

population, 2 45 748 individuals were reported with long-term diseases. Key statistical signals are presented for several disease groups (respiratory, neoplasms, neurodegenerative, etc).

**Discussion** The approach presented had the following advantages:

- enabling systematic evaluations of all disease – occupational activity associations,
- high statistical power, and
- costless data acquisition.

The main drawback is its lack of direct information regarding exposure. For this reason, further work is currently performed to estimate exposure to pesticides retrospectively relying on other databases. This data mining approach will later be enriched by identifying diseases using the medical-related expense databases (including information on medications, biological exams, etc).

### 1159 OCCUPATIONAL RISKS FOR MIGRANT WORKERS IN SPAIN

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**Introduction** Migrant populations appear to be in general at greater risk than native populations for developing a number of diseases. However, the health and safety environments for these migrant populations are scarcely studied. The objective of this study is to compare the prevalence of risk exposures between migrant workers and Spain-native workers in Spain.

**Methods** Information gathered through the ongoing Platform of Longitudinal Studies of Immigrant Families (PELFI; started 2015) provides insight into the different kinds of health and safety risks that migrant and Spain-native workers experience. For the present study, migrants from Colombia, Morocco, and Ecuador, as well as Spanish controls make up a cohort of 473 workers. Data on socio-demographic variables (age, sex, and type of job) and self-reported occupational exposures were collected through face-to-face interview. Analysis of specific risks to worker health and safety focused on [1] frequency of exposure to chemical, psychosocial, and ergonomic hazards, and [2] employment arrangements. Data were analysed using STATA.

**Results** The overall frequency of hazardous exposure was consistently higher for migrants when compared to Spain-native workers. PELFI results show significant differences ( $p < 0.05$ ) between migrant and Spain-native workers for occupations involving heavy lifting (38.85% migrants; 19.35% natives), high heights (16.35%; 3.30%), repetitive movements (81.58%; 59.78%), chemical products (50.76%; 18.28%;), experiencing pain as a result of the work (59.39%; 1.57%), and standing long hours (67.68%; 19.35%). 26.32% of migrant workers and 15.48% of Spain-native workers reported that their salaries were insufficient to cover unexpected expenses.

**Conclusion** Migrant workers in this study are more frequently exposed to occupational risks than Spain-native workers. Although limitations exist regarding participants' different perceptions of risk, results suggest that special attention must be paid to migrant workers in Spain. A promising area for future research seeks to understand the processes by which workers are differentially exposed to occupational risks.

### 1206 APPLICATION OF METABOLOMIC SCIENCE IN THE DETECTION OF LUNG CANCER: A CASE-CONTROL STUDY

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**Introduction** Lung cancer is the leading cause of cancer death in the world. The challenge of screening for early stage lung cancer is still unresolved. The exploration of metabolites in breathe using sensor array technique may become a powerful screening tool to solve the problem.

**Methods** We conducted a prospective study to enrol cases of lung cancer and controls who received surgery for gall bladder stone, hernia, hemorrhoid resection, and thoracoscopic surgery in the same hospital between July 2016 and June 2017. The alveolar air of subjects were collected under the guidance of mainstream carbon dioxide analyzer. An electronic nose composed of 32 carbon nanotubes sensors was used to measure the VOCs of the alveolar air. The diagnostic accuracy was analysed by linear discriminant analysis (LDA) using the pathological reports as the reference standard.

**Results** After excluding 2 subjects with technical problems in sampling, 12 subjects with cancers in other sites, benign lung tumour, or metastatic lung cancer, 5 subjects received chemotherapy, 5 subjects with diabetes, 2 subjects with asthma, and 2 subjects with chronic obstructive pulmonary disease, a total of 17 cases and 105 controls were used in the final analysis. We randomly split the data into 80% for model building (training set) and 20% for validation (test set). By LDA, the accuracy, sensitivity, specificity, false positive rate, false negative rate, and ROC-AUC were 96.9%, 75.0%, 100.0%, 0%, 25%, and 0.98 (95% CI: 0.96 to 1.00) in the training set, and 84.0%, 80.0%, 85.0%, 15.0%, 20.0% and 0.84 (95% CI: 0.62 to 1.00) in the test set.

**Conclusion** The use of sensor array technique to explore the metabolites in breathe may become a powerful tool in the screening for lung cancer. Standardised procedures to eliminate confounding factors are warranted before clinical application.

### 1222 DIAGNOSIS OF 1,561 COMPENSATED CASES FOR OVERWORK-RELATED CEREBROVASCULAR/CARDIOVASCULAR DISEASES (CCVDS) KNOWN AS 'KAROSHI' IN JAPAN, 2010–2014

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**Introduction** Overwork-related health disorders including cerebrovascular/cardiovascular diseases (CCVDs) and mental disorders, known as 'Karoshi', have been the keen occupational health issue. Main criteria applied for compensation of overwork-related CCVDs in Japan were (1) extraordinary events,