It is not well established that long-term contact to low concentration of toluene produces changes in male hormonal profile (MHP).

Objective To identify changes in the MHP, consisting of luteinizing hormone (LH), follicle-stimulating hormone (FSH) and testosterone, in workers exposed to toluene in an industrial packaging plant in Mexico City.

Material and Methods Cross-sectional study that included 42 workers, from which were formed two groups: with high (HET) and low (LET) exposure to toluene; serum FSH, LH, testosterone and acid hippuric in urine were measured in all subjects.

RESULTS Hippuric acid in subjects with LET: 2.53 ± 1.20 g/g creatinine, and with HET: 6.31 ± 3.83 g/g creatinine (p = 0.02). Seric FSH concentration: 5.12 ± 0.77 and 3.55 ± 0.3 mU/mL (p = 0.02) in LET and HET respectively; LH: 2.66 ± 0.45 and 2.77 ± 0.21 (p = 0.81), and testosterone: 3.91 ± 0.34 and 4.86 ± 0.23 ng/mL (p = 0.04). By regression analysis, the correlation coefficient of FSH with hippuric acid: -0,182 (p = 0.031), with coefficient of determination of 11%, the LH: -0,007 (p = 0.88) and 0.05% respectively, and testosterone: + 0209 (p = 0.0001) and 34%.

Conclusions The effect of toluene is evident on FSH; LH also decreased but not overwhelming; testosterone seems to have opposite response, perhaps explained by different sensitivity of the male gonads to toluene exposure. These findings appear to be the initial changes in MHP of workers exposed to the solvent in question.

95 EXPOSURE TO POLYCYCLIC AROMATIC HYDROCARBONS AND SPERM DNA INTEGRITY OF COKE OVEN WORKERS

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The objective of this study was to examine sperm DNA integrity of coke-oven workers in relation to exposure to PAHs from coke processing. A total of 72 human subjects participated in this study: 24 topside-oven workers, 28 side-oven workers, and 20 administrative personnel serving as the high exposure group, low exposure group, and control, respectively. An exposure assessment was conducted to depict the extent of PAH exposure by measuring urinary 1-hydroxypyrene (1-OHP). DNA fragmentation, 8-oxo-7,8-dihydro-2'-deoxyguanosine (8-oxodGuo), and bulky DNA adducts in sperm DNA were quantified using terminal deoxynucleotidyl transferase-mediated dUTP nick end labelling, liquid chromatography-mass spectrometry/mass spectrometry, and 32P-labelling, respectively. Coke-oven workers had increased levels of DNA fragmentation, 8-oxodGuo, and bulky DNA adducts. However, there was no significant difference in DNA fragmentation levels among the three studied groups ($P = 0.062$). The levels of 8-oxodGuo and bulky DNA adducts in the exposed groups were significantly higher than those in the control ($P = 0.048$ and 0.032, respectively), while controlling for age, alcohol consumption, and smoking. DNA fragmentation positively correlated with 8-oxodGuo, which suggests that oxidative stress may be linked to DNA breakage. Urinary 1-OHP levels did correlate with 8-oxodGuo levels ($P = 0.036$), but not bulky DNA adducts and DNA fragmentation. In summary, exposure to PAHs correlated with oxidative damage and formation of DNA adducts in sperm. Monitoring of sperm DNA integrity is recommended for affected workers as part of any periodic health assessment to determine the impact of occupational toxins on sperm.

96 MENSTRUAL CYCLE CHARACTERISTICS IN EUROPEAN AND INUIT WOMEN EXPOSED TO PERFLUORINATED CHEMICALS: PRELIMINARY FINDINGS FROM A CROSS-SECTIONAL STUDY

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Objectives Perfluorooctanate (PFOA) and perfluorooctane sulfonate (PFOS) are ubiquitous man-made compounds. Studies suggest that they are possible hormonal disruptors, but findings are inconsistent. We examined the association between measured PFOS and PFOA exposure and menstrual cycle length and irregularities in European and Inuit women.

Methods This cross-sectional analysis included 1,037 pregnant women from the INUENDO cohort, enrolled during antenatal care visits between June 2002 and May2004 in Greenland, Poland and Ukraine. Information on menstrual cycle characteristics were obtained by questionnaires and the woman had a blood sample drawn. Serum concentrations of PFOS and PFOA were measured by liquid chromatography tandem mass spectrometry (LC/MS/MS). The association between PFOS/PFOA and menstrual cycle length and irregularities were analysed using logistic regression with tertiles of exposure and stratified by country. Estimates are given as crude odds ratios (ORs) with 95% confidence intervals (CIs).

Results No consistent effects of PFOS and PFOA exposure on menstrual cycle characteristics were observed across all three groups of pregnant women. Within populations, we observed reduced odds of short cycles (≤24 days) among women from Ukraine exposed to high levels of PFOA (OR 0.38, 95% CI 0.15–0.97). However, in Greenland representing the highest exposure level, PFOA was not related to short cycles (OR 1.06, 95% CI 0.21–5.34).

Conclusions These preliminary findings on 1,037 pregnant women from the INUENDO cohort in Greenland, Poland and Ukraine suggest that it is unlikely that exposure to PFOA and PFOS is a main cause of menstrual disturbances.

97 FACTORS ASSOCIATED WITH RETURN TO WORK 6 MONTHS AFTER DELIVERY

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Nowadays, there is increasing non-return to work in pregnant workers. Therefore, the objective of this study was to explore the association between general characteristics, occupational, maternal and infant factors and women returning to work after pregnancy for further improve occupational health service in this population. The retrospective cohort study was conducted in July 2012 at Nopparat Rajthanee Hospital, Bangkok. The data were interviewing workers at Well baby clinic, Nopparat Rajthanee Hospital and Satellite Health Centers. The total population was women who delivered at this hospital in January 2012 and

worked before delivery. 584 pregnant workers were included in this study, yielding the cover rate 82.60%. The analysis was performed by percentage and regression. The result found that the proportion between returned to work and non-returned to work 6 months after delivery was 4:1. There are three general characteristic factors with statistical significance associated with returning to work, which include age (p-value 0.002), number of pregnancy (p-value < 0.001), and source of income (p-value <0.001). In addition, there are eight occupational factors with statistical significance associated with returning to work consisting of occupation (p-value 0.03), employment status (p-value 0.03), working sectors (p-value <0.001), fulltime or part-time (p-value <0.001), work posture such as standing (p-value <0.001), sitting (p-value <0.001), walking (p-value 0.048), and poor ergonomic posture (p-value 0.02). Furthermore, there is one maternal factors with statistical significance associated with returning to work, which was postpartum hematoma (p-value 0.003). However, there are no infant factors with statistical significance associated with returning to work. In conclusion, this study found factors related to returning to work. The occupational health provider should include these factors for holistic care in this working population.

98 EFFECTS OF ROTATING-SHIFT WORK ON FEMALE SEXUAL FUNCTION IN NURSE - TWO HOSPITALS STUDY

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Objective The main purpose of this study is to examine the impact of night-shift task on the female sexual function, such as sexual desire, arousal, lubrication, orgasm, satisfaction and sexual pain among the female nurses.
Method The study subjects were female nurses who were 20–49 years old and worked in Changhua and Chang Bing Show-Chwan Memorial Hospital. All the study nurses were asked by questionnaire about their time-shift working status, quality of sleep, health status and sexual function. Data were analysed by Statistical Package for Social Science (SPSS).
Results Compared to day-shift nurses, night-shift nurses had a higher risk to have poor sleep quality and self-report health status ($p < 0.05$). The averaged female sexual function index among the study nurses was 56.42 ± 9.12There was 68.85% of the study nurses had at least one kind of female sexual dysfunction. The increased age, body mass index, poor sleep quality, and sexual dysfunction of partner were the risk factors of female sexual dysfunction ($P < 0.05$). The odd ratio of sexual dysfunction of partner was 4.997 (95% CI = -1.341∼-8.654; P = 0.008).
Conclusion Night-shift task can cause female nurses to have poor sleep quality, and self reported health status. The female sexual function was also influence by different work and different shift way. The female sexual function was also influence by age, body mass index, partner sexual function, sleep quality and health status.

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99 ASSOCIATIONS OF POLYMORPHISMS IN CIRCADIAN GENES, SHIFT WORK AND BREAST CANCER IN THE GERMAN GENICA STUDY

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Objectives Recently, the role of night-shift work in breast cancer development has been intensively discussed. Common variants in genes that regulate the circadian system may modify the observed risks of shift work. Here, we hypothesised that circadian genes influence breast cancer risk and may modify the risk of night shift work to develop breast cancer.
Material and Methods The population based case-control study Gene-Environment Interaction and Breast Cancer (GENICA) was conducted in the Greater Region of Bonn, Germany. Shift work and detailed shift work characteristics were assessed in subsequent telephone interviews. Thirteen polymorphisms in circadian genes AANAT, ARNTL, CLOCK, CRY2, MTNR1B, NPAS2, PER2, UGT1A, UGT1A6, UGT2B7, and UGT2B15 were genotyped. Associations between polymorphisms, shift work and breast cancer could be investigated for 1022 controls and 1014 cases. Risk estimates were calculated as odds ratios (ORs) with 95% confidence intervals (CIs) conditional on age and adjusted for hormone replacement therapy, number of mammograms and familial breast cancer. Test for interactions as well as methods for Multifactor Dimensionality Reduction will be presented.
Results First results indicate elevated risk estimates for polymorphism rs8150 of gene AANAT (GC + CC vs. GG: OR 1.17; 95% CI 1.01–1.36). In women that ever worked in shift for at least one year we found an elevated risk estimate for polymorphism rs10462028 in CLOCK gene (OR 3.53; 95% CI 1.09–11.42).
Discussion Our study suggests that polymorphisms in circadian genes may be associated with breast cancer and may also modify the risks of shift work for breast cancer. However, the results are limited by low prevalence of night work and variant genotypes. Therefore a pooling of studies would improve the statistical power to analyse the influence of circadian genes in breast cancer development.

100 IMPACT OF SMOKING ON TOTAL AND MAJOR CAUSES OF MORTALITY AMONG CHINESE SILICOTICS IN HONG KONG: EFFECT MODIFIER OR CONFOUNDER?

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Objectives Whether smoking being an effect modifier or confounder in increased total mortality and mortality from major causes has never been formally evaluated in occupational cohort studies and this lack of knowledge was addressed in a cohort of Chinese workers with silicosis.
Methods All workers with silicosis in Hong Kong diagnosed during the period 1981–2005 were followed up till the end of 2006 to ascertain their vital status and causes of death. An index of 'relative silicosis effect (RSE)' was used to examine the potential multiplicative interaction between smoking and silicosis. A