

Aim
 To understand the mechanisms through which urban air particulate matter causes harmful effects on cardiovascular and respiratory systems.

Method
 Three panels of non-smoking adult subjects (mean-age=63; N=79), 34 with cardiovascular disease (heart group), 18 with chronic lung disease (COPD or asthma) (lung group) and 27 healthy subjects matched by age (control group) were recruited from the patients community of L. Sacco and S. Gerardo hospitals. Each subject was investigated at home for one day during and after his/her habitual activities in Summer 2005 and subsequently will repeat the same protocol in Winter 2005/2006. Summer and Winter data will be compared at the end of the survey.

Investigation consisted in daily symptom/activity recording, measurement of heart and lung functions, analysis of biomarkers of cardio-respiratory injury in blood, sputum samples and monitoring of environmental parameters.

Biological samples were collected at the end of 24-h investigation. Blood cells count, Hb-concentration, fibrinogen, PT, aPTT, PF100 and cytological analysis of sputum were measured within a day of sampling; while F1+2, WF, t-PAI, D-dimer, inflammatory/anti-inflammatory parameters (TNF- α , R-I and II of TNF- α , IL-8, IL-10), hs-CRP, s-Nt-proBNP in blood and IL-8, TNF- α in sputum will be measured in a large batch at the end of the survey.

Results
 Preliminary results of the Summer session showed no significant alterations in blood cell count: mean white blood cells was $5.86 \cdot 10^3/\mu\text{l}$ (SD 1.11) or control, $6.63 \cdot 10^3/\mu\text{l}$ (SD 1.15) for heart group and $7.11 \cdot 10^3/\mu\text{l}$ (SD 1.79) for lung group. Mean plasma fibrinogen concentration (normal value < 400 ng/dl) was 415 mg/dl (SD 89) for control, 437 mg/dl (SD 100) for heart and 400 mg/dl (SD 122) for lung group.

The collection and analysis of results will be completed in the next months. The clinical results will be complemented with data on heart and cardio-vascular function and compared with those of the Winter session for each subject. Moreover, correlation will be examined between clinical parameters and individual PM monitoring results.

RESPIRATORY EFFECTS OF SHORT TERM EXPOSURE TO URBAN PARTICULATE MATTER - THE PM-CARE PROJECT

METRUCIO E.⁽¹⁾, FOSSATI S.⁽¹⁾, COLOMBO S.⁽¹⁾, URSO P.⁽¹⁾, BOSIO D.⁽¹⁾, PECIS M.⁽²⁾, SERGI M.⁽³⁾, CARRER P.⁽¹⁾, MARONI M.⁽¹⁾

Department of Occupational & Environmental Health, Hospital L. Sacco Unit, University of Milan - Italy⁽¹⁾

Department of Traumatology, Orthopaedia and Occupational Health - University of Turin - Italy⁽²⁾

Respiratory Physiopathology Unit, Hospital "L. Sacco", Milan - Italy⁽³⁾

ID 1842] - No. 53 in Poster Area

Introduction: Short-term variation of exposure to particulate air pollution is associated with increased morbidity and mortality in susceptible subjects (COPD, asthma, cardiovascular patients) and onset of respiratory symptoms in healthy subjects.

Several studies have found association between exposure to PM and alterations of ventilatory parameters (e.g. FEV1, FVC, FEF25-75, PEF). Other sources have shown a decrease in haemoglobin O₂ saturation possibly due to alveolar inflammatory process.

Aim: to investigate the pathogenetic mechanisms of cardiovascular and respiratory effects induced by changing personal daily exposure to urban particulate pollution (PM-CARE study).

Methods: Three panels of non-smoking adult subjects (mean-age=63; N=79), 34 with cardiovascular disease (heart group), 18 with chronic lung disease (COPD or asthma) (lung group) and 27 healthy subjects matched by age (control group) were recruited from the patients community of L. Sacco and S. Gerardo hospitals. Each subject was investigated at home for one day during and after its habitual activities in summer 2005 and subsequently will repeat the same protocol in winter 2005/2006. Investigations consist of daily symptom/activity recording; continuous 24h-monitoring of cardiovascular, respiratory and environmental parameters; respiratory function evaluation; and measurement of blood biomarkers of inflammation and cardio-respiratory injury.

In particular, the respiratory investigations consisted of 24h O₂-Hb-saturation monitoring, final spirometric evaluation (FEV1, FVC, FEV1/FVC), DLCO and blood gas analysis.

Results: Being the study in progress, only partial results are so far available. Provisional findings include:

Overall 18% abnormal spirometry results (19% heart group; 44% lung group). In particular: reduced FVC only: 19% heart, 0% lung; reduced FEV1: 0% heart, 6% lung; reduced FEV1/FVC: 0% heart, 6% lung; FVC&FEV1 both decreased: 0% heart, 6% lung; FEV1&FEV1/FVC both decreased: 0% heart, 17% lung; all parameters reduced: 0% heart, 6% lung; overall 38% desaturation (50% heart, 39% lung; 31% control).

The collection and analysis of results will be completed in the next months. The clinical results will be complemented with data on heart and cardiovascular function, haematology and lung inflammation and compared with those of the Winter session for each subject. Moreover, correlation will be examined between clinical parameters and individual PM monitoring results.

MONITORING PORTABLE STATION FOR THE MEASUREMENT OF FINE AND ULTRAFINE PARTICLE EXPOSURE IN THE PM-CARE PROJECT

GARRAMONE G.⁽¹⁾, CAVALLO D.⁽¹⁾, SCHLITT C.⁽²⁾, TARONNA M.⁽²⁾, CATTANEO A.⁽²⁾, PERUZZO C.⁽²⁾, VERCELLI F.⁽²⁾, MARONI M.⁽²⁾

Department of Chemical and Environmental Sciences - University of Insubria at Como - Como - Italy⁽¹⁾

Department of Occupational and Environmental Health - University of Milan - Milan - Italy⁽²⁾

[ID 1893] - No. 54 in Poster Area

Background: The PM-CARE project aims at investigating the association between variation of urban-air particulate personal exposure and acute cardio-respiratory effects in cardiac and pulmonary patients, focusing on seasonal and activity-related PM exposure variations.

Aim: To set up a mobile air-monitoring unit suitable for personal exposure assessment in the PM-CARE project.

Materials and Methods: Three identical measuring units were constructed, consisting of a 0.12m³ transportable packaged trolley equipped with selected low-weight monitoring devices. The particle number concentrations of PM ranging from 0.02 to 1 μm and from 0.3 to 25 μm in aerodynamic diameter are continuously detected by two optical counters, whereas the 24h-averaged mass concentrations of PM0.5, PM1, PM2.5 and PM10 are measured through a multistage cascade impactor for gravimetric determination. CO and O₃ levels are monitored by continuous recording instruments, while the mean concentration of NO₂ is measured by passive sampling. Microclimatic probes for temperature and relative humidity complete the equipment.

Results and Discussion: One of the main problems in personal fine and ultrafine PM exposure assessment is to construct a portable monitoring station including complex instruments without excessive burden to the investigated subjects. The instrumental set assembled in the trolleys reached the goal of providing a complete measuring station that can be easily moved by the patients at home and during outdoor displacements without performance failures. The developed station offers a good compromise between accuracy in the PM exposure measurement and portability and reliability of the instrumental set.

Conclusions: The data obtained so far confirmed that the monitoring station fulfils the requirement of the PM-CARE project, since all the subjects under investigations made a proper use of it with a limited technical assistance and the station provided a detailed and reliable picture of personal PM exposure experienced by people in their daily activities at home and during outdoor displacements.

INDUSTRIAL HYGIENE

INDUSTRIAL EMISSION ASSESSMENT AND CONTROL TECHNOLOGY

LUJL

National Institutes of Health, University of the Philippines - Manila - Philippines

[ID 25] - No. 55 in Poster Area

- 1) Objectives: To establish risk assessment for organic solvents in a printing industry; and to come up with control measures for possible environmental pollution disaster from industrial emissions.
- 2) Methods: The study was conducted in a printing industry with about 400 employees and in a highly populated community. Monitoring of ambient air for various organic solvents was done using detector tubes, sampling pumps and charcoal tubes.
- 3) Results: The industry as the target area uses solvents such as Ethyl Acetate(EAC), Methyl Ethyl Ketone (MEK), Ethanol, and Isopropyl