Call to Action

- IOM, 1988
- Pew Environmental Health Commission, 2000
- Congressional appropriations, 2002
- CDC’s National Environmental Public Health Tracking Program, 2002
CDC’s Tracking Program Mission

To provide information from a nationwide network of integrated health and environmental data that drives actions to improve the health of communities
Environmental Public Health Tracking

Hazard → Data → Tracking Network → Assessment → Stakeholders → Prevention → Improved Public Health

Ongoing Evaluation

Exposure → Data → Tracking Network → Analysis → Dissemination → Prevention

Health Effect → Data → Tracking Network → Analysis → Dissemination → Prevention

*Stakeholders Include:
- Federal Agencies
- State and Local Agencies
- Academia
- Health Care System
- Non-Governmental Organizations

- Business and Industry
- Policy Makers
- Media
- Public

Department of Health and Human Services
Centers for Disease Control and Prevention
Safer • Healthier • People
Tracking Network

At-a-Glance

- Web-based information system that exists at the local, state, and national level
- Provides access to nationally consistent data and indicators of environmental health status
- Serves the public, environmental public health agencies, health care providers and researchers
- Protects privacy of individuals
Strategic Partnerships for Developing & Implementing Environmental Public Health Tracking

Other CDC/ATSDR CIOs
Health Care Organizations
NGOs
EPA & Other Federal Agencies
Universities
Community Groups & Members
State Agencies
Local Agencies

CDC Tracking Program
CDC’s National Biomonitoring Program
CDC’s National Biomonitoring Program

CDC’s Environmental Health Laboratory conducts the National Biomonitoring Program

*Major Activities*

- **Produce** CDC’s *National Report on Human Exposure to Environmental Chemicals*
- **Respond to** public health and terrorism-related emergencies
- **Provide support for** States
- **Collaborate on** studies of exposure and health effects
- **Develop new and better** biomonitoring measurements
CDC’s National Biomonitoring Program

Third National Report on Human Exposure to Environmental Chemicals

- Selected participants in NHANES
- Produced for 2-year survey periods
  - Third Report (2005) - NHANES 01-02, 148 chemicals
  - Fourth Report (2008*) – NHANES 03-04, 275 chemicals
- Blood and urine levels of chemicals and metabolites
  - Metals, tobacco smoke, phthalates phytoestrogens, polycyclic aromatic hydrocarbons (PAHs), pesticides, herbicides, insecticides, dioxins, furans, and polychlorinated biphenyls (PCBs)
  - New for Fourth Report: perfluorinated compounds (PFCs), polybrominated diphenyl ethers (PBDEs), environmental phenols (including bisphenol A), and speciated forms of arsenic

* Tentative date
CDC’s National Biomonitoring Program

Transferring Biomonitoring to States

State Grant Activities

- **2001: Phase I – Planning Grants**
  CDC’s Environmental Health Laboratory launched a planning grant program to support biomonitoring capacity building for public health laboratories.
  - 25 state and regional grants (supporting 33 States)

- **2003: Phase II – Implementation Grants**
  CDC funded three applicants to implement biomonitoring programs.
  - 2 States – New Hampshire and New York
  - 1 Consortium – Rocky Mountain Biomonitoring Consortium (NM, AZ, CO, MT, UT, and WY)
Developing the Tracking Program:
Grantees – 2002 to 2006

[Map showing states with different colors for planning and capacity building activities, infrastructure enhancement & data linkage demonstration projects, academic partners for excellence, and data linkage demonstration projects.]
Pilot Projects Lead the Way ........
# Projects

<table>
<thead>
<tr>
<th>Measured</th>
<th># Grantees</th>
<th># Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Asthma</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Water</td>
<td>11</td>
<td>23</td>
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<tr>
<td>Cancer</td>
<td>8</td>
<td>9</td>
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<tr>
<td>Lead</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Birth defects</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Pesticides</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Reproductive health</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>CO</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Fish/shellfish</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Results from Funded Projects

- Increased capacity
- Increased availability and enhancement of existing data
- Built new data systems
- Created analytic tools
- Linked data
- Took action
"Initially we thought we could quickly link environmental and health data to investigate community concerns; however, we found tracking is like peeling an onion—each layer reveals more issues that require extensive work to find the answers we seek."

LuAnn E. White, Ph.D.
Professor and Director
Tulane School of Public Health and Tropical Medicine
Center for Applied Environmental Public Health
## Challenges Encountered in Pilot Projects

<table>
<thead>
<tr>
<th>Data</th>
<th>Methods</th>
<th>Interpretation &amp; Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>No common toolbox of methods</td>
<td>Sensitivity /Specificity</td>
</tr>
<tr>
<td>Quality</td>
<td>Issues with exposure estimation and misclassification</td>
<td>Confidentiality</td>
</tr>
<tr>
<td>Not in electronic format</td>
<td>Level of resolution</td>
<td>Audience</td>
</tr>
<tr>
<td>Geocoding issues</td>
<td>Small numbers</td>
<td>“Plain speaking”</td>
</tr>
<tr>
<td>Little standardization</td>
<td>Latency/induction</td>
<td>Actionable?</td>
</tr>
<tr>
<td>No metadata</td>
<td>Confidentiality</td>
<td></td>
</tr>
<tr>
<td>Spatial/temporal misalignment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little exposure data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Methods
- No common toolbox of methods
- Issues with exposure estimation and misclassification
- Level of resolution
- Small numbers
- Latency/induction
- Confidentiality

### Data
- Access
- Quality
- Not in electronic format
- Geocoding issues
- Little standardization
- No metadata
- Spatial/temporal misalignment
- Little exposure data

### Interpretation & Communication
- Sensitivity /Specificity
- Confidentiality
- Audience
- “Plain speaking”
- Actionable?
Looking Back – Moving Forward

Key Lessons

• Stakeholder engagement - link people, programs, resources
• Successful data sharing
  – formal agreements, resource-sharing, value-added services
• Policy/regulatory changes may be required
• Significant “up front” work in data enhancement & harmonization
• Level of complexity - surveillance vs. research
• Varying levels of state “readiness”
  – technical infrastructure, data sharing, data discovery
• Communications – getting everyone “on the same page”
Tracking 2006
Planning to Implementation
Setting Priorities for Network Content: Tracking Hazard, Exposure, and Health Effects
## Priorities Reported by State/local Grantees

<table>
<thead>
<tr>
<th>Category</th>
<th>Measure</th>
<th># Grantees (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard</td>
<td>Air</td>
<td>16 (70%)</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>15 (65%)</td>
</tr>
<tr>
<td></td>
<td>Heavy metals</td>
<td>4 (17%)</td>
</tr>
<tr>
<td>Exposure</td>
<td>Heavy metals</td>
<td>4 (17%)</td>
</tr>
<tr>
<td></td>
<td>CO</td>
<td>1 ( 4%)</td>
</tr>
<tr>
<td>Health effect</td>
<td>Asthma</td>
<td>17 (74%)</td>
</tr>
<tr>
<td></td>
<td>Cancer</td>
<td>15 (65%)</td>
</tr>
<tr>
<td></td>
<td>Lead</td>
<td>12 (52%)</td>
</tr>
<tr>
<td></td>
<td>Pesticide Poisoning</td>
<td>11 (48 %)</td>
</tr>
<tr>
<td></td>
<td>Birth defects</td>
<td>10 ( 44%)</td>
</tr>
</tbody>
</table>
EPHT and Biomonitoring
Public Health Application of Biomonitoring

New York City Tracking Program

- Landmark community HANES
- Incorporated NYC HANES environmental biomonitoring (Pb, Cd, Hg), pesticides (organophosphates, pyrethroids)
- Developed manual for community HANES
NYC HANES (cont’d)

Activities

• Determine levels of Hg, Cd, Pb in NYC adults
  – identified illegal Hg containing skin-lightening products

• Metal Hazard Indicators
  – Hg levels associated with fish consumption
  – MeHg exposure in NYC adults higher than national average
  – Half of Asian New York City residents exceed Hg NY standard reporting level 5ug/L
NYC HANES (cont’d)

Public Health Action

• Brochure for women of childbearing age
  – how to choose fish/seafood to maximize health benefits, minimize potential risks

• Culturally relevant guidelines on healthy fish consumption for Asian community

• Alerted health care providers
  – talk with their patients about reducing mercury intake from fish
  – especially women who are pregnant, planning a pregnancy or breastfeeding
Public Health Application of Biomonitoring

New Mexico Tracking Program

Arsenic in Springer, NM

• Tracking & biomonitoring staff conducted urine & drinking water sampling/analysis of 100 residents
  – following physician notification of elevated patient As levels

• Compared community As levels to state and national levels
  – measured different As forms
Arsenic Study in Springer, NM

- Physician tested patient for urinary arsenic to rule out as possible cause of neurological symptoms
- Patient’s results high, according to clinical lab
- Physician tested several other patients, also had high results
- No previous history of elevated As levels in drinking water sampling or other obvious source of environmental contamination
Arsenic Study (cont’d)
New Mexico Tracking Program

Response
• Because of existing biomonitoring capacity, health department able to respond to determine if arsenic elevated in community and if so, what was source
• Tracking & biomonitoring staff conducted urine & drinking water sampling/analysis of over 100 residents
• Compared to rest of state based on previous biomonitoring samples

Results
• Community had LOWER As levels than
  – rest of state
  – the clinical significance level according to CDC guidelines

Conclusion
• Elevated As due to seafood, not environmental community exposure
  – via arsenic speciation
Public Health Application of Biomonitoring

Western Tracking & Biomonitoring Collaboration (WTBC)

2001
• CDC’s Environmental Health Laboratory launch planning grant to support biomonitoring capacity for public health laboratories. $10M distributed to 25 state health departments, regional programs, supporting a total of 33 states

2003
• CDC Biomonitoring Program funds formation of Rocky Mountain Biomonitoring Consortium (RMBC)
  – AZ, CO, MT, NM, UT, WY
• CDC Tracking Program funds 7 western states
  – CA, MT, NV, NM, OR, UT, WA

2005
• CDC Tracking funds formation of Western Tracking and Biomonitoring Collaborative (WTBC)
WTBC (cont’d)

Membership

• Rocky Mountain Biomonitoring Consortium
• Western Tracking States
• AK, HI, ID (Tracking funds to join WTBC)
WTBC (cont’d)

Goal
• Use collaboration between western tracking states and Rocky Mountain Biomonitoring Consortium states to build capacity for tracking and biomonitoring

Objectives
• Assess current capacity to perform tracking/biomonitoring functions
• Assess/collate common exposure/environmental interest among WTBC members
• Explore existing laboratory capacity to perform regional biomonitoring (leveraging methods, equipment, other funding sources)
Tracking Network Implementation

*Live in 2008*

**Functions:**
- Provide Nationally Consistent Data and Measures
- Describe and Discover Data
- Exchange Data
- Provide Data Management and Analysis Tools
- Inform and Interact with the Public
For more information: www.cdc.gov/nceh/tracking
Contact us: EPHT@cdc.gov
Questions