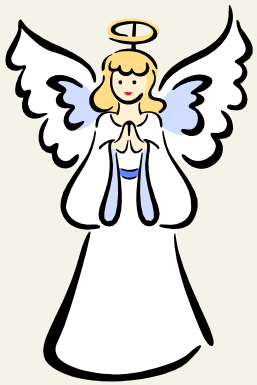


Data Usage for Environmental Public Health Tracking:

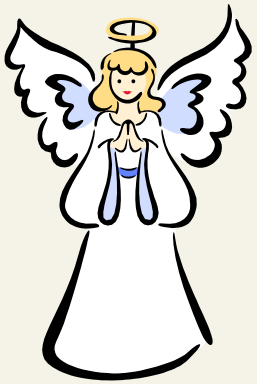
The Devil is in the Details

Funded by the U.S. Centers for Disease Control and Prevention (CDC)

Presentation Overview

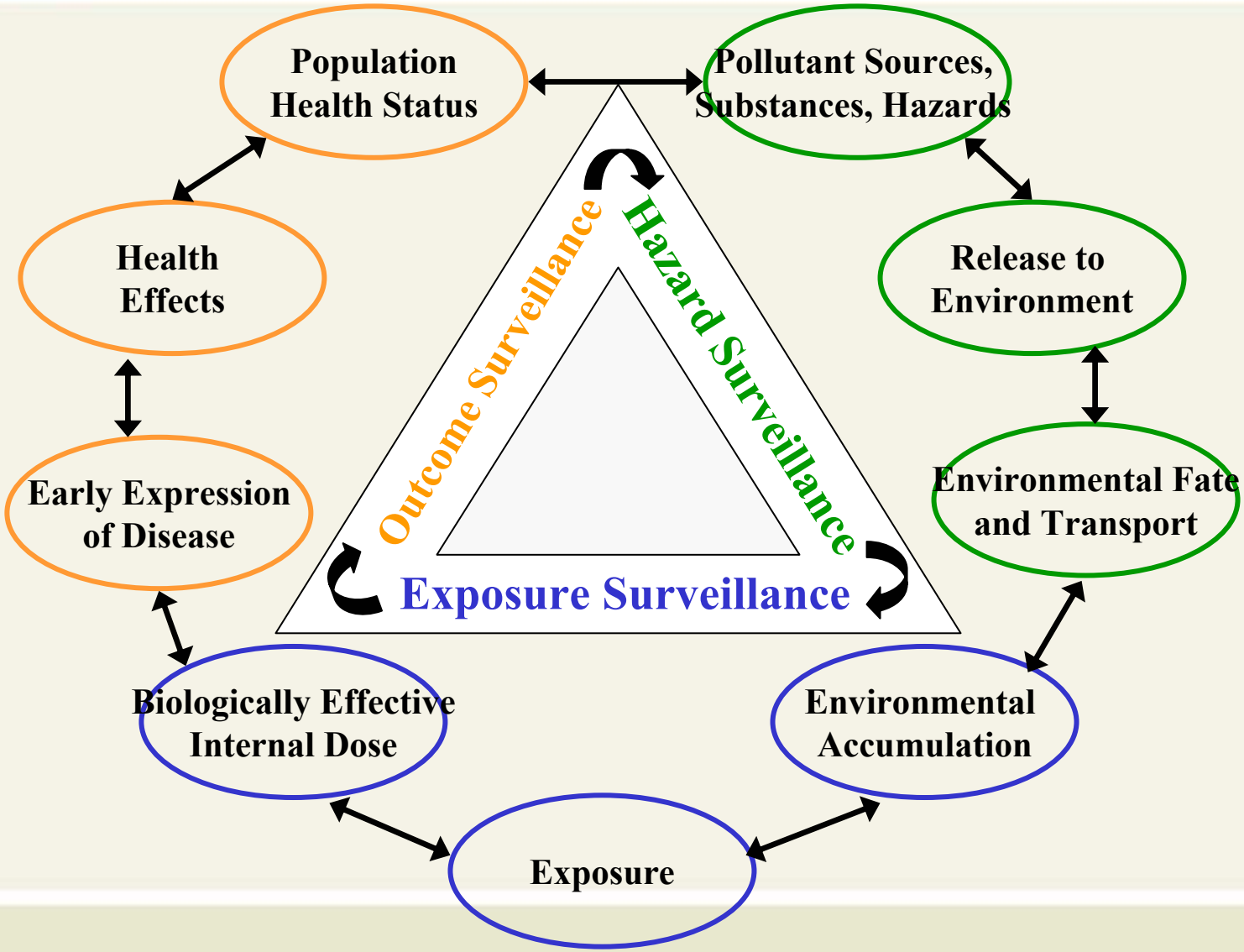
- The Environmental Public Health Tracking Network
- Sources, Example, the Details
  - Hazard Data
  - Exposure Data
  - Health Outcomes Data
- Data Linkage
- Critical Questions

The Environmental Public Health Tracking Network



The ongoing collection, integration, analysis, and interpretation of data about environmental hazards, exposure to environmental hazards, and human health effects potentially related to exposure to environmental hazards. It includes dissemination of information learned from these data.

Tracking Data Paradigm



Evaluation of Data Sources

- Availability of data (format, access, approvals needed, cost)
- Comparability (across geographic areas)
- Coverage (local, state, national; missing data)
- Relevance for tracking (timeliness, etc.)
- Misclassification
- Ability to control confounding, individual level data
- Size, complexity, and format of data files (technology)

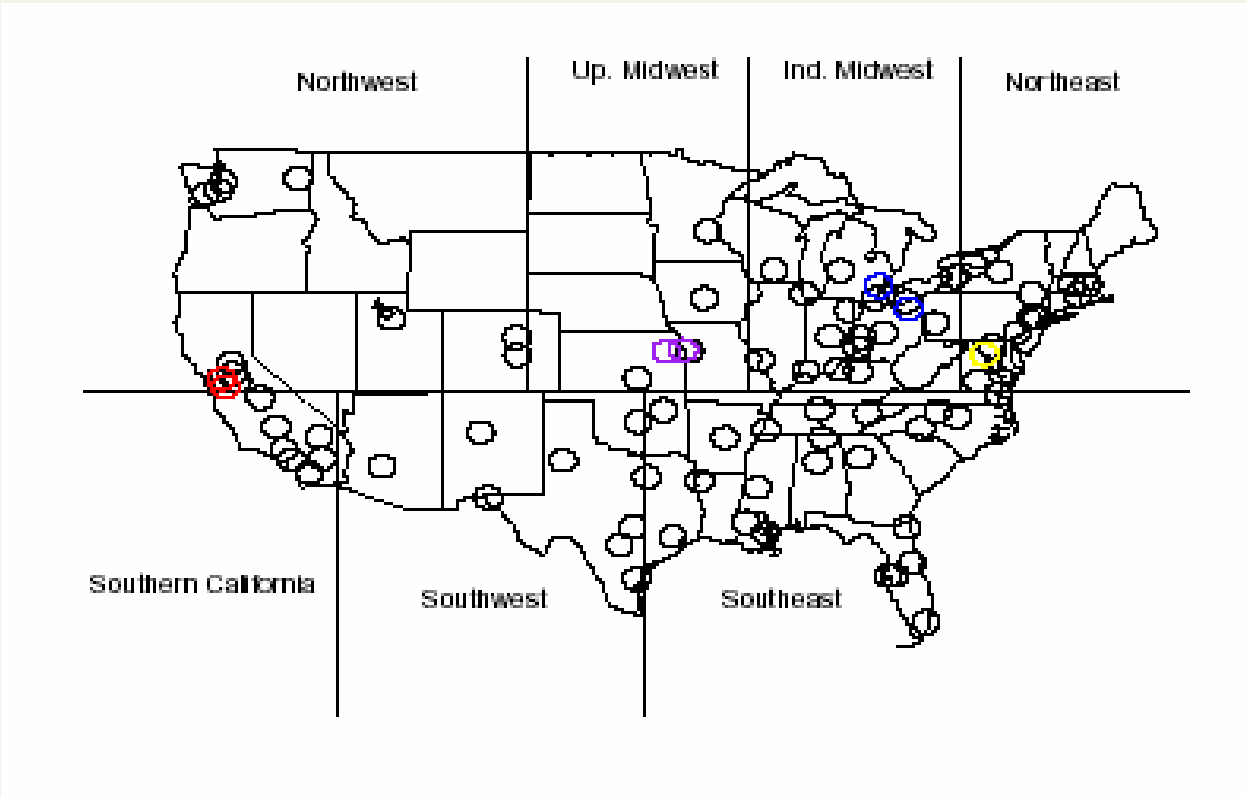
Hazard Data Sources

- Ambient Air Concentrations
- Air Emissions and Inspections
- Toxic Release Inventory
- Ground Water Sampling
- Drinking Water Databases
- Meteorology

Example: Hazard Data

- EPA National Ambient Air Quality Monitoring

90 Largest Locations in the USA



Hazard Data—the details

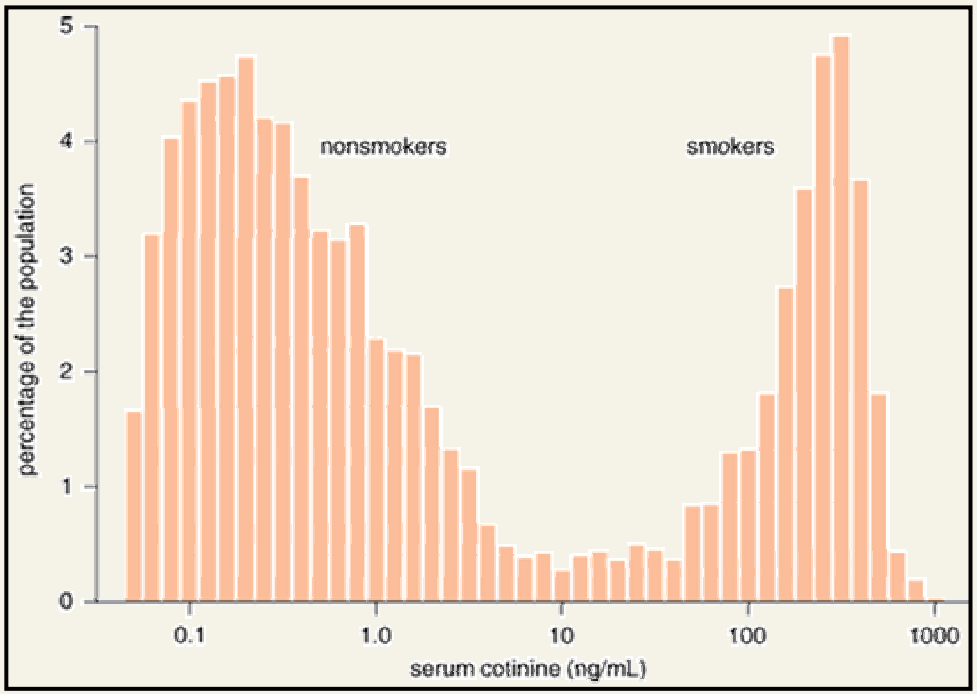
- Separating the "signal" (eg. air pollution effects) from the "noise" (confounders)
- Finer resolution needed (geographic area)
- Limitations in using individual data point locations
- Data collected for regulatory or other purposes
- Timeliness

Exposure Data Sources

- Human Biomonitoring
- Personal Sampling
- Exposure Surrogates
  - Survey Data
  - Modeled Exposures

Example: Exposure Data

- Difficult to identify examples of human exposure data for outdoor air pollutants
- Serum cotinine from environmental tobacco smoke



Sexton et al. American Scientist (2004)

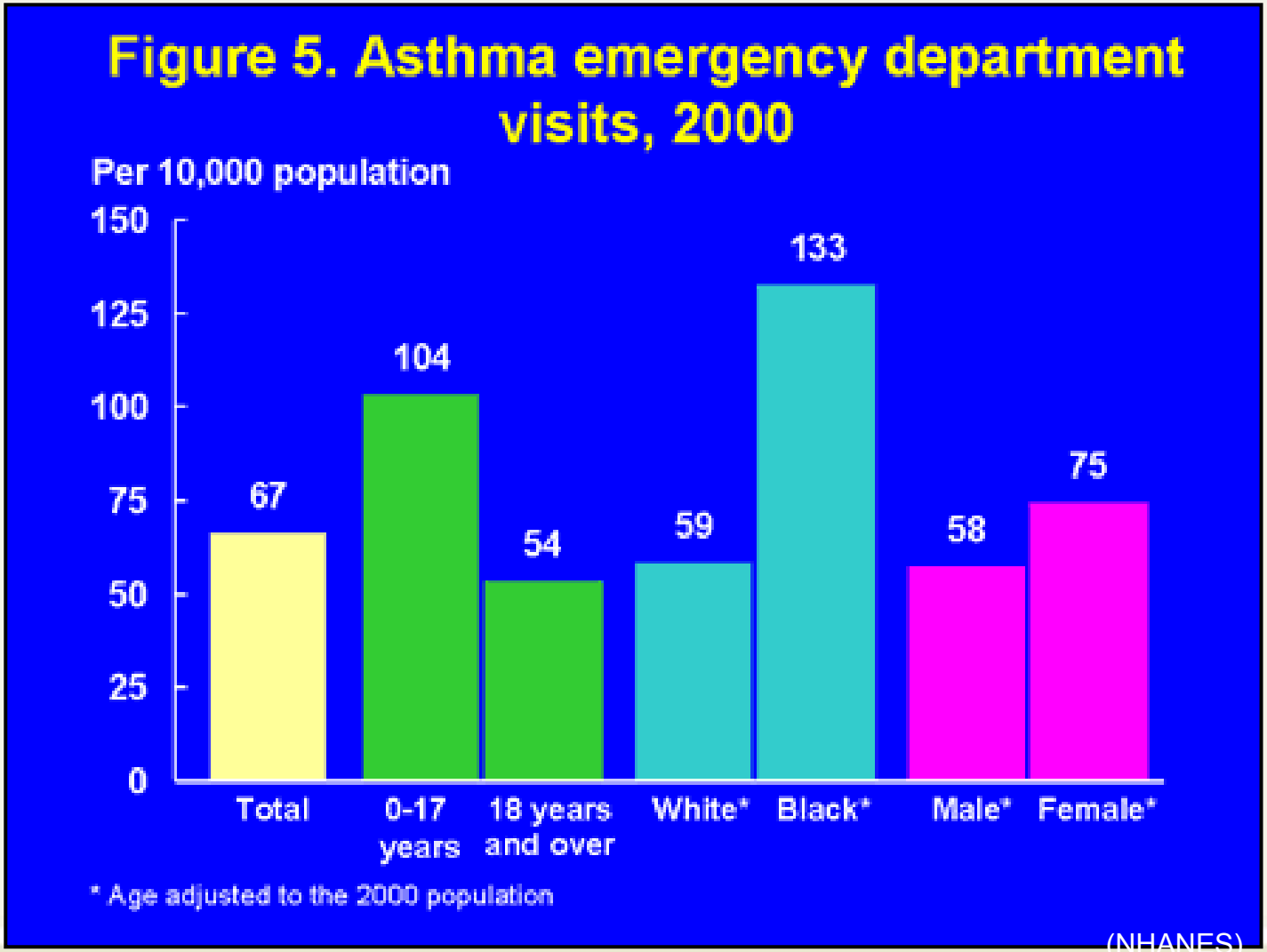
Exposure Data—the details

- Surrogates instead of actual measures
- Laboratory/technical availability
- Expense
- Invasive
- May be time dependent
- Geographic availability (scale)

Health Outcomes Data Sources

- Notifiable diseases
- Laboratory specimens
- Vital records
- Sentinel surveillance
- Registries
- Surveys
- Special studies
- Administrative data systems

Example: Health Outcome Data



(NHANES)

Health Outcome Data—the details

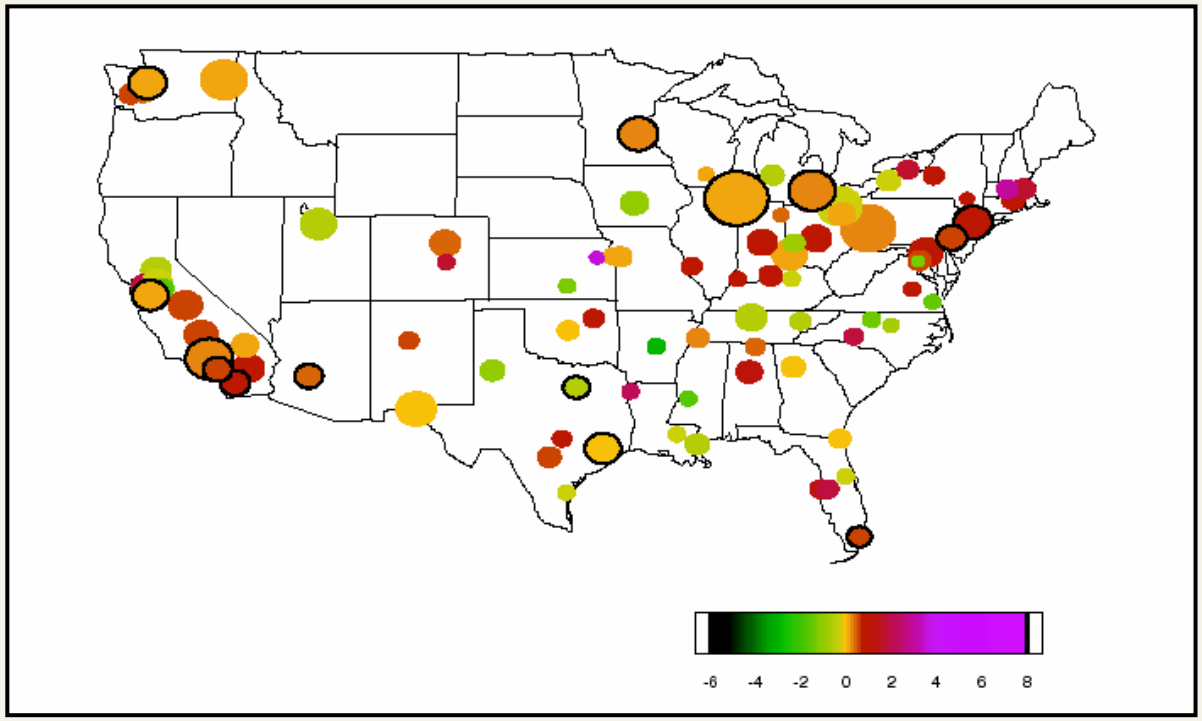
- Differences in clinical case definitions
- Changes in reporting codes (ICD-9 vs. ICD-10)
- Changes in long-term trends: improvements in medical practice over time
- Geographic reporting differences
- HIPAA regulations
- Access
- Timeliness of reporting

Data Linkage

- "Linkage" is defined as the physical integration of different databases resulting from a merge that utilizes a common variable
- Integration of health surveillance and environmental monitoring systems for hazards and exposures

Example: Data Linkage

- Use of statistical methods to estimate associations between air pollution and health effects (eg. mortality)



(Dominici et al. 2002)

Data Linkage—the details

- Data collected for different purposes
- Level of specificity or reporting may not be sufficient (aggregate data)
- Access or permission to use data difficult to obtain, cost or fees associated with use
- Information needed to conduct an epidemiologic study can vary greatly from what is needed for surveillance
- Inadequate variable(s) for indexing
- Methodological limitations

Dealing with the details: Asking the Critical Questions

- Who? What? Where? Why? When? How?
- Is it possible to "retro-fit" existing data systems for environmental public health tracking?
- How can we use the lessons learned to move forward with recommendations for new data collection for tracking?

Answering the Critical Questions

- Political Support
- Leadership
- Partnerships
- Infrastructure
- Resources