ANOMOLOUS PRESCRIBING DETECTION

W205 SPRING 2016 PROJECT

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RESEARCH PROBLEM

Prescription drugs accounted for about **9 percent** of national health expenditure in the U.S. in 2013.

A major concern is that some prescribing patterns in health care lead to **unnecessary cost** and **health outcomes burdens**.

SOLUTION

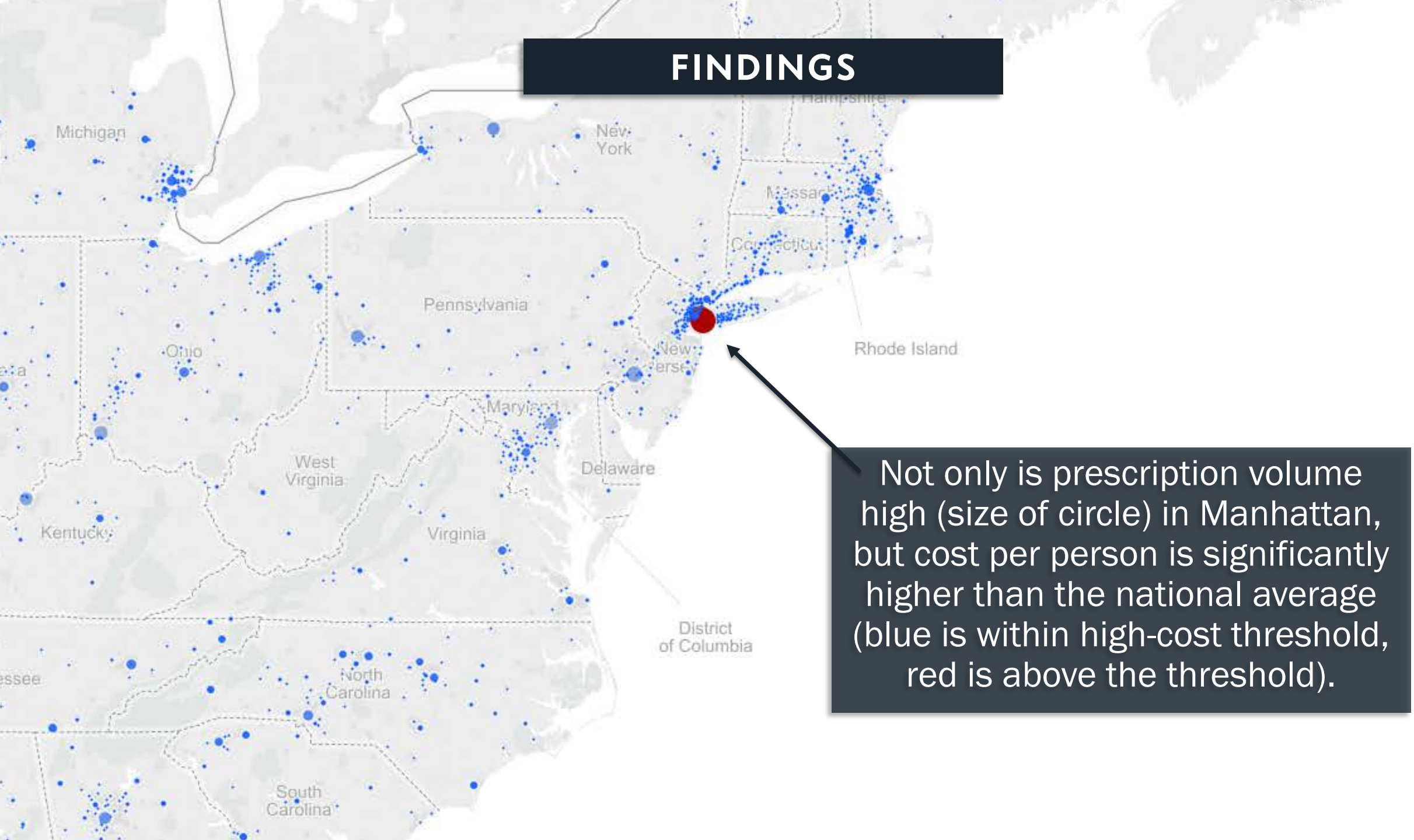
CMS has recently **changed its position** for release of physician-level prescribing data for public use.

Using this **physician-level prescription information** in concert with the **NPPES Physician Registry,** the **FDA National Drug Code Directory**, and **U.S. Census data**, we are finding unexpected prescribing patterns among physicians, based on prescriptions and costs per person.

DATA SETS

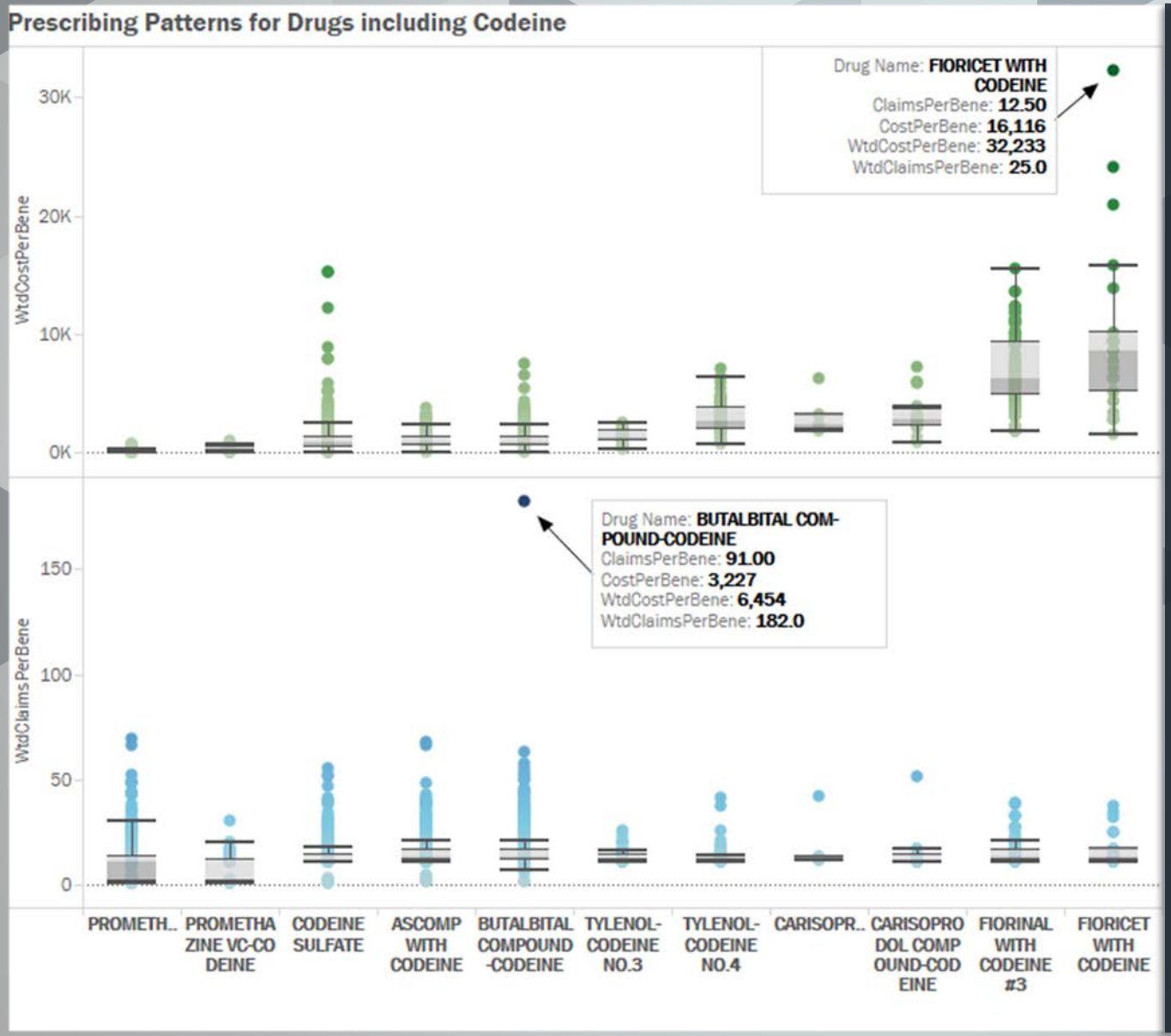
- **CMS Part D Prescriber PUF, 2013**
  - Prescriptions, units, days supply, and costs by physician and drug
  - 2.7GB; 23M lines
- **CMS Part D Prescriber National Summary**
  - Prescriptions, units, and costs by drug aggregated to a national level
  - 3K lines
- **National Plan and Provider Enumeration System (NPPES)**
  - Office location and specialty (credential) by physician
  - 5.7GB; 4.8M lines

FINDINGS



Not only is prescription volume high (size of circle) in Manhattan, but cost per person is significantly higher than the national average (blue is within high-cost threshold, red is above the threshold).

FINDINGS



Each dot is a physician in this data set.

Some physicians' prescriptions have a high cost per person (but few people).

Others have a large number of prescriptions per person (but not necessarily higher cost).

FINDINGS

This is an aggregate view of specialties for Oxycontin prescriptions.

High and left: many prescriptions to few people (per doc).

Low and right: few prescriptions to many people (per doc).

Colored red: very high cost per person.

A handful of medical examiners and radiologists are prescribing to relatively many people.

ROAD MAP

- **Larger data volume and velocity**
  - Implement system as a stream reader.
  - Recompute specialty aggregations as data cubes.

- **Aggregate drugs to therapeutic classes**
  - The drugs in the data set are very specific.
  - Grouping similar drugs together could help establish patterns.

APPENDIX

Using a graph database, we could find relationships between drugs if we connect them by the diseases/symptoms they treat.