

Occupation Classification have performance accuracy which are at least equivalent to manual coding accuracy. Moreover automated coding provides significant time savings. These studies have identified that both natural language processing and machine learning algorithms are effective for auto coding. Whereas NLP based and machine learning approaches both rely on bespoke rules, and existing data sets, machine learning models can proliferate bias from training data if not corrected.

**Objectives** The goal of the study is to explore the impact of altering sex/gender ratios in training data sets on overall performance of the machine learning based prediction of NOC codes using patient provided job titles.

**Methods** Using data participant patient data provided by Atlantic PATH, training data sets were prepared for 100 4-digit NOC categories. The data sets were prepared with sex/gender ratios of 50/50 30/70, 70/30. The data sets were used to train ENENOC machine learning platform and tested on a set of manually coded job titles provided by Atlantic PATH CanPATH . Performance levels were contrasted for all 4-digit NOC categories used in the study.

**Results** Initial results in this preliminary study have identified that sex and gender are variables that can influence auto coding performance, however the extent to which overall coding accuracy is impacted is relative minor. Further studies are required with larger training sets to fully explore the extent of sex and gender as contributing variables to bias to ENENOC.

**Conclusion** We initiated studies to investigate the impact of sex and gender bias on performance of the ENENOC algorithm. Together, the ENENOC contributed training and test sets provide a suitable framework for ongoing work in this area.

## Muskuloskeletal-1

### 0-21 PATTERNS OF OPIOID DISPENSING AND ASSOCIATED WAGE REPLACEMENT DURATION IN WORKERS WITH ACCEPTED CLAIMS FOR LOW BACK PAIN: A RETROSPECTIVE COHORT STUDY

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**Introduction** When unable to work due to low back pain a worker may seek income support and funding for healthcare from an income support system such as workers' compensation. Clinical practice guidelines recommend opioids for low back pain are only used for a short duration, at a low dose and with a plan to cease use.

**Objectives** This study aimed to identify patterns of opioid dispensing in Australian workers with low back pain and determine the association of dispensing patterns with wage replacement duration.

**Methods** Australian workers' compensation claimants with low back pain and at least one day of wage replacement were included. We used group-based trajectory modelling to identify opioid dispensing patterns over a two and half year period from reported low back pain onset. Quantile regression was then used to compare wage replacement duration between each dispensing pattern group.

**Results** One third of workers with low back pain (N=3205, 33.3%) received at least one opioid dispense during their claim. Three dispensing patterns were identified. The majority had a short-term low-volume opioid dispensing pattern (N=2166, 67.6%), while 798 (24.9%) had a long-term moderate-volume pattern and 241 (7.5%) had a long-term high-volume pattern. Workers dispensed opioids had significantly longer wage replacement duration than those not dispensed opioids (median (weeks): 63.6 versus 7.1 respectively). In addition, moderate- and high-volume long-term dispensing had significantly longer wage replacement duration compared with short-term dispensing (median (weeks): 126.9, 126.0 and 30.7 respectively).

**Conclusion** Our study found a high use of opioids for long durations among compensated Australian workers with low back pain. Multifaceted strategies to limit long-term use of opioids are needed. These could include implementation of clinical care standards and indicators that can be used to monitor and regulate opioid use, and implementing financial mechanisms to stem long-term opioid use.

### 0-179 OCCUPATIONAL DEMANDS ASSOCIATED WITH ROTATOR CUFF DISEASE SURGERY: RESULTS FROM A NOVEL LINKAGE OF A JOB-EXPOSURE MATRIX TO THE UK BIOBANK

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**Objective** Occupations requiring high physical demands may lead to greater risk of rotator cuff disease (RCD) and corresponding surgical treatment. We linked a job-exposure matrix (JEM) to the UK Biobank to measure physical occupational exposures and estimate associations with incident RCD surgery.

**Methods** Job titles at baseline and UK Standard Occupational Classification (SOC) codes were recorded during a verbal interview. Lifetime job histories were captured through a web-based survey. UK SOC codes were linked to a JEM based on the US O\*NET database. O\*NET-based scores for physical demands were assigned to jobs including: static strength, dynamic strength, general physical activities, handling/moving objects (range=1–7), time spent using hands, whole body vibration, and cramped/awkward positions (range=1–5). RCD surgeries were identified through national hospital inpatient records. Cox regression was used to calculate hazard ratios (HRs) as estimates of associations with RCD surgery accounting for confounders. Among those with lifetime job histories, associations were estimated with duration of time with high exposure (i.e. above cut-offs identifying approximately the top quartile of exposure).

**Results** Job titles were available for 277,808 people, of which 1,345 (0.5%) had a subsequent inpatient RCD surgery. After adjusting for age, sex, race, education, deprivation, and body mass index, all O\*NET variables considered were associated with RCD surgery (HR per point increase range=1.10–1.45, all P<0.005). More frequent occupational manual labor self-reported in the UK Biobank verbal interview was also associated with RCD surgery (HR for 'Always' vs. 'Never/rarely'=2.12; 95%CI=1.79–2.50). Lifetime job histories were available for 100,929 people, in which high exposures were

significantly associated with RCD surgery after more than 10 years of work (Ex. HR for 11–20 years vs. 0 years with static strength score  $\geq 4 = 2.06$ , 95%CI=1.39–3.04).

**Conclusion** Numerous occupational physical exposures were associated with incident RCD surgery. Associations were strongest in workers with more than a decade of high exposure.

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#### ASSOCIATIONS BETWEEN FEELING COLD AT WORK AND WORK PERFORMANCE IN A COLD-EXPOSED WORKING POPULATION FROM THE TROMSØ 6 STUDY

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**Objective** Cold exposure is associated with an increased prevalence of musculoskeletal pain. We found earlier that employees spending  $\geq 25\%$  of their working time in cold environments had higher odds of chronic musculoskeletal pain. There was a consistent tendency of higher odds for increasing frequency of feeling cold. Cold exposure can also interfere with work performance. The aim of this study was therefore to investigate if the frequency of cold experience was associated with impaired work performance.

**Methods** We used data from the sixth survey of the Tromsø study (2007–2008). Participants aged 30–67 years who reported to work in a cold environment  $\geq 25\%$  of the time, were not retired, not receiving full-time disability benefits and without missing values were included, leading to 793 participants. Feeling cold was categorized into never, sometimes and often feeling cold. Work performance variables comprised of binary variables of impaired control of movement, heavy physical work and long-lasting physical work, finger dexterity and –sensitivity. Associations between feeling cold at work and self-reported work performance were examined with Poisson-regression, adjusted for age, sex, smoking and body mass index.

**Results** Both prevalence of impaired work performance and associations between frequency of feeling cold and impaired work performance were consistently lower for those never feeling cold and higher for those feeling cold often, compared to those feeling cold sometimes. In the fully adjusted model, the strongest associations were found for impaired long-lasting work performance with prevalence ratio (PR) 0,35 (95%CI 0,20–0,62) for never feeling cold and PR 1,81 (95%CI 1,35–2,42) for feeling cold often. For impaired heavy work PRs were 0,53 (95%CI 0,31–0,90) and 2,13 (95%CI 1,50–3,04), respectively.

**Conclusion** In this cross-sectional study on cold-exposed workers, cold experience frequency was associated with work performance with the tendency of increased work impairment with increasing frequency of feeling cold.

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#### WHICH QUEBEC INDUSTRIES AND OCCUPATIONS ARE AT RISK OF WORK-RELATED MUSCULOSKELETAL DISORDERS? A COMPARISON OF ANALYSES OF 2010–2012 WORKERS' COMPENSATION AND 2014–2015 HEALTH SURVEY DATA

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**Introduction** Non traumatic work-related musculoskeletal disorders (WMSD) represent an enormous burden of preventable illness. Two strategies and data sources to document this burden and identify workers at highest risk were compared.

**Objectives** To identify gender-stratified worker groups at high risk of non-traumatic WMSD by industry and type of occupation and compare WC to health survey results.

**Methods** Using 2014–2015 Quebec Health Survey (QPHS) data on 24,300 workers, measuring self-reported WMSD and industry groupings stratified by occupation (manual/mixed/non-manual), WMSD risk for each industry-occupation group was estimated using gender-stratified adjusted regression analyses and estimation methods. Using Quebec 2010–2012 workers' compensation (WC) data, gender-stratified WMSD incidence rates per 1,000 full-time equivalent employees (% FTEE) were calculated for 174 industry-type-of-occupation groups. WMSD risk was ranked according to Prevention Index scores.

**Results** In both studies, women in manual occupations had the highest WMSD risk compared to male counterparts (WC: 39%vs27% FTEE; QPHS: 36%vs25%); manual male and female workers in administrative/support/cleaning/garbage services were identified at high risk; as well as women in accommodation/restaurant and men in specialised construction trades, civil engineering, and metal manufacturing. Compensation data identified another 9 high-risk groups for men, and 11 for women including 3 health sector groups that ranked in the top 5 for women. Conversely, the QPHS identified another 13 high risk groups in men including several construction and manufacturing sectors and 5 in women.

**Discussion** Differences between the 2 studies' results are likely due to methodologic differences, including under-reporting in compensation data and the survey's low power to identify some industries stratified by gender and occupation. Results of the two studies are complementary and each adds to our understanding of which groups are at WMSD risk to target for prevention. Research is needed to compare different survey and compensation data analytic strategies to improve capacity to identify workers at high WMSD risk.

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#### PAIN IN HEALTHCARE WORKERS: A PERSPECTIVE OF MULTIDISCIPLINARY APPROACH

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**Introduction** Health professionals deal with numerous hazards during their occupational life from a physical and mental point of view: precarious working conditions, irregular working hours, emotional pressure, physically demanding jobs, involving weight lifting and manual tasks, which may cause pain and musculoskeletal disorders. Our occupational health service assists more than 20,000 health workers in a large hospital complex in Latin America. It consists of a multidisciplinary team involving physicians, psychologists, engineers, occupational therapists, physiotherapists, as well as an emergency care service where workers may seek immediate medical attention.

**Objective** To describe the most frequent complaints related to musculoskeletal pain in emergency medical care at our