



Health Effects Institute



For Release August 18, 2016

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**NEW STUDY:
AIR POLLUTION FROM COAL A MAJOR SOURCE OF
HEALTH BURDEN IN CHINA**

Continued Aggressive Policy Action Could Reduce Health Impact Significantly

A comprehensive study led by Tsinghua University and the Health Effects Institute (HEI¹) has found that coal combustion is the single largest source of air pollution-related health impact, contributing to 366,000 premature deaths in China in 2013. The study was released today and is available in Chinese and English at: <http://pubs.healtheffects.org/view.php?id=455>.

China has implemented extensive pollution control programs for power plants, vehicles, and other sources, and required substantial reductions in all major cities. Looking ahead, the study, *Burden of Disease Attributable to Coal-Burning and Other Major Sources of Air Pollution in China*, found that, with continued actions to control air pollution, levels will decline substantially by the year 2030, and 275,000 premature deaths will be avoided. However, even with these reduced future pollution levels, as the Chinese population continues to grow and age, the health impacts from air pollution will increase, highlighting the challenges facing the country.

This new report, published after rigorous analysis and peer review, provides the first comprehensive assessment at national and provincial levels of current and future burdens of disease attributable to coal-burning and other major sources of particulate-matter air pollution (particulate matter with an aerodynamic diameter of less than 2.5 μm , or $\text{PM}_{2.5}$) in China. This is the first report of Global Burden of Disease–Major Air Pollution Sources (GBD MAPS), a multi-year, international collaboration of Tsinghua University, HEI, the Institute for Health Metrics and Evaluation (IHME), and the University of British Columbia.

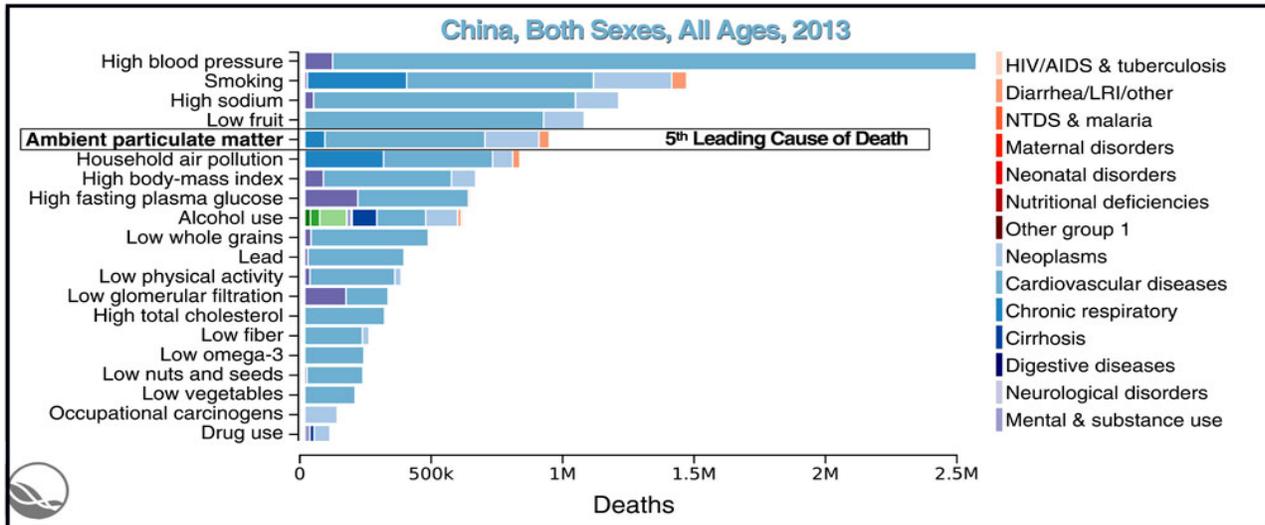
Air Pollution a Significant Source of Health Burden in China

The Global Burden of Disease (GBD) 2013 estimated that exposure to ambient fine particulate air pollution ($\text{PM}_{2.5}$) contributed to 916,000 premature deaths in China in 2013. “The GBD is the largest and most comprehensive effort to date to measure epidemiological levels and trends worldwide” (www.healthdata.org/gbd), said Zhou Maigeng, Deputy Director of the National Center for Chronic and Non-communicable Disease Control and Prevention of the China Center for Disease Control and lead author of the GBD 2013 Chinese analysis published in the British medical journal *The Lancet* in October 2015.² “Based on Chinese data, we found that outdoor air pollution was the 5th leading cause of premature death in China in 2013.” (See Figure 1.)

¹ The Health Effects Institute is an independent, nonprofit research institute funded jointly by the U.S. Environmental Protection Agency, industry, foundations, and development banks to provide credible, high-quality science on air pollution and health for air quality decisions.

² The Global Burden of Disease is an international effort to estimate what the world's population is dying from, and what risk factors contribute to that. The Institute for Health Metrics and Evaluation (IHME) leads an international team of over 1600 scientists from 119 countries in conducting the analysis. The latest estimates of risks from air pollution, diet, smoking, and other risk factors in China can be found in Zhou et al. 2016. Cause-specific mortality for 240 causes in China during 1990–2013: a systematic subnational analysis for the Global Burden of Disease Study 2013. *Lancet* 387: 251–72. Published online October 26, 2015: [http://dx.doi.org/10.1016/S0140-6736\(15\)00551-6](http://dx.doi.org/10.1016/S0140-6736(15)00551-6)

Figure 1. Estimates of causes of premature death from 20 top risk factors in 2013 (GBD Compare, <http://ihmeuw.org/3tva>).

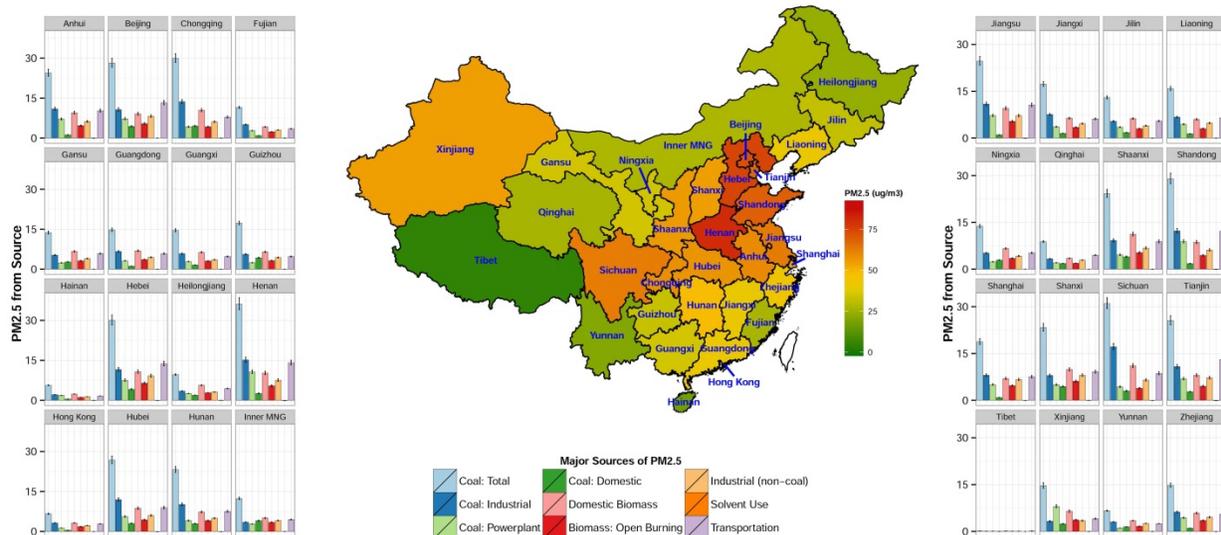


Coal, Industry, and Household Combustion among Leading Sources in 2013

The GBD MAPS study took advantage of enhanced satellite data and China’s growing network of air pollution monitors, and was the first to estimate the impact of different air pollution sources province by province throughout China (see Appendix V.6. for detailed health burdens for each province). It found that coal combustion — from industrial, electricity, and domestic sources — was the largest contributor to PM_{2.5} population exposure and health burden across China (Figure 2).

“Coal-burning was the most important contributor to ambient PM_{2.5}, causing an estimated 366,000 premature deaths in 2013,” according to Professor Wang Shuxiao of Tsinghua University, a lead investigator for the study. In addition she noted that “industrial sources and household solid fuel combustion, from both coal and non-coal emissions, were the largest sectoral contributors to disease burden attributable to ambient PM_{2.5} in China, responsible for 250,000 and 177,000 premature deaths, respectively.”

Figure 2. Population-weighted PM_{2.5} concentrations and levels of sector contributions for all provinces.

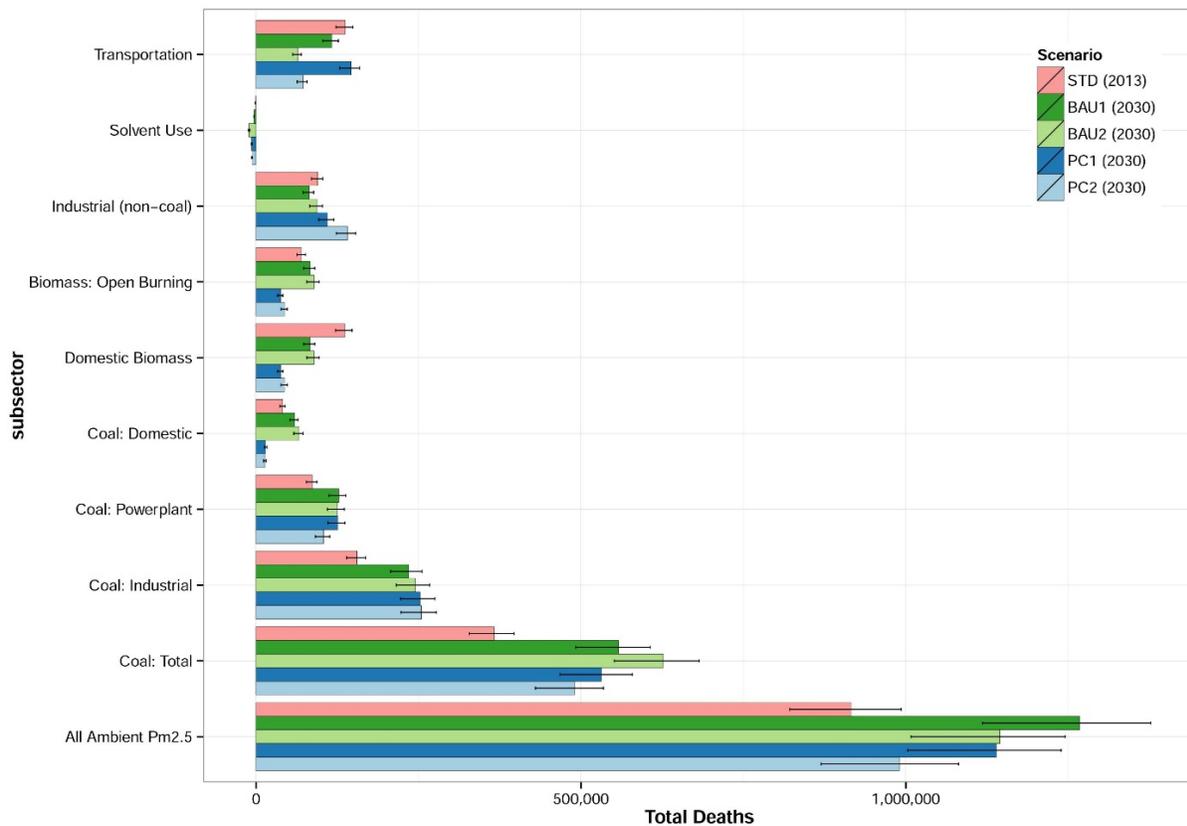


Future Impacts to 2030: Lower Air Pollution, But Continued High Health Burden

GBD MAPS also made estimates of future burdens in 2030, based on four future air pollution control and energy efficiency scenarios, ranging from “Business as Usual” (representing full implementation of the Twelfth Five Year Plan pollution control measures [BAU1]) to a maximum feasible air pollution control and energy efficiency scenario (PC2). The study projected that under all four scenarios exposure to PM_{2.5} will decrease, and will be cut in half with implementation of the most aggressive efforts (PC2). However, as the Chinese population grows and people live longer, the number of air pollution-related deaths from cardiovascular and lung diseases will rise as well. The GBD MAPS analysis predicted that deaths attributable to air pollution could rise to 1.3 million annual deaths in 2030 (Figure 3). “Air pollution health burdens will continue to be a challenge, but the potential for future health benefits from further control is enormous,” said Robert O’Keefe, Vice President of the Health Effects Institute.

China has initiated a number of measures to control pollution in recent years, and these are starting to show benefits. “These analyses highlight the need for even more aggressive strategies to reduce emissions from coal combustion along with reductions in emissions from other sectors — strategies that are beginning to be implemented in the Thirteenth Five-Year Plan,” said Hao Jiming, Academician of Tsinghua University. “The GBD MAPS estimates suggest that further emissions reductions in the industrial and domestic sectors are needed to provide future public health benefits.”

Figure 3. Deaths attributable to PM_{2.5} from major air pollution sources in 2013 and in 2030 under four alternative scenarios.



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