

## Publication

## Residential air pollution does not modify the positive association between physical activity and lung function in current smokers in the ECRHS study

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Very few studies have examined whether a long-term beneficial effect of physical activity on lung function can be influenced by living in polluted urban areas. We assessed whether annual average residential concentrations of nitrogen dioxide (NO<sub>2</sub>) and particulate matter with aerodynamic diameters  $\leq 2.5 \mu\text{m}$  (PM<sub>2.5</sub>) and  $\leq 10 \mu\text{m}$  (PM<sub>10</sub>) modify the effect of physical activity on lung function among never- (N=2801) and current (N=1719) smokers in the multi-center European Community Respiratory Health Survey. Associations between repeated assessments (at 27-57 and 39-67/years) of being physically active (physical activity:  $\geq 2$  times and  $\geq 1$ /h per week) and forced expiratory volume in 1/s (FEV<sub>1</sub>) and forced vital capacity (FVC) were evaluated using adjusted mixed linear regression models. Models were conducted separately for never- and current smokers and stratified by residential long-term NO<sub>2</sub>, PM<sub>2.5</sub> mass and PM<sub>10</sub> mass concentrations ( $\leq 75$ th percentile (low/medium) versus  $> 75$ th percentile (high)). Among current smokers, physical activity and lung function were positively associated regardless of air pollution levels. Among never-smokers, physical activity was associated with lung function in areas with low/medium NO<sub>2</sub>, PM<sub>2.5</sub> mass and PM<sub>10</sub> mass concentrations (e.g. mean difference in FVC between active and non-active subjects was 43.0/mL (13.6, 72.5), 49.5/mL (20.1, 78.8) and 49.7/mL (18.6, 80.7), respectively), but these associations were attenuated in high air pollution areas. Only the interaction term of physical activity and PM<sub>10</sub> mass for FEV<sub>1</sub> among never-smokers was significant (p-value=0.03). Physical activity has beneficial effects on adult lung function in current smokers, irrespective of residential air pollution levels in Western Europe. Trends among never-smokers living in high air pollution areas are less clear.

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