Surveillance for Health Effects Secondary to an Expected Rise in Air Pollution

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Objective

The Vermont Department of Health established a short term surveillance system to track health effects related to a test burn of tire-derived fuel.

Background

Every year the United States generates close to 300 million scrap tires [1]. Due to their high energy-generating capacity, tires can be used as a fuel source (tire-derived fuel, or TDF). In 2006 a paper mill located less than 3 miles from the Vermont border received a permit to conduct a 2-week test burn of TDF to evaluate its potential to replace oil as a source of fuel. Simulations and data from other mills suggested that tires may release metal emissions and fine particulates when they are burned [2]. The Vermont Department of Health (VDH) conducted surveillance in the population living closest to the paper mill because metal emissions and fine particulates have been associated with adverse health effects.

Methods

An existing hospital-based syndromic surveillance system that utilizes the Early Aberration Reporting System (EARS)[3] software was monitored at two hospitals. Although this system routinely tracks respiratory syndromes, a new respiratory subcategory was created for purposes of monitoring health conditions most likely to be associated with the tire burn. Additionally, ICD-9 data were collected from a third hospital and from eight outpatient clinics. Data were collected for the two-weeks before the burn, two weeks during the burn and two weeks after the burn for a total of six weeks of data. Three years of historic data were available to provide a seasonal average for comparison. Hospital and outpatient clinic visits were monitored for increases in shortness of breath, exacerbations of chronic illnesses (asthma, emphysema and chronic bronchitis) and throat irritation. Data fields included chief complaint, ICD-9 code, age, and town of residence. The Vermont Department of Environmental Conservation, Air Pollution Control Division conducted air sampling and meteorological analysis. The mill performed smokestack emission testing.

Results

Tires were burned in much lower quantities and for a shorter duration than planned. The mill ceased the test burn 9 days after it began, with burning occurring only 5 of those days. Environmental data (air sampling and meteorological findings) could not definitively link particulate counts with the tire burn. [4]. Surveillance data allowed us to track respiratory cases. Preliminary analyses did not suggest an increase in respiratory conditions beyond expected levels.

Conclusions

Although respiratory conditions did not appear to correlate with the test burn, there were numerous lessons learned from this short-term study. The VT-EARS program was able to support rapid tracking of a newly defined syndrome. While the health department was able to get provider buy-in and successfully set up ICD-9 based data collection on short notice, the process would have been facilitated by infrastructure improvements in data transmission security and provider access. These data were not available in real time and so could not be used for decision-making during the event. Another improvement would be a separate data collection instrument for health reports phoned directly to the health department, with a mechanism for linking these reports with actual visits to a health care provider. Surveillance that is more active, rather than passive, including exposure and medical histories of affected patients, would help to overcome the numerous challenges in linking environmental exposures to health effects.

References

[1] "Scrap Tire Markets in the United States: 2005 Edition." Rubber Manufacturers Association, November 2006.

[2] "Air Emissions from Scrap Tire Combustion." U.S. Environmental Protection Agency Office of Research and Development, October 1997.

[3] Hutwagner L, Thompson W, Seeman GM, Treadwell T. The Bioterrorism Preparedness and Response Early Aberration Reporting System (EARS). J Urban Health 2003;80(2 Suppl 1):i89-i96.

[4] "Air Quality Data and Observations Made in Vermont during the November 2006 Trial Burn of Tire Derived Fuel at the International Paper Company, Ticonderoga, New York: Final Report." Vermont Agency of Natural Resources Department of Environmental Conservation: Air Pollution Control Division, January 2008.

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