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NEW STUDY FINDS COMMUNITY-WIDE WOODSTOVE “CHANGEOUT” CAN IMPROVE OUTDOOR, NOT JUST INDOOR, AIR QUALITY

(Boston, MA December 21, 2011) A “changeout” of some 1200 woodstoves in the town of Libby, Montana has improved air quality and may have improved children’s health, according to a new study published by the Health Effects Institute¹ today at www.healtheffects.org. Woodstove use in the United States is wide spread, with the US EPA estimating over 10 million stoves currently in use across the country. The study, *Assessing the Impact of a Wood Stove Replacement Program on Air Quality and Children’s Health*, by Curtis Noonan of the University of Montana in Missoula and his colleagues, evaluated a large-scale program² to replace some 1200 older wood stoves with new, less polluting stoves in the rural mountain community of Libby, Montana, where residential wood combustion had been identified as a major winter time source of fine particulate matter (PM) air pollution. Exposure to wood smoke is associated with increased respiratory symptoms in children and adults, decreased lung function in children, and more emergency department visits and hospitalizations.

Noonan and colleagues collected air quality and health data during four consecutive winters starting in 2005, the first year of the changeout program. The investigators measured PM with an aerodynamic diameter of 2.5 or smaller (PM_{2.5}) and some of its components outdoors, inside schools, and in about 20 homes before and after stove changeout. In parallel, they tracked respiratory symptoms (as reported by parents) and illness-related school absences.

¹ The Health Effects Institute is an independent, non-profit research institute funded jointly by government and industry to provide credible, high quality science on air pollution and health for air quality decisions. HEI sponsors do not participate in the selection, oversight or review of HEI science, and HEI’s reports do not necessarily represent their views.

² The program in Libby, Montana, was one of the first extensive changeout programs in the United States, a collaboration among the Montana Department of Environmental Quality (DEQ), U.S. EPA, Lincoln County Department of Public Health, Hearth, Patio & Barbecue Association, the State of Montana, and the town of Libby.

Ambient winter concentrations of PM_{2.5} gradually declined over the study period and were 30% lower in the final winter after the changeout program than in the baseline years. By the end of the study period, Libby was no longer out of compliance with the National Ambient Air Quality Standard for PM_{2.5}. After stove changeout, indoor PM_{2.5} concentrations were lower in a majority of the homes sampled, although there was substantial variability within and between homes.

Using data from about 1700 surveys filled out by parents of schoolchildren during the four years, Noonan and colleagues reported a significant reduction in childhood wheezing associated with lower winter ambient PM_{2.5} concentrations. The most robust associations were observed for itchy or watery eyes, sore throat, bronchitis, influenza, and throat infection although not all of the health data showed consistent improvements that could be linked to the wood stove changes.

In its independent evaluation, the HEI Review Committee – an independent panel of medical, biological, air pollution and statistical experts who subjected the study to rigorous peer review – agreed that the study showed that wood stove changeout programs can contribute to community-level improvements in air quality. In most cases, air quality inside homes also improved, but the Committee noted that stoves remain relatively high emitters compared with oil or gas furnaces, and proper stove operation remains an important determinant of emissions. This study provided some evidence, based on parental surveys, that children’s health improved in the community, with evidence for reduced rates of symptom reporting for wheezing, itchy or watery eyes, sore throat, bronchitis, influenza, and throat infection. But further research using hospital admission data or more direct outcomes, such as medication use, or biomarkers of exposure and effect would be useful.

This is the latest of a series of studies that HEI has funded over the last decade to evaluate whether actions taken to improve air quality have actually succeeded in reducing exposure to air pollution and thereby improving public health; this area is known as “health outcomes” or “accountability” research. (Research Report 162 is available for downloading, free of charge, at www.healtheffects.org: printed copies can be purchased from HEI.)

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