Improving our knowledge on transport pollution and health

TRANSPHORM

Transport related Air Pollution and Health impacts
Integrated Methodologies for Assessing Particulate Matter

Policy relevant recommendations for health impacts assessment of particulate matter

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SEVENTH FRAMEWORK PROGRAMME

University of Hertfordshire

Impact

- Urban increments analysed for Cyprus
- PM concentration levels inside Cypriot street canyons can be significantly higher (i.e. up to 27 μg/m3 for PM10 and 10 μg/m3 for PM2.5) above those of the urban background
- Re-think Athens – use of TRANSPHORM modelling approaches to assess local impact of interventions within Athens and surrounding areas
- AQMS installed and implemented in Organization of Planning and Environmental Protection of Thessaloniki (OR.TH.) including analysis of widespread substitution of domestic central heating systems with low-quality wood-burning units

Recommendation
Integrated approach

An integrated approach is required for a full assessment of the effects of policy measures on health impacts of particulate matter bringing together:

- For a full chain approach from emissions to health impacts
- Local and regional high resolution models
- Information from measurements (e.g. through source apportionment)
- Health and population information
- Cost-benefit considerations in effect of measures

Recommendation
Tools to support policy

Process orientated, deterministic models should be used to support air quality policy development and monitoring

- Multipollutant
- Non-linear linkages and responses
- Scales are linked (e.g. regional contributions can dominate city air quality
- Changes emissions produces a non-linear response in concentrations
- Pollutants exhibit spatial and temporally resolve behaviour
- For future predictions

Recommendation
Sources and emission

Sources other than transport will become more important to control regional pollution in the future (e.g. agriculture)

Improved quantification of emissions/factors are needed:
- Reduce emissions from shipping (e.g. NOx, particle number)
- Non-exhaust (e.g. tyre and brake wear, road wear, re-suspension)
- Coarse fraction (e.g. wind blown dust)
- Agricultural contributions, residential combustion
- PN emission inventories for cities and Europe

Recommendation Exposure and HIA

Relative exposure to PNC or EC of people living close to roads is more reflective of the strength of the traffic source than other PM metrics

When quantifying exposure and health impacts of PM account should be taken of how much time people spend near busy streets

Epidemiological studies should examine the health impacts of non-exhaust, coarse and ultrafine components of PM

Recommendation
Measures to reduce HIs of PM

Largest impact arises from the technological changes in emissions and not locally implemented measures – must deliver and monitored!

Local measures will be more effective for short term episodes (e.g. hotspots caused by emissions) and general urban increment but will have less affect on long term levels of PM

Measures to reduce regional background of PM are important to reduce the overall burden of PM in cities and Europe on the longer term

Recommendation
Measures to reduce HIs of PM

Health impacts of regional BG PM species should be quantified as regional contributions of PM2.5 can be dominant in cities

In order to reduce PM levels in cities a *combined approach* bringing together control of local and regional contributions of PM (depended on components)

Research recommendations

Improvement of regional models to predict PM and its components should be a research priority to take full advantage of their capabilities for policy applications

Further research on how traffic-related PM components affect exposure and health impacts is needed

Source apportionment to quantify contributions from e.g. coarse fraction, non-exhaust, regional differences

Research in PN in terms of their sources, long term measurements in urban areas, predictions and health effects is needed