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## ***NEW STUDY: Air Quality and Heart Health Improved During the Beijing Olympics***

(Boston, MA USA March 11, 2013) A new study published today by the Health Effects Institute (HEI)<sup>1</sup> at [www.healtheffects.org](http://www.healtheffects.org) finds that in the wake of a number of Chinese government actions to reduce emissions of air pollutants both air quality and the heart health of a carefully-monitored group of young Beijing adults improved during the 2008 Beijing Olympic Games. The study, *Cardiorespiratory Biomarker Responses in Healthy Young Adults to Drastic Air Quality Changes Surrounding the 2008 Beijing Olympics (HEI Research Report 174)* was conducted by a joint U.S.-Chinese research team led by Dr. Junfeng (Jim) Zhang, currently of the University of Southern California in Los Angeles. As part of its Health Outcomes Research program, HEI funded the study to evaluate the impact of changes in air pollution before, during, and after the Games on heart and lung responses in a group composed mainly of healthy medical residents living close to the hospital in which they worked in Beijing.

***Action to Control Air Pollution*** In the run-up to the 2008 Beijing Olympic and Paralympic Games, the Chinese government launched a series of policies to reduce local and regional emissions in the greater Beijing metropolitan area. These aggressive controls on air pollution from vehicular traffic and industrial sources - including both long-term closures of polluting factories and upgrading of car emission requirements, along with short term measures restricting traffic, power generation and other emissions - were intended to result in a short-term but dramatic decline in air pollution levels during the Games.

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<sup>1</sup> The Health Effects Institute is an independent, non-profit research institute funded jointly by the US Environmental Protection Agency, industry, foundations and development banks to provide credible, high quality science on air pollution and health for air quality decisions.

## Results

*Cleaner Air* Each day the investigators measured the concentrations of multiple pollutant gases and of particulate matter (PM) and its components. The investigators found that during the Olympics, concentrations of all measured pollutants decreased as compared with their pre-Olympics levels, except ozone (which increased due to the absence of NO<sub>2</sub>). The largest decreases (40–60%) were found for the pollutant gases sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and nitrogen dioxide (NO<sub>2</sub>), but particulate pollutants — PM<sub>2.5</sub> (PM with an aerodynamic diameter of 2.5 μm or less) and its components sulfates (SO<sub>4</sub><sup>2-</sup>), elemental carbon (EC) and ultrafine particles (UFP) — also dropped substantially. (See Figure 1 below.) After the Olympics, when the special controls on emissions were lifted, the observed concentrations of most pollutants were higher than the levels observed during the Games.

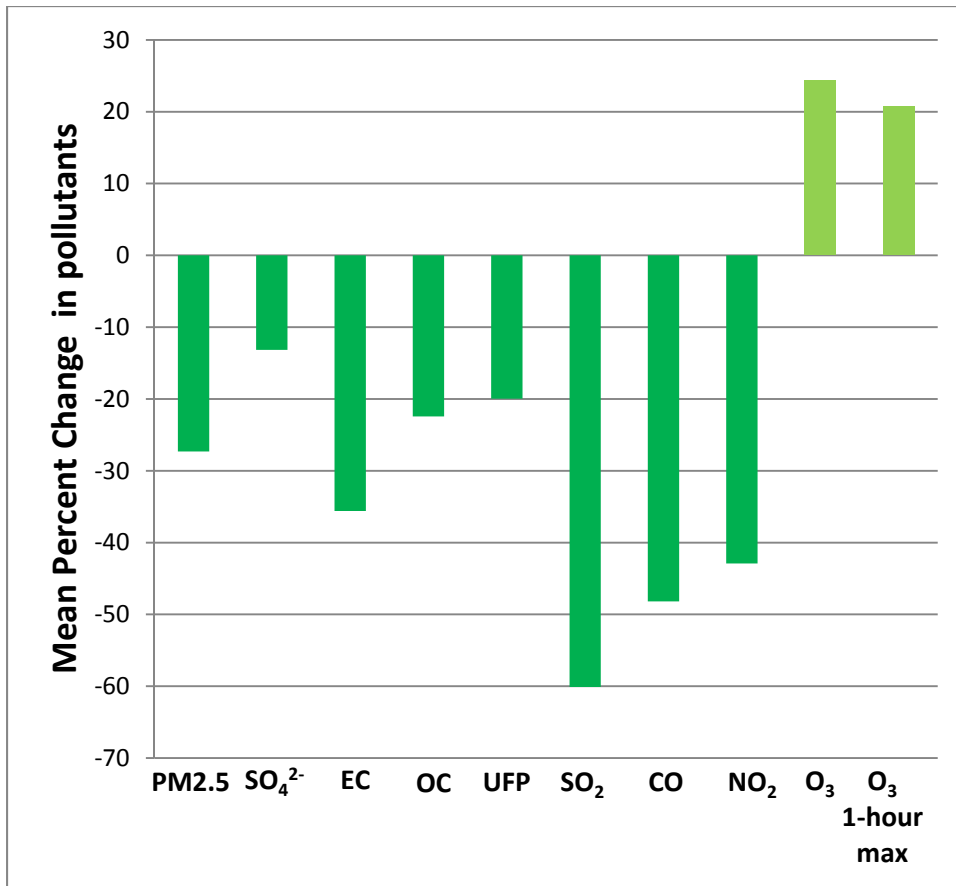


Figure 1. Estimated percent changes in air pollution from the pre-Olympic to the during-Olympic period

*Better Heart Health* The investigators also evaluated several cardiovascular and respiratory biomarkers in their group of 125 volunteers (ages 19 – 33) at each of six clinical visits — two

before, two during, and two after the Games. Levels of several markers thought to be associated with cardiovascular disease and measured in the blood of study participants declined during the Olympics, suggesting an improvement in their health status. Large percentage decreases were also observed in multiple markers of airway inflammation, oxidative stress, and coagulation, again suggesting healthier conditions in response to lower levels of air pollution.

### ***Lessons Learned***

“The study makes an important contribution to the literature regarding short-term interventions and their impacts on biomarkers thought to be related to development of heart and lung disease,” said Dr. Homer Boushey, Chair of the HEI Health Review Committee and distinguished professor at the University of California—San Francisco Medical School. “It is one of the first studies, and to date the most comprehensive, to evaluate changes in health end points associated with the control measures taken to reduce air pollution during the 2008 Beijing Olympics and provides important supporting evidence that air quality interventions can improve health-related biomarkers, with the potential for beneficial health effects.”

“The city of Beijing has had to address some of the worst air pollution in the world,” said Dan Greenbaum, President of the Health Effects Institute. “But as it moves forward with actions to address this serious air pollution, it can do so with the knowledge from this important study that when it chooses to act it can improve air quality and public health as well,” he added.

For more information on the study, contact Dan Greenbaum (+1 617 488 2331; [dgreenbaum@healtheffects.org](mailto:dgreenbaum@healtheffects.org)) and/or Dr. Junfeng (Jim) Zhang (+1 (323) 388-6366; [junfengz@usc.edu](mailto:junfengz@usc.edu))