

Wood Smoke is a Severe Health Hazard If You Can Smell it, You are Being Exposed

by Mary Rozenberg, President of Clean Air Revival, Inc.

The GASP Hotline welcomes articles from guest authors in our column, "A Breath of Fresh Air." This column features GASP members and friends sharing stories from their personal or professional environmental work, as well as their thoughts on topical environmental issues. To submit a piece, please contact the editors at hotline@gasp-pgh.org. Note: The opinions of the author do not necessarily reflect the views of GASP.

Many citizens complain of high wood smoke levels invading their homes. Neighborhood time-series monitoring data shows smoke increasing rapidly in the early evening, with concentrations peaking after 11 PM, suggesting non-industrial and non-automotive sources.

According to Dr. Wayne Ott, "One important outdoor source of air pollution remains inadequately addressed in most areas—residential fireplaces and wood stoves. Yet this is the one source of air pollution that produces fine particles and gases containing a multitude of toxic substances and carcinogens, and fine particles are associated with morbidity and mortality in urban areas."

GASP members are well aware of the health danger posed by fine particulate soot (PM_{2.5}), particulate matter smaller than 2.5 microns in diameter. In the Fall 2007 edition of Hotline, doctors Unligil, and Eibling describe its serious effects on the cardiovascular system.

Emerging air pollution research has linked soot from all sources to increases in many illnesses, infections and premature deaths—perhaps 60,000 every year in the United States, and almost 2 million worldwide. It is accepted science that was established at a major colloquium: "Particulate Air Pollution and Human Mortality and Morbidity" in 1994, with a paper by Dr. Joel Schwartz, et al.

Interviewed for this article, Dr. Schwartz said, "PM_{2.5} is very bad for public health. Large and growing populations can live safely together, with little increased PM_{2.5}, if clean fuel is mandated. It is impossible to burn solid fuel cleanly under home conditions. Wood burning and wood stoves in populated areas are a terrible idea."

There is no safe level of soot, and half of the population is vulnerable. Wood smoke inhaled today can be detected in a urine sample tomorrow. Burning wood causes a focal point of high particulate pollution and gases.

In the words of Dr. Wayne Ott, Stanford University, creator of the Pollution Standard Index (PSI). "Wood smoke like other combustion sources—cigars, cigarettes, diesel engines, incinerators—generates hundreds of toxic com-

pounds and many carcinogens. A home with a single wood burning source can elevate indoor particle concentrations at hundreds of surrounding homes in the neighborhood. Despite efforts to tighten windows, close doors, and insulate a home, there is no defense—the fine particles from a neighbor's chimney penetrate through the barrier of all surrounding walls of residences, entering the lungs of its residents. For those on the receiving end of a neighbor's fireplace or wood stove, it is often similar to living with a chain smoker. The pollutant exposure is involuntary, repetitive, caused by a tiny minority of burners, and composed of a great array of toxic chemicals and cancer-causing compounds, such as polycyclic aromatic hydrocarbons, dioxins, and metals."

"Particulate polycyclic aromatic hydrocarbons (PPAHs) are highly toxic chemicals that coat the surface of very small particles, and these particles are so tiny (less than 1 micrometer) that they can be inhaled deep into the lungs, where they can cause serious health effects. Many of these pollutants are known carcinogens, such as benzo(a)pyrene, and also are found in secondhand smoke."

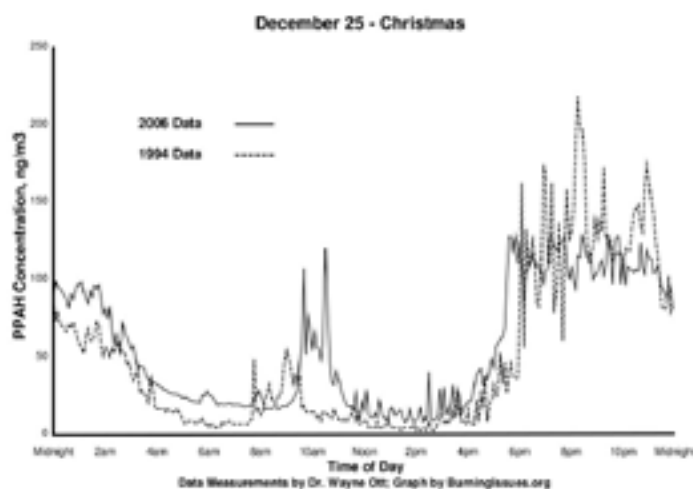


Figure 1 - PPAH Concentrations from Wood Burning 1994 & 2006

Comparing outdoor measurements of particulate polycyclic aromatic hydrocarbons (PPAH) on Christmas Day 1994 and 2006, using real time monitoring in the San Francisco Bay Area, Dr. Wayne Ott found that there was basically no change in PPAH levels (Fig. 1).

This indicates that over a decade of government subsidized “new technology” wood stoves and fire place inserts did not clear the air. Indeed the Bay Area Air Quality Management District announced in March 2008 that it will only subsidize changing to gas or propane fired stoves.

About half the outdoor PPAHs infiltrate indoors, so residential wood smoke caused the equivalent of more than 5 cigarettes smoked indoors on this date.”

Fig. 2, below, is a chart with the same scale, using the same instrument, showing five Marlboro regular filter cigarettes smoked inside a large house at a non-wood burning time of year.

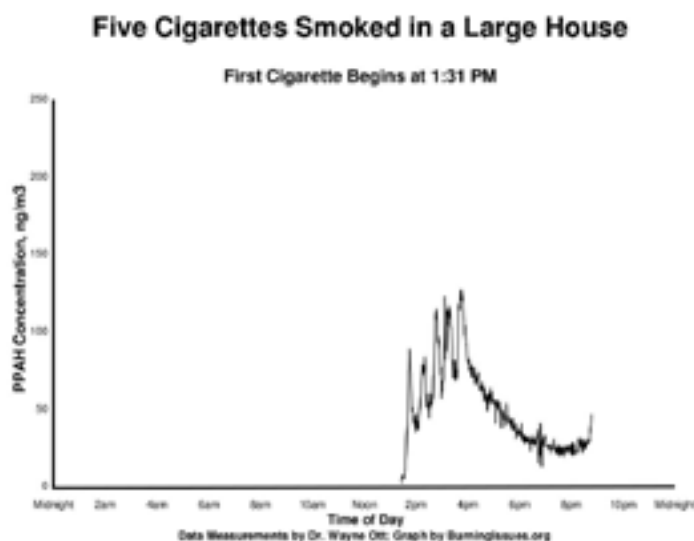


Figure 2: PPAH Concentrations from Secondhand Smoke
Note that the high PPAH concentrations from smoking 5 cigarettes in a home were lower than the PPAH concentrations outdoors on Christmas Day.

Wood burning is the third leading source of dioxins in the United States. The ash in some East coast areas is radioactive. The smallest invisible soot is not picked up by even the best air cleaners, nor can masks fully protect you, and it seeps indoors with alarming ease.

The key word is burning. When anything is burned it creates toxic pollution. Since smoke cannot be cleaned up, it makes sense not to create it! Cigarette smoking regulations say a lot about that. They have to ban cigarettes to clear the air. Smoking sections for instance, don't work. Wood burning regulations have not worked either.

For over 20 years the US EPA worked with the hearth industry to create “cleaner burning wood stoves.” A 2000 EPA

study measured long-term performance of EPA-certified Phase 2 woodstoves, which had been in use for a number of years. An important quotation from that study is: “This study shows that the new technology stoves do not achieve the emission reduction expected. Some models were experiencing degraded emission control performance after only a few months use. “The relatively poor showing of the control technologies was very disappointing.”

It would serve public health to place PM2.5 air monitors in neighborhoods. It is where we spend a great deal of our time, and where our most vulnerable populations spend all of their time. To date, very little of this kind of monitoring has been done.

We all dream of a healthy environment with clean air, water, and healthy food. The Pennsylvania legislature passed an “Environmental Bill of Rights”, in 1970, which stated that “the people have a right to clean air, [and] pure water...”

Somehow we see wood as a natural and romantic fuel. While burning and fires can be relaxing, keep in mind that it is the toxics that make it so: carbon monoxide causes blood vessels to constrict and creates a false sense of well-being. Breathing toluene from wood smoke, like sniffing glue, can get you high. What is pleasant to a young healthy person could be causing pain, suffering, infections and even death in an infant.

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Mary Rozenberg began her study of particulate pollution and founded Burning Issues, a project of Clean Air Revival, Inc., in 1987, when she first became aware of the medical implications of particulate pollution. Since 1987, Clean Air Revival's mission has been to clear the air of soot, using education to raise awareness of this problem. <http://BurningIssues.org> 