Approaches to integrating air pollution monitoring and health data: Does the new environmental health tracking initiative offer an opportunity for air pollution control?

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Topics

• “Integrating” and “linking” air pollution and health data for research
• What environmental public health tracking is
• Opportunities and challenges in the “tracking” initiative and issues for air pollution control:
  - New metrics
  - Movement from standards-based approaches
  - Indicators based on standards
“Linking” air pollution and health data

• “Linking” generally refers to study designs that use (relatively) routinely collected, surveillance data

• Different from studies that measure or follow health status in a group or population

• Data typically “linked” at the individual level but sometimes at a geographic level (county, metropolitan area, etc)
Types of air pollution data

- **Air pollution data:**
  - Monitored criteria pollution data usually from your networks
  - Modeled estimates (usually from emission inventories)
  - Traffic measurements or surrogates
Types of health data

- Medical records from defined populations such as those enrolled in Medicaid or HMO
- Information about medical care use such as hospitalizations, ER visits, or medical office visits (based on periodic survey of medical records)
- Surveys that ask people about their health experience and illnesses (state or national)
- Surveys that include a medical exam
- Registries (birth defects, cancer)
Important results from linking

• Many studies have been done using such approaches. Some examples:
  - Woodruff et al (1997) report sudden infant death syndrome associated with PM
• Such studies contribute to air pollution epidemiology at relatively low cost
New Initiative: Environmental Public Health Tracking

Initiative run out of the Centers for Disease Control and Prevention

  - Various luminaries on commission
  - Identified need for tracking of chronic diseases and identified some
  - Noted link to environmental factors
Environmental Public Health Tracking Network (EPHTN)

- Money was appropriated
- CDC issued RfAs in July 2002 and Summer 2003
- Funded about 20 states, a few cities, and 3 “Centers of Excellence” at universities
- Some states are “planning” and some are “implementing”
  - Focus on projects for linking data
Funded participants

States and cities (more than 20)
  • Beginner (“Part A”) - planning
  • Intermediate (Part B) - implementing linkage
    - The grants funded health departments but they had to get a letter of support from the environmental department
    - Many of the state linkage projects focus on air pollution and asthma
  • “Centers of Excellence” at universities
    • University of California Berkeley
    • Tulane
    • Johns Hopkins
Framework for the Environmental Public Health Tracking Network

- State & National Data Collection Systems
  - Environmental Hazards
  - Environmental Exposure
  - Health Effects

- Integrating Environmental Health Data
  - Linkage
  - Analysis
  - Evaluation
  - Dissemination

- Public Health Actions
  - Research
  - Track health effects, exposures, and hazards
  - Develop, implement, and evaluate interventions & policies
  - Raise awareness
Goals of tracking

• Improve information technology and ability to link data >> most attention
• Better understand links between environment and health – especially causes of disease
• Better support for policy steps needed to reduce disease >> policy leaders
• Better integrate analysis of health and environment more generally
CDC framework

Agent is a hazard

Agent present in environment

Route of exposure exists

Host exposed to agent

Agent reached target tissue

Agent produces adverse effects

Adverse effect clinically apparent

Hazard Tracking

Exposure Tracking

Disease Tracking
Tracking inherently collaborative

- Requires knowledge of environmental and health fields
- Requires integration of data and analysis
- If actions are to be taken based on analysis, will require sharing of political effort and results as well
- Recognized by CDC-EPA joint agreement and requirement for state environmental agencies to participate
- Does require effort
Academic Centers’ role

• Do research on links between environment and health
• Help states do their tasks under CDC agreement
• Do things that are easy for us and hard for states
• Work on some of the (harder) conceptual and practical issues
Centers work with states

- Centers have affiliated states
- Berkeley: WA, CA, OR, NV, NM, UT, MT
- Hopkins: ME, MA, NY, PA, MD, NYC, RI
- Tulane: WI, MO, IL, Houston
- What the western states want help with:
  - IT decisions
  - Indicators feasibility assessment
  - Regional initiatives on data analysis and linkage for priority areas: air pollution, asthma, birth defects
  - How to “fix” water data systems
  - How to best use biomonitoring
Issues for states in tracking

- Emerging diseases and concerns about possible or actual environmental etiology
  - Environmental agencies expected to respond
  - Teasing out real relationships requires sophisticated analysis and better data
- Challenges of “MEME” relationships
- New metrics – going beyond the standards in analysis and advocacy
- How to implement “linking” on a surveillance basis
- Avoid having to “show” health effects to act
Autism rate doubles among state's kids
Scientists mystified by 'frightening' rise of disability

Ulysses Torassa, Chronicle Health Writer

The number of kids in California being treated for autism doubled between 1998 and 2002, and there is still no end in sight to the growing trend, state officials reported Tuesday. The report, released by the state Department of Developmental Services, found that 10,360 autistic children sought services in 1998. By the end of last year the number had jumped to 20,377, a 97 percent increase, far outstripping the growth rate in population or births. Concern over rising autism rates has been growing since the late 1990s as parents, educators and pediatricians began reporting increasing numbers of affected children across the country.

Scientists remain largely in the dark about what causes autism, a devastating disorder that disrupts the ability to communicate and socialize with others. As many as 20 different genes are known to play a role, but it also is believed that environmental factors are at work. Steep increases have also been documented in other industrialized countries such as Japan and Israel.
One “hazard,” multiple outcomes

- Particulate matter in air
  - Increased mortality
  - Asthma related ER visits
  - Increased lung cancer risk
  - Increased respiratory diseases (bronchitis)
One outcome, multiple causes

- Diesel exhaust
- Particulate matter in air
- Tobacco smoke
- Indoor allergens including those from animals, insects, rodents
- Ozone, SO2, NO2, possibly hazardous air pollutants
- Bioaerosols including fungi and molds and pollens
New metrics

- Emphasis has been on compliance reporting – are we meeting the NAAQS (or state equivalents)
- Looking at data integration leads to more flexible ways of looking at air pollution data
  - Both longer and shorter time periods may be relevant
  - Methods to look at multiple pollutants and net burden
Indicators

- Indicators in use not yet reflecting science in this regard
  - Healthy People 2010
  - Council of State and Territorial Epidemiologists - CDC Public Health indicators
  - Both still using attainment-based measures
  - Even though scientific studies going beyond this
Linking as an approach

• Competing expectations
  - New relationships between environmental factors and health outcomes to be defined?
  - Research v. integrated surveillance
  - What exactly do you get out of “linking” between health and environmental data
  - Do we need to do this everywhere?

• Linking within components may also be valuable
  - More complete measures for agents or outcomes
Opportunities for states

• Environmental factors are integral part of tracking
• Fall under rubric of “hazards”
• Opportunity to seek upgraded information systems
• Move beyond strict compliance focus in collecting and analyzing data
• Gain support for policy measures from health sectors
ECOS – ASTHO Asthma project

- Agenda to address environmental factors that contribute to asthma in children
  - Developed jointly by representatives of state health agencies and state environmental agencies, ASTHO, ECOS
  - For many, first time they had met
  - Strong commitment among participants to more unified efforts in future
CATCHING YOUR BREATH:
Strategies to Reduce Environmental Factors
that Contribute to Asthma in Children

A Summary of the Report from the Working Group of
Representatives from State Health and Environmental Agencies

Asthma is a major public health problem of increasing concern at state health and environmental agencies. Nearly one in 13 children in the U.S. has asthma, making it the most common chronic disease among children. Low-income populations, minorities, and individuals living in urban areas are at the greatest risk of developing asthma. The economic cost of asthma is enormous. In 2000, an estimated $12.7 billion was spent on asthma in the U.S. The Catching Your Breath: Strategies to Reduce Environmental Factors that Contribute to Asthma in Children report identifies steps states can take to address environmental factors contributing to asthma in children. To ensure that asthma poses no barriers to a healthy and active life for every child, state health and
Summary

• Tracking initiative will depend on contribution from environment sector
• Air pollution and asthma are one of the major focus areas
• Presents potential challenges and opportunities for state environmental and air pollution agencies
References to “linking” studies


Web links

- Berkeley Center for Environmental Public Health Tracking. [http://ehtracking.berkeley.edu](http://ehtracking.berkeley.edu)
- Resources for Catching Your Breath. [http://envirohealth.berkeley.edu/CatchingYourBreath.htm](http://envirohealth.berkeley.edu/CatchingYourBreath.htm)