Research IT Information & Exchange Series

Analysis of Research Data

April 7, 2017

Research IT Information & Exchange Series

- **Goal:** To educate pediatric researchers on the Research IT and Informatics resources and expertise available to facilitate their research and to identify areas where we can enhance IT methods to better support research.
- **Format:** One hour sessions led by subject matter experts to present information on the current services and expertise available.
- **Intended audience:** Researchers with an interest in capitalizing on Research IT tools to make their research better. Also, researchers who are interested in using Big Data and Healthcare Analytic approaches in their research.

Research IT Information & Exchange Series:

Resources that will be highlighted include:

- Pediatric Biostatistics Cores
- Emory SPH Resources including the BCC
- ACTSI BERD
- CHOA Consultative Analysts
- REAL Program
- Graduate Students at GT

Research IT Information & Exchange Series

Our presenters today

- **Courtney McCracken, PhD**, Director, Pediatric Biostatistics Core, Department of Pediatrics, Emory University
  - courtney.mccracken@emory.edu
- **Christina Mehta,** Assistant Professor, Biostatistics & Informatics, Rollins School of Public Health
  - christina.mehta@emory.edu
- **John Hanfelt, PhD,** Professor, Biostatistics & Informatics, Rollins School of Public Health
  - jhanfel@emory.edu
- **Robert Palmer, PhD,** Director, Outcomes & Quality Measurement, Children's Healthcare of Atlanta
  - Robert. Palmer@choa.org
- **Natasha Simpson, MPA,** Student Academic Services Administrator, REAL, Rollins School of Public Health, Emory University
  - natasha.simpson@emory.edu
- **Julie Swann, PhD,** Harold R. and Mary Anne Nash Professor, H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology
  - jswann@isye.gatech.edu






Pediatric Biostatistics Core

WHO ARE WE?

Courtney McCracken, PhD
Director, Pediatric Biostatistics Core
DOP

Traci Leong, PhD
Assistant Research Professor
Dept. Biostatistics and Informatics, RSPH

Scott Gillespie, MS
Biostatistician Sr., Pediatric Biostatistics Core
DOP

Michael Kelleman, MSPH
Biostatistician Sr., Pediatric Biostatistics Core
DOP

Leah Bryan, MPH
Biostatistician Sr, Pediatric Biostatistics Core
DOP

Curtis Travers, MPH
Biostatistician, Pediatric Biostatistics Core
DOP

Janet Figueroa, MPH
Biostatistician , Pediatric Biostatistics Core
DOP

Pediatric Biostatistics Core

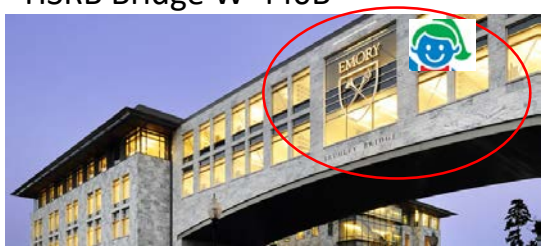
WHAT DO WE DO?

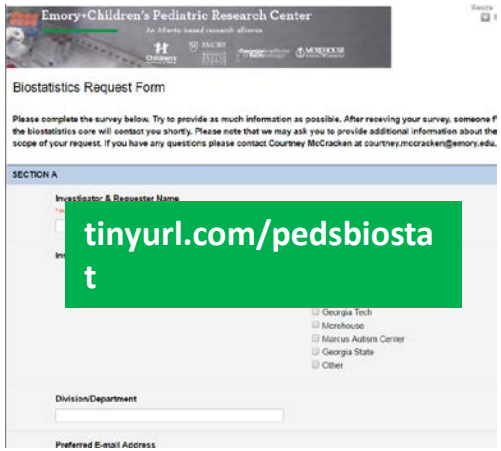
- We provide an *initial 1 hour* session for any requested assistance. During this session, the scope of the request and needed resources are determined.
    - Study design and planning for grants
    - Protocol development
    - Sample size calculations for grants and studies
    - Analysis for abstracts, manuscripts, and grants
    - Insight for proper data collection given the study design
    - Database modeling and data management
    - Validating Instruments
    - Randomization Schematics
    - Basic qualitative analysis support

Pediatric Biostatistics Core

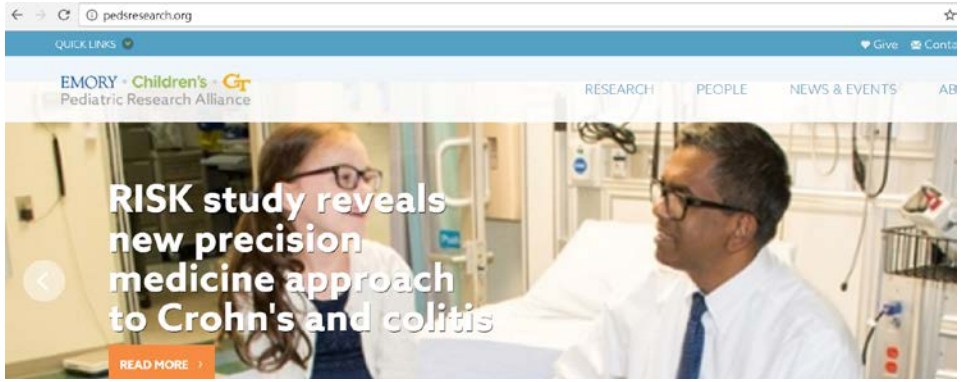
WHERE DO I FIND YOU?

HSRB Bridge W-440B





tinyurl.com/pedsbiostat



pedsresearch.org/research/cores/biostatistics-core/overview

Room 371
Wednesday/Friday

Pediatric Biostatistics Core

WHY DO I FIND YOU?

- You want to chat about a new research idea
- You need help with statistical analyses
- You want to talk about data collection
- You want to identify collaborators outside DOP
  - Highly Specialized Statistician
  - Mixed methods Researcher

Pediatric Biostatistics Core

WHEN DO I FIND YOU?

- There are 2 main stages we (the biostatisticians) "like" to be involved:
  - 3-6 months out during the initial development of your research hypotheses and study design.
  - During/after the data have been collected to work on analysis for abstract and manuscript submissions

3-6 MONTHS PRIOR

Development of research hypotheses and design of study. Sample size calculations, database design, etc.

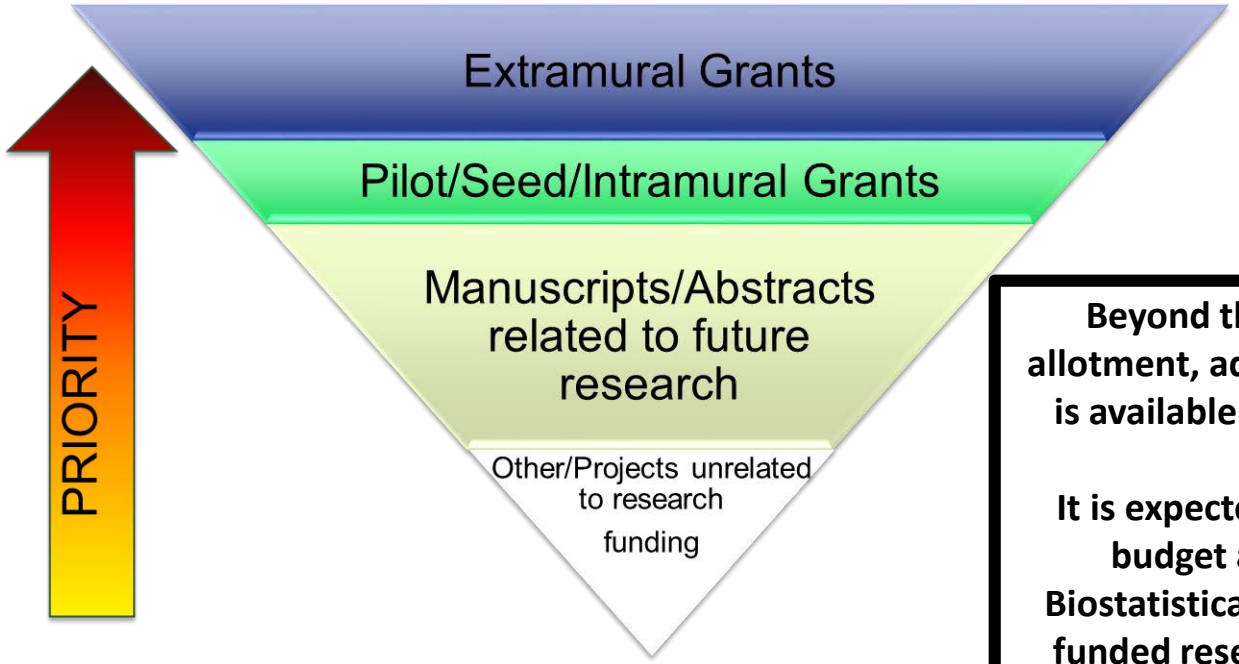
Following Data Collection

Analysis of data for abstracts and manuscripts. About 1-2 months before target submission date.

Pediatric Biostatistics Core

HOW MUCH DO YOU COST?

The business model of this core provides a pre-set number of subsidized hours for various types of pre-award projects.



Beyond the subsidized allotment, additional support is available at ~ $50/hour.

It is expected that PI's will budget appropriate Biostatistical staff effort for funded research activities.

Introduction to the Biostatistics Consulting Center (BCC)

Reneé H. Moore, PhD
C. Christina Mehta, PhD, MSPH
Emory University
Department of Biostatistics & Bioinformatics
Biostatistics Consulting Center

Options for Biostatistics support

- Biostatistician supported in project personnel of a grant
- Departmental support for Biostatistics (e.g. Department of Medicine, Radiology, Pediatric Biostatistics Core)
- Program Project cores (e.g. ACTSI BERD, CFAR)
- Biostatistician as a Committee Member for Theses/Dissertations
- **Biostatistics Consulting Center (BCC)**

When may **BCC** be the **best choice**?

- Dedicated, short-term support for clearly delineated tasks
  - What is short-term? 3 – 6 months
  - Examples of tasks:
    - Statistical Analysis for Abstract Preparation
    - Statistical Analysis for Grant and Contract Preparation
    - Manuscripts without grant support
    - Study Design
    - Database Development, Implementation, Maintenance
    - Statistical Review of Manuscripts in the publication process
- Truven MarketScan project

Steps in obtaining **BCC** support

1. Contact BCC Director Reneé H. Moore
   - renee.moore@emory.edu
   - 404-727-9291
   - Or Christina Mehta (christina.mehta@emory.edu, 404-727-7623) while Dr. Moore is on maternity leave

2. Meet with BCC Director and possibly other biostatistics faculty with relevant content area expertise (e.g. genetics)
   - Investigators provides a brief summary of the objectives and study design
   - BCC and investigators review research needs and study design issues, estimate work load, and plan a realistic timeline

3. Statement of Work completed
   - First draft by BCC Director, Round(s) of edits by investigator and BCC Director
   - Includes: description of tasks, BCC deliverables, Time table, Fee

Steps in obtaining **BCC** support (continued)

4. BCC Director brings together the appropriate personnel to complete the BCC tasks and deliverables

- Faculty content area experts, M.S. statisticians, Programmers, Database Personnel, Graduate Students

5. Meetings with investigators, BCC Director, and key staff to discuss analysis results, co-write grants/manuscripts, etc.

- As many as needed until deliverables completed

BCC Fee Structure

- Determined based on Statement of Work
- Agreed upon by BCC Director and PI
- Task based fee structure
- FY16 Rates

BCC Fee Structure

Tier	SOM/RSPH Rate	Emory Rate	Consulting Examples in this Tier
P	$490	$820	Power analysis; Rigor & Reproducibility Plan; small dataset prep & cleaning
1	$2,950	$4,4500	R21/R03/K grant prep design & prelim analysis; routine analysis; pre-data collection; abstract
2	$4,120	$6, 060	R01 (standard) grant design & prelim analysis prep; custom design & data analysis; database-small; manuscript
3	$7,070	$10,570	Custom design & data analysis-medium; R01 nonstandard; database-medium
4	$7,540	$11,790	PPG/U01/P01; database-large; MarketScan dataset prep

BCC Director Reneé

can't wait to work with you!

renee.moore@emory.edu

404-727-9291

Biostatistics, Epidemiology & Research Design (BERD) Function

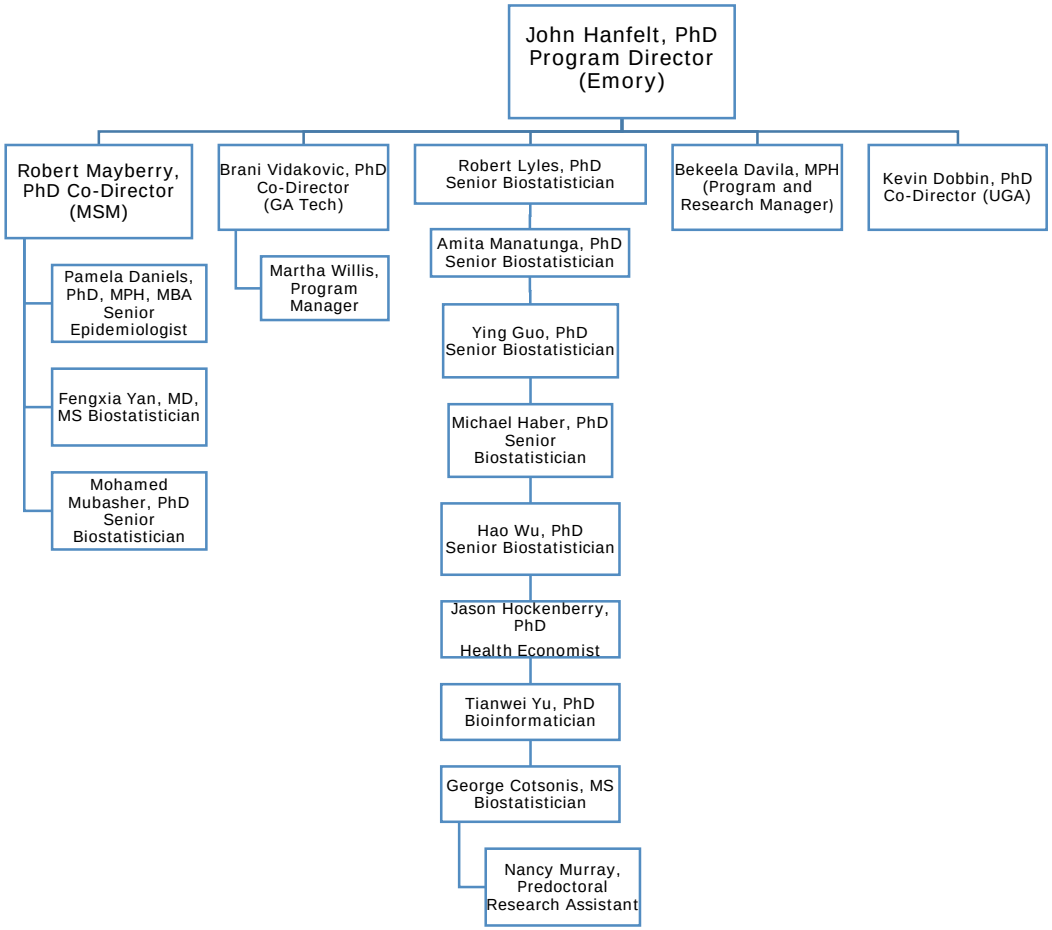
John Hanfelt, PhD, Director (Emory)
Robert Mayberry, PhD, Co-Director (MSM)
Brani Vidakovic, PhD, Co-Director (GA Tech)

April 2017

BERD Features

- Connections to quantitative experts at RSPH, MSM, and Georgia Tech
  - Health economics
  - Imaging statistics
  - Analysis of 'omics data (genomics, metabolomics, microbiomics, etc.)
  - Community & urban epidemiology
  - Biomedical engineering
- All BERD services are free of charge to early-career clinical & translational science researchers at Emory, CHOA, MSM and Georgia Tech

BERD Leadership and Program Team



BERD Features (continued)

- ACTSI Studio Sessions: face-to-face brainstorming sessions for protocol development with ACTSI experts in multiple disciplines (biostatistics, epidemiology, health economics, clinical research networks, biomedical informatics & research IT, regulatory, etc.)
- Webinars & training courses in introductory statistical computing at MSM
- Sorry, BERD does not have the resources to provide:
  - Data management
  - Help for senior researchers
  - Help for residency training programs
  - Help on urgent projects

How do I request help from BERD?

- **Go to http://www.actsi.org/**

  … and click on the tab for "Submit a Request"

Outcomes Center

CHOA Analytic Consulting

Robert Palmer, PhD, MSN, RN

Director, Outcomes and Quality Measurement

Care Transformation

robert.palmer@choa.org

Children's℠
Healthcare of Atlanta
Dedicated to All Better

Quantitative and Qualitative Data Analysis

- We are familiar with most of CHOA's data sources (clinical and financial) and additional ones purchased by CHOA (i.e. PHIS)
- Our team consists of Biostatisticians, EPIC-certified analysts, and a Medical Economist
- Consulting
  - Measure design
  - Study design
  - Survey development
  - Statistical Approach
  - Data Sources

Quantitative and Qualitative Data Analysis

- Support
  - Quality/Process Improvement analysis
  - Decision-support analysis
  - Tool validation
  - Analysis for abstracts/manuscripts
  - Analysis for small grants (time-based)

Who Do We Support / How to get support

- Who?
  - CHOA Employees/Researchers (i.e. Emp ID, AD Account, CHOA email, etc)
  - External researchers sponsored by CHOA Employees/Researchers
- How?
  - Data or Research Data Request Form (See Appendix A)
    - Short/simple analysis, less than one week of work, few resources
  - Care Prioritization Form
    - Short and long-term projects requiring a week or more
    - Multiple department resources across CHOA needed for completion
    - Form reviewed for approval by CHOA leadership committee every month
    - No approval, no support
- Cost?
  - None

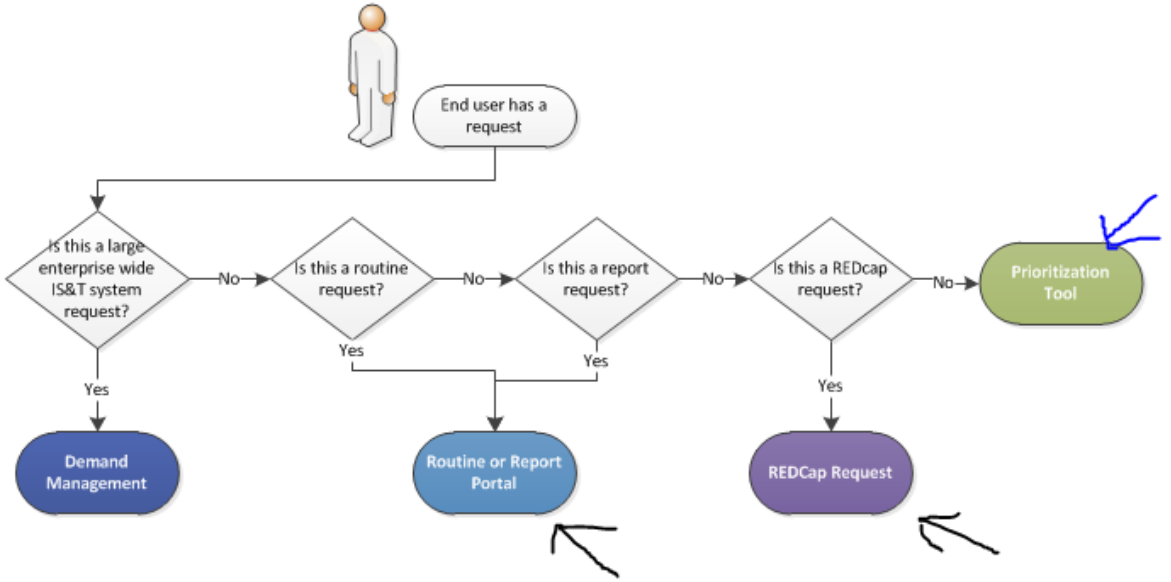
Care Transformation Request Form (1 of 2)

Care Transformation Request Form (2 of 2)

New Requests

For Department Only

- IS&T System requests (i.e., Demand Management, Capital Projects, etc.) will route through IS&T Demand Management and Capital process and can be accessed here.
- Routine requests (i.e., new Epic report) will flow through the Routine/Reporting Portal, accessed here.
- REDcap requests will flow through the REDcap request portal within the Outcomes Center and can be accessed here.
- All non-routine information delivery requests will funnel through the prioritization committee and can be accessed here. For example you manage requests for the report portal/routine requests and get a request for a data mart to be built, you would reach out to the appropriate workstream prioritization group (Care Delivery and Administrative).



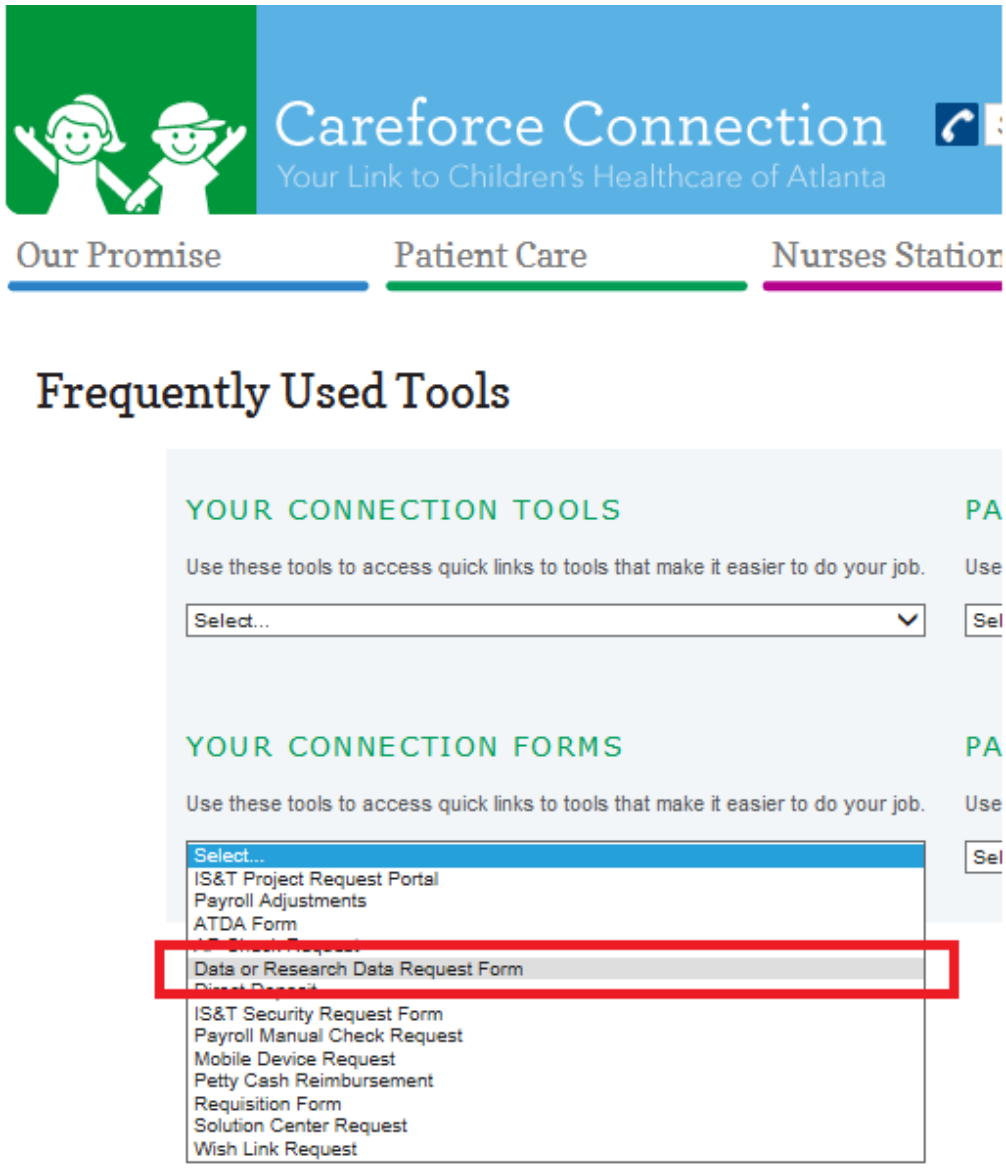
Submit new requests here:

Questions

"Data don't make any sense,
we will have to resort to statistics."

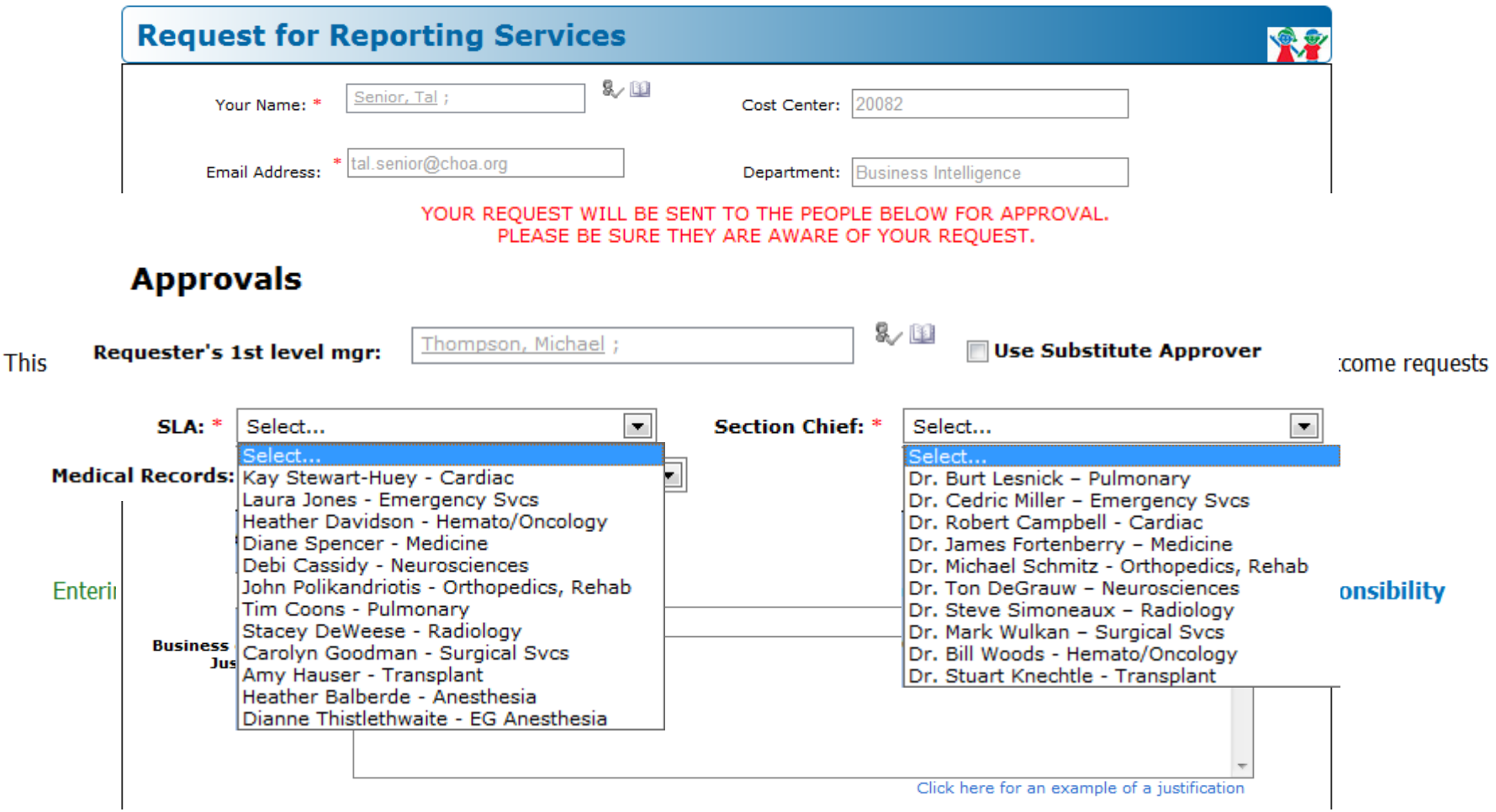
Appendix A: Requesting Support

1. Reporting Services Request:



- email: data@choa.org

Appendix A: Requesting Support



Rollins School of Public Health
Rollins Earn And Learn (REAL)
Office of Admission and
Student Services
Emory University

Natasha Simpson, MPA
Rollins Earn and Learn (REAL) Program
Office of Student Services
Rollins School of Public Health
Emory University
real@emory.edu

What is REAL?

Applied work experience program

- Mentorship
- Earnings
- For full-time MPH and MSPH students
- Students work part-time on- or off-campus with partner employers

To participate, must receive REAL Award in financial aid package (OPUS)

Public health experiences in:

- Federal, state, county and other government agencies
- For-profit and nonprofit organizations
- Emory University, Emory Healthcare, and Emory-affiliated programs

50/50 salary split between Emory and the partnering organization or department (only $6/hour)

What is REAL?

- $12.00/hour (up to $2,500 per semester)
- Maximum of 208.3 hours/semester
- Average of 10-15 hours/week
- 1-2 semesters in length

Students are allowed employment in **only one** position funded through the Rollins Earn And Learn at a given time. However, a student employee may hold both a Rollins Earn And Learn position and a non-REAL position simultaneously.

Net earnings are deposited directly to your bank account every two weeks based on the number of hours worked.

What are REAL Opportunities?

Positions in the REAL Program are designed to be **public health competency-based** which allow for students' professional development:

- Analytical/assessment
- Policy development/program planning
- Communication
- Cultural competency
- Community dimensions of practice
- Public health sciences
- Financial planning and management
- Leadership and systems thinking

Established by the accrediting body, Council on Linkages between Academia and Public Health Practices, adopted on May 3, 2010.

What Kind of Work are Students Doing?

- Program planning and evaluation
- Safety education
- Health curricula development
- Literature reviews
- Policy research for health issues
- Benchmarking research for program development
- Data management for programmatic or research databases
- Constituent communication via social media and web sites
- Emergency drills and preparedness
- Laboratory work
- Budgetary and management assistance
- Research interviews
- Conducting focus groups
- Research study subject or patient recruitment
- Statistical analysis
- Manuscript preparation assistance
- Event planning and execution
- Health promotion
- Community asset mapping
- Conference planning
- Disease prevention
- **Much, much more!**

Who is Eligible?

ROLLINS SCHOOL OF PUBLIC HEALTH full-time students

- **Complete the Free Application for Federal Student Aid (FAFSA)**

- **All eligible students receive award on a first-come, first-serve basis**
- There is no separate application process and eligibility for this award is based upon the following (domestic and permanent residents):
  - The availability of funds
  - Date of submission of a completed FAFSA
  - Date of admission
  - Full-time enrollment as a degree-seeking student
  - Student must maintain satisfactory progress as defined by the Rollins School of Public Health
- Eligible international students are sent an application to apply for a REAL award after enrolling in their first semester at RSPH (after August). International students who are approved to work are eligible for the REAL Award beginning their second semester of their first year of the MPH/MSPH program. Should the student receive the award, it would be for their second semester of their first year of the program. They could then apply again for REAL their second year of the MPH program during the Spring semester before they start their second year at RSPH.

Who is Eligible? (con't)

Employers:

- Federal, state, county and other government agencies
- For-profit and nonprofit organizations
- Emory University, Emory Healthcare, and Emory-affiliated programs

Must be approved by Emory University, Rollins School of Public Health

APPROVED EXTERNAL PARTNERS

Advocates for Responsible Care
Adeptus Health
American Cancer Society
Arthritis Foundation
Atlanta Community Food Bank
Ben Franklin Academy
Benevis, LLC.
The Biophilic Institute
Bioscape Digital
Brigham and Women's Hospital
Biomathematics Consulting
Boys And Girls Clubs
CARE
Centers for Disease Control and Prevention (CDC)
Center for Black Women's Wellness
Children's Healthcare of Atlanta
Childspring International
Clarkston Community Center
Coker Group
Community Advanced Practice Nurses
Community Ecosystem
Compassion in World Farming
DeKalb County
DeKalb Medical
Diabetes Association of Atlanta, Inc.
Eagle Hospital Physicians
Education Development Center, SE Area
Fayette C.A.R.E. Clinic
Federal Defender Program
Feminist Women's Health Center
Four Seasons Health Consulting
Fund for Theological Education
Georgia AIDS Coalition
Georgia Appleseed Center for Law and Justice
Georgie CORE
Georgia Dental Association
Georgia Department of Agriculture
General Board of Global Ministries
Georgia Campaign for Adolescent Power and Potential
Georgia Department of Public Health

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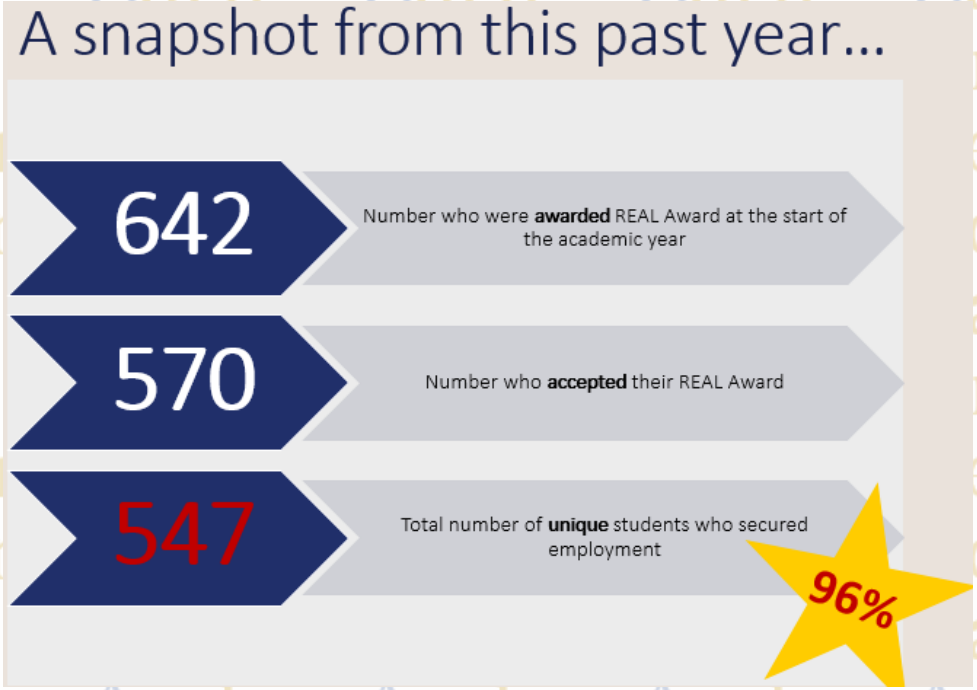
Georgia Department of Public Health

National Association of Chronic Disease Directors
The New School
New Venture Fund on behalf of WASH Advocates
Palmetto Health Council
Partnership for Community Action
Pedestrians Educating Drivers on Safety, Inc. (PEDS)
Piedmont Healthcare
Planned Parenthood Southeast, Inc.
Postpartum Progress
Prevent Blindness Georgia
Project Open Hand – Atlanta, Inc.
Reaching Our Sisters Everywhere (ROSE)
RTI International
Safe States Alliance
Save the Children
Side by Side Brain Injury Clubhouse
Skyland Trail
Soccer in the Streets
Southeastern Primary Care Consortium Area Health Education Center (SPCC-AHEC)
SHPR Group
Star C (Willow Wellness)
State of Georgia Department of Human Resources
Task Force for Global Health
Third Sector Development, Inc.
Thompson Victory Group
Truancy Intervention Project Georgia
United Methodist
Urban Health Initiative
VaxTrac
VOICE Today
Wellcentive
West Atlanta Watershed Alliance
Whitefoord, Inc.
Wholesome Wave Georgia
WCA of Greater Atlanta

Rollins School of Public Health, Students and Employers Working Together



Contact Information

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Rollins Earn and Learn (REAL) Program
Office of Student Services
Rollins School of Public Health
Emory University
real@emory.edu

Health Analytics Group at Georgia Tech: Data in Action

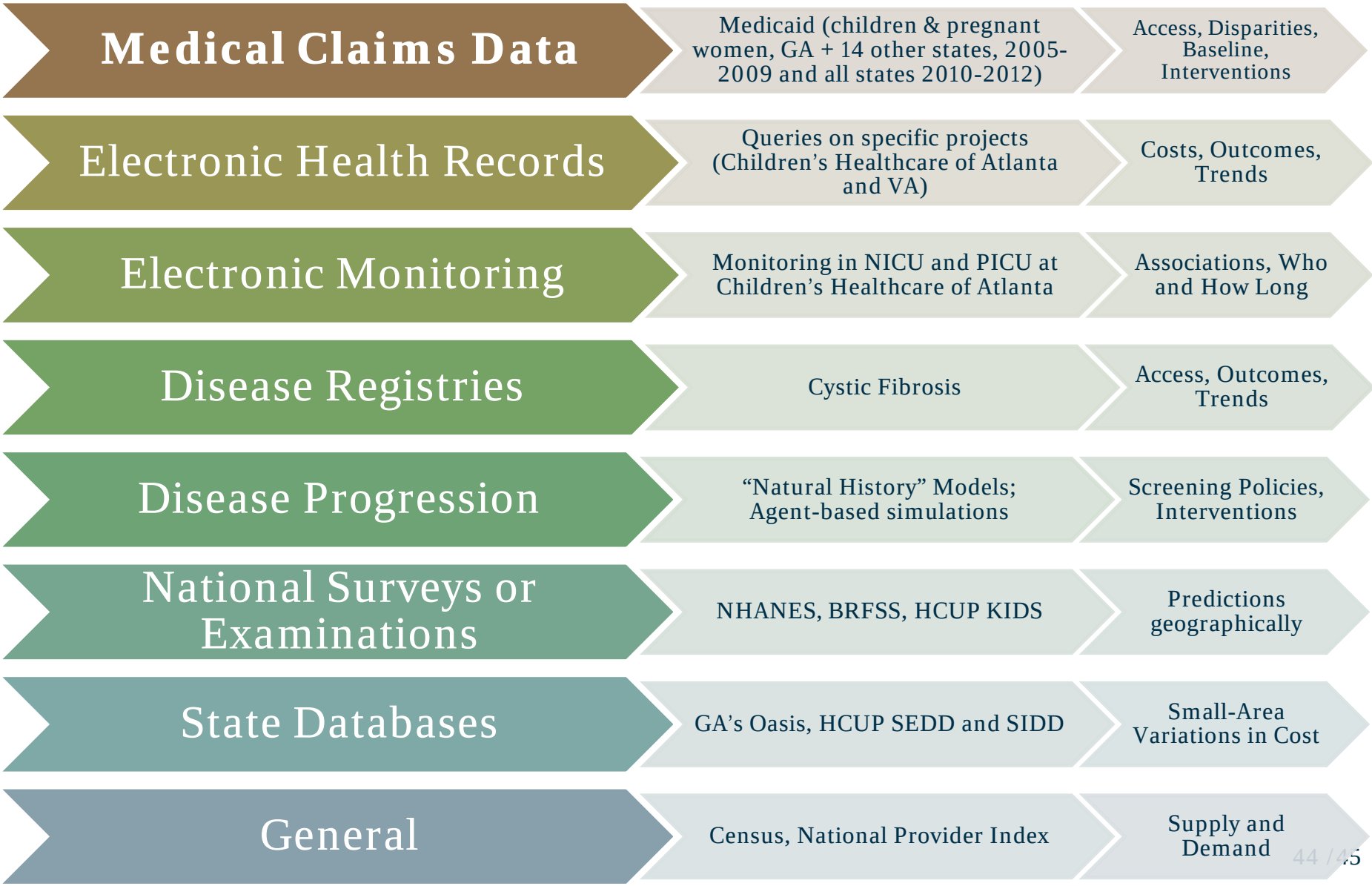
Nicoleta Serban, PhD
Coca Cola Associate Professor
Julie Swann, PhD
Harold R. and Mary Anne Nash Professor

H. Milton Stewart School of Industrial and Systems Engineering
Georgia Institute of Technology

Georgia Tech Health Analytics
Stewart School of Industrial & Systems Engineering

Georgia Tech ISyE
Stewart School of Industrial & Systems Engineering

Health Analytics: Data Landscape



Example Projects

- Pediatric Asthma
  - Access to care and links to severe outcomes
  - Asthma baseline (utilization, expenditures, treatment) for small areas
  - Pathways to care (e.g., primary care, ERs, other)
- Access to care and disparities
  - Quantification of access to primary care or pediatric care
  - Studies of geographical inequities in access
  - Comparison of potential access to realized access (utilization)
- Expenditures and cost
  - By patient Clinical Risk Group (CRG, using 3M software)
  - Geographically or over time
- Others
  - Estimated prevalence of pediatric obesity geographically
  - Utilization of dental care (preventative or treatment)
  - Provider adherence to guidelines for ADHD
  - Potential sites for telemedicine for primary or specialty pediatric care
  - Infectious disease modeling and interventions

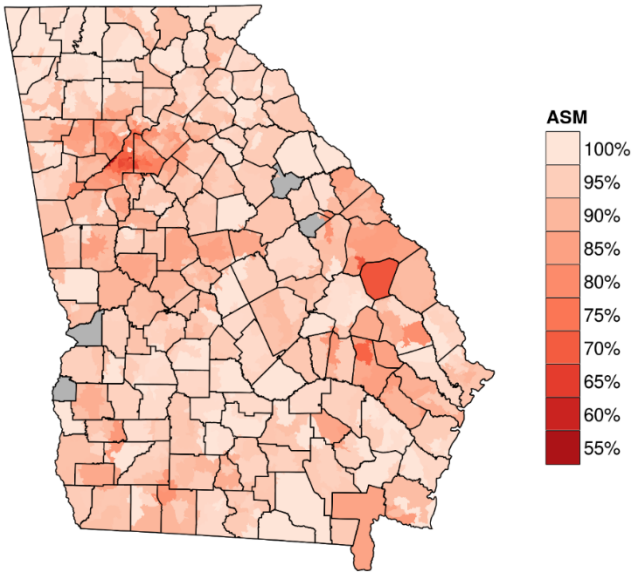
Improving Cost and Outcomes for Pediatric Asthma

- GT has developed baseline metrics for pediatric asthma among children on Medicaid together with Children's Healthcare of Atlanta

  - Utilization of services (ED, hospital, other)
  - Expenditures per visit or per patient
  - Treatment (adherence to medication, or ratio of controller to emergency use)

- The measures (in small areas, over time, and between states) can be used to design and target interventions

- GT has worked with CDC to project Return on Investment of asthma interventions (Griffin, Keskinocak, and Swann)



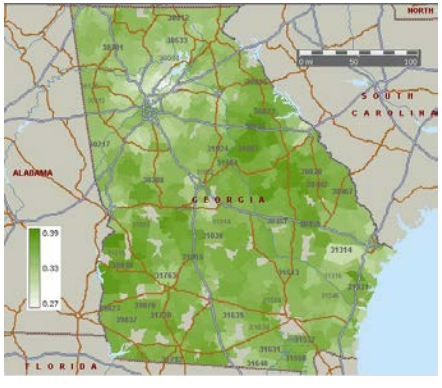
Many patients meeting definition of "persistent asthma" are not getting even one controller medication (Serban & Swann)

Disease Prevalence

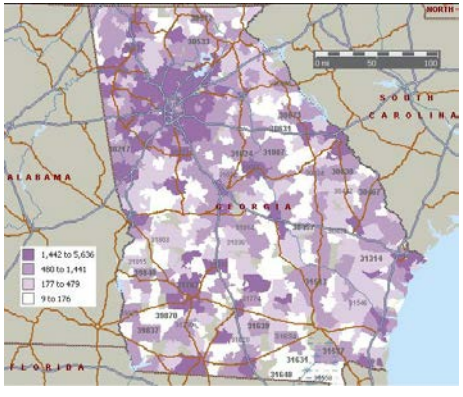
- What is the expected level of disease in each area, so interventions may be targeted effectively?
  - Prevalence of pediatric obesity differs by population characteristics and/or geographically; widespread survey may be costly
- Statistical modeling can be used to project prevalence in "small" geographical areas"
  - Build regression to predict probability child is overweight or obese
    - NHANES (with examinations) or NSCH (self-reported)
  - Combine with a simulation of virtual individuals from Census data
- Validated with external data and compared to CDC approach

Results used to target interventions by a large healthcare provider in GA

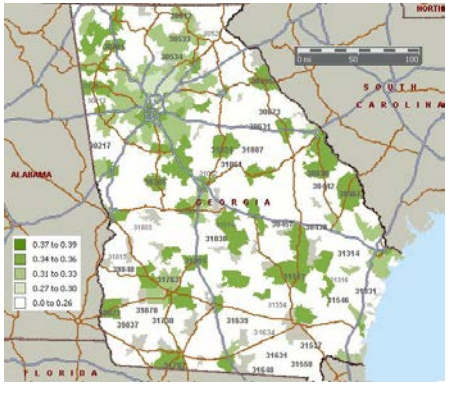
Prevalence (zip codes)



Number of Children (2-17)



Priority Areas: ~ 80% of the overweight children in GA

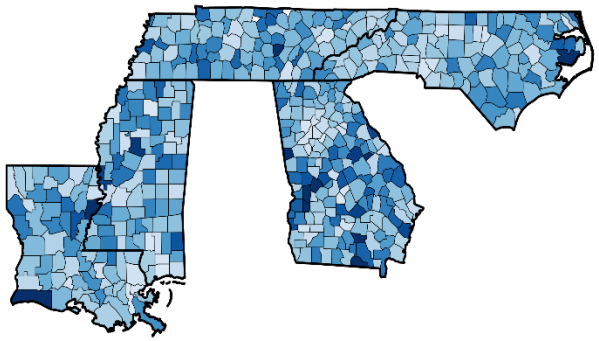


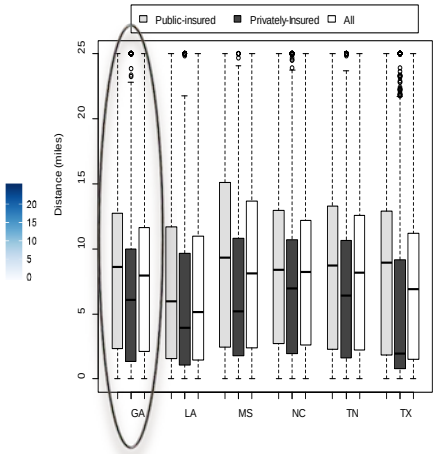
Access to Primary Care for Children: How is Georgia doing in SE?

GOAL:
Comparing travel distance to and availability of pediatric primary care across SE states.

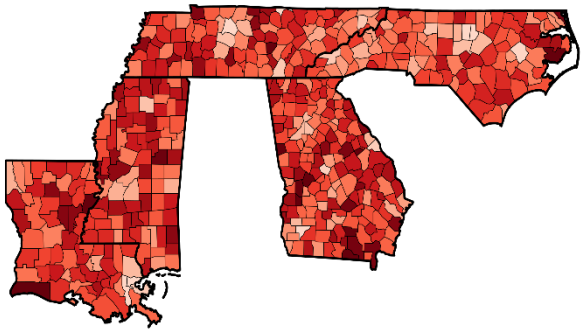
FINDINGS:
- Georgia is no worse or better for both travel distance and availability in SE
- Public-insured children in Georgia travel a few miles more for primary care but they experience similar waiting times as privately-insured

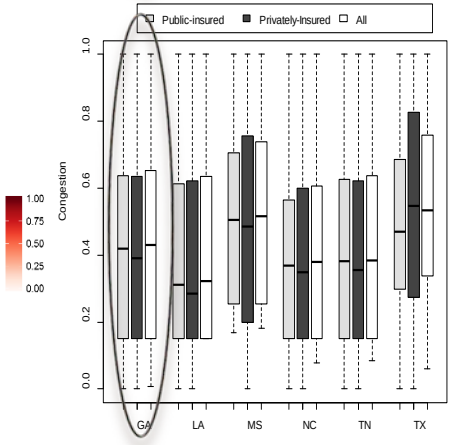
Travel distance





Availability





Work by GT Faculty Serban and Swann

The Basics

- Areas of specialty/core competencies
  - Statistics
  - Disease Modeling & Simulations, Cost-Effectiveness
  - High performance computing (e.g., small area analysis)
- Groups served
  - Collaborations with CDC, Children's, Emory, VA, others
- How to request – mechanism and time considerations
  - healthanalytics@isye.gatech.edu or faculty
- Best time to contact in the project development pathway
  - Early is best but can be done later
- Pricing model
  - Jointly apply for funding from NIH, AHRQ, etc.

Contact

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Julie Swann, jswann@isye.gatech.edu

Georgia Tech Health Analytics
Stewart School of Industrial & Systems Engineering

http://healthanalytics.gatech.edu

APPENDIX

Health Analytics at Georgia Tech

Georgia Tech

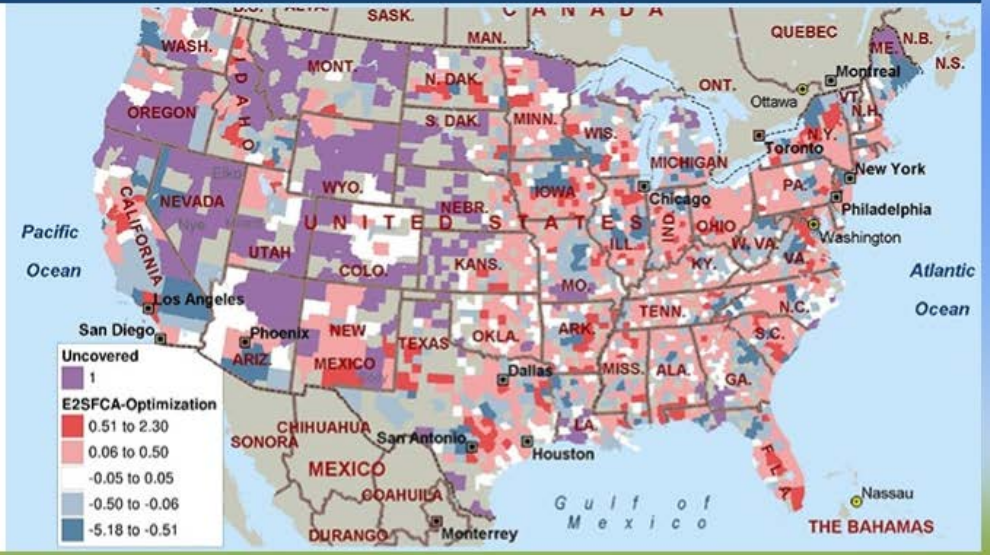
Georgia Tech Health Analytics
Stewart School of Industrial & Systems Engineering

Home About Focus Areas Data Tools Publications People CONTACT SEARCH

An optimization framework for measuring spatial access over healthcare networks

Measurement of healthcare spatial access over a network involves accounting for demand, supply, and network structure.

Read More



HEALTH ANALYTICS @ GEORGIA TECH

Health Analytics at Georgia Tech bridges fundamental mathematical and computational modeling with health services research and health economics as a means of translating health and healthcare data into knowledge and decision making.

Prevent Communicable Diseases through Mathematical Modeling

- Mathematical models estimate disease spread geographically and over time to
- Analysis helps determine effective intervention strategies and their impact

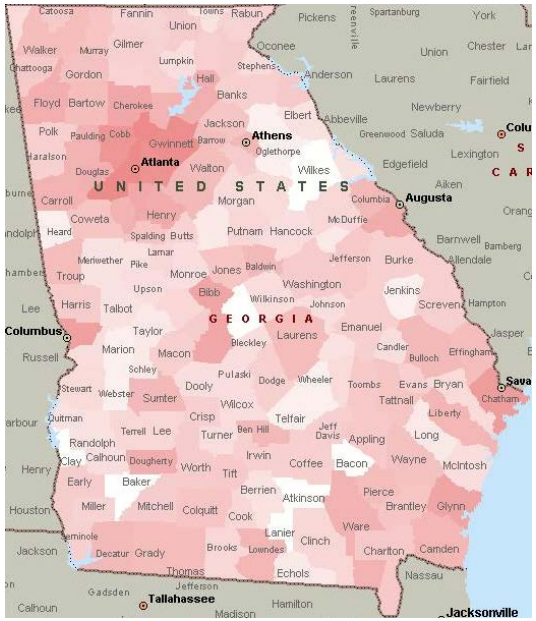


Figure shows projected disease spread of flu after 90 days (Keskinocak/Swann team);

Hospital-Acquired Infections | Pandemic Flu | Ebola | Cholera | Measles

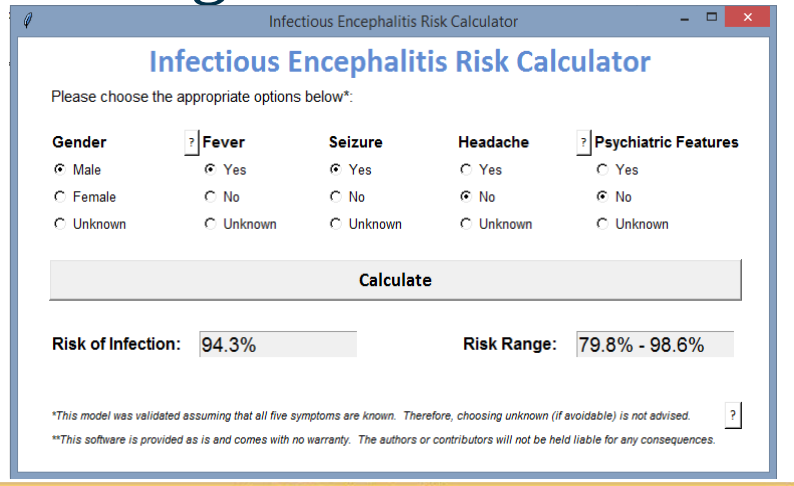
Population Screening

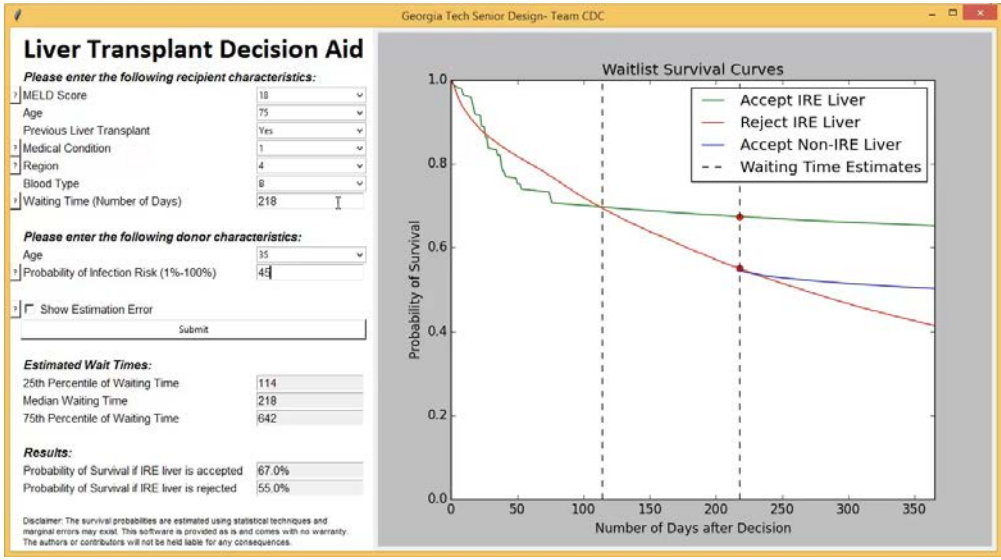
- Screening/Monitoring
  - Increase treatment success or slow disease
  - Reduce secondary infections
  - Cancers, HIV, Hepatitis C, newborn screening, etc.
- Trade-offs
  - May be costly to test many people
  - Test or overtreatment may involve some risk
- Research question
  - Who should be screened (monitored) and how often (for how long)?
- Simulation: Examine screening policies for current and future cost and outcomes
  - "Natural History" of a disease populated with clinical findings on progression, rates, etc.

Work by GT Faculty Ayer, Griffin, Keskinocak, Swann

Decision-support tools for informed and shared clinical decision making

- Organ transplant: Identification and allocation of increased risk encephalitis organs
  - Risk calculator
  - Estimation of survival curves and wait time considering patient condition and location
- Prenatal screening for down syndrome considering women's preferences





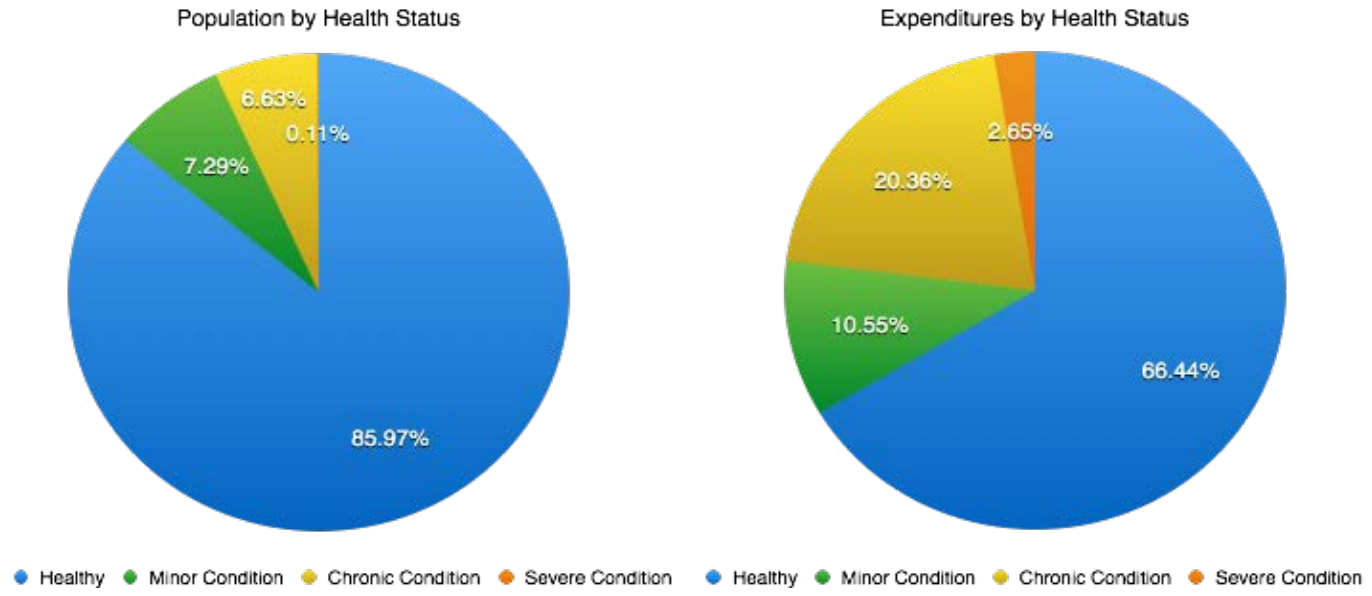
Work by GT Faculty Ayer and Keskinocak

Snapshots from transplant decision tool

Variations in Healthcare Costs

Objective: Categorize populations by cost while identifying factors associated with variations in cost

Findings: A small percentage of medically-needy patients have large costs, while the majority of Medicaid expenditures are driven by other populations of children

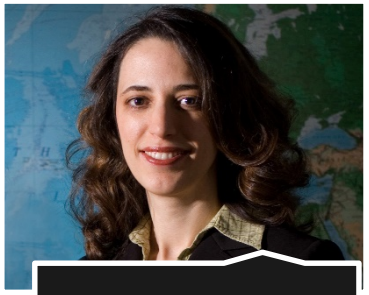


Work by GT Faculty Serban and Swann

Many GT ISyE Faculty with Health Research

Turgay Ayer

Dave Goldsman



Pinar Keskinocak

Eva Lee

Yajun Mei

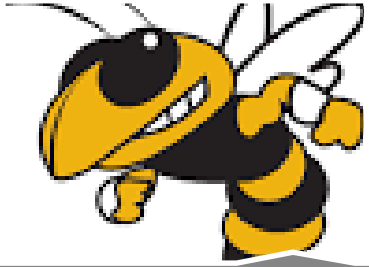
Nicoleta Serban

Julie Swann

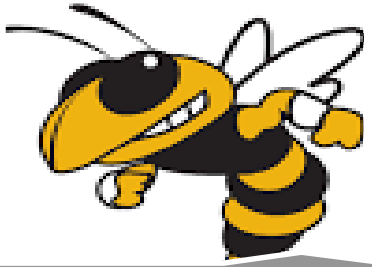
Brani Vidakovic

There may be others not listed!

Today is just a sample of topics…

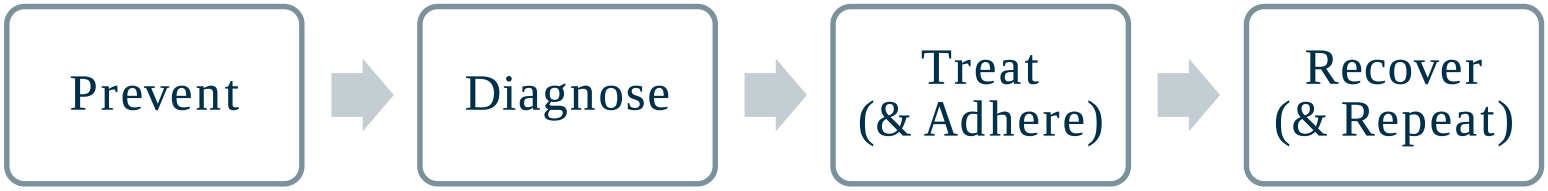


"Humanitarian" (John Bartholdi, John VandeVate, …)



Others (Shabbir Ahmed, Kamran Paynabar, Edwin Romeijn, Joel Sokol…)

Analysis Informs Interventions



- Interventions may take different forms
  - Patient behaviors (e.g., use of ER, adherence to medication)
  - Provider practices (e.g., adherence to guidelines or development of new protocols where needed)
  - Network changes (e.g., telehealth, pharmacies, schools)
  - Education and Outreach (to patients or providers)
  - Environment (e.g, homes, schools)
  - Policies (e.g., reimbursement rules)
- Different stakeholders, “customers”, or decision makers
- Goals: Efficiency (cost), Effectiveness (outcomes), or Equity (fairness, e.g., in public health)

CMS Data and Background

Medicaid claims data are used as a test bed for the decision-making support tools to improve the system providing care for children on Medicaid.

Medicaid Data Questions: Dr. Nicoleta Serban (nserban@isye.gatech.edu)
or Dr. Julie Swann (jswann@isye.gatech.edu) or Richard Starr (rstarr7@gatech.edu)

CMS Medicaid Data

- MAX Claims Data Files
  - **Personal Summary**: patients, demographics, birthdate, etc.
  - **Inpatient**: claims, diagnoses, procedures, LOS, payment
  - **Other Therapy**: claims for physician, lab, clinic, outpatient
  - **Long Term Care**: facility type, date of service, etc.
  - **Prescription Drug**: paid drug claims
  - (National Provider ID & Characteristics File for 2009 forward)
- Years 2005 – 2009 for 14 states
  - SE: Georgia, Alabama, Arkansas, Louisiana, Mississippi, N. Carolina, S. Carolina, Tennessee, Texas & Other: California, Minnesota, New York, Pennsylvania
- Years 2010-2012 for all states available (46+)
- Data for 2013 available for purchase soon
- Terabytes of information (100's Billions of claims records), coded in CMS claims terminology, extensive data dictionary (420+ pages)
  - Highly complex: heterogeneous set of patients, multiple hierarchy levels (e.g. states), observational study, compounded dependencies
  - Patient-level Identifiable-Files requiring high levels of safeguards

CMS Medicaid Data: Access to Data

- Data stored in secure location at Georgia Tech, with access to the detailed data by a limited set of GT employees approved by CMS and IRB
- Massive data files, with technology infrastructure for efficient access
- Sharing of aggregated data is allowed with collaborators, if consistent with research purposes and research protocol
  - Cells should have at least 11 entries
  - Data undergoes review process at GT before release from data workstation
- Significant liability involved if breach occurs
- Data management plan revised for easier maintenance

Comments about MAX Data

- Limitations
  - Research must fit within scope proposed to CMS
  - Analysis of raw data must be conducted at GT
  - Process for analyzing data is onerous, time-consuming, and "expensive"
  - Data only covers Medicaid claims
  - Does not include school absenteeism data
  - Data never includes the most recent (~2) years of data
- Positives
  - We can benchmark GA against 13 other states
  - Patients and/or providers can be followed longitudinally
  - Includes provider visits and prescription claims
  - No one has to give permission for us to ask specific questions or publish related answers

Examples of Potential Research Allowed

- Asthma Specific
  - Access
    - Where is access to asthma care most critical for Medicaid patients?
    - What factors are related to lower access, and what policies might improve access?
    - Does access to specialty care impact outcomes (e.g., reduce ER visits)?
  - Current Utilization and Costs
    - What are the costs, utilizations, and “outcomes” (such as hospitalizations) for Medicaid patients across the network? How does GA compare to other states?
    - How do estimates of prevalence compare to utilization of services for asthma care?
    - Where is variation in care and patient usage the greatest for medication adherence?
  - Projections of Changes
    - Which interventions are likely to have the largest impact and where?
    - Telemedicine? Reimbursement changes? Medical Education? Etc.

CMS Medicaid: Approved Topics

1) MEASURING AND EXPLAINING INEQUITIES:

To assess the impact of healthcare system characteristics *vs.* inequities in healthcare, including *geographical*, *use*, *quality*, *expenditure and outcomes* among Medicaid children enrollees, especially in states with historic inequities like in the southeast.

a) To identify geographic areas with widespread and increasing Medicaid healthcare use (status quo and over time) and determine the underlying associative factors (e.g. access to healthcare facilities, race and ethnicity);

b) To investigate geographic variations in healthcare quality indicators (adherence to medications, emergency room visits, and other utilization measures) for high-impact diseases in children such as respiratory deficiencies, obesity, diabetes and other disabilities;

c) To identify geographic subdivisions which have achieved good health outcomes and low disparities despite adverse social determinants, or which have achieved poor health outcomes and high disparities worse than the social inequalities.

CMS Medicaid: Approved Topics

2) OPTIMIZING INTERVENTIONS AND DELIVERY SYSTEMS

To analyze flows and policies across the system, e.g., the match between supply and demand, and financially, both geographically and across time, along with the corresponding costs or outcomes, to analyze improved methods of delivery including medical homes.

a) To examine areas in the children Medicaid expenditure with the greatest costs or utilization, and assess potential interventions for reducing the healthcare costs, especially where interventions may be targeted by patient characteristics such as risk or where chronic issues like pediatric obesity can be addressed;

b) To evaluate the potential costs and benefits to creating a medical home or using telemedicine in the Medicaid system, where the creation may be focused on a subgroup of the Medicaid population or within specific geographical areas with great need;

c) To forecast the available "supply" of general or specialist providers or network services across geographical regions (e.g., counties or census tracts) as a function of socio-economic and other elements, link this factor with the costs or outcomes in the system as measured by the claims data, and examine potential interventions.;

d) To evaluate the impact of various public policies, such as changes in cost-sharing, on the demand for Medicaid coverage.