

Indoor Air Quality in 5 Kentucky Counties, 2011

Introduction

The purpose of this study was to assess fine particles in the air in workplaces located in five Kentucky counties. Secondhand smoke (SHS) comes from exhaled smoke and smoke from the burning end of a cigarette. It contains 7000 chemicals of which 250 are toxic and 70 are known to cause cancer. The size of a fine particle can be compared to splitting a piece of hair lengthwise 100 times. These particles are so small that they cannot be seen but they can lodge deep into your lungs causing damage. From your lungs, the toxins are carried throughout the body where they cause immediate damage to blood vessel linings and DNA. SHS is a cause of heart attacks, asthma attacks, stroke, and cancer. There is no safe level of SHS.

Summary

Indoor air quality was assessed in workplaces in Bell, Clay, Harlan, Jackson and Rockcastle counties. Fine particulates were measured from June to July 2011 using the TSI SidePak AM510 Personal Aerosol Monitor. The average PM_{2.5} level for the five counties was compared to the average PM_{2.5} levels in Georgetown and Lexington, Kentucky before and after their smoke-free laws took effect, as well as the outdoor National Ambient Air Quality Standard (NAAQS; 35 µg/m³) for 24 hours.

Key findings are:

- The level of indoor air pollution in workplaces measured in the five counties combined (average PM_{2.5} level 86 µg/m³) was approximately 4.3 times higher than Georgetown and 4.8 times higher than Lexington after implementation of their smoke-free laws (see Figure 1). Further, the level of indoor air pollution in the five counties' workplaces was 2.5 times higher than the National Ambient Air Quality Standard for *outdoor* air. Indoor air pollution decreased by 91% in Lexington and 77% in Georgetown after the implementation of their comprehensive smoke-free laws.
- The five counties had average PM_{2.5} levels ranging from 43 to 147 µg/m³ (see Figure 2). Air pollution in all five counties exceeded the National Ambient Air Quality Standard for *outdoor* air.

Figure 1. Average fine particle air pollution in Kentucky communities, pre- and post-law

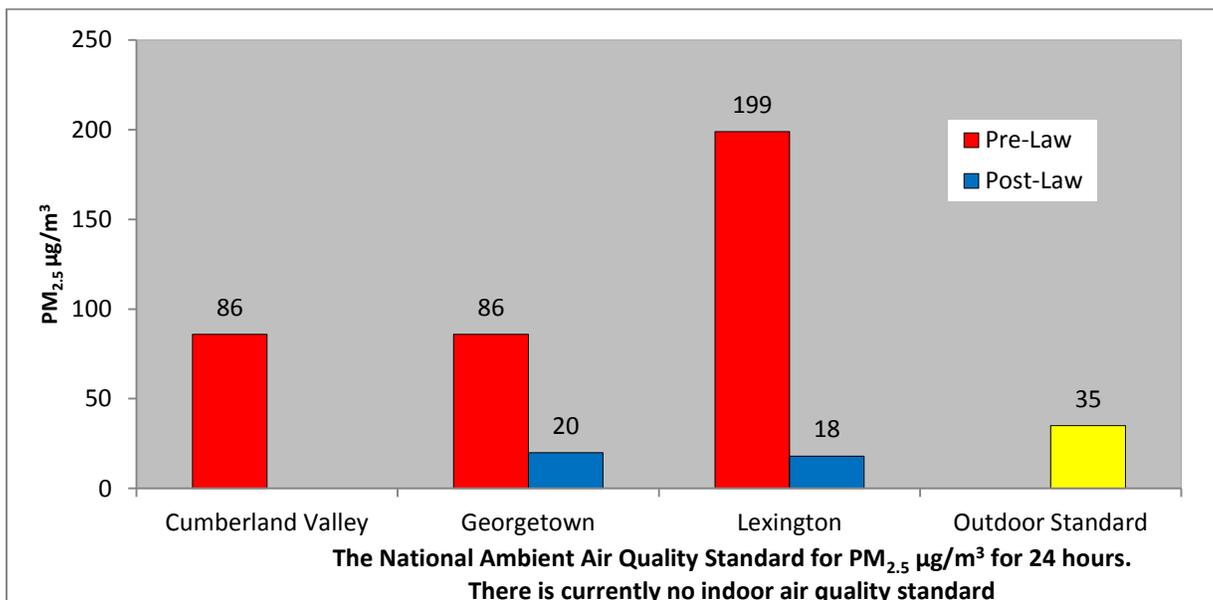
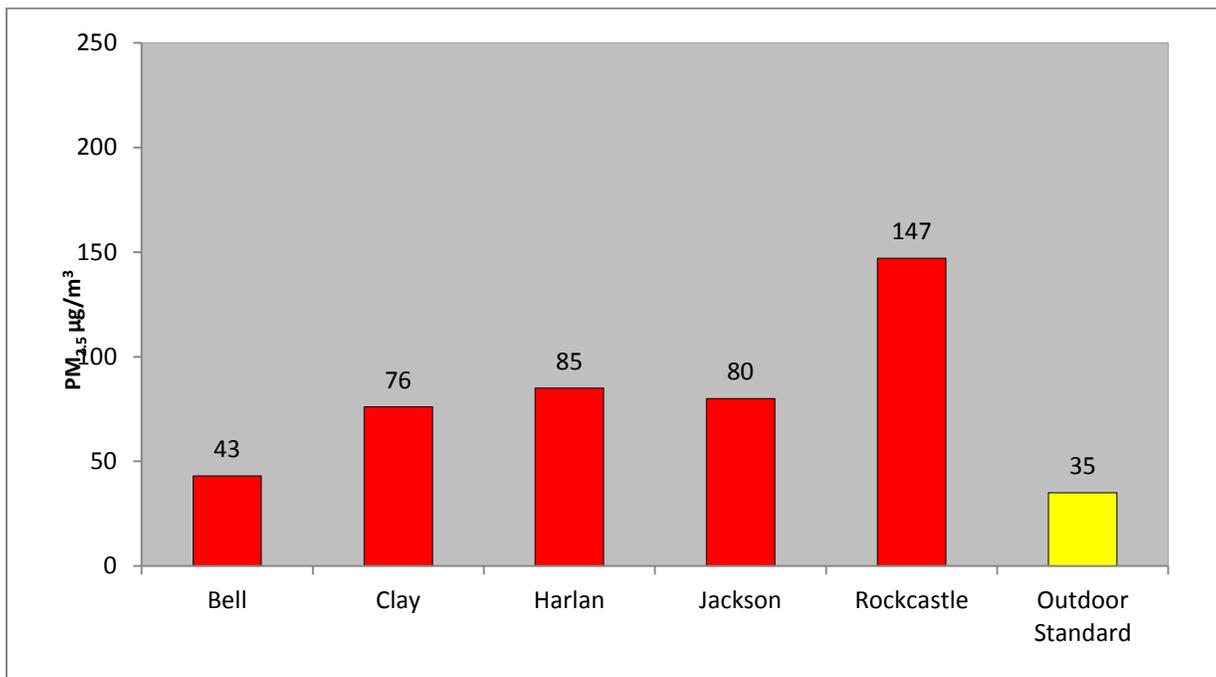


Figure 2. Average indoor fine particle concentration in five Kentucky counties, 2011



Conclusions

This study demonstrated that workers and patrons at worksites in the five counties are exposed to harmful levels of SHS. On average, workers and patrons in the five counties were exposed to indoor air pollution levels approximately 2.5 times higher than the National Ambient Air Quality Standard, and the level of indoor air pollution in these workplaces was 4.3 times higher than Georgetown and 4.8 times higher than Lexington's average PM_{2.5} levels after their smoke-free laws took effect. After their comprehensive smoke-free laws, indoor air pollution in Lexington decreased by 91% and 77% in Georgetown. When smoking is completely prohibited, air quality significantly improves.

Note: Funding for the study was provided by the Cumberland Valley District Health Department. All counties were in the district at the time of the study.

For more information, contact Ellen Hahn at ejhahn00@email.uky.edu, Heather Robertson at HRobertson@uky.edu or 859-323-1730 or Hilarie Bratset at Hilarie.Bratset@uky.edu or 859-323-9958.