THE LANCET

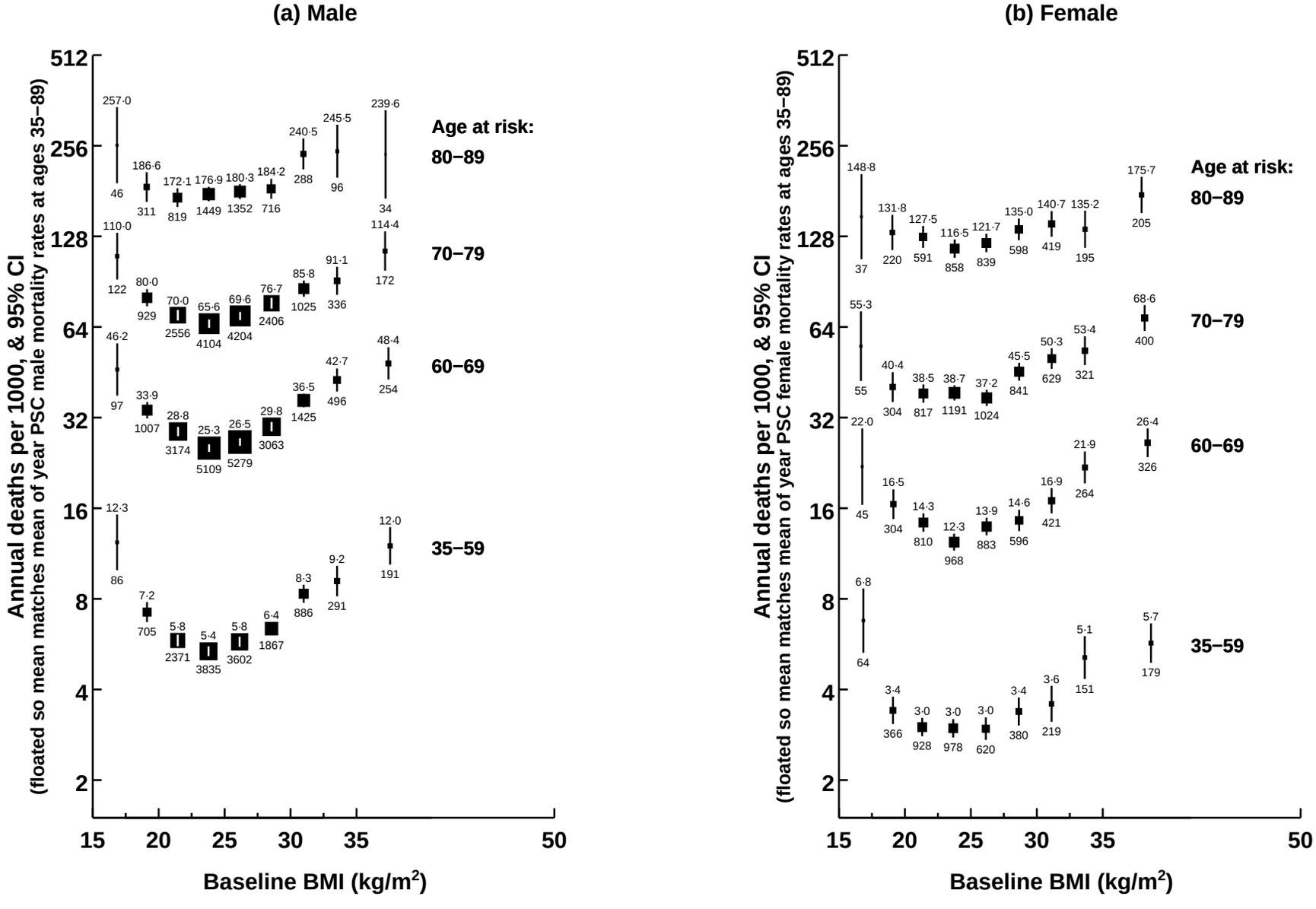
Supplementary webappendix

This webappendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Prospective Studies Collaboration. Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies. *Lancet* 2009; published online March 18. DOI:10.1016/S0140-6736(09)60318-4.

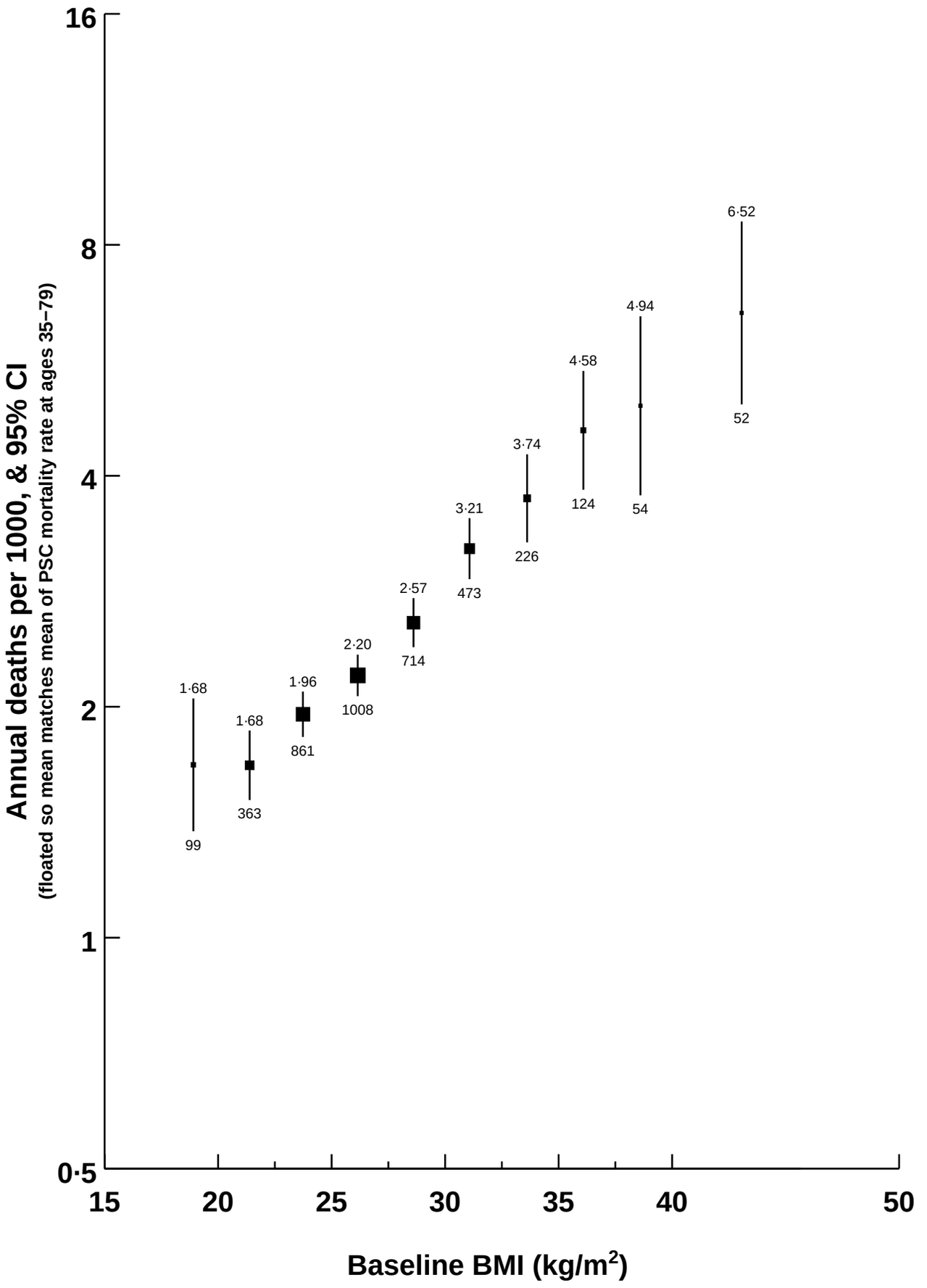
Webfigure 1: All-cause mortality vs. BMI in the range 15-50 kg/m^2, by age at risk (excluding the first 5 years of follow-up)

Conventions as in figure 2.



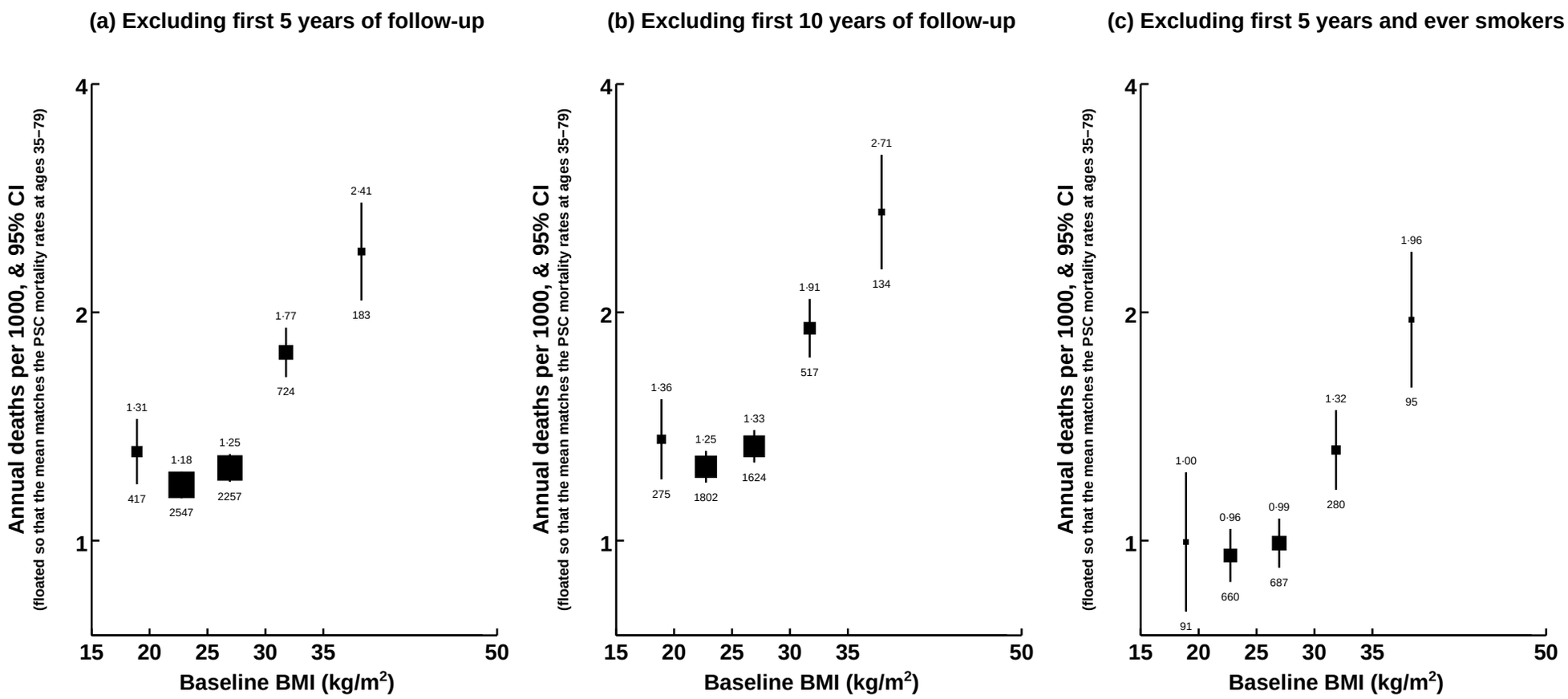
Webfigure 2: IHD mortality vs. BMI for never-smokers in the range 15-50 kg/m^2 (excluding the first 5 years of follow-up)

Conventions as in figure 2, except not adjusted for smoking.



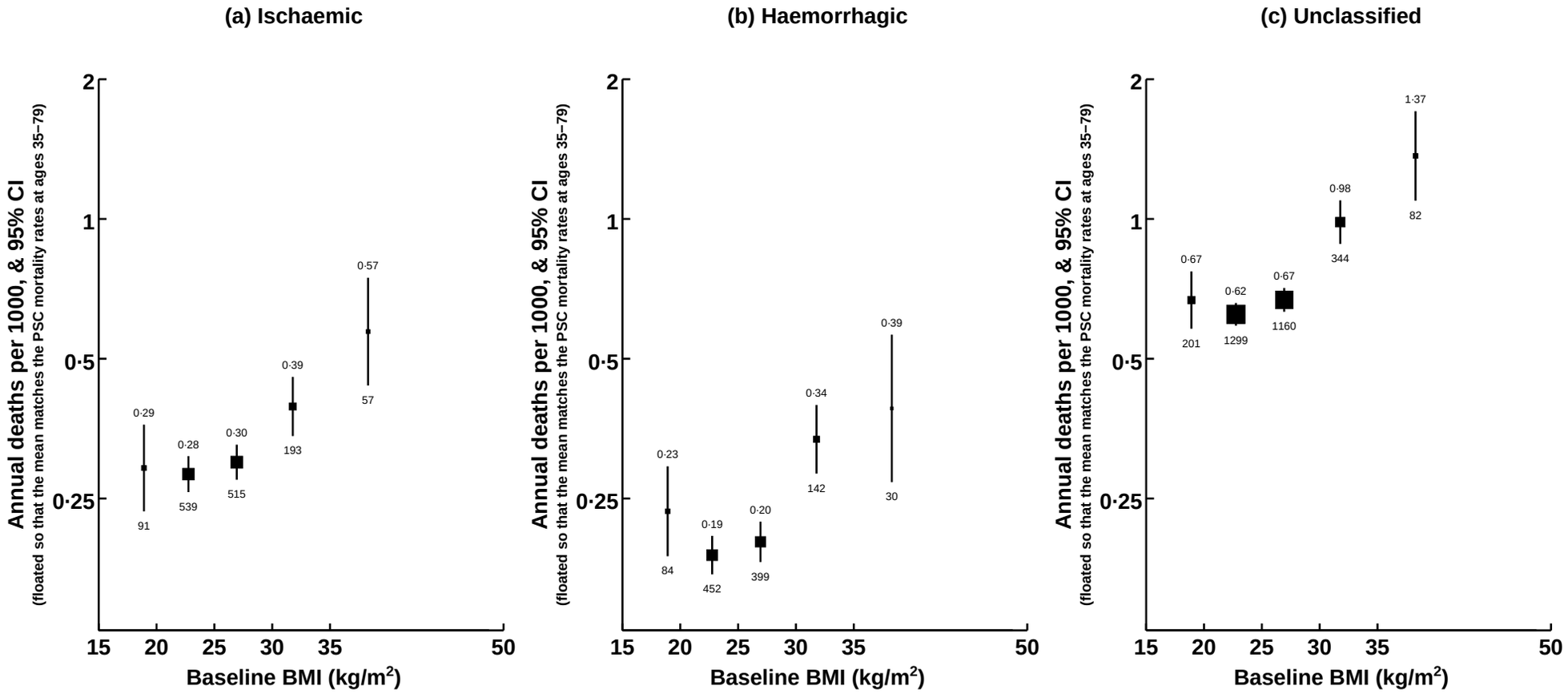
Webfigure 3: Stroke mortality vs. BMI in the range 15-50 kg/m^2, excluding (a) the first 5 years of follow-up, (b) the first 10 years of follow-up, or (c) the first 5 years of follow-up and those who had ever smoked

Conventions as in figure 2, except (c) not adjusted for smoking.



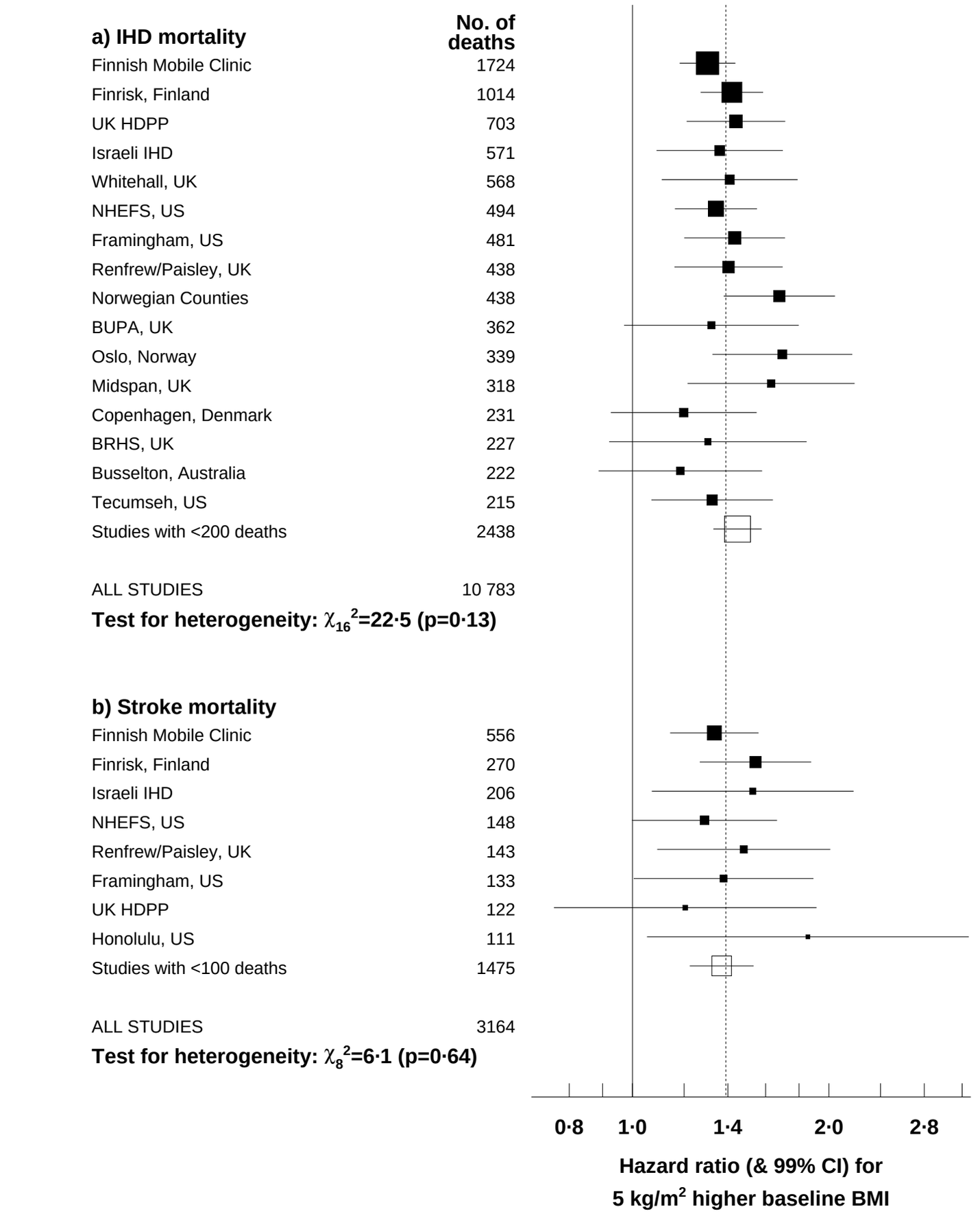
Webfigure 4: Stroke subtype mortality vs. BMI in the range 15-50 kg/m^2 (excluding the first 5 years of follow-up)

Conventions as in figure 2.



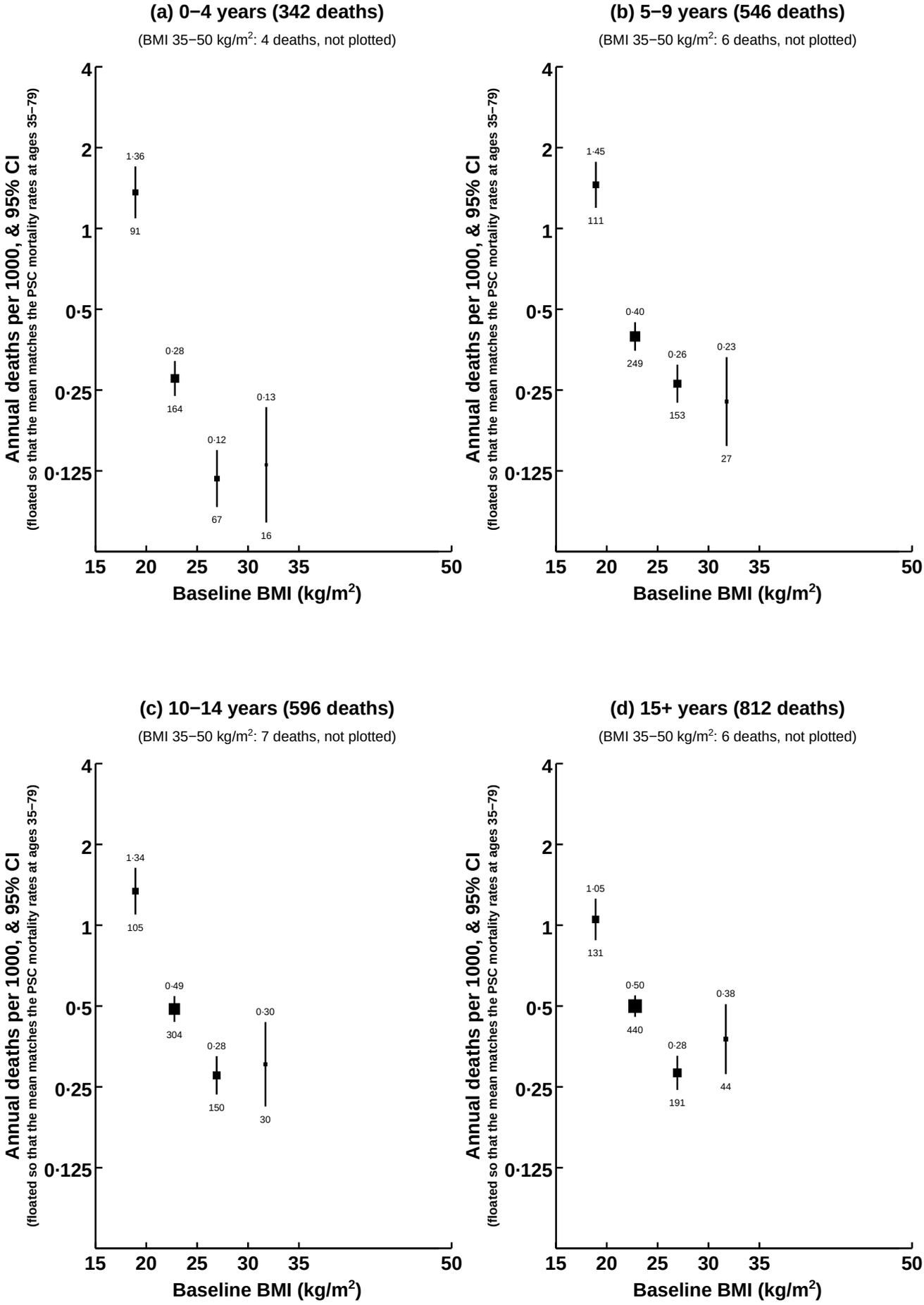
Webfigure 5: IHD and stroke mortality vs. BMI, by study: hazard ratio per 5 kg/m^2 higher BMI in the range 25-50 kg/m^2 (excluding the first 5 years of follow-up)

Conventions as in figure 4, except: (i) hazard ratios adjusted for baseline age rather than age at risk (cf. Methods); and (ii) white squares represent inverse-variance-weighted averages for smaller studies. Dotted line indicates hazard ratio 1.39 (cf. IHD and stroke results in webtable 6). Study names as in webtable 1.



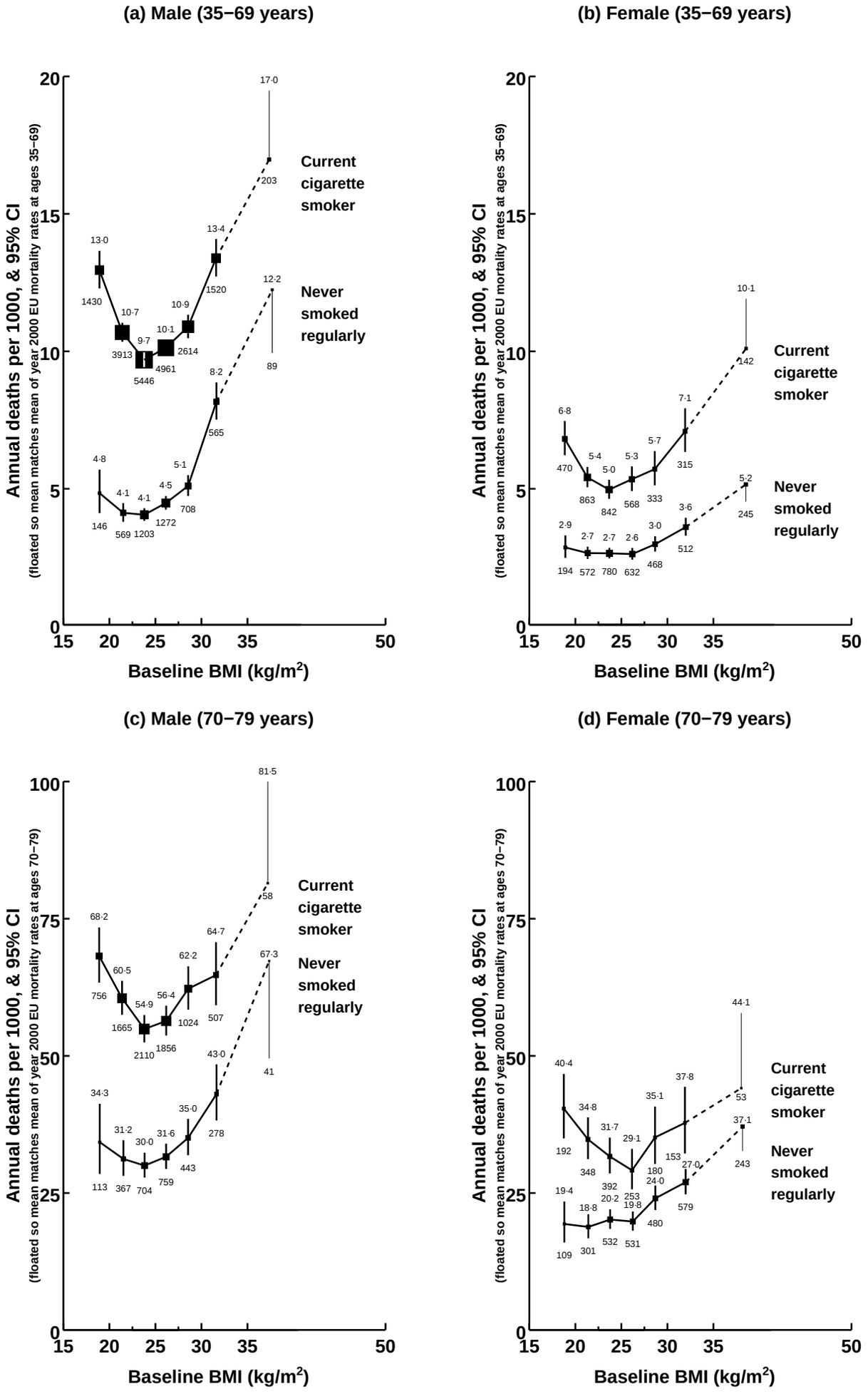
Webfigure 6: COPD mortality vs. BMI in the range 15-50 kg/m^2 (by follow-up period)

Conventions as in figure 2. Results for 35-50 kg/m^2 not plotted because of small numbers of deaths.



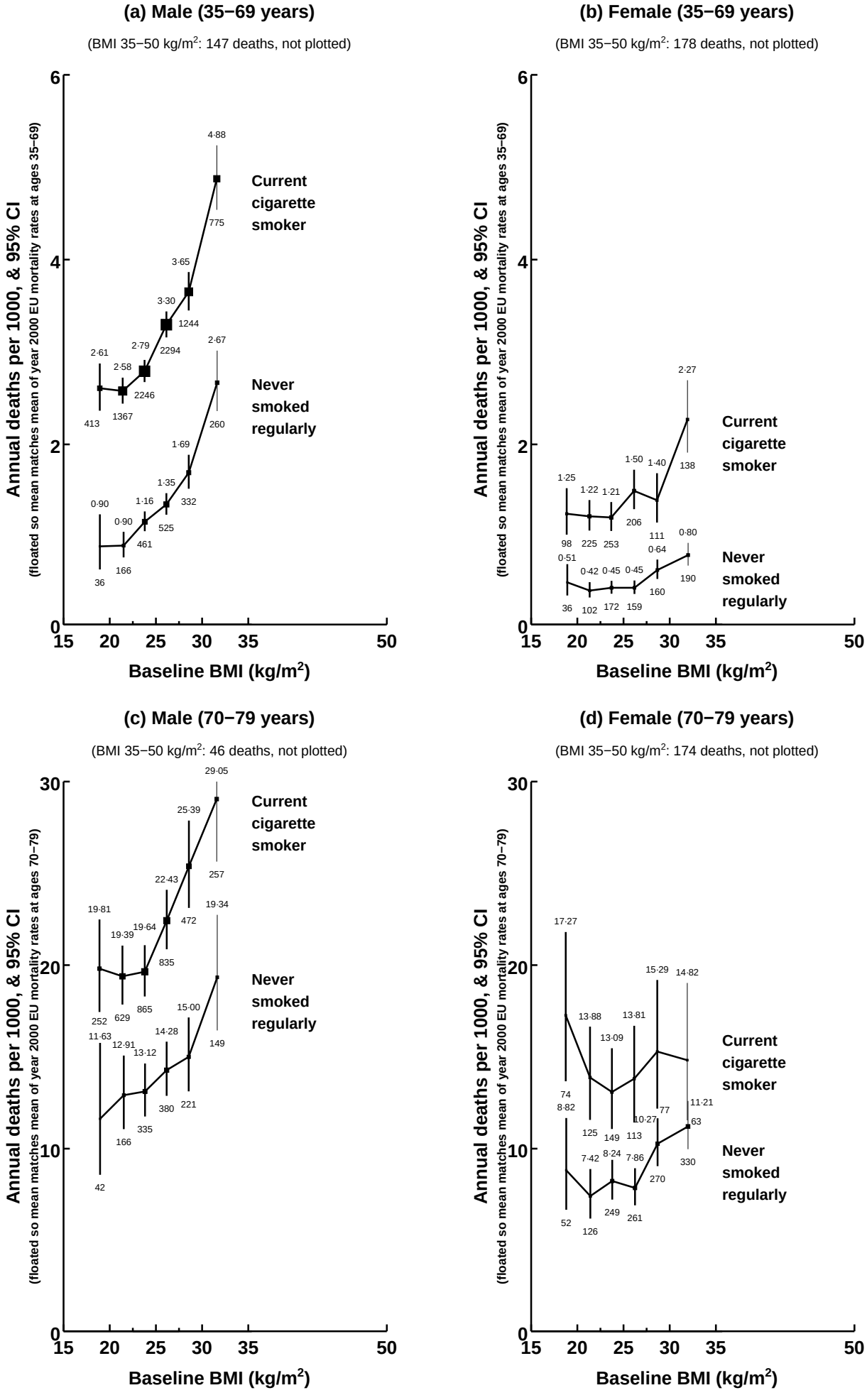
Webfigure 7: All-cause mortality vs. BMI by baseline smoking status (excluding the first 5 years of follow-up)

Conventions as in figure 6. For 35-50 kg/m^2, only the upper or only the lower part of the CI is shown.



Webfigure 8: Vascular mortality vs. BMI by baseline smoking status (excluding the first 5 years of follow-up)

Conventions as in figure 6. Results for 35-50 kg/m^2 not plotted because of small numbers of deaths.



Webtable 1: Characteristics of 56 collaborating studies with data on BMI*

	Baseline				Excluding 1st 5 years of follow-up		
Study, by region and median year of assessment	**Median year of assessment**	**Number of participants**	**% Female**	**BMI, mean (SD), kg/m^2**	**Number of deaths**	**Mean (SD) age at death**	**Median year of death**
Europe and Israel (32 studies)							
Seven Countries, Croatia	1958	1 305	0	23.0 (3.2)	645	68 (7)	1976
Seven Countries, Finland	1959	1 487	0	23.7 (3.2)	712	67 (7)	1976
Seven Countries, Greece	1960	1 155	0	23.1 (3.3)	371	69 (7)	1979
Seven Countries, Italy	1960	2 310	0	25.6 (3.7)	897	67 (7)	1977
Seven Countries, Netherlands	1960	829	0	24.0 (2.7)	360	68 (7)	1978
Israeli IHD	1963	9 849	0	25.6 (3.3)	3 085	68 (8)	1979
Seven Countries, Serbia	1963	964	0	23.7 (3.5)	476	68 (7)	1980
Whitehall, UK	1968	18 863	0	24.7 (3.0)	2 737	66 (7)	1979
Gothenburg Women, Sweden	1969	1 406	100	24.0 (3.7)	259	68 (8)	1988
Finnish Mobile Clinic	1970	46 815	47	24.5 (4.0)	7 903	68 (12)	†
Paris PS, France	1970	7 517	0	25.9 (3.3)	1 938	64 (6)	1986
Midspan, UK	1971	6 602	14	25.0 (3.1)	1 714	66 (8)	1987
UK HDPP	1972	13 398	0	25.3 (3.2)	3 410	68 (7)	1990
Oslo, Norway	1973	15 692	0	24.7 (2.9)	1 738	58 (5)	1986
Northwick Park HS, UK	1975	3 334	31	24.9 (3.3)	446	68 (9)	1988
Renfrew/Paisley, UK	1975	11 205	55	25.6 (3.8)	2 320	68 (6)	1986
Norwegian Counties	1976	46 805	50	24.9 (3.6)	2 791	55 (5)	†
CB Project, Netherlands	1977	48 725	52	24.6 (3.4)	1 083	52 (6)	1988
Copenhagen, Denmark	1977	13 749	55	25.2 (4.2)	3 640	71 (9)	1989
Finrisk, Finland	1977	37 573	52	26.1 (4.2)	3 973	63 (9)	1988
BUPA, UK	1978	21 187	0	25.1 (2.8)	1 862	65 (8)	1990
BRHS, UK	1979	7 401	0	25.5 (3.2)	1 029	63 (6)	1990
Tromso, Norway	1979	14 361	48	23.7 (3.2)	275	53 (7)	1988
OG-Rome, Italy	1980	3 168	0	26.5 (3.2)	225	65 (5)	1987
Speedwell, UK	1980	1 870	0	25.5 (3.2)	256	66 (5)	1991
Caerphilly, UK	1981	1 891	0	26.0 (3.5)	240	63 (5)	1991
IPC-Paris, France	1982	180 039	44	23.8 (3.4)	3 860	60 (12)	1991
BIRNH, Belgium	1983	10 559	48	25.9 (4.1)	575	70 (9)	1990
Glostrup, Denmark	1983	9 140	50	24.8 (4.0)	529	68 (12)	1990
PROCAM, Germany	1983	13 580	24	26.0 (3.4)	176	59 (7)	1990
Scottish HHS	1986	12 514	51	25.7 (4.1)	523	60 (6)	1993
FLEMENGHO (Leuven), Belgium	1987	1 212	51	25.9 (4.1)	50	73 (10)	1993
Subtotals & averages‡	**1978 (1972§)**	**566 505**	**37**	**24.7 (3.6)**	**50 098**	**65 (10)**	**1987**
United States and Australia (17 studies)							
Framingham, US	1950	5 072	56	25.5 (4.1)	2 920	72 (10)	1977
Tecumseh, US	1960	4 288	52	25.8 (4.6)	1 241	70 (11)	1977
Charleston, US	1961	2 066	56	25.4 (4.8)	1 117	71 (10)	1980
Honolulu, US	1967	7 582	0	23.8 (3.1)	2 866	74 (8)	1985
Puerto Rico HHP, US (admin)	1967	9 167	0	25.1 (4.1)	1 156	66 (7)	1976
Busselton, Australia	1969	6 542	52	24.5 (3.7)	1 428	74 (11)	1986
NHEFS, US	1973	12 979	60	25.5 (4.9)	3 131	74 (11)	1985
Rancho Bernardo, US	1973	5 333	56	24.4 (3.5)	1 409	78 (9)	1986
Lipid Research Clinic, US	1974	8 165	46	26.0 (4.2)	995	69 (12)	1985
Physicians' HS, US	1982	22 058	0	24.9 (3.0)	1 435	71 (10)	1991
Perth, Australia	1983	9 272	49	25.2 (3.9)	552	69 (11)	1993
Minnesota HHP, US	1984	15 164	55	26.1 (4.7)	213	69 (11)	1989
Minnesota HS, US	1985	8 494	54	26.4 (4.8)	116	67 (11)	1989
Health Professionals, US	1986	46 717	0	25.5 (3.1)	648	67 (9)	1992
ARIC, US	1988	14 774	57	27.5 (5.2)	474	64 (5)	1995
Nurses' HS, US**	1988	78 069	100	25.6 (4.8)	417	64 (6)	1993
CHS, US	1989	4 493	60	26.4 (4.6)	25	77 (6)	1994
Subtotals & averages‡	**1986 (1968§)**	**260 235**	**50**	**25.6 (4.3)**	**20 143**	**72 (10)**	**1985**
Japan† (8 studies)							
Seven Countries, Japan	1958	954	0	22.0 (2.4)	399	68 (7)	1975
Japan Railway: EJR	1976	50 039	0	22.7 (2.7)	857	55 (4)	1982
Noichi	1976	2 180	63	22.9 (3.2)	290	72 (9)	1988
Ikawa	1977	2 098	56	23.6 (3.2)	266	71 (9)	1988
Shibata	1977	2 246	58	22.4 (3.0)	388	75 (10)	1987
Kyowa	1983	4 099	57	23.5 (3.3)	184	68 (8)	1991
Saitama	1987	3 406	63	22.4 (2.9)	109	72 (10)	1993
Ohasama	1990	2 814	62	23.6 (3.1)	15	74 (12)	1995
Subtotals & averages‡	**1977 (1975§)**	**67 836**	**15**	**22.8 (2.9)**	**2 508**	**66 (11)**	**1984**
TOTALS & AVERAGES‡	**1979 (1972§)**	**894 576**	**39**	**24.8 (3.8)**	**72 749**	**67 (11)††**	**1986**

* References to all 61 PSC studies are in Lancet 2002;360:1903-13 (Appendix A). Excluded from these BMI analyses are 3 studies without BMI data (MRFIT, Evans County and Shanghai), 1 study with BMI data in broad categories only (Värmland), and 1 study without IHD mortality data (Seven Cities China).

† Data unavailable. Median year of death during all follow-up: 1985 (Finnish Mobile Clinic), 1987 (Norwegian Counties).

‡ Where available; weighted for number of individuals

§ Median year of assessment of those who died after 5 or more years of follow-up

** Nurses who had a cholesterol measurement in about 1988

†† For the 66 552 deaths of known cause, the mean (SD) age at death was 67 (10) years

Webtable 2: Mortality endpoints and their ICD-9* codes

Endpoint name	ICD-9 codes	Notes
ALL VASCULAR DISEASE	390-459, 798	Includes sudden death and hypertensive renal disease
Ischaemic heart disease (IHD)	410-414	
Stroke	430-438	
Ischaemic stroke	433-434	
Haemorrhagic stroke	431-432	Mainly intracerebral haemorrhage (and excludes subarachnoid haem.)
Subarachnoid haemorrhage	430	
Unclassified stroke	435-438	Includes (miscertified) transient cerebral ischaemia
Other vascular disease	Remainder of vascular	Some such deaths could not be further subdivided in the PSC
Aortic aneurysm	441	
Pulmonary embolism	415	Includes acute cor pulmonale, but not deep vein thrombosis
Heart failure	428	
Hypertensive disease	401-405	Includes essential hypertension and hypertensive renal disease
Atherosclerosis & other arterial disease	440, 442-448	Includes peripheral arterial disease, & diseases of arterioles/capillaries
Inflammatory heart disease	420-424	Includes pericarditis, myocarditis, endocarditis
Rheumatic heart disease	390-398	
Sudden death	798	
Other heart disease (not IHD)	416-417, 425-427, 429	Includes pulmonary heart disease, cardiomyopathy, dysrhythmia
Other circulatory disease	451-459	Includes venous disease
Diabetes (any type)	250	In some countries, rarely recorded as the underlying cause
Kidney disease (non-neoplastic)	580-589	Excludes hypertensive renal disease
Liver disease (non-neoplastic)	070, 570-573	
Cirrhosis	571	
ALL NEOPLASTIC DISEASE	140-208	Excludes benign neoplasms
Liver cancer	155	Includes intrahepatic bile ducts; excludes known secondary cancers
Kidney cancer	189	
Female breast cancer, age < 60	174	Deaths at ages 35-59 only
Female breast cancer, age ≥ 60	174	Deaths at ages 60-89 only
Ovarian cancer	183	
Endometrial cancer	182	Includes all cancers of body of the uterus
Prostate cancer	185	
Pancreatic cancer	157	
Gallbladder cancer	156	Includes extrahepatic bile ducts
Stomach cancer	151	
Colorectal cancer	153-154	
Upper aerodigestive cancer	140-150,161	Mouth, pharynx, larynx, oesophagus
Oesophageal cancer	150	
Lung cancer	162	Includes trachea and bronchus, but not pleura
Haematological cancer	200-208	
Leukaemia	204-208	
Non-Hodgkin's lymphoma	202	
Multiple myeloma	203	
Unspecified cancer	195-199	Unspecified to the PSC
Other specified cancer (in webtable 7†)	Remainder of neoplastic	Excludes benign neoplasms
ALL RESPIRATORY DISEASE	010-012, 460-519	Includes influenza
Chronic obstructive pulmonary disease	490-496	Includes asthma
Pneumonia	480-486	
Respiratory tuberculosis	010-012	
Other respiratory disease	Remainder of respiratory	Includes influenza
Other specified disease	Remainder of 001-779	
External cause	(E)800-999	Mostly injury
Unknown cause (in webtable 7†)	780-797, 799	Unknown to the PSC
ALL CAUSES	001-999	

* Not all studies provided ICD-9 codes. When other ICD versions or the study's own codes were provided, these were grouped to approximate as closely as possible the endpoints shown here.

† In table 2 and webtable 9, other specified cancer was defined as all specified cancers other than lung and upper aerodigestive cancer. In table 2, unknown cause was defined as ICD-9 codes 195-199, 780-797 and 799.

Webtable 3: Change in BMI from baseline to a repeat measurement, by age and sex

	No. of people at baseline, and their mean age, height and BMI:*						No. of people resurveyed, and their change in BMI from baseline to first repeat measurement at:						
							0-4 (mean 2.6) years		5-9 (mean 6.0) years			≥10 (mean 13.1) years	
	Baseline age (years)	No.	Mean age	Mean year of birth†	Mean height (cm)	Mean BMI (kg/m^2)	No.	Change (SE)	No.	Change (SE)	r (SE)‡	No.	Change (SE)
Male	15-19	3 510	17.2	1956	1.75	19.95	82	1.15 (0.17)	70	1.86 (0.16)	0.88 (0.028)	96	3.72 (0.24)
	20-29	27 724	26.0	1953	1.76	23.29	1 317	0.49 (0.04)	2 222	1.01 (0.04)	0.87 (0.005)	733	2.41 (0.10)
	30-39	88 766	35.3	1944	1.75	24.60	3 517	0.30 (0.02)	5 813	0.78 (0.02)	0.89 (0.003)	1 058	1.42 (0.07)
	40-49	205 599	44.4	1932	1.74	25.28	9 290	0.11 (0.01)	34 782	0.18 (0.01)	0.91 (0.001)	1 451	1.06 (0.05)
	50-59	138 176	53.7	1923	1.73	25.57	14 303	-0.01 (0.01)	16 977	0.13 (0.01)	0.92 (0.001)	722	0.46 (0.08)
	60-69	41 389	63.3	1916	1.71	25.33	5 686	-0.08 (0.02)	4 804	0.02 (0.03)	0.90 (0.003)	575	-0.31 (0.10)
	70-79	7 679	72.6	1909	1.70	24.91	1 542	0.10 (0.03)	1 076	-0.44 (0.05)	0.88 (0.007)	105	-1.31 (0.21)
	80-89	506	82.0	1899	1.68	24.38	271	0.02 (0.06)	125	-0.73 (0.16)	0.86 (0.023)	0	-
Female	15-19	3 647	17.2	1957	1.63	20.04	81	0.93 (0.28)	74	0.64 (0.32)	0.68 (0.063)	95	3.53 (0.40)
	20-29	29 779	25.7	1953	1.63	21.82	1 362	0.27 (0.05)	2 333	0.77 (0.05)	0.84 (0.006)	1 123	2.17 (0.10)
	30-39	73 310	35.1	1944	1.62	23.09	2 403	0.33 (0.04)	4 398	0.96 (0.03)	0.87 (0.004)	1 536	1.90 (0.08)
	40-49	103 458	44.5	1937	1.61	24.56	5 920	0.45 (0.02)	8 215	0.94 (0.02)	0.91 (0.002)	1 373	1.38 (0.08)
	50-59	82 340	54.2	1929	1.60	25.34	8 804	0.21 (0.02)	8 317	0.65 (0.02)	0.91 (0.002)	790	0.56 (0.10)
	60-69	41 391	63.3	1921	1.59	25.40	4 884	0.08 (0.02)	4 581	0.16 (0.03)	0.90 (0.003)	772	-0.79 (0.11)
	70-79	5 046	72.7	1906	1.56	25.33	1 855	-0.01 (0.03)	1 412	-0.55 (0.06)	0.87 (0.006)	149	-2.08 (0.28)
	80-89	504	82.1	1897	1.54	24.40	242	0.02 (0.09)	131	-1.19 (0.21)	0.82 (0.029)	0	-
Both sexes, all ages		852 824	46.0	1932	-	24.76	61 559	0.14 (0.01)	95 330	0.36 (0.01)	0.90 (0.001)	10 578	1.16 (0.03)

* Excluding 41 752 with less than 5 years of follow-up, and standardising mean height and BMI for study

† For the 755 890 participants with data on year of birth

‡ Self-correlation (within these age groups) between baseline BMI and BMI measured between 5-9 years of follow-up. The overall value of 0.90 is adjusted for the age/sex categories in this table. This value of 0.90 might suggest that the associations of risk with baseline BMI underestimate the associations with usual BMI by about 10%, but this regression dilution was counterbalanced by a slight tendency of BMI values to disperse (webtable 4), so the underestimation was probably even less than 10%, and, therefore, of little importance (particularly during the first decade of follow-up).

Webtable 4: Change in BMI from baseline to a repeat measurement, by baseline BMI

No. of people* at baseline, and their mean BMI (kg/m^2):			No. of people resurveyed, and their change in BMI from baseline to first repeat measurement at:					
			0-4 (mean 2.6) years*		5-9 (mean 6.0) years		≥10 (mean 13.1) years	
Baseline BMI	**No.**	**Mean BMI**	**No.**	**Change (SE)**	**No.**	**Change (SE)**	**No.**	**Change (SE)**
15-20	64 703	18.91	3 929	0.43 (0.02)	8 844	0.62 (0.02)	888	2.02 (0.08)
20-25	427 682	22.76	26 800	0.26 (0.01)	48 478	0.44 (0.01)	4 942	1.59 (0.04)
25-30	287 628	26.94	22 900	0.04 (0.01)	29 894	0.21 (0.01)	3 473	0.90 (0.05)
30-50	72 811	33.08	7 930	-0.13 (0.03)	8 114	0.12 (0.03)	1 275	-0.38 (0.11)
30-35	*58 337*	31.79	*5 986*	*-0.07 (0.03)*	*6 275*	*0.24 (0.03)*	*974*	*0.02 (0.11)*
35-40	*11 195*	36.90	*1 460*	*-0.29 (0.07)*	*1 388*	*-0.18 (0.10)*	*237*	*-0.89 (0.29)*
40-50	*3 279*	43.04	*484*	*-0.45 (0.15)*	*451*	*-0.69 (0.21)*	*64*	*-4.51 (0.70)*
Difference, 30-50 vs. 15-20†:		14.17		0.56 (0.03)		0.50 (0.04)		2.40 (0.14)
Reduction in range, as % of baseline range:				4		4		17

* Excluding 41 752 with less than 5 years of follow-up

† 30-50 kg/m^2 at baseline vs 15-20 kg/m^2 at baseline

Webtable 5: Other cross-sectional associations* with BMI: height, cigarettes smoked per day, and grams of alcohol consumed per day

	BMI (kg/m^2)	All participants				Current cigarette smokers†			Current alcohol drinkers‡		
		No. of people	Mean BMI	Height		No. of smokers	Cigarettes/day§		No. of drinkers	Alcohol g/day	
				Mean	SE		Mean	SE		Mean	SE
Male	15-17.5	2 454	16.8	1.73	0.0013	811	18.1	0.33	265	18.8	1.04
	17.5-20	26 432	19.1	1.73	0.0004	8 369	18.3	0.11	2 651	16.8	0.33
	20-22.5	96 693	21.4	1.73	0.0002	24 930	18.6	0.06	14 118	16.6	0.14
	22.5-25	168 043	23.8	1.73	0.0002	36 624	18.7	0.05	31 528	16.6	0.10
	25-27.5	145 249	26.1	1.73	0.0002	30 013	19.0	0.05	29 724	16.8	0.10
	27.5-30	65 434	28.6	1.73	0.0003	13 930	19.6	0.08	12 846	17.7	0.15
	30-32.5	24 891	31.0	1.72	0.0004	5 105	19.7	0.13	5 062	18.2	0.24
	32.5-35	8 008	33.5	1.72	0.0007	1 593	20.5	0.24	1 800	18.7	0.40
	35-50	4 248	37.5	1.71	0.0010	843	20.6	0.33	1 102	17.0	0.51
	All	541 452	24.9	1.73		122 218	18.9		99 096	17.0	
Female	15-17.5	3 460	16.8	1.62	0.0010	514	15.8	0.38	358	8.5	0.51
	17.5-20	35 673	19.1	1.62	0.0003	4 212	15.2	0.13	4 198	7.7	0.15
	20-22.5	90 994	21.3	1.62	0.0002	11 605	15.1	0.08	14 208	7.7	0.08
	22.5-25	90 033	23.7	1.62	0.0002	12 009	15.1	0.08	15 495	7.4	0.08
	25-27.5	59 458	26.2	1.61	0.0002	7 687	15.1	0.10	10 558	7.0	0.09
	27.5-30	32 545	28.7	1.61	0.0003	3 936	15.1	0.14	5 399	6.5	0.13
	30-32.5	19 473	31.1	1.60	0.0004	2 229	16.0	0.18	3 151	6.3	0.17
	32.5-35	9 979	33.6	1.60	0.0006	1 140	15.8	0.18	1 630	5.5	0.24
	35-50	11 509	38.6	1.60	0.0006	1 174	16.0	0.25	1 807	5.3	0.23
	All	353 124	24.6	1.61		44 506	15.2		56 804	7.2	

NB This table includes all participants irrespective of follow-up duration.

* At ages 35-89 years. Associations adjusted for age (7 groups) and study; association for alcohol also adjusted for smoking status (3 groups).

† Restricted to current smokers (cf. fig 1) in the 33 cohorts with information on cigarettes per day. Excludes smokers with values recorded as 0 cigarettes/day; >60 cigarettes/day taken as 60 cigarettes/day.

‡ Restricted to current regular drinkers (cf. fig 1) in the 21 cohorts with information on both current drinking status and alcohol grams/day. Excludes drinkers with values recorded as 0 g/day; >100 g/day taken as 100 g/day.

§ In the full BMI range (15-50 kg/m^2), 5 kg/m^2 lower BMI was associated with 0.5 fewer cigarettes per day per smoker (male 0.65 SE 0.04, female 0.18 SE 0.05), but — in a separate analysis of 2772 British smokers (not in the PSC) — with 11.8% (SE 1.4) more cotinine per ml of blood among those smoking similar numbers of cigarettes (Parish S et al. BMJ 1995; 311: 471-77 & personal communication). See also Istvan et al. Am J Epidemiol 2008; 139: 628-36 and Campuzano et al. Nicotine Tob Res 2004; 6: 997-1008.

Webtable 6: All-cause, vascular, diabetic, hepatic and renal mortality vs. baseline BMI in the ranges 15-25, 25-50 and (for selected endpoints) 15-50 kg/m^2: hazard ratio (HR) per 5 kg/m^2 higher BMI; HR < 1 if BMI inversely associated with risk

	15-25 kg/m^2		25-50 kg/m^2		15-50 kg/m^2
	Deaths	**HR (95% CI)**	**Deaths**	**HR (95% CI)**	**HR (95% CI)**
ALL CAUSES	35 256	0.79 (0.77-0.82)	37 493	1.29 (1.27-1.32)	
Male	26 720	0.79 (0.76-0.82)	27 983	1.32 (1.29-1.36)	
Female	8 536	0.80 (0.75-0.85)	9 510	1.26 (1.23-1.30)	
Never smoker	7 054	0.87 (0.81-0.94)	9 849	1.32 (1.28-1.36)	
Current cigarette smoker	19 872	0.76 (0.73-0.80)	15 777	1.25 (1.21-1.29)	
Other/unknown smoking at entry	8 330	0.81 (0.75-0.87)	11 867	1.32 (1.28-1.37)	
Follow-up 0-4 years	*8 158*	*0.62 (0.58-0.66)*	*7 838*	*1.18 (1.14-1.23)*	
Follow-up 5-9 years	11 319	0.70 (0.66-0.75)	11 738	1.25 (1.21-1.30)	
Follow-up 10-14 years	10 763	0.81 (0.76-0.87)	11 419	1.34 (1.29-1.39)	
Follow-up ≥ 15 years	13 174	0.85 (0.81-0.91)	14 336	1.30 (1.25-1.34)	
Cohorts of US health professionals*	1 257	1.02 (0.78-1.33)	1 243	1.34 (1.19-1.52)	
ALL VASCULAR DISEASE	13 073	1.05 (0.99-1.11)	17 343	1.41 (1.37-1.45)	
Male	10 204	1.09 (1.02-1.17)	13 142	1.44 (1.39-1.50)	
Female	2 869	0.90 (0.81-1.00)	4 201	1.36 (1.31-1.42)	
Never smoker	2 687	1.04 (0.91-1.18)	4 668	1.43 (1.36-1.49)	
Current cigarette smoker	7 232	1.03 (0.95-1.11)	7 210	1.34 (1.28-1.41)	
Other/unknown smoking at entry	3 154	1.11 (0.98-1.26)	5 465	1.46 (1.39-1.54)	
Follow-up 0-4 years	*2 689*	*0.94 (0.83-1.06)*	*3 305*	*1.24 (1.16-1.32)*	
Follow-up 5-9 years	3 988	0.93 (0.84-1.04)	5 181	1.38 (1.31-1.46)	
Follow-up 10-14 years	3 893	1.12 (1.00-1.26)	5 321	1.43 (1.36-1.51)	
Follow-up ≥ 15 years	5 192	1.11 (1.01-1.22)	6 841	1.41 (1.35-1.47)	
Ischaemic heart disease	7 461	1.22 (1.13-1.32)*	10 783	1.39 (1.34-1.44)	1.35 (1.32-1.38)†
Male	6 070	1.27 (1.16-1.39)	8 556	1.42 (1.35-1.48)	
Female	1 391	1.01 (0.86-1.18)	2 227	1.35 (1.28-1.43)	
Never smoker	1 323	1.20 (0.99-1.45)	2 651	1.41 (1.33-1.50)	
Current cigarette smoker	4 327	1.20 (1.09-1.33)	4 690	1.33 (1.25-1.41)	
Other/unknown smoking at entry	1 811	1.26 (1.07-1.50)	3 442	1.45 (1.36-1.54)	
Follow-up 0-4 years	*1 480*	*1.16 (0.98-1.38)*	*2 069*	*1.26 (1.16-1.36)*	
Follow-up 5-9 years	2 281	1.03 (0.89-1.20)	3 291	1.33 (1.24-1.43)	
Follow-up 10-14 years	2 323	1.42 (1.21-1.66)	3 407	1.43 (1.33-1.53)	
Follow-up ≥ 15 years	2 857	1.29 (1.13-1.47)	4 085	1.42 (1.34-1.51)	
Stroke	2 964	0.92 (0.82-1.03)	3 164	1.39 (1.31-1.48)	
Ischaemic stroke	630	0.87 (0.68-1.10)	765	1.38 (1.23-1.56)	
Haemorrhagic stroke	536	0.76 (0.58-1.00)	571	1.53 (1.32-1.78)	
Subarachnoid haemorrhage	298	0.92 (0.64-1.33)	242	1.19 (0.94-1.52)	
Unclassified stroke	1 500	1.02 (0.87-1.20)	1 586	1.40 (1.28-1.53)	
Other vascular disease‡	2 648	0.84 (0.75-0.95)	3 396	1.47 (1.39-1.56)	
Aortic aneurysm	279	1.09 (0.74-1.60)	386	1.19 (0.95-1.48)	1.37 (1.21-1.55)
Pulmonary embolism	113	0.88 (0.50-1.54)	145	1.24 (0.90-1.70)	1.14 (0.94-1.38)
Heart failure	328	0.93 (0.66-1.29)	289	1.86 (1.55-2.23)	
Hypertensive disease	227	1.17 (0.77-1.76)	327	2.03 (1.75-2.36)	1.71 (1.53-1.91)
Atherosclerosis & other arterial dis.	239	0.69 (0.47-1.02)	216	1.07 (0.82-1.41)	0.92 (0.80-1.07)
Inflammatory heart disease	139	0.90 (0.51-1.59)	150	1.36 (1.01-1.84)	1.15 (0.95-1.39)
Rheumatic heart disease	93	0.64 (0.34-1.21)	96	0.90 (0.57-1.44)	0.93 (0.73-1.18)
Sudden death	199	0.95 (0.57-1.57)	281	1.44 (1.13-1.84)	1.35 (1.16-1.57)
Other heart disease (not IHD)	664	0.72 (0.57-0.91)	807	1.51 (1.34-1.70)	
Other circulatory disease	57	0.65 (0.30-1.42)	102	1.47 (1.05-2.05)	1.46 (1.17-1.81)
DIABETES	171	0.96 (0.59-1.55)	393	2.16 (1.89-2.46)	
KIDNEY DISEASE (non-neoplastic)	197	1.14 (0.74-1.77)	217	1.59 (1.27-1.99)	1.22 (1.06-1.41)
LIVER DISEASE (non-neoplastic)	489	0.69 (0.52-0.91)	603	1.82 (1.59-2.09)	
Cirrhosis	409	0.73 (0.54-1.00)	505	1.79 (1.54-2.08)	

Analyses exclude the first 5 years of follow-up (unless otherwise indicated: italic), and are adjusted for study, sex, age at risk and baseline smoking status. Mean ages for IHD death and stroke death in various subgroups are given in figure 4, but the dependence of the HR on mean age at death is not corrected for either in that figure or in this webtable. HRs for the full range (15-50 kg/m^2) are not necessarily an average of the HRs for the two component ranges (cf. Simpson's paradox). For analyses restricted to those who had never smoked, see webtable 9.

* Studies of US physicians, nurses or other health professionals (webtable 1), in which there may have been relatively little confounding by socioeconomic status.

† IHD HR (95% CI): 1.27 (1.17-1.38) for 17.5-25 kg/m^2, and 1.36 (1.33-1.39) for 17.5-50 kg/m^2 [1.31 (1.28-1.34) before adjustment for smoking status]

‡ Unspecified other vascular disease: 310 deaths at 15-25 kg/m^2 (HR 0.83, 95% CI 0.58-1.18), 597 deaths at 25-50 kg/m^2 (HR 1.36, 95% CI 1.20-1.55)

Webtable 7: Neoplastic mortality vs. baseline BMI in the ranges 15-25, 25-50 and (for selected endpoints) 15-50 kg/m^2: hazard ratio (HR) per 5 kg/m^2 higher BMI; HR < 1 if BMI inversely associated with risk

	15-25 kg/m^2		25-50 kg/m^2		15-50kg/m^2
	Deaths	**HR (95% CI)**	**Deaths**	**HR (95% CI)**	**HR (95% CI)**
ALL NEOPLASTIC DISEASE	11 772	0.82 (0.77-0.87)	10 820	1.10 (1.06-1.15)	
Male	8 824	0.78 (0.73-0.84)	8 058	1.10 (1.04-1.16)	
Female	2 948	0.98 (0.87-1.10)	2 762	1.11 (1.05-1.18)	
Never smoker	2 190	0.96 (0.83-1.10)	2 704	1.13 (1.05-1.21)	
Current cigarette smoker	6 870	0.77 (0.72-0.83)	4 637	1.06 (0.99-1.13)	
Other/unknown smoking at entry	*2 712*	*0.88 (0.77-1.00)*	*3 479*	*1.13 (1.05-1.21)*	
Follow-up 0-4 years	*3 164*	*0.64 (0.57-0.71)*	*2 699*	*1.07 (1.00-1.15)*	
Follow-up 5-9 years	4 078	0.77 (0.69-0.85)	3 902	1.05 (0.98-1.12)	
Follow-up 10-14 years	3 713	0.79 (0.70-0.88)	3 266	1.14 (1.06-1.24)	
Follow-up ≥ 15 years	3 981	0.91 (0.82-1.01)	3 652	1.13 (1.05-1.21)	
Lung cancer	2 959	0.71 (0.63-0.79)	2 040	0.98 (0.88-1.09)	0.80 (0.76-0.84)
Upper aerodigestive cancer	685	0.49 (0.39-0.61)	471	0.98 (0.79-1.20)	0.72 (0.65-0.81)
Oesophageal cancer	339	0.52 (0.38-0.72)	259	0.93 (0.69-1.24)	0.76 (0.65-0.88)
Lung and upper aerodig. cancer*	3 644	0.66 (0.59-0.73)	2 511	0.98 (0.89-1.07)	
Follow-up 0-4 years	*929*	*0.45 (0.37-0.54)*	*643*	*0.91 (0.77-1.08)*	
Follow-up 5-9 years	1 299	0.58 (0.48-0.69)	988	1.01 (0.87-1.17)	
Follow-up 10-14 years	1 164	0.65 (0.53-0.79)	801	0.96 (0.80-1.16)	
Follow-up ≥ 15 years	1 181	0.75 (0.62-0.91)	722	0.95 (0.78-1.15)	
Cancer, not lung or upper aerodig.*	6 134	0.94 (0.87-1.02)	6 190	1.12 (1.06-1.18)	
Follow-up 0-4 years	*1 879*	*0.78 (0.68-0.90)*	*1 741*	*1.14 (1.06-1.24)*	
Follow-up 5-9 years	2 311	0.88 (0.76-1.02)	2 390	1.04 (0.95-1.14)	
Follow-up 10-14 years	2 042	0.91 (0.78-1.07)	1 974	1.17 (1.06-1.30)	
Follow-up ≥ 15 years	1 781	1.04 (0.88-1.23)	1 826	1.17 (1.06-1.29)	
Liver cancer	201	1.37 (0.87-2.15)	221	1.61 (1.26-2.05)	1.47 (1.26-1.71)
Kidney cancer	193	1.02 (0.64-1.64)	254	1.30 (1.02-1.67)	1.23 (1.06-1.43)
Female breast cancer, age < 60†	291	1.51 (1.01-2.25)	171	1.10 (0.88-1.39)	1.15 (1.02-1.31)
Female breast cancer, age ≥ 60†	192	1.06 (0.66-1.70)	228	1.11 (0.91-1.36)	1.15 (1.02-1.31)
Ovarian cancer	182	0.74 (0.47-1.18)	158	0.98 (0.75-1.28)	1.00 (0.85-1.16)
Endometrial cancer	35	0.97 (0.32-2.94)	67	1.18 (0.80-1.74)	1.38 (1.08-1.77)
Prostate cancer	578	1.00 (0.75-1.32)	665	1.09 (0.91-1.31)	1.13 (1.02-1.24)
Pancreatic cancer	470	0.87 (0.65-1.17)	520	1.04 (0.86-1.25)	1.07 (0.97-1.19)
Gallbladder cancer	102	0.46 (0.26-0.80)	120	1.29 (0.90-1.85)	1.12 (0.90-1.38)
Stomach cancer	934	0.86 (0.70-1.05)	651	1.11 (0.94-1.32)	0.98 (0.90-1.07)
Colorectal cancer‡	1 054	1.01 (0.83-1.24)	1 200	1.20 (1.07-1.35)	1.20 (1.12-1.28)
Male	782	0.99 (0.77-1.26)	931	1.32 (1.14-1.52)	1.29 (1.19-1.40)
Female	272	1.08 (0.74-1.57)	269	1.04 (0.86-1.26)	1.05 (0.94-1.18)
Haematological cancer	765	1.11 (0.87-1.42)	828	1.10 (0.95-1.27)	1.11 (1.02-1.20)
Leukaemia	290	1.02 (0.69-1.50)	315	0.88 (0.68-1.14)	1.01 (0.89-1.16)
Non-Hodgkin's lymphoma	193	1.19 (0.70-2.02)	196	1.09 (0.81-1.47)	1.13 (0.96-1.34)
Multiple myeloma	138	1.38 (0.77-2.48)	190	1.34 (1.01-1.77)	1.27 (1.07-1.50)
Other specified cancer	1 137	0.87 (0.71-1.06)	1 107	1.00 (0.87-1.14)	0.98 (0.92-1.06)
Unspecified cancer	1 994	0.83 (0.72-0.96)	2 119	1.17 (1.08-1.27)	

Analyses exclude the first 5 years of follow-up (unless otherwise indicated: italic), and are adjusted for study, sex, age at risk and baseline smoking status. HRs for the full range (15-50 kg/m^2) are not necessarily an average of the HRs for the two component ranges (cf. Simpson's paradox). For analyses restricted to those who had never smoked, see webtable 9.

* These are the cancer endpoints in figure 5; they do not include unspecified cancer.

† By chance, the two age-specific breast cancer results for the range 15-50 kg/m^2 were the same to two decimal places.

‡ Difference between male and female HRs: P for interaction = 0.08 in the range 25-50 kg/m^2, 0.002 in the full range 15-50 kg/m^2.

Webtable 8: Respiratory mortality, and remaining causes, vs. baseline BMI in the ranges 15-25 and 25-50 kg/m^2: hazard ratio (HR) per 5 kg/m^2 higher BMI; HR < 1 if BMI inversely associated with risk

	15-25 kg/m^2		25-50 kg/m^2	
	Deaths	**HR (95% CI)**	**Deaths**	**HR (95% CI)**
ALL RESPIRATORY DISEASE	2 426	0.31 (0.28-0.35)	1 344	1.20 (1.07-1.34)
Male	1 993	0.31 (0.27-0.35)	1 086	1.17 (1.01-1.34)
Female	433	0.32 (0.25-0.41)	258	1.24 (1.04-1.48)
Never smoker	370	0.48 (0.36-0.65)	257	1.16 (0.93-1.45)
Current cigarette smoker	1 497	0.29 (0.25-0.34)	645	1.26 (1.07-1.48)
Other/unknown smoking at entry	559	0.26 (0.20-0.34)	442	1.15 (0.93-1.40)
Follow-up 0-4 years	*447*	*0.14 (0.11-0.18)*	*199*	*1.35 (1.07-1.71)*
Follow-up 5-9 years	713	0.25 (0.20-0.31)	375	1.08 (0.85-1.37)
Follow-up 10-14 years	757	0.30 (0.24-0.37)	439	1.26 (1.02-1.55)
Follow-up ≥ 15 years	956	0.37 (0.30-0.44)	530	1.15 (0.94-1.39)
Chronic obstructive pulmonary disease	1 340	0.26 (0.22-0.30)	614	1.18 (1.00-1.40)
Follow-up 0-4 years	*255*	*0.11 (0.08-0.16)*	*87*	*1.12 (0.74-1.69)*
Follow-up 5-9 years	360	0.21 (0.15-0.28)	186	0.99 (0.68-1.44)
Follow-up 10-14 years	409	0.22 (0.16-0.29)	187	1.25 (0.90-1.74)
Follow-up ≥ 15 years	571	0.31 (0.24-0.40)	241	1.24 (0.93-1.65)
Pneumonia	695	0.46 (0.37-0.57)	482	1.15 (0.96-1.38)
Respiratory tuberculosis	120	0.08 (0.04-0.13)	16	-
Excluding 10 years of follow-up	72	0.09 (0.04-0.19)	7	-
Other respiratory disease	271	0.48 (0.34-0.69)	232	1.34 (1.04-1.72)
OTHER SPECIFIED DISEASE*	2 049	0.62 (0.54-0.71)	1 823	1.20 (1.10-1.31)
Male	1 536	0.60 (0.51-0.70)	1 363	1.30 (1.16-1.47)
Female	513	0.67 (0.52-0.87)	460	1.09 (0.94-1.25)
Never smoker	532	0.62 (0.47-0.81)	523	1.31 (1.13-1.52)
Current cigarette smoker	953	0.63 (0.52-0.77)	684	1.22 (1.04-1.42)
Other/unknown smoking at entry	564	0.59 (0.45-0.78)	616	1.07 (0.91-1.27)
EXTERNAL CAUSE	2 112	0.82 (0.71-0.95)	1 720	1.19 (1.08-1.32)
Male	1 641	0.88 (0.74-1.04)	1 424	1.23 (1.09-1.38)
Female	471	0.66 (0.50-0.87)	296	1.12 (0.94-1.34)
Never smoker	506	0.84 (0.62-1.13)	510	1.19 (1.01-1.41)
Current cigarette smoker	1 128	0.78 (0.65-0.95)	695	1.21 (1.03-1.43)
Other/unknown smoking at entry	478	0.86 (0.63-1.18)	515	1.17 (0.97-1.41)
UNKNOWN CAUSE	2 967	0.66 (0.59-0.73)	3 230	1.24 (1.17-1.32)
Male	1 839	0.63 (0.55-0.73)	1 988	1.27 (1.16-1.40)
Female	1 128	0.67 (0.56-0.79)	1 242	1.22 (1.12-1.32)
Never smoker	599	0.73 (0.57-0.95)	842	1.26 (1.13-1.40)
Current cigarette smoker	1 709	0.64 (0.56-0.74)	1 410	1.20 (1.08-1.32)
Other/unknown smoking at entry	659	0.62 (0.48-0.80)	978	1.28 (1.15-1.43)

Analyses exclude the first 5 years of follow-up (unless otherwise indicated: italic), and are adjusted for study, sex, age at risk and baseline smoking status. For analyses restricted to those who had never smoked, see webtable 9.

* Specified diseases other than vascular, neoplastic, respiratory, hepatic or renal diseases, and other than diabetes; see webtable 2.

Webtable 9: Selected mortality in the ranges 15-25 and 25-50 kg/m^2 among lifelong non-smokers: hazard ratio (HR) per 5 kg/m^2 higher BMI; HR < 1 if BMI inversely associated with risk

	15-25 kg/m^2		25-50 kg/m^2	
	Deaths	**HR (95% CI)**	**Deaths**	**HR (95% CI)**
ALL CAUSES	7 054	0.87 (0.81-0.94)	9 849	1.32 (1.28-1.36)
Male*	3 694	0.87 (0.78-0.97)	4 811	1.44 (1.36-1.53)
Female*	3 360	0.87 (0.78-0.97)	5 038	1.27 (1.22-1.32)
Follow-up ≥ 10 years	*4 719*	*0.89 (0.81-0.98)*	*6 900*	*1.34 (1.28-1.39)*
Cohorts of US health professionals†	450	1.30 (0.82-2.05)	418	1.21 (0.96-1.54)
ALL VASCULAR DISEASE	2 687	1.04 (0.91-1.18)	4 668	1.43 (1.36-1.49)
Ischaemic heart disease‡	1 323	1.20 (0.99-1.45)	2 651	1.41 (1.33-1.50)
Stroke	751	0.98 (0.78-1.23)	1 062	1.38 (1.25-1.52)
Ischaemic stroke	203	1.07 (0.68-1.67)	361	1.36 (1.16-1.60)
Haemorrhagic stroke	134	0.91 (0.51-1.62)	197	1.37 (1.09-1.73)
Subarachnoid haemorrhage	66	1.24 (0.56-2.76)	74	1.19 (0.82-1.74)
Unclassified stroke	348	0.95 (0.68-1.32)	430	1.48 (1.26-1.73)
Other vascular disease	613	0.85 (0.66-1.09)	955	1.52 (1.38-1.67)
DIABETES, LIVER OR KIDNEY DISEASE	170	1.12 (0.69-1.81)	345	1.82 (1.56-2.11)
Diabetes‡	39	2.46 (0.75-8.01)	135	1.88 (1.50-2.36)
Kidney disease (non-neoplastic)	62	0.92 (0.43-1.96)	76	2.01 (1.51-2.69)
Liver disease (non-neoplastic)	69	0.93 (0.44-1.95)	134	1.60 (1.20-2.12)
Cirrhosis	52	0.96 (0.40-2.31)	107	1.63 (1.18-2.25)
ALL NEOPLASTIC DISEASE	2 190	0.96 (0.83-1.10)	2 704	1.13 (1.05-1.21)
Lung cancer‡	122	0.90 (0.48-1.68)	117	0.82 (0.55-1.24)
Upper aerodigestive cancer	54	0.35 (0.16-0.74)	60	1.00 (0.56-1.78)
Other specified cancer	1 594	0.99 (0.83-1.17)	1 833	1.10 (1.00-1.20)
Unspecified cancer	420	1.03 (0.75-1.42)	694	1.24 (1.10-1.40)
ALL RESPIRATORY DISEASE	370	0.48 (0.36-0.65)	257	1.16 (0.93-1.45)
Chronic obstructive pulmonary disease	135	0.38 (0.23-0.62)	77	1.09 (0.68-1.74)
Follow-up ≥ 10 years	*92*	*0.40 (0.21-0.74)*	*61*	*1.15 (0.70-1.90)*
Pneumonia	149	0.61 (0.38-0.98)	122	1.05 (0.75-1.46)
Respiratory tuberculosis	29	0.10 (0.04-0.29)	2	-
Other respiratory disease	57	1.13 (0.48-2.70)	56	1.49 (1.00-2.22)
OTHER SPECIFIED DISEASE	532	0.62 (0.47-0.81)	523	1.31 (1.13-1.52)
EXTERNAL CAUSE	506	0.84 (0.62-1.13)	510	1.19 (1.01-1.41)
UNKNOWN CAUSE	599	0.73 (0.57-0.95)	842	1.26 (1.13-1.40)

Analyses exclude the first 5 years (or 10 years: italic) of follow-up, and are adjusted for study, sex and age at risk.

* By chance, the all-cause 15-25 kg/m^2 results for the two sexes were the same to two decimal places.

† Studies of US physicians, nurses or other health professionals (webtable 1), in which there may have been relatively little confounding by socioeconomic status.

‡ HR (95% CI) for full BMI range (15-50 kg/m^2): IHD 1.36 (1.30-1.42); diabetes 2.03 (1.72-2.41); lung cancer 0.99 (0.81-1.22).

Webtable 10: Assumed causal relative risks used to estimate* figure 7 survival curves

Cause of death	Age at risk (years)	Relative risk† for baseline BMI (kg/m^2) range				
		22.5-25	25-30	30-35	35-40	40-50
Ischaemic heart disease	35-59	0.73	1	1.48	*2.25*	*3.70*
	60-69	0.83	1	1.47	*1.94*	*2.92*
	70-79	0.84	1	1.40	*1.70*	*2.36*
Stroke	35-59	0.95	1	1.72	*3.10*	*6.19*
	60-69	0.82	1	1.52	*2.20*	*3.57*
	70-79	0.95	1	1.35	*1.75*	*2.47*
Other vascular disease	35-59	0.89	1	1.83	*2.81*	*5.30*
	60-69	0.82	1	1.57	*2.52*	*4.45*
	70-79	0.82	1	1.28	*1.88*	*2.78*
Diabetes	35-79	0.58	1	2.57	*4.90*	*13.05*
Kidney disease (non-neoplastic)	35-79	1.13	1	1.88	*2.71*	*5.02*
Liver disease (non-neoplastic)	35-79	0.71	1	1.75	*3.23*	*6.64*
Liver and gallbladder cancer	35-79	0.74	1	2.05	*2.43*	*4.19*
Kidney cancer	35-79	0.80	1	1.34	*1.64*	*2.21*
Colorectal cancer, male‡	35-79	0.83	1	1.23	1.53	2.0**
Colorectal cancer, female‡	35-79	0.91	1	1.21	1.24	1.33
Endometrial cancer‡§	35-79	0.67	1	1.69	1.85	4.17
Female breast cancer, age < 60	35-59	1	1	1	1	1
Female breast cancer, age ≥ 60 ‡‖	60-79	0.75	1	1.22	1.27	1.58
Ovarian cancer‡	35-79	0.87	1	1.01	1.31	1.5**
Prostate cancer	35-79	0.89	1	1.12	*1.23*	*1.39*
Pancreatic cancer	35-79	0.85	1	1.12	*1.17*	*1.28*
Lung & upper aerodig. cancer††	35-79	(1.11)	1	(0.96)	*(0.92)*	*(0.88)*
Other specified cancer††	35-79	(0.99)	1	(1.03)	*(1.08)*	*(1.13)*
Unspecified cancer	-	-	-	-	-	-
Respiratory disease††	35-79	(1.09)	1	(1.10)	*(1.51)*	*(1.95)*
Other specified disease††	35-79	(1.02)	1	(1.24)	(1.72)	(2.36)
External cause††	35-79	(1.01)	1	(1.18)	(1.44)	(1.28)
Unknown cause	-	-	-	-	-	-

* The causal relative risks were applied to EU 2000 cause-specific death rates at ages 35-39 to 75-79 (with summation yielding the all-cause rates). For older ages, the BMI-specific relative risks for all-cause mortality at ages 75-79 (relative to BMI 25-30 kg/m^2) were applied to estimates of the all-cause death rates for single years of age in England and Wales in 2000. (As a sensitivity analysis, the square roots of these relative risks yielded similar results.)

† Relative risks (RR) are from the PSC unless indicated otherwise. These RRs were adjusted for study, age at risk, sex and baseline smoking, and the first 5 years of follow-up were excluded. The RRs for vascular disease were assumed to depend on age but not, given age, on sex. (The lower RRs for women than for men in figure 4 chiefly reflect the difference between the sexes in mean age at death.) RRs in italics were, to improve statistical stability, calculated from regressions on BMI as a continuous variable in the range 25-50 kg/m^2 (or, for prostate and pancreatic cancers, 15-50 kg/m^2).

‡ These RRs are, for greater statistical stability, from the Cancer Prevention Study-II (CPS-II),[4] and were adjusted for age, smoking, physical activity and education (among other variables). Mean age at baseline in CPS-II was 57 years, and deaths were recorded during follow-up for 16 years. Analyses did not exclude early follow-up, but did exclude anyone with a history of cancer or recent notable weight loss. CPS-II RRs for the 18.5-24.9 kg/m^2 category have been inserted above into the 22.5-25 kg/m^2 column.

§ In CPS-II but not PSC, endometrial cancer included ICD-9 179 (uterus, part unspecified).

‖ Defined in CPS-II as postmenopausal breast cancer.

** RR unavailable in CPS-II, but estimated here from the trend in RRs across lower BMI groups

†† For these causes of death the RRs describing the associations of BMI with risk in the PSC are given in parentheses, as it was assumed in estimating the effects of BMI on mortality for figure 7 that these associations could have been non-causal (ie, these RRs were taken as 1.0 in calculating figure 7). Sensitivity analyses that instead used the RRs in parentheses showed that this assumption did not materially alter the median survival in any BMI category.

Webtable 11: Cumulative mortality at ages 35-79 implied by webtable 10: male

Cause of death	Age at risk (years)	Cumulative mortality* (%) for baseline BMI (kg/m^2) range				
		22.5-25	25-30	30-35	35-40	40-50
Ischaemic heart disease	35-59	1.1	1.6	2.3	3.5	5.8
	60-69	2.7	3.3	4.8	6.3	9.5
	70-79	7.4	8.8	12.3	14.9	20.7
Stroke	35-59	0.4	0.4	0.7	1.3	2.6
	60-69	0.9	1.0	1.6	2.3	3.7
	70-79	4.0	4.3	5.8	7.5	10.5
Other vascular disease	35-59	0.7	0.8	1.5	2.3	4.4
	60-69	1.4	1.7	2.7	4.4	7.8
	70-79	4.6	5.7	7.2	10.7	15.7
ALL VASCULAR	35-79	23.3	27.6	39.0	53.2	80.8
Diabetes	35-79	0.9	1.5	3.8	7.3	19.5
Kidney disease (non-neoplastic)	35-79	0.7	0.6	1.2	1.7	3.2
Liver disease (non-neoplastic)	35-79	1.5	2.1	3.7	6.8	14.0
ALL HEPATO-RENAL-DIABETIC	35-79	3.1	4.3	8.7	15.9	36.8
Liver and gallbladder cancer	35-79	0.9	1.2	2.5	2.9	5.1
Kidney cancer	35-79	0.6	0.8	1.0	1.2	1.7
Colorectal cancer, male	35-79	2.5	3.1	3.7	4.7	6.1
Prostate cancer	35-79	2.2	2.4	2.7	3.0	3.4
Pancreatic cancer	35-79	1.1	1.3	1.5	1.5	1.7
Lung cancer	35-79	10.5	10.5	10.5	10.5	10.5
Other specified cancer	35-79	7.5	7.5	7.5	7.5	7.5
Unspecified cancer†	35-79	0.0	0.0	0.0	0.0	0.0
ALL NEOPLASTIC	35-79	25.3	26.8	29.4	31.4	35.9
Respiratory disease	35-79	6.7	6.7	6.7	6.7	6.7
Other specified disease	35-79	6.7	6.7	6.7	6.7	6.7
External cause	35-79	3.4	3.4	3.4	3.4	3.4
Unknown cause†	35-79	0.0	0.0	0.0	0.0	0.0
ALL CAUSES (and corresponding‡ risk of 35 year old dying before 80)	35-79	68.6 (50%)	75.4 (53%)	93.9 (61%)	117.3 (69%)	170.3 (82%)

* For the BMI 25-30 kg/m^2 category, the cumulative mortality in a given range of ages at risk is assumed to be the total duration in years (eg, 25 for the range 35-59) times the average of the annual death rates in each of the 5-year age ranges within it (eg, 35-39, 40-44 etc). The death rates are those for the European Union in 2000 (ie, the aggregate of 15 western European countries). For the other BMI categories, the cumulative mortality is assumed to be that at BMI 25-30 kg/m^2 multiplied by the corresponding relative risk in webtable 10 (unless the relative risk is in parentheses, in which case the multiplier is 1). Cumulative mortalities in different age ranges, or from different causes of death, are exactly additive.

† Unspecified cancer deaths were redistributed over the other neoplastic categories by dividing each category's rate by 1 minus the proportion of neoplastic deaths that were unspecified (ie, by 0.94). Deaths from unknown cause were then redistributed over all other mortality categories (including the neoplastic categories) by dividing each category's rate by 1 minus the proportion of all deaths that had an unknown cause (ie, by 0.98).

‡ If the cumulative mortality at ages 35-79 is c % then the probability that a 35-year-old will die before age 80 is 1 - exp(-c/100). For example, if c = 75.4 then the survival probability is 1 - exp(-0.754) = 0.53.

Webtable 12: Cumulative mortality at ages 35-79 implied by webtable 10: female

Cause of death	Age at risk (years)	Cumulative mortality* (%) for baseline BMI (kg/m^2) range				
		22.5-25	25-30	30-35	35-40	40-50
Ischaemic heart disease	35-59	0.2	0.3	0.5	0.7	1.1
	60-69	0.8	1.0	1.5	2.0	2.9
	70-79	3.5	4.1	5.8	7.0	9.8
Stroke	35-59	0.3	0.3	0.5	0.8	1.6
	60-69	0.5	0.6	0.9	1.3	2.1
	70-79	2.9	3.0	4.1	5.3	7.5
Other vascular disease	35-59	0.3	0.3	0.6	1.0	1.8
	60-69	0.7	0.8	1.3	2.1	3.7
	70-79	3.0	3.7	4.7	6.9	10.2
ALL VASCULAR	35-79	12.1	14.2	19.8	27.1	40.8
Diabetes	35-79	0.7	1.1	2.9	5.5	14.7
Kidney disease (non-neoplastic)	35-79	0.4	0.4	0.7	1.0	1.9
Liver disease (non-neoplastic)	35-79	0.7	0.9	1.6	3.0	6.2
ALL HEPATO-RENAL-DIABETIC	35-79	1.8	2.5	5.3	9.6	22.9
Liver and gallbladder cancer	35-79	0.4	0.6	1.1	1.3	2.3
Kidney cancer	35-79	0.3	0.3	0.4	0.5	0.7
Colorectal cancer, female	35-79	1.6	1.8	2.1	2.2	3.5
Endometrial cancer	35-79	0.1	0.2	0.4	0.4	0.4
Female breast cancer, age <60	35-59	0.9	0.9	0.9	0.9	0.9
Female breast cancer, age ≥ 60	60-79	1.5	2.0	2.4	2.5	4.0
Ovarian cancer	35-79	0.8	1.0	1.0	1.3	1.9
Pancreatic cancer	35-79	0.8	0.9	1.0	1.1	1.2
Lung cancer	35-79	2.4	2.4	2.4	2.4	2.4
Other specified cancer	35-79	4.3	4.3	4.3	4.3	4.3
Unspecified cancer†	35-79	0.0	0.0	0.0	0.0	0.0
ALL NEOPLASTIC	35-79	13.1	14.4	16.1	16.9	21.7
Respiratory disease	35-79	2.9	2.9	2.9	2.9	2.9
Other specified disease	35-79	4.5	4.5	4.5	4.5	4.5
External cause	35-79	1.4	1.4	1.4	1.4	1.4
Unknown cause†	35-79	0.0	0.0	0.0	0.0	0.0
ALL CAUSES (and corresponding‡ risk of 35 year old dying before 80)	35-79	35.8 (30%)	39.7 (33%)	49.9 (39%)	62.4 (46%)	94.2 (61%)

Footnotes as in webtable 11.