Night Shift Work and Occupational Exposures

Sarah M Jay, PhD

Sleep/Wake Research Centre

Massey University, Wellington

SLEEP~WAKE *research centre*
MOE TIKA~MOE PAI

Shift Work in New Zealand

- **Defined as any work that displaces sleep (may or may not involve night work)**
- **NZ Blood Donors Health Survey** ***Fransen et al 2006***
- **21% (n=3119) reported working shift work**
- **15% (n=2331) reported working at least 1 night per week**

Shift Work and Workplace Injury

Variable		RR (95%CI)
Usual Work Pattern	Daytime no shifts	1.00
	Irregular/Other	1.17 (0.95-1.43)
	Rotating no nights *	1.75 (1.17-2.61)
	Permanent nights	1.38 (0.95-2.00)
	Rotating with nights *	1.89 (1.49-2.41)
Hours worked	> 40 h vs ≤ 40 hrs/week *	1.32 (1.12-1.55)

Adjusted for sex, education, smoking, sleep difficulties, headaches, BMI, occupation

NZ Blood Donors Health Survey, n=15,365 paid employees
Fransen et al. (2006) OEM 63:352-358

SLEEP~WAKE *research centre*
MOE TIKA~MOE PAI

Night Work and Occupational Risk

- **Night work contributes to fatigue by reducing opportunity for adequate good quality sleep and the requirement to work when we are at our least functional**

- **Relative risk of a workplace incident is greatest on the night shift** ***Tucker & Folkard , 2003***

- **Risk of an injury crash is significantly increased with driving between 2-5am** ***Conner et al, 2002***

Night Work & Chronic Sleep Problems

	OR	95% CI	p
Age (yrs)	1.02	1.01-1.03	<0.05
NZDep2001	1.05	1.01-1.08	<0.01
Unemployed vs employed	1.49	1.20-1.86	<0.001
Night work vs employed, no night work	1.61	1.20-2.17	<0.01

Adjusted for ethnicity, sex

2,603 New Zealanders aged 20-60 yrs (response rate=72.5%)

SLEEP~WAKE *research centre*
MOE TIKA~MOE PAI

Shift Work as a Carcinogen?

- **International Agency for Research on Cancer (IARC) (2007) conclusion, based on:**
  - **Limited evidence in humans for the carcinogenicity of shift-work that involves night work**
  - **Sufficient evidence in experimental animals for the carcinogenicity of light during the daily dark period ("biological night")**

"Shift work that involves circadian disruption is probably carcinogenic to humans"

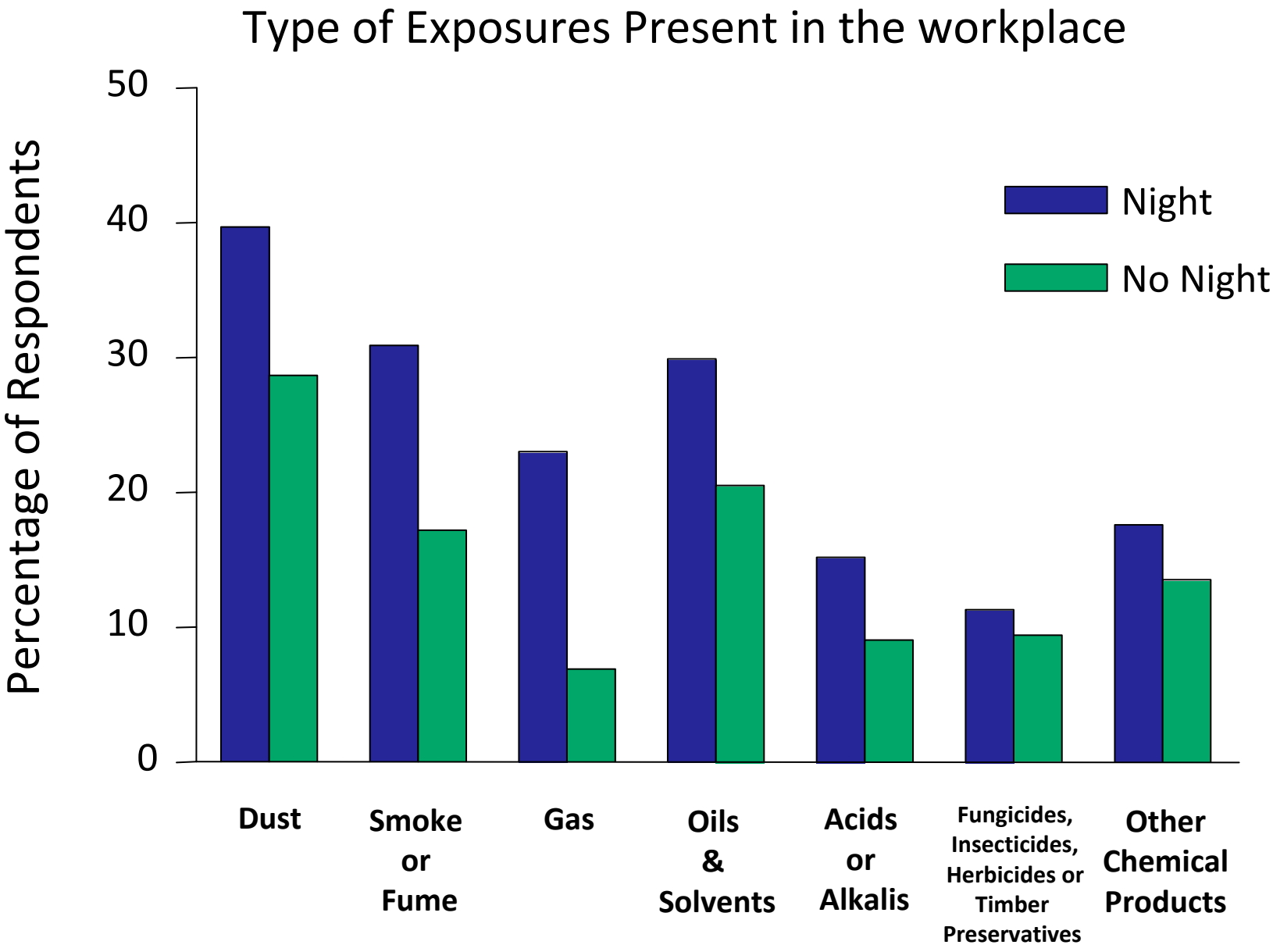
SLEEP~WAKE *research centre*
MOE TIKA~MOE PAI

New Zealand Workforce Survey

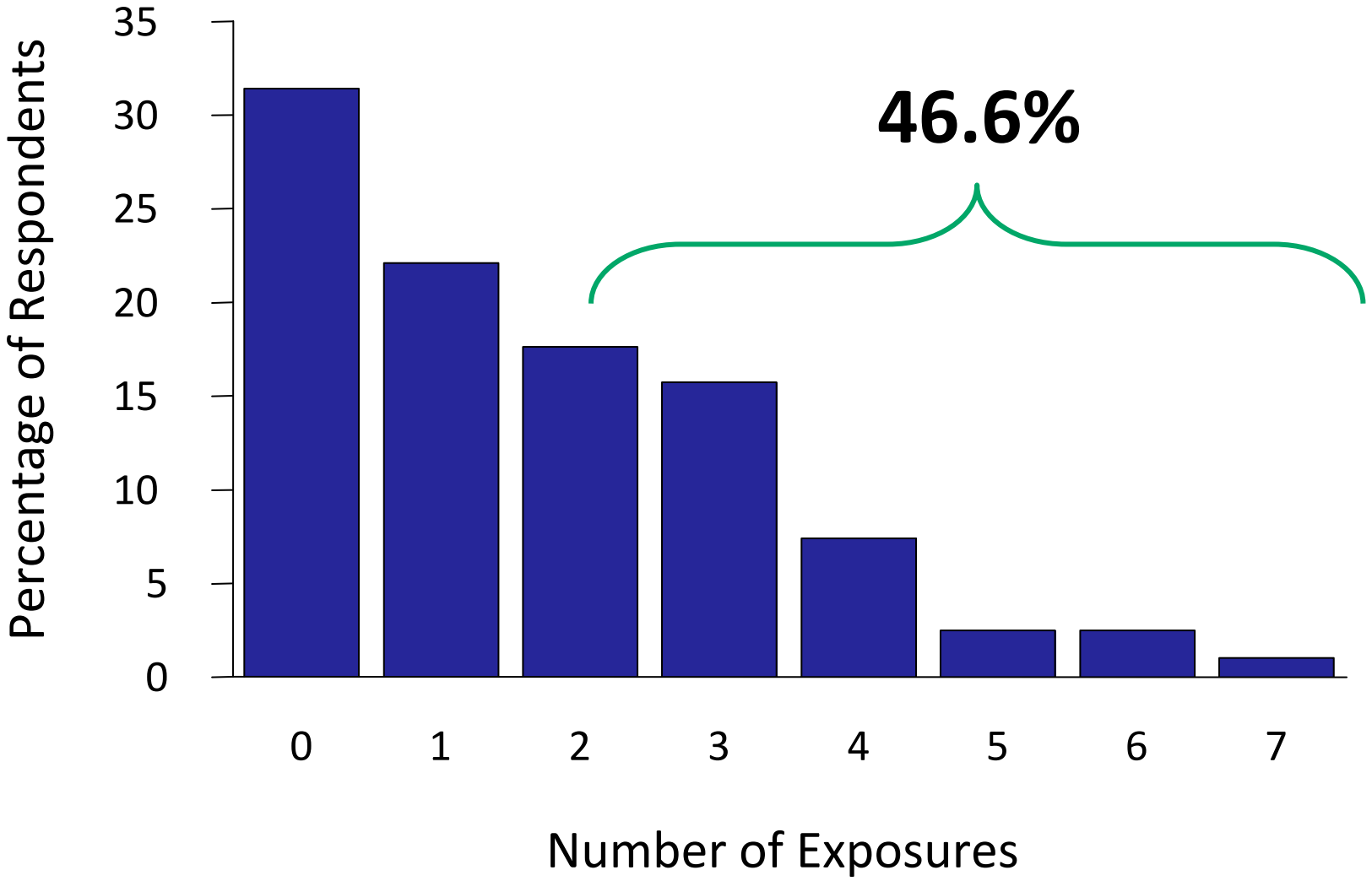
- **6.9% (n=204) worked nights**

(classified as work >3h between 00:00h and 05:00h in last month)

	Working Nights	Working No Nights
Mean age (±s.d.)	44.1±10.4	44.2±11.3
% men in sample	67.6	45.7
% women	32.4	54.3
% Māori in sample	10.8	8.8
Mean days worked/week (±s.d.)	5.0±1.1	4.9±1.1
Mean hours worked/week (±s.d.)	46.5±14.5	38.5±14.5


Type of Exposures Present in the workplace
Percentage of Respondents
50
40
30
20
10
0
Night
No Night
Dust
Smoke or Fume
Gas
Oils & Solvents
Acids or Alkalis
Fungicides, Insecticides, Herbicides or Timber Preservatives
Other Chemical Products

Report of Multiple Exposures in the Workplace



Chronotoxicity

- **Working at night may have added risks that exacerbate the toxicity of certain hazards/exposures**
- **Chronotoxicity - changes in sensitivity to toxins across the 24h day**

***timing* of exposure contact will contribute to;**

- **how a toxin is metabolised**
- **how sensitive target organs or systems are to it**
- **how rapidly and effectively it is excreted**

SLEEP~WAKE *research centre*
MOE TIKA~MOE PAI

Conclusions

- **Shift work, particularly that involving night work can contribute to occupational injury in the same way as other occupational hazards**
- **There are health implications for people who work shift work, particularly night work**
- **Circadian disruption resulting from night work, may even increase risk by exacerbating the effects of certain exposures**

Thank you

s.m.jay@massey.ac.nz

sleepwake.massey.ac.nz

SLEEP~WAKE *research centre*
MOE TIKA~MOE PAI