

▶ **DIRECT FROM CDC** ENVIRONMENTAL PUBLIC HEALTH TRACKING NETWORK

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At Your Fingertips...

Editor's Note: As part of our continuing effort to highlight innovative approaches and tools to improve the health and environment of communities, the *Journal* is pleased to publish a bimonthly column from the Centers for Disease Control and Prevention's (CDC's) Environmental Public Health Tracking Network (Tracking Network). The Tracking Network is a system of integrated health, exposure, and hazard information and data from a variety of national, state, and city sources. The Tracking Network brings together data concerning health and environmental problems with the goal of providing information to help improve where we live, work, and play.

Environmental causes of chronic diseases are hard to identify. Measuring amounts of hazardous substances in our environment in a standard way, tracing the spread of these over time and area, seeing how they show up in human tissues, and understanding how they may cause illness is critical. The Tracking Network is a tool that can help connect these efforts. Through these columns, readers will learn about the program and the resources, tools, and information available from CDC's Tracking Network.

The conclusions of this article are those of the author(s) and do not necessarily represent the views of CDC.

As a public health informatics fellow in CDC's Environmental Health Tracking Branch within the National Center for Environmental Health, Carrie Eggers works on developing new content and enhanced functionality for the Tracking Network in collaboration with state and federal partners. Prior to joining CDC, Ms. Eggers was part of the Bureau of Epidemiology's Surveillance Systems Unit at the Florida Department of Health.

A group of blind men surrounds an elephant, and in an attempt to discern what the object is, each man reaches out and begins touching it. As each man feels a different part, he shares his observation. One man feels a leg and proclaims the pillar-like object to be a stout

tree. Another one feels the trunk and declares the curved subject a snake. Still another touches an ear and pronounces the thing a fan. Although their observations are singularly plausible, it is only when all viewpoints are combined that the whole object becomes known as an elephant.

Although the tale may vary in its retelling, the message is clear. When separate information is shared and brought together, we are able to see a more complete picture.

Bringing varied and disparate information together to effect knowledge is a cornerstone of informatics. Public health informatics is the systematic application of knowledge about systems that capture, manage, analyze, and use information to improve population health. We use informatics to move from our current understanding to a more knowledgeable comprehension through acquiring and using information.

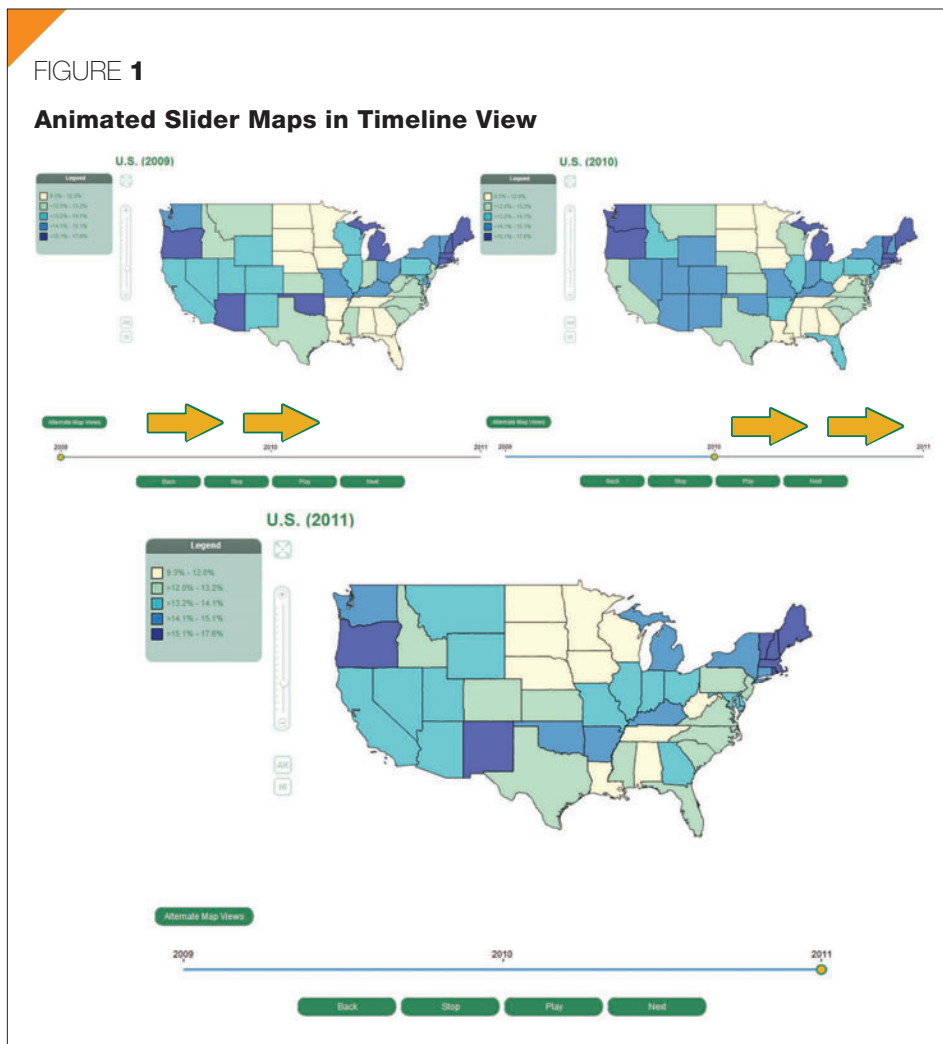
Where problems occur is at the gap between the present and future states, because we don't have the information we need or we can't use the information we do have. Information that can't be consumed, employed, and applied is ineffective.

The Environmental Public Health Tracking Program (Tracking Program) tries to make useful information available through a practical and engaging system. The Environmental Public Health Tracking Network (Tracking Network) is a web-based surveillance system for public health use that is constantly evolving. Environmental and health data are added several times per year, and the analysis and visualization tools are continually enhanced to improve utilization of the data and information available on the Tracking Network.

Since its launch in 2009, the Tracking Network has consistently added and enhanced functionalities. The most recent visualization additions include multiple chart types, animated slider maps, auto-conforming thumbnail maps, and demographic pop-ups on maps. These functional changes are designed

FIGURE 1

Animated Slider Maps in Timeline View



with the end users in mind. They make data searching more intuitive and inviting and put useable information at your fingertips.

On the Tracking Network, you can search environmental and health outcome data, stratify and group the data based on geographic and demographic variables, and then automatically display the results in various maps, charts, or tables. Map displays are the most widely used functionality because of the location-focused nature of population health. Viewing data over time is particularly helpful when examining health conditions and considering trends. Animated slider maps in the timeline view make trends easy to see by dynamically displaying multiple maps (Figure 1).

You can search data in the Tracking Network by running a query based on a selected content area, geography and time elements, and optional age or gender breakdowns. The

results of your query are automatically displayed on a large map, with alternate map views available, such as the timeline view.

The timeline view allows you to more easily see trends in data over time. In this view, you watch the dynamic map automatically change from year to year or manually drag the slider to go back and forth between years (Figure 1). For example, you select the asthma content area and would like to see the asthma prevalence among adults as a percentage of adults ever diagnosed with asthma throughout the entire nation for the years 2009–2011. The query displays the results as maps for each year with the option of choosing alternate map views such as the timeline view. After selecting this option, you can use controls below the main map to either manually or automatically alternate the display between 2009, 2010, and 2011 (Figure 1). While viewing the map in motion, you can

zoom in or drag the map to highlight specific areas of interest. The timeline function gives you the power to view data over the years and actually see trends progressing or regressing, all at your fingertips.

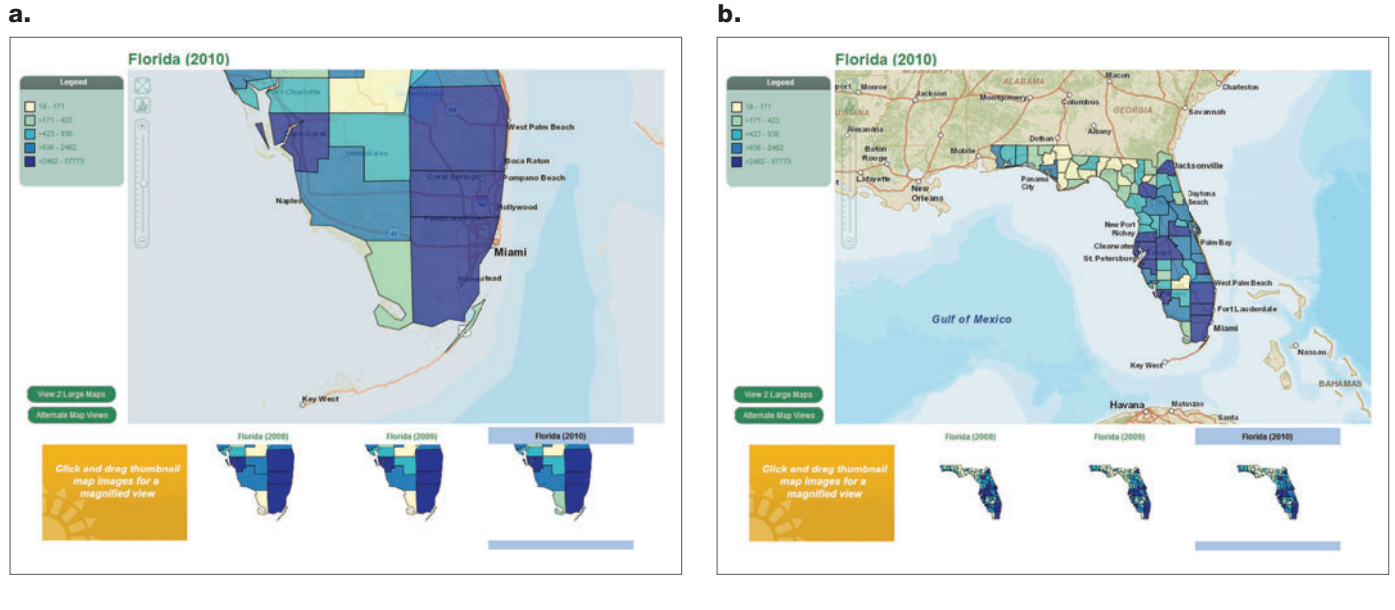
Query results on maps can also be displayed in a tile view that shows the selected years of data in thumbnail maps, allowing you to see multiple years in one view. You can zoom into any area where you need to see more detail. With one click, you can rebuild all of the thumbnail maps to zoom in on the same area of interest as the main display map, which is a unique feature of this display (Figures 2a and 2b). The maps can also be linked so that all maps adjust when zooming in or out, allowing you to more easily compare data side by side. As shown in Figures 2a and 2b, you can visualize how the number of children tested for blood lead levels in Florida's Miami-Dade and Palm Beach counties has changed from 2008 to 2010. Once the query is run and the maps are created, you zoom in on southern Florida and are able to see all three years' maps in the same view at the same geographical level.

Another innovative feature recently added is U.S. Census demographic information in a map pop-up display (Figure 3). By double clicking on the state or county of interest, a window appears with a table and charts showing total population and population stratified by age group, race, ethnicity, and gender for that area. This quick view provides contextual information in an easy-to-read format, all at your fingertips.

These innovative visualization options also can be practically applied when using the Tracking Network's unique outdoor air health impact assessment estimates. In the outdoor air section of the network, you can find a mortality benefits assessment tool that estimates the number of deaths that could be prevented by lowering fine particulate matter (PM_{2.5}) levels. For instance, you can compare how many lives could potentially be saved from coronary artery disease if a 5%–25% reduction in PM_{2.5} levels occurred. This interactive tool uses informatics technology to link air quality data and health data together to help identify areas where interventions to reduce air pollution could result in vital health improvements. Then you can use all of the interactive tools like slider maps, tile views, and more to visualize the impact of these estimates.

FIGURE 2

County Level Thumbnail Maps



Making data available and useful is the driving principle of the Tracking Network. Listening to user comments has been an invaluable source of ideas for the previous enhancements and two new functionalities coming soon: multiple measure displays and improved info-by-location views.

Public health and environmental information and data should be simple to find and easy to use, all in one place. In the case of the blind men and the elephant, merging individual information in a meaningful way created awareness. In the case of environmental factors and effects on the public's health, combining data to inform and making it easily accessible at your fingertips provides the opportunity to generate enlightenment and helps us save lives and protect people. 🐘

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FIGURE 3

County Demographics Pop-Up Display

