

# Air Pollution Linked to Sleep Breathing Problems

## Study Shows Sleep-Disordered Breathing Increases With Air Pollution

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June 17, 2010 -- Air pollution increases the risk for [breathing problems](#) during [sleep](#), researchers have found.

Air pollution has long been known to have a negative effect on health, says researcher Antonella Zanutti, PhD, a senior research scientist at the Harvard School of Public Health. "With this study, we found air pollution also increases the risk of poor sleep," she says.

More specifically, air pollution increased the risk of sleep-disordered breathing, a group of disorders including [sleep apnea](#), in which breathing stops briefly during sleep. Up to 17% of U.S. adults have sleep-disordered breathing, Zanutti says, although many are unaware they have the problem.

Sleep-disordered breathing and air pollution have both been linked to increased risk for cardiovascular disease, but the link between air pollution and sleep disordered breathing is not well understood, Zanutti says. Her study is believed to be the first to link pollution and breathing problems during sleep.

The study is published online in the *American Journal of Respiratory and Critical Care Medicine*.

Zanutti and colleagues used data from the Sleep Heart Health Study, which included more than 6,000 participants and looked at the cardiovascular effects of sleep-disordered breathing. From that study, conducted between 1995 and 1998, the researchers evaluated more than 3,000 of the participants for the air pollution study.

They also got data on air pollution monitoring from seven cities: Framingham, Mass., Minneapolis, Minn., New York, Phoenix, Pittsburgh, Sacramento, Calif., and Tucson, Ariz.

Participants were monitored during sleep to evaluate sleep problems and oxygen saturation of the [blood](#), among other parameters.

The experts speculated that an increase in air pollution would be linked with an increased risk of sleep-disordered breathing, low blood oxygen levels, and reduced quality of sleep. They looked at the interaction of seasons with the level of air pollution commonly associated with traffic. They also looked at whether seasonal temperature variations would have an effect, independently, on sleep problems.

They controlled for such factors known to be linked with sleep-disordered breathing, such as advancing age and [smoking](#).

### Effects of Air Pollution and Temperature Changes

As air pollution and temperature increased, so did breathing problems during sleep, says Diane Gold, MD, MPH, associate professor of environmental health, Harvard School of Public Health, and another researcher on the study.

Increases in sleep problems were linked with increases in short-term outdoor temperatures all year long and with increases in the pollution levels during summer months.

How much? In the summer, she says, "you are at a 13% higher risk of having shallow breathing or stopping breathing for at least 10 seconds if pollution goes from the lower range to the higher range of pollution for that city."

"This is clinically significant," she says, with people likely to notice the effects on sleep quality.

While the study finds a novel link between pollution and sleep problems, there are unanswered questions, Gold says. "How much of the cardiac risk that can be explained by pollution, we don't know yet."

Why pollution affects sleep isn't known, Gold says. Inhaled particulates may migrate directly to the [brain](#), causing the central nervous system to malfunction.

Or the particles may adversely affect the upper airways. "You could have upper airway inflammation from pollution," Gold says.

### **Second Opinion**

The findings may come as a surprise to many experts, says John Heffner, MD, past president of the American Thoracic Society and William J. Garnjobst Chair of Medical Education, Providence Portland Medical Center, Portland, Ore. He reviewed the study findings for WebMD.

The study findings add on to a body of information that's well accepted, Heffner says. "We know that air pollution is a risk factor for cardiovascular disease by itself," he says. It's also known that sleep-disordered breathing is associated with cardiovascular disease.

"We need more research to see if there is really a causal link [between pollution and sleep-disordered breathing]," he says. The new study found just an association, not cause and effect.

Even so, those who know they have sleep breathing problems can take precautions, Heffner says.

"I would advise patients with sleep-disordered breathing, particularly if they are not too responsive to therapy for their sleep problems, to seek air conditioned homes, and to seek out air conditioning if they don't have it in their homes during times of serious air pollution problems."