AIR POLLUTION HEALTH IMPACT ASSESSMENT USING TIME-ACTIVITY DATA: TIME AND LOCATION MATTER

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Background and Aims: Important differences in air pollutant concentrations can occur over a day and between different locations, e.g. higher pollution during rush hours in areas with high commuter traffic and employment facilities. At the same time, the location of individuals also varies over space and time. Previous studies have shown that exposure assessments that do not take into account this variability underestimate the exposure of the population. Choices about time and activity will therefore ultimately affect exposure and health effects.

Methods: The standard health impact assessment methodology is applied to Flanders and Brussels and modified with special attention given to the exposure assessment. Human exposure to air pollutants ($PM_{2,5}$, O_3, NO_2) is estimated by combining air quality data from a dispersion model at high temporal and spatial resolution with population data from an activity-based transport model. This model takes into account the activity-travel behaviour of individuals during the day and provides hourly population mobility data on suburban level. For children school locations are taken into account during school hours.

Results: Health effects are presented for both a dynamic and static exposure profile together with their health effects. The magnitude of the difference is compared for different population subgroups and pollutants.

Conclusions: A comparison of the dynamic with the static approach provides information on the sensitivity of the applied methodology for health impact assessment. Using a dynamic exposure assessment we argue to model the actual exposure and health impact of populations more accurately.