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***Proposed Bill No. 6616***  
***AN ACT ESTABLISHING WOOD SMOKE TO BE A PUBLIC***  
***NUISANCE.***

Chairs Senator Jonathan Harris, Representative Betsy Ritter and Members of the Public Health Committee:

My name is David R. Brown ScD. I am the Public Health Toxicologist for Environment and Human Health, Inc., a non-profit organization comprised of nine members who are physicians, public health professionals and policy experts. We investigate where the environment is harming human health and try to bring policy changes that will better protect the public from environmental harms. I have also recently published a peer-reviewed paper on the health risk of particulates released from wood burning. (1)

I will restrict my comments to the health effects demonstrated to occur from breathing wood smoke in contaminated houses. Outdoor wood smoke contamination is the primary cause of indoor exposures to wood smoke. All wood smoke is a mixture of particulate matter and organic chemicals of different toxicities including cancer.

Components of wood smoke and cigarette smoke are quite similar, and many components of both are carcinogenic. Wood smoke contains fine particulate matter, carbon monoxide, formaldehyde, sulfur dioxide and various irritant gases such as nitrogen oxides that can scar the lungs. Wood smoke also contains chemicals known or suspected to be carcinogens, such as polycyclic aromatic hydrocarbons (PAHs) and dioxin.

**HEALTH**

Wood smoke interferes with normal lung development in infants and children. It also increases children's risk of lower respiratory infections such as bronchitis and pneumonia. Wood smoke exposure can depress the immune system and damage the layer of cells in the lungs that protect and cleanse the airways.

According to the Environmental Protection Agency (EPA), toxic air pollutants are components of wood smoke. Wood smoke can cause coughs, headaches, eye, and throat irritation in otherwise healthy people.

For vulnerable populations, such as people with asthma, chronic respiratory disease and those with cardiovascular disease, wood smoke is particularly harmful— even short exposures can prove dangerous

Exposure to particulate matter is a serious threat to the health and well-being of Connecticut's citizens. An important part of this threat is caused by short-term daily exposures to local sources such as wood smoke. **Episodes of short-term exposure to extreme levels of fine particulates from wood smoke and other sources for periods as short as two hours can produce significant adverse health effects.<sup>1</sup>**

The particles of wood smoke are extremely small and therefore are not filtered out by the nose or the upper respiratory system. Instead, these small particles end up deep in the lungs where they remain for months, causing structural damage and chemical changes. Wood smoke's carcinogenic chemicals adhere to these tiny particles, which enter deep into the lungs.

Recent studies show that fine particles that go deep into the lungs increase the risk of heart attacks and strokes. EPA warns that for people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. If you have heart disease, these tiny particles may cause you to experience chest pain, palpitations, shortness of breath, and fatigue.

## **SCIENCE AND RISKS IN HOMES**

The particulate matter in wood smoke is so small that windows and doors cannot keep it out—even the newer energy-efficient weather-tight homes cannot keep out wood smoke.

The EPA estimates that a single fireplace operating for an hour and burning 10 pounds of wood will generate 4,300 times more PAHs than 30 cigarettes. PAHs are carcinogenic. **A study by the University of Washington in Seattle showed that 50 to 70 percent of the outdoor levels of wood smoke were entering homes that were not burning wood. EPA did a similar study in Boise, Idaho, with similar results.**

Unlike outdoor exposures that are reduced by increased air movement when wood smoke is trapped in a house it takes many hours to clear to safe levels. Children and the elderly have the highest sensitivity to wood smoke. Respiratory problems predominately asthma and chronic obstructive pulmonary disease result from breathing wood smoke. The effects are cumulative but can also occur after short term exposures of one to two hours. Although children and the elderly are especially susceptible no age group is without risk.

## **SUMMARY**

The combination of particulate and the toxic gases found in wood smoke is especially hazardous because the gases become attached to the particles and are carried deep into

the sensitive alveolar area of the lungs. Two well-regarded studies show that both pulmonary diseases and heart attacks increase after only a few hours of exposures to particulates in the air. It is absolutely essential that health agencies have the ability to take steps to reduce these serious exposures when they are occurring in people's homes. Thank you for your time and I am prepared to answer any health questions that the committee may have.

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Brown, Callahan and Boissevain 2007 "An Assessment of Risk from particulate released from outdoor wood boilers" Human and Ecological Risk Assessment 13: 191-208 . "Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information. OAQPS Staff Paper." EPA-452/R-05-005, June 2005. Available at [http://www.epa.gov/ttn/naaqs/standards/pm/data/pmstaffpaper\\_20050630.pdf](http://www.epa.gov/ttn/naaqs/standards/pm/data/pmstaffpaper_20050630.pdf); and Peters, A., D.W. Dockery, J.E. Muller, M.A. Mittleman. 2001. "Increased Particulate Air Pollution and the Triggering of Myocardial Infarction," *Circulation* 103:2810.