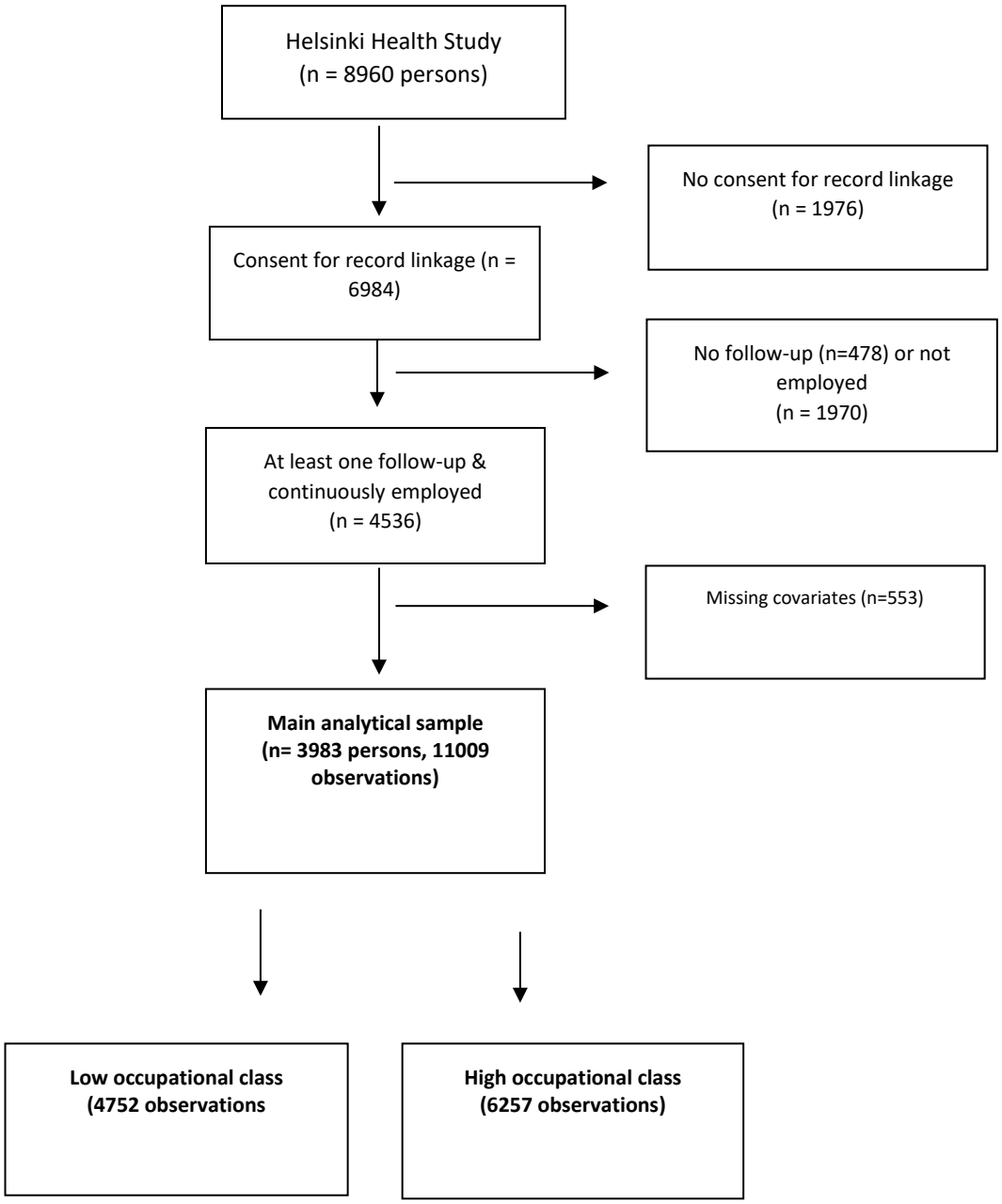
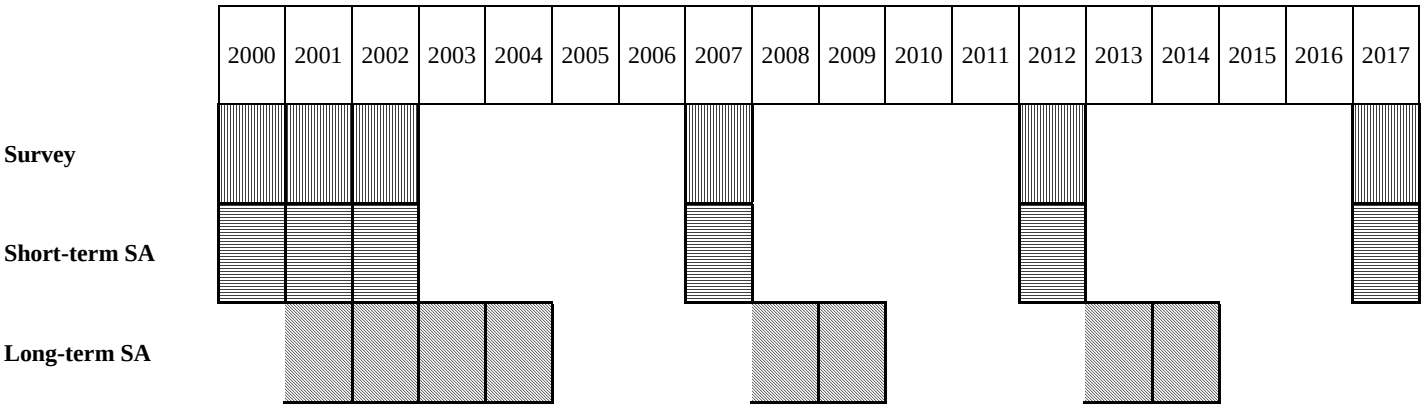
SUPPLEMENTARY MATERIALS



Supplementary figure S1. Flowchart of the study population



Supplementary figure S2. Study design. Years are calendar years

Supplementary Table S1. Within-individual association between acute/subacute and chronic pain, and short-term sickness absence days while using imputations for item missing values. Incidence Rate Ratios, IRRs, and their 95% confidence intervals CI.

Model	All	High occupational class	Low occupational class	P-value for occupational class interaction[a]
	IRR [95% CI]	IRR [95% CI]	IRR [95% CI]	
Pain (ref group: no pain)				
Acute or subacute pain	1.12* [1.00,1.24]	1.02 [0.87,1.20]	1.25** [1.08,1.44]	0.039
Chronic pain	1.30*** [1.18,1.44]	1.23** [1.06,1.43]	1.39*** [1.20,1.61]	0.150
Health				
Long-standing illness	1.33*** [1.20,1.47]	1.25** [1.07,1.46]	1.40*** [1.22,1.61]	
Common mental disorders	1.53*** [1.40,1.68]	1.59*** [1.39,1.83]	1.56*** [1.37,1.78]	
Working conditions				
Mentally strenuous work	1.02 [0.89,1.16]	0.97 [0.81,1.17]	1.03 [0.85,1.25]	
Physically strenuous work	1.30*** [1.16,1.46]	1.14 [0.94,1.39]	1.31*** [1.13,1.52]	0.316
Low job control	1.05 [0.93,1.18]	1.17 [0.95,1.43]	0.99 [0.86,1.16]	0.250
Number of observations	14670	7916	6754	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Short-term association is measures by SA days in the survey. All models are adjusted for survey wave, marital status, night/shift work and part-time work

a) interaction terms for variables differed in the stratified models included to a single model

Notes on imputations:
First, the patterns of item missingness were explored. Then, based on the explorative analyses, multivariate imputation by chained equations and 20 created data sets were considered as the most appropriate approach. We used all variables in the present study in the imputation model and, in addition, gender, and baseline occupation class as potential predictors. Logarithm converted baseline SA measure was used also as predictor, but no imputed SA values were used as the measure did not consist of any missing values. Imputations were performed in a wide format meaning that the responses from the other waves were used also as potential predictors. We did not impute the missingness for the persons who were non-respondents in a given wave, i.e. no whole wave imputations were used. Logistic or multinomial logistic regression where appropriate were used in the imputations process. STATA's mi impute chained command was used.

Supplementary Table S2. Within-individual association between acute/subacute and chronic pain, and longer-term sickness absence days while using imputations for item missing values. Incidence Rate Ratios, IRRs, and their 95% confidence intervals CI.

Model	**All**	**High occupational class**	**Low occupational class**	**p- value for the occupational class interaction[a]**
	IRR [95% CI]	IRR [95% CI]	IRR [95% CI]	
Pain (ref group: no pain)				
Acute or subacute pain	1.13* [1.03,1.24]	1.10 [0.96,1.27]	1.18* [1.04,1.34]	0.443
Chronic pain	1.25*** [1.14,1.37]	1.22** [1.06,1.40]	1.30*** [1.14,1.47]	0.571
Health				
Long-standing illness	1.11* [1.01,1.22]	1.22** [1.06,1.41]	1.01 [0.89,1.16]	0.071
Common mental disorders	1.00 [0.92,1.10]	1.07 [0.93,1.22]	0.95 [0.84,1.06]	
Working conditions				
Mentally strenuous work	1.12 [1.00,1.26]	1.19* [1.02,1.40]	1.03 [0.85,1.24]	0.182
Physically strenuous work	1.15** [1.04,1.28]	1.06 [0.88,1.27]	1.19* [1.04,1.36]	0.272
Low job control	1.10 [0.98,1.22]	1.08 [0.88,1.32]	1.11 [0.98,1.26]	
Number of observations	9225	4988	4237	

Notes: * p < 0.05, ** p < 0.01, *** p < 0.001

Long-term association is measures by SA days in the two years after the survey year. All models are adjusted for survey wave, marital status, night/shift work and part-time work

b) interaction terms for variables differed in the stratified models included to a single model

Supplementary Table S3. Within-individual association between multisite pain and sickness absence days while using imputations for item missing values. Incidence Rate Ratios, IRRs, and their 95% confidence intervals CI.

Pain	**All**	**High occupational class**	**Low occupational class**	**p- value for the occupational class interaction[a]**
	IRR [95% CI]	IRR [95% CI]	IRR [95% CI]	
Short-term association				
Pain (ref group: no pain)				
One pain location	1.24*** [1.12,1.36]	1.11 [0.96,1.29]	1.37*** [1.20,1.58]	0.009
Two pain locations	1.33*** [1.17,1.50]	1.31** [1.09,1.58]	1.37*** [1.14,1.64]	0.600
Three or more pain locations	1.15 [1.00,1.32]	1.08 [0.87,1.34]	1.24* [1.02,1.51]	0.346
No of observations	14670	7916	6754	
Long-term association				
Pain (ref group: no pain)				
One pain location	1.16** [1.06,1.27]	1.14 [1.00,1.31]	1.22** [1.08,1.38]	0.562
Two pain locations	1.22*** [1.09,1.36]	1.21* [1.01,1.43]	1.22** [1.05,1.42]	0.764
Three or more pain locations	1.33*** [1.17,1.51]	1.19 [0.96,1.48]	1.47*** [1.25,1.74]	0.234
No of observations	9225	4988	4237	

Notes: * p < 0.05, ** p < 0.01, *** p < 0.001

All models adjusted for CMDs, long-standing illness, physical and mental work environments, job control, survey wave, marital status, night/shift work, part-time work

a) interaction terms for variables differed in the stratified models included to a single model

Supplementary table S4. Transitions in sickness absence

SA – short-term				
Time 0 (wave t) SA	None % (n)	1-9 % (n)	10 or more % (n)	Total % (n)
None	51 (1064)	34 (705)	15 (313)	100 (2082)
1-9 days	26 (742)	48 (1399)	26 (747)	100 (2888)
10 days or more	13 (266)	33 (687)	54 (1103)	100 (2056)
Total	29 (2072)	40 (2791)	31 (2163)	100 (7026)
Proportion of participants with at least one observation in which no SA days				
All				51 (2018)
Baseline high occupational class				58 (1245)
Baseline low occupational class				42 (773)
Proportion of participants with at least one observation with 1-9 SA days				
All				68 (2692)
Baseline high occupational class				70 (1497)
Baseline low occupational class				65 (1195)
Proportion of participants with at least one observation with 10 SA days				
All				52 (2090)
Baseline high occupational class				44 (941)
Baseline low occupational class				62 (1149)
SA – Long-term				
Time 0 (wave t) SA	None % (n)	1-9 % (n)	10 or more % (n)	Total % (n)
None	46 (398)	32 (278)	22 (188)	100 (864)
1-9 days	15 (252)	46 (777)	39 (653)	100 (1682)
10 days or more	7 (164)	23 (549)	71 (1727)	100 (2440)
Total	16 (814)	32 (1604)	52 (2568)	100 (4986)
Proportion of participants with at least one observation in which no SA days % (n)				
All				29 (977)
Baseline high occupational class				35 (629)
Baseline low occupational class				22 (348)
Proportion of participants with at least one observation with 1-9 SA days% (n)				
All				55 (1835)
Baseline high occupational class				61 (1085)
Low occupational class				48 (750)
Proportion of participants with at least one observation with 10 or more SA days % (n)				
All				70 (2361)
Baseline high occupational class				63 (1109)
Baseline low occupational class				79 (1252)

Supplementary table S5. Pain change variables and subsequent sickness absence (Incidence Rate Ratios, IRRs, and their 95% confidence intervals CI).

Pain	Short-term association		Long-term association	
	IRR	95% CI	IRR	95% CI
Stable no pain	1		1	
Stable pain	1.19***	1.09-1.30	1.37***	1.25-1.50
Decreasing pain[a]	0.99	0.92-1.08	1.16**	1.06-1.26
Increasing pain[b]	1.39***	1.28-1.51	1.48***	1.36-1.60
No of observations	4944		4122	

Notes: * p < 0.05, ** p < 0.01, *** p < 0.001
Negative binomial regression with GEE (exchangeable correlation structure). Outcomes were SA days in 2007, 2012 and 2017 for the short-term association and SA days in 2008-9 and 2013-14 for the long-term association. Adjusted for lagged SA (the SA days in the period before, log transformed), marital status, occupational class, part-time work, night/shift-work, long-standing illness, common mental disorders and working conditions.

a) i.e. from chronic pain to acute/subacute pain or no pain, or from acute/subacute to no pain
b) i.e. from no pain to acute/subacute or chronic pain, or from acute/subacute pain to chronic pain