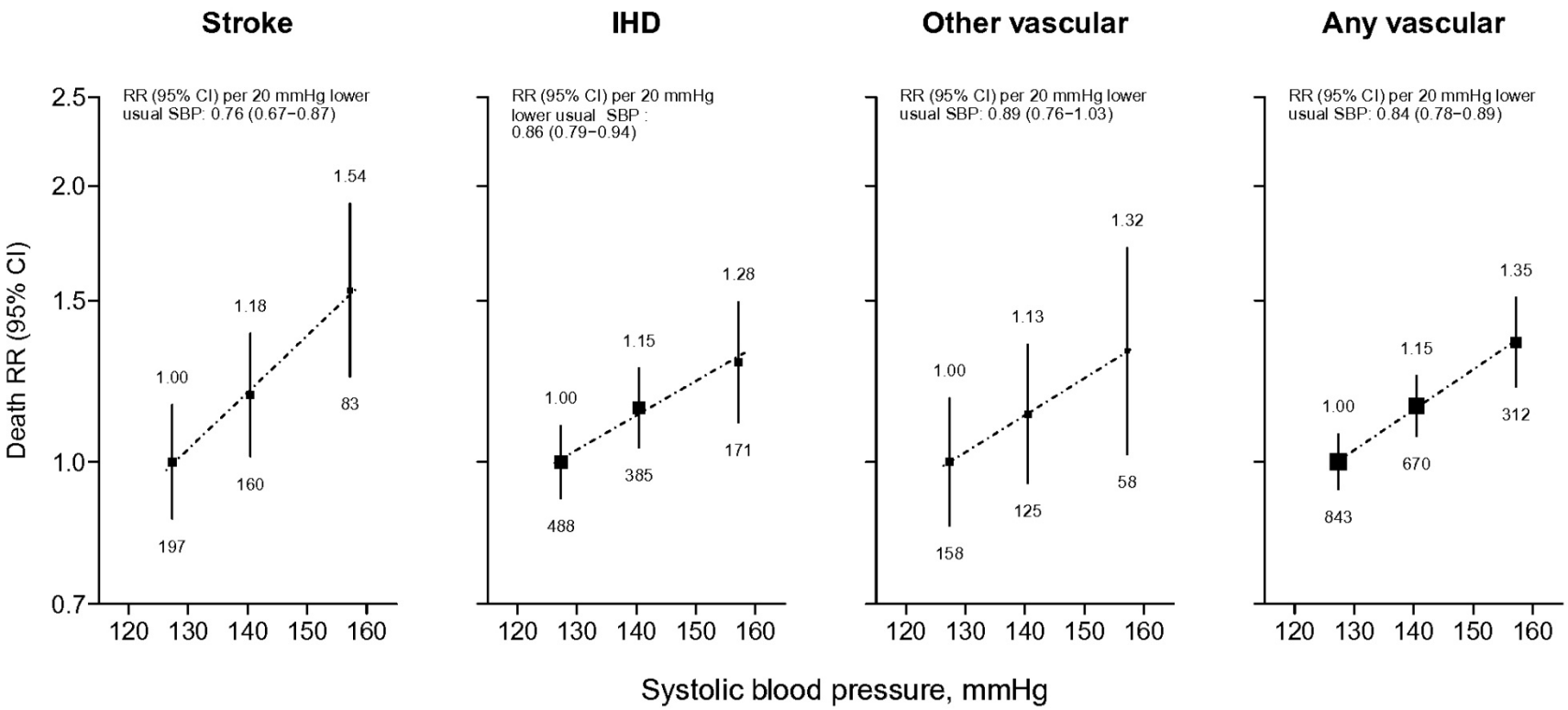
Analysis restricted to participants aged 35−74 and without prior chronic disease (chronic kidney disease, ischemic heart disease, stroke, cirrhosis, cancer, or emphysema) at recruitment, with complete data on analysis covariates (see Table 1) and with complete, plausible, blood pressure data at both recruitment and resurvey. The regression dilution ratio (RDR) is calculated as the ratio of the range of mid−point to baseline means; for example for SBP this equates to (147.6−115.1)/(150.7−107.8)=0.76.

eFigure 2: SBP, DBP and Use of Antihypertensive Drugs at Recruitment, by Age and Sex Among 141 074 Participants Without Prior Chronic Disease and Aged 35 to 84 Years at Recruitment



Results shown for five equally−sized groups of men and ten equally−sized groups of women (just under 10 000 participants in each group). Vertical lines representing 95% confidence intervals are drawn, but are mostly contained within the height of each plotting symbol.

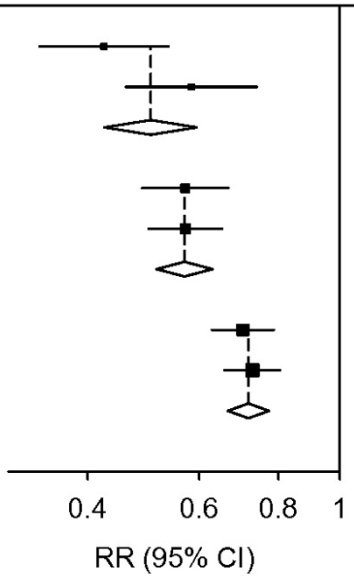
eFigure 3: Association of SBP with Cause−Specific Vascular Mortality at Ages 75 to 84 Years



Analyses and exclusions as for Figure 1, except that analyses are for ages 75−84. Due to smaller numbers, the first two, middle two and last two SBP categories have each been combined to give three groups.

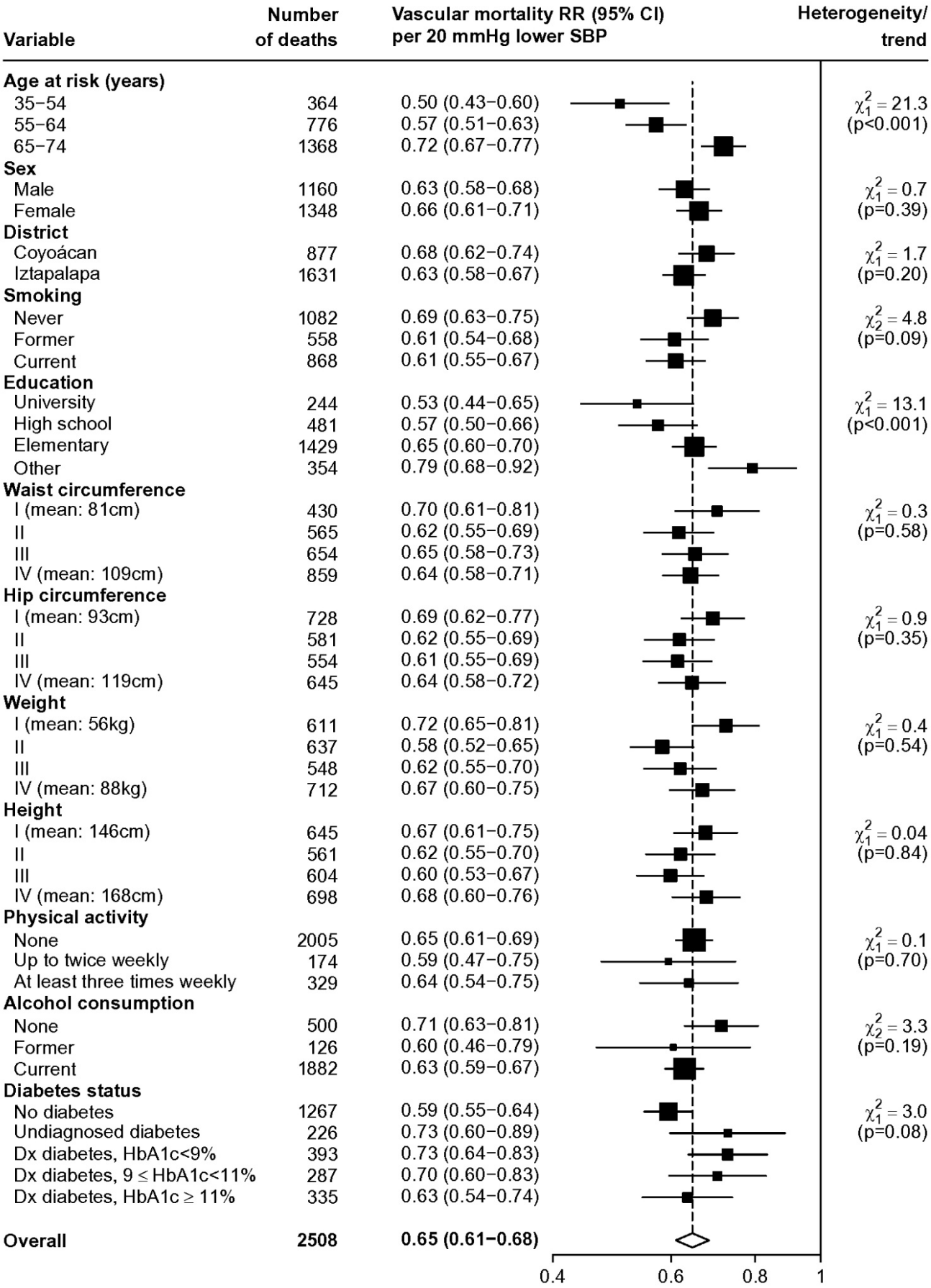
eFigure 4: Association of SBP With Vascular Mortality by Age and Sex

Age (years)	Sex	No. of deaths	RR (95% CI) per 20 mmHg lower usual SBP	p−value
35−54	Men	177	0.42 (0.34−0.54)	<0.001
	Women	187	0.58 (0.46−0.74)	<0.001
	Both	**364**	**0.50 (0.43−0.59)**	**<0.001**
55−64	Men	356	0.57 (0.49−0.67)	<0.001
	Women	420	0.57 (0.50−0.65)	<0.001
	Both	**776**	**0.57 (0.51−0.63)**	**<0.001**
65−74	Men	627	0.70 (0.63−0.79)	<0.001
	Women	741	0.73 (0.66−0.80)	<0.001
	Both	**1368**	**0.72 (0.67−0.77)**	**<0.001**



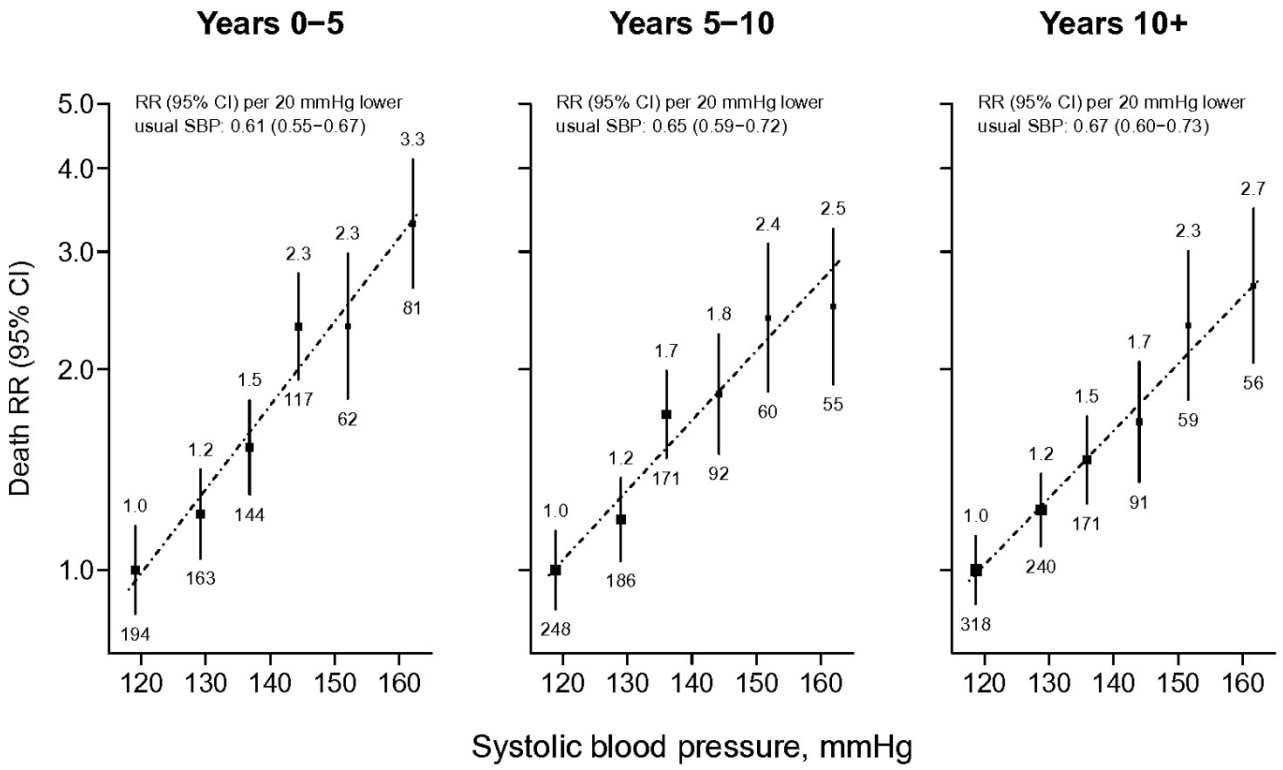
Analyses and exclusions as for Figure 2, except that RRs are instead estimated separately in men and women (and adjusted for diabetes status). Within each age−group shown, the RRs shown are consistent in men and women (all three tests for heterogeneity give p>0.05).

eFigure 5: Association of SBP with Vascular Mortality at Ages 35 to 74 Years by Levels of Confounders



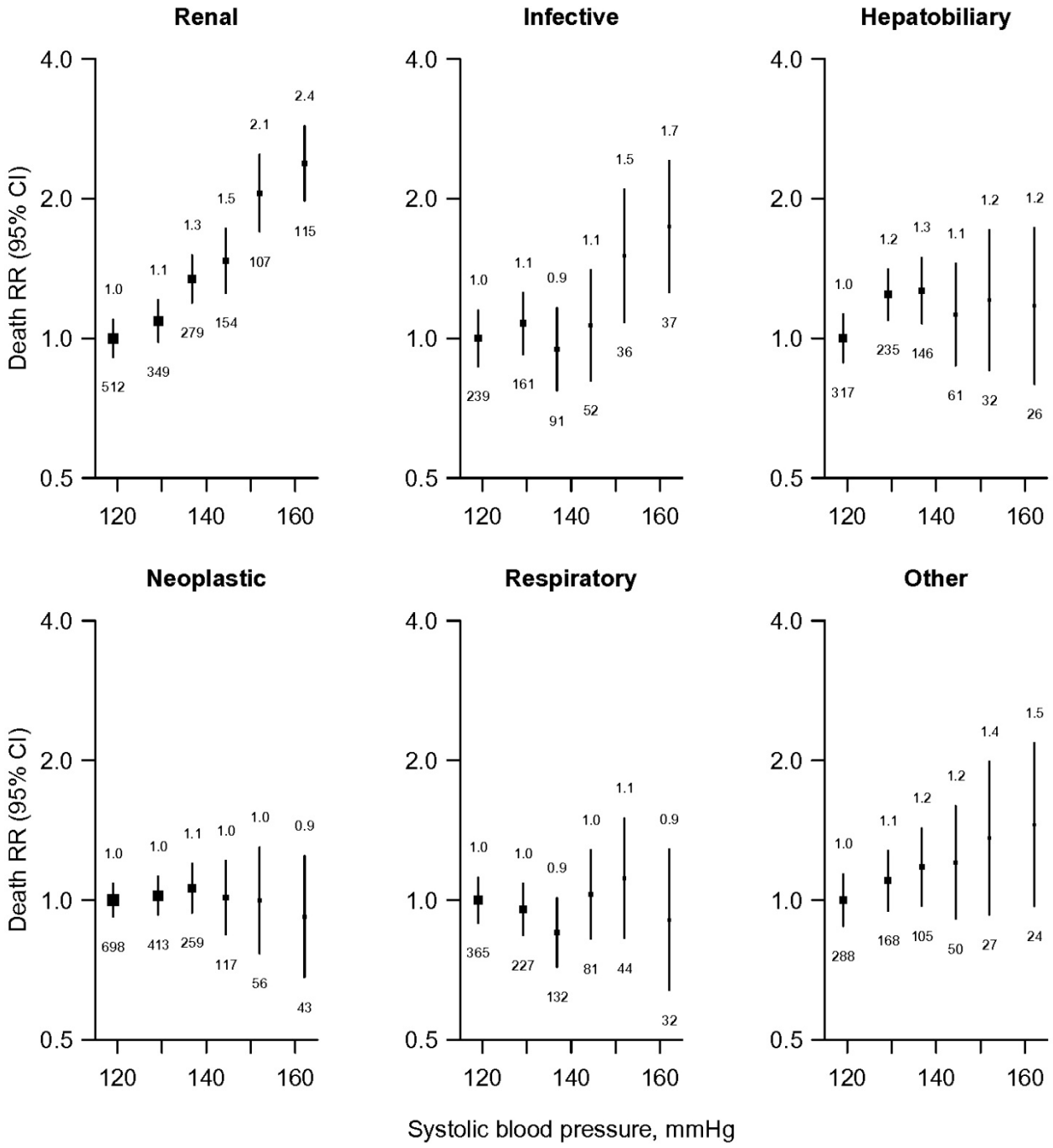
Exclusions and analyses as for Figure 2, with the exception that RRs are now estimated separately by levels of each confounder shown (with mutual adjustment for the other shown confounders).

eFigure 6: Association of SBP With Vascular Mortality at Ages 35 to 74 Years Separately by Period of Follow−up



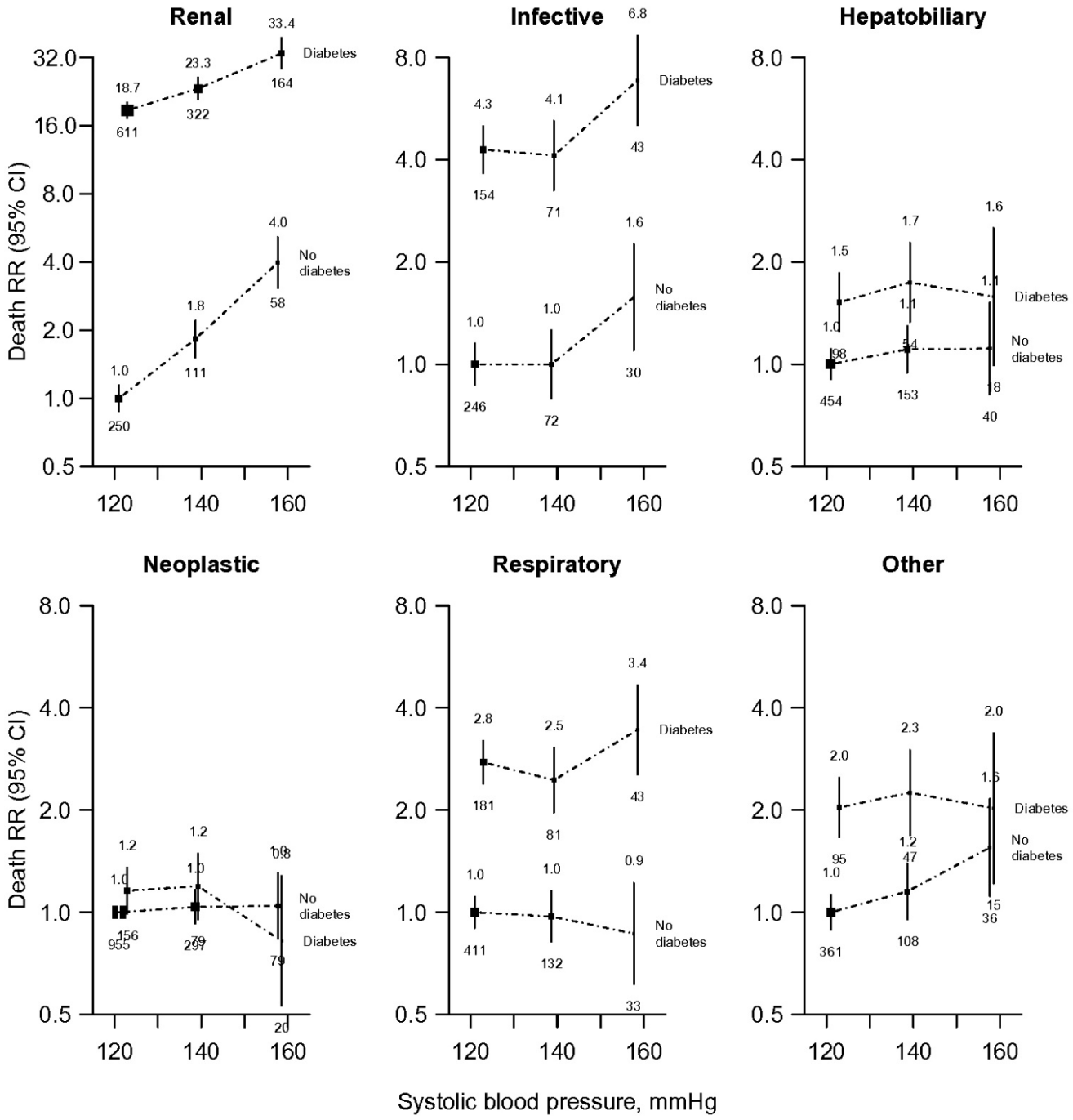
Analyses and exclusions as for Figure 1, except that analyses are now done separately by period of follow−up.

eFigure 7: Association of SBP with Cause−Specific Nonvascular Mortality at Ages 35 to 74 Years



Analyses and exclusions as for Figure 1. Infective endpoint excludes respiratory infections (which are included in respiratory).

eFigure 8: Association of SBP with Cause−Specific Nonvascular Mortality at Ages 35 to 74 Years, by History of Previously Diagnosed Diabetes



Analyses and exclusions as for Figure 1, but now separately by, instead of adjusted for, diabetes. Infective endpoint excludes respiratory infections (which are included in respiratory).

eTable 1: Numbers of Deaths at Ages 35 to 74 Years by Underlying Cause (ICD-10 code)

Underlying cause of death	ICD-10 codes (and number of deaths)
Stroke (n=574)	I600 (1), I602 (1), I608 (1), I609 (57), I61 (1), I610 (1), I612 (1), I614 (1), I615 (2), I618 (1), I619 (178), I620 (7), I629 (3), I633 (2), I634 (11), I635 (2), I638 (2), I639 (44), I649 (1), I64X (77), I669 (5), I671 (6), I672 (1), I673 (1), I674 (2), I678 (56), I679 (86), I693 (4), I694 (3), I698 (16)
IHD (n=1406)	I200 (4), I209 (2), I210 (16), I211 (8), I219 (1270), I221 (1), I249 (7), I251 (30), I252 (1), I255 (1), I258 (6), I259 (60)
Other vascular (n=528)	E115 (25), E145 (25), I050 (1), I051 (1), I059 (13), I070 (1), I071 (2), I080 (2), I081 (1), I091 (1), I099 (13), I110 (72), I119 (8), I260 (2), I269 (53), I270 (6), I272 (2), I279 (6), I301 (1), I319 (1), I330 (5), I340 (3), I348 (1), I350 (11), I351 (1), I358 (1), I38X (5), I420 (7), I429 (1), I442 (5), I443 (1), I460 (1), I469 (8), I471 (1), I472 (2), I489 (2), I48X (5), I490 (4), I500 (35), I501 (10), I509 (47), I515 (1), I518 (2), I519 (10), I710 (5), I712 (1), I713 (4), I714 (1), I718 (3), I719 (1), I729 (1), I739 (2), I741 (1), I771 (11), I776 (1), I802 (6), I803 (1), I822 (1), I828 (1), I829 (3), I830 (1), I872 (4), I879 (1), I99X (2), K550 (52), K551 (1), K552 (1), K559 (5), K761 (1), Q210 (1), Q231 (1), Q238 (1), Q248 (1), R570 (8)
Renal (n=1516)	E102 (6), E112 (655), E122 (1), E142 (285), I120 (79), I129 (2), I130 (1), I131 (1), I132 (21), N002 (1), N039 (23), N049 (1), N059 (3), N10X (2), N12X (7), N142 (1), N151 (9), N170 (1), N179 (64), N180 (9), N185 (17), N189 (135), N19X (34), N200 (6), N201 (1), N289 (1), N390 (148), Q619 (1), Y841 (1)
Infective (n=616)	A047 (2), A060 (1), A090 (12), A099 (28), A09X (10), A170 (1), A180 (1), A181 (1), A182 (1), A183 (1), A188 (1), A199 (3), A415 (1), A419 (155), A483 (1), A498 (1), A810 (2), A86X (2), B200 (1), B201 (1), B207 (2), B208 (6), B210 (1), B212 (1), B227 (1), B238 (4), B24X (5), B690 (2), B948 (1), G009 (3), G039 (4), G049 (6), G060 (1), H440 (1), K052 (1), K222 (1), K223 (2), K228 (1), K251 (3), K254 (8), K255 (7), K256 (2), K259 (5), K264 (5), K265 (2), K269 (1), K274 (3), K275 (1), K290 (5), K291 (2), K292 (1), K295 (3), K297 (1), K318 (6), K352 (4), K353 (3), K358 (4), K359 (1), K572 (2), K578 (4), K579 (9), K610 (2), K611 (1), K650 (9), K658 (1), K659 (47), K920 (8), K921 (1), K922 (95), L021 (3), L022 (6), L023 (1), L024 (1), L031 (3), L038 (1), L039 (3), L089 (18), L899 (3), L89X (4), L905 (1), L984 (5), M009 (1), M600 (2), M725 (1), M726 (12), M798 (22), M869 (2), N410 (1), N498 (6), N499 (1), N719 (1), N739 (2), N764 (1)
Hepatobiliary (n=817)	B169 (2), B171 (21), B181 (2), B182 (8), B189 (1), B190 (2), I850 (12), I859 (4), K563 (1), K701 (18), K702 (1), K703 (131), K704 (13), K709 (12), K711 (2), K716 (1), K720 (6), K721 (39), K729 (139), K739 (2), K742 (1), K743 (3), K745 (1), K746 (221), K750 (9), K754 (2), K759 (1), K766 (10), K767 (10), K769 (15), K800 (4), K801 (7), K802 (2), K803 (4), K804 (1), K805 (3), K810 (15), K811 (3), K819 (4), K822 (1), K829 (5), K830 (14), K831 (2), K852 (4), K858 (7), K859 (22), K85X (23), K861 (2), K868 (3), Q447 (1)
Neoplastic (n=1586)	C029 (7), C049 (1), C069 (1), C07X (1), C089 (1), C109 (3), C119 (1), C139 (1), C140 (3), C159 (11), C160 (2), C169 (146), C170 (6), C179 (1), C182 (1), C184 (1), C187 (2), C189 (89), C19X (4), C20X (15), C220 (38), C221 (14), C229 (82), C23X (20), C240 (7), C241 (8), C248 (3), C249 (14), C250 (19), C259 (71), C260 (2), C269 (2), C319 (1), C329 (12), C33X (1), C349 (126), C37X (1), C383 (1), C384 (1), C412 (2), C414 (1), C419 (6), C437 (1), C438 (1), C439 (12), C445 (1), C447 (1), C449 (5), C450 (1), C451 (1), C459 (3), C469 (1), C479 (1), C480 (9), C482 (5), C492 (3), C499 (7), C509 (147), C519 (2), C539 (87), C541 (13), C549 (2), C55X (10), C56X (78), C609 (1), C61X (48), C629 (1), C64X (60), C679 (18), C680 (2), C709 (2), C710 (13), C711 (1), C718 (1), C719 (28), C729 (1), C73X (19), C741 (1), C749 (1), C751 (1), C759 (1), C760 (4), C763 (2), C764 (1), C765 (1), C780 (4), C786 (1), C787 (8), C788 (2), C793 (2), C794 (3), C795 (1), C796 (1), C798 (2), C800 (23), C809 (11), C80X (1), C817 (1), C819 (8), C829 (1), C833 (10), C838 (1), C839 (2), C844 (1), C845 (1), C851 (1), C857 (1), C859 (37), C900 (29), C901 (1), C902 (1), C910 (21), C911 (1), C920 (25), C921 (6), C927 (2), C929 (2), C950 (1), C959 (3), C97X (1), D371 (2), D372 (1), D374 (3), D376 (6), D377 (1), D380 (2), D381 (4), D383 (2), D391 (2), D410 (2), D419 (1), D430 (7), D432 (1), D449 (1), D486 (1), D487 (5), D489 (2)
Respiratory* (n=881)	A162 (8), A165 (1), A169 (2), B206 (2), B441 (1), B909 (1), E848 (1), J069 (1), J09 (3), J100 (2), J111 (1), J151 (3), J157 (1), J159 (21), J180 (48), J181 (25), J182 (1), J188 (1), J189 (380), J209 (3), J22X (16), J348 (1), J391 (1), J42X (12), J439 (20), J440 (71), J448 (4), J449 (112), J459 (9), J46X (2), J47X (2), J60X (1), J64X (5), J677 (1), J679 (2), J680 (1), J690 (1), J80X (1), J81X (3), J841 (65), J849 (6), J850 (1), J852 (1), J869 (5), J90X (3), J939 (1), J960 (2), J961 (1), J969 (1), J980 (1), J981 (1), J984 (10), J985 (4), J988 (7), Q311 (1)

IHD=Ischemic heart disease. *Includes respiratory infections.

eTable 2: Baseline Characteristics of 7461 Participants Without Prior Chronic Disease and Aged 75 to 84 Years at Recruitment

	Baseline systolic blood pressure (participants)						
	<125 mmHg (n=1732)	125-134 mmHg (n=1792)	135-144 mmHg (n=1636)	145-154 mmHg (n=1075)	155-164 mmHg (n=632)	≥165 mmHg (n=594)	Overall (n=7461)
Age, years	79 (3)	79 (3)	79 (3)	79 (3)	79 (3)	79 (3)	79 (3)
Male	748 (43%)	680 (38%)	594 (36%)	382 (36%)	197 (31%)	188 (32%)	2789 (37%)
Blood pressure							
Systolic blood pressure, mmHg	116 (8)	130 (3)	140 (3)	150 (3)	159 (3)	179 (14)	138 (19)
Diastolic blood pressure, mmHg	75 (8)	83 (7)	87 (8)	89 (9)	92 (10)	97 (13)	85 (11)
Taking blood pressure lowering medication	344 (20%)	538 (30%)	593 (36%)	453 (42%)	296 (47%)	337 (57%)	2561 (34%)
Socio-economic status and lifestyle behaviours							
Resident of Coyoacán	480 (28%)	592 (33%)	586 (36%)	381 (35%)	218 (34%)	264 (44%)	2521 (34%)
University/college educated	46 (3%)	72 (4%)	70 (4%)	36 (3%)	16 (3%)	21 (4%)	261 (3%)
Current smoker	259 (15%)	249 (14%)	226 (14%)	149 (14%)	86 (14%)	65 (11%)	1034 (14%)
Current drinker	1203 (69%)	1254 (70%)	1106 (68%)	729 (68%)	432 (68%)	395 (66%)	5119 (69%)
Any regular leisure-time physical activity	349 (20%)	357 (20%)	301 (18%)	218 (20%)	114 (18%)	132 (22%)	1471 (20%)
Physical measurements							
BMI, kg/m²	26.7 (4.4)	27.6 (4.5)	27.9 (4.7)	28.0 (4.6)	28.2 (4.6)	28.1 (4.7)	27.6 (4.6)
Waist circumference, cm	95 (11)	97 (11)	97 (11)	98 (11)	97 (11)	97 (11)	97 (11)
Hip circumference, cm	101 (10)	103 (11)	104 (10)	104 (11)	104 (10)	104 (10)	103 (10)
Diabetes and glycosylated hemoglobin							
Diabetes status							
No diabetes	1298 (75%)	1284 (72%)	1171 (72%)	749 (70%)	462 (73%)	410 (69%)	5374 (72%)
Undiagnosed diabetes	102 (6%)	115 (6%)	119 (7%)	88 (8%)	39 (6%)	32 (5%)	495 (7%)
Diagnosed diabetes with HbA1c <9%	225 (13%)	272 (15%)	243 (15%)	179 (17%)	84 (13%)	100 (17%)	1103 (15%)
Diagnosed diabetes with 9 ≤ HbA1c <11%	69 (4%)	80 (4%)	59 (4%)	41 (4%)	38 (6%)	31 (5%)	318 (4%)
Diagnosed diabetes with HbA1c ≥ 11%	38 (2%)	41 (2%)	44 (3%)	18 (2%)	9 (1%)	21 (4%)	171 (2%)
Medication use							
Any anti-thrombotic	90 (5%)	88 (5%)	77 (5%)	53 (5%)	37 (6%)	39 (7%)	384 (5%)
Any lipid lowering	11 (1%)	9 (1%)	11 (1%)	7 (1%)	5 (1%)	2 (<0.5%)	45 (1%)

Mean (SD) or n (column %) shown. BMI=Body mass index. Table excludes those with prior chronic disease at recruitment (ischemic heart disease, stroke, chronic kidney disease, cirrhosis, cancer, emphysema), missing or out-of-range data on any analysis covariate (sex, district of residence, educational level attained, anthropometry, smoking status, alcohol intake, leisure time physical activity, diabetes status), uncertain follow-up, or missing or out-of-range blood pressure (defined as SBP <80 or >250 mmHg, DBP <40 or >150 mmHg, or pulse pressure <15 mmHg).

eTable 3: Baseline Characteristics of 9031 Resurveyed Participants Without Prior Chronic Disease and Aged 35 to 74 Years at Original Study Recruitment, by Sex

	Men (n=2705)	Women (n=6326)	All (n=9031)
Age, years	52 (10)	50 (10)	51 (10)
Blood pressure			
Systolic blood pressure, mmHg	128 (15)	127 (16)	127 (16)
Diastolic blood pressure, mmHg	85 (10)	83 (10)	83 (10)
Taking blood pressure lowering medication	219 (8%)	917 (14%)	1136 (13%)
Socio-economic status and lifestyle behaviours			
Resident of Coyoacán	1536 (57%)	3285 (52%)	4821 (53%)
University/college educated	516 (19%)	571 (9%)	1087 (12%)
Current smoker	1420 (52%)	1291 (20%)	2711 (30%)
Current drinker	2336 (86%)	4422 (70%)	6758 (75%)
Any regular leisure-time physical activity	813 (30%)	1083 (17%)	1896 (21%)
Physical measurements			
BMI, kg/m²	28.2 (4.1)	29.9 (5.1)	29.4 (4.9)
Waist circumference, cm	97 (10)	94 (12)	94 (11)
Hip circumference, cm	101 (7)	107 (11)	105 (10)
Diabetes and glycosylated hemoglobin			
Diabetes status			
No diabetes	2307 (85%)	5411 (86%)	7718 (85%)
Undiagnosed diabetes	143 (5%)	321 (5%)	464 (5%)
Diagnosed diabetes with HbA1c <9%	148 (5%)	332 (5%)	480 (5%)
Diagnosed diabetes with 9 ≤ HbA1c <11%	71 (3%)	145 (2%)	216 (2%)
Diagnosed diabetes with HbA1c ≥ 11%	36 (1%)	117 (2%)	153 (2%)
Medication use			
Any anti-thrombotic	42 (2%)	146 (2%)	188 (2%)
Any lipid lowering	12 (<0.5%)	27 (<0.5%)	39 (<0.5%)

Mean (SD) or n (column %) shown. BMI=Body mass index. Table excludes those with prior chronic disease at recruitment (ischemic heart disease, stroke, chronic kidney disease, cirrhosis, cancer, emphysema), missing or out-of-range baseline data on any analysis covariate (sex, district of residence, educational level attained, anthropometry, smoking status, alcohol intake, leisure time physical activity, diabetes status), uncertain follow-up, or missing or out-of-range blood pressure (at baseline or resurvey).

eTable 4: Comparison of the Informativeness of Different Blood Pressure Indices (Measured Only Once) for Stroke, Ischemic Heart Disease (IHD) and Vascular Mortality Rates at Ages 35 to 74 Years

	Relative informativeness* for		
Blood pressure index	**Stroke mortality**	**IHD mortality**	**Vascular mortality**
Systolic blood pressure (SBP)	100%	100%	100%
Diastolic blood pressure (DBP)	69%	52%	62%
Mid blood pressure (1/2 SBP + 1/2 DBP)	98%	90%	95%
Mean arterial pressure (2/3 DBP + 1/3 SBP)	93%	81%	89%
Pulse pressure (SBP - DBP)	54%	69%	60%

IHD=Ischemic heart disease. *Informativeness of the given index (as indicated by the age-stratified and confounder-adjusted χ^2 statistic relating it to cause-specific mortality), as a percentage of the informativeness of the systolic blood pressure. Estimates of the informativeness of each blood pressure index are adjusted for age, sex, location, education alcohol intake, leisure-time physical activity, anthropometry and diabetes status.