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Objectives Underreporting of occupational diseases (OD) is an important issue worldwide. To address this problem, we projected a Cochrane review to evaluate the effect of interventions aimed at reducing the underreporting of OD by physicians.
Methods We will include randomised controlled trials (RCT), cluster-RCT, controlled before-and-after (CBA) and interrupted time-series (ITS) studies. We will include any type of intervention acting directly or indirectly to influence the behaviour of physicians. As primary outcome, we will define the reporting of OD either measured as the number of physicians reporting or as the number of OD reported per physician. Pairs of authors will independently screen the titles and abstracts of the search strategy results. Potentially relevant articles will be obtained in full text and independently assessed for inclusion.
Results A preliminary search to locate RCT was conducted in Medline (through Pubmed) up to November 2012. The search strategy identified 137 potentially pertinent articles. Of these, three articles met the inclusion criteria. Two RCT were conducted in high income countries (the Netherlands and United States), while the other one was conducted in Nigeria. Two studies evaluated the effect of informative interventions, the third one evaluated the effect of a training programme. Results indicate insufficient evidence for the effect of informative interventions for reducing the underreporting of OD (1 RCT on occupational physicians, not effective - 1 RCT on physicians, effective). On the other hand, training had a positive effect on health personnel knowledge, reporting requirement and the timeliness and completeness of the disease surveillance and notification system.
Conclusions These preliminary results, not including data from future searches regarding CBA and ITS, highlight the widespread problem of underreporting of OD. More high quality RCT are needed to evaluate the effect of interventions which could be applied to increase the reporting of OD in different contexts and countries.

204 SEARCHING FOR SIGNALS OF POTENTIALLY NEW DISEASE-EXPOSURE ASSOCIATIONS: INTEREST OF SCREENING WORK-RELATED DISEASES SURVEILLANCE DATABASES WITH DATA MINING APPROACHES?

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Objective We defined potential new work-related diseases as either new couples "disease x agent", or new triads "disease x agent x occupational setting" ("old friends in new places") with, at least, a reasonably strong causality presumption. Before such cases have been reported a high number of times and raise clinicians' concern, they will have been encountered only a few times, sometimes by different physicians. Some cases might have been captured by surveillance networks. Thus, it is for interest for these networks to develop tools trying to highlight pro-actively these kinds of early potential signals within their growing databases (rather than waiting to be asked, after clinician concern was expressed, how many cases they have been recorded the previous years). The objective of this communication, is to show and illustrate to what extent, a Data Mining approach could help identifying such cases of interest for vigilance purposes.
Methods Databases from the French National Surveillance Scheme on occupational diseases Surveillance and Prevention (rnv3p), and from the UK team of occupational diseases surveillance (THOR) have been explored (both schemes being part of a wider Modernet consortium, whose networking is currently funded by EU-COST program).

Analyses of the existing couples and triads and identification of those generating a signal with disproportionality measures used in pharmacovigilance (ex PRR: Proportional Reporting Ratio).
Results New couples and triads already derived from these analyses conducted on rnv3p and THOR schemes will be presented.
Conclusion These methods stand at the frontier of conventional epidemiological surveillance of work-related diseases, and might be beneficial for vigilance in highlighting similar cases, in order to investigate them as early as possible. The higher the "background noise" in the database, the more efficient they are to highlight disproportionalities.

Session: Mini symposium V: Shift work and cancer

205 BIOLOGICAL MECHANISMS THAT UNDERLIE SHIFTWORK AS A RISK FACTOR FOR BREAST CANCER

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Objectives We investigated hypotheses for the association between shiftwork and breast cancer based on our a priori theoretical framework of five biological mechanisms which might be operational in shiftwork: light at night; phase shift (when central cycles have adjusted to night work, but peripheral cycles have not); sleep disruption; lifestyle factors (diet, physical activity and alcohol intake) and low vitamin D.
Methods We conducted a population-based case-control study with 1205 breast cancer cases, identified from 2009 to 2011 identified through the Western Australian Cancer Registry, and 1789 age-matched controls from the Western Australian electoral roll. An occupational history was collected by self-completed questionnaire for every job a woman had held for at least six months (job title, main tasks, year started, duration, hours per week and weeks per year worked, and whether the job involved night work, shift work, or work at unusual hours). Using the web application OccIDEAS, we obtained further details about the shiftwork by telephone interview. Automatic assessments with manual reviews were used to assess occupational exposure to the hypothesized factors.
Results We found a 22% increase in breast cancer risk (OR 1·22, 95% CI 1·01–1·47) for phase shift with a statistically significant dose response relationship (p = 0.04). For the other hypothesized mechanisms, risks were marginally elevated and

not statistically significant. No association was significant in Bayesian analyses.
Conclusions We suggest that future studies use similar biologically-based exposure assessments in order for us to be sure what advice we should give to the millions of women around the world who work at night.

206 MELATONIN AND SEX HORMONE BIOMARKERS AND LIGHT INTENSITY EXPOSURE IN FEMALE AND MALE PERMANENT NIGHT SHIFT WORKERS

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Objectives Night shift work has been associated with higher breast cancer risk. It has been proposed that night shift workers experience light-induced reduction in melatonin production. Melatonin has direct oncostatic properties and a potential interplay with reproductive hormones. In this cross-sectional study the hypothesis was that night shift workers produce less melatonin and more estrogens and androgens compared to day workers. Changes in the rhythm of hormone production under different individual light exposures were evaluated.
Methods 75 permanent night workers and 42 day workers of both sexes, aged 22–64 years, were recruited from 4 companies in Barcelona, Spain. Levels of 6-sulfatoxymelatonin (melatonin metabolite) and 27 steroid metabolites were measured in urine samples collected from all voids over 24-hours on a working day by all participants. Simultaneously participants wore a data logger that continuously recorded their light exposure. Sociodemographic, occupation and lifestyle information was collected for each participant by interview. Cosinor analysis was performed for 6-sulfatoxymelatonin in every individual to evaluate their circadian rhythm estimating the mesor (midpoint in the full-range), amplitude (difference of the peak value to the mesor) and peak time of production. Geometric means were calculated for each parameter in night and day workers.
Results Sociodemographic and lifestyle characteristics of day and night shift groups were not significantly different. 6-sulfatoxymelatonin production was significantly lower in night compared to day workers (mesor 10.9 vs 14.2 ng/mg creatinine respectively; amplitude 11.5 vs 18.3 ng/ml creatinine) and peak time was later in night shift workers (6:00 am vs 3:48 am). Mean oestrogen and androgen levels tended to be higher among night workers but differences were not significant.
Conclusions This study indicates potential differences in melatonin and steroid profiles between night and day workers. Results from hormone levels in relation to personal light exposure using nonlinear mixed models will be presented.

207 NIGHTSHIFT WORK AND LEVELS OF 6-SULFATOXYMELATONIN, CORTISOL AND SEX HORMONES IN MEN

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Objectives Nightshift work has been associated with cancer among men, but the mechanism underlying this association is not clear. We investigated whether male nightshift workers demonstrated changes in the normal circadian levels and secretion patterns of melatonin, cortisol and sex hormones that may be directly related to cancer risk.
Methods Participants were 185 male nightshift workers (NSW) and 158 male dayshift workers (DSW) employed as healthcare providers, aged 22–55. Urine samples were collected throughout work and sleep periods and assayed for various hormone metabolites.
Results Compared to DSW during their nighttime sleep, NSW had significantly lower levels of 6-sulfatoxymelatonin during daytime sleep, nighttime work, and nighttime sleep on their off-nights (57%, 62% and 40% lower, respectively). Urinary cortisol levels in the NSW were 16% higher during daytime sleep and 13% lower during nighttime sleep on off-nights, compared to DSW during nighttime sleep. While cortisol levels between NSW during night work and DSW during night sleep were not significantly different, metabolites of cortisol (e.g. cortisone, tetrahydrocortisol) were significantly increased among NSW. No significant differences were observed in testosterone or dihydrotestosterone levels between nightshift workers during their day sleep or night sleep compared to dayshift workers during nighttime sleep.
Conclusions Male sex hormones have been implicated in prostate carcinogenesis, however, results of this study indicate that the impact of nightshift work on cancer risk may occur through other mechanisms. Substantially reduced 6-sulfatoxymelatonin levels during night work, daytime sleep and even night sleep on off-nights among night shift workers were observed, and given the oncostatic properties of melatonin, this chronic reduction in melatonin among nightshift workers may represent an important carcinogenic mechanism. Corticosteroid secretion and metabolism was also found to be impacted by night shift work, which could have implications for cancer risk through its effects on immune function.

Session: Plenary session

208 CHANGES IN EMPLOYMENT CONDITIONS AND MENTAL HEALTH DURING THE ECONOMIC CRISIS IN MIGRANT WORKERS IN SPAIN

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Objective Evaluate the influence of changes in employment conditions on mental health of migrant workers in Spain, in the context of economic crisis.
Methods Follow-up survey at two time points: 2008 and 2011, whose reference population consists of 318 workers from Colombia, Ecuador, Morocco and Romania living in Spain. Those who reported good mental health (n = 214) at 2008 were selected to evaluate, after three years, the incidence of poor mental health according to several sociodemographic and occupational factors (sex, age, nationality, education level, occupation and employment status), and the association between this health indicator and different employment trajectories during this period, by means of adjusted odds ratio (aOR).
Results There is an increased risk of poor mental health in those workers who lost their employment (aOR = 3.62; IC 95%: 1.64–7.96), who increased the number of work hours