Supplementary information

Neighbourhood socioeconomic deprivation and allostatic load: a multi-cohort study

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S1 Table. Description of the included cohorts.

Cohort	Description
CoLaus	The CoLaus (COhorte LAUSannoise) is a prospective study assessing the clinical, biological and genetic determinants of cardiovascular disease in the city of Lausanne, Switzerland. The initial survey was conducted between 2003 and 2006 and included 6,733 participants aged 35-75 years; wave 2 was conducted 5.5 years later and included 5,064 participants. In each survey, data on SEP, lifestyle, mental status and cardiovascular risk factors was collected by questionnaire and clinical examination (https://www.colaus-psycolaus.ch/).
EPIPorto	The EPIPorto study was initiated in 1999 and recruited 2,485 adult community dwellers aged 18 years or older in the city of Porto, Northwest of Portugal. Participants were invited to visit the Porto Medical School for an interview, which included a questionnaire on social, demographic, behavioural and clinical data, and a physical examination including blood collection. Since the initial recruitment period there have been two additional waves (wave 2 in 2005-08 and wave 3 in 2013-14) (http://ispup.up.pt/research/research-structures/cohorts/).
WHITEHALL II	The Whitehall II study was established in 1985 to examine the socioeconomic inequalities in health among 10,308 London-based civil servants (6,895 men and 3,413 women) aged 35–55. Baseline examination (wave 1) took place during 1985–1988, and involved a clinical examination and a self-administered questionnaire containing sections on demographic characteristics, health and lifestyle factors, work characteristics, social support, and life events. The first follow-up took place in 1989-90 and the third one in 1991-93 and included 8,815 participants (https://www.ucl.ac.uk/whitehallII).

S2 Table. Description of neighbourhood deprivation indexes available in each cohort

Cohort	Indicator	Data (year)	Geographical Unit	Description
CoLaus	Townsend index of deprivation	2000	hectometric grid (100*100 m)	Composite index of the following variables: 1.Percentage of households without access to a car; 2.Percentage of households with more than one person per room (overcrowding); 3.Percentage of households not owner-occupied (tenure); 4.Percentage of economically active residents who are unemployed.
EPIPorto	EDI European Deprivation Index	2001	Census block groups (~600 inhab/area)	Composite index of the following weighted variables: % overcrowded households, % households with no bath or shower, % household with no indoor flushing, % households occupied by non-owners, % women aged 65 or more, % individuals with low education, % individuals in low income occupation, and % unemployed individuals.
WHITEHALL II	Townsend index of deprivation	1991	Electoral ward (~5500 inhab/area)	Composite index of the following variables: 1.Percentage of households without access to a car; 2.Percentage of households with more than one person per room (overcrowding); 3.Percentage of households not owner-occupied (tenure); 4.Percentage of economically active residents who are unemployed.

S3 Table. Description of the variables/procedures used for multiple imputation.

Variable	Missing (n): Colaus	Missing (n): EPIPorto	Missing (n): Whitehall II	Used for imputation
Sex	0	0	0	YES
Marital Status (2 classes)	47	1	509	YES
Individual SEP (3 classes of educational attainment)	5	0	542	YES
Neighbourhood SES (quintiles of deprivation)	196	2	429	YES
Smoking (3 classes)	57	63	998	YES
Alchool Intake (3 classes)	0	74	503	YES
Sedentariness (2 classes)	883	60	496	YES
Systolic Blood Pressure Quantile (2 classes: 1: >p75; 0: <=p75)	24	173	733	YES
Distolic Blood Pressure Quantile (2 classes: 1: >p75; 0: <=p75)	24	176	734	YES
C-reactive Protein Quantile (2 classes: 1: >p75; 0: <=p75)	43	880	1207	YES
Body Mass Index Quantile (2 classes: 1: >p75; 0: <=p75)	65	46	741	YES
HDL Cholesterol Quantile (2 classes: 1: <p25; 0: >=p25)	22	206	818	YES
LDL Cholesterol Quantile (2 classes: 1: >p75; 0: <=p75)	68	231	951	YES
Total Cholesterol Quantile (2 classes: 1: >p75; 0: <=p75)	22	153	793	YES
Triglycerides Quantile (2 classes: 1: >p75; 0: <=p75)	22	168	793	YES
Waist Circumference Quantile (2 classes: 1: >p75; 0: <=p75)	29	37	819	YES
Glucose Quantile (2 classes: 1: >p75; 0: <=p75)	23	181	1206	YES

S4 Table. Associations (RR and 95% CI) obtained by included a random effect term at neighbourhood level.

cohort	neighbourhood	adjustment	RR	INF 95% CI	SUP 95% CI
CoLaus	Q1-highest SES neighbourhoods	adjusted for demographics	1	1	1
CoLaus	Q2	adjusted for demographics	1,09	1,02	1,16
CoLaus	Q3	adjusted for demographics	1,1	1,04	1,18
CoLaus	Q4	adjusted for demographics	1,13	1,06	1,2
CoLaus	Q5-lowest SES neighbourhoods	adjusted for demographics	1,17	1,1	1,24
EPIPorto	Q1-highest SES neighbourhoods	adjusted for demographics	1	1	1
EPIPorto	Q2	adjusted for demographics	1,04	0,92	1,17
EPIPorto	Q3	adjusted for demographics	1,02	0,91	1,15
EPIPorto	Q4	adjusted for demographics	1,13	1,01	1,27
EPIPorto	Q5-lowest SES neighbourhoods	adjusted for demographics	1,17	1,04	1,31
CoLaus	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES	1	1	1
CoLaus	Q2	adjusted for demographics + individual SES	1,07	1,01	1,14
CoLaus	Q3	adjusted for demographics + individual SES	1,08	1,02	1,15
CoLaus	Q4	adjusted for demographics + individual SES	1,1	1,03	1,18
CoLaus	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES	1,14	1,07	1,21
EPIPorto	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES	1	1	1
EPIPorto	Q2	adjusted for demographics + individual SES	1	0,89	1,12
EPIPorto	Q3	adjusted for demographics + individual SES	0,97	0,86	1,09
EPIPorto	Q4	adjusted for demographics + individual SES	1,06	0,94	1,18
EPIPorto	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES	1,06	0,94	1,19
CoLaus	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1	1	1
CoLaus	Q2	adjusted for demographics + individual SES + behaviours	1,07	1,01	1,14
CoLaus	Q3	adjusted for demographics + individual SES + behaviours	1,08	1,01	1,15
CoLaus	Q4	adjusted for demographics + individual SES + behaviours	1,09	1,02	1,16
CoLaus	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1,12	1,05	1,19

EPIPorto	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1	1	1
EPIPorto	Q2	adjusted for demographics + individual SES + behaviours	0,98	0,88	1,1
EPIPorto	Q3	adjusted for demographics + individual SES + behaviours	0,94	0,85	1,05
EPIPorto	Q4	adjusted for demographics + individual SES + behaviours	1,03	0,92	1,14
EPIPorto	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1,03	0,92	1,15

S5 Table. Associations (RR and 95% CI) obtained using the non-imputed dataset.

cohort	neighbourhood	adjustment	RR	INF 95% CI	SUP 95% CI
CoLaus	Q1-highest SES neighbourhoods	adjusted for demographics	1	1	1
CoLaus	Q2	adjusted for demographics	1,09	1,03	1,15
CoLaus	Q3	adjusted for demographics	1,12	1,06	1,18
CoLaus	Q4	adjusted for demographics	1,11	1,05	1,17
CoLaus	Q5-lowest SES neighbourhoods	adjusted for demographics	1,17	1,1	1,23
EPIPorto	Q1-highest SES neighbourhoods	adjusted for demographics	1	1	1
EPIPorto	Q2	adjusted for demographics	0,99	0,88	1,11
EPIPorto	Q3	adjusted for demographics	1	0,89	1,13
EPIPorto	Q4	adjusted for demographics	1,12	1,01	1,26
EPIPorto	Q5-lowest SES neighbourhoods	adjusted for demographics	1,15	1,02	1,28
Whitehall II	Q1-highest SES neighbourhoods	adjusted for demographics	1	1	1
Whitehall II	Q2	adjusted for demographics	1,08	1,03	1,14
Whitehall II	Q3	adjusted for demographics	1,11	1,05	1,16
Whitehall II	Q4	adjusted for demographics	1,08	1,03	1,14
Whitehall II	Q5-lowest SES neighbourhoods	adjusted for demographics	1,13	1,07	1,2
All cohorts	Q1-highest SES neighbourhoods	adjusted for demographics	1	1	1
All cohorts	Q2	adjusted for demographics	1,08	1,04	1,11
All cohorts	Q3	adjusted for demographics	1,1	1,06	1,14
All cohorts	Q4	adjusted for demographics	1,1	1,06	1,13
All cohorts	Q5-lowest SES neighbourhoods	adjusted for demographics	1,15	1,11	1,19
CoLaus	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES	1	1	1
CoLaus	Q2	adjusted for demographics + individual SES	1,07	1,01	1,13
CoLaus	Q3	adjusted for demographics + individual SES	1,09	1,04	1,15
CoLaus	Q4	adjusted for demographics + individual SES	1,08	1,02	1,14

CoLaus	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES	1,13	1,07	1,2
EPIPorto	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES	1	1	1
EPIPorto	Q2	adjusted for demographics + individual SES	0,95	0,85	1,07
EPIPorto	Q3	adjusted for demographics + individual SES	0,95	0,85	1,07
EPIPorto	Q4	adjusted for demographics + individual SES	1,03	0,92	1,16
EPIPorto	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES	1,02	0,9	1,14
Whitehall II	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES	1	1	1
Whitehall II	Q2	adjusted for demographics + individual SES	1,08	1,03	1,14
Whitehall II	Q3	adjusted for demographics + individual SES	1,11	1,05	1,16
Whitehall II	Q4	adjusted for demographics + individual SES	1,08	1,03	1,14
Whitehall II	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES	1,13	1,07	1,2
All cohorts	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES	1	1	1
All cohorts	Q2	adjusted for demographics + individual SES	1,07	1,03	1,1
All cohorts	Q3	adjusted for demographics + individual SES	1,09	1,05	1,13
All cohorts	Q4	adjusted for demographics + individual SES	1,08	1,04	1,12
All cohorts	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES	1,12	1,09	1,17
CoLaus	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1	1	1
CoLaus	Q2	adjusted for demographics + individual SES + behaviours	1,05	0,99	1,12
CoLaus	Q3	adjusted for demographics + individual SES + behaviours	1,06	1	1,13
CoLaus	Q4	adjusted for demographics + individual SES + behaviours	1,05	0,99	1,12
CoLaus	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1,12	1,05	1,19
EPIPorto	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1	1	1
EPIPorto	Q2	adjusted for demographics + individual SES + behaviours	0,95	0,84	1,07
EPIPorto	Q3	adjusted for demographics + individual SES + behaviours	0,9	0,8	1,01
EPIPorto	Q4	adjusted for demographics + individual SES + behaviours	1,01	0,9	1,13
EPIPorto	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	0,98	0,87	1,1
Whitehall II	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1	1	1

Whitehall II	Q2	adjusted for demographics + individual SES + behaviours	1,05	1	1,11
Whitehall II	Q3	adjusted for demographics + individual SES + behaviours	1,08	1,02	1,14
Whitehall II	Q4	adjusted for demographics + individual SES + behaviours	1,05	0,99	1,1
Whitehall II	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1,08	1,02	1,15
All cohorts	Q1-highest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1	1	1
All cohorts	Q2	adjusted for demographics + individual SES + behaviours	1,04	1	1,08
All cohorts	Q3	adjusted for demographics + individual SES + behaviours	1,07	1,03	1,11
All cohorts	Q4	adjusted for demographics + individual SES + behaviours	1,06	1,02	1,1
All cohorts	Q5-lowest SES neighbourhoods	adjusted for demographics + individual SES + behaviours	1,11	1,07	1,15

S6 Table. Associations (RR and 95% CI) obtained using a fixed-effect meta-analysis.

cohort	neighbourhood	adjustment	rr	rrlow	rrup	i2
All cohorts	Q1-least deprived neighbourhoods	adjusted for demographics	1	1	1	
All cohorts	Q2	adjusted for demographics	1,07	1,04	1,1	
All cohorts	Q3	adjusted for demographics	1,07	1,04	1,1	
All cohorts	Q4	adjusted for demographics	1,11	1,08	1,14	
All cohorts	Q5-most deprived neighbourhoods	adjusted for demographics	1,15	1,12	1,18	**64.5% (34.3% - 80.9%)**
All cohorts	Q1-least deprived neighbourhoods	adjusted for demographics + individual SES	1	1	1	
All cohorts	Q2	adjusted for demographics + individual SES	1,06	1,03	1,1	
All cohorts	Q3	adjusted for demographics + individual SES	1,06	1,03	1,09	
All cohorts	Q4	adjusted for demographics + individual SES	1,09	1,06	1,12	
All cohorts	Q5-most deprived neighbourhoods	adjusted for demographics + individual SES	1,12	1,09	1,15	**61.3% (27.3% - 79.4%)**
All cohorts	Q1-least deprived neighbourhoods	adjusted for demographics + individual SES + behaviours	1	1	1	
All cohorts	Q2	adjusted for demographics + individual SES + behaviours	1,06	1,02	1,09	
All cohorts	Q3	adjusted for demographics + individual SES + behaviours	1,04	1,01	1,07	
All cohorts	Q4	adjusted for demographics + individual SES + behaviours	1,07	1,04	1,1	
All cohorts	Q5-most deprived neighbourhoods	adjusted for demographics + individual SES + behaviours	1,09	1,06	1,12	**56.2% (16.4% - 77.0%)**

S7 Table. Associations (RR and 95% CI) obtained using a fixed-effect meta-analysis (stratified).

cohort	neighbourhood	Individual SES	rr	rrlow	rrup	i2
All cohorts	Q1-least deprived neighbourhoods	low	1	1	1	
All cohorts	Q2	low	1,07	1,02	1,11	
All cohorts	Q3	low	1,1	1,06	1,15	
All cohorts	Q4	low	1,09	1,04	1,13	
All cohorts	Q5-most deprived neighbourhoods	low	1,17	1,13	1,22	**70.3% (46.4% - 83.6%)**
All cohorts	Q1-least deprived neighbourhoods	medium	1	1	1	
All cohorts	Q2	medium	1	0,94	1,07	
All cohorts	Q3	medium	1,02	0,96	1,09	
All cohorts	Q4	medium	1,06	0,99	1,13	
All cohorts	Q5-most deprived neighbourhoods	medium	1,08	1,01	1,15	**56.7% (17.5% - 77.3%)**
All cohorts	Q1-least deprived neighbourhoods	high	1	1	1	
All cohorts	Q2	high	1,09	1,04	1,14	
All cohorts	Q3	high	1,03	0,98	1,09	
All cohorts	Q4	high	1,13	1,08	1,19	
All cohorts	Q5-most deprived neighbourhoods	high	1,08	1,03	1,14	**49.3% (1.5% - 73.9%)**

S8 Table. Associations (RR and 95% CI) including only individuals that did not change neighbourhood deprivation quintile between wave 1 and wave 2.

cohort	neighbourhood	adjustment	rr	rrlow	rrup
CoLaus	Q1-least deprived neighbourhoods	adjusted for demographics	1,00	1,00	1,00
CoLaus	Q2	adjusted for demographics	1,10	1,02	1,19
CoLaus	Q3	adjusted for demographics	1,11	1,02	1,20
CoLaus	Q4	adjusted for demographics	1,10	1,01	1,19
CoLaus	Q5-most deprived neighbourhoods	adjusted for demographics	1,18	1,10	1,27
CoLaus	Q1-least deprived neighbourhoods	adjusted for demographics + individual SEP	1	1	1
CoLaus	Q2	adjusted for demographics + individual SEP	1,08	1,01	1,17
CoLaus	Q3	adjusted for demographics + individual SEP	1,09	1,01	1,18
CoLaus	Q4	adjusted for demographics + individual SEP	1,08	0,99	1,17
CoLaus	Q5-most deprived neighbourhoods	adjusted for demographics + individual SEP	1,14	1,06	1,22
CoLaus	Q1-least deprived neighbourhoods	adjusted for demographics + individual SEP + behaviours	1	1	1
CoLaus	Q2	adjusted for demographics + individual SEP + behaviours	1,08	1,01	1,16
CoLaus	Q3	adjusted for demographics + individual SEP + behaviours	1,08	1	1,17
CoLaus	Q4	adjusted for demographics + individual SEP + behaviours	1,07	0,99	1,16
CoLaus	Q5-most deprived neighbourhoods	adjusted for demographics + individual SEP + behaviours	1,11	1,03	1,17