

# Applications of Remote Sensing Data for the National Environmental Public Health Tracking Program

## *CDC - NASA collaboration*

*June 16<sup>th</sup>, 2016*

Ambarish Vaidyanathan, PhD  
Environmental Health Scientist

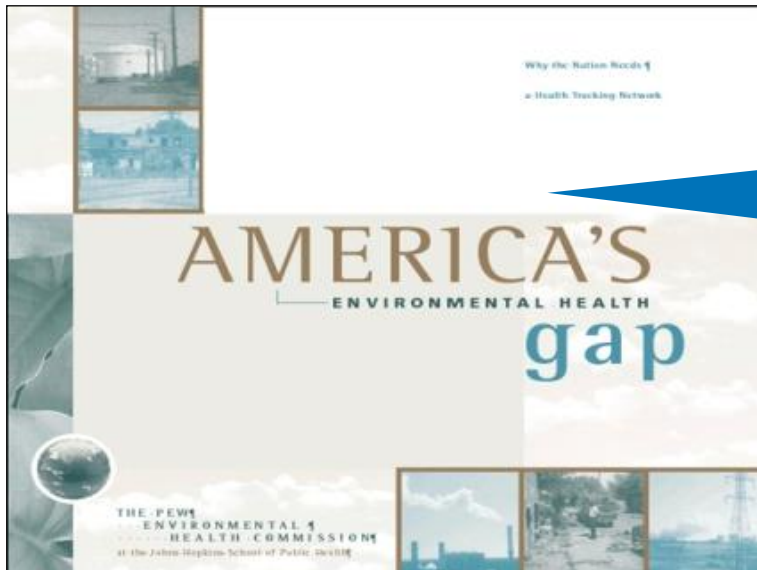
Environmental Health Tracking Branch  
National Center for Environmental Health  
Centers for Disease Control and Prevention

# Outline

- ❑ **National Environmental Public Health Tracking Program and Network**
- ❑ **CDC – NASA partnership**
- ❑ **New Initiatives**
- ❑ **CDC Tracking Network – Portal Demonstration**

# National Environmental Public Health Tracking Program

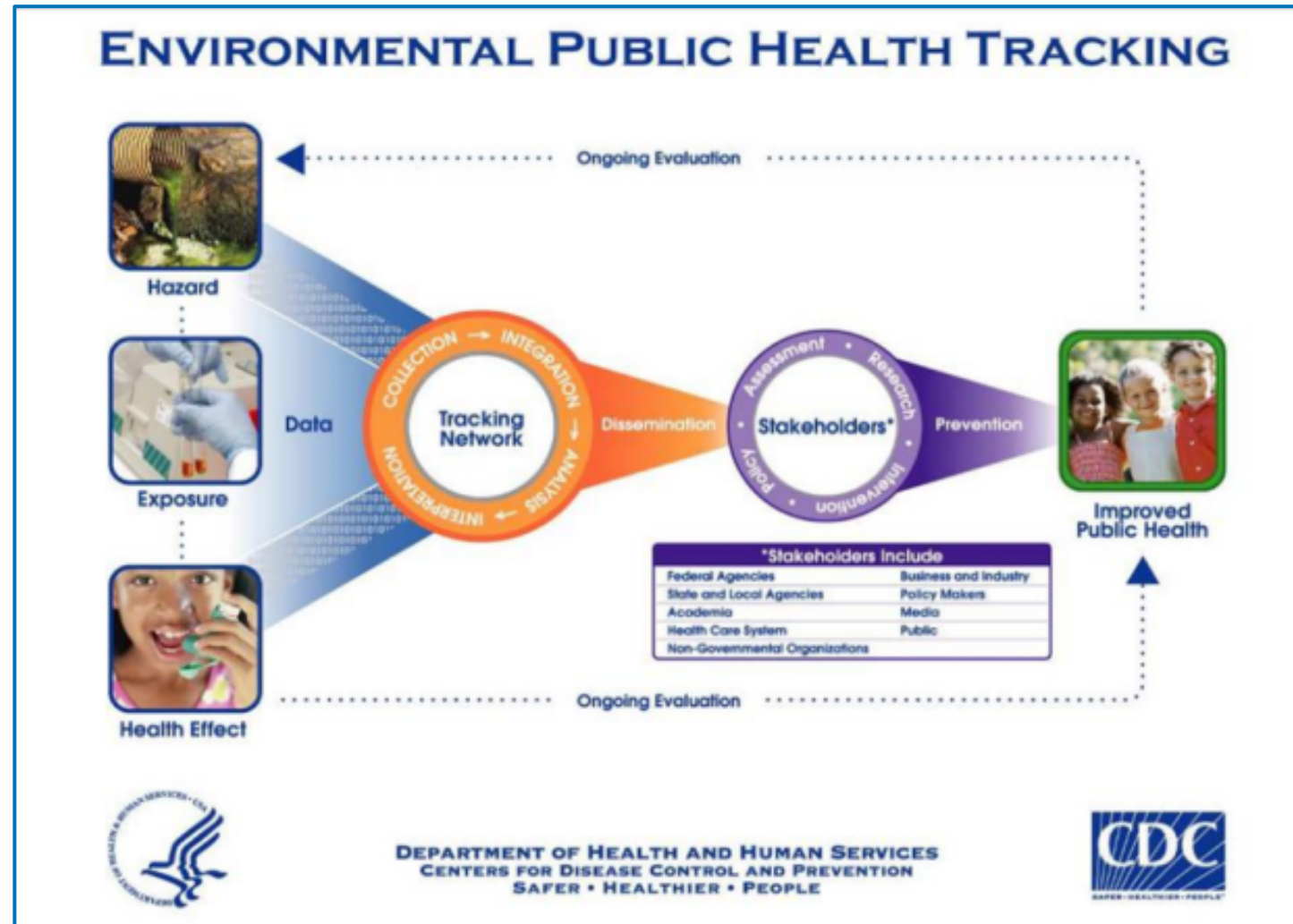
- ❑ Created in 2002 in response to Pew Commission report
- ❑ Recommended a “Nationwide Health Tracking Network for diseases and exposures”
- ❑ CDC currently funds 25 states and NYC



*“...create a federally supported Nationwide Health Tracking Network with the appropriate privacy protection, that informs consumers, communities, public health practitioners, researchers, and policymakers on chronic diseases and related environmental hazards and population exposures.”*

# National Environmental Public Health Tracking Program

**Vision: Healthy informed people**



**Tracking = Public Health Surveillance**

# Cornerstone of Program: The National Environmental Public Health Tracking Network

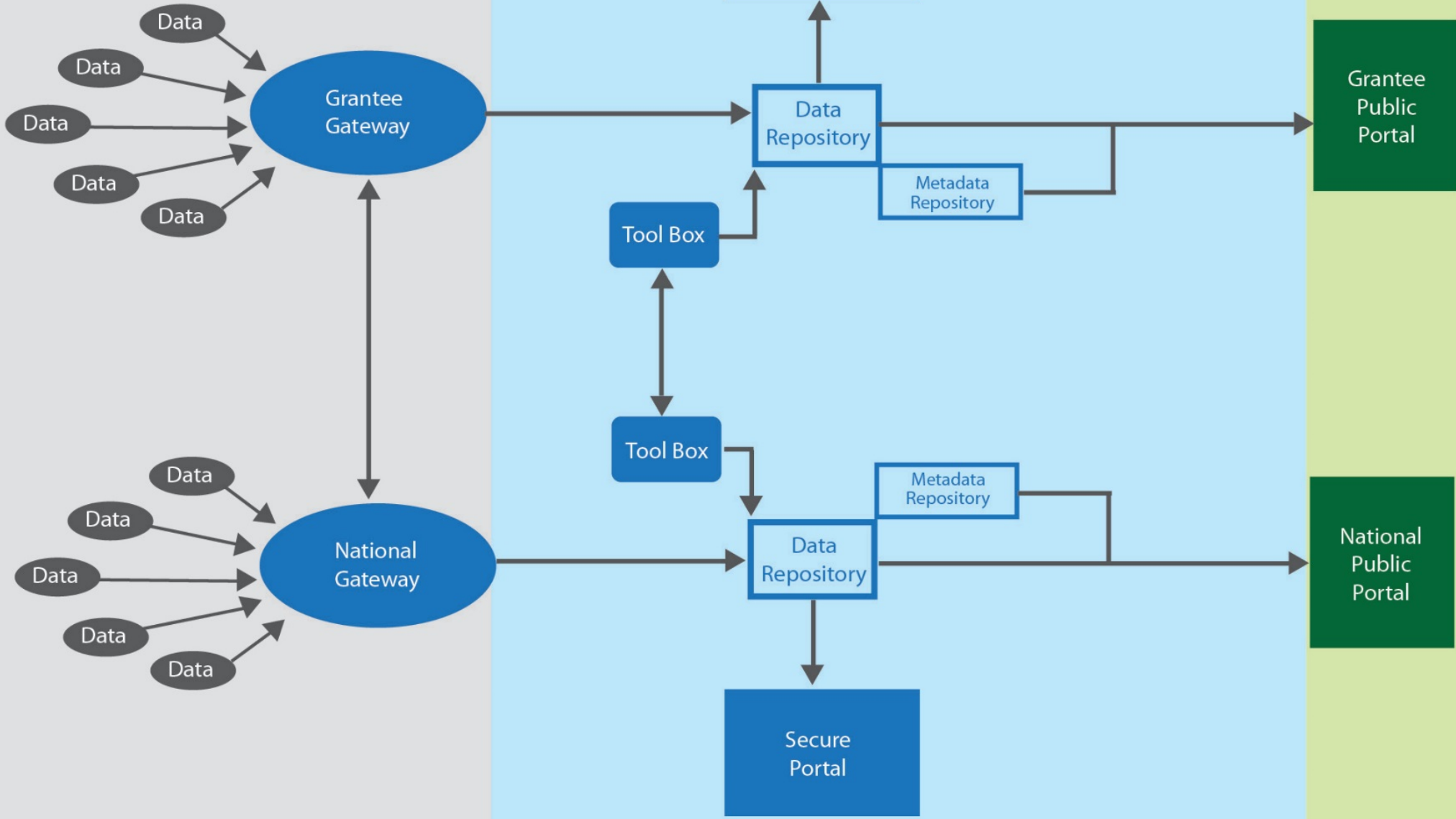
*A system of integrated health, exposure, and hazard information and data from a variety of sources, that is accessible through a public web portal for educational and policymaking purposes*

The screenshot shows the homepage of the National Environmental Public Health Tracking Network. It features a navigation bar with 'Glossary A-Z', 'CDC A-Z', and 'Tracking A-Z'. The main content area includes a 'YOU A DEVELOPER?' section with 'ACCESS TRACKING DATA USING OUR NEW API', a 'Health' section with a description of the network, and a 'Quick Links' sidebar. Below these are sections for 'Environments', 'Health Effects', and 'Population Health', each with a 'GO' button. A 'STATE & LOCAL TRACKING PROGRAMS' section is also visible at the bottom.

This block contains two screenshots from the CDC website. The top screenshot shows the 'Indicator: PM2.5 - Days Above Regulatory Standard (Monitor + Modeled)' page, which includes a 'Type of EPHI Indicator' dropdown set to 'Hazard', a 'Derivation of Measure' section, and a 'Geographic Scope' section. The bottom screenshot shows a query panel with five steps: 'Step 1: Select Your Mode' (Basic/Advanced), 'Step 2: Select Your Content' (All/Child), 'Step 3: Choose Geography & Time' (listing states and years), 'Step 4: Advanced Options', and 'Step 5: Submit'. Below the query panel is a map of the United States with a legend for 'Model PM2.5' showing 'Percent of days with PM2.5 levels over the NAAQS (U.S., 2014)'. The legend indicates three categories: 0-3, 4-14, and 15-100+.

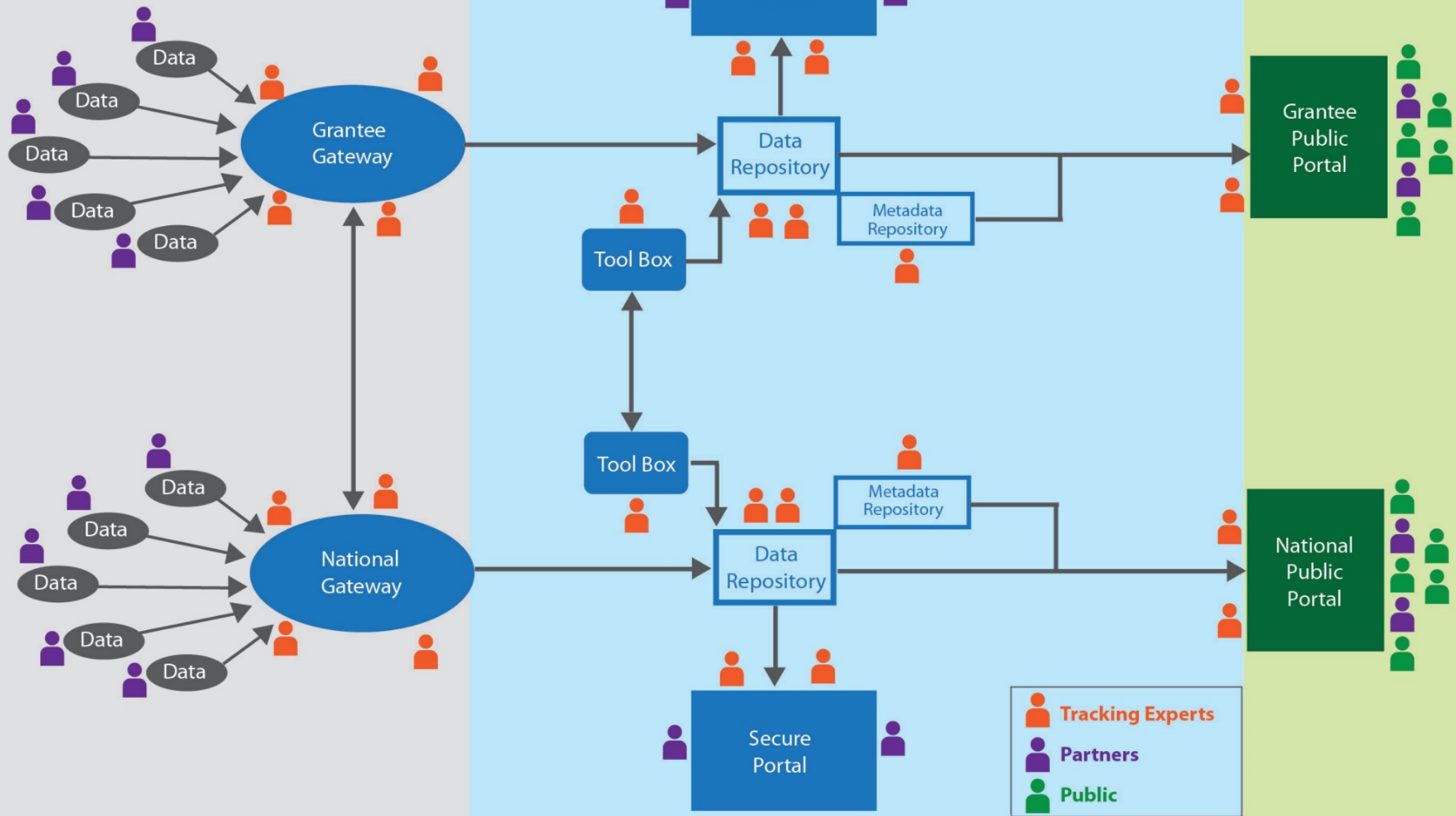
Visit the Tracking Network at: [ephtracking.cdc.gov](http://ephtracking.cdc.gov)

# National Environmental Public Health Tracking Network



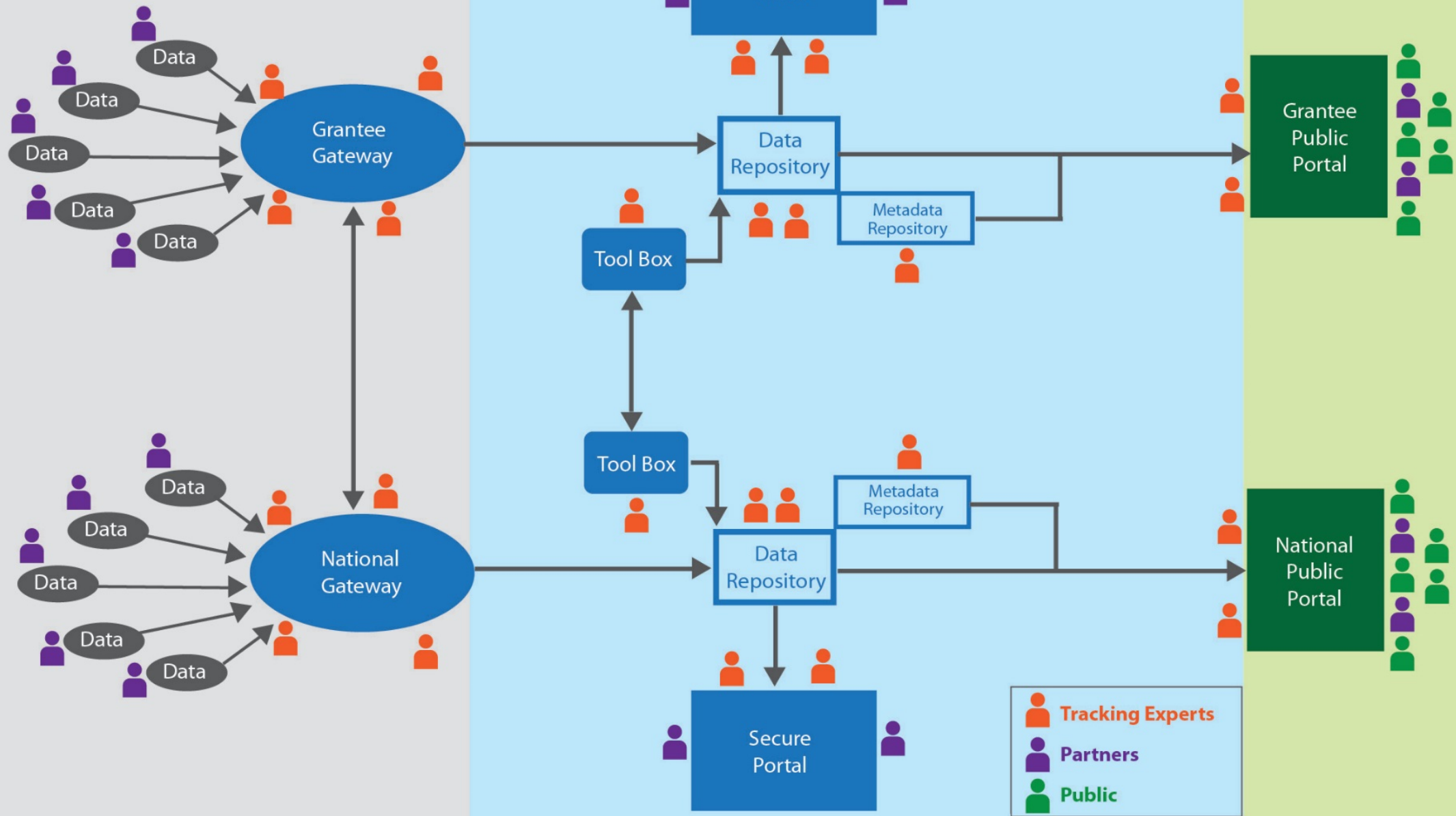


# National Environmental Public Health Tracking Network



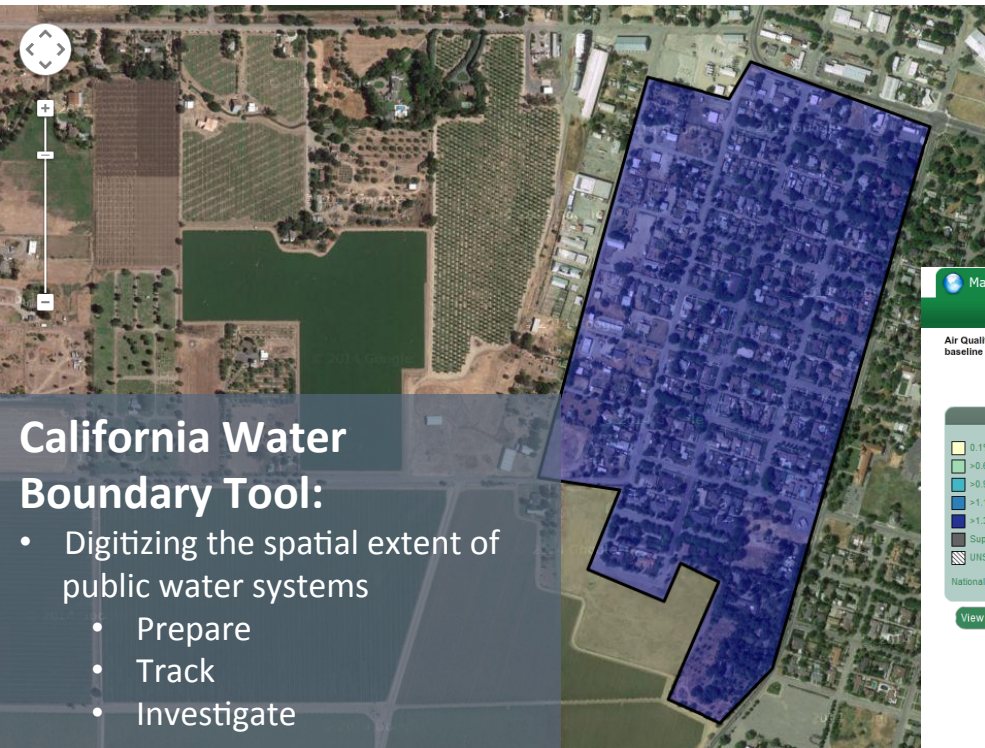
# National Environmental Public Health Tracking Network

# Infrastructure + Data + People





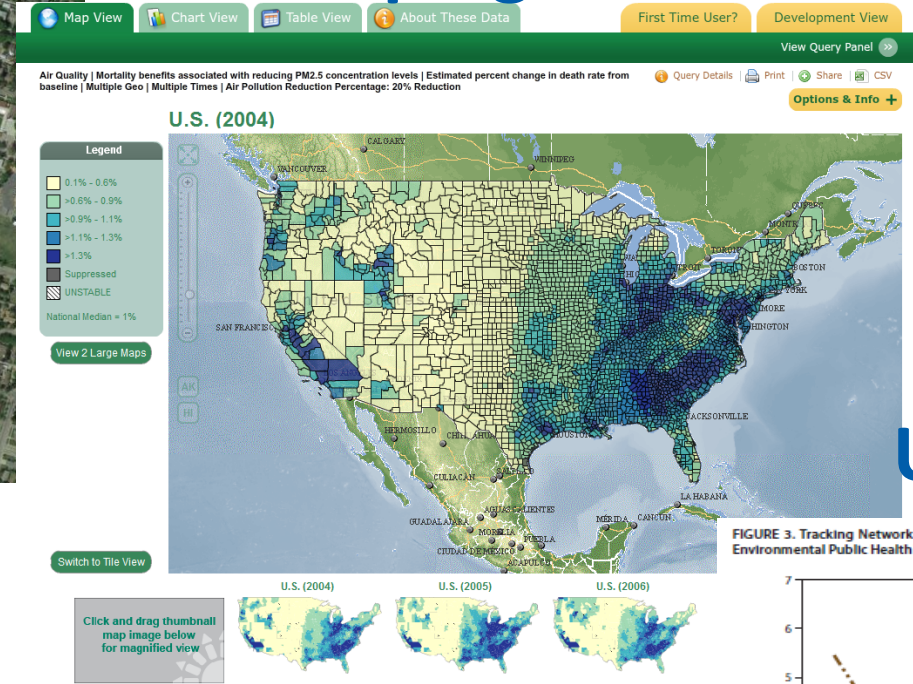
# Addressing Data Gaps



## California Water Boundary Tool:

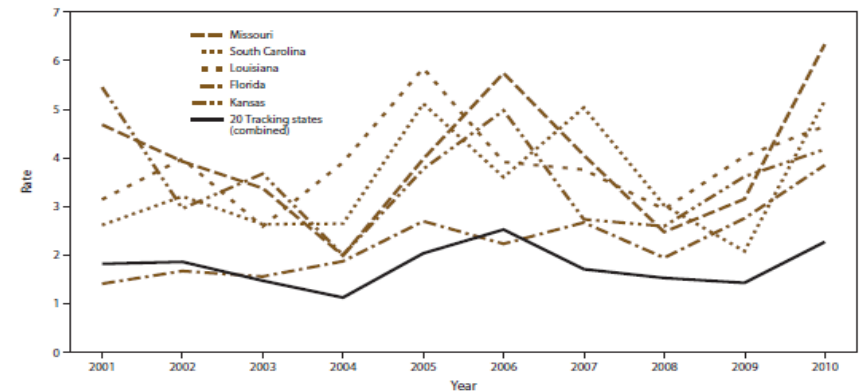
- Digitizing the spatial extent of public water systems
  - Prepare
  - Track
  - Investigate

# Developing Tools



# Understanding Trends

FIGURE 3. Tracking Network states with the highest age-adjusted rates of heat stress illness hospitalizations per 100,000 population — Environmental Public Health Tracking Program, 20 States, 2001–2010



**Driving Public Health Actions...**

# Current National Tracking Network Content

## Asthma

Biomonitoring

Birth Defects

Cancer

CO Poisoning

Childhood Lead

Climate Change

Community Design

Dev. Disabilities

Heart Disease



## 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*

State & Local  
Grantees

25/1

State & Local  
Practitioners

200+

Tracking Fellowships

34

Partnerships

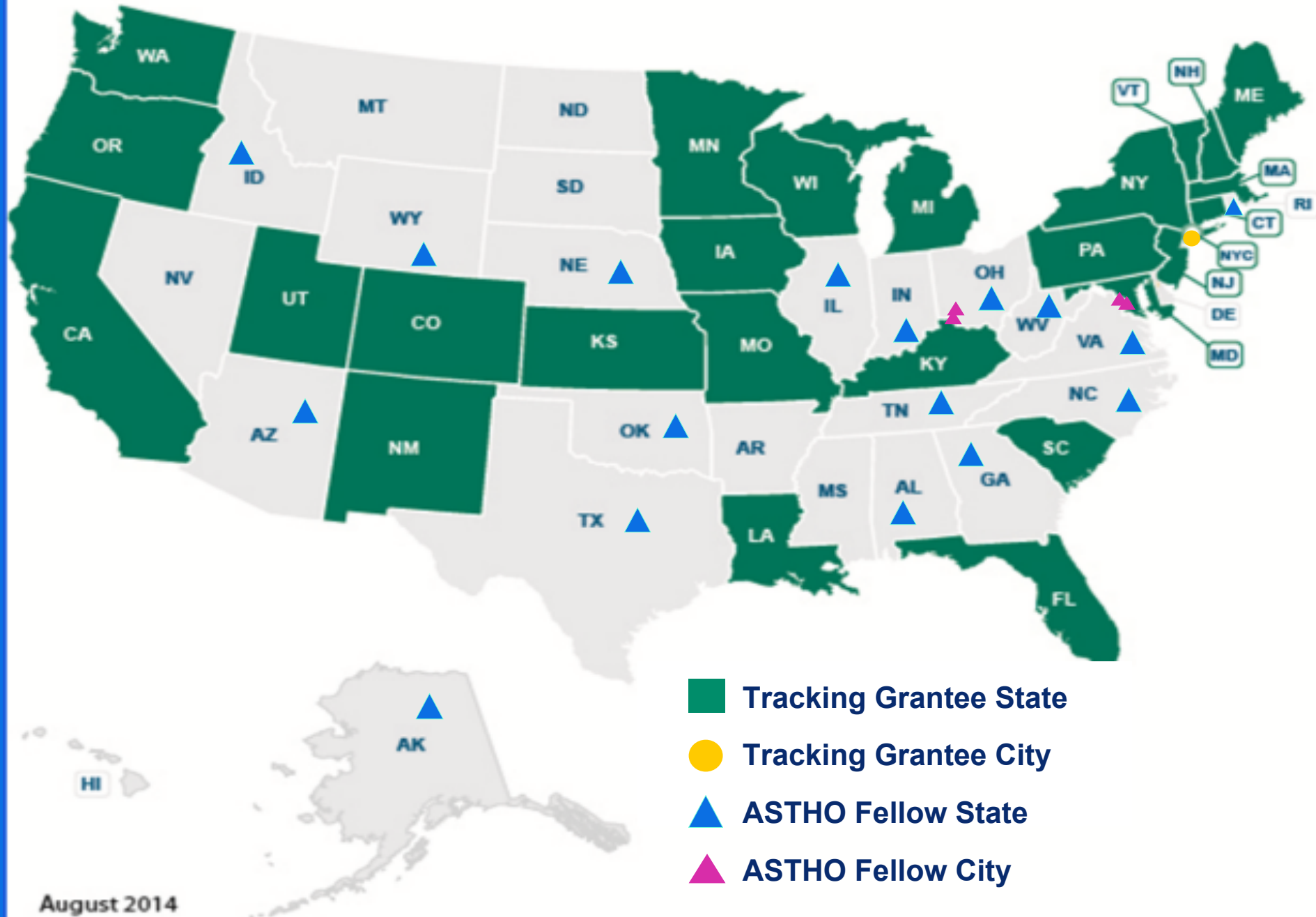


CDC, federal agencies, national  
organizations

Public Health Actions

350+

# CDC's National Environmental Public Health Tracking Program



August 2014

# CDC– NASA PARTNERSHIP

# More Than A Decade of Collaboration with NASA and NASA-funded Researchers

□ **First Memorandum of Understanding signed in 2004**

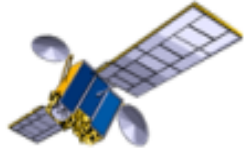
□ **Scope:**

- Conduct meetings and share knowledge to evaluate the use of NASA Earth system science, technology & data to characterizing high priority environmental hazards & other risk factors to be measured and tracked by CDC/ATSDR
- Verify, validate, and benchmark the potential solutions identified
- Identify public health and Earth system science education, training and communications needs
- Develop and disseminate messages on collaborative activities
- Establish an interagency working group to accelerate the development, evaluation, and utilization of Earth system science, technology, and data for environmental public health



# Serving the Needs of Public Health

## Earth science resources



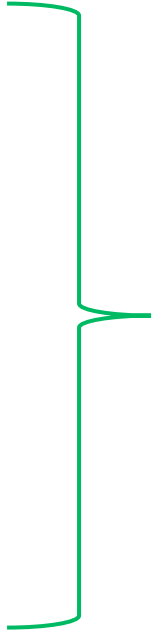
satellites



suborbital platforms



models



## Public Health Needs

- Measures or reliable estimates of population exposures
  - Past, present, and future
  - Timely
  - Flexible spatial scale
  - Translatable
  - Sustainable
- Uncertainty estimates

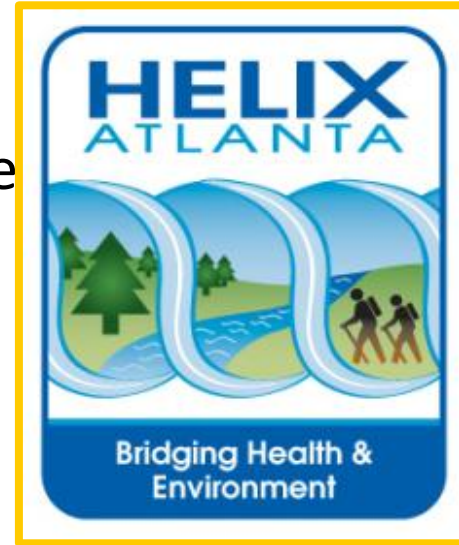
***Goal - to understand and reduce health impacts***



# Examples of Collaborations

## □ Health and Environment Linked for Information Exchange (HELIX)

- Initiated in 2005
- Used Aerosol Optical Depth (AOD) to predict  $PM_{2.5}$  concentrations in the Metropolitan Atlanta area
- Linked to health outcomes such as asthma



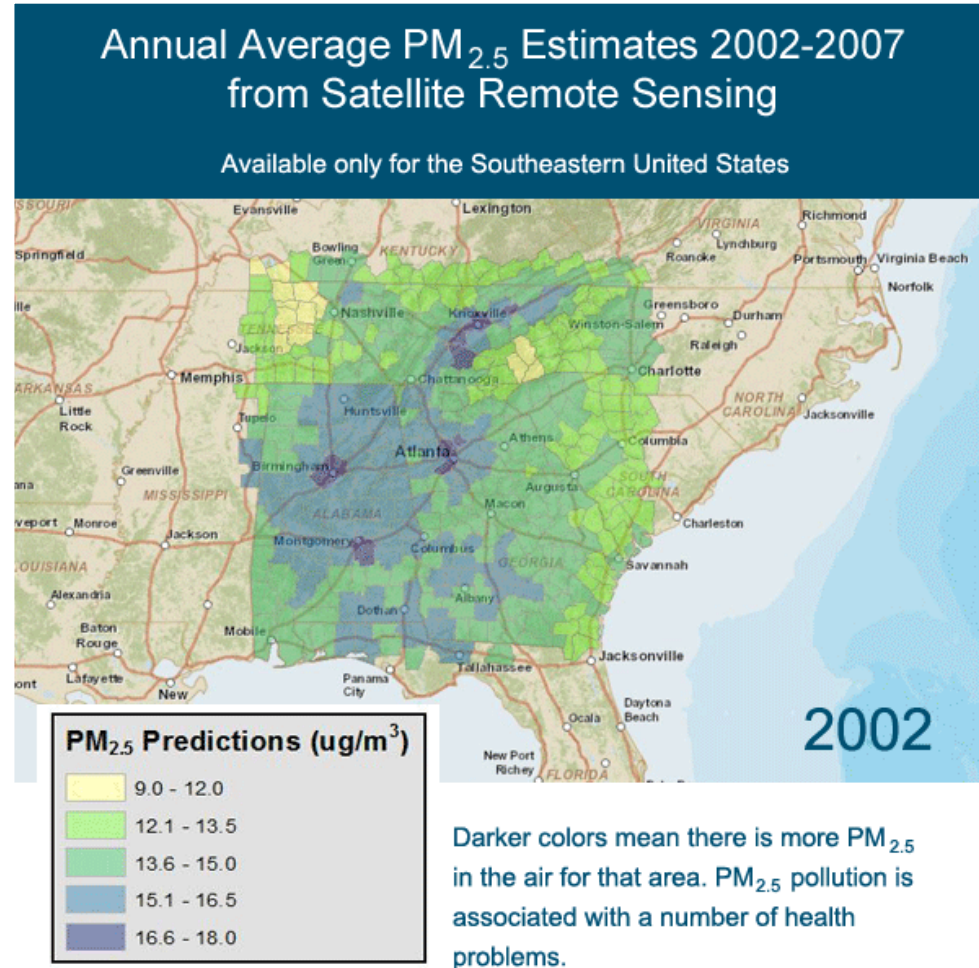
## □ Heat and Health

- Heat event identification tool
- Collaborated with NASA, USRA, and UAH on developing county-level daily heat metrics

# Examples of Collaborations (Cont'd)

## Collaborated with NASA and Emory University on enhancing spatial coverage of PM<sub>2.5</sub> in the Southeast

- AOD-based PM<sub>2.5</sub> estimates available on the Tracking Network
- County-level information on the annual average level of PM<sub>2.5</sub> for Alabama, Georgia, and parts of South Carolina, Tennessee, North Carolina, Florida, and Virginia



## Examples of Collaborations (Cont'd)

- ❑ **Evaluate and Enhance Suomi NPP Products for Air Quality and Public Health Applications (specifically UV and skin cancer)**
  - Lead PI: Jun Wang (University of Nebraska – Lincoln)
  
- ❑ **NASA ROSES Collaboration Project: Assessing and predicting wildfire smoke related health effects using satellites, in-situ measurements**
  - Lead PI: Jeff Pierce (Colorado State University)
  
- ❑ **NASA ROSES Collaboration Project: Quantify Social Vulnerabilities to Heat Stress and Strengthen Environmental Public Health Tracking and Heat Mitigation Efforts**
  - Lead PI: Tabassum Insaf (New York State Department of Health)

# Looking Forward – Opportunities for Collaboration

- ❑ **Characterize exposure, vulnerabilities, and health impacts to take action**
  - Prescribed burnings: forest; agricultural
  - Traffic-related pollutants
  - Natural and manmade disasters
  - Climate-related events
  
- ❑ **Joint collaborations to assess the effectiveness of policy and other interventions on reducing health impacts:**
  - Quantify changes in AQ concentrations/sources, in places with no monitors
  
- ❑ **Using the Tracking Network as a Decision Support System and as a platform to host earth science data products**

# **NEW INITIATIVES ON THE TRACKING NETWORK**

# New Initiatives: Addressing Needs

## Changing US health care landscape

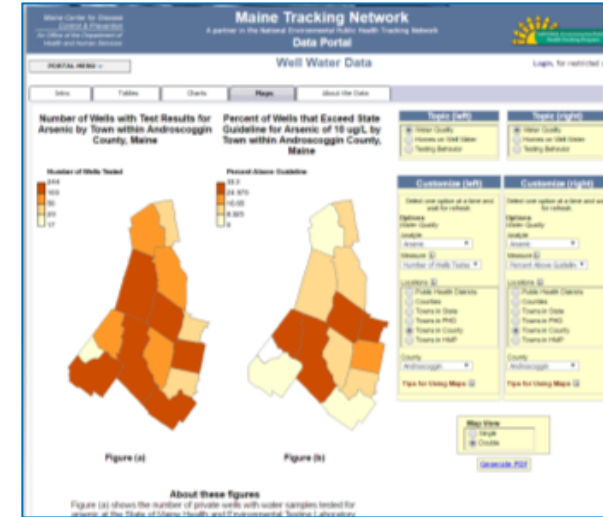
- Electronic Health Records and Meaningful Use
- Community Needs Assessments

## Higher geographic resolution on Tracking Network

- Address local issues and research needs

## Community Profiles

## Health Impact Assessment toolkits





# New Initiatives: Data and Tools On the Horizon

## ☐ Extreme Weather / disasters

- Exploring daily data feeds during an event
- Identifying vulnerable populations (social vulnerability)
- Exploring community-specific heat-health risk relationship
- Developing a real-time online tool for identifying populations at risk to wildfire smoke hazards
- Drought

## ☐ Daily PM<sub>2.5</sub> source impacts over the continental US

## ☐ County level UV radiation (from remote sensing)

## ☐ Exploring cost data



# **CDC TRACKING NETWORK – PORTAL DEMO**

# Questions?

## Thank You

Ambarish Vaidyanathan, PhD  
rishv@cdc.gov

Arie Manangan, MA  
amanangan1@cdc.gov



For more information, contact NCEH/ATSDR  
1-800-CDC-INFO (232-4636)

TTY: 1-888-232-6348      [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)      [www.cdc.gov](http://www.cdc.gov)

Follow us on Twitter @CDCEnvironment

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.

