Heart Rate Variability in Smelter Furnace Workers

Introduction
Exposure to fine particulate matter in urban air has been associated with increased risk of hospitalisation and death from cardiovascular diseases. One hypothesis suggests a direct influence of particles on the autonomic nervous system. Some studies have shown an association between particle exposure and reduced heart rate variability (HRV). Furnace workers in metal smelters are occupationally exposed to fine and ultrafine particles. The aim of this study was to examine the association between exposure to particulate matter in metal smelters and HRV.

Methods
We examined 64 workers in three Norwegian metal smelters on a working day, and on a day off after at least two days since last exposure. On the working day, exposure to different particle size fractions was assessed by personal sampling, using respirable cyclones and five-stage Sioutas cascade impactors. The workers carried Holter monitors for 24 hours' heart rate registration during the working day and the day off. HRV indices were analysed by exposure for each hour of the day, using mixed model regression, adjusted for relevant covariates.

Results
There were 58 male and 6 female workers. Their mean age was 34 years (range 19–64). The mean exposure to respirable particulate matter was 2.36 mg/m³, while 0.88 mg/m³ was below 250 nm. Standard deviation of normal-to-normal intervals (SDNN) was reduced during working hours on the working day relative to the day off, whereas in the afternoon and night hours there were no significant differences. Low frequency/high frequency (LF/HF) ratio was higher during working hours on the working day, but in the afternoon and evening hours the LF/HF ratio was significantly higher on the day off compared to the working day.

Conclusion
HRV indices differ between working day and day off. Analyses are in progression, and further results on the effects of particle exposure will be presented.

Organophosphates in the Workplace: A 20-Year Prospective Study

Introduction
Organophosphates are widely used in industrial processes, and their exposure has been associated with increased risk of hospitalisation and death from cardiovascular diseases. One hypothesis suggests a direct influence of particles on the autonomic nervous system.

Methods
We examined 64 workers in three Norwegian metal smelters on a working day, and on a day off after at least two days since last exposure. On the working day, exposure to fine particulate matter in urban air has been associated with increased risk of hospitalisation and death from cardiovascular diseases. Some studies have shown an association between particle exposure and reduced heart rate variability (HRV). Furnace workers in metal smelters are occupationally exposed to fine and ultrafine particles. The aim of this study was to examine the association between exposure to particulate matter in metal smelters and HRV.

Results
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Conclusion
HRV indices differ between working day and day off. Analyses are in progression, and further results on the effects of particle exposure will be presented.
**Introduction** The organophosphates (OPs) are a group of insecticides that have been widely used worldwide for the past 50 years. It is estimated that 3,000,000 people are exposed to OPs yearly, with the associated death rate being 3,000,000 deaths/year. OPs are cholinergic inhibitors and their toxicity is possible through acute or chronic exposure, with severe consequences for different organs and systems. The main objective of this study was to identify signs and symptoms of exposure to OPs on women with chronic exposure.

**Methods** A prospective study (1994–2014) followed up 43 women exposed to OPs, and evaluated signs and symptoms described as being associated to OPs exposure, as well as analytical parameters associated to asthma and cellular protection, namely pyruvate (PA) and lactate (LA).

**Results** During the first appointment, 98% of the women had asthma. Among the evaluated signs and symptoms, musculoskeletal injuries (78%) and menstrual cycle changes (36%) occurred with the highest frequency. Slightly less frequent were the changes observed in the peripheral nervous system (11%). Regarding the evaluated biochemical parameters, women generally showed a decrease in ferritin and an increase in TSH. Throughout the study a progressive drop in AChE was observed. In 64% and 92% of the women a change in PA and LA values respectively was observed.

**Discussion** The results suggest that prolonged exposure to OPs can chronically affect different human organism systems, namely parameters related to mitochondrial dysfunction.

**Discussion** We succeeded to develop a method to assess dermal exposure to diisocyanates. Field studies are now necessary to further evaluate the suitability of the custom-made patches, as well as to relate low levels of exposure and potential health outcomes.

**Primary Care and Work**

**1701** SCALE UP WORKERS’ HEALTH COVERAGE THROUGH PRIMARY HEALTH CARE

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Aim To explore ways of ups skuilling primary health care to offer essential occupational health to a broader population; some country examples.

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**1701a** GLOBAL BACKGROUND OF INSUFFICIENT COVERAGE BY OCCUPATIONAL HEALTH SERVICES: WHAT CAN WE DO TO SUPPORT PREVENTION AND CARE

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**Background** According to latest estimates by ILO 2.8 million men and women die every year caused by problems at work. Health disorders cause 2.4 million deaths. Costs are 3.9% of the global GDP or 3 trillion (million millions) USD. Problems include: poor legal and enforcement coverage, poor or no workers’ compensation systems, poor or no occupational health services – some 15% or less of the global workforce is covered. According to WHO 93% of global health resources go for treatment and 7% for prevention. Lack of knowledge, policies, systems and resources is evident.

**Methods and processes** A number of solutions and good practices have been identified to be useful and successful, although largely in developed countries. Simple methods to increase coverages and enhance services are needed. The ILO...