

Associations of fine particulate matter and health burdens in Handan city

*aifang gao^{1,2,3,4,5,6}, junyi wang¹, jianfei lu¹, aiguo li¹, jingyi li^{4,5,6}, Hongliang Zhang

1. School of Water Resources and Environment, Hebei GEO University, 2. Hebei Province Collaborative Innovation Center for Sustainable Utilization of Water Resources and Optimization of Industrial Structure, 3. Hebei Province Key Laboratory of Sustained Utilization and Development of Water Resources, 4. Jiangsu Key Laboratory of Atmospheric Environment Monitoring and Pollution Control, 5. Collaborative Innovation Center of Atmospheric Environment and Equipment Technology, 6. Nanjing University of Information Science & Technology

The North China Plain (NCP) has been experiencing severe air pollution in recent decades and high levels of fine particulate matter ($PM_{2.5}$) are related to different diseases. However, it is not clear the relationship between very high $PM_{2.5}$ and human health outcomes as most studies are conducted in developed countries with lower concentrations. At the present study, the integrated exposure-response (IER) model was applied to estimate the health effects of exposure to fine particulate matter ($PM_{2.5}$) in Handan city, China. The premature mortality (Δ Mort), years of life lost (YLL), and mortality benefits due to $PM_{2.5}$ reductions were quantified in 2015-2017. According to YLL per 1000 person, the males had higher health risks than females. Decreasing $PM_{2.5}$ concentrations would lead to a significant reduction of premature mortality and YLL. This indicates that a more stringent measure adopted by Handan government would be needed to reduce fine particulate matter pollution and enhance the health benefits.

Keywords: $PM_{2.5}$, Δ Mort, YLL, integrated exposure-response model