

Occupational noise exposure and ischemic heart disease: a pooled analysis of six Nordic cohorts¹

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Supplementary Table S1: Detailed information on study cohorts.

Cohort	Location	Baseline Years	End of follow-up	Funding	Reference
Diet, Cancer, and Health (DCH)	Copenhagen/ Aarhus, Denmark	1993- 1997	December 2016	The Danish Cancer Society	Tjønneland A, Olsen A, Boll K et al. Study design, exposure variables, and socioeconomic determinants of participation in Diet, Cancer and Health: A population-based prospective cohort study of 57,053 men and women in Denmark. <i>Scand J Public Health</i> 2007;35:432-441.
FINRISK ^a	Helsinki, Vantaa and Turku, Finland	1997- 2012	December 2015	Ministry of Social Affairs and Health / Finnish Institute for Health and Welfare	Borodulin K, Tolonen H, Jousilahti P et al. Cohort Profile: The National FINRISK Study. <i>Int J Epidemiol</i> 2018;47:696-696i.
Malmö Diet and Cancer Study (MDCS)	Malmö, Sweden	1991- 1996	December 2017	Swedish Research Council Infrastructure grant; Swedish Heart-Lung Foundation.	Berglund G, Elmståhl S, Janzon L, Larsson SA. Design and feasibility. <i>J Intern Med</i> 1993;233:45-51.

Swedish Primary Prevention Study (PPS)	Gothenburg, Sweden	1970-1973	December 2011	The Bank of Sweden Tercentenary Fund and the Swedish Medical Research Council	Wilhelmsen L, Berglund G, Elmfeldt D, Samuelsson O, Svardsudd K. The Multifactor Primary Prevention Trial in Göteborg, Sweden. <i>Drugs</i> 1986;31:47-51.
Screening Across the Lifespan Twin Study (SALT)	Stockholm, Sweden	1998-2002	December 2016	Swedish Environmental Protection Agency; the Swedish Council for Health, Working Life and Social Research; the Swedish Heart-Lung Foundation; NIH grant 575 AG-08724; Swedish Research Council grant number 2017-00641.	Magnusson PKE, Almqvist C, Rahman I et al. The Swedish Twin Registry: Establishment of a Biobank and Other Recent Developments. <i>Twin Research and Human Genetics</i> 2013;16:317-329.
Swedish National Study of Ageing and Care in Kungsholmen (SNAC-K)	Stockholm, Sweden	2001-2004	December 2016	Swedish Environmental Protection Agency; Swedish Council for Health, Working Life and Social Research; Swedish Research Council; Swedish Heart-Lung Foundation; Ministry of Health and Social Affairs, Sweden; Stockholm County Council; and participating Municipalities and University Departments	Lagergren M, Fratiglioni L, Hallberg IR et al. A longitudinal study integrating population, care and social services data. The Swedish National study on Aging and Care (SNAC). <i>Aging Clinical and Experimental Research</i> 2004;16:158-168.

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Supplementary Table S2: Characteristics of the study population at baseline by individual cohort (%)

	DCH n=45 458	FINRISK n=4206	MDCS n=21 921	PPS^a n=4706	SALT^b n=5720	SNAC-K^b n=1092
Age at baseline (mean)	56.5	45.5	56.2	51.2	58.0	67.3
Sex						
Men	47.2	43.5	39.0	100	44.0	41.3
Women	52.8	56.5	61.0		56.0	58.7
Marital status						
Single	23.0	29.5	34.1	13.8	32.4	46.4
Married/cohabiting	77.0	70.5	65.9	86.2	67.6	53.6
Educational level						
Low	27.3	13.4	64.8	68.7	25.1	17.8
Medium	47.8	59.9	18.9	20.2	36.5	39.0
High	24.9	26.7	16.3	11.1	38.4	43.2
Area-level income (quartiles)						
Q1	33.8	19.7	21.8	25.7	7.0	
Q2	22.6	24.9	20.3	22.1	10.1	
Q3	17.0	26.7	26.8	24.7	18.3	
Q4	26.6	28.7	31.1	27.5	64.6	
Smoking Status						
Current	35.7	26.6	29.3	39.5	20.6	18.4
Former	28.1	35.7	33.2	33.2	35.7	41.3
Never	36.2	43.6	37.5	37.3	43.7	40.3
Leisure-time physical activity						
Low	50.7	18.1	51.0	24.9	54.2	70.4
Medium	20.1	36.4	21.0	58.7	36.4	23.1
High	29.2	45.5	28.0	16.4	9.2	6.5

Alcohol Consumption						
Daily	19.8	17.5	17.8	N/A		10.8
Weekly	60.1	48.1	35.6	N/A		54.0
Seldom	17.5	27.4	30.9	N/A		29.4
Never	2.5	5.8	14.4	N/A		5.8
Missing	0.1	1.2	1.3			
BMI (mean)	26.0	26.2	25.6	25.3	24.5	25.8

^aData on alcohol consumption was not available for the PPS cohort

^bData suppressed due to small numbers.

Supplementary Table S3 Associations between occupational noise exposure at baseline and ischemic heart disease and myocardial infarction incidence; hazard ratios (HR) and 95% CI without adjustment for education.

Occupational noise level [dB(A)]	Cases (n)	Model 1^a HR (95% CI)	Model 2^b HR (95% CI)	Model 3^c HR (95% CI)
Ischemic heart disease				
<70	9071	ref	ref	ref
70-74	2960	1.11 (1.06–1.16)	1.11 (1.06–1.16)	1.08 (1.04–1.13)
75-79	1794	1.14 (1.08–1.20)	1.14 (1.08–1.20)	1.11 (1.05–1.16)
80-84	1434	1.13 (1.07–1.20)	1.13 (1.07–1.20)	1.09 (1.03–1.16)
85+	961	1.22 (1.14–1.30)	1.22 (1.14–1.30)	1.15 (1.08–1.23)
Ischemic heart disease excluding angina pectoris^b				
<70	5006	ref	ref	ref
70-74	1616	1.11 (1.05–1.17)	1.11 (1.04–1.17)	1.07 (1.01–1.13)
75-79	1049	1.16 (1.09–1.25)	1.16 (1.08–1.24)	1.12 (1.05–1.20)
80-84	913	1.19 (1.11–1.28)	1.19 (1.11–1.28)	1.14 (1.06–1.22)
85+	615	1.28 (1.18–1.40)	1.28 (1.17–1.40)	1.20 (1.10–1.31)
Acute myocardial infarction				
<70	3168	ref	ref	ref
70-74	1007	1.12 (1.04–1.20)	1.12 (1.04–1.20)	1.07 (1.00–1.16)
75-79	690	1.16 (1.06–1.26)	1.16 (1.06–1.26)	1.12 (1.03–1.22)
80-84	640	1.18 (1.09–1.29)	1.18 (1.08–1.29)	1.14 (1.04–1.24)
85+	440	1.32 (1.19–1.47)	1.32 (1.19–1.46)	1.24 (1.12–1.37)

^aModel 1: Adjusted for age (by design), cohort, baseline year, sex

^bModel 2: Adjusted for age (by design), cohort, baseline year, sex, marital status, area-level income

^cModel 3: Adjusted for age (by design), cohort, baseline year, sex, marital status, area-level income, smoking, and physical activity

^dInformation on angina pectoris was not available for the FINRISK cohort.

Supplemental Table S4. Adjusted^a associations between occupational noise exposure at baseline and ischemic heart disease and myocardial infarction incidence stratified by education level; hazard ratios (HR) and 95% CI

Occupational noise level [dB(A)]	Low Education		Medium Education		High Education	
	Cases (n)	Model 3 HR (95% CI)	Cases (n)	Model 3 HR (95% CI)	Cases (n)	Model 3 HR (95% CI)
Ischemic heart disease						
<70	3480	ref	3590	ref	2001	ref
70-74	1499	1.05 (0.99–1.12)	990	1.05 (0.98–1.13)	471	1.06 (0.95–1.18)
75-79	1014	1.11 (1.03–1.20)	597	1.05 (0.96–1.16)	183	0.86 (0.74–1.01)
80+	1588	1.06 (0.99–1.13)	691	1.06 (0.97–1.15)	116	0.99 (0.82–1.21)
Ischemic heart disease excluding angina pectoris^b						
<70	2049	ref	1912	ref	1045	Ref
70-74	866	1.02 (0.94–1.11)	519	1.04 (0.94–1.15)	231	1.03 (0.88–1.20)
75-79	630	1.09 (1.00–1.20)	328	1.09 (0.96–1.23)	91	0.84 (0.67–1.05)
80+	1077	1.07 (0.98–1.16)	398	1.13 (1.00–1.26)	53	0.94 (0.71–1.25)
Acute myocardial infarction						
<70	1395	ref	1158	ref	615	Ref
70-74	572	1.01 (0.92–1.12)	313	1.06 (0.93–1.20)	122	1.04 (0.84–1.27)
75-79	442	1.09 (0.97–1.22)	196	1.07 (0.91–1.25)	52	0.84 (0.63–1.12)
80+	809	1.07 (0.97–1.18)	246	1.14 (0.98–1.32)	25	0.82 (0.54–1.23)

^aModel 3: Adjusted for age (by design), cohort, baseline year, sex, marital status, area-level income, smoking, and physical activity

^bInformation on angina pectoris was not available for the FINRISK cohort.

Supplementary Table S5. Associations between occupational noise exposure at baseline and ischemic heart disease and myocardial infarction incidence, excluding cohort with missing alcohol (PPS); hazard ratios (HR) and 95% CI.

Occupational noise level [dB(A)]	Cases (n)	Model 1^a HR (95% CI)	Model 2^b HR (95% CI)	Model 3^c HR (95% CI)	Model 4^d HR (95% CI)	Model 5^e HR (95% CI)
Ischemic heart disease						
<70	8289	ref	ref	ref	ref	ref
70-74	2711	1.12 (1.07–1.17)	1.08 (1.03–1.13)	1.06 (1.02–1.11)	1.05 (1.00–1.09)	1.04 (0.99–1.08)
75-79	1510	1.14 (1.08–1.21)	1.10 (1.04–1.16)	1.07 (1.01–1.14)	1.06 (1.00–1.12)	1.04 (0.98–1.10)
80-84	1103	1.13 (1.06–1.20)	1.07 (1.01–1.14)	1.05 (0.98–1.12)	1.03 (0.96–1.10)	1.00 (0.94–1.07)
85+	700	1.25 (1.15–1.35)	1.15 (1.07–1.25)	1.10 (1.02–1.20)	1.09 (1.00–1.18)	1.06 (0.98–1.15)
Ischemic heart disease excluding angina pectoris^f						
<70	4433	ref	ref	ref	ref	ref
70-74	1430	1.12 (1.05–1.19)	1.07 (1.01–1.14)	1.04 (0.98–1.11)	1.03 (0.97–1.09)	1.02 (0.96–1.08)
75-79	829	1.16 (1.08–1.25)	1.10 (1.02–1.19)	1.08 (1.00–1.16)	1.06 (0.98–1.14)	1.03 (0.96–1.12)
80-84	649	1.17 (1.08–1.28)	1.10 (1.01–1.20)	1.07 (0.98–1.17)	1.05 (0.96–1.14)	1.02 (0.94–1.11)
85+	407	1.31 (1.18–1.46)	1.19 (1.08–1.33)	1.13 (1.02–1.26)	1.11 (1.00–1.24)	1.08 (0.97–1.20)
Acute myocardial infarction						
<70	2677	ref	ref	ref	ref	ref
70-74	850	1.14 (1.05–1.23)	1.08 (1.00–1.17)	1.05 (0.97–1.15)	1.03 (0.95–1.12)	1.02 (0.94–1.10)
75-79	518	1.19 (1.08–1.31)	1.12 (1.02–1.23)	1.09 (0.99–1.20)	1.07 (0.97–1.18)	1.05 (0.95–1.15)
80-84	420	1.17 (1.05–1.30)	1.08 (0.97–1.20)	1.07 (0.96–1.19)	1.04 (0.93–1.15)	1.01 (0.91–1.12)
85+	264	1.40 (1.23–1.59)	1.25 (1.09–1.42)	1.18 (1.04–1.35)	1.15 (1.01–1.32)	1.12 (0.99–1.28)

^aModel 1: Adjusted for age (by design), cohort, baseline year, sex

^bModel 2: Adjusted for age (by design), cohort, baseline year, sex, marital status, area-level income, education

^cModel 3: Adjusted for age (by design), cohort, baseline year, sex, marital status, area-level income, education, smoking, and physical activity

^dModel 4: Adjusted for age (by design), cohort, baseline year, sex, marital status, area-level income, education, smoking, physical activity, and alcohol

^eModel 5: Adjusted for age (by design), cohort, baseline year, sex, marital status, area-level income, education, smoking, physical activity, alcohol, and BMI

^fInformation on angina pectoris was not available for the FINRISK cohort.

Supplementary Table S6. Adjusted^a associations between occupational noise exposure at baseline and ischemic heart disease and myocardial infarction incidence by individual cohort; hazard ratios (HR) and 95% CI.

Occupational noise level [dB(A)]	DCH n=45 458	FINRISK^c n=4206	MDCS n=21 921	PPS n=4706	SALT^b n=5720	SNAC-K^c n=1092
Ischemic heart disease						
<70	ref	ref	ref	ref	ref	
70-74	1.05 (1.00–1.11)	0.72 (0.40–1.31)	1.06 (0.98–1.16)	0.90 (0.78–1.05)	0.97 (0.77–1.22)	
75-79	1.04 (0.97–1.11)	0.99 (0.57–1.71)	1.10 (0.99–1.22)	0.95 (0.82–1.10)	1.04 (0.80–1.34)	
80-84	0.99 (0.89–1.09)	1.35 (0.55–3.28)	1.05 (0.95–1.15)	0.96 (0.83–1.11)	1.22 (0.93–1.60)	
85+	1.02 (0.93–1.13)	1.53 (0.58–4.06)	1.25 (1.08–1.44)	0.91 (0.78–1.07)		
Ischemic heart disease excluding angina pectoris^b						
<70	ref	N/A	ref	ref	ref	
70-74	1.04 (0.96–1.12)	N/A	1.02 (0.92–1.14)	0.92 (0.77–1.09)	0.98 (0.73–1.31)	
75-79	1.03 (0.93–1.14)	N/A	1.10 (0.96–1.25)	0.99 (0.84–1.17)	1.07 (0.78–1.47)	
80-84	0.99 (0.86–1.15)	N/A	1.06 (0.94–1.19)	1.03 (0.88–1.21)	1.14 (0.80–1.62)	
85+	1.10 (0.97–1.25)	N/A	1.13 (0.94–1.35)	0.99 (0.83–1.18)		
Acute myocardial infarction						
<70	ref		ref	ref	ref	
70-74	1.04 (0.94–1.16)		1.03 (0.91–1.17)	0.90 (0.74–1.09)	0.91 (0.62–1.33)	
75-79	1.06 (0.93–1.21)		1.13 (0.97–1.31)	0.91 (0.75–1.09)	0.97 (0.65–1.45)	
80-84	0.91 (0.75–1.12)		1.09 (0.95–1.24)	0.99 (0.83–1.18)	1.27 (0.83–1.95)	
85+	1.15 (0.97–1.37)		1.15 (0.92–1.42)	0.97 (0.80–1.17)		

^aAdjusted for age (by design), baseline year, sex, marital status, area-level income, education, smoking, and physical activity

^bInformation on angina pectoris was not available for the FINRISK cohort.

^cSome results were suppressed due to small sample sizes.