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Shift work and the incidence of prostate cancer: a 10-year follow-up of a German population-based cohort study 1

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1 *Supplementary tables*

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Tab. S1: Associations between shift and night work in the Heinz Nixdorf Recall Cohort: Time-to-event analysis

Factor	Person-years	Prostate cancer	HR [a]	95% CI	HR [b]	95% CI	HR [c]	95% CI
Never / <1 year of shift work	12 168.1	38	1.0	Reference	1.0	Reference	1.0	Reference
Ever at least 1 year of shift work	6153.8	38	1.99	1.27-3.11	2.14	1.36-3.36	2.31	1.44-3.70
Never, < 1 year of shift work	12 168.1	38	1.0	Reference	1.0	Reference	1.0	Reference
1-<10 years of shift work	2499.6	13	1.77	0.94-3.32	1.86	0.99-3.50	1.96	1.03-3.71
10-<20 years of shift work	1311.8	8	1.95	0.91-4.18	1.99	0.93-4.26	2.09	0.97-4.53
20+ years of shift work	2245.3	17	2.30	1.30-4.07	2.59	1.45-4.62	3.03	1.64-5.60
p for trend			0.0019		0.0006		0.0002	
Never / < 1 year of shift work without night work	12 168.1	38	1.0	Reference	1.0	Reference	1.0	Reference

Ever at least 1 year of shift work without night work	1342.6	6	1.53	0.65-3.62	1.58	0.67-3.74	1.92	0.79-4.66
Never/ < 1 year of night work	13 510.7	44	1.0	Reference	1.0	Reference	1.0	Reference
Ever at least 1 year of night work	4811.1	32	2.01	1.27-3.17	2.19	1.38-3.46	2.31	1.44-3.70
Never, < 1 year of night work	13 510.7	44	1.0	Reference	1.0	Reference	1.0	Reference
1-<10 years of night work	2088.6	11	1.64	0.85-3.18	1.74	0.90-3.38	1.79	0.92-3.49
10-<20 years of night work	1031.2	5	1.44	0.57-3.63	1.56	0.62-3.95	1.67	0.66-4.23
20+ years of night work	1605.7	16	2.91	1.64-5.17	3.25	1.82-5.80	3.70	2.01-6.79
p for trend			0.0004		<.0001		<.0001	

HR: Hazard Ratio, 95% CI: 95% Confidence interval,

[a] Modelled with time-to-event timescale and adjusted for age, [b] Modelled with time to event and adjusted for age, smoking (never, former smoker, current smoker), family history of prostate cancer (yes, no), [c] as in b, additionally adjusted for level of school education (≤13 years, 14-17 years, ≥18 years) and equivalent income (low, medium, high)

Table S2: Associations between shift work and prostate cancer according to preferred midpoint of sleep: Time-to-event analysis

Factor	Person-years	Prostate cancer (n)	HR [a]	95% CI	HR [b]	95% CI	HR [c]	95% CI
Preferred midpoint of sleep [d]								
Early	2474.7	13	1.22	0.67-2.24	1.21	0.66-2.22	1.20	0.66-2.21
Intermediate	9829.4	42	1.0	Reference	1.0	Reference	1.0	Reference
Late	2673.6	8	0.68	0.32-1.43	0.72	0.34-1.50	0.72	0.34-1.51
Early								
Never/ < 1 year of shift work	1615.7	4	1.0	Reference	1.0	Reference	1.0	Reference
Ever, at least 1 year of shift work	859.0	9	4.35	1.34-14.16	3.97	1.16-13.60	5.21	1.38-19.69
Never/ < 1 year of shift work	1615.7	4	1.0	Reference	1.0	Reference	1.0	Reference
1-<10 years of shift work	382.9	4	4.49	1.11-18.20	3.10	0.66-14.46	3.93	0.77-19.99
10+ years of shift work	476.1	5	4.25	1.14-15.85	4.71	1.24-17.87	6.60	1.47-29.62
p for trend			0.0209		0.0197		0.0112	
Never / < 1 year of night work	1864.6	6	1.0	Reference	1.0	Reference	1.0	Reference
Ever at least 1 year of night work	610.1	7	3.54	1.19-10.54	4.58	1.40-14.98	6.20	1.75-22.0

1-<10 years of night work	238.5	2	2.64	0.53-13.13	3.09	0.57-16.74	4.54	0.77-26.87
10+ years of night work	371.6	5	4.11	1.25-13.55	5.56	1.58-19.62	7.27	1.82-29.07
p for trend			0.0172		0.0067		0.0040	
Intermediate								
Never, < 1 year of shift work	6751.8	20	1.0	Reference	1.0	Reference	1.0	Reference
Ever, at least 1 year of shift work	3077.5	22	2.28	1.24-4.18	2.43	1.32-4.49	2.55	1.35-4.83
Never, <1 year of shift work	6751.8	20	1.0	Reference	1.0	Reference	1.0	Reference
1-<10 years of shift work	1108.4	8	2.50	1.10-5.69	2.55	1.12-5.80	2.63	1.14-6.06
10+ years of shift work	1914.0	14	2.21	1.12-4.39	2.41	1.20-4.82	2.56	1.24-5.27
p for trend			0.0138		0.0076		0.0067	
Never, < 1 year of night work	7467.1	24	1.0	Reference	1.0	Reference	1.0	Reference
Ever at least 1 year of night work	2362.2	18	2.25	1.22-4.15	2.45	1.31-4.56	2.63	1.38-5.01
1-<10 years of night work	974.3	8	2.52	1.13-5.62	2.61	1.17-5.84	2.79	1.24-6.32
10+ years of night work	1344.2	10	2.12	1.01-4.44	2.36	1.11-5.02	2.55	1.17-5.55
p for trend			0.019		0.0095		0.0069	
Late								

Never/ < 1 year of shift work	1793.8	5	1.0	Reference	1.0	Reference	1.0	Reference
Ever, at least 1 year of shift work	879.8	3	1.38	0.33-5.83	1.40	0.33-5.96	1.61	0.37-7.06
Never, < 1 year of night work	1937.8	5	1.0	Reference	1.0	Reference	1.0	Reference
Ever, at least 1 year of night work	735.8	3	1.76	0.42-7.48	1.84	0.44-7.81	1.83	0.42-7.94

HR: Hazard Ratio, 95% CI: 95% Confidence interval,

[a] Modelled with time-to-event timescale and adjusted for age, [b] Modelled with time to event and adjusted for age, smoking (never, former smoker, current smoker), family history of prostate cancer (yes, no), [c] as in b, additionally adjusted for level of school education (≤13 years, 14-17 years, ≥18 years) and equivalent income (low, medium, high)

Table S3: Confounder analysis for the association between night work and prostate cancer risk

Potential confounder	No prostate cancer (mean)	S.d.	Prostate cancer (mean)	S.d.	HR[a]	95% CI
Physical activity (MET-hours)	47.11	47.30	56.72	49.71	1.0	1.0-1.01
Alcohol in g per week	101.10	133.63	80.82	102.11	1.0	1.0-1.01

Potential confounder	No prostate cancer (n)	Prostate cancer (n)	HR[a]	95% CI
Smoking status				
Never	474	33	1.0	Reference
Former smoker	775	34	0.57	0.35-0.92
Current smoker	432	9	0.36	0.17-0.76
Family history of prostate cancer				
No	1660	74	1.0	Reference
Yes	21	2	1.78	0.44-7.27
Body Mass Index				
<20 kg/m^2	413	23	0.99	0.51-1.92
20-<25 kg/m^2	334	15	1.0	Reference
25-<30 kg/m^2	929	38	0.76	0.42-1.39
30+ kg/m^2	0	0	-	-
Missing	5	0	-	-
Level of school education				
≤13 years	811	32	0.67	0.41-1.08
14-17 years	588	34	1.0	Reference
≥18 years	280	10	0.83	0.41-1.69
Missing	2	0	-	-
Equivalent income				
Low (<2 567.60 DM)	560	19	0.56	0.32-0.98

Medium (2 567.60-<3 666.70 DM)	536	32	1.0	Reference
High (3 666.70 DM+)	530	23	0.92	0.53-1.58
Missing	55	2	0.69	0.16-2.87
Vitamin D status				
Low	705	26	0.87	0.52-1.46
High	714	33	1.0	Reference
Missing	262	17	1.54	0.86-2.77
Preferred midpoint of sleep				
Early	215	13	1.19	0.64-2.23
Intermediate	867	42	1.0	Reference
Late	240	8	0.64	0.30-1.37
Missing	359	13	1.08	0.58-2.03

HR: Hazard Ratio, 95% CI: 95% confidence interval, s.d.: standard deviation

[a] Modelled with age at event, never/ever night work

Table S4: Associations between longest-held shift job and prostate cancer

Most frequent jobs and sectors involving shift work	Number	Person-years	Prostate cancer (n)	HR [a]	95% CI	HR [b]	95% CI
Mining							
No	1712	17 859	71	1.0	Reference	1.0	Reference
Yes	45	462.8	5	1.94	0.77-4.85	2.34	0.92-5.96
Mechanical engineering							
No	1716	17 885.4	73	1.0	Reference	1.0	Reference
Yes	41	436.5	3	1.58	0.50-5.01	1.47	0.46-4.71
Metal working							
No	1719	17 924.7	71	1.0	Reference	1.0	Reference
Yes	38	397.1	5	3.24	1.30-8.04	3.68	1.46-9.27

Industries							
Not industries	1516	15 799.1	54	1.0	Reference	1.0	Reference
Industries	241	2522.8	22	2.26	1.37-3.71	2.45	1.46-4.09
Not public service	1702	17 727.4	71	1.0	Reference	1.0	Reference
Public service	55	594.5	5	2.25	0.91-5.57	2.26	0.90-5.63

HR: Hazard Ratio, 95% CI: 95% Confidence interval

[a] Modelled with age at event, [b] Modelled with age at event, adjusted for smoking (never, former smoker, current smoker), family history of prostate cancer (yes, no), level of school education (≤13 years, 14-17 years, ≥18 years), equivalent income (low, medium, high)