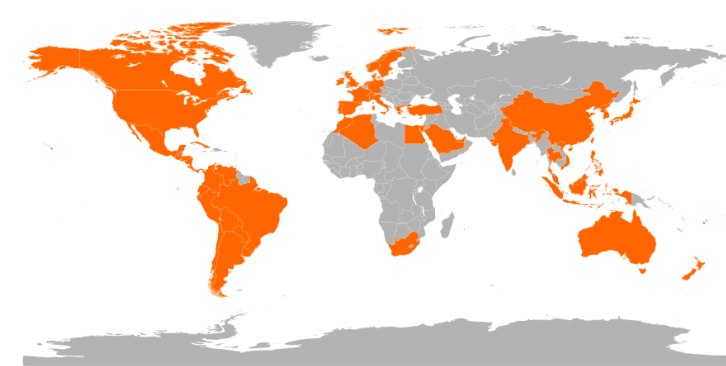


# Open-source GIS Spatial Analysis: Flu Surveillance and Response in Philadelphia

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## Spatial Implications in Pan Flu Strategy

- Decision Support System - critical in large outbreaks
- Provide accurate geographic representation of infection
- Critical for community-level intervention strategies
  - Distribution of vaccines & antivirals
  - Specific geographic locations of points of infection
  - Point of contacts of agency in charge of outbreak control

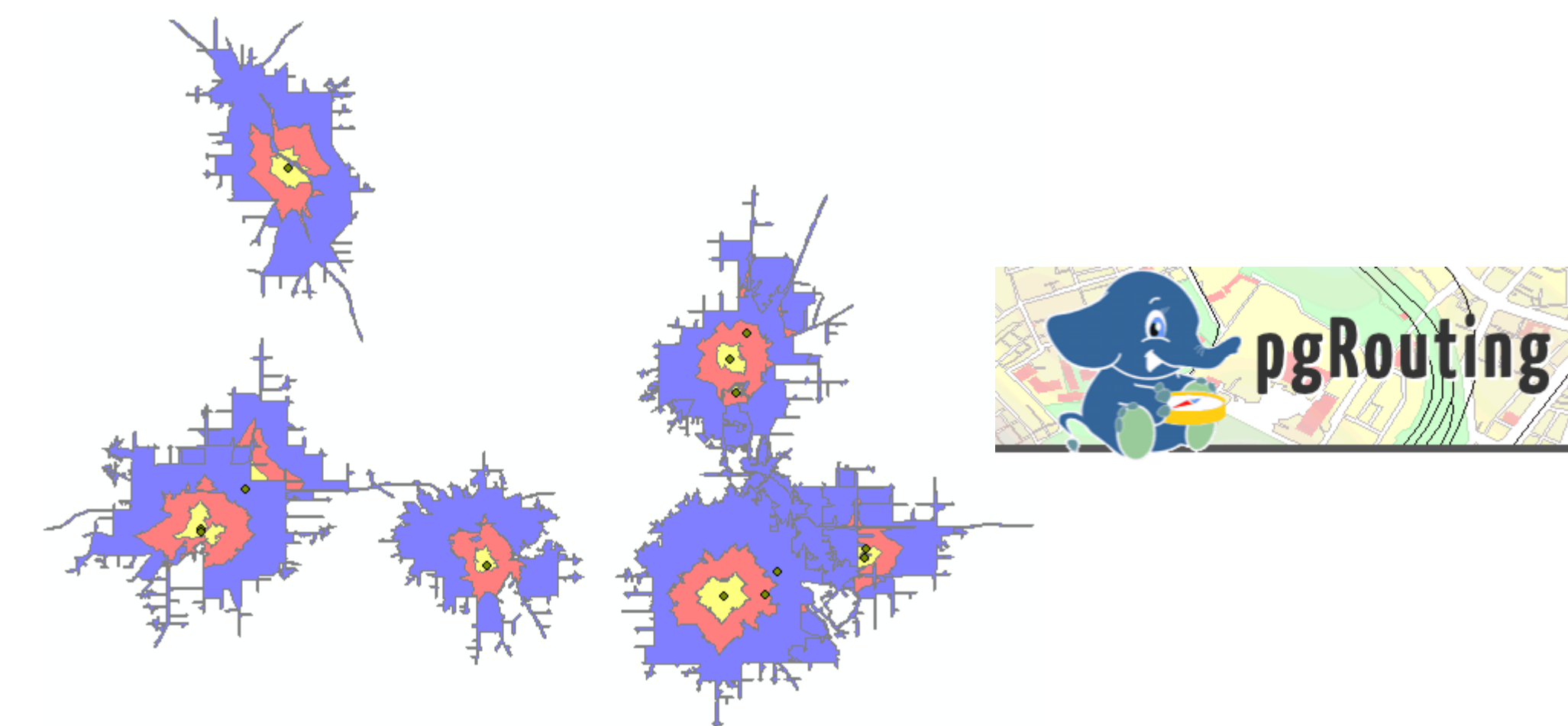
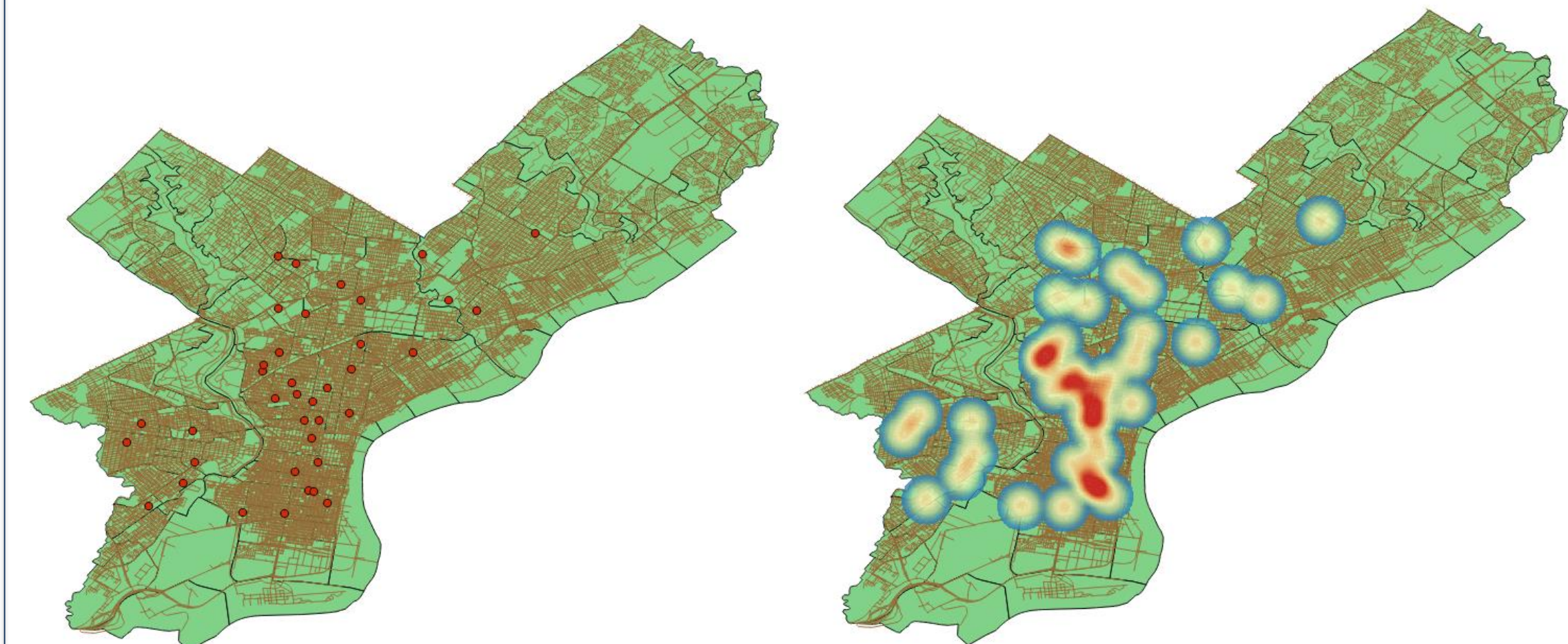
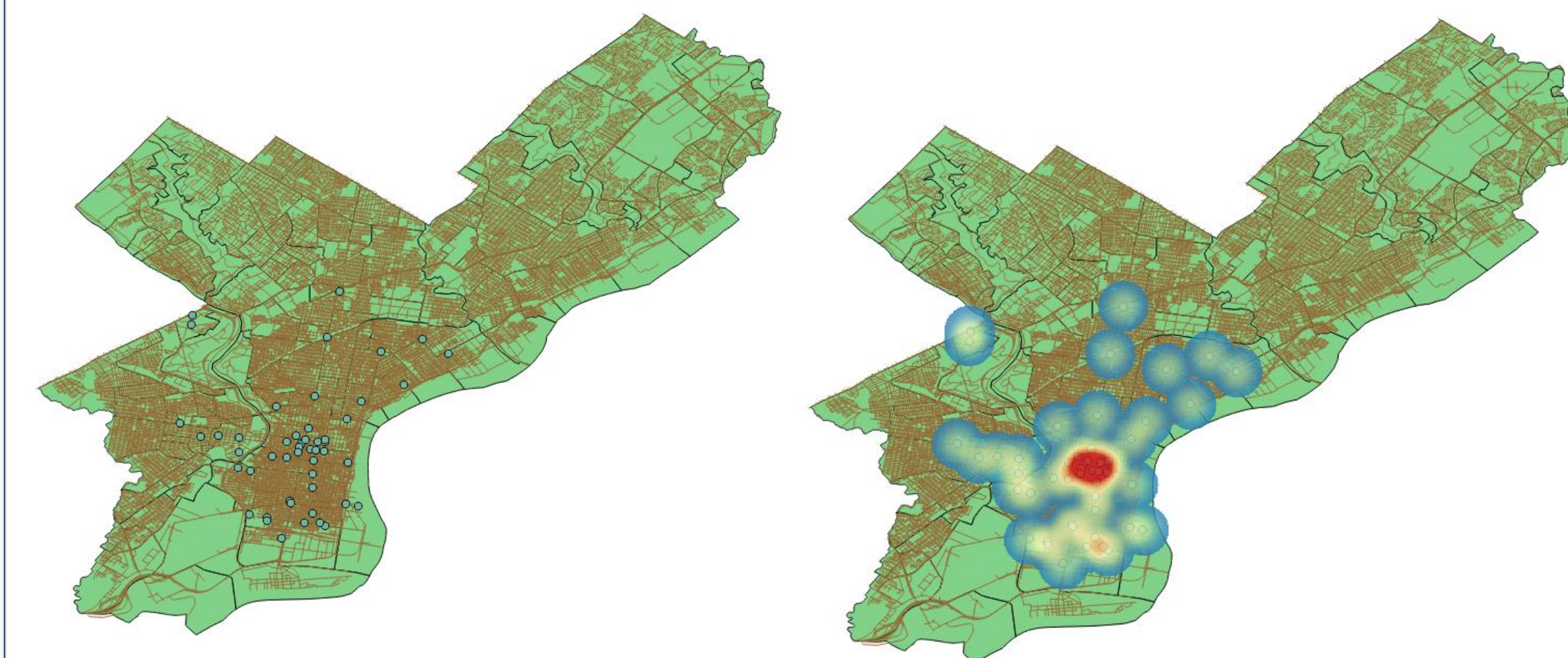


## Flu Surveillance and Response

- General response:
1. \*Quarantine
  2. Vaccine
- PDPH preparedness:
1. Planning
  2. Exercising
  3. Collaborating
  4. Communicating
- Who's at risk?
1. Children & infants (Between 6 months and 5 years old)
  2. Pregnant women
  3. Seniors (older than 65)
  4. People with disabilities and/or health conditions
  5. Travelers & people living abroad



## Results



## Why Use GIS Technology

- Geography as a common ground for managing and communicating information
- Selected capabilities of GIS
  - Data capture & storage
  - Database management
  - Spatial data analysis
  - Data display
  - Data sharing
- Delivery mechanisms



## Methods

- Data
  - Philadelphia Census Tract 2010
  - Philadelphia Neighborhoods
  - Philadelphia Health Providers
  - Philadelphia Vaccine Provider
  - Philadelphia Street Centerlines
- Geocoding
  - Philadelphia Health Providers
  - Philadelphia Vaccine Provider
- Use QGIS plugin – MMQGIS: a great tool for geocoding in QGIS. Add it as an extension, choose "GeoCode from Google", and load up your CSV of addresses.
- QGIS has a plugin infrastructure. Users can add a lot of new functionality by writing their own plugins. These plugins can either be written in C++ or in Python. I'd prefer using python for this project. QGIS has python bindings so I can automate tasks in QGIS via python.
- Spatial analysis: hot spot analysis, network analysis, etc.
  - Heatmap**

The Heatmap plugin uses Kernel Density Estimation to create a density (heatmap) raster of an input point vector layer. The density is calculated based on the number of points in a location, with larger numbers of clustered points resulting in larger values. Heatmaps allow easy identification of "hotspots" and clustering of points.
  - Drive time analysis**

Site analyses can benefit greatly from using "drive-time" isochrones to define the study area. Drive time isochrones are often significantly different from simple buffer areas which disregard natural barriers such as rivers or slow roads.

## Why Open Source

- Limited funds, technical infrastructure and human resource capacity result in little or no access to spatial information for crucial infrastructure development decisions at local level.
- Most commercial software uses proprietary storage formats. This means that your data, once entered into their system, stays in their system. If you're unsatisfied with their software for some other reason, you're stuck with it because you have no way to get your data out and migrate it to something else.

