THE ASSESSMENT OF THE IMPLEMENTATION OF FUEL RELATED LEGISLATIONS AND THEIR IMPACT ON AIR QUALITY AND PUBLIC HEALTH - THE APHEKOM PROJECT

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Background and Aims: The main focus of Work Package 6 of the Aphekom project was: to develop innovative methods to analyse the decrease in air pollution levels following implementation of an European regulation to reduce the sulphur content in liquid fuels; to follow the evolution of health risks over time; to track related effect modifiers; and to quantify the monetary costs of health impacts of the implemented regulation.
Methods: Daily SO_2 air pollution and mortality data from 20 participating cities, spread all over Europe, was analysed employing generalized additive models (GAM) using in R statistical software environment. City specific effect estimates were combined using meta-analysis.
Results: A general downwards trend over the study period urban background SO_2 was observed. There was no clear step change in SO_2 concentrations after implementation of the Directives; rather a gradual decline in SO_2 levels was observed.
The health data analysis showed no evidence of change of slope in the dose-response curve after implementation of the legislations and hence observed effects were related to level changes. The analysis showed that an increase of $10\mu gm^{-3}$ in SO_2 levels was associated with an overall (pooled) increase in daily all-cause (0.53%), respiratory (0.49%) and cardiovascular (0.72%) mortality. Intuitively one would expect that a decrease in daily SO_2 levels would result in a decrease in daily deaths.
The meta-analysis of the mortality data suggests that overall 2212 (95% CI: 772; 3663) lives per year were saved associated with decreases in SO_2 for 20 European cities from year 2000 onwards compared to the pre-Directive period. This has been valued at about €192 million relying on preference-derived monetary values.
Conclusion: The findings underscores the health and monetary benefits from drafting and implementing effective EU policies on air pollution and ensuring compliance with them over time.