

The aim of this study assessment of OSAS role in occurrence of road traffic accidents in sleeping drivers of commercial heavy vehicles such bus and truck driver. This cross-sectional and case-control study was carried out on 760 truck and bus drivers that were involved in a road accident between 2009 and 2011 in Yazd - Iran. In this study we used the Polysomnography method for assessing patients with suspected sleep disorders, including sleep apnea. The stage of sleep is assessed by electroencephalography. The findings indicated that among 760 drivers, 91 drivers had more than 10 EES score. Among 91 drivers, 35 drivers involved in one accident and 38 drivers had no history of accident in study period. Driving in the night time had significant association with road accident occurrence in participated drivers ( $p=0.01$ ). Drivers who have sleepiness and especially OSAS had more chance to involve an accident. But OSAS was not independent predictor of road accident.

## Poster Presentation

### Risk Assessment

#### 0317 APPLICATION OF FAILURE MODE AND EFFECT ANALYSIS (FMEA) TO ASSESS OCCUPATIONAL RISKS IN OIL REFINERY

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10.1136/oemed-2017-104636.258

**Abstract** Failure Modes and Effect Analysis (FMEA) is a systematic method for identifying the factors that a product or process encounter with them, and identifying their results and effects. The aim of this study is to evaluate the potential occupational risks in different parts of the one of oil refinery in central Iran by using risk assessment techniques. This cross-sectional study was conducted in Shiraz Refinery and relationship RPN(Risk Priority Number) with tasks e.g. milling, welding, transportation handling and etc. were studied in this company. The findings showed that transportation and handling and then external surface scraping achieved the highest of RPN before and after corrective measures (200,210) and (72, 84) respectively. While RPN for welding and drilling (punching the external surfaces) before and after corrective measures are (144,120) and (24, 36) respectively. But hazard severity curve show tasks with lower RPN in comparison with those have higher RPN are more important of injury severity. some of tasks e.g. handling, transportation and milling have high RPN and by using effective control measures can eliminate or control hazards. Then Failure Modes and Effect Analysis is a useful and efficient for hazard assessment.

## Oral Presentation

### Other

#### 0318 OCCUPATIONAL EPIDEMIOLOGY RESEARCH IN THE NEW "LOW-CARBON" ECONOMY.

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10.1136/oemed-2017-104636.259

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Occupational health risks posed by climate change have focused on heat-related illness and mortality, and a growing body of evidence shows substantial risks to health and economic productivity for many countries. Since the 2015 Paris Agreement on climate change, the shift away from fossil fuel-based economies has accelerated. Potential population health benefits from improved air quality, more physically active urban commuting and reduced future heating of the planet are substantial. However, unquantified is the extent that technologies in renewable energy sources pose risks to workers. A comparison between fossil fuel-related job risks and those stemming from renewable energy-related jobs will be presented. Gaps in knowledge will be identified to help guide the safest path for workers in our evolving low-carbon society.

**Note** this abstract is part of the Mini-Symposium, **Climate Change impacts on Occupational Health via workplace heat (Tord Kjellstrom, organiser).**

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## Poster Presentation

### Pesticides

#### 0320 INDIRECT PARENT-MEDIATED PATHWAYS OF CHILD EXPOSURE TO 2,4-D AND CHLORPYRIFOS IN FARM FAMILIES

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10.1136/oemed-2017-104636.260

**Background** To reduce children's exposure to pesticides used on farms, identifying and interrupting exposure pathways is critical. We evaluated applicator (parent) exposure as a determinant of

children's paraoccupational exposure to chlorpyrifos or 2,4-Dichlorophenoxyacetic Acid (2,4-D) in a study of farm families who used one of these pesticides as part of their usual practice.

**Methods** The sample included 34 applicators applying 2,4-D (n=53 children) or chlorpyrifos (n=50 children). Sequential 24 hour urine samples were collected on the day preceding application through the third day after application of chlorpyrifos or 2,4-D. Maximum post-application urine concentrations of 3,5,6-trichloropyridinol (TCP), a chlorpyrifos metabolite, and 2,4-D (log-transformed) were used to examine the association of children's exposure with applicator exposure using mixed model regression including a random intercept for farm to account for correlation. The final adjusted model included children's age, gender, and presence during the application as covariates. Separate models were fit based on children's presence or absence during the application.

**Results** Adjusted models revealed positive associations between children's exposure with applicators' exposure (TCP:  $\beta=0.257$ ; 95% CI=0.052, 0.462; 2,4-D:  $\beta=0.593$ , 95% CI=0.364, 0.822). The association persisted among children who were absent during the application process (TCP:  $\beta=0.218$ , 95% CI=-0.029, 0.466; 2,4-D:  $\beta=0.547$ , 95% CI=0.283, 0.811).

**Conclusions** Specific pesticide exposure pathways to children living on farms are difficult to identify, but these data indicate that applicator exposure is associated with exposures to their children absent any known direct exposure to the children. Applicators protecting themselves from exposures may also protect their children.

## Oral Presentation

### Cancer

#### 0321 ASSOCIATION BETWEEN OCCUPATIONAL EXPOSURE TO ASBESTOS AND CHOLANGIOCARCINOMA: A POPULATION-BASED NESTED CASE-CONTROL STUDY

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10.1136/oemed-2017-104636.261

**Objective** To investigate the association between occupational exposure to asbestos and the risk of cholangiocarcinoma (CC) using data from the Nordic Occupational Cancer (NOCCA) cohort.

**Methods** We conducted a nested case-control study of 1458 intrahepatic CC (ICC) and 3972 extrahepatic (ECC) cholangiocarcinoma cases registered among subjects born 1920 or later in Finland, Iceland, Norway and Sweden. Five population controls were individually matched by birth year, gender, and country to each case. We applied the NOCCA job exposure matrix to job titles from national population censuses

(1960, 1970, 1980/81, and 1990) to estimate the cumulative exposure to asbestos. We estimated odds ratios (OR) and 95% confidence intervals (CI) by conditional logistic regression models adjusted by printing industry work.

**Results** The risk of ICC was increased among workers with high cumulative exposure to asbestos: never exposed, OR=1.0 (reference category); 0.1–4.9 f/ml \* years, OR=1.1 (95%CI 0.9–1.3); 5.0–9.9 f/ml \* years, OR=1.3 (95%CI 0.9–2.1); 10.0–14.9 f/ml \* years, OR=1.6 (95%CI 1.0–2.5);  $\geq 15.0$  f/ml \* years, OR 1.7 (95%CI 1.1–2.6). We did not observe an association between cumulative asbestos exposure and ECC.

**Conclusions** Our study supports the hypothesis that occupational exposure to asbestos is a risk factor for ICC, while we did not observe evidence of an association between exposure to asbestos and ECC. Further studies, such as pooled analysis of asbestos cohorts, are necessary to assess the strength of the association between asbestos and ICC and clarify the observed differences between ICC and ECC.

## Oral Presentation

### Cancer

#### 0322 CANCER INCIDENCE IN FIREFIGHTERS IN SWEDEN – PRELIMINARY FINDINGS FROM AN UPDATED COHORT STUDY

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10.1136/oemed-2017-104636.262

**Objectives** Firefighters are potentially exposed to carcinogens during work, such as benzene, benzo(a)pyrene, arsenic, asbestos and silica dust. There are previous studies indicating an increased cancer risk among firefighters. The aim was to study risk of cancer in Swedish firefighters.

**Methods** We updated a previous cohort study of firefighters in Stockholm, comprising 1 080 men who worked at least 1 year as a firefighter during 1931–1983. They were followed regarding cancer incidence (in the National Cancer Register) from 1958–2012, adding 26 years of follow-up compared to the previous study. We also updated the information of employment duration, by annual records at the fire stations. We calculated standardised incidence ratios (SIR) with the male population in Stockholm as reference.

**Results** The overall cancer incidence was low (SIR=0.81, 95% CI=0.71–0.91), but there was a trend of increasing cancer incidence with increasing employment duration (p=0.03). There was an increased incidence of stomach cancer (SIR=1.89, 95% CI=1.25–2.75). The risk was significantly low for prostate cancer (SIR=0.68, 95% CI=0.52–0.87) and for malignant melanoma of the skin (SIR=0.30, 95% CI=0.06–0.88).

**Conclusions** We found no increased cancer incidence overall in Swedish firefighters, although the increasing incidence with increasing work duration indicates a possible carcinogenic effect of exposures at work. The cause of the increased incidence of stomach cancer is uncertain but could possibly be due to exposure to asbestos or silica dust, although this is quite speculative.