

1.59), 2.03 (1.007–4.13), respectively]. Males who slept  $\geq 10$  hours/night had a 40% increase in cancer incidence and 59% increase in cancer-caused mortality than males who slept 7–8 hours/night [HR (95% CI)=1.40(1.04–1.88) and 1.59 (1.01–2.49), respectively]. There was an interaction effect between night-shift work of  $\geq 20$  years and sleep of  $\geq 10$  hours/night on cancer incidence ( $P_{\text{interaction}}=0.027$ ).

**Conclusion** For male subjects, both long night-shift work ( $\geq 20$  years) and nighttime sleep duration ( $\geq 10$  hours) were independently and jointly associated with higher cancer incidence.

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#### SHIFTWORK AND BREAST CANCER: EPIDEMIOLOGY, BURDEN, AND IMPLICATIONS FOR PREVENTION

<sup>1</sup>Manisha Pahwa\*, <sup>2,3</sup>France Labrèche, <sup>1,4,5</sup>M Anne Harris, <sup>1,6</sup>Joanne Kim, <sup>1</sup>Chaojie Song, <sup>1,5,7</sup>Paul A Demers. <sup>1</sup>Occupational Cancer Research Centre, Cancer Care Ontario, Toronto, Canada; <sup>2</sup>Institut de recherche Robert-Sauvé en santé et en Sécurité du travail, Montréal, Canada; <sup>3</sup>School of Public Health, Université de Montréal, Montréal, Canada; <sup>4</sup>School of Occupational and Public Health, Ryerson University, Toronto, Canada; <sup>5</sup>Dalla Lana School of Public Health, University of Toronto, Toronto, Canada; <sup>6</sup>Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montréal, Canada; <sup>7</sup>CAREX Canada, Simon Fraser University, Burnaby, Canada

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**Introduction** Approximately one in five workers globally work night, evening, or rotating shifts. Shiftwork involving circadian disruption is a probable carcinogen for breast cancer. Our objective was to synthesise the current state of the epidemiological literature, report on shiftwork-associated breast cancer burden in Canada, and discuss implications for prevention.

**Methods** A search was conducted for meta-analyses accompanied by a systematic review, published from 2010–2017, that included at least one meta-risk estimate (mRE) for breast cancer associated with any permanent/rotating night work exposure metric. For each included meta-analysis, heterogeneity values were extracted and an eight-point checklist was used to evaluate quality. An attributable fraction (AF) range for breast cancer, based on mREs from high quality meta-analyses and Canadian shiftwork survey data, was calculated using Levin's equation.

**Results** Seven meta-analyses collectively included 30 cohort and case-control studies spanning 1996–2016. Most reported statistically significant heterogeneity. In 5 meta-analyses that scored  $\geq 6$  points on the quality assessment checklist, mREs for ever/never night shiftwork exposure ranged from 1.15 (95% confidence interval [CI]: 1.05 to 1.25, n=9 studies) to 1.40 (95% CI: 1.13 to 1.73, n=9 studies). Using these mREs as lower and upper values in Levin's equation, the AF for breast cancer among the 1.5 million Canadian women who ever worked night/rotating shifts during 1961–2001 ranged from 2.04%–5.23%. This corresponds to an estimated 460–1180 annual incident breast cancers probably due to shiftwork; nearly half (200–510) are diagnosed among women in health care and social assistance.

**Discussion** Summaries of 20 years of epidemiological evidence support shiftwork as a probable breast carcinogen, but considerable heterogeneity between studies poses a challenge for precisely evaluating breast cancer risk and burden. Given the potentially substantial burden of breast cancer due to shiftwork, applied research on workplace-based prevention of circadian disruption is acutely needed to identify effective solutions for sectors where shiftwork prevalence is high.

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#### A COMPARATIVE STUDY OF HEALTH STATUS OF SHIFT WORKERS AND NON-SHIFT WORKERS IN AN AUTOMOBILE INDUSTRY

Shriniket Mishra\*. Hero MotCorp Limited, New Delhi, India

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**Introduction** In today's industrialised world, focus of mass producing organisations is to achieve maximum output and optimum utilisation of human resource by deploying workers in shift duties. This helps industries in achieving production targets but it adversely affects health of workers which is a well-established fact. Shift duties cause changes in circadian rhythm of human body which leads to adverse effects on physical and psychological health. This study was conducted at a large automobile organisation for comparing health status of shift workers with non-shift workers, establish cause and make improvement in health of shift workers.

**Methods** A cross sectional study was done through a questionnaire based survey and medical examination of workers. Two groups of 200 workers each was selected, one group was involved in shift work for 8 years and other group was working in day shift only for same number of years. A detailed questionnaire containing personal, occupational and medical history was presented to both groups. All data related to findings of medical examinations and survey was analysed to reach a conclusion.

**Results** There were significant differences in health status of both group of workers. 76% shift workers were suffering from G.I disorders- Indigestion, constipation, hyperacidity etc. compared to 18% of non-shift workers, 22% shift worker had Diabetes compared to 9% in non-shift workers, 36% shift workers had hypertension compared to 14% in non-shift, 44% shift workers had sleep disorder compared to 19% and 42% shift workers were obese compared to 26% of non-shift workers.

**Discussion** Results of study show that there are less health issues in non-shift workers compared to shift workers. This provides us evidence that if shift work can't be avoided then organisations should have scientific plans to minimise health hazards of shift work and more focus should be given to health of shift workers.

### Small Scale Enterprises and Informal Sector

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#### SMALL + SAFE + WELL: UNDERSTANDING THE RELATIONSHIP BETWEEN PROGRAMS, ORGANISATIONAL CLIMATE, AND OUTCOMES FOR HEALTH, SAFETY AND WELLBEING AMONG SMALL BUSINESS

Natalie Schwatka\*, Liliana Tenney, Erin Shore, Josh Scott, Miranda Dally, Carol Brown, Lee Newman. University of Colorado Denver, Colorado School of Public Health, Centre for Health, Work, and Environment, Aurora, USA

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**Introduction** The majority of workers are employed by small enterprises; however, small enterprises face many barriers to building and maintaining cultures of health and safety. This presentation will describe preliminary data from the evaluation