Addressing Gaps in Evidence and Data for Environmental Public Health

Data Challenges in the Physical Sciences
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CDC’S ENVIRONMENTAL PUBLIC HEALTH TRACKING PROGRAM

Goal: Increase the number of data-driven environmental public health actions and decisions by providing information from a nationwide network of standardized, integrated health and environmental data.
Reducing Pesticides Near Schools in California

Agricultural Pesticide Use Near Public Schools in California Executive Summary

California agriculture produces nearly half of all fruits and vegetables grown in the United States. These foods are essential components of a healthful diet and help promote public health here and throughout the country. However, agricultural production frequently relies on the application of pesticides that, under some circumstances, can be hazardous to human health. Compared with adults, children are more susceptible to the effects of pesticide exposure. Because of the potential public health risks to children, we examined the use of selected agricultural pesticides near public schools in the top 15 counties by agricultural pesticide use in California for 2010. Our goals were to improve the methodology for the coupling surveillance of agricultural pesticides to understand pesticide use patterns and provide information that can be used to assess and inform efforts to minimize potential pesticide exposure among schoolchildren.

In 1990, California established the Pesticide Use Reporting (PUR) program, a world-class system administered by the California Department of Pesticide Regulation (CDPR) to collect and disseminate data on pesticide use. For this study, we utilized the most accurate data available from PUR and other sources to estimate pesticide applications within 1/4 mile of school property boundaries. The pesticides included in this study were selected for their public health relevance and categorized based on their known health effects or regulatory status. The six categories of pesticides considered are carcinogens, reproductive and developmental toxicants, cholinesterase inhibitors, toxic air contaminants, fungicides, and priority pesticides by assessment and monitoring. These chemicals, many of which are of regulatory interest in California, are considered in this report to be pesticides of public health concern.

For this study, we assessed 2,511 public schools, attended by over 1.4 million students, in the 15 counties with the highest total reported agricultural pesticide use in 2010. We linked geographic school data to over 2.5 million pesticide-use records. We found:

- Most schools did not have any pesticides of public health concern applied nearby. In 2010, the majority of schools in this study (94% or 1,472 schools) did not have any pesticides of public health concern applied within 1/4 mile. For the remaining 30% of schools, pesticide use within 1/4 mile ranged from 0.01 to 269.79 lbs.

- A small percentage of schools had many pounds of pesticides of public health concern applied nearby:
  - The top 5% of schools with any pesticide use nearby (46 schools attended by over 33,000 students) had amounts of pesticides applied within 1/4 mile ranging from 2.635–269.79 lbs.
  - The top 25% of schools with any use nearby (226 schools attended by over 118,000 students) had at least 319 lbs of pesticides applied within 1/4 mile.

- Pesticide use near schools varied among counties.
  - Fresno County had the highest number of schools (131) with any pesticides applied nearby, whereas Tuolumne County had the highest percentage of its schools (35.4%) with any pesticides applied nearby.
  - Ventura County had the highest number of schools (12) and the highest number of students (13,040) in the top 5% of schools. Monterey County had the highest percentage of its schools (4%) and highest percentage of its students (13%) in the top 5% of schools.
Evaluating Health Impact of Transportation Strategies in OR

Source: Oregon Health Authority, Environmental Public Health Tracking report: DMV records are valuable for obesity surveillance in Oregon, September 2012

https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/TRACKINGASSESSMENT/ENVIRONMENTALPUBLICHEALTHTRACKING/Pages/Tracking-Activities-and-Events-.aspx
In order to have data-driven actions, data must be:

- TIMELY
- ACCURATE
- LOCAL
- ACCESSIBLE
Tracking Program Core Strategies

- Improve data utility
- Enhance data use
- Expand data access
- Increase network awareness
Infrastructure + Data + People

National Environmental Public Health Tracking Network

Grantee Gateway

Secure Portal

Data Repository

Tool Box

Metadata Repository

Grantee Public Portal

National Gateway

Tool Box

Data Repository

Secure Portal

Tracking Experts

Partners

Public
ENVIRONMENTAL PUBLIC HEALTH TRACKING

CONNECTS ENVIRONMENT & HEALTH INFORMATION

Check out CDC’s data explorer and state and local tracking programs for more information.

Environmental
- Radon
- Drought
- Sunlight & UV
- Wildfire Smoke

Exposures
- Air Quality
- Extreme Heat
- Drinking Water
- Flood Vulnerability
- Community Design
- Pesticide Exposures
- Toxic Substance Releases
- Other Environmental Chemicals

Health Effects
- Asthma
- Cancer
- Heart Disease
- Heat Stress Illness
- Childhood Lead Poisoning
- Developmental Disabilities
- Carbon Monoxide Poisoning
- Reproductive and Birth Outcomes

Population Characteristics
- Lifestyle Risk Factors
- Socioeconomics
- Demographics
- Vulnerabilities

CDC
Accessible Data via the National Tracking Network

www.cdc.gov/ephtracking
Mitigating the Impact of Air Pollution

DATA

EVIDENCE

CAPACITY

ACTION

EVALUATION

Hazard

Exposure

Adverse outcome
Addressing Gaps in Evidence Used for Air Standards

- Currently standards rely on studies that are
  - Multi-city with populations over 65
  - Medicare data
  - Single city studies with all ages, or
  - International
- Estimates could be more robust by including studies that have
  - Multiple U.S. cities and all ages
  - Sensitive populations

A “Pyramid of Effects” from Air Pollution

Emergency Department Visits

Particulate Matter (PM$_{2.5}$)

Ozone

Temperature
Addressing Gaps in Evidence Used for Air Standards

- Investigated short-term associations between
  - Pollutants: Ozone, PM2.5
  - Respiratory ED visits: All, Acute respiratory infections, Asthma, COPD, Pneumonia
  - Age groups: All, 0-<19, 19-<65, 65+
- Found significant positive associations for all age groups between all respiratory ED visits and both pollutants
  - Except PM$_{2.5}$ among 65+
  - Highest magnitude association among 19-<65
- PM$_{2.5}$ was associated with respiratory emergency department visits among 0-<19 and 19-<65 but not 65+
- The associations also varied by age group for specific respiratory outcomes

Strosnider, Chang, Darrow, Liu, Vaidyanathan, Strickland. Age-specific associations of ozone and PM2.5 with respiratory emergency department visits in the US. Am J Respir Crit Care Med. 2019 Apr 1;199(7):882-890.