

just entering this area of occupational health, and an interchange among the research delivery communities on what else may or may not help and why.

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### 1602a MULTIPLE JOB STRESSORS OF NIGHT AND ROTATING SHIFT WORKERS THAT AFFECT HEALTH AND WELLBEING: BASIS FOR COMPREHENSIVE INTERVENTIONS FOR THEIR SOLUTIONS

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Multiple workplace xenobiotic, physical, and psychosocial factors can affect employee wellbeing and health, particularly when working nights. The human circadian time structure (CTS) is an unappreciated, yet potentially important consideration to establishing threshold limiting values, employee biological monitoring (BM) procedures, and recommended biological exposure indices (BEIs). Encounters by night workers, before CTS adjustment, to potentially harmful workplace contaminants and stressful physical conditions, occur during a different circadian stage than day workers. Numerous animal and human investigations document prominent circadian patterning in the biological tolerance to a broad array of chemical, biological, and physical stressors often found in occupational settings. Time-qualified for biological rhythms reference values, several currently utilised in clinical laboratory medicine, are likely to be of relevance to employee surveillance. Workplace psychosocial factors are additionally of great importance to employee wellbeing, with several demand-control-social support and effort-reward imbalance models serving to assess detrimental outcomes. Despite recognition the psychosocial workplace milieu can affect the physical and psychological health of dayworkers, there is a scarcity of knowledge of its impact on night and shift employees. Some studies indicate low job control, high physical demands, low supervisor social support, and high overcommitment can be more problematic for night than day shift workers. At-work violence is an additional psychosocial stress, with police officers, security personnel, bank employees, professional drivers, and other service employees in regular contact with the public, in particular, at elevated risk. The severity of workplace violence problems and their consequences is probably underestimated, especially when co-existing among stressors with known impact on workers' health. Practical considerations and recommendations

for action to mitigate the effect of these multiple job stressors of particularly high relevance to night and shift workers are presented.

### 1602b SLEEPINESS AND VIGOUR IN AIRLINE GROUND CREW SHIFT WORKERS MOVING FROM 8- TO 12-HOUR ROTATING SHIFT SCHEDULES: A PILOT FIELD STUDY

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**Objective** To investigate the effects of transition from 8- to 12 hour shifts on sleepiness and vigour of employees during morning and night shifts.

**Methods** Thirty-nine airline ground crew shift workers (mean age  $38.9 \pm 8.2$  y; mean seniority  $13.9 \pm 7.1$  y, 19 male) volunteered in a pilot study. During each round, employees were assessed during one morning and two night shifts, by completing a sleepiness questionnaire (the Karolinska Sleepiness Scale, KSS) hourly, and a vigour questionnaire (3 times in the 8 hour, 4 times in the 12 hour rounds) per shift. Repeated measures ANOVA was performed to compare changes in sleepiness and vigour levels in 8 hour and 12 hour shift plans, during day and night shifts.

**Results** For morning shifts main effects were found for sleepiness [ $F_{(3,58)}=13.1$ ,  $p<0.001$ ] and for shift plan [ $F_{(1,18)}=7.4$ ,  $p<0.014$ ]. Sleepiness levels rose throughout both morning shifts, and were lower during the 12 hour than during the 8 hour shifts. Furthermore, main effects were found for vigour [ $F_{(1,25)}=11.37$ ,  $p<0.001$ ] and for shift plan [ $F_{(1,18)}=14.87$ ,  $p<0.001$ ]. Vigour levels decreased in both morning shifts, and were higher during 12 hour shifts than in the 8 hour shifts. No interactions were found.

For night shifts main effects were found for sleepiness [ $F_{(7,18)}=9.9$ ,  $p<0.001$ ], and for sleepiness\*shift plan [ $F_{(3,81)}=3.2$ ,  $p<0.023$ ]. During the 8 hour round, sleepiness consistently increased with a slight decrease towards the end of the shift, while in the 12 hour round sleepiness increased until 04:00 am, after which there was a decrease and again and increase towards the end of the shift.

Furthermore, main effects were found for vigour [ $F_{(1,25)}=11.37$ ,  $p<0.001$ ], and for shift plan [ $F_{(1,18)}=14.87$ ,  $p<0.001$ ], during the 12 hour shift round participants' vigour levels were higher than in the 8 hour shift round. Vigour levels decreased during the night in both rounds, no interaction was observed.

**Conclusion** An overall improvement was observed in somnolence and vigour indices of employees after the transition to 12 hour shift, which appears to be preferable over the 8 hour shift.

### 1602c SLEEPY ON THE NIGHT SHIFT? BIO-PSYCHO-SOCIAL FACTORS OF SUBJECTIVE SLEEPINESS IN FEMALE NURSES DURING THE NIGHT SHIFT

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