develop and deploy a multi-sensor box for assessing working life exposures (exposure at and outside work) during a working week in a case study on respiratory health as part of the EU Exposome Project for Health and Occupational Research (EPHOR) project.

**Material and Methods** A multi-exposure sensor box (particulate matter (PM), noise, light, UV and temperature) has been developed and is currently being deployed with the aim to assess exposures during a working week in relation to acute respiratory health among 300 mild asthma patients. The sensors were evaluated against conventional equipment separately. Several PM sensors were co-located in different occupational settings with gravimetric samplers and the Aerodynamic Particle Sizer (APS). Sensors for noise, light, UV and temperature were tested against conventional instruments in various environmental settings.

**Results and Conclusions** Low-cost PM sensors and the APS correlated reasonably well in different occupational settings (high-resolution data) ($R^2=0.4–0.6$). Comparing the low-cost PM2.5 mass concentration from the sensors with the respirable gravimetric results (TWA) showed a moderate correlation ($R^2=0.5$). A semi-quantitative comparison of TWA exposures with PM mass concentrations showed higher correlations ($R^2>0.75$). A method for calibrating the PM sensor results to reflect different workplace and nonworkplace aerosols is being developed. The noise, light, UV and temperature sensors demonstrated $R^2$ values of 0.9 and above with reference monitors in laboratory or field comparisons. Calibration equations have been developed based on these relationships. Along with the evaluation results of the different sensors, the preliminary results of the multi-sensor box among ~25 case study subjects will be presented.

### Climate change

**O-217 AIR QUALITY AND HEALTH CO-BENEFITS OF CLIMATE CHANGE MITIGATION AND ADAPTATION ACTIONS BY 2030: AN INTERDISCIPLINARY MODELING STUDY IN AHMEDABAD, INDIA**

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**Introduction** An unprecedented urbanization and population encroachment in Indian cities is making it’s urban population more vulnerable to climate change and air pollution effects. Using an interdisciplinary modelling approach, our team has estimated the health co-benefits of mitigation and adaptation policies in Ahmedabad, India, through collaboration among the Indian Institute of Tropical Meteorology (IITM), Gujarat Energy Research & Management Institute (GERMI), Indian Institute of Public Health Gandhinagar (IIPH-G), and the Natural Resources Defense Council (NRDC) and an applied research project funded by the Wellcome Trust’s Our Planet, Our Health Program.

**Method** We selected Ahmedabad city as it’s experiencing extreme heat wave events in summer. The project aim was to estimate the local health benefits of actions to reduce air pollution emissions and adapt to climate change in Ahmedabad, India, by the year 2030 using open-access BenMAP modelling software. We compared the relative health impacts of putting two climate strategies in place by 2030: more reliance on cleaner, renewable energy sources instead of coal; and expanding cool roof installation area across the city.

**Results** Our results yielded local, city-specific insights on climate change and energy demand, as well as air quality and health. On air quality and health, annual average fine particle air pollution (PM2.5) would climb to 75.18 ug/m3 by 2030 under BAU. But with mitigation and adaptation strategies put in place, air quality would improve; lower PM2.5 concentrations (70.95 ug/m3) would mean 1,414 fewer all-cause deaths across the city by 2030. Furthermore, thousands more premature deaths could be avoided by meeting air quality standards: under the National Clean Air Program (NCAP), 6,510 annually; under the National Ambient Air Quality Standards (NAAQS), 9,047 annually; and under the World Health Organization (WHO) air quality guidelines, 17,369 annually. Moreover, one sees how climate adaptations can mean saving energy, and climate mitigation can mean saving lives.

### Shift work

**O-229 TIME SCHEDULE AND THE TOTAL AMOUNT OF NIGHT SHIFTS IN RELATION TO DEPRESSION AMONG HONG KONG NURSES**

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**Introduction** Night shift work has recently been recognized as an important occupational hazard linked with depression. However, the extent to which shift workers’ mental well-being is negatively affected by night shift exposure has rarely been assessed. This study examined the association between cumulative night shift work exposure and the risk of depression.

**Material and Methods** A cross-sectional study, using a computer-based questionnaire, was conducted among Hong Kong nurses between March and May 2022. Social demographic information and detailed shift work history (frequency of morning/evening/night shift and timetable, number of years and nights worked) were collected. Depression was assessed by Hospital Anxiety and Depression Scale. Logistic regression model adjusting for relevant covariates was used to assess the association between depression and night shift exposure. Ethics approval: CREC 2021.228

**Results** A total of 866 (82.6%) female nurses and 182 (17.4%) male nurses responded, with an average age of 33.5 ±7.2 years. The mean duration of night shift work of the nurses was 8.3 ±7.0 years and their cumulative night shifts were 8.3 ±7.0 years and their cumulative night shifts...
worked were 364.0±364.5 night-shift years. Multivariate logistic regression showed that every 10 night-shift year increments were associated with depression (adjusted odds ratio, aOR: 1.01, CI: 1.00, 1.02). Additionally, the risk became more prominent and significant among those who ended nighttime work between 6 and 7 AM (aOR: 8.66, CI: 1.04, 72.15) compared to those who ended between 8 and 12 noon. Moreover, in comparison to female nurses, male nurses were more susceptible to depression (aOR: 1.82, CI: 1.03, 3.22).

Conclusions This study found a significant association between nurse night shift work and depression. Furthermore, the results showed that male sex and those who ended nighttime work between 6 and 7 AM may contribute an elevated risk of depression. The results suggested a further investigation into circadian disruption and gender disparity in certain vocational scenarios.

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Healthcare workers

Introduction Night work has become inevitable in industrialized societies. This work pattern generates or is likely to aggravate various health problems.

Objective To assess the quality of sleep in night health care workers (HCW) and to detect a possible sleep apnea syndrome (SAS).

Methods This is a descriptive cross-sectional study of night HCW in the surgical and acute medicine departments of Charles Nicolle University Hospital. Sociodemographic and clinical characteristics were collected on a pre-established form. The risk of SAS was assessed according to the Berlin questionnaire.

Results A total of 57 HCWs participated in the study. The mean age was 38.9 ± 10.9 years with a sex ratio of 0.96. The HCW were affiliated to surgical departments in 65% of the cases, mainly to the gynecology department in 36.9%. Nurses were the most represented professional category in 36.8% of cases with an average professional seniority of 11.46 ± 9.88 years. Night work was permanent in 68.4% of cases, with an average of 2.6 shifts per week and 8.4 ± 8.18 years of service. The risk of SAS was considered high in 40.4% of cases. A slight female predominance was noted, with a higher mean age and seniority on the night shift compared with the low-risk SAS group (41.8 vs 36.9 years, 9.2 vs 7.8 years). A total of 55.6% of the hypertensive HCWs were at high risk of SAS.

Conclusion In order to prevent health problems related to night work, preventive medical check-ups in the form of medical examinations of aptitude for night work should be recommended.

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Exposure assessment

O-234 OCCUPATIONAL CHEMICAL AND PARTICLE JEM DEVELOPMENT WITHIN EUROPEAN JOB-EXPOSURE MATRIX (EUROJEM), EU EXPOsOME PROJECT FOR HEALTH AND OCCUPATIONAL RESEARCH (EPHOR)

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Introduction A first version of a European Job-exposure matrix (EuroJEM) for chemicals and particles has been developed within the EU Exposome Project for Health and Occupational Research (EPHOR). The aim was to develop an improved tool for exposure assessment suitable for epidemiological studies on the European population. The working group includes experts on job-exposure matrices and/or occupational exposures from several European countries, including Sweden, Finland, Norway, Denmark, Netherlands, France, and Spain.

Material and Methods The first version, EuroJEM1.0, includes four agents; Respiratory Crystalline Silica Dust (RCS), Nickel, Wood dust and Diesel Engine Exhaust (measured as Elemental Carbon, EC). The agents were chosen based on suggestions from occupational hygienist and epidemiologists within the project, considering availability of high-quality exposure data and research priorities within the EPHOR project. Data of interest were obtained from JEM-holders, and when necessary, occupational codes were translated into the International Standard Classification of Occupations, ISCO-88(COM). Experts from the working group independently assigned EuroJEM values from three to five JEMs for each agent. Consensus was reached during meetings. In the first step, the prevalence of exposed subjects in each occupation was assessed for each specific agent, including regional and temporal differences. In the second step occupations will be assigned with an exposure level from quantitative ‘state of the art’ JEMs available. The work on this part is ongoing. The EuroJEM will be linked with the EPHOR mega cohort and will be publicly available for widespread use.

Results EuroJEM contains 31 occupations exposed to RCS, 14 to Nickel, 34 to Wood dust and 44 to Diesel Engine Exhaust, where at least 25% of the workers within the occupation are exposed.

Conclusions This is the first attempt to harmonize several European JEMs to be used in European epidemiological studies on work exposure and disease.