

Using Health Data with Environmental Data to Improve Outcomes: Surveillance to Identify Community Needs

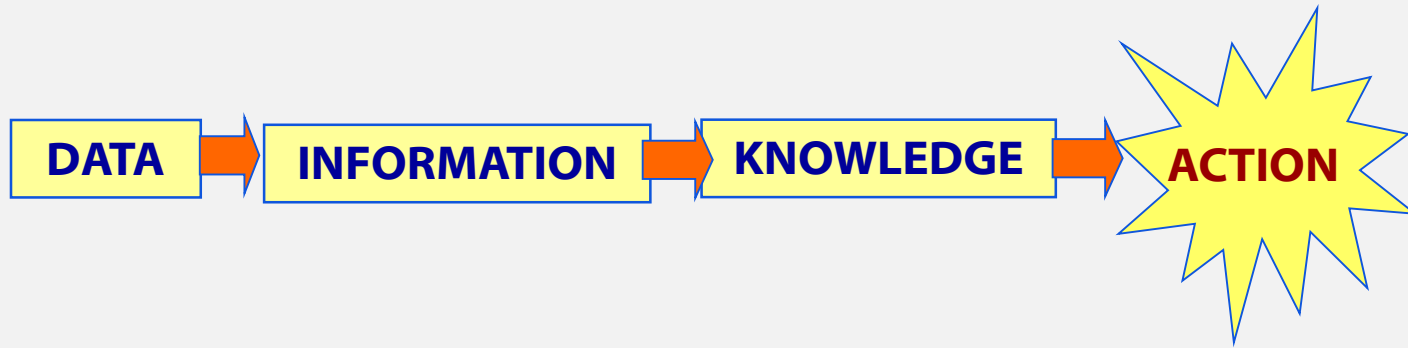
Preventing Air Pollution-Cardiopulmonary Illnesses:
Innovative, Cross-disciplinary Solutions

U.S. EPA -- Washington, DC

Judith R Qualters, PhD

Director, Division of Environmental Hazards and Health Effects (DEHHE)

Foundation for Public Health: Surveillance



“The purpose of surveillance is to empower decision makers to lead and manage more effectively by providing timely, useful evidence.” *

* Peter Nsubuga, Mark E. White, Stephen B. Thacker, et al. 2006. *Disease Control Priorities in Developing Countries (2nd Edition)*, ed. , 2006

Public Health Surveillance

Ongoing, systematic collection, analysis, interpretation of outcome-specific data for use in the planning, implementation and evaluation of public health practice and is integrated with dissemination of these data to prevent and control disease.*

* Thacker S, Berkelman R. Public Health Surveillance in the United States. Epidemiologic Reviews. 1988;10:164-190.

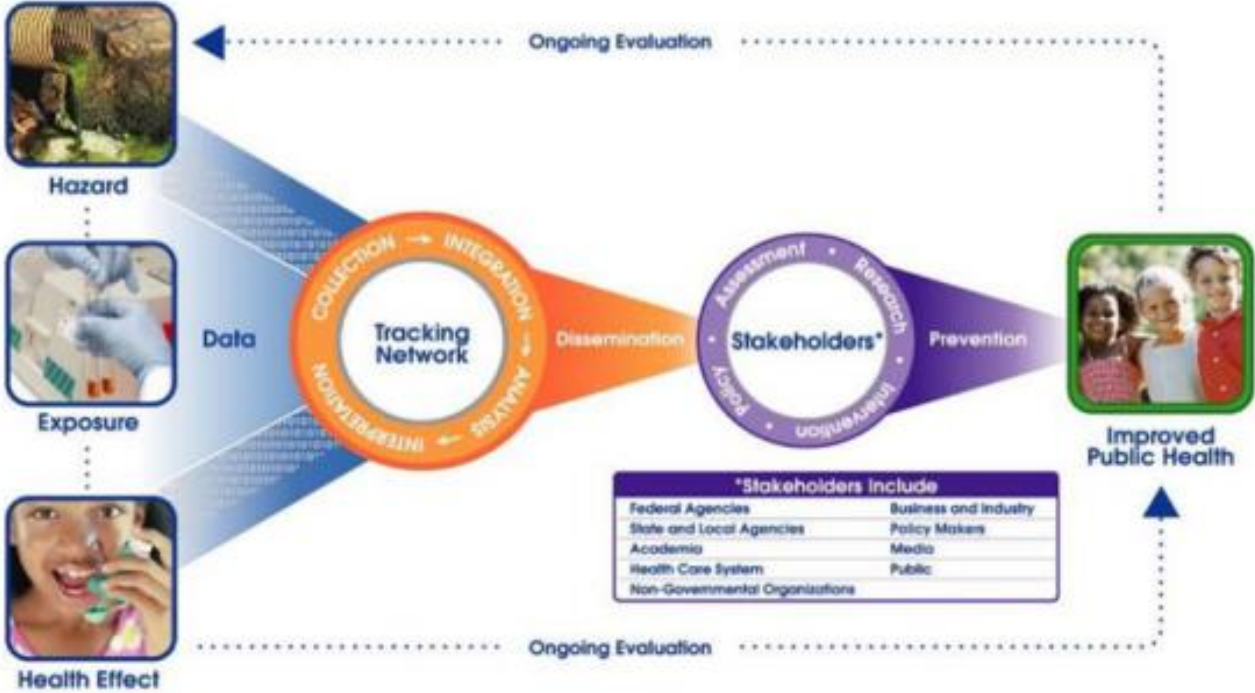
Environmental Public Health Surveillance / Tracking



Social Determinants



Other risk factors

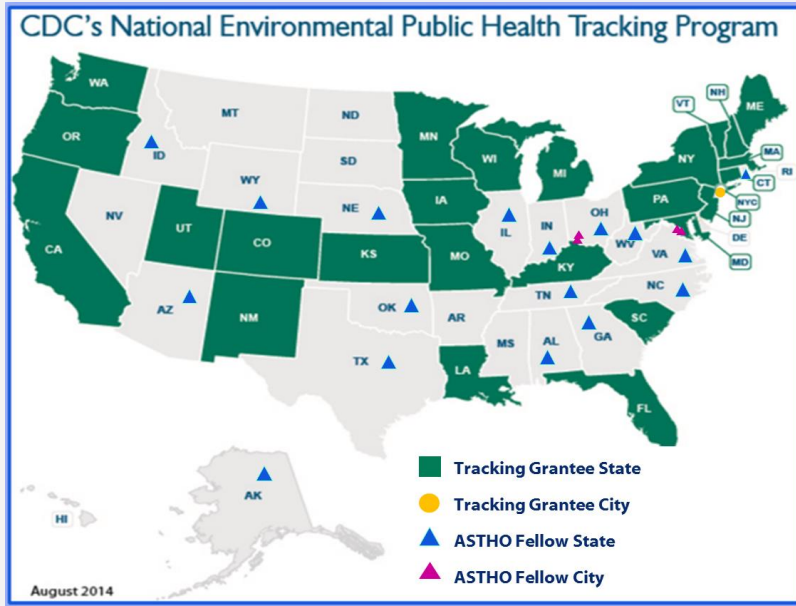


***Stakeholders Include**

| | |
|--------------------------------|-----------------------|
| Federal Agencies | Business and Industry |
| State and Local Agencies | Policy Makers |
| Academia | Media |
| Health Care System | Public |
| Non-Governmental Organizations | |



CDC's National Environmental Public Health 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
- CDC currently funds 25 states and NYC

The National Environmental Public Health Tracking Network

Current Content

Asthma

Biomonitoring

Birth Defects

Cancer

CO Poisoning

Childhood Lead

Climate Change

Community Design

Dev. Disabilities

Heart Disease



Visit us at - ephtracking.cdc.gov

Homes

**Lifestyle Risk
Factors**

Outdoor Air

Pesticide Exposures

**Population
Characteristics**

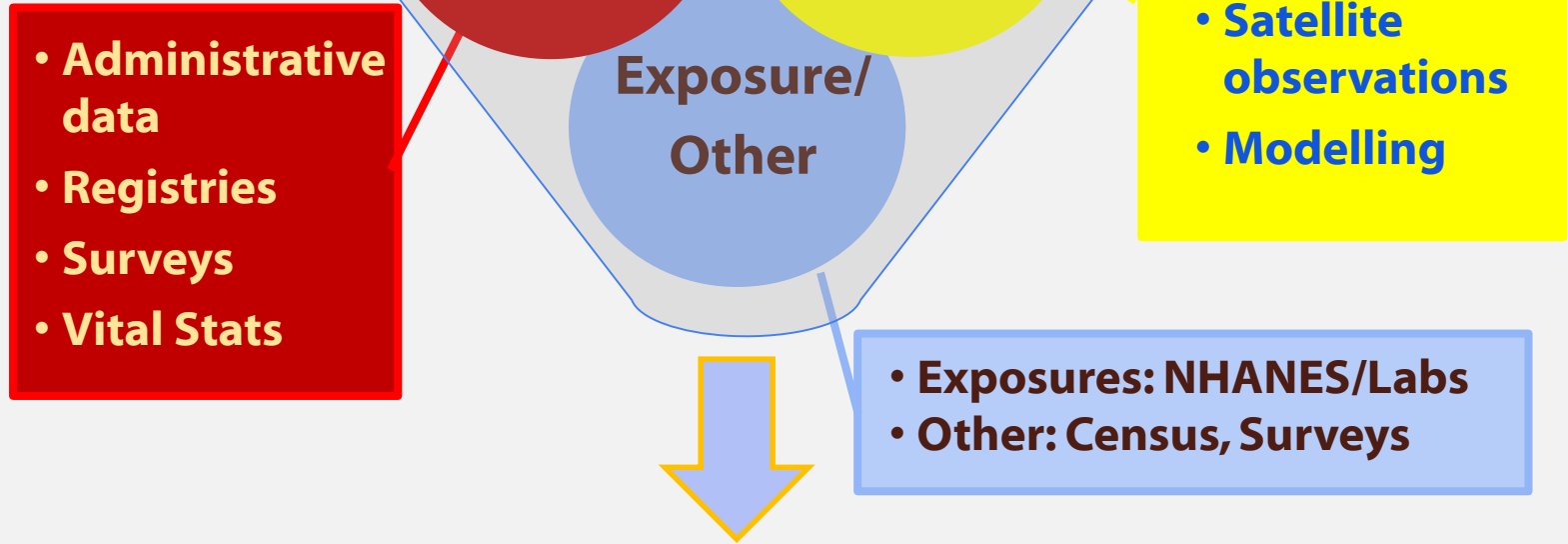
**Reproductive &
Birth Outcomes**

**Toxic Substance
Releases**

Water

Red text indicates content area contains nationally consistent data and measures

Sources:



Data and Information

Uses of Surveillance/Tracking Data

- ❑ Quantify the magnitude of a problem
- ❑ Detect unusual trends, occurrences, relationships
- ❑ Identify populations at risk
- ❑ Generate hypotheses
- ❑ Provide data to test some hypotheses
- ❑ Direct and evaluate control and prevention measures
- ❑ Develop information for better clinical care and individual-health action
- ❑ Facilitate policy development

USING DATA TO ADDRESS COMMUNITY NEEDS

Highlights from the Tracking Program

CDC National Portal: CHD Mortality Benefits Associated with a 10% Reduction in PM_{2.5}

Step 1: Select Your Mode ?

Basic Advanced

All Child

Step 2: Select Your Content ?

Air Quality:

Mortality Benefits Associated With:

Estimated number of Coronary H...:

Step 3: Choose Geography & Time ?

All States

- Alabama
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- District of Columbia

2004

2005

2006

2007

2008

2009

2010

2011

2012

Step 4: Advanced Options ?

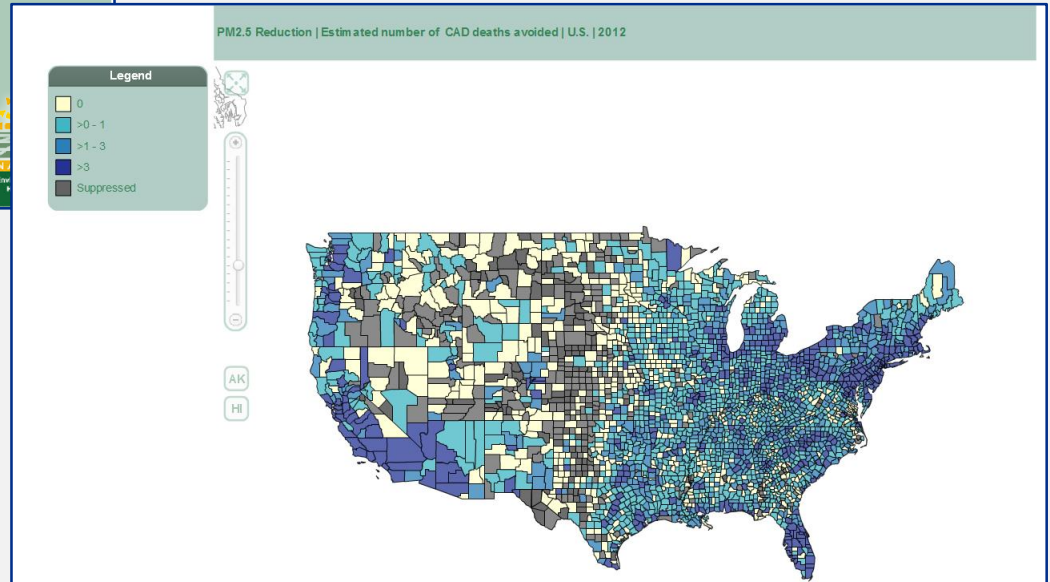
Advanced Options (Required)

- Reduction Percent

Advanced Options (Optional)

- Adult Obesity Prevalence
- Diabetes Prevalence
- Percent of Adult Smokers
- Percent of Population (under
- Percent of Population in Pove
- Percent of Population Over 65

Step 5: Submit ?

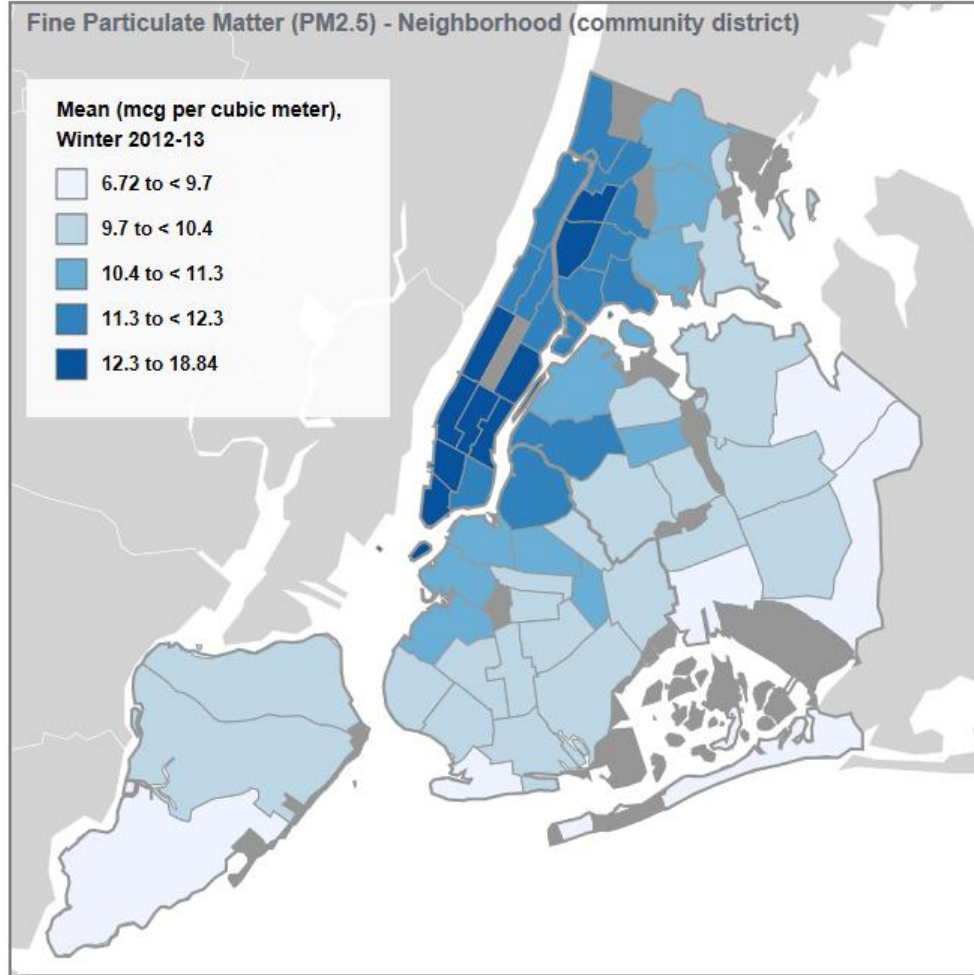


Connecting Air Pollution and Health in Washington

- ❑ Woodstove smoke a major asthma trigger in some AI and AN communities
- ❑ Tracking Program and asthma program studied non-certified wood burning stove use in tribal communities with high asthma rates
- ❑ Educated tribal leaders about effects of wood smoke on asthma
- ❑ Tribal leaders mobilized communities around smoke management

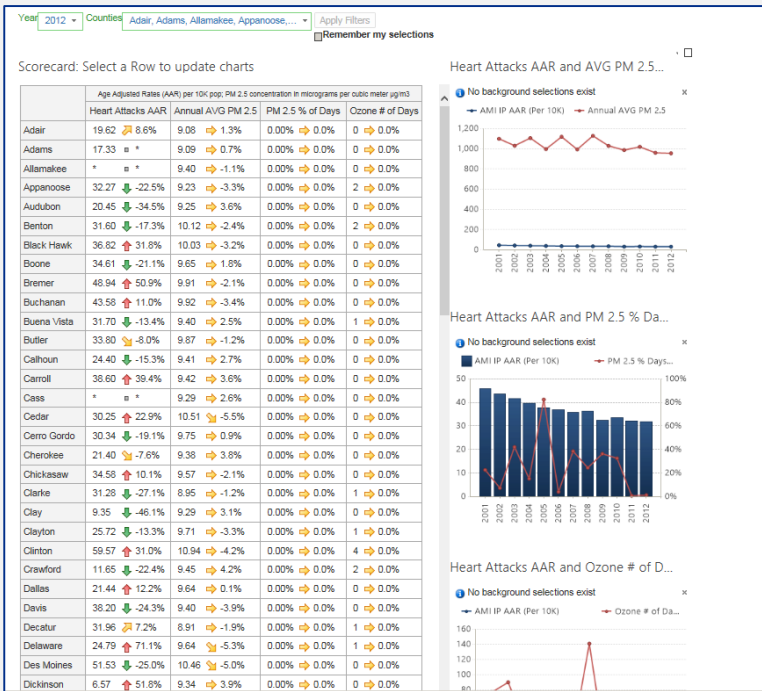


Targeting Sources of Air Pollution in NYC

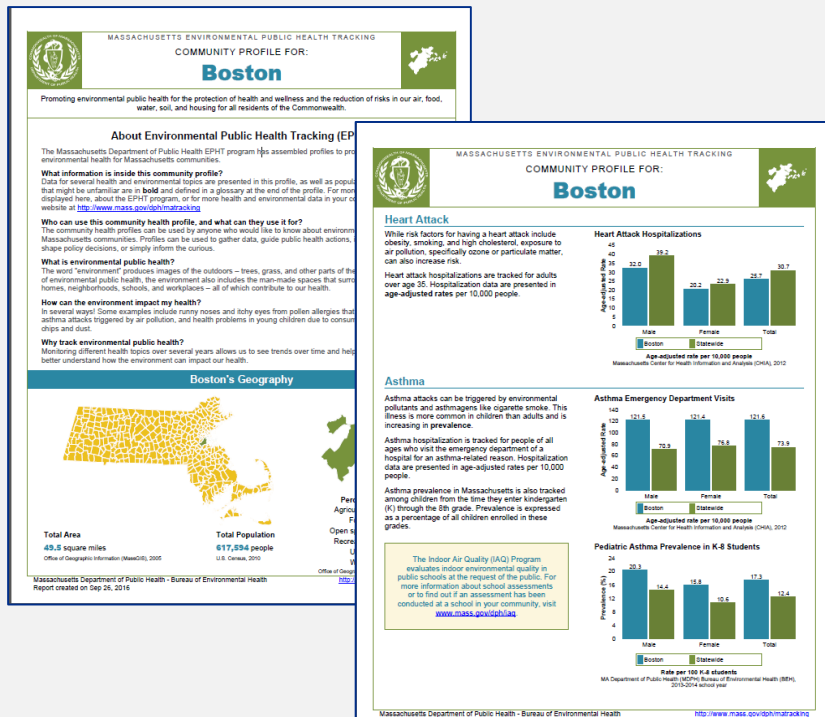


Translating Health and Environmental Information

Iowa Air Quality and Heart Health Dashboard



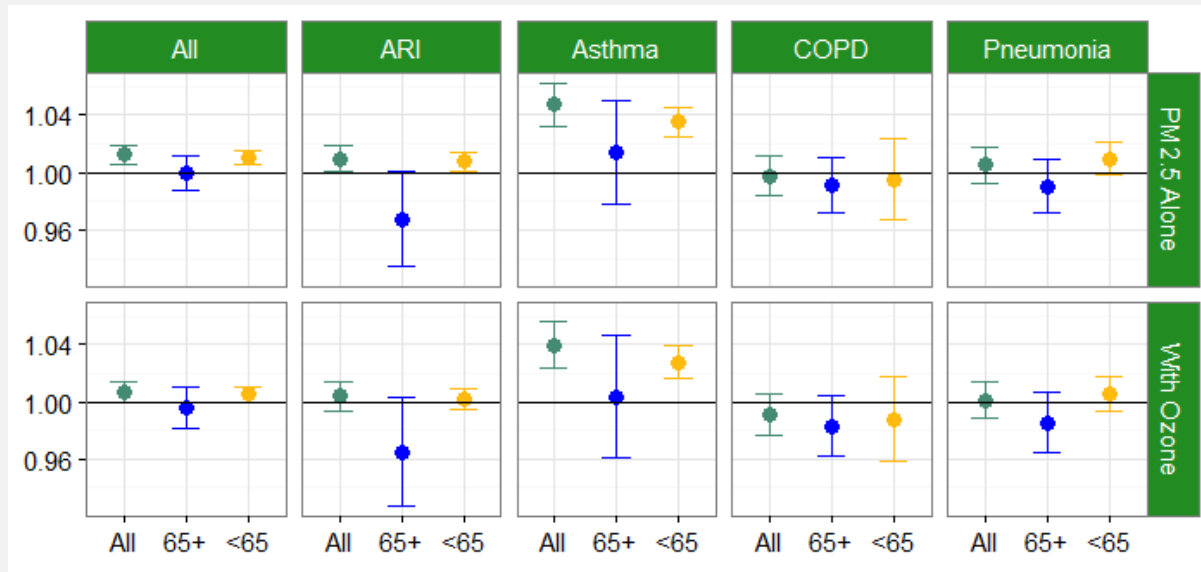
Massachusetts Community Profile



Investigating the Relationship between Health and Air Pollution

Associations between ambient air pollution concentrations and respiratory emergency department visits among all age groups in the U.S.

Rate Ratios & 95% CIs:
unconstrained, distributed
lag model (lags 0 – 6) for a
10 $\mu\text{g}/\text{m}^3$ increase in 24
hour $\text{PM}_{2.5}$

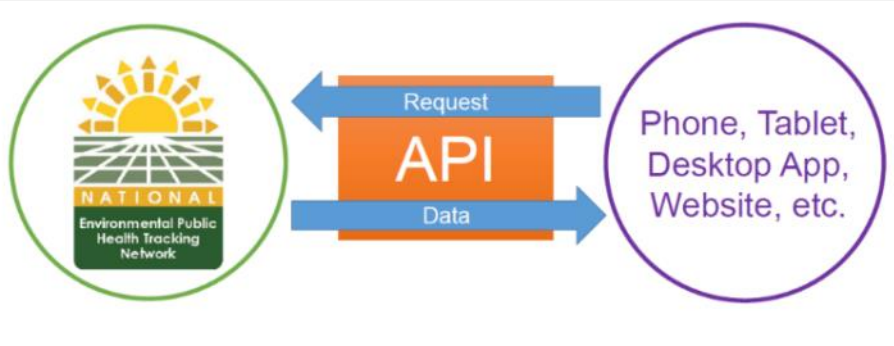


Addressing the Changing Health Care and Technology Landscape

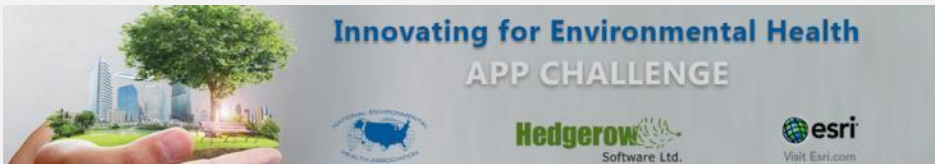
- ❑ **“for surveillance systems to be useful, they must adapt to the changing environment in which they operate and accommodate emerging public health requirements...”**

I've Got an App for That!

Tracking Application Program Interface (API) Released



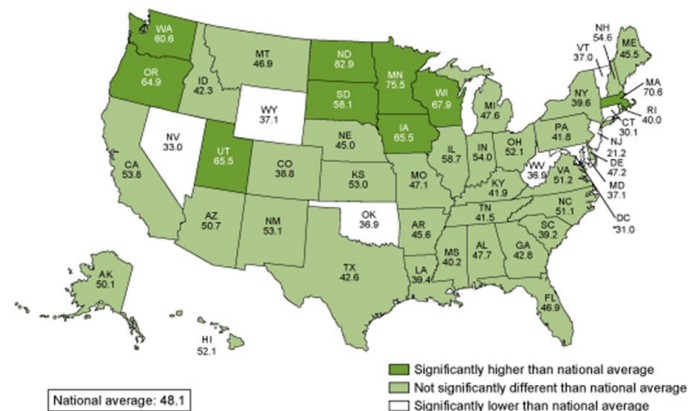
- ❑ Provides machine-friendly data for a person to program a machine to read and create people-friendly data tools such as apps for your phone
- ❑ Part of NEHA's Innovating for Environmental Health APP Challenge
- ❑ Planning our own APP Challenge



Electronic Health Records (EHRs)

- ❑ How can we be best positioned to take advantage of these for improving community health?
- ❑ Opportunities for Tracking/Surveillance:
 - Improved timeliness
 - Improved population coverage
 - Improved geographic resolution
 - Fill data gaps – e.g. other risk factors

Percentage of office-based physicians with a basic EHR system, by state: United States, 2013



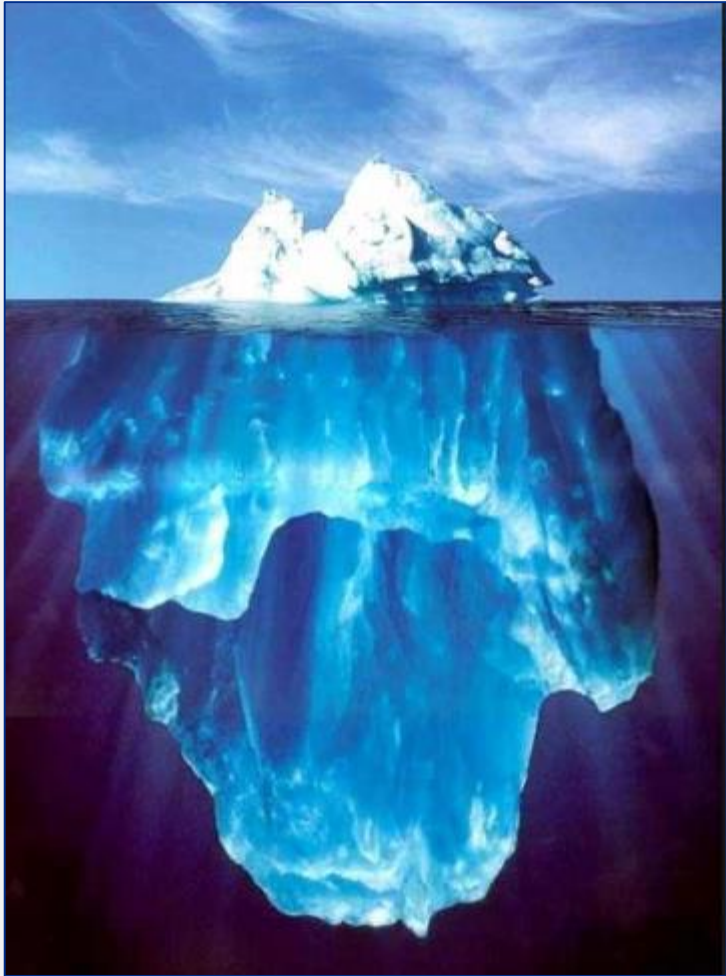
SOURCE: CDC/NCHS, National Ambulatory Medical Care Survey, Electronic Health Records Survey.
<http://www.cdc.gov/nchs/data/databriefs/db143.htm#x2013;2013/a>>

EHR Pilot Projects

| State | Project |
|---------------|---|
| California | Glycohemoglobin testing and diabetes surveillance among members of KPNC living in Contra Costa or Solano Counties |
| Massachusetts | ALS and pediatric asthma in MDPHnet (connects Atrius Health, Cambridge Health Alliance, and MA League of Community Health Centers) |
| Missouri | Focused on technical requirements for using data from ELRs and ESSENCE |
| New York City | Validation of prevalence of smoking, obesity, hypertension, diabetes, and elevated cholesterol obtained as aggregate counts from 700 ambulatory practices |

Overall Results from Tracking EHR Pilots

- ❑ **Results are promising; but, vary across outcome and data sources**
 - Laboratory data may be sufficient for some outcomes
 - Rx data did not improve validity / reliability
- ❑ **Validation necessary. Validity may be impacted by...**
 - Case definition / indicator definition
 - Population coverage/representativeness
 - Tenure of insurance coverage
 - Data quality
 - Rarity of outcome
- ❑ **Administrative barriers**
 - Data privacy and governance
 - Interoperability / harmonization
 - Training and documentation



Conclusions

- ❑ **Tracking / Surveillance is foundational to community health and decision making**
- ❑ **Tremendous opportunities with EHRs and the Internet of Things (e.g. wearable technology and apps)**
- ❑ **More work to be done**

Discussion



For more information, contact NCEH/ATSDR

1-800-CDC-INFO (232-4636)

TTY: 1-888-232-6348

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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 and the Agency for Toxic Substances and Disease Registry.

