European Commission

Science for Environment Policy

Increasing energy efficiency in the home may boost life expectancy and health

6 August 2015
Issue 424

Subscribe to free weekly News Alert

Source: Milner, J., Chalabi, Z., Vardoulakis, S. & Wilkinson, P. (2015). Housing interventions and health: Quantifying the impact of indoor particles on mortality and morbidity with disease recovery. *Environment International* 81, pp.73-79. DOI: /10.1016/j.envint.2015.04.011

Contact:
james.milner@lshtm.ac.uk

Read more about:
Air pollution, Climate change and energy, Environment and health, Risk assessment

Changes in the home that increase energy efficiency, such as improved insulation and ventilation control, have the potential to reduce indoor air pollution. This study assessed the health impact of interventions in the UK arising from changes to indoor concentrations of fine particulate matter and found that such changes could improve health and increase life expectancy for men and women by three and two months, respectively.

As well as reducing greenhouse gas emissions, energy efficient housing interventions can reduce levels of indoor air pollution, if properly implemented. This study, which was part funded by the European Commission under the PURGE[1] project, assessed the health impacts of home energy efficiency measures in England and Wales.

The analysis focused on exposure to fine particulate matter ($PM_{2.5}$). When inhaled, $PM_{2.5}$ is small enough to penetrate deep into the lungs and can cause cardiovascular and respiratory disease and premature death.

The researchers based their analysis on previously published modelled changes in residential $PM_{2.5}$ exposure due to four greenhouse gas reduction strategies in the UK: building fabric improvements, improved ventilation, fuel switching, and behaviour changes of occupants. If well implemented, changes to ventilation can protect against the penetration of particle pollution from the outside air, while limiting the build up of $PM_{2.5}$ generated from indoor sources, such as cooking. The modelled net effect was to reduce annual average indoor $PM_{2.5}$ concentrations by 3 micrograms per cubic metre of air by 2050, compared to 2010 levels.

The study assessed the impact of changing $PM_{2.5}$ on deaths from all causes, as well as specific illness and death due to coronary heart disease, lung cancer and asthma. They used a novel method, the multistate life table model, which accounts for the different health statuses of individuals throughout lifespan. To assess the full impact of the intervention on the population over a lifetime, the simulations were carried out over a follow-up period of 90 years.

The results showed that reduction in exposure to $PM_{2.5}$ would have significant benefits for mortality and morbidity. Overall, the reduction was predicted to increase life expectancy by around three months for men and two months for females. Benefits generally increased with age, reaching a peak at around 80, with over 300 fewer deaths in the population per year at this age by the end of the follow-up.

As well as mortality, the model suggests that the interventions would result in significant reductions in disease burden. By the end of the follow up, around 260 000 fewer people in England and Wales would suffer from asthma, while 55 000 fewer would have coronary heart disease and 3 000 fewer would have lung cancer.

The study also indicates that the interventions would result in an increase of around 13 million quality-adjusted life years (QALYs) in England and Wales, a measure of health in which the benefits of longer life are adjusted to reflect quality of life (one QALY = one year of life in perfect health).

Continued on next page.

1.PURGE (Public health impacts in URban environments of Greenhouse gas Emissions reduction strategies) was supported by the European Commission under the Seventh Framework Programme. See: http://purge.lshtm.ac.uk/

European Commission

Science for Environment Policy

Increasing energy efficiency in the home may boost life expectancy and health *(continued)*

This study provides important information for policymakers working in air quality, as it suggests that energy efficient interventions in the home could significantly reduce disease burden (as long as adequate compensatory ventilation is provided). The multistate life table model also provides a more realistic method for assessing the health impact of environmental policies. This is important for assessments of air quality and respiratory illness where adverse health effects may be frequent, but fatalities rare.

6 August 2015
Issue 424

Source: Milner, J., Chalabi, Z., Vardoulakis, S. and Wilkinson, P. (2015). Housing interventions and health: Quantifying the impact of indoor particles on mortality and morbidity with disease recovery. *Environment International* 81, pp.73-79. DOI: /10.1016/j.envint.2015.04.011.

Contact:
james.milner@lshtm.ac.uk

Read more about:
Air pollution, Climate change and energy, Environment and health, Risk assessment