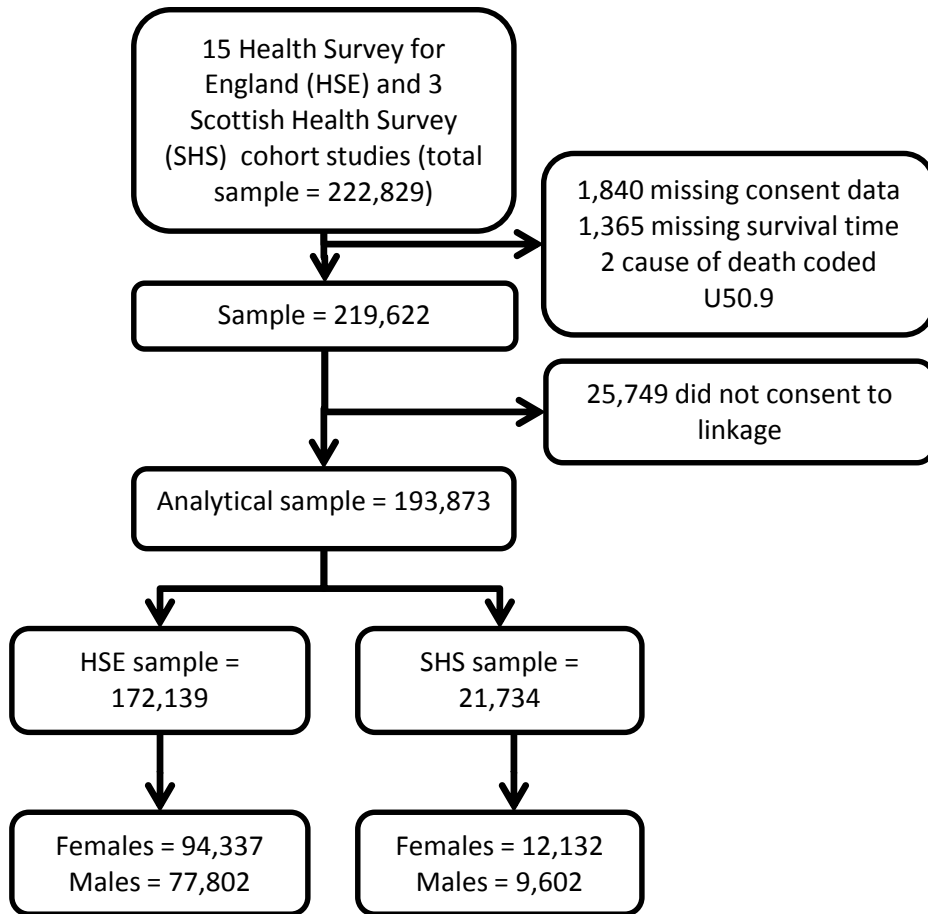


Webfigure 1 - Flow chart of participants from initial pooled sample to analytic sample: follow-up of eighteen cohort studies from the Health Survey for England and Scottish Health Survey



Note: The ICD 10 code U50.9 denotes an ‘event awaiting determination of event’ (i.e. there hasn’t been a complete assessment concluding an undetermined cause of death). These deaths have therefore been excluded from the analyses.

Webtable 1 - Characteristics of survey participants who consented and did not consent to record linkage(*N* = 193,873)

	Consented	Did not consent	<i>P</i>-value
N	193,873	25,749	-
Age (mean [SD])	46.9 (18.5)	49.0 (20.4)	<0.001
Female (%)	54.9	57.5	<0.001
Non-manual occupational social class (I-IIIINM) (%)	56.6	53.4	<0.001
Left school ≥ 16 (approximates to compulsory education) (%)	66.8	64.4	<0.001
Current smoker (%)	26.2	23.4	<0.001
Drinks alcohol at least weekly (%)	61.6	48.7	<0.001
Self-assessed general health good or very good (%)	74.5	70.0	<0.001
Longstanding illness (%)	44.0	41.8	<0.001

Webtable 2 - Baseline characteristics of study members pooled according to survey: follow-up of eighteen cohort studies from the Health Survey for England and Scottish Health Survey ($N = 193,873$)

	Health Survey for England	Scottish Health Survey	<i>P</i>- value
N	172,139	21,734	-
Age (mean [SD])	47.0 (18.8)	45.7 (16.2)	<0.001
Female (%)	54.8	55.8	0.004
Non-manual occupational social class (I-IIIINM) (%)	57.1	52.5	<0.001
Left school ≥ 16 (approximates to compulsory education) (%)	67.2	63.6	<0.001
Current smoker (%)	25.3	32.8	<0.001
Drinks alcohol at least weekly (%)	61.6	61.2	<0.001
Self-assessed general health good or very good (%)	74.6	73.6	<0.001
Longstanding illness (%)	44.3	42.3	<0.001
Prescribed antidepressant ¹	9.2	9.5	0.308
Prescribed anxiolytic ²	1.2	2.0	<0.001

¹ British National Formulary (BNF) chapter 4.3. There are substantial missing data and the reported percentages are of the total participants with medication recorded, rather than the entire sample.

² British National Formulary (BNF) chapter 4.1.2. There are substantial missing data and the reported percentages are of the total participants with medication recorded, rather than the entire sample.

Webtable 3 - Hazard ratios (95% confidence interval) for Scotland relative to England for all-cause mortality, and deaths from all cancers, smoking-related cancers and site-specific cancers: Scotland relative to England (N = 193,873)

Model	Age & sex-adjusted ¹					Fully adjusted ²				
	Deaths	N	HSE HR	SHS HR	P-value	Deaths	N	HSE HR	SHS HR	P-value
All-cause mortality	21,345	193,873	1 (ref.)	1.40 (1.34, 1.47)	<0.001	20,330	181,560	1 (ref.)	1.29 (1.23, 1.36)	<0.001
Cancer	6,009	193,873	1	1.54 (1.42, 1.66)	<0.001	5,818	181,560	1	1.41 (1.30, 1.53)	<0.001
Smoking-related ³	2,677	193,873	1	1.91 (1.71, 2.12)	<0.001	2,605	181,560	1	1.62 (1.45, 1.81)	<0.001
Non-smoking-related	3,332	193,873	1	1.26 (1.12, 1.40)	<0.001	3,213	181,560	1	1.22 (1.09, 1.37)	0.001
Lung	1,287	193,873	1	2.20 (1.91, 2.58)	<0.001	1,260	181,560	1	1.67 (1.43, 1.94)	<0.001
Bowel	539	193,873	1	1.65 (1.28, 2.13)	<0.001	526	181,560	1	1.63 (1.26, 2.12)	<0.001
Breast (all)	459	193,873	1	1.39 (1.05, 1.82)	0.020	424	181,560	1	1.32 (0.99, 1.75)	0.062
Breast (female)	457	106,469	1	1.39 (1.05, 1.83)	0.018	422	98,187	1	1.32 (0.99, 1.77)	0.056
Prostate (men)	364	87,313	1	0.83 (0.52, 1.30)	0.411	361	83,283	1	0.86 (0.54, 1.35)	0.500
Pancreas	317	193,765	1	0.93 (0.62, 1.39)	0.705	306	181,461	1	0.88 (0.58, 1.34)	0.560
Oesophagus	265	193,835	1	2.35 (1.70, 3.25)	<0.001	258	181,524	1	2.23 (1.60, 3.09)	<0.001
Stomach	205	193,873	1	1.57 (1.03, 2.40)	0.038	202	181,560	1	1.47 (0.96, 2.25)	0.079
Bladder	183	193,659	1	1.70 (1.09, 2.65)	0.020	177	181,360	1	1.62 (1.04, 2.54)	0.035
Ovary (women)	164	106,176	1	1.45 (0.92, 2.28)	0.111	156	97,926	1	1.41 (0.87, 2.27)	0.159
Non-Hodgkin's Lymphoma	160	193,696	1	0.70 (0.37, 1.34)	0.282	153	181,396	1	0.74 (0.39, 1.40)	0.351
CNS cancer	138	193,690	1	1.74 (1.12, 2.71)	0.014	137	181,390	1	1.74 (1.12, 2.72)	0.014
Kidney	137	193,823	1	1.10 (0.62, 1.97)	0.741	133	181,513	1	1.11 (0.62, 1.99)	0.718
Leukaemia	137	193,785	1	2.25 (1.42, 3.56)	0.001	128	181,479	1	2.32 (1.45, 3.71)	<0.001
Multiple myeloma	84	193,686	1	1.72 (0.90, 3.27)	0.101	81	181,387	1	1.60 (0.81, 3.13)	0.173
Liver	76	193,385	1	2.84 (1.59, 5.09)	<0.001	72	181,029	1	2.54 (1.37, 4.73)	0.003
Mesothelioma	69	193,140	1	2.04 (1.06, 3.93)	0.033	69	180,864	1	2.04 (1.06, 3.93)	0.034

¹ Unless sex-specific analyses, where noted

² Model adjusted for age, sex, occupational social class, educational attainment, smoking status, frequency of alcohol consumption, self-assessed general health, and longstanding illness

³ ICD-9 codes 141-151, 155.0, 157, 160.0, 160.2-160.9, 161, 162.2-162.9, 180, 188, 189, and 205 and ICD-10 codes C01-16, C22, C25, C30.0, C31, C32, C34, C53, C64, C65, C67, and C92, in line with WHO definitions. HR smoker vs non-smoker for smoking related cancer 1.74 (95% CI 1.61, 1.88); non-smoking-related cancer HR 0.65 (0.60, 0.71); all cancers HR 1.06 (1.00, 1.12).

Webtable 4 - Hazard ratios (95% confidence interval) for all-cause mortality stratified by age-groups: Scotland relative to England (N= 193,873)

Model*	Age group					16-44					45-64					65+				
	Deaths	N	HSE HR	SHS HR	P-value	Deaths	N	HSE HR	SHS HR	P-value	Deaths	N	HSE HR	SHS HR	P-value					
Age- & sex-adjusted (basic model)	1,023	94,532	1	1.68 (1.44, 1.97)	<0.001	4,733	59,873	1	1.71 (1.59, 1.83)	<0.001	15,589	39,468	1	1.19 (1.11, 1.28)	<0.001					
+ Occupational social class	955	86,418	1	1.59 (1.35, 1.88)	<0.001	4,655	58,729	1	1.65 (1.53, 1.77)	<0.001	14,800	37,896	1	1.21 (1.12, 1.29)	<0.001					
+ Educational attainment	1,021	94,457	1	1.66 (1.42, 1.94)	<0.001	4,730	59,848	1	1.67 (1.56, 1.79)	<0.001	15,567	39,428	1	1.19 (1.11, 1.27)	<0.001					
+ Smoking status	1,018	93,853	1	1.56 (1.33, 1.83)	<0.001	4,720	59,783	1	1.54 (1.43, 1.65)	<0.001	15,571	39,432	1	1.15 (1.07, 1.23)	<0.001					
+ Frequency of alcohol consumption	1,007	92,239	1	1.69 (1.44, 1.98)	<0.001	4,725	59,844	1	1.69 (1.58, 1.82)	<0.001	15,579	39,448	1	1.18 (1.10, 1.26)	<0.001					
+ Self-assessed general health	1,022	94,516	1	1.67 (1.42, 1.95)	<0.001	4,733	59,859	1	1.66 (1.55, 1.79)	<0.001	15,584	39,460	1	1.21 (1.13, 1.30)	<0.001					
+ Longstanding illness	1,023	94,510	1	1.70 (1.45, 1.99)	<0.001	4,732	59,857	1	1.71 (1.60, 1.84)	<0.001	15,586	39,462	1	1.21 (1.13, 1.30)	<0.001					
Multiply-adjusted ¹	950	85,182	1	1.54 (1.30, 1.81)	<0.001	4,633	58,580	1	1.47 (1.37, 1.58)	<0.001	14,747	37,798	1	1.17 (1.09, 1.25)	<0.001					

* Covariates selected from potentially relevant variables because data for these variables were missing in less than 20% of participants

‡ The unadjusted HR suggests in some models that death rates are lower in Scotland but the age distributions of the two samples are different – the HSE cohorts are older

¹ Model adjusted for age, sex, occupational social class, educational attainment, smoking status, frequency of alcohol consumption, self-assessed general health, and longstanding illness

Webtable 5 - Hazard ratios (95% confidence interval) for all-cause mortality stratified by occupational social class: Scotland relative to England (*N* = 193,873)

Model*	I - Professional					II – Managerial/Technical					IINM – Skilled non-manual				
	Deaths	N	HSE HR	SHS HR	<i>P</i> -value	Deaths	N	HSE HR	SHS HR	<i>P</i> -value	Deaths	N	HSE HR	SHS HR	<i>P</i> -value
Age- & sex-adjusted (basic model)	592	8,402	1	0.79 (0.54, 1.14)	0.204	4,304	50,036	1	1.30 (1.17, 1.44)	<0.001	4,249	44,717	1	1.37 (1.23, 1.53)	<0.001
+ Educational attainment	592	8,399	1	0.80 (0.55, 1.16)	0.243	4,299	50,020	1	1.30 (1.17, 1.44)	<0.001	4,245	44,701	1	1.36 (1.22, 1.52)	<0.001
+ Smoking status	592	8,398	1	0.78 (0.54, 1.14)	0.198	4,297	49,980	1	1.23 (1.11, 1.37)	<0.001	4,248	44,559	1	1.31 (1.18, 1.47)	<0.001
+ Frequency of alcohol consumption	592	8,397	1	0.79 (0.55, 1.14)	0.211	4,301	49,980	1	1.29 (1.16, 1.43)	<0.001	4,245	44,374	1	1.36 (1.21, 1.51)	<0.001
+ Self-assessed general health	592	8,400	1	0.83 (0.58, 1.21)	0.338	4,303	50,029	1	1.28 (1.16, 1.42)	<0.001	4,248	44,710	1	1.41 (1.26, 1.58)	<0.001
+ Longstanding illness	592	8,402	1	0.81 (0.56, 1.18)	0.269	4,303	50,026	1	1.32 (1.19, 1.46)	<0.001	4,248	44,709	1	1.39 (1.25, 1.56)	<0.001
Multiply-adjusted ¹	592	8,389	1	0.85 (0.59, 1.23)	0.392	4,287	49,903	1	1.21 (1.09, 1.35)	<0.001	4,238	44,278	1	1.33 (1.19, 1.49)	<0.001
Model*	IIIM – Skilled manual					IV – Semi-skilled manual					V – Unskilled manual				
	Deaths	N	HSE HR	SHS HR	<i>P</i>	Deaths	N	HSE HR	SHS HR	<i>P</i>	Deaths	N	HSE HR	SHS HR	<i>P</i>
Age- & sex-adjusted (basic model)	5,156	35,070	1	1.45 (1.32, 1.58)	<0.001	3,951	32,645	1	1.39 (1.25, 1.55)	<0.001	2,044	11,324	1	1.49 (1.30, 1.71)	<0.001
+ Educational attainment	5,150	35,040	1	1.43 (1.31, 1.56)	<0.001	3,947	32,624	1	1.38 (1.24, 1.53)	<0.001	2,042	11,317	1	1.49 (1.30, 1.70)	<0.001
+ Smoking status	5,147	34,959	1	1.37 (1.25, 1.50)	<0.001	3,944	32,503	1	1.28 (1.15, 1.43)	<0.001	2,038	11,281	1	1.40 (1.22, 1.61)	<0.001
+ Frequency of alcohol consumption	5,154	34,854	1	1.44 (1.32, 1.58)	<0.001	3,947	32,357	1	1.39 (1.25, 1.54)	<0.001	2,037	11,216	1	1.49 (1.30, 1.70)	<0.001
+ Self-assessed general health	5,155	35,062	1	1.41 (1.29, 1.54)	<0.001	3,950	32,637	1	1.38 (1.25, 1.54)	<0.001	2,042	11,321	1	1.49 (1.30, 1.71)	<0.001
+ Longstanding illness	5,156	35,063	1	1.45 (1.33, 1.59)	<0.001	3,950	32,638	1	1.40 (1.26, 1.56)	<0.001	2,044	11,322	1	1.48 (1.29, 1.69)	<0.001
Multiply-adjusted ¹	5,138	34,750	1	1.31 (1.20, 1.44)	<0.001	3,934	32,236	1	1.27 (1.14, 1.41)	<0.001	2,029	11,174	1	1.40 (1.22, 1.61)	<0.001

* Covariates selected from potentially relevant variables because data for these variables were missing in less than 20% of participants

¹ Model adjusted for age, sex, educational attainment, smoking status, frequency of alcohol consumption, self-assessed general health, and longstanding illness

Webtable 6 – Subgroup adjusted analyses*—Hazard ratios (95% confidence interval) for all-cause mortality, cardiovascular disease and all cancers: Scotland relative to England (N = 193,873)

Model	All-cause Mortality					Cardiovascular disease					Cancer				
	Deaths	N	HSE HR	SHS HR	P-value	Deaths	N	HSE HR	SHS HR	P-value	Deaths	N	HSE HR	SHS HR	P-value
Age- & sex-adjusted (basic model)	21,345	193,873	1 (ref.)	1.40 (1.34, 1.47)	<0.001	7,372	193,873	1 (ref.)	1.37 (1.26, 1.48)	<0.001	6,009	193,873	1 (ref.)	1.54 (1.42, 1.66)	<0.001
+ Doctor-diagnosed CVD (any)	11,274	106,375	1	1.41 (1.34, 1.48)	<0.001	3,896	106,375	1	1.34 (1.23, 1.46)	<0.001	3,126	106,375	1	1.66 (1.53, 1.81)	<0.001
+ Doctor-diagnosed CVD (stroke or IHD)	11,357	106,741	1	1.40 (1.33, 1.47)	<0.001	3,928	106,741	1	1.32 (1.21, 1.44)	<0.001	3,145	106,741	1	1.66 (1.53, 1.81)	<0.001
+ Doctor-diagnosed hypertension	8,996	89,358	1	1.45 (1.37, 1.53)	<0.001	3,164	89,358	1	1.46 (1.33, 1.60)	<0.001	2,405	89,358	1	1.70 (1.54, 1.87)	<0.001
+ Diabetes ³	18,159	146,144	1	1.35 (1.29, 1.41)	<0.001	6,351	146,144	1	1.33 (1.23, 1.44)	<0.001	4,959	146,144	1	1.49 (1.38, 1.62)	<0.001
+ Portions of fruit and vegetables eaten yesterday	5,380	90,084	1	1.31 (1.20, 1.44)	<0.001	1,725	103,789	1	1.51 (1.30, 1.76)	<0.001	1,518	90,084	1	1.39 (1.18, 1.63)	<0.001
+ Height (cm)	17,551	181,798	1	1.43 (1.36, 1.50)	<0.001	5,913	181,798	1	1.41 (1.29, 1.54)	<0.001	5,380	181,798	1	1.55 (1.43, 1.68)	<0.001
+ Body mass index (kg/m ²)	17,018	174,427	1	1.44 (1.37, 1.52)	<0.001	5,736	174,427	1	1.43 (1.31, 1.57)	<0.001	5,213	174,427	1	1.55 (1.42, 1.68)	<0.001
+ Systolic blood pressure ² (mmHg)	13,298	122,901	1	1.44 (1.36, 1.52)	<0.001	4,584	122,901	1	1.38 (1.26, 1.52)	<0.001	3,842	122,901	1	1.61 (1.48, 1.76)	<0.001
+ Diastolic blood pressure ² (mmHg)	13,298	122,901	1	1.44 (1.36, 1.52)	<0.001	4,584	122,901	1	1.40 (1.27, 1.54)	<0.001	3,842	122,901	1	1.61 (1.48, 1.76)	<0.001
+ Antidepressant use	11,639	68,880	1	1.37 (1.30, 1.46)	<0.001	4,194	68,880	1	1.37 (1.24, 1.52)	<0.001	3,002	68,880	1	1.55 (1.39, 1.71)	<0.001
+ Anxiolytic use	11,639	57,244	1	1.37 (1.29, 1.46)	<0.001	4,194	68,877	1	1.37 (1.24, 1.52)	<0.001	3,002	68,877	1	1.55 (1.39, 1.71)	<0.001
+ Fixed Vital Capacity (FVC)	7,333	56,978	1	1.22 (1.14, 1.30)	<0.001	2,509	56,978	1	1.09 (0.97, 1.23)	0.151	2,302	56,974	1	1.38 (1.23, 1.54)	<0.001
+ FVC and smoking status	7,319	56,725	1	1.17 (1.10, 1.25)	<0.001	2,506	56,725	1	1.06 (0.94, 1.19)	0.347	2,297	56,721	1	1.31 (1.18, 1.47)	<0.001
+ Forced Expiratory Volume in 1 second	7,333	56,978	1	1.18 (1.10, 1.26)	<0.001	2,509	56,978	1	1.06 (0.94, 1.19)	0.352	2,302	56,974	1	1.35 (1.21, 1.51)	<0.001
+ FEV ₁ and smoking status	7,319	56,725	1	1.14 (1.07, 1.22)	<0.001	2,506	56,725	1	1.03 (0.92, 1.16)	0.581	2,297	56,721	1	1.30 (1.16, 1.45)	<0.001
+ Peak flow	7,333	56,978	1	1.16 (1.08, 1.24)	<0.001	2,509	56,978	1	1.04 (0.93, 1.17)	0.492	2,302	56,974	1	1.33 (1.19, 1.49)	<0.001
+ Peak flow and smoking status	7,319	56,725	1	1.12 (1.04, 1.20)	0.001	2,506	56,725	1	1.01 (0.91, 1.14)	0.811	2,297	56,721	1	1.28 (1.14, 1.43)	<0.001
+ Physical activity ⁴	11,367	118,563	1	1.50 (1.42, 1.57)	<0.001	3,923	118,563	1	1.45 (1.33, 1.58)	<0.001	3,333	118,563	1	1.65 (1.52, 1.80)	<0.001
+ Psychological distress ¹	17,368	166,631	1	1.42 (1.35, 1.48)	<0.001	5,922	166,631	1	1.39 (1.28, 1.51)	<0.001	4,994	166,631	1	1.56 (1.44, 1.69)	<0.001

* These models are adjusted for age and sex plus individual covariates. These were not included in the preceding tables and the fully adjusted models because data are missing for these variables in more than 20% of participants. Since the patterns of missing data do not exactly coincide, a model adjusting for all these covariates at the same time would result in none or very few deaths). However the pattern of missingness is different – in Scotland data are present in the most recent survey only (2003), in England just in the earlier surveys (1994-2002).

¹ Measured by the 12-item General Health Questionnaire

² Mean of 2nd and 3rd readings

³ Diabetes indicator incorporating doctor-diagnosed diabetes, longstanding illness (diabetes) and HbA1c

⁴ Number of weekly episodes of physical activity including domestic

Webtable 7 - Comparison of using calendar time from survey date (adjusting for age) with using age as the timescale in Cox proportional hazards models: follow-up of eighteen cohort studies from the Health Survey for England and Scottish Health Survey (N = 193,873)

	Deaths	Total N	Calendar time (age-adjusted) HR (95% CI)	Age as timescale (unadjusted) HR (95% CI)
Total mortality	21,345	193,873	1.39 (1.33, 1.45)	1.68 (1.60, 1.76)
Cancer	6,009	193,873	1.53 (1.41, 1.65)	1.88 (1.74, 2.03)
Cardiovascular disease	7,372	193,873	1.36 (1.25, 1.47)	1.64 (1.51, 1.78)
Ischaemic heart disease	3,571	193,873	1.59 (1.42, 1.76)	1.97 (1.78, 2.19)
Stroke	1,793	193,873	1.42 (1.20, 1.68)	1.67 (1.42, 1.98)
External (intentional)	122	193,873	1.82 (1.17, 2.85)	2.16 (1.38, 3.39)
External (unintentional)	418	193,873	0.95 (0.68, 1.32)	1.31 (0.94, 1.82)
Alcohol-related deaths	252	193,873	5.39 (4.17, 6.96)	6.49 (5.02, 8.38)
Drug-related poisonings	50	193,873	3.83 (2.13, 6.88)	4.34 (2.41, 7.80)