



# Detailed and specific shift work exposures, sleep and fatigue in a representative sample of Swedish shift workers.

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## Objective

The present study combined a representative sample with a detailed collection of exposure data (all work hours during one work week) to estimate the effect of specific shift sequences on sleep and fatigue in the general population.

## Methods

A questionnaire with work hours, sleep, fatigue and social complaints was completed by 2029 shift workers in a representative sample of the working population in Sweden. Response rate was 73%. A total of 10,061 shifts and 8409 free days were analysed.

Shift sequences were quantified and used to predict complaints the same day using a logistic regression model accounting for clustering within individuals adjusted for age, sex, marital status, education and blue colour work.

## Results

The results showed that working day, morning, evening and night increased sleep complaints compared to days off. Sleep complaints were stable at the second morning shift in a sequence but decreased at the third morning shift suggesting adaptation to the early hours. Long shifts did not predict sleep problems but short rest did.

The risk for fatigue also increased for all shift types in addition to an increase the second day of night, morning, day and evening work.

## Conclusion

Detailed analysis of work schedules in a representative sample of shift-workers suggest sleep problems increase for any work-day but most for night shift. After two morning shifts in a row sleep improves but fatigue accumulates.

Table 1: Logistic Regression (Generalized Estimation Equations)

Shift/sequence	%	n	Fatigue		Disturbed sleep	
			OR	95% CI	OR	95% CI
M	6%	796	8.33	5.67 - 12.23	6.96	4.73 - 10.23
MM	4%	466	1.40	1.03 - 1.92	1.20	0.85 - 1.71
MMM	2%	296	1.29	0.97 - 1.73	0.54	0.34 - 0.86
D	31%	4614	4.28	3.47 - 5.27	2.45	1.92 - 3.12
DD	17%	2448	1.25	1.06 - 1.48	0.94	0.72 - 1.21
DDD	9%	1358	0.92	0.77 - 1.10	0.86	0.67 - 1.11
E	15%	2064	4.91	3.89 - 6.20	5.53	4.28 - 7.14
EE	5%	712	1.33	1.05 - 1.69	1.13	0.87 - 1.48
EEE	3%	328	1.14	0.89 - 1.46	0.94	0.70 - 1.26
N	6%	855	7.96	5.56 - 11.39	11.51	7.69 - 17.24
NN	3%	424	1.64	1.27 - 2.12	1.20	0.90 - 1.60
NNN	2%	195	1.13	0.84 - 1.51	0.79	0.56 - 1.12
Long shifts (>10h)	8%	1081	1.56	1.26 - 1.93	0.99	0.75 - 1.30
Short rest (<11h)	7%	1016	3.09	2.51 - 3.79	3.13	2.46 - 3.99

### CONTACT