Overview of Environmental Public Health Tracking

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The First Core Function

Assessment

Monitor health status to identify community health problems
Diagnose and investigate health problems and hazards in the community
Public Health Approach

Surveillance: What is the problem?

Risk Factor Identification: What is the cause?

Intervention Evaluation: What works?

Implementation: How do you do it?
“Public health surveillance is the ongoing systematic collection, analysis, and interpretation of outcome-specific data for use in planning, implementation, and evaluation of public health practice”

(Thacker and Berkelman, 1988)
Tracking = Surveillance
Brings us back to the first core function of public health - assessment
Provides a foundation for redefining the role of environmental public health
Has applications throughout all of public health practice and research
Is a foundation for community prevention efforts and providing the essential services of public health
Uses of Public Health Surveillance

- Estimate magnitude of the problem
- Determine geographic distribution of illness
- Portray the natural history of a disease
- Detect epidemics/define a problem
- Generate hypotheses, stimulate research
- Evaluate control measures
- Monitor changes in etiologic agents and risks
- Detect changes in health practices
- Facilitate planning and establish priorities
The London Fog event of 1952 provides a clear example of an early time-series analysis. The figure below shows the estimates of weekly mortality and average sulfur dioxide concentrations for London during the winter of 1952-’53. Deaths in December were approximately 2.5 times increased over comparable periods in 1947 to 1951.

Blood Lead Measurements 1975-1981

Predicted blood lead

Gasoline lead

Observed blood lead

Add comments on the removal of lead from gasoline

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Lead poisoning prevention activities continue to serve as a model for surveying and responding to environmental disease.

Legislative activity at the Federal and State level has been key to protecting the public’s health from lead poisoning; and

Federal funding has been and continues to be instrumental in supporting state and local intervention and prevention activities.

71 percent of childhood lead monitoring systems and 50 percent of adult lead monitoring systems are entirely or largely supported by federal funding (MMWR, July 3 1998)
Environmental Health Tracking

Agent is a hazard

Agent is present in the environment

Route of exposure exists

Host is exposed to agent

Agent reaches target tissue

Agent produces adverse effect

Adverse effect becomes clinically apparent

Hazard Tracking

Exposure Tracking

Health Outcome Tracking

Adapted from Thacker, et al., AJPH 86: 633-638 (1996)
Examples of Questions Facing Communities and Public Health Officials in Environmental Health

- Are environmental exposures related to clusters of childhood cancer and autism?
- What are the impacts of pesticide exposure on children's health?
- What proportion of birth defects is related to environmental exposures?
- Are changes in the environment related to the dramatic increase in asthma?
- Are adult onset diseases such as Parkinson's and Alzheimer's related to cumulative environmental exposures?
- Are there increases in Systemic Lupus Erythmetosis (SLE) and Multiple Sclerosis (MS) in communities with hazardous waste sites?
- Are learning disabilities related to environmental exposures?
- Is Attention Deficit Disorder (ADD) related to in utero exposures to contaminants in the environment?
- Are there endocrine disrupting pollutants in the environment related to the increasing incidence of breast and prostate cancers?
- How does particulate air pollution increase the risk of death in the elderly?
Pew Environmental Health Tracking Project

State / Local Environmental Infrastructure
- Interviews of State and Local Leadership
  - Capacity
  - Needs
  - Priorities
  - Implementation

National Surveillance Activities
- Outreach with Federal Leadership and Review of Federal System
  - State of the Art
  - Capacity
  - Action

Selecting Health Endpoints for Tracking
- Examination of Available Information
  - Toxics Release Inventory
  - Health Endpoints of Concern
  - National Health Outcome Databases

National Tracking Recommendations
Conclusions from the states and localities

- Guidance and support for state and local capacity building;
- Improved information networks within and across states and localities;
- Increased training in environmental epidemiology;
- Designation of an environmental epidemiologist in every state;
- Increased guidance and technical support on identifying priority health conditions; and,
- Improved capacity to assess population exposures.
<table>
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<th>Recommendations from the Environmental Health Summit</th>
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<td>➢ Coordination of multiple agency efforts at the federal, state, and local level;</td>
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<td>➢ Development of the national environmental health information infrastructure;</td>
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<td>➢ Establishment of minimum performance standards to guide agency-specific tracking efforts;</td>
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<td>➢ Identification of populations at high risk of environmental exposures and adverse health effects;</td>
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<td>➢ Regular reporting of findings and improved public access to information; and</td>
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<td>➢ Strong linkages to prevention.</td>
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A tiered approach to implementation including:

- national tracking for high priority outcomes and exposures;

- a sentinel network to identify acute and emerging hazards;

- a coordinated network of pilot regional, state, and local tracking programs; and

- an aggressive research program to guide and evaluate tracking.
There is currently no cohesive national strategy to identify environmental hazards, measure population exposures, and track health conditions that may be related to the environment.

Basic information on the incidence and trends in health conditions that may be related or influenced by the environment is largely unavailable.

Advances in technology provide unprecedented opportunities to understand disease, measure exposures, and provide access to information.

The Commission calls upon our national leaders to seize these opportunities to revitalize the public health infrastructure and close America’s environmental health gap.
The Commission Recommends

The Commission recommends the creation of a Nationwide Environmental Health Tracking Network that informs communities, public health practitioners, researchers, and policymakers on environmental hazards, population exposures, and related diseases and their causes –

- Nationwide baseline tracking of priority diseases and priority exposures.
- Monitoring of immediate health crises such as heavy metal and pesticide poisonings to serve as early warning systems.
- Establishing 20 state pilot programs to allow for the addressing of regional concerns.
- Developing a federal, state and local rapid response capability to investigate clusters, outbreaks and emerging threats.
- Tracking links to communities and research.
Investing in prevention through these five components is estimated to cost the federal government $275 million annually –

- less than 0.1% of the current annual economic cost of treating and living with chronic disease.

An ounce of prevention is still worth a pound of cure
Environmental Exposure Tracking
- Environmental Hazards Tracking
- Environmental Exposure Tracking
- Health Outcomes Tracking

State and National Data Collection Systems

Public Health Actions
- Track health, disease, and risks to target interventions
- Detect new health events and unusual occurrences associated with environmental exposures
- Monitor effects of interventions and policies
- Raise awareness of environmental health issues
- Guide research initiatives

Integrated Environmental Health Tracking, Analysis, Evaluation And Dissemination
## CDC's Environmental Public Health Tracking Program Grantees FY 2004

### Summary:

**Planning & Capacity Building Activities**

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**Infrastructure Enhancement & Data Linkage Demonstration Projects**

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**Centers of Excellence**

| Johns Hopkins University | Tulane University | University of California, Berkeley |

**Data Linkage Demonstration Projects**

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update

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Tools for quantifying, through direct or indirect measures, a significant aspect of an environmental health issue. They can be used to assess and communicate the status of and trends in overall environmental health.

Criteria for Selecting Environmental Health Indicators

**Simple**
- Measures one item
- Is clear

**Understandable**
- Makes sense to general public and policy makers

**Measurable**
- Comparable
- Quantifiable

**Defensible**
- Supports a relationship between environmental factors and health status

*National Association of County and City Health Officials, “Protocol for Assessing Community Excellence in Environmental Health,” May 2000*
examples of indicators

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Scientific challenges

Selecting Indicators
Interpretation of Findings
Refining Tracking Methods
Application to Epidemiological Methods
Cumulative risks
Translation to Prevention and Policy
Challenges Ahead

Efforts are just beginning and there is a long way to go
Fragmentation... still
Leadership
Involving Communities
Sustainability
Communication of Findings
Getting the Data Out
Applications to Prevention, Regulation?
The Challenge: Informing Policy Makers
"Hey, no problem!"
So, how are we doing

There has been amazing progress in a very short time
Tracking is leading to fundamental changes in the national approach to environmental health
Many Pew recommendations are now reality
If you don’t believe me Google EPHT!
There is still a long way to go
Our challenge is to build the support through results, partnerships, resources, and support.
Bridging the Chasm

- Population Health Status
- Health Effects
- Early Expression of Disease
- Biologically Effective / Internal Dose
- Exposure
- Environmental Accumulation
- Environmental Fate and Transport
- Release to Environment
- Pollutant Sources, Substances and Hazards

Outcome Surveillance
Hazard Surveillance
Exposure Surveillance
Environmental Public Health Tracking Network

Hazard Tracking

Exposure Tracking

Health Outcome Tracking