

**Result** Over 180 group locations in different geographies completed self-assessment questionnaires (SAQs). Gaps were identified and improvement plans were executed at locations. This has resulted into overall improvement of WASH scores across the group from approx. 75% to >90%.

**Discussion** A focused approach of self-assessment questionnaire along with gap identification and action plans in a web based software has been found very useful to monitor and support development of WASH status across the organisation. This initiative has also resulted in increased awareness among workforce, peers and other stakeholders regarding WASH.

309

# WORK-RELATED ILL-HEALTH: REPUBLIC OF IRELAND, NORTHERN IRELAND, GREAT BRITAIN 2005–2016

<sup>1</sup>Annemarie Money, <sup>1</sup>Melanie Carder, <sup>2</sup>Peter Noone, <sup>3</sup>Johnny Bourke, <sup>4</sup>James Hayes, <sup>1</sup>Raymond Agius. <sup>1</sup>University of Manchester, Manchester, UK; <sup>2</sup>Health Service Executive, Dublin, Republic of Ireland; <sup>3</sup>South Infirmary-Victoria Hospital, Cork, Republic of Ireland; <sup>4</sup>Cavan Monaghan Hospital, Cavan, Republic of Ireland

10.1136/oemed-2018-ICOHabstracts.412

**Background** Data on work-related ill-health (WRIH) in the Republic of Ireland (ROI) are inconsistent, with no mandatory requirement for employers to report occupational diseases/illness unless liable for compensation.

**Aims** To compare the incidence of WRIH in ROI, Northern Ireland (NI) and Great Britain (GB).

**Methods** Analysis of voluntary reported, medically verified data submitted to The Health and Occupation Research (THOR) network in ROI, 2005–2016. ROI-THOR comprises 4 schemes (74 physicians) enabling chest physicians (ROI-SWORD), dermatologists (ROI-EPIDERM), occupational physicians (ROI-OPRA) and general practitioners (THOR-GP-ROI) to report. Data were compared with the corresponding UK THOR schemes.

**Results** 2148 case reports (dermatologists: 453, chest physicians: 164, OPs: 1514, GPs: 17) were reported to ROI-THOR. Contact dermatitis was the most frequently reported skin disease in all three areas (ROI, 96%; NI, 48%, GB, 76%). Asthma was the most frequently reported respiratory disease in the ROI (36%), whilst for GB and NI it was benign pleural disease (42% and 36%, respectively). OPs and GPs in the ROI reported mental ill-health (53%, 35%) and musculoskeletal disorders (34%, 24%) most frequently; a similar pattern was observed in NI and GB. ROI skin and respiratory incidence rates (based on reports from dermatologists and chest physicians) were generally similar, or slightly lower compared to NI and GB.

**Conclusions** Overall, THOR-ROI continues to provide the best overall source of data relating to medically attributed occupational disease incidence in the ROI. Comparisons with UK data suggest specialists in the ROI see proportionately less long latency skin (e.g. neoplasia) and respiratory (e.g. mesothelioma; lung cancer) diagnoses compared to the UK. Other observed differences included a much larger proportion of OP ROI cases originating from the health and social care sector compared to GB and NI reports.

358

# RETURN TO WORK AND WORK PARTICIPATION AFTER CHANGES IN OCCUPATIONAL HEALTH SERVICE AND HEALTH INSURANCE ACT. NATIONWIDE FINNISH REGISTER STUDIES

<sup>1</sup>E Viikari-Juntura\*, <sup>2</sup>U Vlrta, <sup>1</sup>T Leinonen, <sup>1</sup>K Husgafvel-Pursiainen, <sup>2</sup>I Autti-Rämö, <sup>1</sup>S Solovieva. <sup>1</sup>Finnish Institute of Occupational Health, Helsinki, Finland; <sup>2</sup>The Social Insurance Institution of Finland, Helsinki, Finland

10.1136/oemed-2018-ICOHabstracts.413

**Introduction** In many countries the social security legislation has been changed to support staying at work and return to work (RTW) from sickness absence (SA). However, the effectiveness of such changes is not well known. The aim was to assess the effectiveness of the introduction of part-time sick leave in 2007 and an amendment in its use in 2010 (enabling use at early stage of disability) on RTW and work participation. We also looked at RTW and work participation after the so-called 30–60–90 day rule was enacted in 2012, obligating, among others, early notification of prolonged SA (>30 days) as well as assessment of remaining work ability and possibilities to continue working (before 90 days).

**Methods** We used nationwide register information on ill-health benefits, as well as employment and unemployment periods. Receivers of partial sickness benefit were compared with propensity-score matched controls of full sickness benefit receivers. For the 30–60–90 day rule, we followed-up (2–10 months) those who had a continuous SA of 30 calendar or 60 compensated days before and after 2012.

**Result** Part-time sick leave at the early stage of disability enhanced return to work. Moreover, the proportion of time at work was at a significantly higher level in the part-time than full-time sick leave group. The prevalence of full disability retirement reduced and that of partial disability retirement increased among users of part-time compared with those with full-time sick leave. Work participation did not essentially differ after a SA of 30 calendar or 60 compensated days after the introduction of the 30–60–90 day rule.

**Discussion** The use of part-time sick leave enhances return to work and overall work participation, and should be considered, when a person is not able to work full time. The 30–60–90 day rule seems not to have affected work participation during our follow-up times.

429

# SIGNATURE OF EPIGENETIC ALTERATIONS INDUCED BY CARBON NANOTUBE- IN VITRO, IN VIVO AND IN WORKERS

<sup>1</sup>Lode Godderis\*, <sup>2</sup>Deniz Öner, <sup>2</sup>Manosij Ghosh, <sup>3</sup>Bram Bekaert, <sup>2</sup>Ali M Tabish, <sup>2</sup>Peter HM Hoet. <sup>1</sup>KU Leuven, Department of Public Health and Primary Care, Centre Environment and Health/idewe, Leuven, Belgium; <sup>2</sup>Department of Forensic Medicine, Laboratory of Forensic Genetics and Molecular Archaeology, University Hospitals Leuven, Leuven, Belgium; <sup>3</sup>KU Leuven, Department of Public Health and Primary Care, Centre Environment and Health, Leuven, Belgium

10.1136/oemed-2018-ICOHabstracts.414

**Introduction** Growing indication of toxicity and production of carbon nanotubes (CNTs), have resulted in concern about

adverse effect of occupational exposure. Research have suggested carcinogenic potential of some forms of CNTs (MWCNT-7 Mitsui) and asbestos-like pathogenesis. Studying epigenetic alterations (e.g. DNA methylation) could provide important additional evidence to determine CNT toxicity and disease progression.

**Methods** To understand epigenetic effects of CNT (SWCNT and MWCNT), we designed a translational study incorporating *in vitro* and *in vivo* experiments. The changes were compared to results of asbestos exposure study. Changes in DNA methylation were studied at global (LC/MS-MS), genome wide (illumina 450 K), sequence specific levels (bisulfite pyrosequencing). Changes in gene expression were studied using RNA-Seq. Finally, signatures obtained from these studies were validated in 23 workers exposed to MWCNT.

**Result** *In vitro*, CNTs and asbestos induced gene specific DNA methylation changes. Asbestos exposure induced alterations in genes associated with Rho mediated signal transduction, HOX genes, WNT genes. Methylation and transcriptomic profiles of CNT exposed cells revealed alterations in DNA damage repair, tp53, cell cycle, protein phosphorylation pathways. Additionally, CNTs induced sequence specific changes in promoter region of several key genes including DNMT1, HDAC4, ATM, MAP3K10, PIK3R2 and MYO1C. Some of the genes, specifically ATM was also differentially methylated by SWCNTs and MWCNTs in the *in vivo* study. Based on these result, we studied some of these markers in MWCNT exposed workers, where we observed significant changes in sequence specific methylation for DNMT1, ATM, SKI and HDAC4 promoter CpGs.

**Conclusion** Epigenetic cell responses provides important insights in potential health risks and underlying mechanisms. Hence, many of these genes have been associated with occupational asbestos and smoking induced diseases and cancer. Further research needs to confirm whether methylation alterations in this set of genes can be used in monitoring changes associated CNT exposure and effect.

#### 514 FACTORS ASSOCIATED TO RETURN TO WORK AFTER SICKNESS ABSENCE DUE TO MENTAL DISORDERS AMONG BRAZILIAN WORKERS

<sup>1</sup>JS Silva-Junior\*, <sup>2</sup>RH Griep, <sup>3</sup>MC Martinez, <sup>4</sup>FM Fischer. <sup>1</sup>National Social Security Institute, São Paulo, Brazil; <sup>2</sup>Oswaldo Cruz Foundation, Rio de Janeiro, Brazil; <sup>3</sup>WAF Informática, São Paulo, Brazil; <sup>4</sup>School of Public Health, University of São Paulo, São Paulo, Brazil

10.1136/oemed-2018-ICOHabstracts.415

**Introduction** Mental disorders are the third leading cause for grant sickness social security benefit in Brazil. Those workers have longer time to return to work (RTW) comparing to other disabilities. This study aims to analyse factors associated to RTW after an episode of sickness absence due to mental disorders (MD).

**Methods** A longitudinal study was conducted in the city of São Paulo, Brazil, from 2014–2016. Included 204 workers requiring sickness social security benefit due to MD. At baseline, participants fill questionnaires about sociodemographic, health risk behaviours, work characteristics, health conditions and social security history. They were followed for 365 days after the first day of sickness absence. Survival analysis (Kaplan-Meier curve and Cox regression) were performed to identify factors influencing the first RTW.

**Result** The group was composed mostly by women (71.1%), people aged under 40 (67.6%) education equal or higher 12 years (80.4%) and diagnosed as depressed (52.9%). Many worked in customer service jobs (44.1%), reported effort-reward imbalance at work (57.4%) and high overcommitment (74.2%). The average time for return to work was approximately six months among the 63.0% who tried to resume their work activities. Factors associated to return to work within one year after sick leave were: aged between 30–39 years (HR 1.76; 95% CI: 1.08 to 2.79), 12 or more years of education (HR 1.87; 95% CI: 1.10 to 3.17), low alcohol intake (HR 2.65; 95% CI: 1.75 to 4.02) and low level of anxiety symptoms at baseline (HR 0.17; 95% CI: 0.04 to 0.74) – when analysis were adjusted by sex and job title.

**Discussion** Sociodemographic characteristics, risk health behaviours and medical conditions at baseline were associated to RTW after sick leave due to MD. Further studies, with larger sample, are needed to improve estimates and discussion focused in interventions to early RTW in public and private sectors. Acknowledgments: CNPq grant n°442051/2014–0.

#### 543 RELATIONSHIP BETWEEN SHIFT WORK AND THE ONSET OF RHEUMATOID ARTHRITIS; RESULTS FROM THE SWEDISH EIRA CASE-CONTROL STUDY

<sup>1,2</sup>Alfredsson Lars\*, <sup>1</sup>AK Hedström, <sup>3</sup>T Åkerstedt, <sup>4</sup>L Klareskog. <sup>1</sup>Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden; <sup>2</sup>Centre for Occupational and Environmental Medicine, Stockholm County Council, Stockholm, Sweden; <sup>3</sup>Stockholm University and Department of clinical neuroscience, Karolinska institutet, Stockholm, Sweden; <sup>4</sup>Department of Medicine, Rheumatology Unit, Karolinska University Hospital, Solna, Stockholm, Sweden

10.1136/oemed-2018-ICOHabstracts.416

**Introduction** Shift work has previously been associated with increased RA risk in females. The aim of this study was to investigate the potential association between permanent night shift work, rotating shift work, and day oriented shift work, and risk of developing anti-citrullinated peptide antibodies (ACPA) positive and ACPA negative RA.

**Methods** The present report is based on a Swedish population-based, case-control study with incident cases of RA (1951 cases, 2225 matched controls). Using logistic regression, occurrence of RA among subjects who have been exposed to different kinds of shift work was compared with that among those who have never been exposed, by calculating the odds ratio (OR) with a 95% confidence interval (CI).

**Result** Rotating shift work and day oriented shift work were associated with a 30% increased risk of developing ACPA positive RA, but not ACPA negative RA. There was an inverse association between permanent night shift work and risk of both ACPA positive RA (OR 0.7, 95% CI: 0.6 to 0.9) and ACPA negative RA (OR 0.8, 95% CI: 0.6 to 1.0). For both subsets of RA, significant trends showed a lower risk of developing RA with increasing duration of permanent night shift work.

**Discussion** Sleep restriction as a consequence of shift work is associated with several biological effects among which changes in melatonin production may be involved. The present epidemiological findings of a complex relationship between sleep patterns and different forms of RA may be of importance for increasing the understanding of the pathophysiology of RA.