

Health Effects of LA County Wildfires in October 2007

Akbar Sharip, MD, MPH; Emily Kajita, MPH; Megan Jones, MPH; Bessie Hwang, MD, MPH
Los Angeles County Department of Public Health, Acute Communicable Disease Control

OBJECTIVE

Determine if poor air quality resulting from wildfires could be measured in the general population by monitoring smoke-related respiratory Emergency Department (EDs) visits.

BACKGROUND

October 20, 2007 marked the beginning of a series of wildfires in Southern California stretching from Santa Barbara County to the U.S. Mexico border. The increased concentration of smoke, ash, and dust particles from the wildfires caused the air quality across Southern California to deteriorate [1]. Most areas of Los Angeles experienced unhealthy-sensitive air (Air Quality Index (AQI) of 101 to 150), whereas areas close to the wildfire experienced unhealthy air (AQI of 150 to 200) [2]. Air pollution is a major cause of respiratory stress in sensitive populations and on October 22, 2007, Los Angeles County (LAC) Department of Public Health Acute Communicable Disease Control Program's (ACDC) syndromic surveillance team was requested to rapidly assess the health impacts caused by the wildfires.

METHODS

Using ED admission data from 33 LAC EDs, the respiratory category, and respiratory subcategories were analyzed. A new asthma syndrome category was created and utilized as the primary focus of analysis because previous studies indicate patients with asthma, and chronic obstructive lung disease (COPD) are most sensitive to respiratory stress [3,4,5]. Air pollution is also harmful to the elderly, those people with lung or heart problems, and children whose lungs are still developing. The Centers for Disease Control and Prevention Early Aberration Reporting System (EARS) was utilized for calculating and analyzing daily counts and rates (per 1000) of ED visits. A threshold based on the cumulative sum (CUSUM) algorithm with three standard deviations was used for detecting significant aberrations from normal levels. In addition, t-tests were used to compare counts and rates of asthma-related ED visits one week before (Oct. 14-20) and after (Oct. 21-27) the wildfires. Analysis was extended until the first week of November to further quantify the change in ED visit frequency resulting from the poor air quality.

RESULTS

Upon reviewing 152,028 ED visits, the overall number of daily ED visits did not change significantly during the wildfire period ($p=0.95$). However, both respiratory and asthma syndrome visits significantly increased during the fire. The average asthma syndrome related daily ED visits for the week changed from 69 in the week before the fires began, to 87 during the week of the wild fires ($p=0.0115$). In addition, the average rates of asthma syndrome related visits increased from 1.4% (14 per 1000) to 1.8 % (18 per 1000) ($p=0.01$). These increases in daily counts and rates generated three CUSUM signals during October 21 to 24. Asthma syndrome trends returned to the baseline levels one week after the fire ended, which was the same time that the air quality was reported to have improved.

CONCLUSIONS

While the number of overall ED visits remained relatively unchanged, the system quickly detected a temporary increase in respiratory and asthma related visits, providing evidence of the health impact of wildfire induced air pollution on the general population. In turn, this information was used to guide the Health Department's decision to declare a county-wide smoke advisory. These results demonstrate the utility of syndromic surveillance in assessing the health-related impacts of natural disasters in near real-time. Despite the limitations in this study, which include potential syndrome misclassification due to the lack of definitive diagnosis data for most of the EDs, the possibilities for using syndromic surveillance machinery for objectives beyond the early warning of infectious disease or bioterrorism outbreaks is promising.

REFERENCES

1. Jeff Brady . Poor Air Quality May Linger Long after Fire's Out, National Public Radio, *October 29*
2. AQMD smoke advisory. URL: <http://aqmd.gov/news1/2007/smokeadvisoryoctober26.html>
3. Emmanuel SC. Impact to lung health of haze from forest fires: the Singapore experience. *Respiratory* 2000; 5:175-182.
4. Johnson J, Hicks L, McClean C, Ginsberg M. MMWR, Supplement, August 26, 2005 / 54(Suppl);190 .Leveraging Syndromic Surveillance During the San Diego Wildfires, 2003
5. Wildfire Smoke A Guide for Public Health Officials URL: <http://www.arb.ca.gov/smp/progdev/pubeduc/wfgv8.pdf>