

The organisation of work is undergoing rapid change making our traditional definitions and methods of exposure assessment less applicable or effective in understanding work-related risks. In a keynote address at EPICOH in 1995 I discussed concepts of measurement error and argued for use of statistical methods which explicitly linked exposure concepts with the outcomes. These concepts are now widely understood and we have moved beyond them using mixed models and a variety of more advanced statistical methods which were new at the time.

However, our framework for that work is less and less relevant in current and future occupational settings. Non-standard employment arrangements and increasing disparities in income, often associated with other demographic characteristics, compel an increasing focus on the health of working populations, rather than individual diseases or conditions. However, the ways in which the work context is defined and implemented in research is highly variable. While many of the terms used have overlapping attributes, and each have been associated with changes in work exposures and health risk, their lack of clear conceptual definitions hampers our ability to explain the apparent health risks with which they are associated.

This paper describes the various concepts and labels associated with precarious work and suggests that precarity requires integration of concepts of work organisation with worker vulnerability. By doing so, we can better understand the relationships between job content, working conditions and power dynamics within the workplace and its social context. Thus, we identify work as a social determinant of health, and can better assess the health implications of precarious work.

These concepts are implemented using a multidimensional approach to job quality which incorporates both work organisation and workplace power dynamics, based on latent class cluster analysis, to define an integrated typology for defining contemporary employment conditions, as developed by Van Aerden, et al, in a European dataset. We adopt this approach within the US based General Social Survey, and compare the clusters identified in the EU with those observed in the US. This typological approach overcomes the limitations of characterising work organisation or social determinants on single dimensional characteristics, such as contract-type or demographic factors, and offers a new framework for understanding the implications of precarity.

While the 'exposure,' health outcomes, and methods differ substantially than those relevant in the 1990s, we again argue that a clear conceptual definition, measurement methods, and linkage with outcomes of importance in the 21st century, are required to continue understanding the impact of working conditions on health.

Poster Presentation

Pesticides

0393

A SYSTEMATIC LITERATURE REVIEW: ORGANOPHOSPHATE (OP) PESTICIDE EXPOSURE AND SEMEN QUALITY

¹Zulhairul Naim Bin Sidek Ahmad*, ²Daniel Brison, ¹Andrew Povey. ¹Centre for Occupational and Environmental Health, School of Health Sciences, Faculty of Biology, Medicine and Health, University of Manchester, Manchester, M13 9PL, UK; ²Department of Reproductive Medicine, St Mary's Hospital, Central Manchester University Hospitals NHS Foundation Trust, Manchester Academic Health Sciences Centre, Oxford Road, Manchester M13 9WL, UK

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Introduction Organophosphate (OP) pesticides exposure has been linked to various health effects but the association between exposure and semen quality is unclear. This systematic review aimed to investigate the association between OP exposure and semen quality.

Methods Electronic databases including Ovid-Medline, PubMed and Website of Science were searched for studies on OP and semen quality published between 2000 and 2016. Terms representing population, exposure and outcome were used in combination. Relevant articles were extracted and critically appraised using the Newcastle Ottawa Scale.

Results 12 epidemiological studies were identified of which 10 were cross-sectional and two case-control studies. Eight studies were of occupationally exposed workers with exposure assessed by self-report in four studies or inferred in three studies or by the use of urinary dialkylphosphates in five studies. Sperm concentration or motility or morphology was altered in eight studies. Concentration was reduced in one study of which assessed exposure by self-report, one by inference and three by biomarkers. Motility was reduced in four studies of which assessed exposure by self-report, one by inference and two by biomarkers. Morphology was reduced in three studies of which assessed exposure by self-report and one by inference. More fundamentally only one study examined the relationship between time of exposure and outcome assessment.

Conclusion There was a lack of consistency in the reported associations and hence there is limited evidence to support a causal association between OP exposure and semen quality. This could be due to heterogeneity in study populations and different in exposure assessment

Oral Presentation

Musculoskeletal

0394 ARE GENDER DIFFERENCES IN DISABILITY DURATION FOR WORK-RELATED MUSCULOSKELETAL INJURIES EXPLAINED BY HEALTH CARE UTILISATION?

^{1,2}Mieke Koehoorn*, ¹Lillian Tamburic, ²Sheilah Hogg-Johnson, ³Katherine Lippel, ^{1,2}Christopher McLeod. ¹University of British Columbia, Vancouver, British Columbia, Canada; ²Institute for Work and Health, Toronto, Ontario, Canada; ³University of Ottawa, Ottawa, Ontario, Canada

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Introduction In British Columbia, Canada, women have longer work disability durations for musculoskeletal injuries than men, even after adjustment for confounders. This study investigated if different types of health care utilisation in the first four weeks of injury explain differences in disability duration.

Methods Three cohorts were identified from compensation claims for back strain, limb fractures and connective tissue injuries. Claims were restricted to at least four-weeks disability for a standard health care utilisation window. Quantile regression investigated the effect of physician visits (log count), physical therapies and prescriptions (yes/no), on disability days (censored at 365) at the 25th, 50th and 75th percentile by gender.

Results In multivariable models, physician visits were associated with shorter disability durations for both genders across injury cohorts. For example, for connective tissue injuries, an increase of one physician visit was associated with 44 fewer days [95% CI -64.8, -23.9] for women and 56 fewer days for men [-74.2, -37.5], at the 75th percentile. Opiate prescriptions were associated with longer disability durations for fractures only, with 39 more days [95% CI 16.1, 61.3] for women and 46 more days [32.1, 59.3] for men, at the 75th percentile. The effect of physical therapies varied by injury and gender.

Discussion Physician visits in the first weeks of a compensation claim may be part of return-to-work procedures associated with shorter disability. Opiate prescriptions in the first weeks of a fracture may be a measure of severity associated with longer disability. Health care utilisation did not readily explain longer disability durations for women.

Poster Presentation

Disease Surveillance

0397 DETECTION OF OCCUPATION INJURY AND ILLNESS THROUGH SURVEILLANCE AT EMERGENCY ROOM AT A MEDICAL CENTRE IN TAINAN, TAIWAN

¹Ting-Chia Weng*, ^{2,3}I-Lin Hsu, ²Chia-Chang Chuang, ¹Heng-Hao Chang, ^{1,4}Chen-Long Wu, ^{1,3}Jung-Der Wang, ^{1,4}How-Ran Guo, ^{1,4}Yau-Chang Kuo. ¹Department of Occupational and Environmental Medicine, National Cheng Kung University Hospital, Tainan, Taiwan; ²Department of Emergency Medicine, National Cheng Kung University Hospital, Tainan, Taiwan; ³Department of Public Health, College of Medicine, National Cheng Kung University, Tainan, Taiwan; ⁴Department of Environmental and Occupational Health, National Cheng Kung University, Tainan, Taiwan

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Underreporting of occupational injury and illness has been an important issue in Taiwan. We tried to implement an integrated surveillance system in the emergency services of National Cheng Kung University Hospital to screen work-related accidents. The system mobilised staffs of triage, registration and doctors to report occupational causes. A total of 4097 events were identified from Feb 2015 to Feb 2017, among which 2722 were work-related, and 1375 commuting injuries. Work-related events were predominant males (71.7%), but equally in commuting injuries. 1532 events were sent by ambulance, 498 cases hospitalised in the first month, and 4 patients died within 30 days after emergency services and all fatal cases were work-related injuries. The majority of diagnoses were contusions, abrasions and lacerations, totally accounting for 43.1%. However, significant proportion of head injuries (n=751, 18.3%), fractures (n=351, 8.6%), burns (n=264, 6.4%) including 62 cases (1.5%) of chemical burns, and 106 cases (4.4%) of amputations were found. The results were different from the government funded reporting system where most frequently reported were chronic musculoskeletal diseases. The total medical costs were about 2.9 million USD, based on a conservative estimation accounting 90 days from the first encounter. This study revealed the fact of underestimation of occupational injuries and illness resulting in significant health and societal impacts. The emergency room based surveillance system can augment the conventional reporting system. Furthermore, cluster analysis and work associated disability should be investigated to improve occupational safety and labour right.

Oral Presentation

Working Conditions

0398 CLIMATE CHANGE THREATS TO OCCUPATIONAL HEALTH AND PRODUCTIVITY AT POPULATION LEVEL

²Lauren Lines*, ^{3,2}Tord Kjellstrom, ^{1,2}Mattias Otto, ^{1,2}Bruno Lemke. ¹Nelson Marlborough Institute of Technology, Nelson, New Zealand; ²Ruby Coast Research Centre, Nelson, New Zealand; ³Lund University, Lund, Sweden

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Climate change will cause increasing environmental heat levels in large parts of the world. The heat levels for millions of people working outdoors or indoors without air conditioning, particularly in tropical areas, are already so high that physiological limits are exceeded and health risks and productivity loss occurs.

Using data on climate and working population size for 67,000 geographic grid cells (size = 0.5 × 0.5 degrees) based on internationally refereed sources we produced global heat stress maps for different calendar months and time periods. We combine these estimates with exposure-response relationships for heat stress indices to calculate heat strain risks and work capacity loss at global, regional and country level. The physiological laboratory evidence concerning heat impacts on workers is extensive, but more quantitative epidemiological studies are needed to improve risk assessments of occupational health risks due to climate change.

For example, we calculated that the global number of people subjected to extremely high monthly average heat levels (WBGT > 30°C, when even moderate work is restrained)