

O-072**OUTDOOR EXPOSURE TO NO₂ AND FORMALDEHYDE IS ASSOCIATED WITH INCREASED GENOTOXIC DAMAGE IN CHILDREN****Authors:**

Alessandro Marcon, Unit of Epidemiology and Medical Statistics, University of Verona, Italy, alessandro.marcon@univr.it

Maria Enrica Fracasso, Section of Pharmacology, University of Verona, Italy

Paolo Girardi, Unit of Epidemiology and Medical Statistics, University of Verona, Italy

Linda Guarda, Unit of Epidemiology, NHS Mantua, Italy

Pierpaolo Marchetti, Unit of Epidemiology and Medical Statistics, University of Verona, Italy

Giancarlo Pesce, Unit of Epidemiology and Medical Statistics, University of Verona, Italy

Vanda Pironi, Unit of Epidemiology, NHS Mantua, Italy

Giorgio Siliprandi, Department of Mantua, Environmental Protection Agency, Italy

Paolo Ricci, Unit of Epidemiology, NHS Mantua, Italy

Roberto de Marco, Unit of Epidemiology and Medical Statistics, University of Verona, Italy

Background: Industrial air pollution may be a health hazard for exposed people.

Objectives: Residential outdoor exposure to NO₂ and formaldehyde was evaluated and associated with early genotoxic damage, in buccal mucosa cells of children who lived in the largest chipboard manufacturing area in Northern Italy (Viadana).

Methods: In 2010, randomly selected children (6-12 years) living in the Viadana district were surveyed through a parental questionnaire. DNA strand breaks and nuclear abnormalities were evaluated by the comet and micronucleus assays respectively. During the same year and in the same area, 63 passive samplers were installed, and NO₂ and formaldehyde levels were monitored both in winter and summer. Kriging interpolation was used to attribute the average annual concentration of pollutants to each child's residential address.

Results: 417 out of 656 eligible children (64%) took part in the study. Children who lived near (<2km) the chipboard industries had a higher mean exposure to outdoor NO₂ and formaldehyde ($p < 0.001$). A 1-standard deviation (SD) increase in formaldehyde (+0.16 $\mu\text{g}/\text{m}^3$) was associated with an increase of 10% (95%CI: 5-20%) in the comet tail intensity and of 10% (95%CI: 1-19%) in the frequency of nuclear buds. A 1-SD increase in NO₂ (+1.50 $\mu\text{g}/\text{m}^3$) was associated with a 12% (95%CI: 6-18%) increase in binucleated cells and with a 12% (95%CI: 4-21%) increase in nuclear buds.

Conclusions: Exposure to pollutants emitted by chipboard industries statistically significantly increased DNA damage and nuclear abnormalities in children's buccal mucosa cells.

Keywords: children, biomarker, genotoxic, air pollution, outdoor, industrial