

first employment [OR 8.1 (95% CI 3.2, 21) for > 30 vs < 15 years]. Surprisingly, after adjusting for years since first employment, age was still predictive of silicosis risk ($p < 0.001$). Miners from Lesotho, who make up a large minority of the workforce, had an increased odds (OR 1.55; 95% CI 1.2, 1.9) of silicosis relative to South African miners.

Conclusions Goldmining shafts differ in silicosis risk independently of workforce age and length of mining service. Speculative explanations include higher silica fraction of the rock and greater intensity of exposure to silica. Basotho miners are at increased relative risk of silicosis, suggesting greater involvement in dustier jobs. The strong independent effect of age on silicosis risk, reported previously, remains to be explained.

Session: 28. Health impact analysis physical factors

366 THE ASSOCIATION BETWEEN HEAT EXPOSURE AND WORK-RELATED INJURIES IN SOUTH AUSTRALIA, 2001–2010

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Objective To investigate the association between work-related injuries and temperature, to identify the groups of workers at high risk of heat-related injuries, and to explore the possible lagged effects of extreme heat on work-related injuries.

Method Workers' compensation claims data obtained from SafeWork South Australia for the period of 2001–2010 were transformed into time series format and merged with daily meteorological data. The impacts of temperature on daily work-related injury rates were estimated by using generalised estimating equation model with negative binomial distribution, a log link function and a first order autocorrelation structure. A piecewise linear spline function was utilised to quantify the effect of temperature on work-related injury rates below and above thresholds. The day of the week and long-term trends were adjusted.

Result Overall, there was an association between work-related injuries and temperature in South Australia. One degree Celsius increase in temperature below 38 was associated with 0.2% increase of injury rate. However, the injury risk declined significantly above this temperature. Specifically, the following groups of workers were at high risk of heat-related injury: male workers (IRR 1.004, 95% CI 1.002–1.005); and young workers aged < 24 (IRR 1.003, 95% CI 1.000–1.006). Occupations at risk were labourers and related workers (IRR 1.004, 95% CI 1.001–1.006), intermediate production and transport workers (IRR 1.002, 95% CI 1.000–1.004), and tradespersons and related workers (IRR 1.003, 95% CI 1.001–1.006). Industries showing an association between injuries and temperature were agriculture (IRR 1.007, 95% CI 1.002–1.013), construction (IRR 1.005, 95% CI 1.002–1.008), finance, property and business services (IRR 1.006, 95% CI 1.001–1.012), and overall outdoor industries (IRR 1.004, 95% CI 1.002–1.006). A lagged effect of extreme heat on work-related injury rates has not been found.

Conclusion The risk of work-related injuries is significantly associated with heat exposure, especially for vulnerable groups in the workplace.

367 INVESTIGATING OCCUPATIONAL FACTORS AND BIOMARKERS OF KIDNEY FUNCTION AMONG NICARAGUAN WORKERS

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Objective In Nicaragua, an epidemic of chronic kidney disease (CKD) with unknown aetiology has been described primarily among young, male sugarcane workers. Our goals were to characterise the type of kidney damage and evaluate the potential role of occupational factors.

Methods Our study population included 284 sugarcane workers, 51 miners, 60 construction workers, and 53 port workers in Western Nicaragua. For sugarcane workers in seven jobs (e.g. cane cutters, pesticide applicators, etc.), blood and urine samples were collected at the beginning and end of the 6-month sugarcane harvest. One round of samples were also collected from workers who were employed in the other three industries (but had never worked in the sugarcane industry). Biomarkers of kidney injury included serum creatinine, urinary albumin, and urinary neutrophil gelatinase-associated lipocalin (NGAL). Linear regression models were used to determine whether biomarkers of kidney injury increased during the harvest and/or varied by job.

Results Biomarkers of kidney injury were significantly different by sugarcane job and estimated glomerular filtration rate (eGFR) declined significantly during the harvest among those engaged in the most strenuous work tasks, while urine albumin remained low in all groups. Compared to factory workers, eGFR was lowest among cane cutters ($p = 0.006$) and urinary NGAL was highest among cane cutters ($p = 0.04$). Workers in other industries also had higher than expected prevalence of eGFR <60 mL/min/1.73 m².

Conclusions Our results provide evidence that the type of kidney damage occurring in sugarcane workers, as well as among workers in other industries, is primarily tubulointerstitial (and not glomerular) in nature. Biomarkers of kidney injury varied by job and were highest among workers engaged in more strenuous physical labour. If acute kidney damage is on the causal pathway to CKD, heat or other work-related exposures may be contributing to this epidemic.

368 OCCUPATIONAL NOISE EXPOSURE AND SERUM LIPIDS: THE IMPACT OF NOISE EXPOSURE LEVEL AND HEARING PROTECTION

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Objectives Environmental and occupational noise exposure have been related to increased risk of cardiovascular disease. Activation of the physiological stress response and altered serum lipid levels have been proposed as alternative causal pathways. The objective of this study was to investigate the relation between occupational noise exposure and serum levels of total cholesterol, LDL-cholesterol, HDL-cholesterol, and triglycerides when