Oral Presentation

Methodology

0242 MEASURING AND ESTIMATING PHYSIOLOGICAL RESPONSES TO OCCUPATIONAL HEAT EXPOSURE

¹Rebekah Lucas*, ²Kristina Jakobsson, ³Tord Kjellstrom, ⁴David Wegman. ¹*School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, Birmingham, UK;* ²*Section of Occupational and Environmental Medicine, Department of Molecular and Clinical Medicine, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden;* ³*Centre for Technology Research and Innovation, Limassol, Cyprus;* ⁴*Department of Work Environment, University of Massachusetts, Lowell, USA*

10.1136/oemed-2017-104636.193

There are direct and indirect health and performance detriments associated with occupational heat stress. This presentation will review methods and tools that can be used to examine physiological responses to occupational heat stress and highlight future directions for practice and research.

Technological advancements have opened new opportunities for the capture and monitoring of physiological responses and metrics, particularly in the field. Continued validation of new technologies is necessary to benchmark the reliability and validity of field-based measures and methods.

Measures of body temperature, metabolic workload, hydration status and psychophysiological responses can yield important information as to the strain induced from working in a hot environment. While there are a range of measurement techniques and methods to measure or estimate physiological responses, there are limitations that must be considered. These include the sensitivity, reliability and practicality of proposed measures. For example, gastro-intestinal temperature measures via a telemetric pill allows for direct, wireless, non-invasive measurement of deep internal temperature. However, water ingestion can influence telemetric pill readings while it remains in the stomach and the expense of such a system makes it prohibitive to use in large cohorts.

Continued validation of new technologies is necessary to benchmark the reliability and validity of field-based measures and methods with the ultimate goal being to better quantify exposure-response and exposure-effect relationships for workers' health, wellbeing and productivity. Importantly, more comprehensive assessments of the heat strain experienced by different populations would aid the interpretation of climate change impact on worker's health at a local and global level.

Oral Presentation

Shift Work

0243 ROTATING SHIFT WORK AND PREVALENCE OF DIABETES MELLITUS AND PREDIABETES IN MALE EMPLOYEES OF A LARGE GERMAN CHEMICAL COMPANY: RESULTS OF A CROSS-SECTIONAL STUDY

Matthias Claus*, Michael Schuster, Christoph Oberlinner, Stefan Webendörfer. *BASF SE, Ludwigshafen, Rhineland-Palatinate, Germany*

10.1136/oemed-2017-104636.194

Purpose The aim of the study was to investigate the association between rotating shift work (RSW) and prevalence of diabetes and prediabetes in male employees of a large chemical company.

Methods We used cross-sectional data, surveyed in health checks between January 1st2011 and December 31st2014 at BASF SE in Ludwigshafen (Germany). A blood sample, physical examination and anamnesis by a medical officer as well as a written questionnaire were part of the health-check. Diabetes status (no diabetes, prediabetes, diabetes) was assessed via HbA_{1c}-value and information provided by employees themselves. Shift status was surveyed using company records. Partial proportional odds models for ordinal response variables were applied to assess the association of RSW with diabetes status.

Results Data on 9765 male employees (40.4% rotating shift workers) with a mean age of 44.3 years (SD: 9.6) could be used for analyses. Prevalence of diabetes and prediabetes in rotating shift workers were 6.4% and 14.2% respectively. Corresponding figures for day workers were 3.6% and 11.5% ($p < 0.001$). Unadjusted analyses yielded an Odds Ratio of 1.85 (95%-CI: 1.53–2.22) for RSW (comparing diabetes with prediabetes/no diabetes). The effect attenuated in the fully adjusted multivariable model (aOR: 1.38; 95% CI: 1.11–1.70) but remained significant. The association between RSW and diabetes status varied by BMI and occupational status. The association was stronger in skilled/supervisory workers and respondents with a BMI < 30 kg/m².

Conclusions The present study found a significant association between RSW and diabetes which differed by BMI and occupational status.

Declaration of potential conflict of interest: All authors are employees of BASF SE.

Poster Presentation

Respiratory

0244 THE DIAGNOSIS OF PNEUMOCONIOSIS USING A SENSOR ARRAY TECHNIQUE

¹Hsin-Yi Peng*, ¹Che-Jui Chang, ^{1,2}Pau-Chung Chen, ^{1,2}Hsiao-Yu Yang. ¹*Institute of Occupational Medicine and Industrial Hygiene, National Taiwan University College of Public Health, Taipei, Taiwan;* ²*Department of Environmental and Occupational Medicine, National Taiwan University Hospital, Taipei, Taiwan*

10.1136/oemed-2017-104636.195

Pneumoconiosis is a traditional occupational disease and has reemerged in recent years. Current medical surveillance program have flaws that may result in poor detection of early pneumoconiosis around the world. Pneumoconiosis could generate specific volatile organic compounds (VOCs) that may constitute a specific breath print for diagnosis. The objective of this study was to develop a breath test for pneumoconiosis using a sensor array technique. We conducted a case-control study that enrolled 36 asymptomatic cases of pneumoconiosis and 64 healthy controls between October and November 2016 to construct the prediction model. One liter of breath air was collected after five minutes of tidal breathing through a non-rebreathing valve with inspiratory VOC-filter, and storage by a Tedlar bag. The air was analysed by a 32

nanocomposite sensor array electronic nose within 30 min. We used the profusion category $\geq 1/1$ in chest X-ray in accordance with the ILO-2011D criteria as the reference standard to assess the diagnostic accuracy. Data were randomly split into 80% for model building and 20% for validation. By linear discriminant analysis, the sensitivity was 71.0%, specificity was 91.8%, accuracy was 86.8%, and ROC-AUC was 0.89 in the training set, and the sensitivity was 80.0%, specificity was 66.7%, accuracy was 70.0%, and ROC-AUC was 0.79 in the validation set. Breath test might have potential in the screening for pneumoconiosis; however, a multi-centre study is warranted to establish a reliable model and all procedures must be standardised before clinical application.

Poster Presentation

Methodology

0245

BIG DATA AND OCCUPATIONAL HEALTH VIGILANCE: USE OF FRENCH MEDICO-ADMINISTRATIVE DATABASES FOR HYPOTHESIS GENERATION REGARDING OCCUPATIONAL RISKS IN AGRICULTURE

^{1,2}Charlotte Maugard*, ^{1,2}Delphine Bosson-Rieutort, ²Olivier François, ^{1,3}Vincent Bonneterre. ¹Grenoble-Alpes University (UGA)/TIMC-IMAG Laboratory (UMR CNRS 5525)/EPSP Team (Environment and Health Prediction of Populations), Grenoble, France; ²Grenoble-Alpes University (UGA)/TIMC-IMAG Laboratory (UMR CNRS 5525)/BCM Team (Computational and Mathematical Biology), Grenoble, France; ³Modernet Network, France

10.1136/oemed-2017-104636.196

Surveillance of diseases and associated exposures is a major issue in occupational health, especially identifying and preventing new threats for worker's health. New complementary methods relying on exploitation of already existing data, such as those from health insurance, could be developed to look for relevant signals for early detection of emerging occupational diseases. In this context, a systematic data mining could be performed on databases from the "Mutualité Sociale Agricole" (MSA), the dedicated social security system to French agricultural workers, which covers about 3 million individuals. As this healthcare system holds a large amount of data, MSA databases could allow us to apply "big data" analytics in order to study occupational risks of French agricultural workers. Thereby, this innovative approach could permit to look for associations between diseases and occupational activities without any prior hypothesis and also could have the potential to be used on continuous data flow for vigilance.

The authorisation of the French National Commission on Informatics and Liberty allowed the cross-linking of MSA databases using a common anonymous identifier for each individual. The main methodological point is programming of unsupervised analysis, especially latent models of mixed factors, applied to the "occupational activity x diseases" matrices. Due to the lack of direct information about exposure, a complementary work is performed to estimate retrospectively the exposure to pesticides of agricultural workers.

This innovative method which will be presented, has the following advantages: 1) offers a systematic approach, 2) has a strong statistical power, 3) is costless about data acquisition.

Poster Presentation

Methodology

0246

THE IMPACT OF HIGH-SCHOOL COMPLETION - A MULTI-STATE MODEL FOR WORK PARTICIPATION AND HEALTH-RELATED ABSENCE IN YOUNG MEN

^{1,2}Rune Hoff*, ¹Ingrid Mehlum, ¹Karina Corbett, ^{1,4}Ferdinand Mohn, ¹Therese Harvold, ^{1,3}Petter Kristensen, ²Jon Michael Gran. ¹The National Institute of Occupational Health, Oslo, Norway; ²Oslo Centre for Biostatistics and Epidemiology, Oslo, Norway; ³Institute of Health and Society, University of Oslo, Oslo, Norway; ⁴Institute for Social Research, Oslo, Norway

10.1136/oemed-2017-104636.197

Withdrawn at the author's request

Oral Presentation

Shift Work

0247

SHIFT WORK AND INCIDENCE OF CARDIOVASCULAR DISEASES IN THE DANISH NURSE COHORT

¹Jeanette Therning Jørgensen*, ¹Rikke Horn, ^{2,3}Leslie Stayner, ⁴Johnni Hansen, ¹Zorana Jovanovic Andersen. ¹University of Copenhagen, Copenhagen, Denmark; ²University of Illinois at Chicago School of Public Health, Chicago, IL, USA; ³University of Southern Denmark, Odense, Denmark; ⁴Danish Cancer Society, Copenhagen, Denmark

10.1136/oemed-2017-104636.198