

## ACCESS: THE FIVE A's

### Affordability

"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

### Accessibility

"Location of supply aligns with location of clients or demand"

- Accounts for geographical, economic and social distance, transportation resources, etc.
- Measured in Distance

### Availability

"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

### Accommodation

"Delivery of healthcare accommodates client's needs"

- Appointment systems, hours of operation, walk-in facilities, telephone or web services
- Cultural and language barriers

### Acceptability

"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

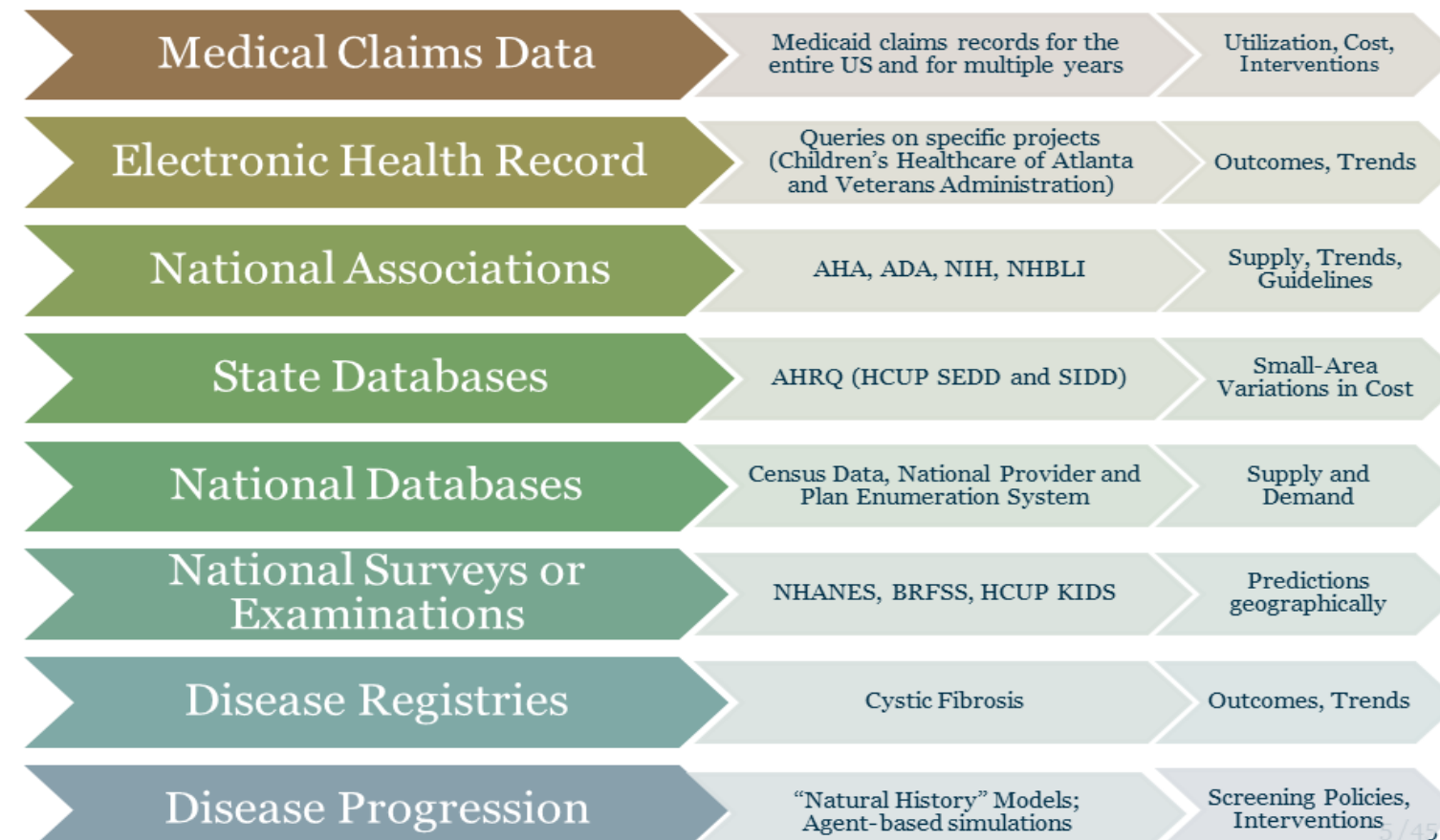
**What?** Which dimension of access to focus on improvement given the type of the healthcare system? What are primary levelers in the system that can be tuned?

**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?

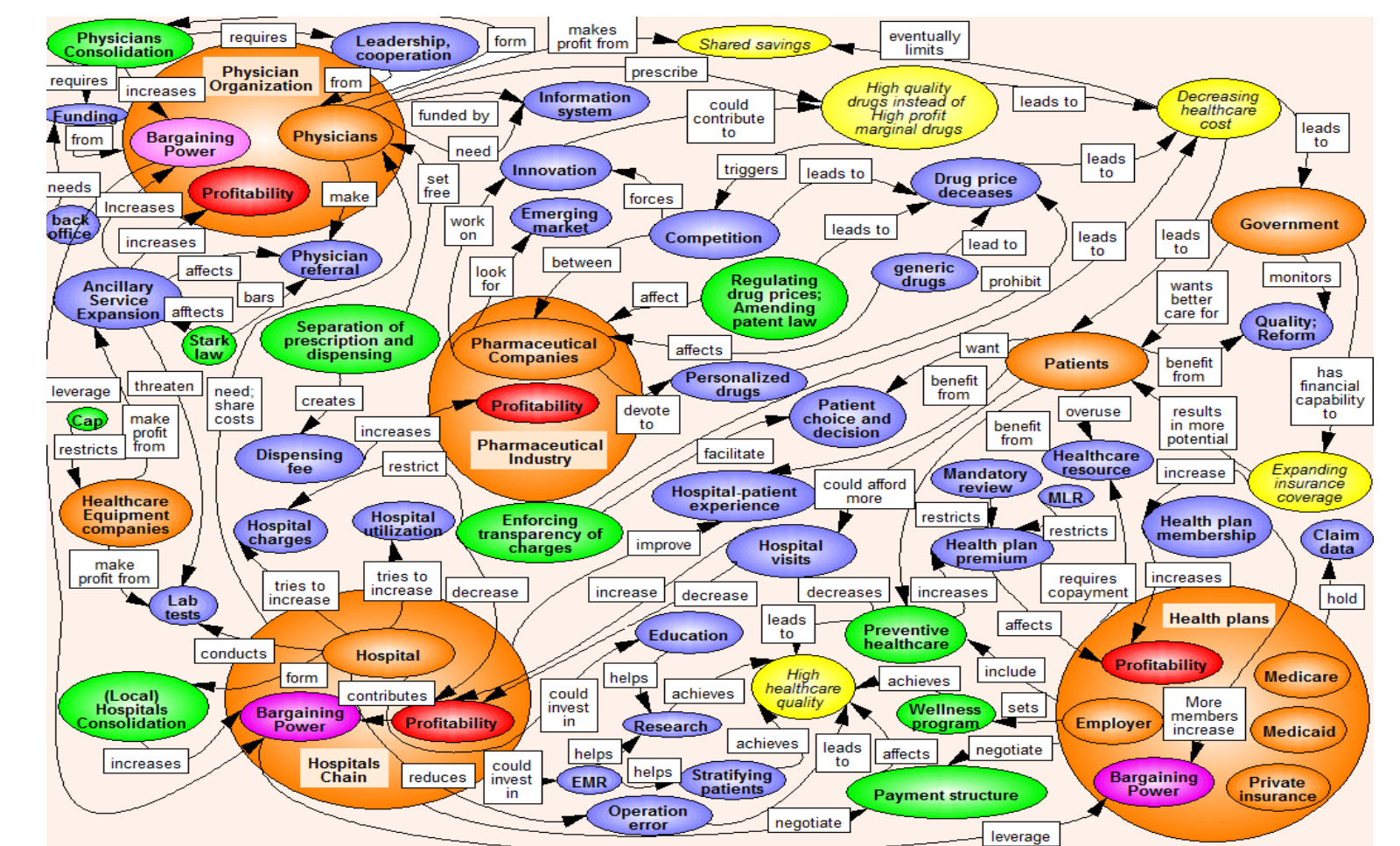
## DATA SOURCES

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



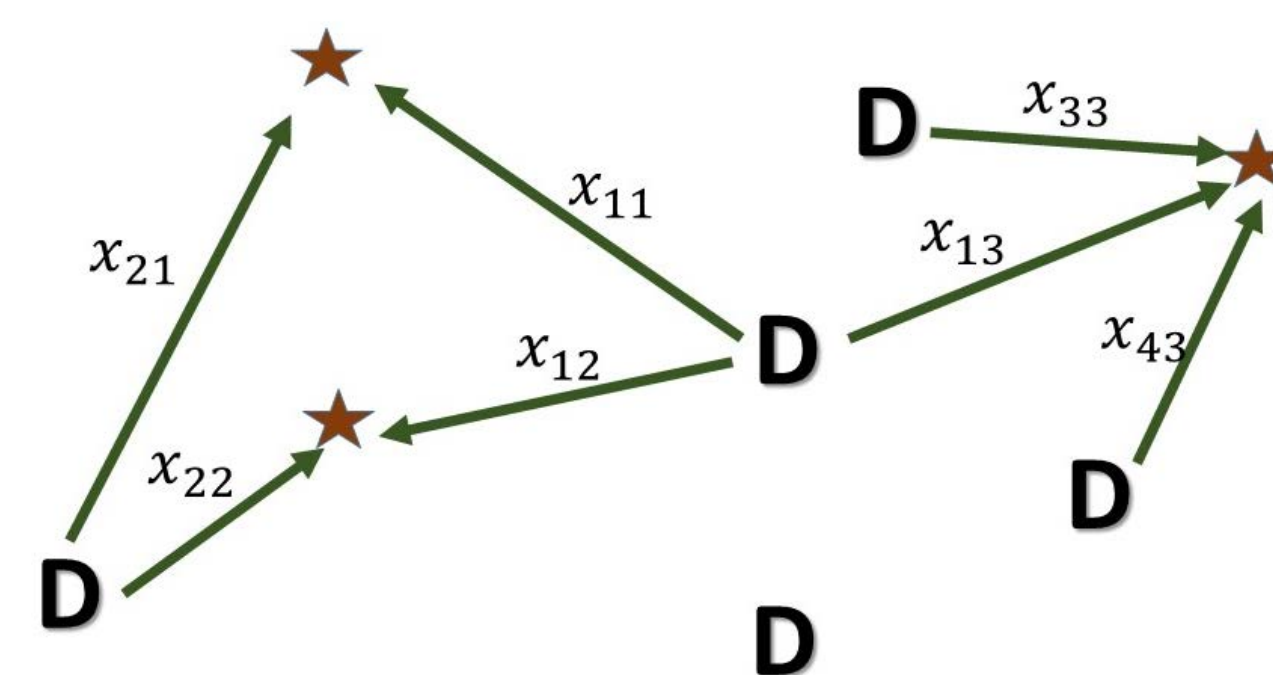
## CHALLENGES

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



## HEALTHCARE ACCESS : METHODS

### Supply ↔ Demand Assignment Problem



### Assignment through Optimization

Data Input

Objective Function + Constraints

**Supply**

- Provider location
- Provider capacity
- Provider constraints

**Need or Demand**

- Community location
- Community population
- Need by age, gender, risk, condition
- Preferences

**System Constraints**

- Health policies
- Transportation access
- Technology access
- Healthcare system

$$\min \sum_{j \in J} \sum_{i \in I} d_{ij} f_j x_{ij}$$

Cost of travel between community  $i$  and provider  $j$

Preference measure for provider  $j$

Proportion of children in community  $i$  using services by provider  $j$

total yearly travel cost experienced by all patients in the system

**Overall coverage**

- Not all population is covered

**Logic constraints**

- Non negativity
- Limited by the population size

**Access barriers**

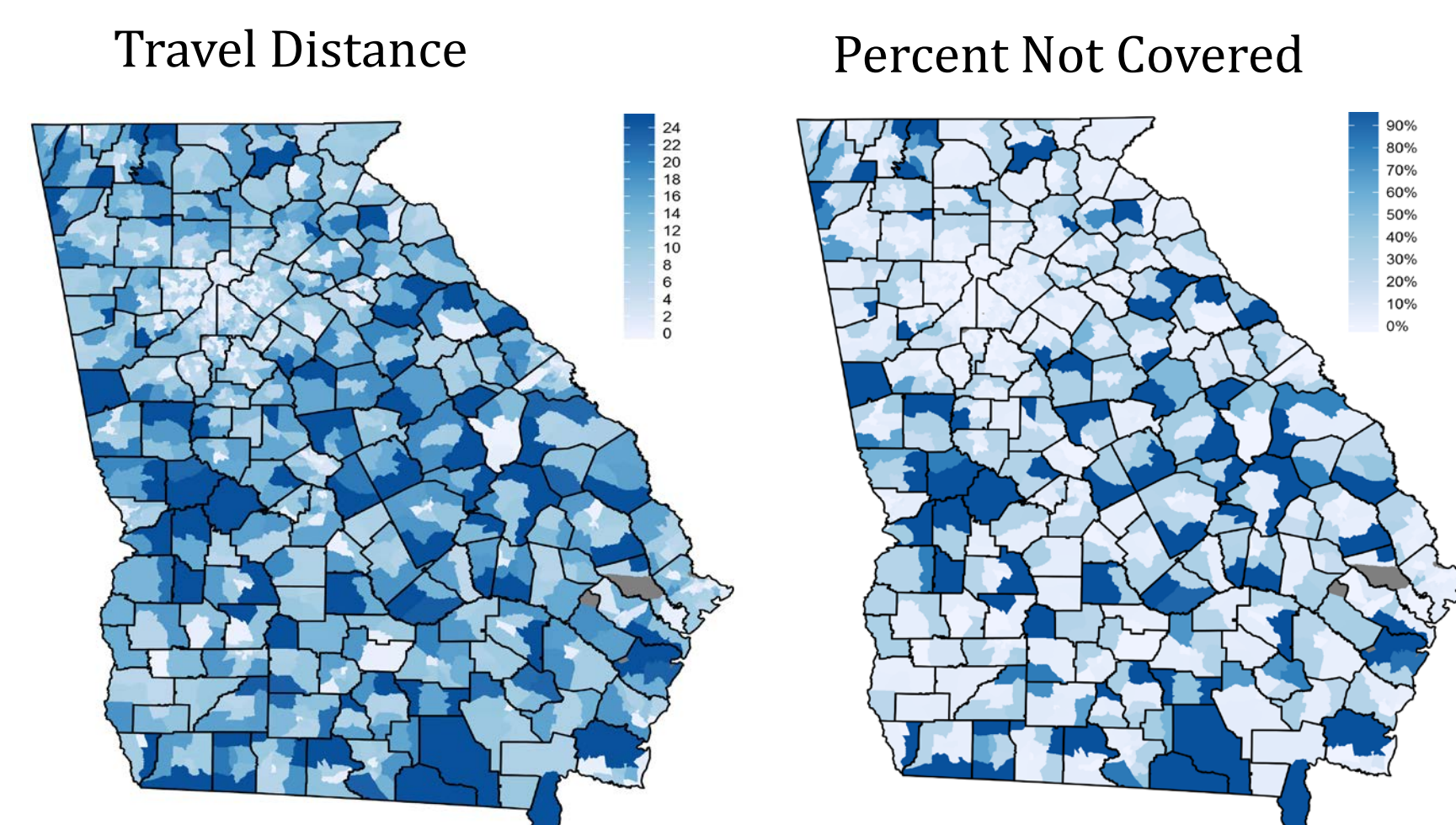
- Willingness to travel
- Transportation means
- Insurance acceptability

**Capacity constraints**

- Limited resources
- Reduced capacity for a specific service or population

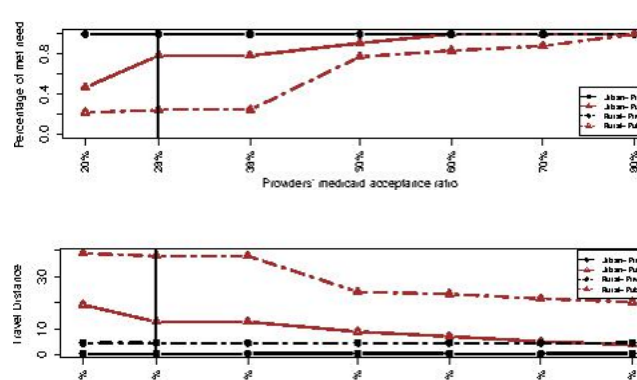
## HEALTHCARE ACCESS TO PRIMARY CARE: RESULTS

### Measures: Pediatric Primary Care



### Intervention Analysis: Pediatric Dental Care

What if more providers accept public insurance?

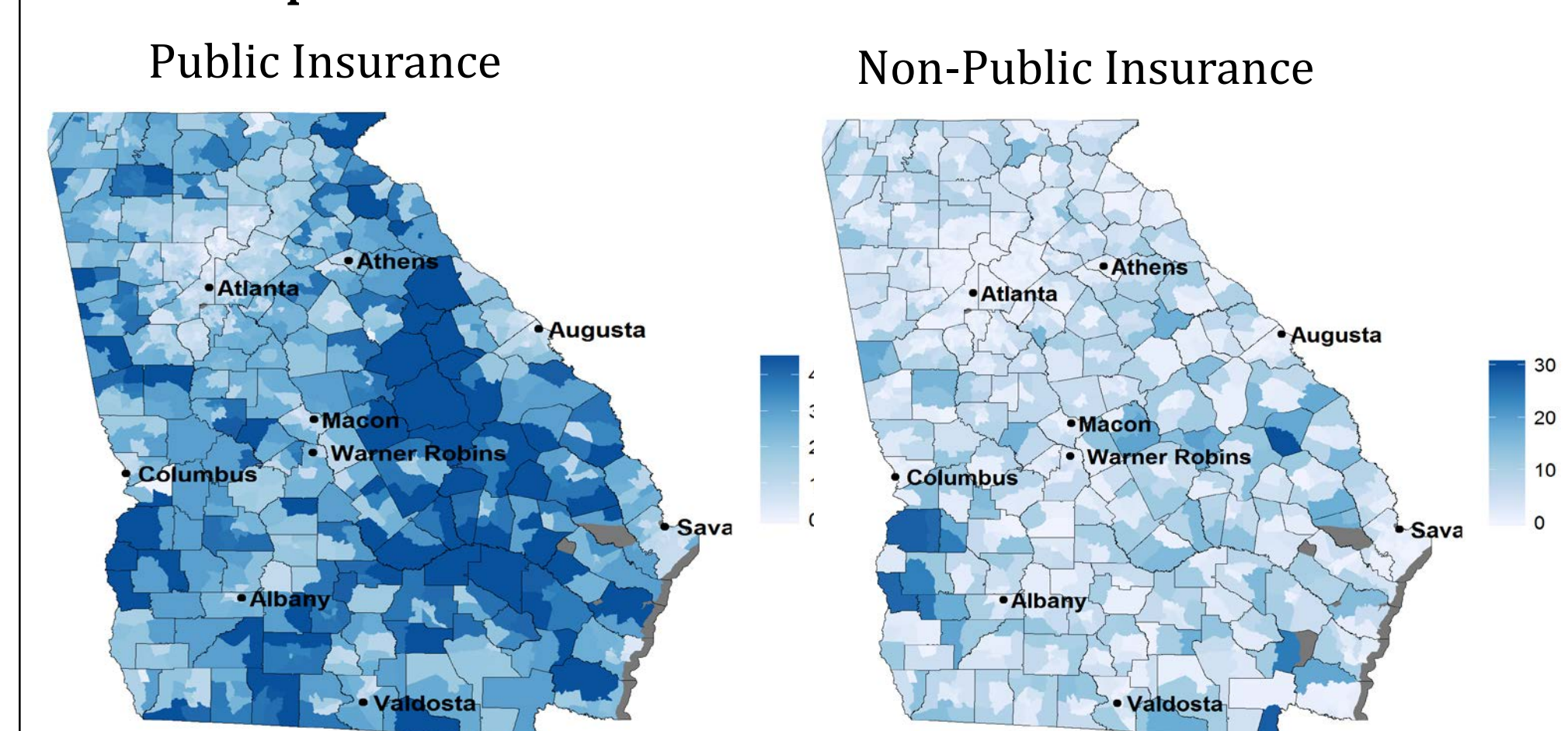


- The disparity gap closes in terms of unmet need, if 75% of dentists accept public insurance.
- The travel distance and provider scarcity improve significantly at 75% of dentists accept public insurance but there are still significant disparities

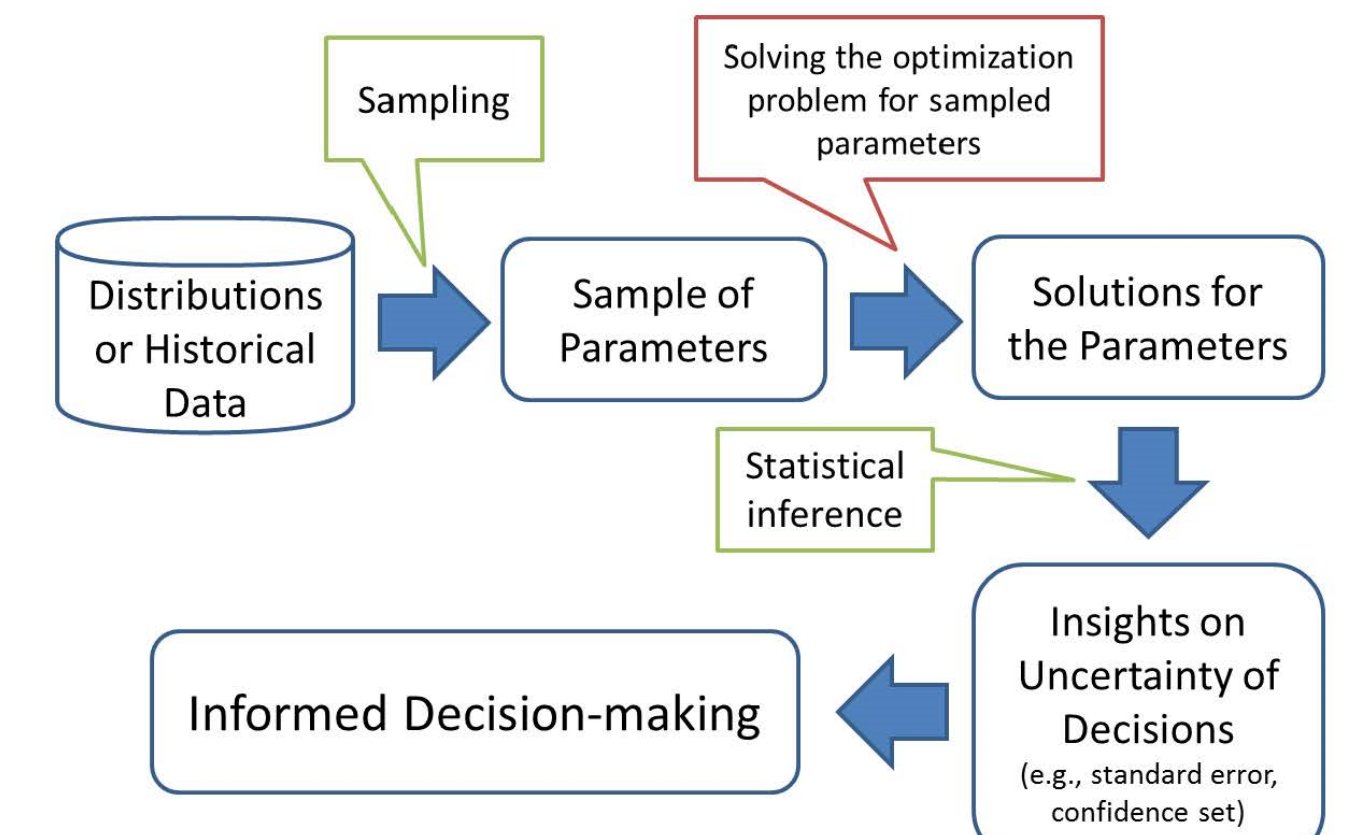
What if more providers are available? A Cost-Savings Analysis

Intervention	Met Need	Intervention Cost	Cost Savings
Loan Repayment	12.9k	\$400k	\$176k
Reimbursement Rate	7.4k	\$38.3M	\$201k
Sealant Program			
Direct Supervision	27.2k	\$1.3M	\$1.1M
Sealant Program			
General Supervision	27.2k	\$566k	\$1.1M

### Disparities in Travel Distance: Pediatric Dental Care



### Uncertainty Quantification: Computational Framework



## 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

## HEALTH POLICY IMPACT

## HEALTH ANALYTICS GROUP & DISSEMINATION

## ACKNOWLEDGEMENT & CONTACT



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

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

Nicoleta Serban, an industrial and systems engineering professor, told state lawmakers that there are more than 100,000 Georgia children who are not eligible for the public insurance programs Medicaid and PeachCare, but whose parents cannot afford dental care.

In addition, Serban's research indicated that more than 100,000 children eligible for these government programs need to travel longer than state standards (up to 10 miles in an urban area, up to 15 miles in a rural area) to reach a dentist to serve them.

"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 same panel was the epicenter of a raucous 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 in pediatric clinics, nursing homes, federally qualified health centers and school-based health clinics without a dentist present. — If the work had been authorized by a dentist. Currently, Georgia law requires that a dentist actually be present in the facility for a hygienist to do such work.



**House panel begins another quest for a dental hygienist law**

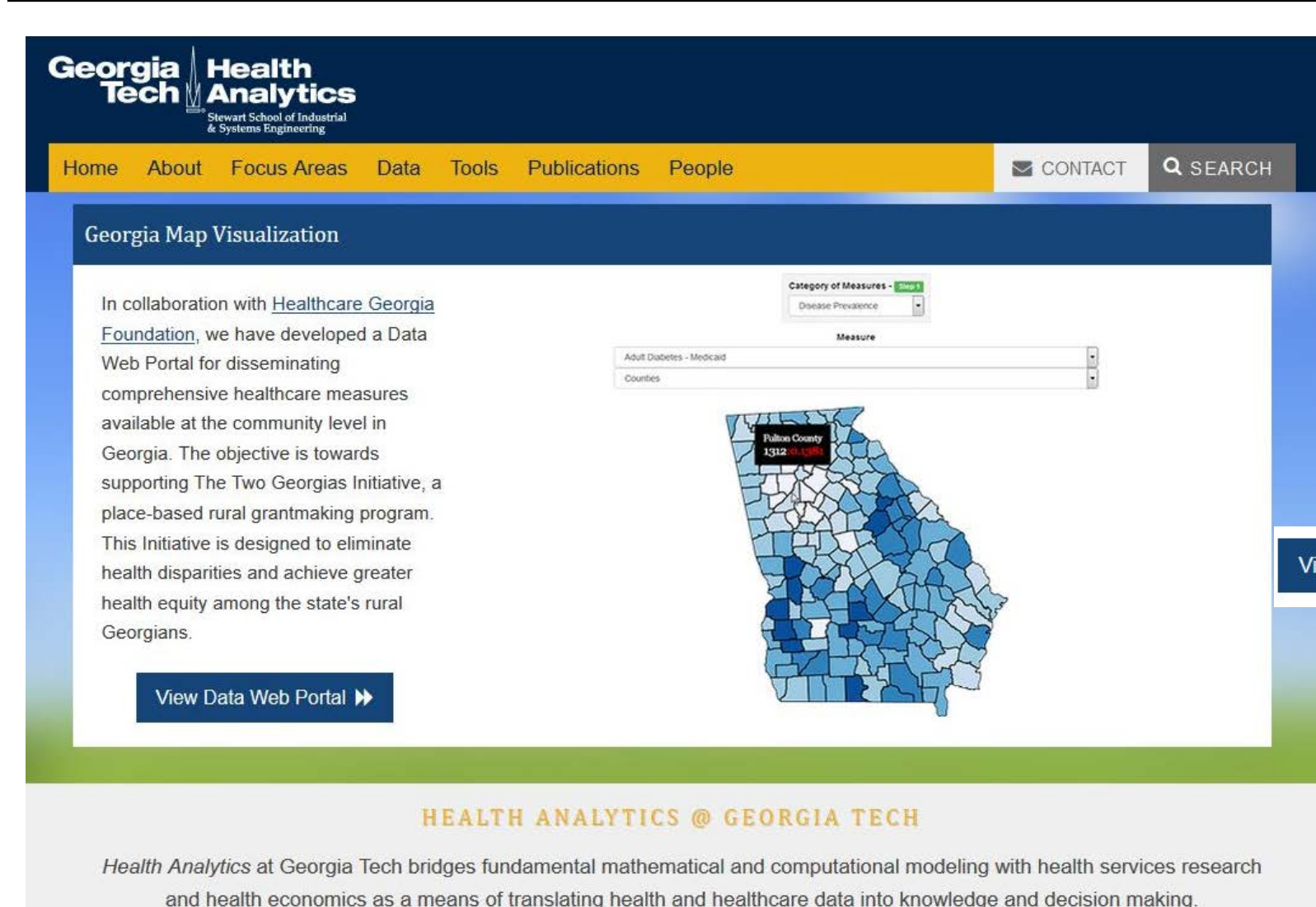
A House committee unanimously approved legislation Tuesday that would allow dental hygienists to practice in school clinics, nursing homes and safety-net locations without having a dentist present.

The passage of House Bill 514 by the House Health and Human Services Committee comes a year after the sudden collapse of similar legislation in the 2016 General Assembly session.

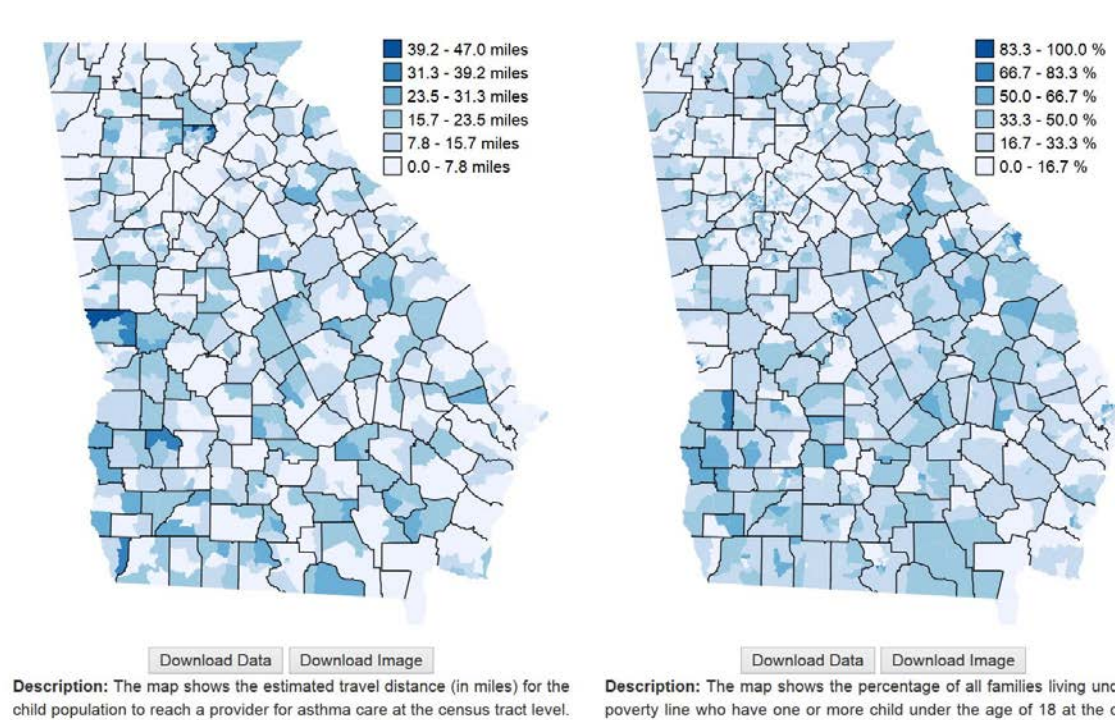
Last year, the Georgia Dental Association signed support for the proposal, but it later died in the House Rules Committee after lobbying by dentists. That wave of opposition created friction with lawmakers, including the panel's chair, Rep. Sharon Cooper (R-Maricopa).

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

**Oral Health Policy in Georgia has been influence by research on access to dental care**



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



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**Contact:** Nicoleta Serban  
nserban@isye.gatech.edu  
www.healthanalytics.gatech.edu