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High-resolution modelling of health impacts and related external cost from air pollution over 36 years using the integrated model system EVA

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A high-resolution assessment of health impacts from air pollution and related external cost has been conducted for Denmark using the integrated EVA model system. The EVA system is based on the impact-pathway methodology, where the site-specific emissions will result, via atmospheric transport and chemistry, in a concentration distribution, which together with detailed population data, is used to estimate the population-level exposure. Using exposure-response functions and economic valuations, the exposure is transformed into impacts on human health and related external costs.

In this study we have used a coupling of two chemistry transport models to calculate the air pollution concentration at different domain and scales; the Danish Eulerian Hemispheric Model (DEHM) to calculate the air pollution levels in the Northern Hemisphere with a resolution down to 5.6 km x 5.6 km and the Urban Background Model (UBM) to further calculate the air pollution in Denmark at 1 km x 1 km resolution using results from DEHM as boundary conditions. Both the emission data as well as the population density has been represented in the model system with the same high resolution. Previous health impact assessments related to air pollution have been made on a lower resolution. In this study, the integrated model system, EVA, has been used to estimate the health impacts and related external cost for Denmark at a 1 km x 1 km resolution.

New developments of the integrated model system will be presented as well as the development of health impacts and related external costs in Europe and Denmark over a period of 36 years (1979-2014).

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