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Shift work and overall and cause-specific mortality in the Danish nurse cohort ¹

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¹ *Supplementary tables*

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Table A. Characteristics of the 10 712 nurses excluded due to missing values on one or more covariate and the 18 015 nurses included in this study by status (active/dead) at end of follow-up (31.12.2012)

	Included Nurses (N = 18 015)				Excluded Nurses (N = 10 712)			
	Alive		Dead ^a		Alive		Dead ^a	
	N	%	N	%	N	%	N	%
Total	16 399	91.0	1616	9.0	6892	64.3	3820	35.7
Work type								
Day	10 338	63.0	934	57.8	1817	61.6	227	56.5
Evening	1569	9.6	236	14.6	336	11.4	62	15.4
Night	829	5.1	151	9.3	201	6.8	41	10.2
Rotating	3663	22.3	295	18.3	595	20.2	72	17.9
Body mass index (kg/m ²)								
< 18.5 kg/m ²	291	1.8	63	3.9	155	2.3	250	6.7
18.5-24.9 kg/m ²	11 593	70.7	1095	67.8	4608	68.2	2352	62.9
25-29.9 kg/m ²	3613	22.0	351	21.7	1633	24.2	916	24.5
≥ 30 kg/m ²	902	5.5	107	6.6	364	5.4	219	5.9
Smoking status								
Never	6323	38.6	402	24.9	1949	31.5	760	21.3
Past	4877	29.7	367	22.7	2056	33.2	1196	33.6
Current	5199	31.7	847	52.4	2181	35.3	1605	45.1
No. of pack years ^b								
≤ 10 years	4745	28.9	351	21.7	1558	28.6	723	22.9
11-20 years	2695	16.4	247	15.3	915	16.8	556	17.6
> 20 years	2636	16.1	616	38.1	1019	18.7	1112	35.3
Never-smokers	6323	38.6	402	24.9	1949	35.8	760	24.1
Alcohol consumption (no. of drinks/week)								
None	1929	11.8	261	16.2	1251	20.0	1158	32.2
Moderate (1-14)	10 607	64.7	915	56.6	3699	59.1	1756	48.8
Heavy (>15)	3863	23.6	440	27.2	1304	20.9	682	19.0

	Included Nurses (N = 18 015)				Excluded Nurses (N = 10 712)			
	Alive		Dead ^a		Alive		Dead ^a	
	N	%	N	%	N	%	N	%
Physical activity								
Low	817	5.0	139	8.6	434	6.5	663	18.2
Medium	10 803	65.9	1103	68.3	1721	25.7	624	17.1
High	4779	29.1	374	23.1	4545	67.8	2364	64.7
Diet								
Consume vegetables on daily basis	16 214	98.9	1573	97.3	6768	98.2	3711	97.1
Consume fruit on daily basis	15 856	96.	1531	94.7	6665	96.7	3619	94.7
Avoids fatty meat	15 060	91.8	1410	87.3	6090	89.3	3126	83.0
Self-reported preexisting diseases								
Hypertension	1619	9.9	271	16.8	1014	15.0	1008	26.8
Diabetes	134	0.8	24	1.5	83	1.2	135	3.6
Myocardial infraction	32	0.2	15	0.9	56	0.8	141	3.7
Self-reported health								
Very good	7463	45.5	531	32.9	2216	34.8	735	20.4
Good	7170	43.7	770	47.6	2751	43.2	1494	41.4
Moderate	1624	9.9	270	16.7	1196	18.8	1105	30.6
Bad	129	0.8	37	2.3	184	2.9	222	6.2
Very bad	13	0.1	8	0.5	26	0.4	52	1.4
Working status								
Working	16 313	99.5	1611	99.7	2917	46.2	396	10.6
Homeworker	1	<1	0	0.0	411	6.5	113	3.0
Retired	8	<1	1	0.1	2676	42.4	3178	85.3
Unemployed/rehabilitation	3	<1	1	0.1	156	2.5	32	0.9
Other	74	0.5	3	0.2	157	2.5	7	0.2
Stressful work environment								
Never	205	1.3	46	2.8	68	2.0	18	3.7
Rarely	2579	15.7	268	16.6	528	15.4	93	19.1
Occasionally	7072	43.1	716	44.3	1511	44.1	211	43.4
Often	5245	32.0	468	29.0	1046	30.5	123	25.3
Almost always	1298	7.9	118	7.3	275	8.0	41	8.4
Marital status								
Married	12 404	75.6	1072	66.3	4717	70.4	1687	44.8
Separated	292	1.8	36	2.2	95	1.4	36	1.0
Divorced	1876	11.4	218	13.5	690	10.3	346	9.2
Single	1230	7.5	175	10.8	629	9.4	884	23.5
Widow	597	3.6	115	7.1	571	8.5	810	21.5
Use of hormone therapy								
Never-users	12 607	76.9	1057	65.4	4327	62.8	2359	61.8
Ever-users	3792	23.1	559	34.6	2565	37.2	1461	38.2

	Included Nurses (N = 18 015)				Excluded Nurses (N = 10 712)			
	Alive		Dead ^a		Alive		Dead ^a	
	N	%	N	%	N	%	N	%
Use of oral contraceptives								
Never-users	5045	30.8	743	46.0	3580	52.7	2988	80.0
Ever-users	11 354	69.2	873	54.0	3218	47.3	746	20.0

^a all-cause mortality; ^b one pack year defined as 20 cig./day/year in ever-smokers;

Table B. Characteristics of the 10 712 nurses excluded due to missing values on one or more covariate by shift work status (day/evening/night/rotating).

	Included Nurses (N = 18 015)								Excluded Nurses (N = 10 712)							
	Day		Evening		Night		Rotating		Day		Evening		Night		Rotating	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	11 272	62.6	1805	10.0	980	5.4	3958	22.0	2044	19.1	398	3.7	242	2.3	667	6.2
No. of deaths ^a	934	8.3	236	13.1	151	15.4	295	7.5	227	11.1	62	15.6	41	16.9	72	10.8
Body mass index (kg/m ²)																
< 18.5 kg/m ²	200	1.8	54	3.0	31	3.2	69	1.7	42	2.1	12	3.1	8	3.4	18	2.8
18.5-24.9 kg/m ²	7945	70.5	1308	72.5	612	62.4	2823	71.3	1371	69.1	282	73.6	149	64.2	451	70.5
25-29.9 kg/m ²	2494	22.1	342	18.9	257	26.2	871	22.0	469	23.7	76	19.8	56	24.1	138	21.6
≥ 30 kg/m ²	633	5.6	101	5.6	80	8.2	195	4.9	101	5.1	13	3.4	19	8.2	33	5.2
Smoking status																
Never	4260	37.8	669	37.1	298	30.4	1498	37.8	499	29.2	89	28.0	50	24.6	171	30.5
Past	3390	30.1	471	26.1	238	24.3	1145	28.9	547	32.0	87	27.4	44	21.7	165	29.5
Current	3622	32.1	665	36.8	444	45.3	1315	33.2	663	38.8	142	44.7	109	53.7	224	40.0
No. of pack-years ^c																
≤ 10 years	3260	28.9	460	25.5	214	21.8	1162	29.4	367	27.4	54	21.8	37	21.6	105	24.5

	Included Nurses (N = 18 015)								Excluded Nurses (N = 10 712)							
	Day		Evening		Night		Rotating		Day		Evening		Night		Rotating	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
11-20 years	1823	16.2	287	15.9	173	17.7	659	16.6	229	17.1	49	19.8	37	21.6	83	19.4
> 20 years	1929	17.1	389	21.6	295	30.1	639	16.1	244	18.2	56	22.6	47	27.5	69	16.1
Alcohol consumption (no. of drinks/week)																
None	1097	9.7	333	18.4	252	25.7	508	12.8	177	10.4	80	24.0	52	26.9	108	18.4
Moderate (1-14)	7312	64.9	1134	62.8	523	53.4	2553	64.5	1092	64.2	197	59.0	109	56.5	358	60.9
Heavy (>15)	2863	25.4	338	18.7	205	20.9	897	22.7	433	25.4	57	17.1	32	16.6	122	20.7
Physical activity																
Low	649	5.8	78	4.3	56	5.7	173	4.4	135	6.9	21	5.4	22	9.5	40	6.3
High	3157	28.0	511	28.3	309	31.5	1176	29.7	539	27.5	99	25.5	74	31.9	180	28.2
Medium	7466	66.2	1216	67.4	615	62.8	2609	65.9	1289	65.7	268	69.1	136	58.6	419	65.6
Diet																
Consume vegetables on daily basis	11 141	98.8	1773	98.2	962	98.2	3911	98.8	2019	98.8	393	98.7	240	99.2	654	98.1
Consume fruit on daily basis	10 887	96.6	1711	94.8	939	95.8	3850	97.3	1977	96.7	381	95.7	235	97.1	648	97.2
Avoids fatty meat	10 363	91.9	1619	89.7	862	88.0	3626	91.6	1816	90.0	338	86.2	194	81.5	577	88.4
Self-reported pre-existing diseases																
Hypertension	1194	10.6	198	11.0	123	12.6	375	9.5	250	12.6	48	12.6	30	13.0	59	9.1
Diabetes	91	0.8	23	1.3	17	1.7	27	0.7	22	1.1	8	2.1	3	1.3	4	0.6
Myocardial infraction	26	0.2	9	0.5	5	0.5	7	0.2	12	0.6	1	0.3	1	0.4	4	0.6
Self-reported health																
Very good	5218	46.3	618	34.2	338	34.5	1820	46.0	787	44.7	121	35.2	56	27.7	248	41.7
Good	4868	43.2	885	49.0	466	47.6	1721	43.5	772	43.9	158	45.9	103	51.0	263	44.2
Moderate	1075	9.5	271	15.0	169	17.2	379	9.6	174	9.9	61	17.7	37	18.3	76	12.8
Bad	100	0.9	28	1.6	7	0.7	31	0.8	25	1.4	4	1.2	6	3.0	8	1.3
Very bad	11	0.1	3	0.2	0	0.0	7	0.2	2	0.1	0	0.0	0	0.0	0	0.0
Working status																
Working	11 220	99.5	1797	99.6	979	99.9	3928	99.2	2003	99.0	392	98.5	239	99.2	651	98.8
Homeworker	0	0.0	0	0.0	0	0.0	1	<1	0	0.0	0	0.0	0	0.0	0	0.0
Retired	6	0.1	1	0.1	0	0.0	2	0.1	5	0.2	4	1.0	1	0.4	2	0.3
Unemployed/rehabilitation	2	<1	1	0.1	0	0.0	1	<1	4	0.2	0	0.0	0	0.0	0	0.0
Other	44	0.4	6	0.3	1	0.1	26	0.7	12	0.6	2	0.5	1	0.4	6	0.9

	Included Nurses (N = 18 015)								Excluded Nurses (N = 10 712)							
	Day		Evening		Night		Rotating		Day		Evening		Night		Rotating	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Stressful work environment																
Never	141	1.3	29	1.6	41	4.2	40	1.0	32	1.6	9	2.3	11	4.7	11	1.7
Rarely	1530	13.6	362	20.1	383	39.1	572	14.5	249	12.4	78	19.7	95	40.6	91	14.0
Occasionally	4643	41.2	904	50.1	433	44.2	1808	45.7	857	42.6	197	49.9	96	41.0	318	49.0
Often	3868	34.3	445	24.7	108	11.0	1292	32.6	687	34.2	92	23.3	26	11.1	178	27.4
Almost always	1090	9.7	65	3.6	15	1.5	246	6.2	186	9.2	19	4.8	6	2.6	51	7.9
Marital status																
Married	8602	76.3	1345	74.5	665	67.9	2864	72.4	1492	76.2	272	71.0	157	66.8	442	68.3
Separated	185	1.6	32	1.8	18	1.8	93	2.3	26	1.3	8	2.1	5	2.1	11	1.7
Divorced	1223	10.8	214	11.9	151	15.4	506	12.8	204	10.4	41	10.7	45	19.1	100	15.5
Single	832	7.4	126	7.0	80	8.2	367	9.3	134	6.8	35	9.1	17	7.2	61	9.4
Widow	430	3.8	88	4.9	66	6.7	128	3.2	103	5.3	27	7.0	11	4.7	33	5.1
Use of hormone therapy																
Never-users	8574	76.1	1293	71.6	672	68.6	3125	79.0	1308	64.0	256	64.3	155	64.0	434	65.1
Ever-users	2698	23.9	512	28.4	308	31.4	833	21.0	736	36.0	142	35.7	87	36.0	233	34.9
Use of oral contraceptives																
Never-users	3580	31.8	723	40.1	412	42.0	1073	27.1	762	37.9	189	48.7	116	48.9	241	37.0
Ever-users	7692	68.2	1082	59.9	568	58.0	2885	72.9	1250	62.1	199	51.3	121	51.1	411	63.0

^a all-cause mortality; ^b one pack year defined as 20 cig./day/year in ever-smokers;

Table C. Estimated all-cause mortality risk among shift workers with and without body mass index and stressful work environment (n = 18 015)

	HR^b	95 % CI^c
Fully adjusted model		
Day (ref.)	1.00	
Evening	1.29	1.11-1.49
Night	1.26	1.05-1.51
Rotating	1.00	0.88-1.15
Fully adjusted model without body mass index		
Day (ref.)	1.00	
Evening	1.30	1.12-1.51
Night	1.27	1.06-1.52
Rotating	1.00	0.88-1.14
Fully adjusted model without stressful work environment		
Day (ref.)	1.00	
Evening	1.32	1.14-1.52
Night	1.33	1.12-1.59
Rotating	1.01	0.89-1.15

^aadjusted for age, smoking, pack-years, physical activity, body mass index (kg/m²), alcohol consumption, diet (vegetables, fruit and fatty meat consumption), pre-existing diseases (hypertension, diabetes and myocardial infarction), self-reported health, stressful work environment, marital status, female reproductive factors (birth, use of hormone therapy and oral contraceptives); ^bhazard ratio; ^c95 % confidence intervals.