conferenceseries.com

4th International Conference on
Epidemiology & Public Health
October 3-5, 2016 | London, UK

Ling Liu
Healthy Environments & Consumer Safety Branch, Canda

EXPOSURE TO AIR POLLUTANT EMISSIONS FROM INDUSTRIAL FACILITIES AND THE ASSOCIATED RISKS OF RESPIRATORY HOSPITAL ADMISSIONS OF YOUNG CHILDREN IN TWO CANADIAN PROVINCES

Background: Industrial plants are important emitters of air pollutants such as fine particles (PM2.5), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2). But adverse health effects of industrial air pollution on children living nearby are not as well studied as those of urban air pollution resulting mostly from automotive transport.

Objective: We studied the associations between exposure to air pollutants emitted from oil refineries, metal smelters and pulp mills and hospital admissions for asthma and bronchiolitis in young children in Quebec (QC) and British Columbia (BC), Canada.

Methods: We defined industrial facilities emitting ≥ 50 tons per year as a major industrial plant. We used two types of estimates for children's exposure to industrial emissions: (1) Daily downwind exposure to emissions of PM2.5, SO_2, or NO_2 from major pulp mills, oil refineries, and metal smelters. We calculated emission exposures at children's home, postal codes by multiplying estimated daily emissions from all nearby major industrial facilities (<7.5 km) with the percent of the day when each postal code was downwind. (2) Daily levels of these pollutants at centralized air pollutant monitoring stations. We collected 2002-2010 data of hospital admissions for asthma and bronchiolitis for children (aged 2-4 years) living within 7.5 km from a major industrial plant. We used a time-stratified case-crossover design and conditional regression models to analyze associations between children's exposure estimates and hospitalizations. We used meta-analysis to pool results from both provinces.

Results: Seventy-one major industries were selected for QC and BC. A total of 2868 cases of hospital admissions for asthma and bronchiolitis were included in our analyses. Although air pollutant levels were similar in two provinces, there were more cases living near a major industrial facility in QC than in BC (e.g. 2505 hospitalizations of children living near SO_2 industrial emitters in QC vs. 334 hospitalizations in BC). Mean downwind exposures across two provinces for PM2.5, SO_2 and NO_2 for all major industries combined were 0.17,1.35, and 0.37 tons/day on case days. The risk estimates for exposure to refinery and smelter emissions were positive in QC but more variable in BC. For example, for an increase of 0.15 tons/day of PM2.5 emissions in QC, the risk estimate was 13% (95% confidence interval: 0, 27%) for refinery, and 3% (95% confidence interval: -1%, 7%) for the smelter. Pooled results from both provinces show that for a 1.5 tons/day increase in exposure to SO2 emissions from all sources, there was a 1% increase (95% confidence interval 0, 3%) in the risk of hospital admissions. Associations with measured pollutant levels were only seen in BC: Daily maximum SO_2 (interquartile range 6 ppb) near oil refineries was associated with 9% increase in the risk of hospitalizations (95% confidence interval 0, 19%); maximum NO_2 (interquartile range 9 ppb) from any industry was associated with 40% increase in the risk (95% confidence interval 10%, 78%).

Conclusion: Exposure to emissions of air pollutants emitted from petroleum refineries and metal smelters is associated with increased hospital admissions for wheezing diseases in young children.

Biography

Ling Liu is a tenured associate professor of epidemiology and biostatistics at Healthy Environments & Consumer Safety Branch, Canda. She serves as an academic advisor and chair for MPH and PhD students. Dr. Liu's research expertise is in cardiovascular disease and diabetes epidemiology with focusing on disease etiological study, the complex of multiple comorbidity, drug-diet interaction and pharmaco-epidemiology in aging, and global health.

ling.liu@hc-sc.gc.ca

Epidemiology (Sunnyvale)
ISSN: 2161-1165 ECR, Open Access

Epidemiology 2016
October 3-5, 2016

Volume 6, Issue 5(Suppl)

Page 43