“Connection the Dots”
Using ArcGIS for Public Health Research & Intervention

Presenter: Jared Shoultz, M.A.
Esri Health and Human Services Technology Specialist
Collaborative Objectives

Overall

- Health Outcomes
- Health Disparities

Methods

- Locate/Access data
- Leverage/Analyze data
- Engage Stakeholders
Big Picture

• Place matters
• Data linkage
• Pattern detection
• Informed action
• Communication

“Modern GIS technology can assist in cancer control efforts—from basic to advanced statistical analysis, determinations of environmental insults on health, and opportunities to develop strategic interventions.” (Estella M Geraghty, Chief Medical Officer and Health Solutions Director, Esri)

National Cancer Institute GIS

Location Platform for Health and Human Services

Knowledge Workers

Executive Access

Public Engagement

Work Anywhere

Enterprise Integration

Professional GIS

Web GIS

Making mapping and location aware apps available across your organization for smarter data-driven decision making
An Integrated WebGIS
Location Information Challenges

A brief illustration of how a Location Platform helps Health and Human Services agencies overcome challenges and realize objectives.

Healthy Communities Location Platform Proof Points

Agencies without a location platform tend to face the following organizational challenges when trying reach their objectives:

- ACCESS
- DISCOVERY
- SHARING & COLLABORATION
- ANALYSIS
- SYSTEMS

ACCESS

The Current State: Staff need data and information to support their work, but are unable to gain access to the location of the data or are unable to access it where they need it.

The Desired State: Reduce barriers to decision information

How Esri Enables Access

- Secure System
- Integrate with your agency network security

Location Information Challenges

Access, Discovered, Sharing, Collaboration, Analysis, Systems

Esri Model Healthcar
Access Challenge

Mobile Access

Field Data Collection
Discovery Challenge

Esri Model Health Organization

Health and Human Services county and state agencies are tasked with promoting, developing and maintaining healthy communities. This requires a high-level of coordination and collaboration between a diverse group of stakeholders and organizational access to the data and analytical resources needed to ensure every decision is driven by the most available information. The stakeholders require to properly address complex health issues from both internal and external so it is key that all internal departments have the ability to easily discover and share data, analysis and results with selected audiences. This Model Health Organization serves as an example of how the Esri ArcGIS Platform can be extended to these organizations by using Esri’s esri360 technology as a cloud-based collaborative content management system and public information portal. Many layers, maps and applications are based on modified South Carolina data and should only be used for demonstration purposes.
Sharing & Collaboration Challenge

Group-based Sharing

Open Data

Simple Applications (Resource Locators)
Spatial Analysis ▶ Providing Insight & Understanding

Desktop
- Statistical Clustering
- Raster Functions
- Models
- Bayesian Regression (EBK)
- Anomaly Detection
- Scientific Data Support
- Integrate Analysis Tools

Portals
- Location Allocation
- Charting
- Mode-Specific Routing
- Aggregation
- Hot Spots
- Interpolation

Integration
- Living Atlas

Advancing the Science of Geography
Systems Challenge

Dashboard Integration

Spatial Tools

Status Filters

Additional Detail

System Health Clinics

- All Features
- Unacceptable Wait Times

Number of Patients: 1,335

Average Wait Time: 10 minutes

Clinics Sorted by Wait Times:
- Hope County Health Department: 32 minutes
- Kent County Health Department: 30 minutes
- Iowa County Health Department: 25 minutes
- Marion Health Center: 17 minutes

Scheduled Appointments:
- Number of appointments by service type:

Highlighted
- Pan to
- Select
- Zoom to
- Directions to here
Learn ArcGIS: Bridging the Breast Cancer Divide

Overview
In this collection of lessons, you'll gain understanding about how mortality rates for breast cancer are higher for black women than for white women in the United States. First, you'll explore maps to see what the mortality rates are for black and white women. Then, you'll map the differences in mortality rates to see where the rates differ. You'll map the ratio of mortality rates to see how much they differ. You'll map significant clusters of higher and lower mortality rate ratios so you can focus on the most problematic areas. Finally, you'll map selected breast cancer risk factors to look for explanations for the clusters.

To investigate this issue, you'll take a spatial problem solving approach. You'll start by exploring the issue and framing important questions. Then you'll model the approach you'll take and process the data analytically to draw out the answers. You'll interpret the results to determine if they make sense. Finally, you'll share your findings with others.

Build skills in these areas:
- Exploring maps and performing visual analysis
- Adding fields, selecting features, and calculating values
- Symbolizing the values
- Performing hot spot analysis
- Interpreting findings

What you need:
- ArcMap
- Estimated time: 2 hours

Data Sources

From Bridging the Breast Cancer Divide Exercise


- County Health Rankings Data (Robert Wood Johnson): http://www.countyhealthrankings.org/rankings/data

Other Sources (National Provider ID (CMS), National Vital Statistics System & Wonder & BRFSS (CDC), State Medical Licensing Boards, Census Bureau, many more.....)
Analysis


Spatial Statistics Resources

Critical Space Time Pattern Mining Patch

Unfortunately the initial release of the new Space Time Pattern Mining toolbox contains a substantial logic flaw in the Create Space Time Cube tool which makes the results from the Emerging Hot Spot Analysis tool unreliable. Regrettably you must rerun all of your previous analyses using the provided fix.

- ArcGIS 10.3 for (Desktop, Engine, Server) Spatial Statistics and Space Time Pattern Mining 2 Patch
- ArcGIS Pro 1.0 Spatial Statistics and Space Time Pattern Mining Patch

Presentations from the UC

- Spatial Statistics: Simple Ways to Do More with Your Data (2015 Video, PDF)
- Spatial Data Mining: A Deep Dive into Cluster Analysis (2014 Video, PDF)
- Beyond Where: Modeling Spatial Relationships Using Regression Analysts (2014 Video, PDF)

Brand new to spatial statistics?

Start here →
1. Spatial Statistics: Simple Ways to Do More with Your Data (Video, PDF, 2015 UC slides)
2. Spatial Data Mining: A Deep Dive into Cluster Analysis (Video, PDF, 2015 UC slides)
3. Hot Spot Analysis for ArcGIS 10.1 (Tutorial)
4. Beyond Where: Modeling Spatial Relationships Using Regression Analysts (Video, PDF)

Connecting the Dots
Any Questions