National Environmental Public Health Tracking: Environmental Health Surveillance in the U.S.

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U.S. Centers for Disease Control and Prevention

EH Surveillance Meeting
Ottawa, Canada
2/25-26/2013
Environmental Health Surveillance

- Detect and monitor trends
- Generate hypotheses
- Guide action
- Inform policymaking
- Provide information to public
- Track progress
Environmental Health Surveillance

Agent is a hazard

Agent is present in environment

Route of exposure exists

Host is exposed to agent

Agent reaches target tissue

Agent produces adverse effect (cellular)

Adverse effect becomes clinically apparent

Thacker, et al, 1996
Environmental Health Surveillance

Environmental Regulatory Activities

- Hazard tracking
- Monitoring
- Permitting & enforcement
- Environmental fate & transport research

Public Health Activities

- Exposure tracking
- Hazard identification
- Toxicology
- Risk analysis
- Prevention

- Health outcome tracking
- Health studies
- Individual & population exposure assessment

American’s Environmental Health Gap: Why the country needs a nationwide health tracking network. The PEW Environmental Health Commission. 2000

- Chronic conditions account for 4 out of every 5 deaths in the United States
- Little information is routinely collected on non-infectious disease
- Environmental monitoring conducted regulatory purposes
- Little human exposure data
- Answers needed about the role of the environment on health outcomes

Recommended a “Nationwide Health Tracking Network for diseases and exposures”
NATIONAL ENVIRONMENTAL PUBLIC HEALTH TRACKING PROGRAM
## Tracking Program Goals

<table>
<thead>
<tr>
<th>Goal 1</th>
<th>Build a Sustainable National Environmental Public Health Tracking Network</th>
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</thead>
<tbody>
<tr>
<td>Goal 2</td>
<td>Advance Environmental Public Health Science and Research</td>
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<tr>
<td>Goal 3</td>
<td>Disseminate Information to Guide Policy, Practice, and Other Actions to Improve the Nation’s Health</td>
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<td>Goal 4</td>
<td>Enhance Environmental Public Health Tracking Workforce and Infrastructure</td>
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<td>Goal 5</td>
<td>Foster Collaboration Among Health and Environmental Programs</td>
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</tbody>
</table>
CDC’s Tracking Program
Tracking Program

- National Network
  - Public Portals
  - Secure Portals
  - Standardized Data
- Data Utilization
- Engage Partners
- Build Capacity
National Public Portal

- 20 datasets
- 2.2 GB of data
- 18.7 million rows of data
- 270 measures
<table>
<thead>
<tr>
<th>Total Coverage</th>
<th>165 million (55%)</th>
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</thead>
<tbody>
<tr>
<td>Asian</td>
<td>9.6 million (70%)</td>
</tr>
<tr>
<td>Black</td>
<td>18.5 million (48%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>28 million (61%)</td>
</tr>
<tr>
<td>Native American</td>
<td>1.4 million (48%)</td>
</tr>
<tr>
<td>Other</td>
<td>2.8 million (57%)</td>
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<tr>
<td>White</td>
<td>132 million (55%)</td>
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</tbody>
</table>

Total Coverage of US Population by Tracking Program

[Map of the United States with funded states and cities marked.]
62% (167) measures cover more than Tracking states and city
Content and Data

- Asthma
- Birth Defects
- Cancer
- CO Poisoning
- Childhood Lead
- Developmental Disabilities
- Heart Attacks
- Reproductive Birth Outcomes

- Biomonitoring
- Climate Change
- Community Design
- Homes
- Outdoor Air
- Population Characteristics
- Water
Layers of Information
BEYOND THE NETWORK OF GATEWAYS AND PORTALS

Addressing Gaps in Data and Methods
Percent of children tested with confirmed elevated blood lead levels, by birth cohort

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>COUNTIES</td>
<td>2736 (87%)</td>
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<tr>
<td>YEARS</td>
<td>8</td>
</tr>
<tr>
<td>VARIABLE</td>
<td>BLL category</td>
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</tbody>
</table>
Childhood Lead Poisoning

- **Data and information**
  - Developing measures to address new reference value
  - Evaluating impact of program cut on future data availability
  - With grantees

- **Knowledge**
  - Ecological and case control study of ambient air levels and childhood blood lead levels
  - Evaluating the impact of data aggregation on results
  - With UPITT
Addressing Childhood Lead Poisoning Risk in Missouri

- Many children living in St. Louis have elevated blood lead levels
- Tracking Program looked at relationship between building demolitions and BLLs of children living nearby
- Children exposed to multiple demolitions showed a rise in BLLs
- Demolition site work practices revised and inspections increased
Average annual number of Cleft Lip with or without Cleft Palate among live births

| MEASURES | 26 |
| DEFECTS  | 12 |
| VARIABLE | Age, Race, Ethnicity, Infant Sex |

Number of states providing birth defect data

- New Mexico (1998-2002)
- New Mexico (2000-2004)
- New Mexico (2001-2005)
- New Mexico (2002-2006)
- New Mexico (2003-2007)
- New Mexico (2004-2008)
- New Mexico (2005-2009)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
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<tbody>
<tr>
<td>2008</td>
<td>3</td>
</tr>
<tr>
<td>2009</td>
<td>6</td>
</tr>
<tr>
<td>2010</td>
<td>13</td>
</tr>
<tr>
<td>2011</td>
<td>18</td>
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</table>
Birth Defects and Birth Outcomes

Knowledge
- Evaluating the association between cleft defects and PM2.5
- Determining how to use data collected from different types of systems
- With birth defects program

Knowledge
- Evaluating the association of PM2.5 and low birth weight and premature births
- Internally and with UMDNJ

Data
- Evaluating data and methods for tracking infertility
- With grantees
Identifying Preterm Birth Rates in California

- Preterm birth linked to mother’s exposure to air pollutants and lead
- Tracking Network identified preterm birth trends
- Fresno County used trends to target activities related to childhood lead poisoning, air quality and asthma
Estimated percent change in death rate from baseline associated with 20% reduction in air pollution
Impact of Air Pollution on Health

- **Information**
  - Adding specific causes of death to benefits indicator

- **Data**
  - Switching to a new air model for PM2.5 and Ozone

- **Knowledge**
  - Two studies evaluating PM2.5 and cardiovascular health
  - With UPITT and UCB

- **Knowledge**
  - Collaborating with EPA and other CDC on accountability assessments of new regulations
Reducing Asthma Hospital Stays in New York City

- Increase in childhood asthma hospital stays and ED visits
- Data used to urge update of asthma management plans for school start
- Decreasing rates of asthma hospital stays
- Advisories now standard practice
Informing City Planning in California

- Tracking Program developed a tool for city planners to use to screen for air pollutants from high-traffic roads.
- Planning Department uses tool to assess environmental risks before approving projects in city planning.
Climate Change | Extreme Heat Days and Events | Number of extreme heat events | Multiple Geo | 2000 | Heat Metric: Daily Maximum Temperature, Minimum Duration Days: 2 days | Relative Threshold: 90th Percentile
Climate Change and Natural Disasters

- **Data and Information**
  - Evaluating definitions for extreme heat events & heat-related mortality
  - With grantees & CDC
- **Data and Information**
  - Expanding module
  - Connecting with planners and responders
  - Evaluating emergency data feed

- **Knowledge**
  - Updated MMWR on 10 years of heat-related mortality
Reducing Effects of Extreme Heat in California

- Cooling centers costly, but can be life-saving
- San Jose city leaders needed proof of health impacts of heat before approving cooling centers
- Tracking identified increase of heat-related ER visits during heat events
- City leaders approved cooling centers to open
Activities Ahead

- Use data to drive multi-state or national action
- Use innovative informatics for interaction and dissemination of these data
- Put data in the hands of people who need it
Thank you
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http://ephttracking.cdc.gov

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epht@cdc.gov

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Twitter: @CDC_EPHTracking

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the Agency for Toxic Substances and Disease Registry.