

# Healthcare Access: Modeling, Inference and Policy

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## ACCESS: THE FIVE A's



- "Prices of services meet client's income and ability to pay"**
  - Costs: transportation, lost time and income, cost of care, etc.
  - Perception of worth relative to cost, knowledge of prices, total cost, and credit arrangements
- "Location of supply aligns with location of clients or demand"**
  - Accounts for geographical, economic and social distance, transportation resources, etc.
  - Measured in Distance
- "Size or volume of the supply meets client's needs"**
  - Volume and Type of services VS. Resources to client's volume and Type of needs
  - Measured in Congestion, Coverage
- "Delivery of healthcare accommodates client's needs"**
  - Appointment systems, hours of operation, walk-in facilities, telephone or web services
  - Cultural and language barriers
- "Healthcare providers accept all clients regardless of their characteristics"**
  - Client's characteristics: age, sex, social class, ethnicity, type of insurance (e.g. Medicare, Medicaid)

## RESEARCH OBJECTIVES

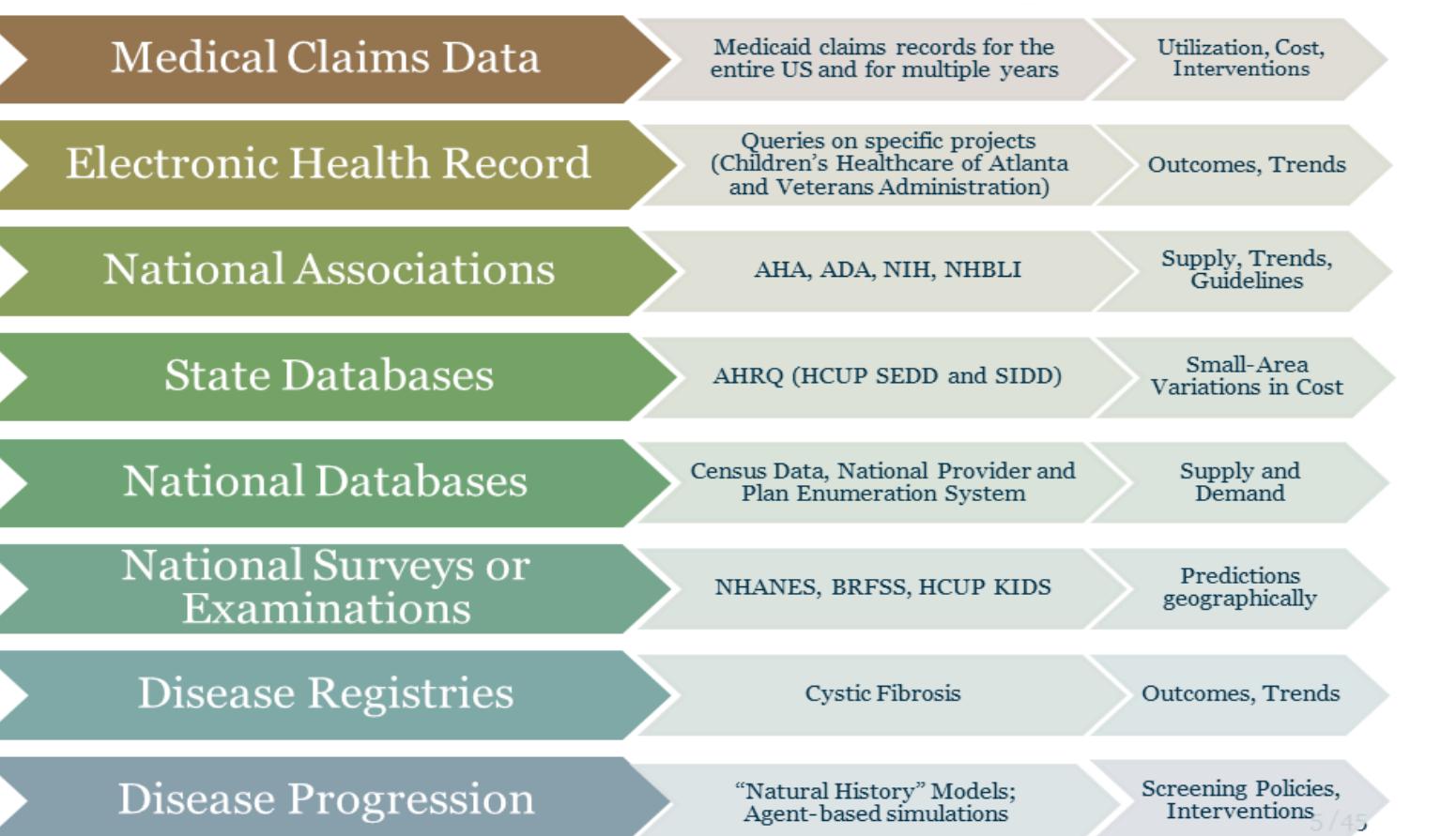
**What?** Which dimension of access to focus on improvement given the type of the healthcare system? What are primary levers in the system that can be tuned?

**How?** How to estimate access given need and supply for a healthcare service (e.g. primary care)? Are there systematic disparities in access for a particular sub-population? How do the disparities impact the system?

**Where?** Where to intervene to improve health outcomes? What sub-population to target for interventions? Which policies are actionable given the system's constraints?

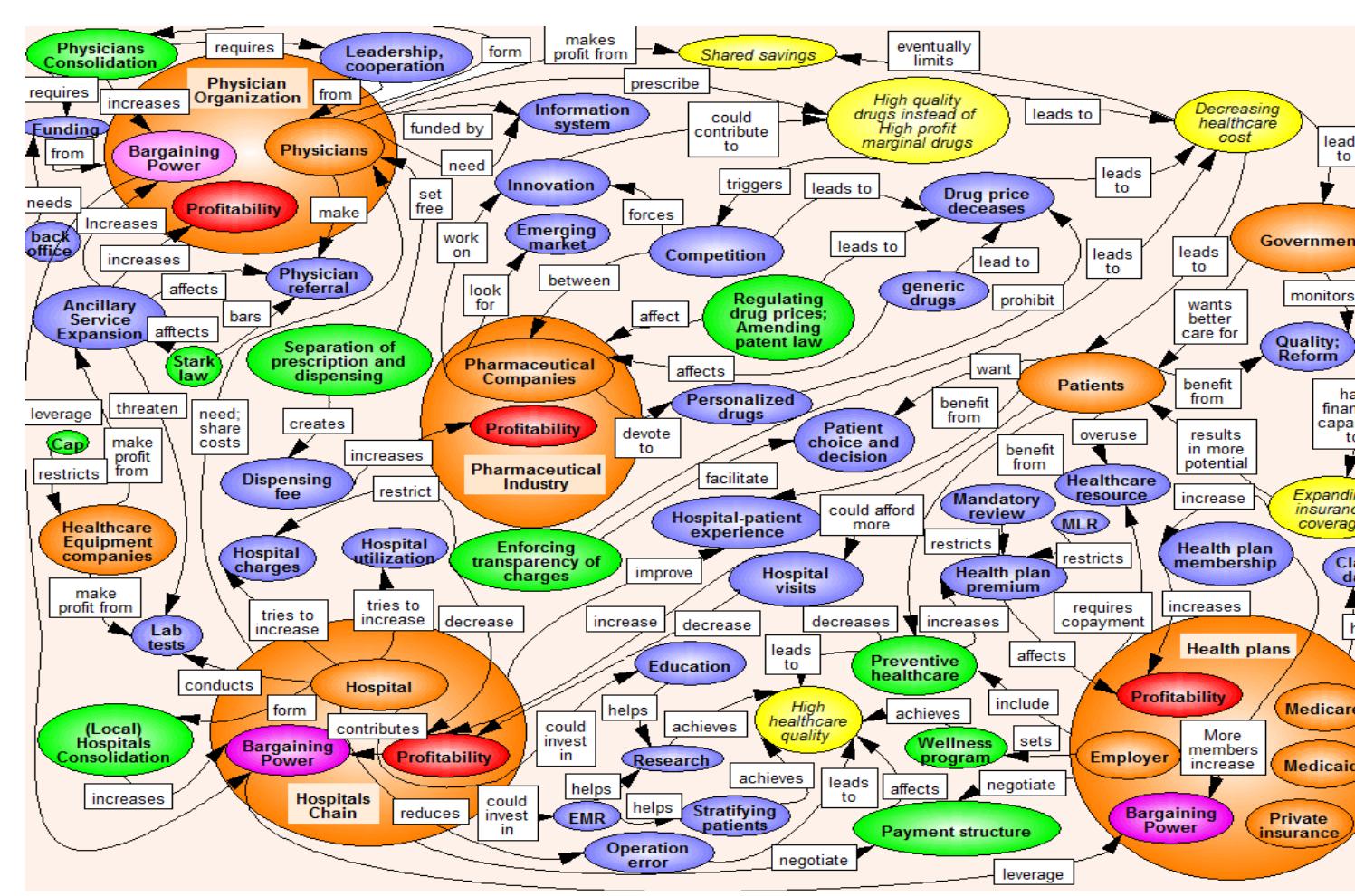
## DATA SOURCES

Multiple data sources, observed at different scales, with different geographic granularity and with different uncertainty level



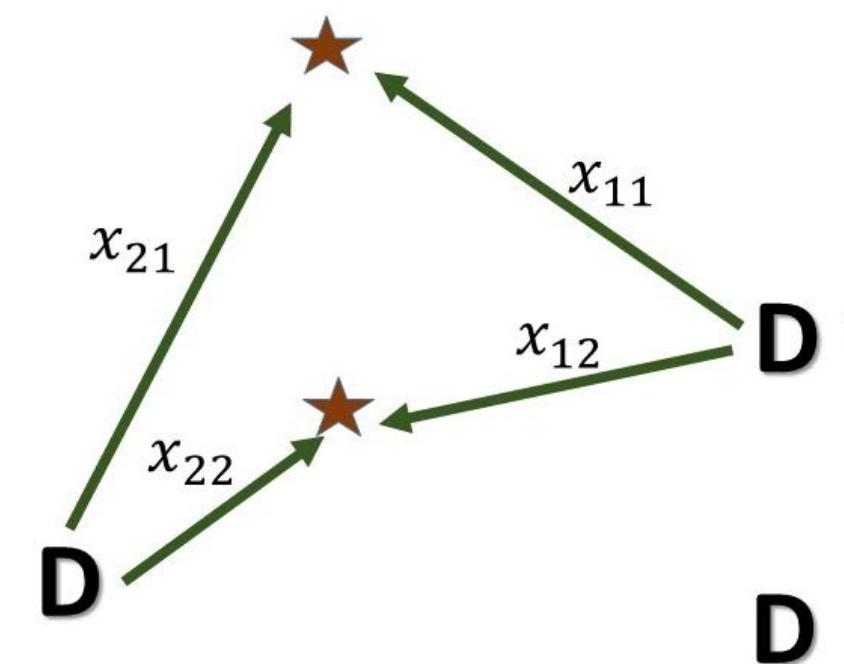
## CHALLENGES

- Competing goals: Equity, Effectiveness, Efficiency
- Complexity of the healthcare system



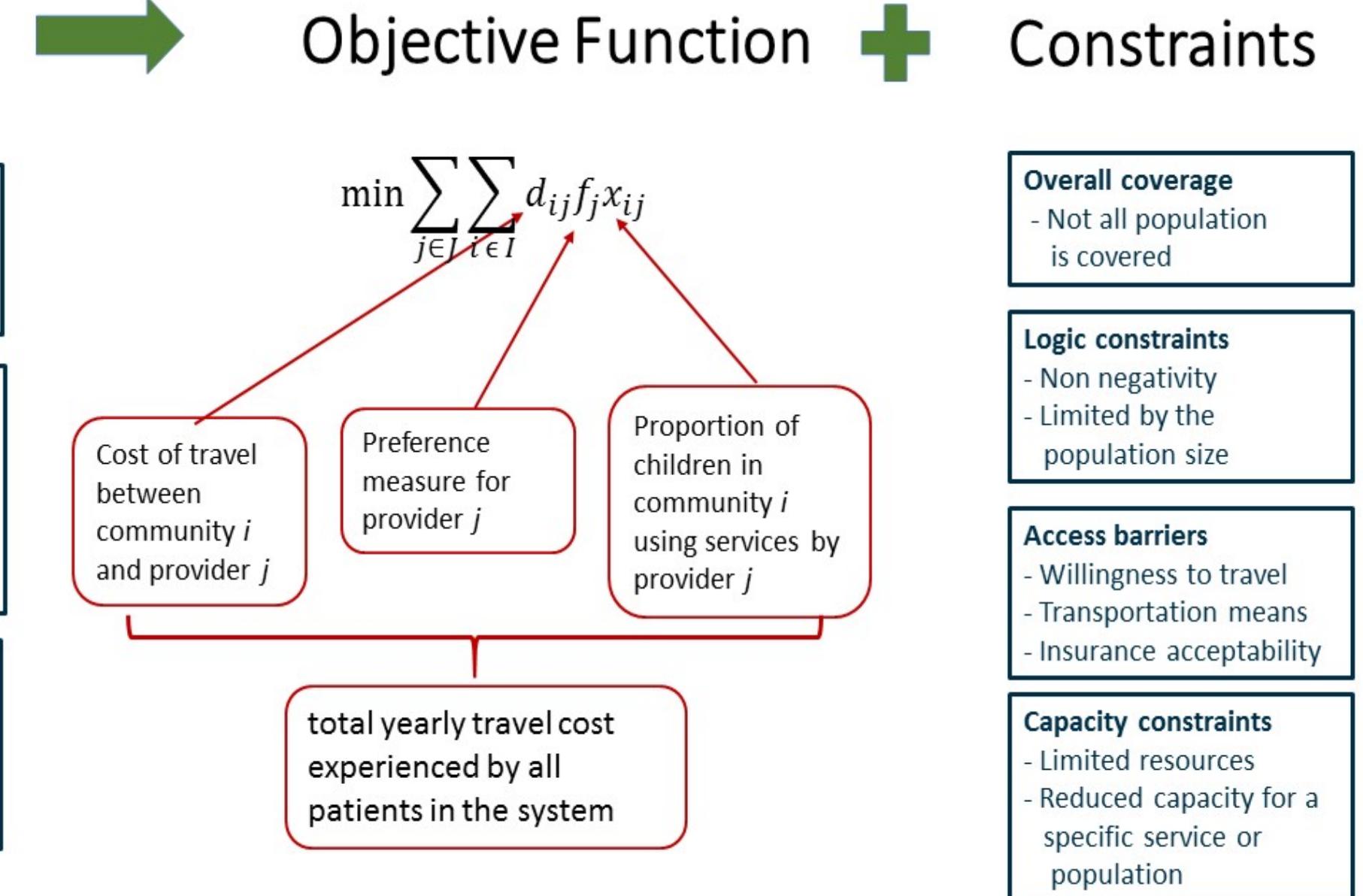
## HEALTHCARE ACCESS : METHODS

### Supply $\leftrightarrow$ Demand Assignment Problem



### Data Input

### Assignment through Optimization



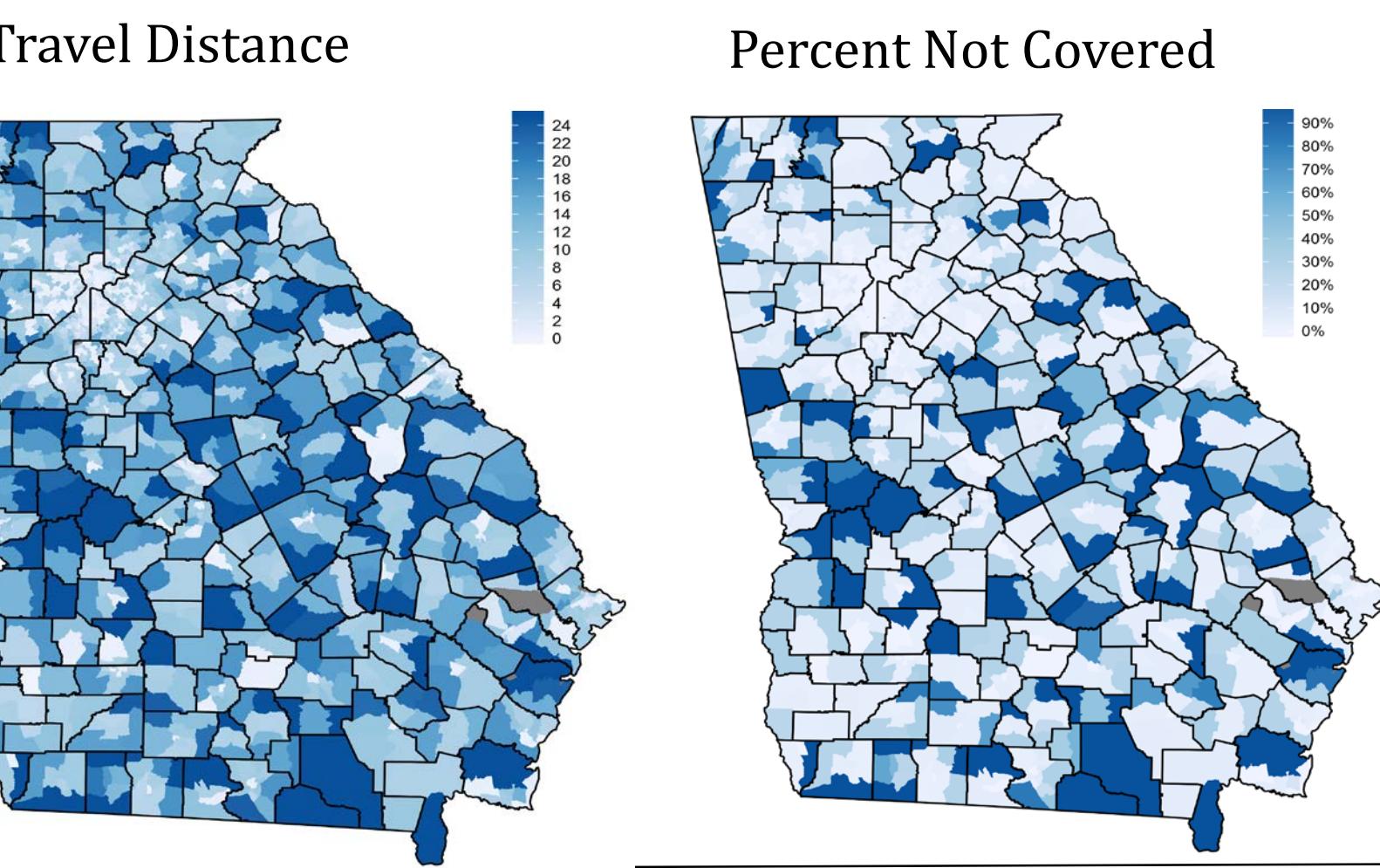
Estimate Assignments:  $x_{ij}$

### Access: Measurement, Inference and Uncertainty Quantification

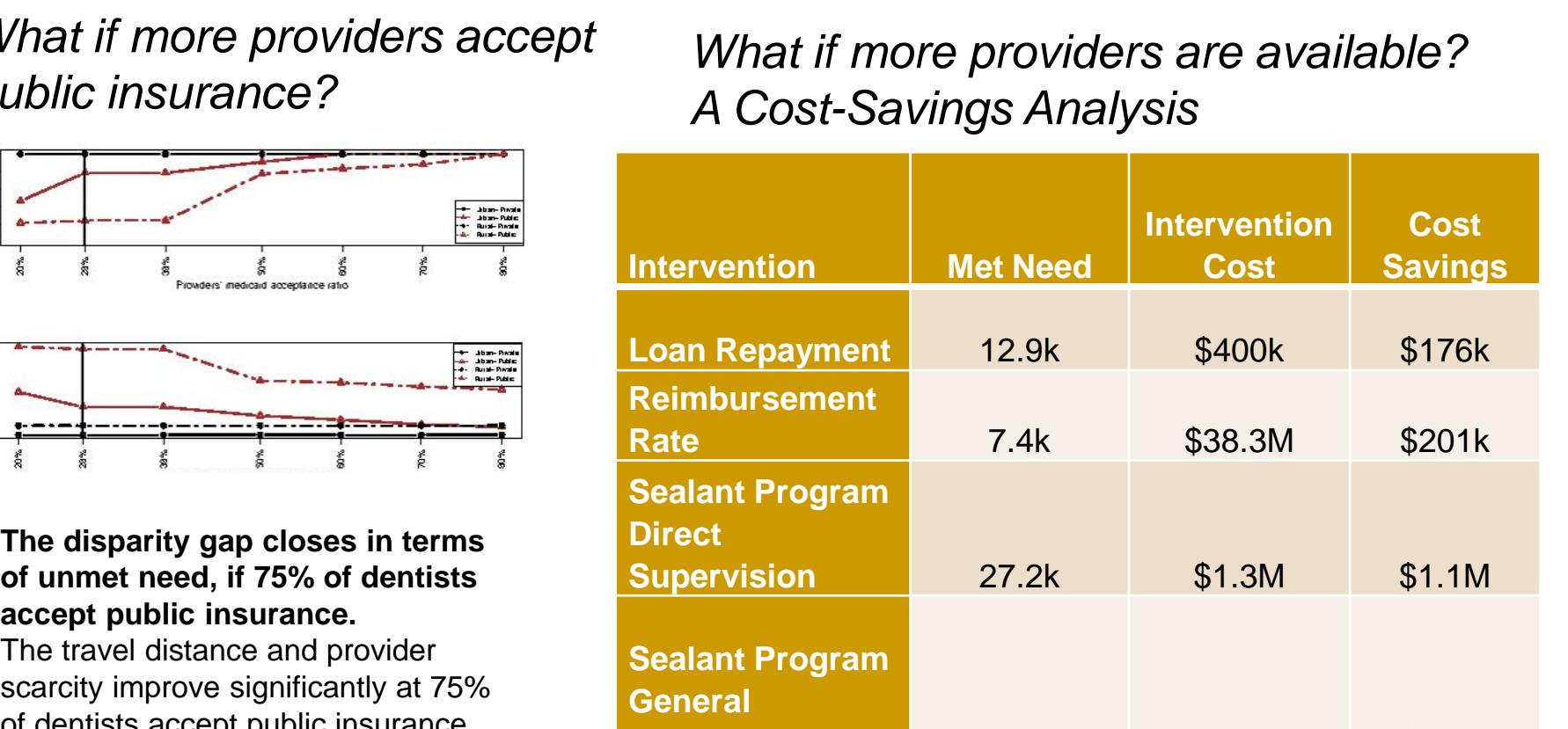
- Measures:** Travel distance, percentage of population with access, wait times for appointments or at the provider office;
- Inference:** Vary system levelers and quantify impact on the measures;
- Uncertainty Quantification:** Quantify impact of uncertainties in the system on policy making for improving access

## HEALTHCARE ACCESS TO PRIMARY CARE: RESULTS

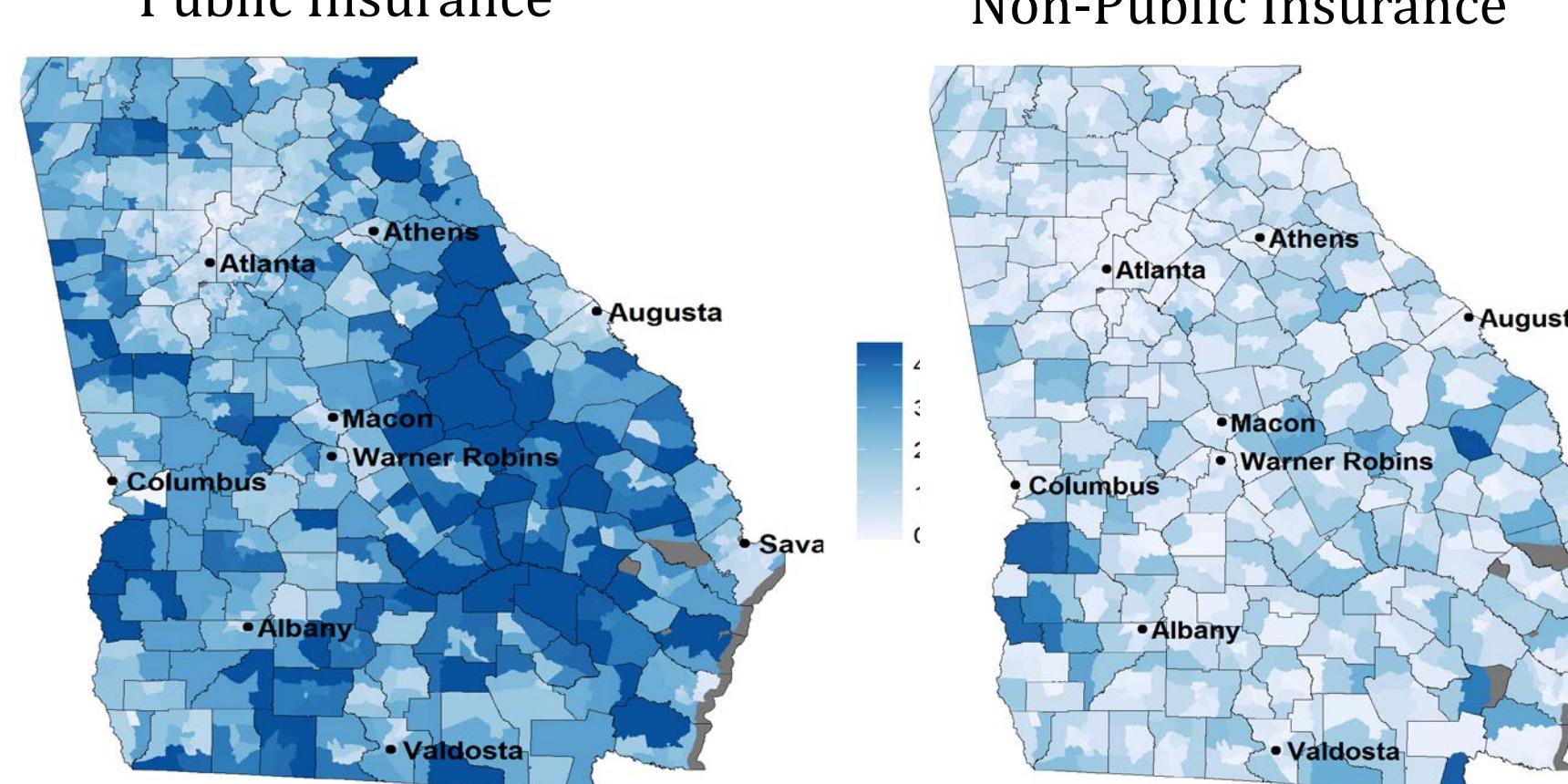
### Measures: Pediatric Primary Care



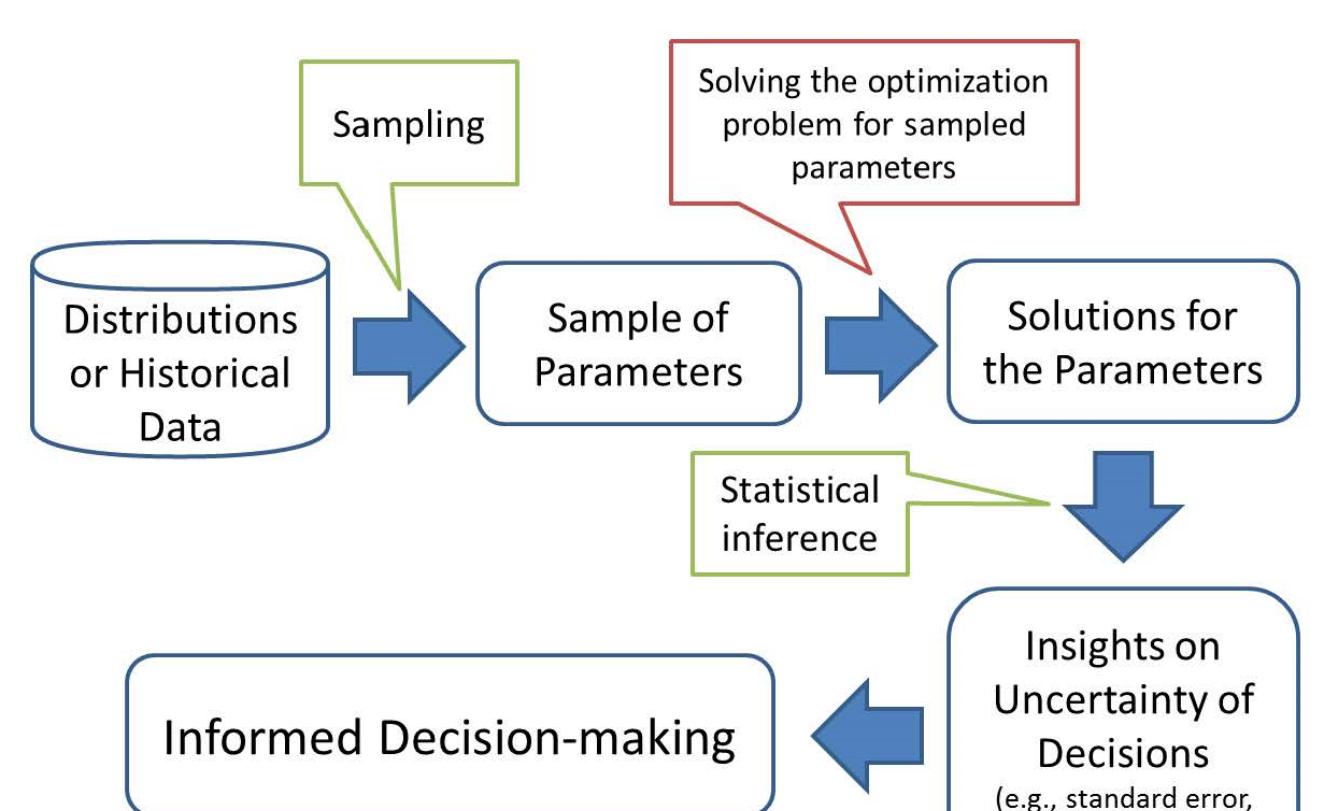
### Intervention Analysis: Pediatric Dental Care



### Disparities in Travel Distance: Pediatric Dental Care



### Uncertainty Quantification: Computational Framework



## HEALTH POLICY IMPACT

GEORGIA HEALTH NEWS  
(http://www.georgiahealthnews.com/)  
August 2016

Huge numbers of Georgia children can't get dental care, researcher says

A Georgia Tech researcher said Monday that hundreds of thousands of Georgia children have problems getting access to a dentist.

According to the researcher, more than 600,000 Georgia children who are not eligible for the public insurance programs Medicaid and PeachCare, but whose parents cannot afford dental care

Georgia has an access issue for dental care," Serban said.

Her data were presented to a meeting of the House Health and Human Services Committee.

The panel was the epicenter of a vicious battle earlier this year over proposed legislation to expand Georgia's access to the services of dental hygienists

Specifically, the bill would have allowed hygienists to clean teeth, take X-rays, and perform other dental procedures in dentists' offices and school-based health clinics without a dentist present — the work had been authorized by a dentist. Currently, Georgia law requires that dentists be present in the facility for a hygienist to do such work.

Georgia Health News  
(http://www.georgiahealthnews.com/)

January 2017

House panel begins another quest for a dental hygienist law

A House committee unanimously approved legislation Tuesday that would allow dental hygienists to practice in school clinics, nursing homes and safety-net locations without having a dentist present.

The passage of House Bill 154 by the House Health and Human Services Committee comes a year after the sudden collapse of similar legislation in the 2016 General Assembly session.

Last year, the Georgia Dental Association signed support for the proposal, but it later died in the House Rules Committee after lobbying by lawmakers, including the panel's chair, Rep. Sharon Cooper (R-Marietta).

But in Tuesday's hearing, the executive director of the Georgia Dental Association said, "We totally support" the new House bill.

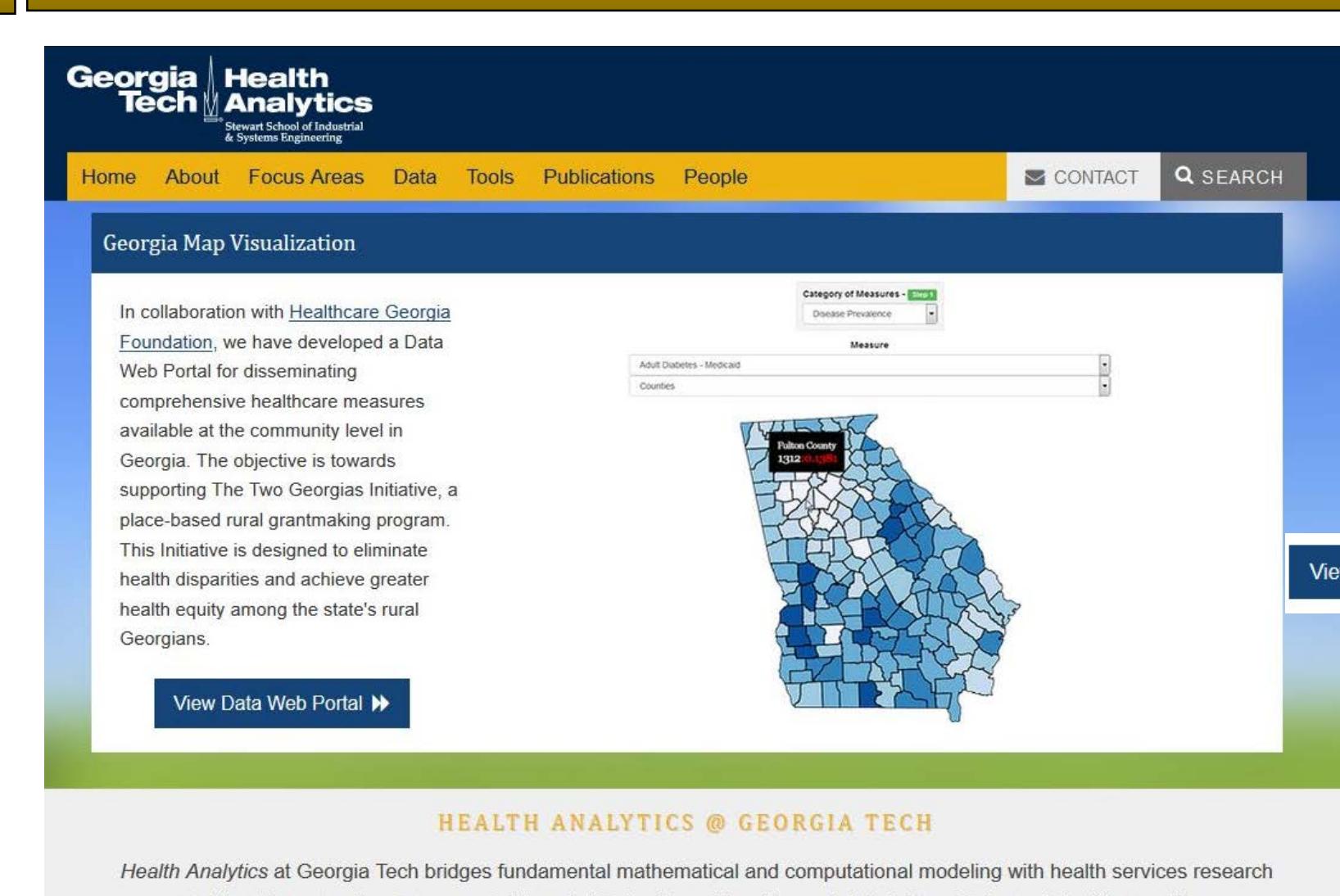
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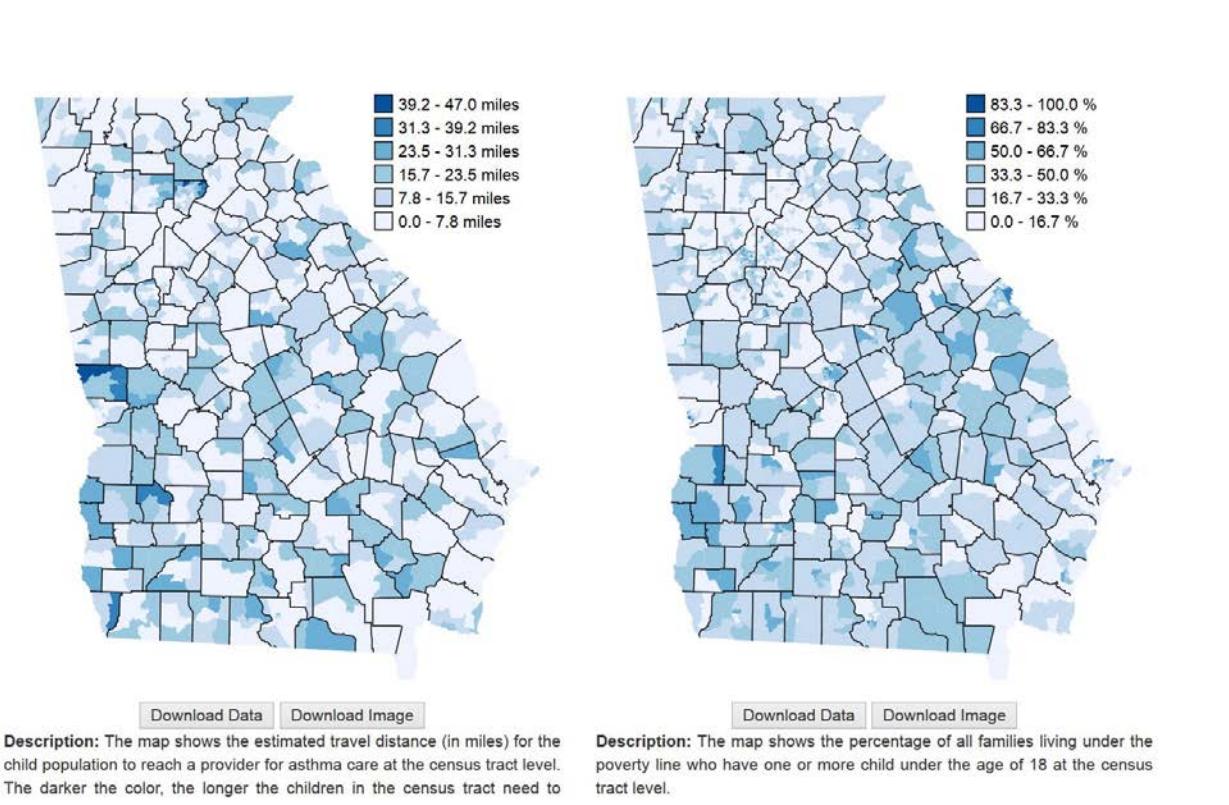
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## HEALTH ANALYTICS GROUP & DISSEMINATION



Web-Data Portal for Georgia: An opportunity for dissemination of research on healthcare access to rural communities and public health agents



## AKNOWLEDGEMENT & CONTACT

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