

Variable	Label	Components	Derivation	cut-off point
hedimhm	ever reported heart murmur (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hediman	ever reported angina (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedimmi	Ever reported myocardial infarction (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedimar	ever reported heart arrhythmia (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedimst	ever reported stroke (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hediblu	ever reported hedibonic lung disease (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedibas	ever reported asthma (diagnosed)	N/A	From ELSA derived variable dataset	N/A
hedibar	ever reported arthritis (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedibos	ever reported osteoporosis (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedibca	ever reported cancer (diagnosed)	N/A	From ELSA derived variables dataset	N/A
heoptgl	ever reported glaucoma (diagnosed)	N/A	From ELSA derived variables dataset	N/A
heoptdi	ever reported diabetic eye disease (diagnosed)	N/A	From ELSA derived variables dataset	N/A
heoptmd	ever reported macular degeneration (diagnosed)	N/A	From ELSA derived variables dataset	N/A
heoptca	ever reported cataracts (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedibps	Ever reported psychiatric disorder (diagnosed)	N/A	From ELSA derived variables dataset	N/A
hedimbp_n	hypertension and high blood pressure (diagnosed and derived)	hedimbp: ever reported hypertension or high blood pressure (diagnosed)	From ELSA derived variables dataset	N/A

		hypertension	gen hypertension=sysval>=140 & diaval>=90 if !missing(sysval) !missing(diaval)	valid systolic BP (sysval) >= 140 valid diastolic BP (diaval) >=90
hedimdi_n	diabetes and high blood sugar (diagnosed and derived)	hedimdi: ever reported diabetes or high blood sugar (diagnosed)	From ELSA derived variables dataset	N/A
		hedbts: ever reported diabetes (diagnosed)	From ELSA derived variables dataset	N/A
		hypergly: hyperglycemia	gen byte hypergly=fglu>7 if !missing(fglu)	blood glucose level (fglu) > 7 mmol/l (fasting)
		hyperglycemia: hyperglycemia	gen byte hyperglycaemia=hba1c>=6.5 if !missing(hba1c)	blood glycated haemoglobin level (HBA1C)>=6.5%
COPD	chronic obstructive pulmonary disease (derived)	HTFEV: lung function - highest technically satisfactory FEV reading (litres)	From ELSA nurse visit dataset	N/A
		HTFVC: lung function - highest technically satisfactory FVC reading (litres)	From ELSA nurse visit dataset	N/A
		FEVFVC_ratio: FEV/FVC ratio	gen FEVFVC_ratio = htfev/htfvc gen byte COPD=FEVFVC_ratio<0.7 if !missing(FEVFVC_ratio)	FEV/FVC ratio < 0.7
hedibde_all	dementia (derived)	hedibde: ever reported dementia (diagnosed)	From ELSA derived variables dataset	

		dementia: dementia	gen byte dementia=IQCODE_mean<3.6 if !missing(IQCODE_mean)	IQCODE_mean is the mean score of IQCODE (derived from variables heiqb - heiqq). IQCODE_mean = IQCODE_sum/16IQCODE_sum = rowtotal(heiqb-heiqq)IQCODE_mean < 3.6 is the cut-off point
		cognitive_impair: cognitive impairment	gen byte cognitive_impair=cfind<=13.5 if !missing(cfind)	cfind is the total cognitive index score. Cut-off point = 1.5 standard deviation below the mean.
		hedibde_all: dementia and cognitive impairment	egen hedibde_all=rowtotal(hedibde dementia cognitive_impair)	
obesity_n	obesity (derived)	obesity: obesity (using BMI)	gen byte obesity=bmiobe>=4 if !missing(bmiobe)	
		BAI: body adiposity index	gen BAI = ((hipval)/((htval/100)^1.5))-18 if !missing(hipval) !missing(htval)	
		adiposity	gen byte adiposity=BAI>25&DhSex==1 BAI>39&DhSex==2 if !missing(BAI)	BAI > 25 for men, BAI > 39 for female
hyperlipid	hyperlipidemia (derived)	hyperlipid_a: high cholesterol level (derived from variable hedim01 in ELSA wave 2 dataset)	gen hyperlipid_a=hedim01	N/A
		hyperlipid_b: hypercholesterolemia (using total cholesterol and LDL levels from blood sample)	gen hyperlipid_b=chol>7.5 & ldl>4.9 if !missing(chol) !missing(ldl)	total cholesterol level > 290mg/dl (7.5mmol/l) or ldl-c > 190mg/dl (4.9mmol/l) in adults
irondefana	anaemia and iron deficiency (derived)	anaemia: anaemia (derived from blood haemoglobin level - HGB)	gen byte anaemia=hgb<13&DhSex==1 hgb<12&DhSex==2 if !missing(hgb)	WHO diagnostic criteria: lower than 13g/dL for men and 12g/dL for women (non-pregnant)

		irondefi: iron deficiency (derived from blood ferritin level - RTIN)	gen byte irondefi=rtin<15 if !missing(rtin)	blood ferritin level (rtin) < 15 ng/ml
blood_clot	blood clotting disorders (derived)	hypofibri: hypofibrinogenaemia (derived from blood fibrinogen level - CFIB)	gen byte hypofibri=cfib<1.5 if !missing(cfib)	hypofibrinogenaemia is characterised by blood fibrinogen level lower than 1.5g/l
		clotb_n: whether having a blood clotting disorder (derived from those 'missing' i.e. not eligible for blood sample)	gen byte clotb_n=clotb==1 if !missing(clotb)	N/A
hypertrig	elevated level of triglyceride (derived)	TRIG: blood triglyceride level (mmol/l) from nurse visit dataset	gen byte hypertrig=trig>=2.3 if !missing(trig)	cut-off point for hypertriglyceridemia is 2.3-5.6 mmol/l
hypohdl	hypoalphalipoproteinemia (HDL deficiency or low HDL level)	HDL: blood HDL level (mmol/l) from nurse visit dataset	gen byte hypohdl=hdl<1.0&DhSex==1 hdl<1.3&DhSex==2 if !missing(hdl)	hypoalphalipoproteinemia (HDL deficiency or low HDL level) is defined clinically as HDL less than 40mg/dl (1.0 mmol/l) in men, and less than 50mg/dl (1.3mmol/l) in women
hi_TGHDL	high triglyceride/HDL ratio	TRIG: blood triglyceride level (mmol/l) from nurse visit dataset HDL: blood HDL level (mmol/l) from nurse visit dataset	gen hi_TGHDL=(trig/hdl)>4 if !missing(trig) !missing(hdl)	TG/HDL-c ratio >4 is the most powerful independent predictor of coronary heart disease (CAD)

Multiple imputation using chained equations (MICE)

	Logistic regression (outcome = multimorbidity status)		Negative binomial regression (outcome = disease number)	
	OR (95% CI)	P- value	IRR (95% CI)	P-value
Sex				
Male	1.59 (1.42 - 1.79)	<0.001	1.10 (1.08 - 1.13)	<0.001
Age category				
60-69	1.99 (1.75 - 2.26)	<0.001	1.26 (1.22 - 1.30)	<0.001
70-79	3.31 (2.81 - 3.89)	<0.001	1.46 (1.41 - 1.51)	<0.001
80+	4.35 (3.39 - 5.59)	<0.001	1.53 (1.47 - 1.59)	<0.001
education				
Intermediate	1.04 (0.91 - 1.19)	0.563	0.99 (0.96 - 1.03)	0.748
No qualification	1.18 (1.01 - 1.38)	0.041	1.02 (0.98 - 1.05)	0.383
quintiles of net financial wealth				
1	1.48 (1.22 - 1.81)	<0.001	1.17 (1.12 - 1.22)	<0.001
2	1.25 (1.03 - 1.51)	0.024	1.11 (1.06 - 1.16)	<0.001
3	1.08 (0.90 - 1.29)	0.402	1.07 (1.03 - 1.12)	0.001

4	1.17 (0.98 - 1.39)	0.084	1.05 (1.01 - 1.09)	0.019
current smoking status				
Smoker	1.21 (1.08 - 1.36)	0.001	1.09 (1.06 - 1.12)	<0.001
drinking				
Regularly	0.73 (0.61 - 0.88)	0.001	0.87 (0.83 - 0.90)	<0.001
Occasionally	0.82 (0.69 - 0.98)	0.029	0.92 (0.89 - 0.95)	<0.001
physical activity level				
Sedentary/low	2.21 (1.86 - 2.63)	<0.001	1.39 (1.33 - 1.44)	<0.001
Moderate	1.39 (1.22 - 1.58)	<0.001	1.14 (1.10 - 1.18)	<0.001
OR/IRR at baseline	1.15 (0.90 - 1.47)	0.251	2.06 (1.94 - 2.18)	<0.001

Complete case analysis

	Logistic regression (outcome = multimorbidity status)		Negative binomial regression (outcome = disease number)	
	OR (95% CI)	P-value	IRR (95% CI)	P-value
Sex				
Male	1.65 (1.45 - 1.89)	<0.001	1.11 (1.08 - 1.14)	<0.001
Age category				

60-69	1.67 (1.45 - 1.93)	<0.001	1.19 (1.15 - 1.23)	<0.001
70-79	2.85 (2.37 - 3.44)	<0.001	1.38 (1.33 - 1.43)	<0.001
80+	3.53 (2.63 - 4.76)	<0.001	1.45 (1.38 - 1.52)	<0.001
education				
Intermediate	1.10 (0.94 - 1.28)	0.221	1.01 (0.97 - 1.04)	0.659
No qualification	1.15 (0.96 - 1.37)	0.120	1.02 (0.98 - 1.05)	0.405
quintiles of net financial wealth				
1	1.54 (1.25 - 1.91)	<0.001	1.18 (1.13 - 1.23)	<0.001
2	1.31 (1.06 - 1.61)	0.013	1.11 (1.06 - 1.16)	<0.001
3	1.09 (0.91 - 1.31)	0.364	1.08 (1.03 - 1.12)	0.001
4	1.23 (1.03 - 1.47)	0.024	1.06 (1.02 - 1.10)	0.007
current smoking status				
Smoker	1.31 (1.15 - 1.49)	<0.001	1.09 (1.06 - 1.12)	<0.001
drinking				
Regularly	0.67 (0.54 - 0.81)	<0.001	0.84 (0.81 - 0.87)	<0.001
Occasionally	0.76 (0.63 - 0.92)	<0.001	0.90 (0.87 - 0.93)	<0.001
physical activity level				
Sedentary/low	2.15 (1.77 - 2.61)	<0.001	1.38 (1.32 - 1.44)	<0.001
Moderate	1.39 (1.20 - 1.61)	<0.001	1.13 (1.09 - 1.18)	<0.001

Odds ratio/coefficient at baseline	1.43 (1.10 - 1.87)	0.008	2.24 (2.11 - 2.37)	<0.001
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