OneFlorida+

Clinical Research Consortium

Using Innovative Approaches, Addressing Real-world Problems

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OneFlorida+ Clinical Research Consortium:

Using Innovative Approaches, Addressing Real-world Problems

Background
Using real-world data to improve health.

Opportunities
Partnerships, infrastructure and purpose.

PCORI Research Priorities
Translates to other funders

Select Current Studies
Opportunities to developing cohorts more deeply.

Future Directions

BACKGROUND
CRITICAL HEALTH ISSUES AND REAL-WORLD DATA

Using Real-world Data to Improve Health

"Data relating to patient health status and/or the delivery of health care routinely collected from a variety of sources."

- US Food and Drug Administration

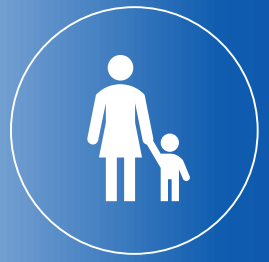
Examples:

- Electronic health record data
- Linked mother-baby data
- Tumor registry data
- Health care claims data

Leading Causes of Death in the Southern US

1. Heart Disease
2. Cancer
3. Stroke
4. Chronic lower respiratory disease
5. Unintentional Injury
6. Diabetes
7. Alzheimer's Disease
8. Influenza/pneumonia
9. Kidney Disease
10. Septicemia

Other Health Issues:

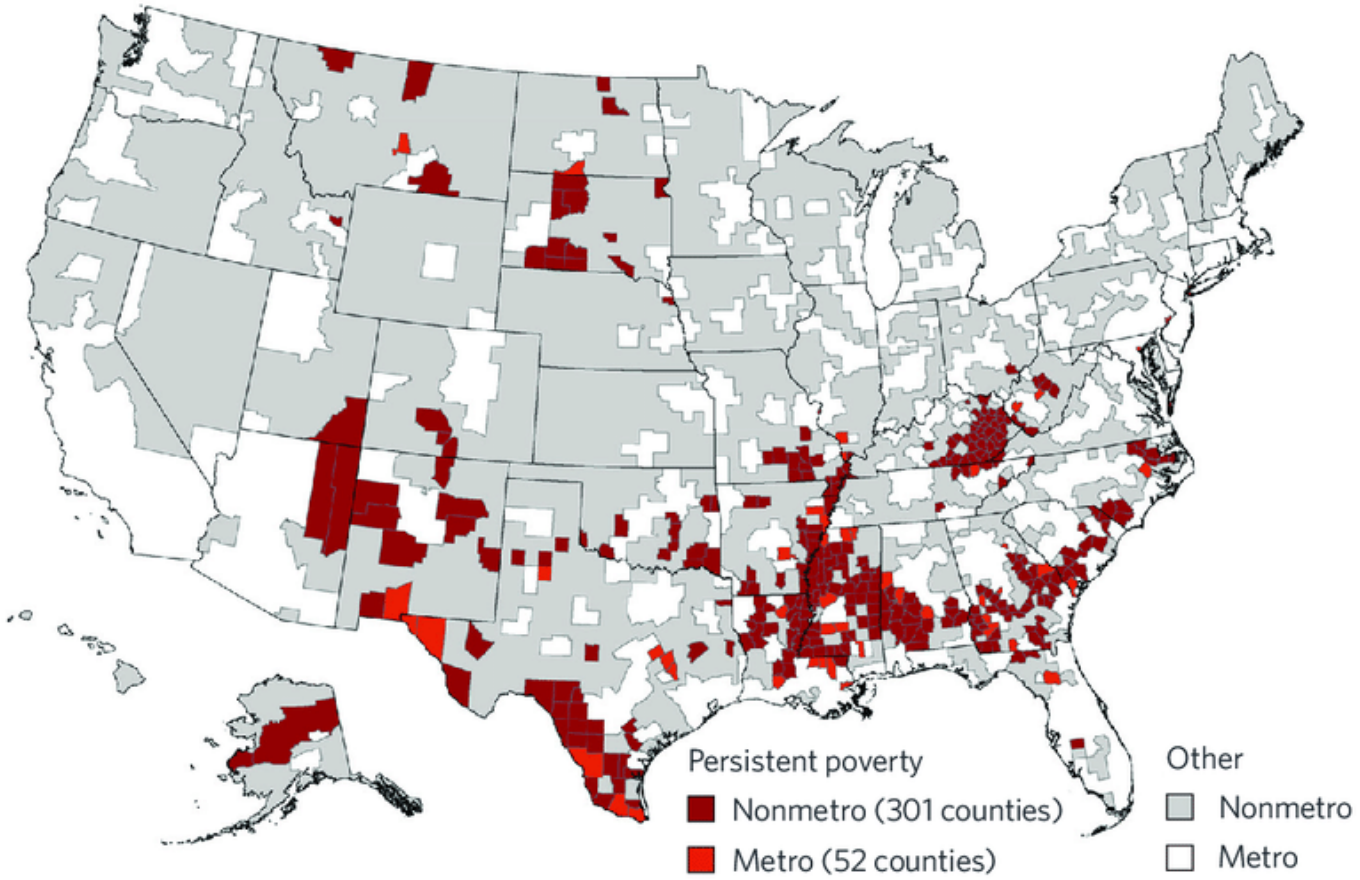


Alabama and Georgia rank in top 10 of US states in terms of **maternal morbidity and mortality**. Florida 32 out of the 50 states.

Alabama, Florida and Georgia rank in the top 15 states for prevalence of **mental illness** among adults in 2020.

Source: CDC and Ranking the States | Mental Health America (mhanational.org)

Persistent Poverty in the Southern US



Note: Persistent poverty counties had poverty rates of at least 20 percent in each US Census 1980, 1990, 2000, and American Community Survey 5-year estimates, 2007-11.

Key takeaways:

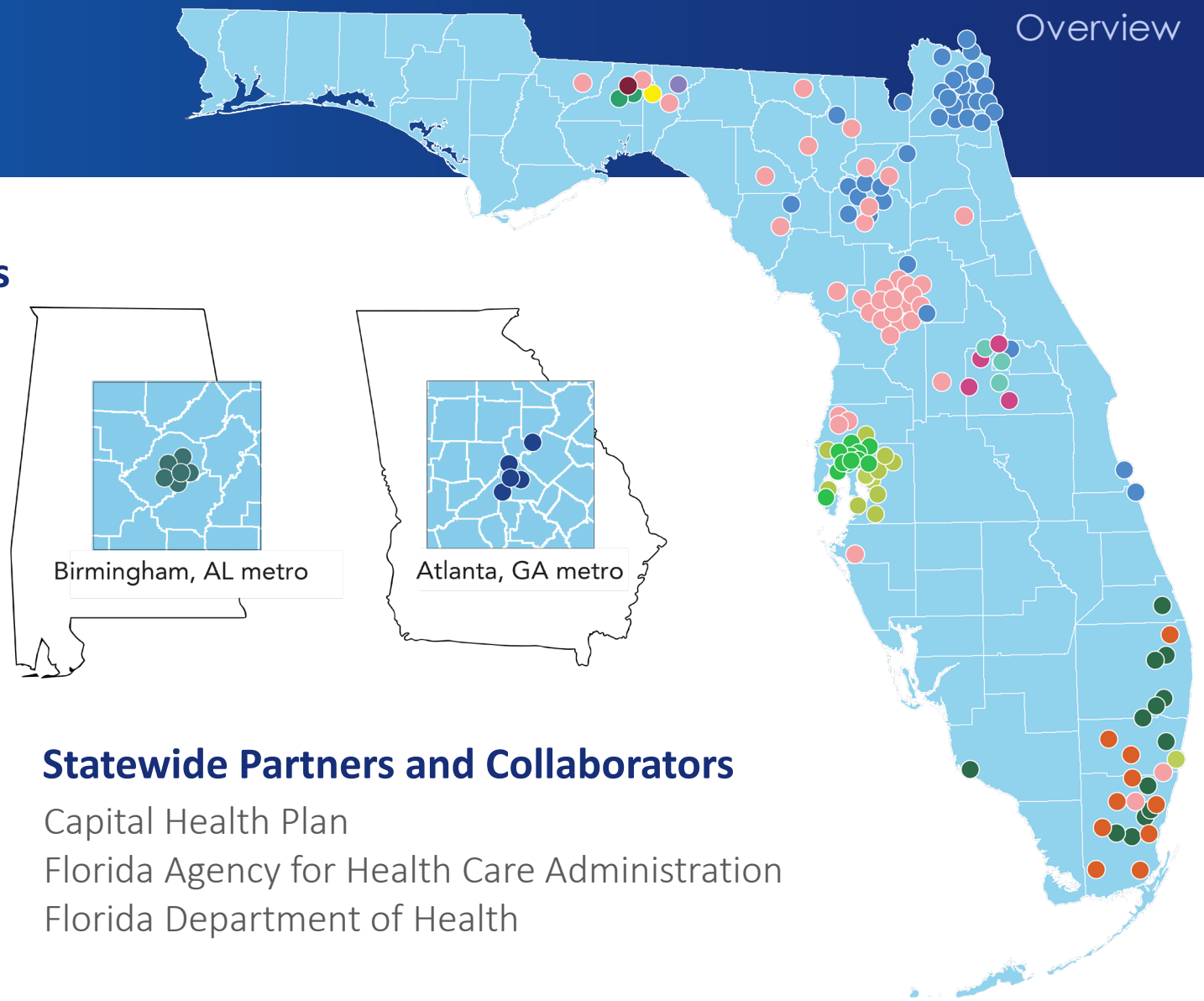
- Clusters in Alabama, Georgia and North Florida.
- Important to consider social determinants of health more broadly as well.

Sources: [The 10-20-30 Provision: Defining Persistent Poverty Counties (fas.org)]

OneFlorida+ Partners

Health Care Systems and Affiliated Practices

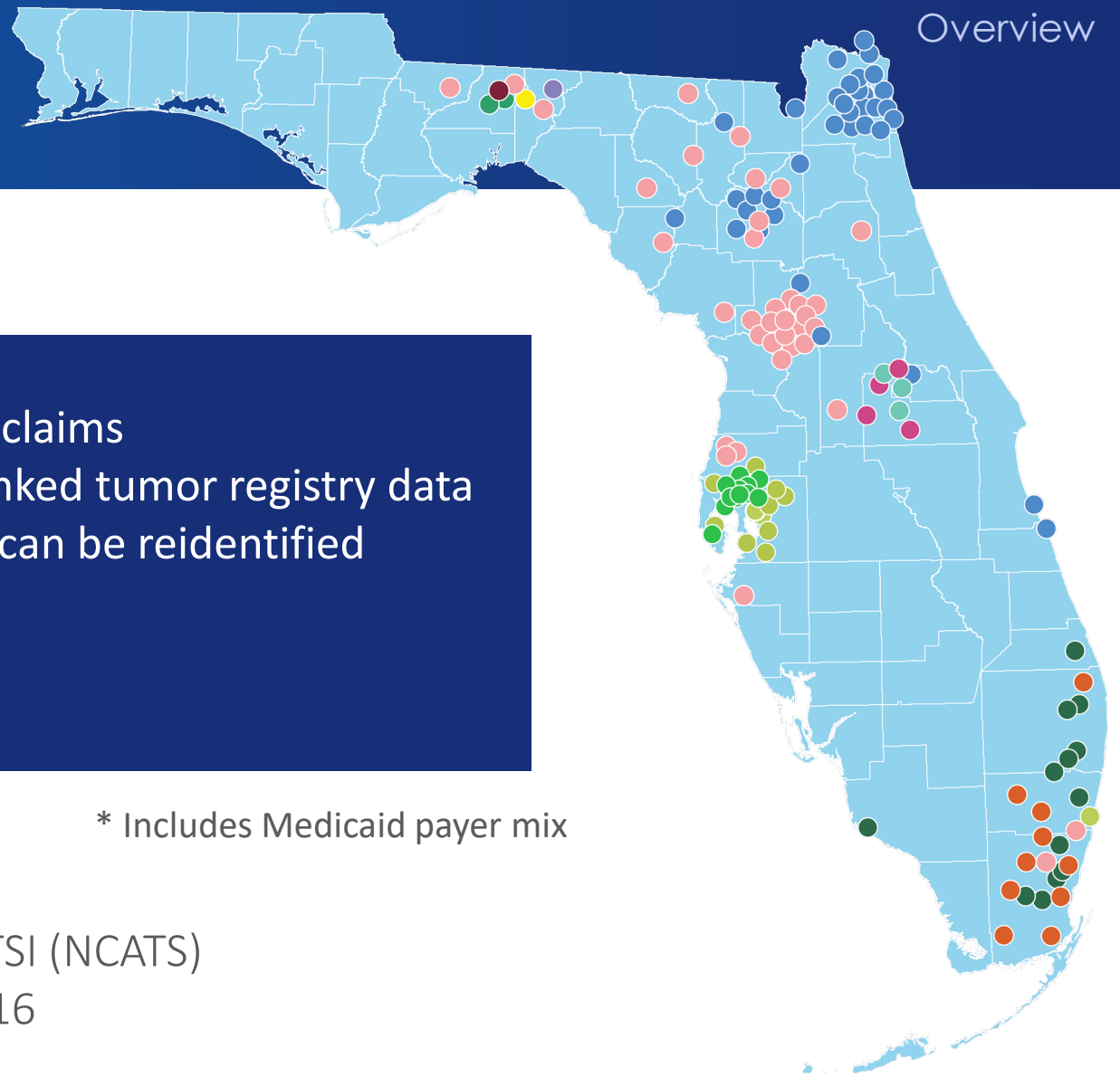
- University of Florida and UF Health
- Florida State University
- University of Miami and UHealth
- Orlando Health System
- AdventHealth
- Tallahassee Memorial HealthCare
- Tampa General Hospital
- Bond Community Health Center Inc.
- Nicklaus Children's Hospital
- CommunityHealth IT
- University of South Florida and USF Health
- University of Alabama at Birmingham
- Emory University



Statewide Partners and Collaborators

Capital Health Plan
Florida Agency for Health Care Administration
Florida Department of Health

OneFlorida+ Partners



Current Key Features:

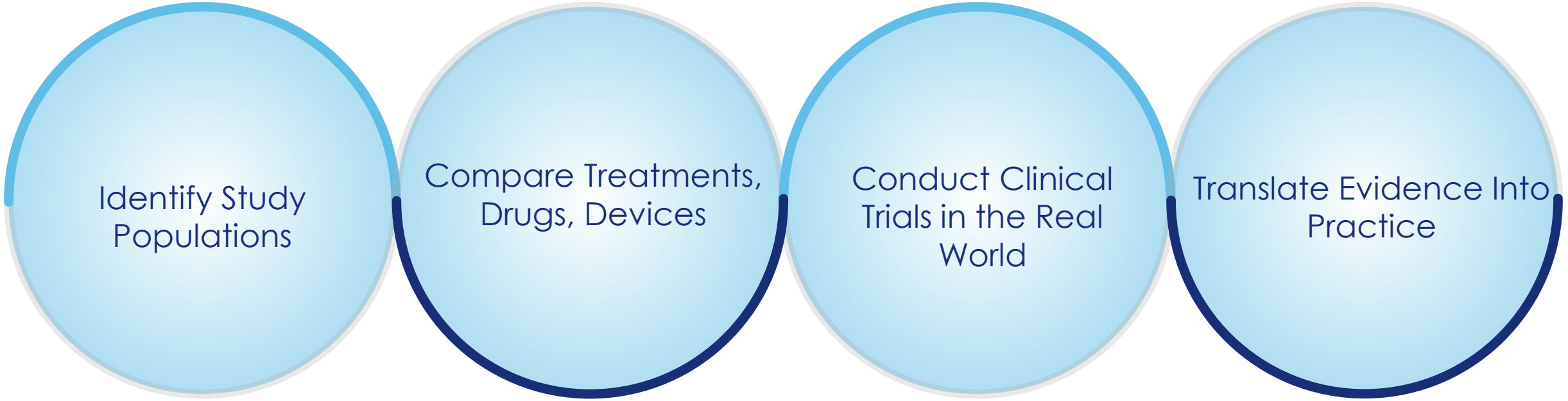
- 17 M Floridians*
- 2.1M Georgians and 1.2M Alabamans
- Centralized Data Trust
- Clinical data (electronic health records)
- Health care claims
- Sites with linked tumor registry data
- All patients can be reidentified

* Includes Medicaid payer mix

Infrastructure Funding:

UFHCC; PCORI CDRN-1501-26692 and 2020-005; CTSI (NCATS)
UL1 TR001472 and UL1 TR000064; FL DOH JEK 4KB16

An Enduring Infrastructure & Capacity for:



OneFlorida+ Research

The Florida, Georgia and Alabama of Today is the United States of Tomorrow: Older and More Diverse

Be the vanguard for innovative pragmatic clinical trials *that we lead* because we look like the future.

Infrastructure

Acquire ongoing support for the Data Trust and pragmatic clinical trial infrastructure.

Initiatives

Lead and conduct studies, refine focus areas, develop pilots that specifically build on our expertise, allow future collaboration with other PCORnet networks and target specific funding opportunities

Better Evidence Through Novel Data Linkages

Add populations, genomic, pathology, and other elements defined by the committee

Enhanced Collaborations

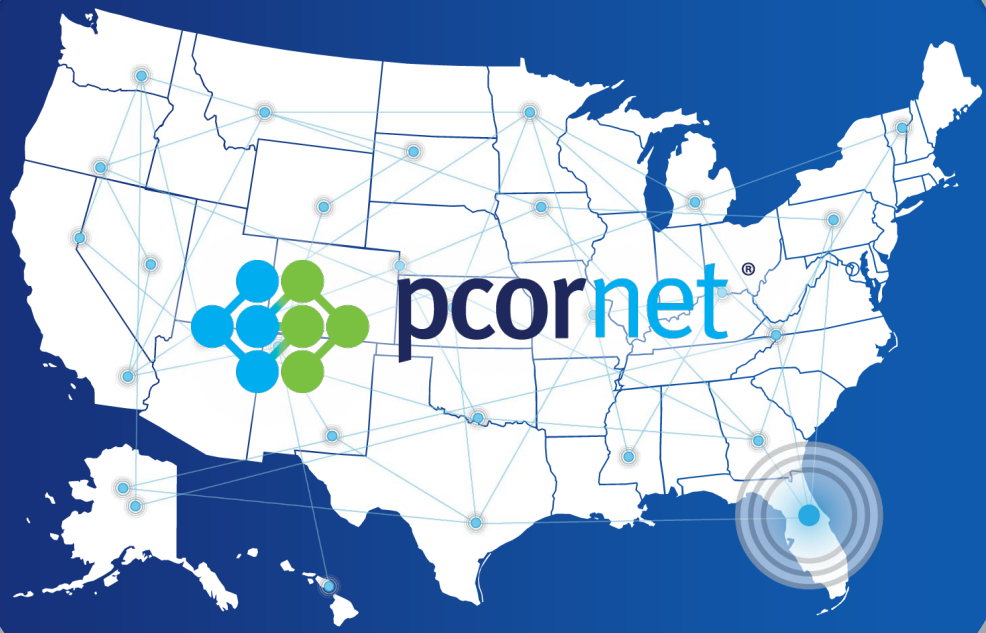
Identify opportunities to enhance use of OneFlorida, particularly with diverse populations for learning health systems and learning health communities

Uniting the State for Clinical Research

2010-11 | 2012 | 2013 | 2014 | **2015** | 2016 | 2017 | 2018 | 2019 | 2020

ONEFLORIDA CLINICAL DATA RESEARCH NETWORK: PCORI

The Patient-Centered Outcomes Research Institute (PCORI) funds the OneFlorida Clinical Research Consortium

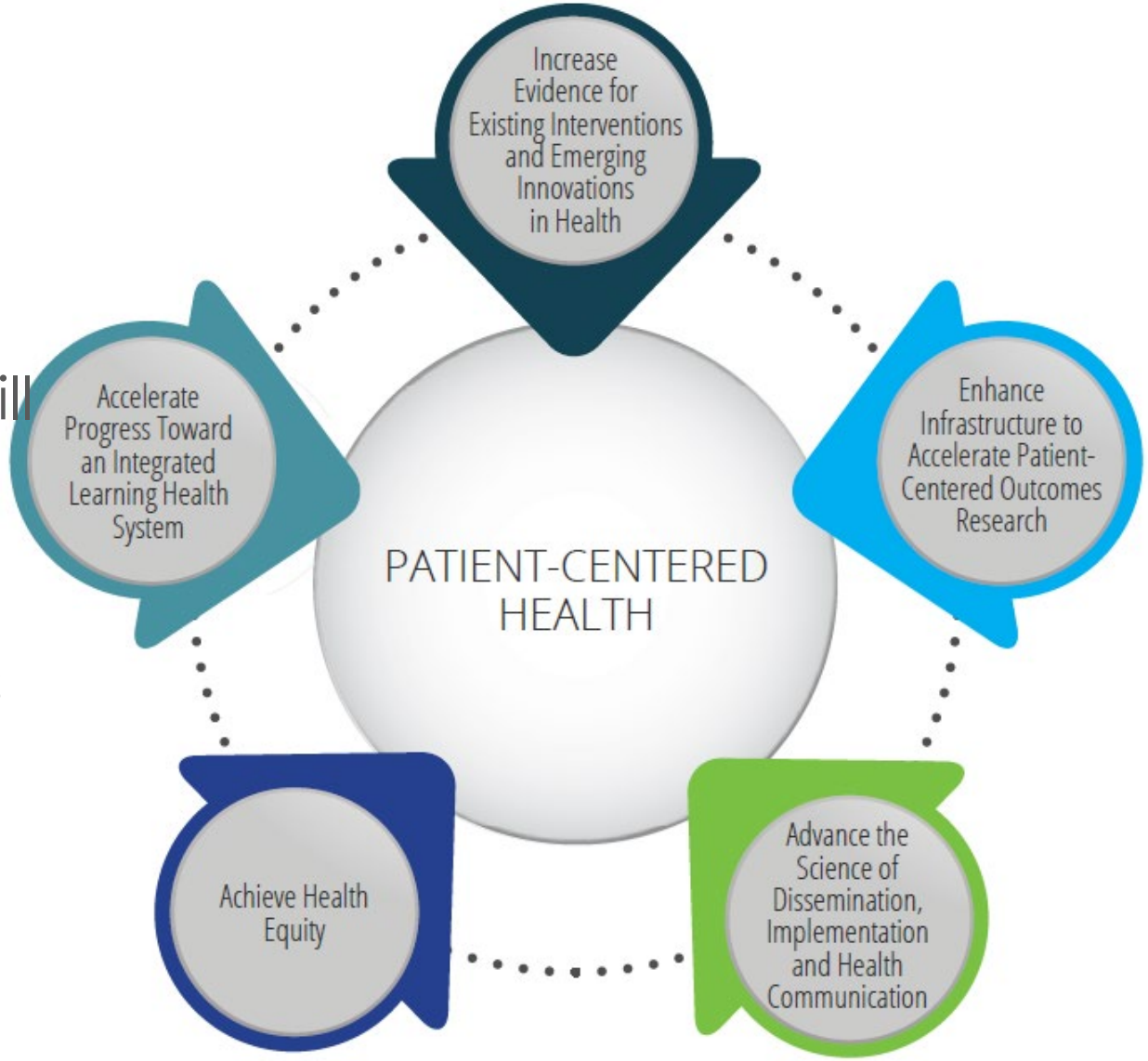


PCORI RESEARCH PRIORITIES & OTHER FUNDERS

PCORI Adopted National Priorities

- PCORI's congressional authorization requires identification of National Priorities and establishment of a Research Agenda outlining how it will address the National Priorities.

- The PCORI Board of Governors developed the first National Priorities for Research and Research Agenda in 2012 with input from PCORI's Methodology Committee and informed by substantial public comment.



PCORI Proposed Research Agenda

Proposed Research Agenda

- Fund research that fills patient- and stakeholder-prioritized evidence gaps and is representative of diverse patient populations and settings
- Fund research that aims to achieve health equity and eliminate health and healthcare disparities
- Fund research that builds the evidence base for emerging interventions by leveraging the full range of data resources and partnerships

PCORI Proposed Research Agenda

- Fund research that examines the diverse burdens and clinical and economic impacts important to patients and other stakeholders
- Fund research that focuses on health promotion and illness prevention by addressing health drivers that occur where people live, work, learn, and play
- Fund research that integrates implementation science and that advances approaches for communicating evidence so the public can access, understand, and act on research findings

PCORI 2022 and Beyond

Opportunities for Funding and Involvement in Patient-Centered Research

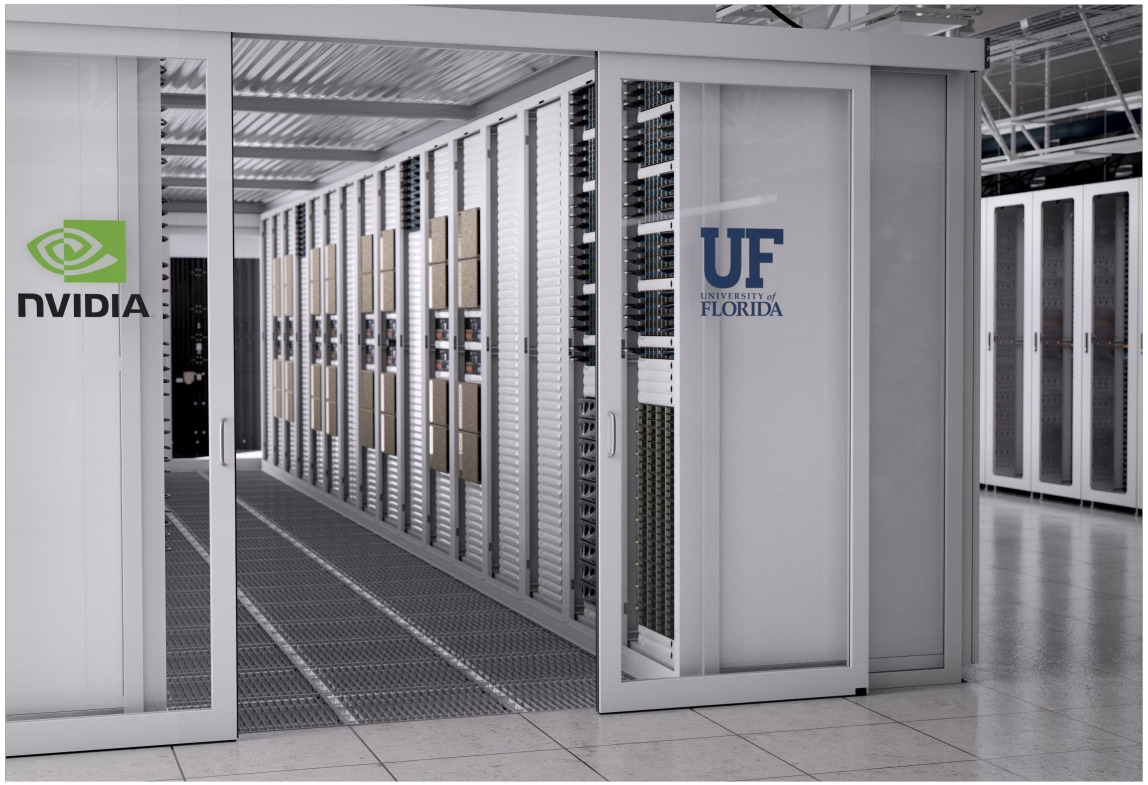
- PCORI BOG Approved Topics for Development
  - Healthy Aging
  - Maternal Morbidity and Mortality
  - Suicide Prevention
  - Visual Impairment
  - Hypertension Control
  - Advancing Health Equity
  - Telehealth for the Management of Chronic Disease
  - COVID-19
  - Cancer Immunotherapy

SELECT CURRENT ONEFLORIDA STUDIES:
ADDRESSING CRITICAL HEALTH ISSUES

OneFlorida & GatorTron:
The World's Largest Artificial Intelligence for Text Data

ALL clinical notes from UF Health

- Over 2 million patients
- Over 290 million clinical notes
- Over 50 million encounters
- Over 80 billion medical words



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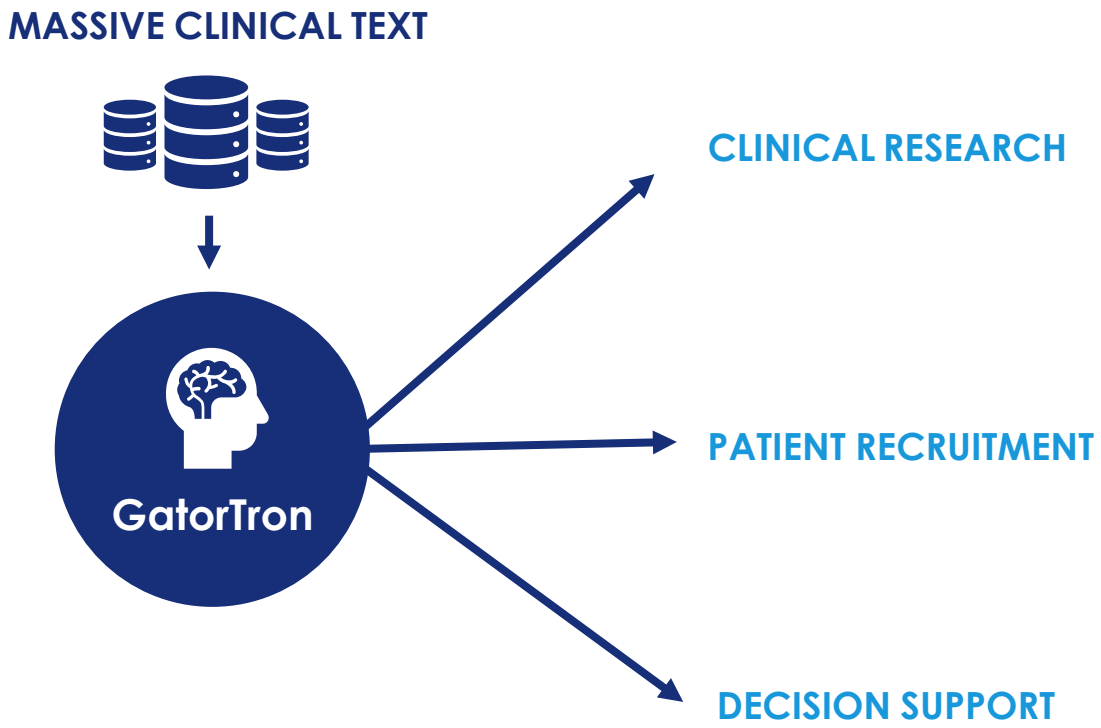


Summary

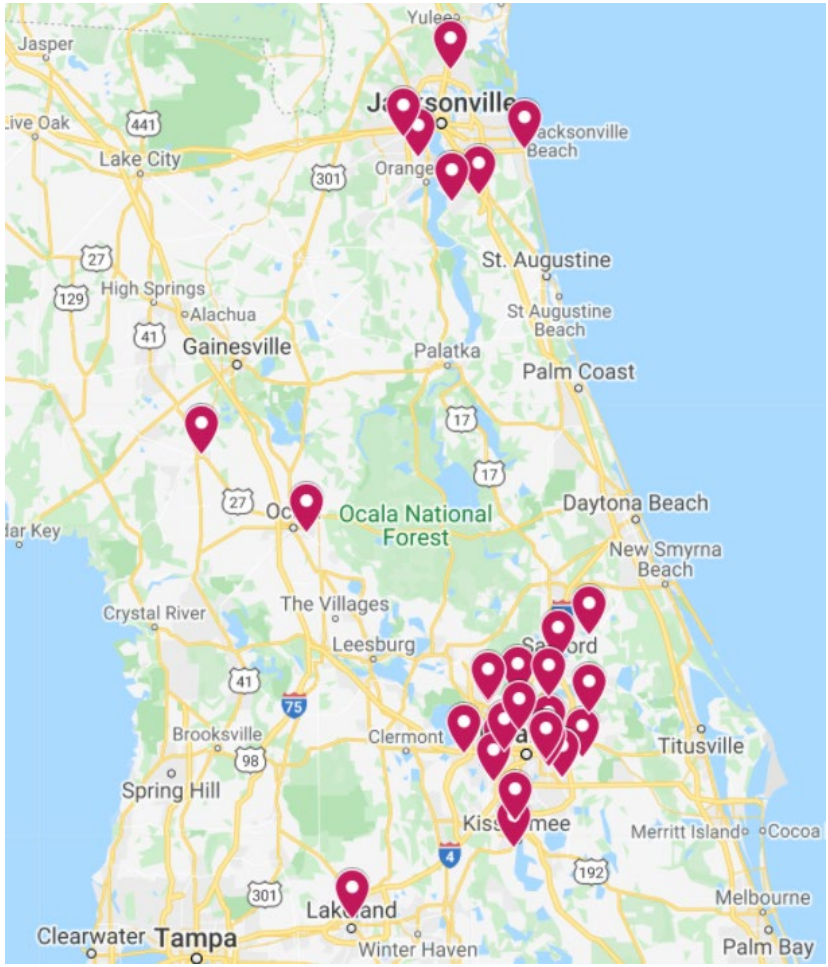
- AI to identify symptoms, adverse events, social issues.
- Built in less than 7 days.
- Impossible to build w/o AI cluster from NVIDIA.
- 24% error-rate reduction relative to state-of-the-art models.

Text and Talk: A multi-level intervention to increase provider HPV vaccine recommendation effectiveness

Stephanie Staras, PhD, University of Florida

Among the United States, **Florida has the 5th highest rate of HPV-related cancers**, and the **45th highest rate for vaccine initiation**

- Comparison of combination of two evidence-based interventions
  - Parent-targeted text messages
  - Clinician-targeted recommendation strategies
- Enrolling over 10,000 11 to 12-year-olds across 30 primary care sites



NIH NATIONAL CANCER INSTITUTE


Cancer burden in vulnerable populations

Yi Guo, PhD; Jiang Bian, PhD (PIs)

- Potentially elevated cancer risk in the Transgender and gender nonconforming (TGNC) population, due to:
  - Long-term impact of gender affirmation hormone use
  - Higher rates of health risk behaviors (e.g. smoking)

- Gap in knowledge: high cancer risk => high cancer burden?
  - Anecdotal evidence in TGNCs due to small samples

- The first population-based cohort studies to examine cancer burden among TGNC people
  - (1) Develop a computable phenotype algorithm to identify a TGNC cohort in OneFlorida EHRs
  - (2) Conduct a population-based cohort analysis to estimate and compare cancer incidence and cancer risk factors between TGNC and non-TGNC individuals

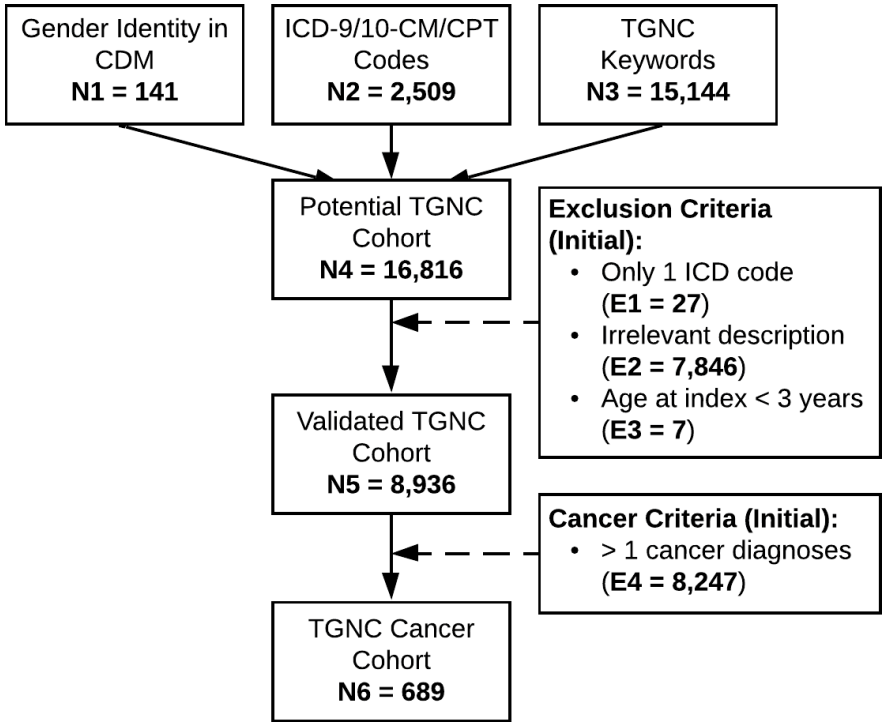


Figure 1. *Identifying TGNC individuals in OneFlorida.*

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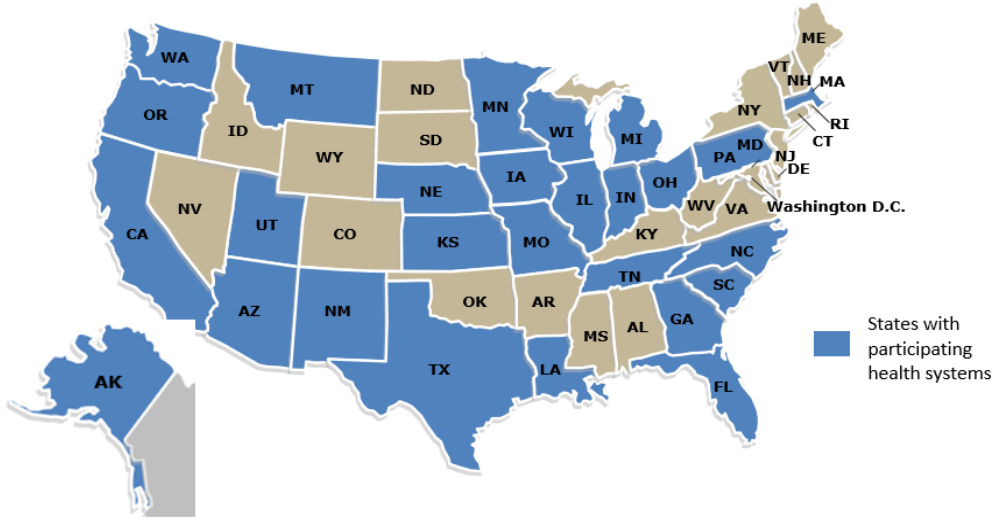
Tracking BP Control Performance and Process Metrics in 25 US Health Systems

Rhonda Cooper-DeHoff, Pharm D, MS, University of Florida and Mark Pletcher MD, MPH UCSF

- BP control calculated averaged 62%.
- BP control was lower in Black patients (57%), and there was substantial variation by health system (range 44%-74%)
- A new class of antihypertensive medication (medication intensification) was prescribed in only 12% (range 0.6%-25%) of patient visits where BP was uncontrolled BP.
- When a medication intensification event occurred, subsequent SBP was 15 ± 20 mm Hg lower on average (range 5-18 mm Hg).



- Major opportunities exist for improving BP control and reducing disparities

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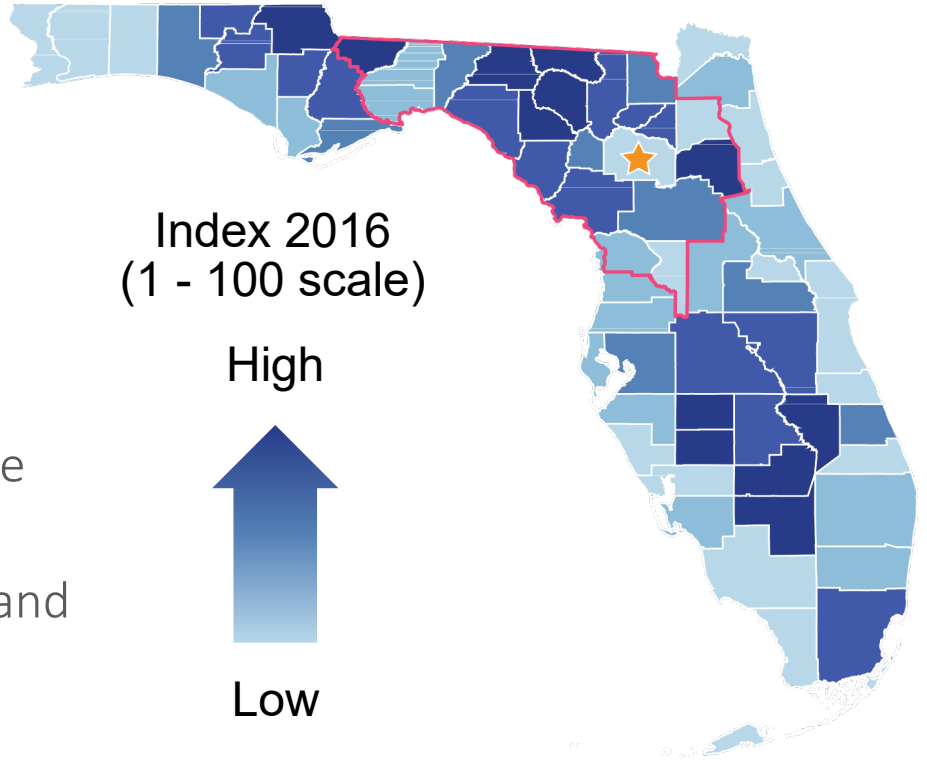
Cooper-DeHoff RM et al. JAHA 2021 in press

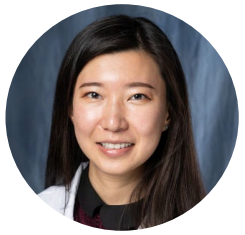
Using NLP to Improve Healthcare

Yonghui Wu, PhD; Jiang Bian, PhD (PIs)

Natural Language Processing to Connect Social Determinants and Clinical Factors for Cancer Outcomes Research

- Value-based health care.
- Up to **80%** of health care costs linked to social determinants.
- Extracting information from clinical notes. (Natural Language Processing)
- Identify high health care users and link to needed community services.



ACTIV-6: Drug Repurposing to Reduce COVID-19 Symptoms

Betsy Shenkman, PhD (Site PI) and Christina Li, MD (MD Site PI)
Adrian Hernandez, MD, MHS, Susanna Naggie, MD, MHS (MPIs) – Duke University

- A platform trial to evaluate the effectiveness of repurposed medications to prevent worsening of COVID-19 infection
- 5-8 arms determined by existing ACTIV medication prioritization committee
  - Ivermectin first candidate. Others under discussion by the prioritization committee include metformin, fluvoxamine, colchicine, and montelukast
- To enroll 15,000 patients across estimated 80+ sites

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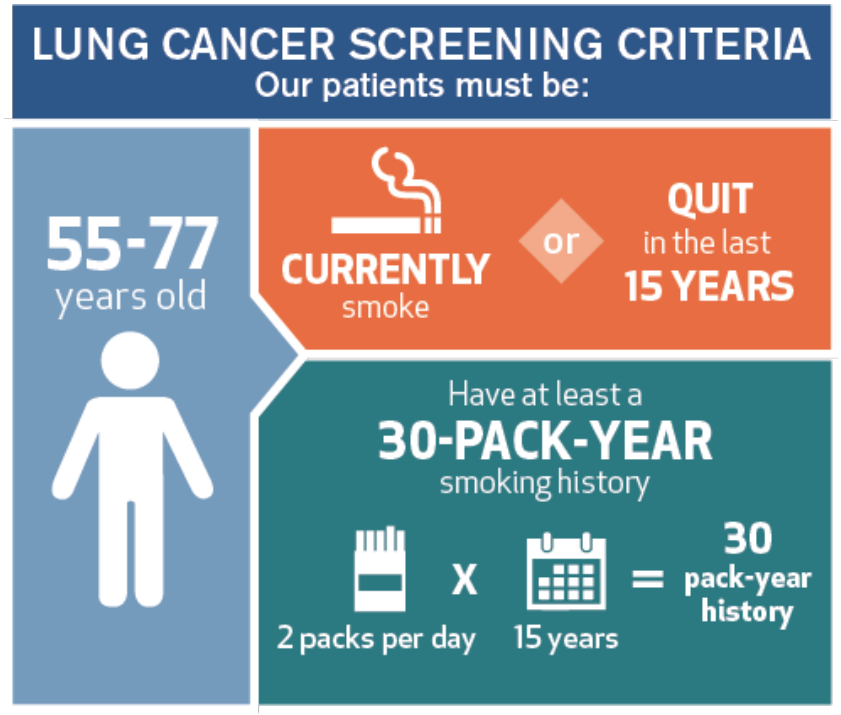
FDA U.S. FOOD & DRUG ADMINISTRATION

NIH National Center for Advancing Translational Sciences


The Benefits and Harms of Lung Cancer Screening in Florida

Jiang Bian, PhD; Yi Guo, PhD (PIs)



Courtesy of Houston Methodist

Lung Cancer

- 56/100,00 population in 2017 and declining
- Average costs of care can be $5K to $7K per month
- Lung cancer screening cost-effective *but*
  - High false positives
  - Invasive diagnostic procedures
  - Issues discovered through real world evidence
- Using OneFlorida Data
  - Identifying those at greatest risk for lung cancer to better target screening efforts

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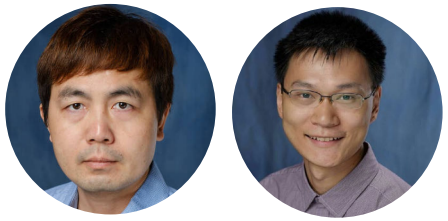
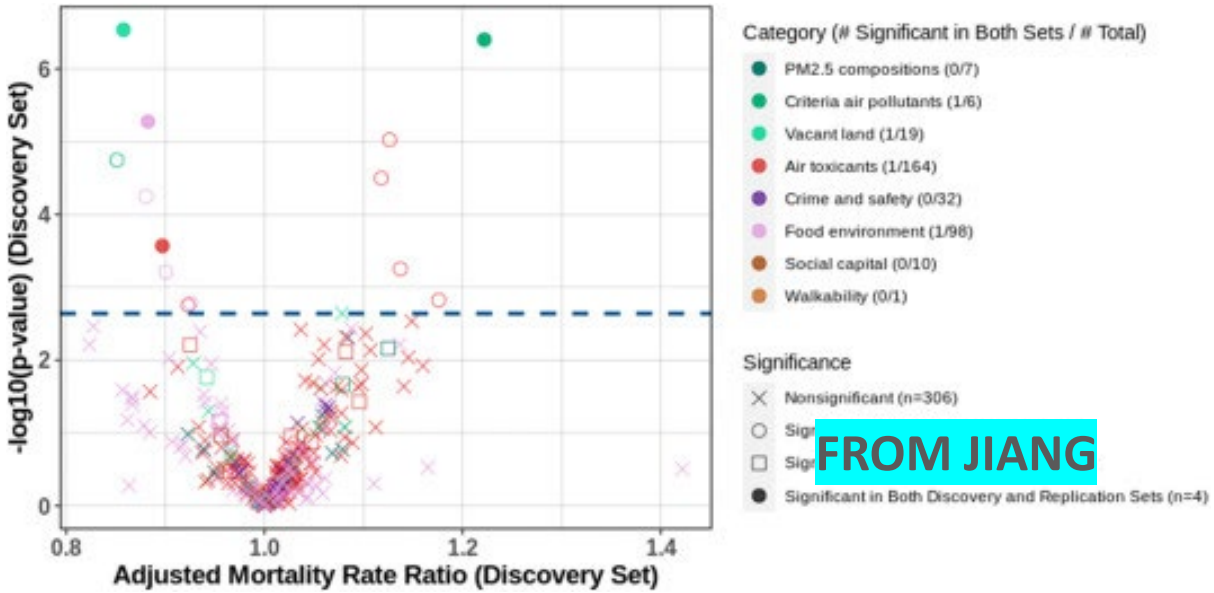


The External Exposome and COVID-19 Severity

Jiang Bian, PhD, University of Florida; Hui Hu, PhD, Harvard University (PIs)

- Our understanding of risk factors for severe COVID-19 is incomplete, with critical knowledge gaps.
  - One such knowledge gap relates to environmental exposures.
- Large racial/ethnic disparities in COVID-19 severity have been reported in the US.
  - Minority groups historically have higher exposures to harmful factors from the **natural** (e.g., air pollution), **built** (e.g., walkability), and **social** (e.g., neighborhood deprivation) environments.



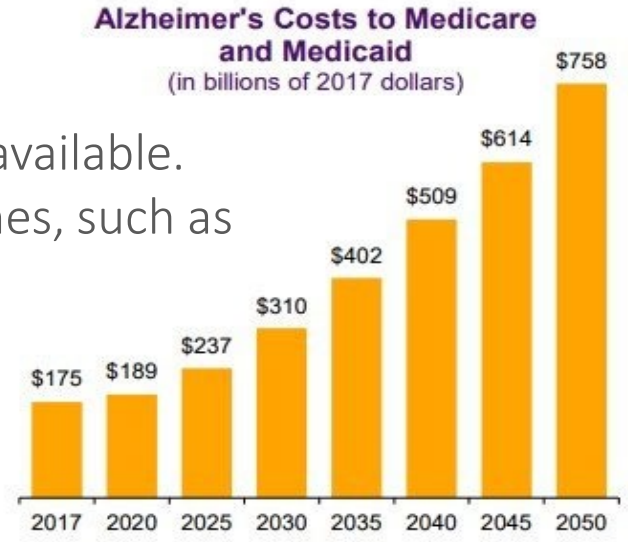
NIH National Institute of Environmental Health Sciences

Hu H, Zheng Y, Wen X, Smith SS, Nizomov J, Fishe J, Hogan WR, Shenkman EA, Bian J. An external exposome-wide association study of COVID-19 mortality in the United States. Sci Total Environ. 2021 May 10;768:144832. doi: 10.1016/j.scitotenv.2020.144832. Epub 2021 Jan 7. PMID: 33450687; PMCID: PMC7788319.


Advancing Drug Repositioning for Alzheimer's Disease using Real-World Data

Yonghui Wu, Jiang Bian, Hua Xu, Yong Chen (PIs)

Florida has 2nd Highest Prevalence of Alzheimer's Disease. Projected to increase by 24% by 2025 to 720K Floridians.



- In the past 20 years, only two new pharmacological therapies have become available.
- Complementing traditional drug discovery with a broader range of approaches, such as drug repositioning, will maximize drug development efforts.
- Drugs such as insulin, metformin and others are all potential candidates.

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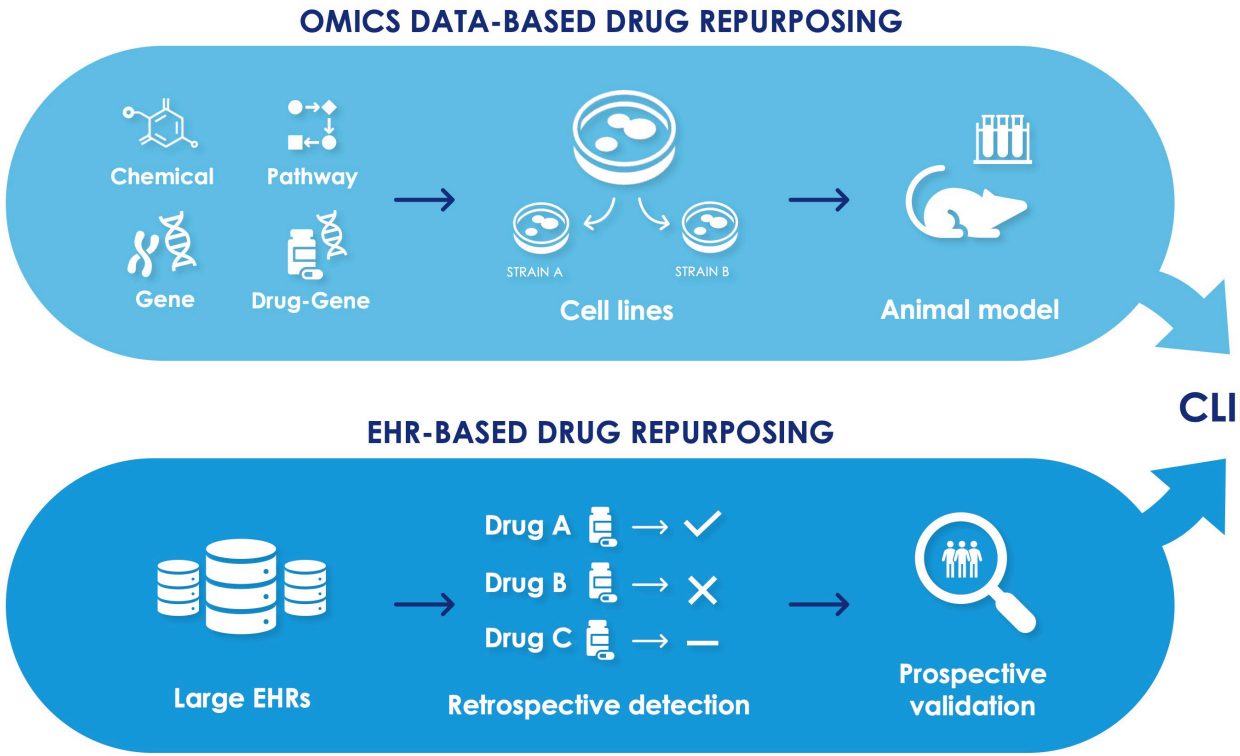
Advancing Drug Repositioning for Alzheimer's Disease using Real-World Data

Yonghui Wu, Jiang Bian, University of Florida; Hua Xu, University of Texas Health Science Center; Yong Chen, University of Pennsylvania (PIs)



402,021 patients with **Mild Cognitive Impairment, AD/ADRD** in OneFlorida Data Trust

- Can speed discovery and be cost effective
- Insulin, metformin and others are all potential candidates
- AI platform speeds analyses

NEXT STEPS

Next Steps

Developed Research Committee

Targeting Healthy Aging and Maternal Health – developed workgroups
Other areas are critical
Seeking workgroup members
Pilot funding

PCORI PLACER and Other Awards

Funding Opportunities | PCORI

OneFlorida+ Front Door

Investigator Feedback

Enhance Collaborations

Identify opportunities to enhance use of OneFlorida, particularly with diverse populations for learning health systems and learning health communities

QUESTIONS?

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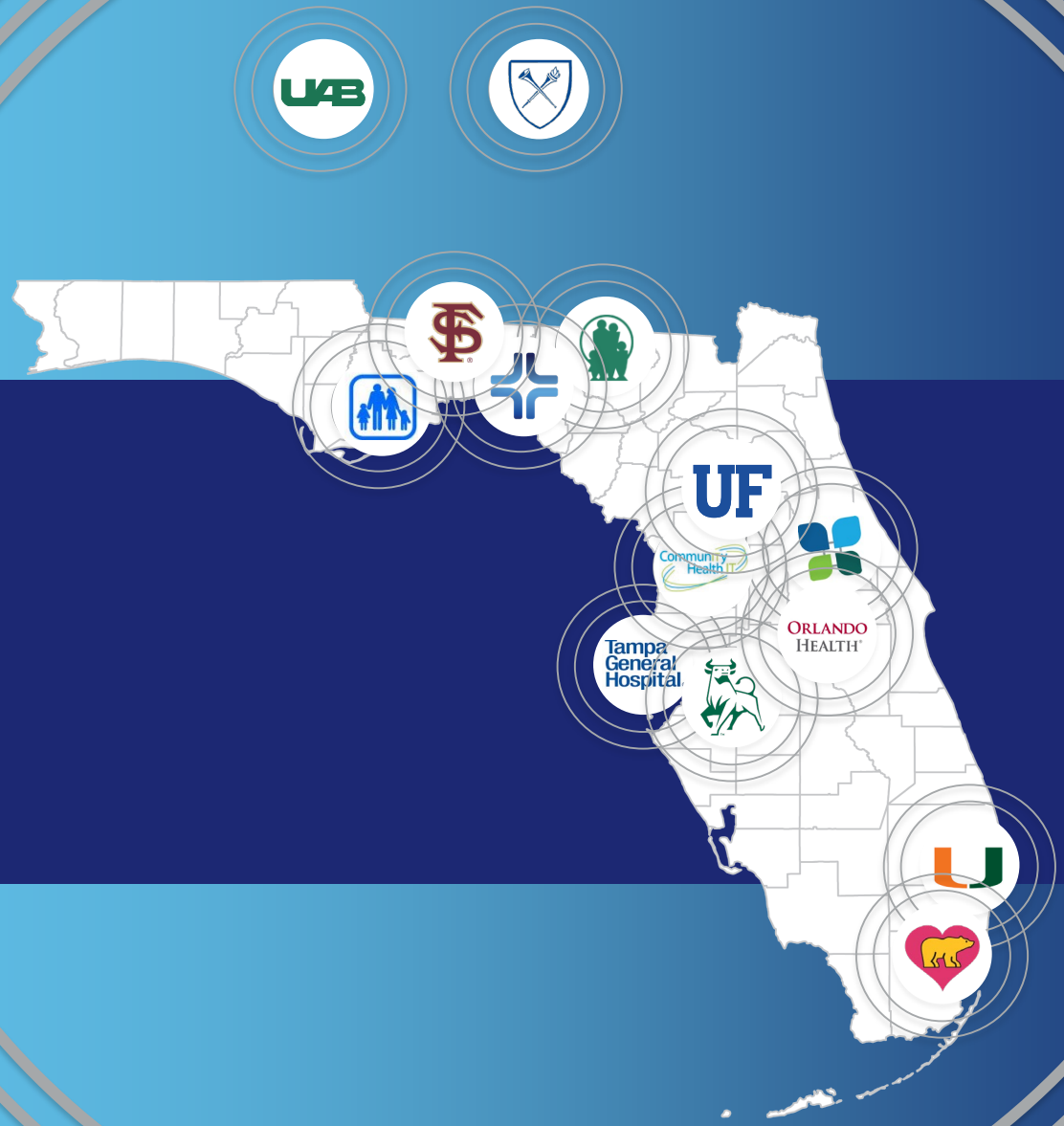
ctsi.ufl.edu
eshenkman@ufl.edu

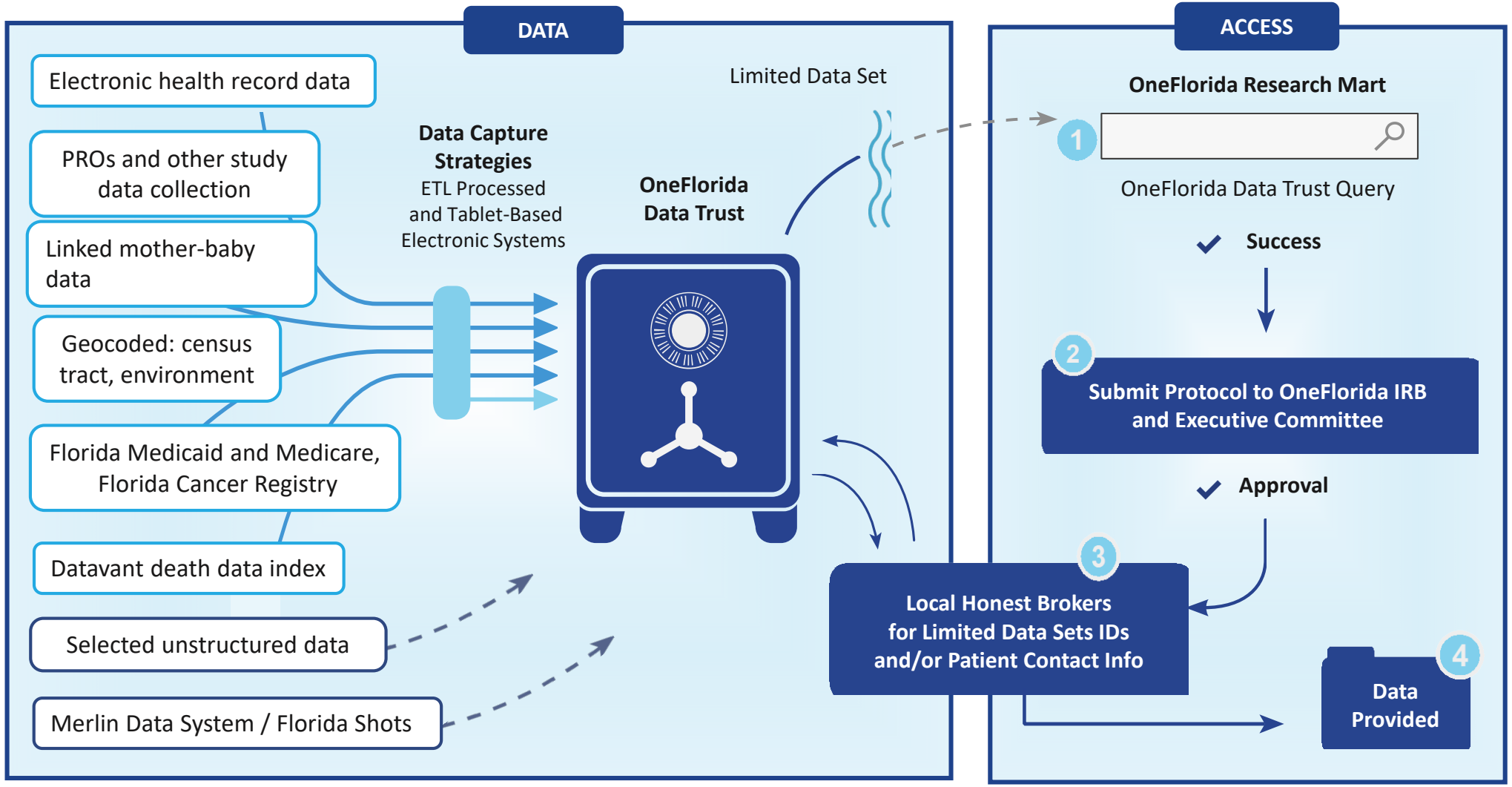


OneFlorida Clinical Research Consortium

SUPPLEMENTAL SLIDES OF DATA TRUST AND CURRENT ONEFLORIDA STUDIES:
ADDRESSING CRITICAL HEALTH ISSUES

The OneFlorida Data Trust:
Putting it All Together

The OneFlorida Data Trust:
A Central Data Repository to Facilitate Research



OneFlorida Data Trust: Current Data Picture, 2012 to Present

PATIENTS

17.19 M

ENCOUNTERS

720.2 M

DIAGNOSES

1.47 B

LAB DATA

924 M

CLAIMS

600.5 M

PROCEDURES

1.81 B

DISPENSED MEDICATIONS

339 M

CLINICAL FINDINGS (T2DM)

1.411 M

PCORI Common Data Model v6.0

Demographic
- PATID

Enrollment
- PATID
- ENR_START_DATE
- ENR_BASIS

Encounter
- PATID
- ENCOUNTERID
- ADMIT_DATE
- ENC_TYPE

Diagnosis
- PATID
- DIAGNOSISID
- DX
- DX_TYPE
- DX_SOURCE

Procedures
- PATID
- PROCEDURESID
- PX
- PX_TYPE

Vital
- PATID
- VITALID
- MEASURE_DATE
- VITAL_SOURCE

Dispensing
- PATID
- DISPENSINGID
- DISPENSE_DATE
- NDC

Lab_Result_CM
- PATID
- LAB_RESULT_CM_ID
- RESULT_DATE

Condition
- PATID
- CONDITIONID
- CONDITION
- CONDITION_TYPE
- CONDITION_SOURCE

PRO_CM
- PATID
- PRO_CM_ID
- PRO_DATE

Prescribing
- PATID
- PRESCRIBING_ID

PCORNET_Trial
- PATID
- TRIALID
- PARTICIPANTID

Death
- PATID
- DEATH_SOURCE
- PARTICIPANTID

Death_Cause
- PATID
- DEATH_CAUSE
- DEATH_CAUSE_CODE
- DEATH_CAUSE_TYPE
- DEATH_CAUSE_SOURCE

MED_ADMIN
- PATID
- MEDADMINID
- MEDADMIN_START_DATE

PROVIDER
- PROVIDERID

OBS_CLIN
- PATID
- OBSCLINID
- OBSCLIN_START_DATE

OBS_GEN
- PATID
- OBSGENID
- OBSGENID_START_DATE

HASH_TOKEN
- PATID

LDS_ADDRESS_HISTORY
- PATID
- ADDRESSID
- ADDRESS_USE
- ADDRESS_TYPE
- ADDRESS_PREFERRED

IMMUNIZATION
- PATID
- IMMUNIZATIONID
- VX_CODE
- VS_CODE_TYPE
- VX_STATUS

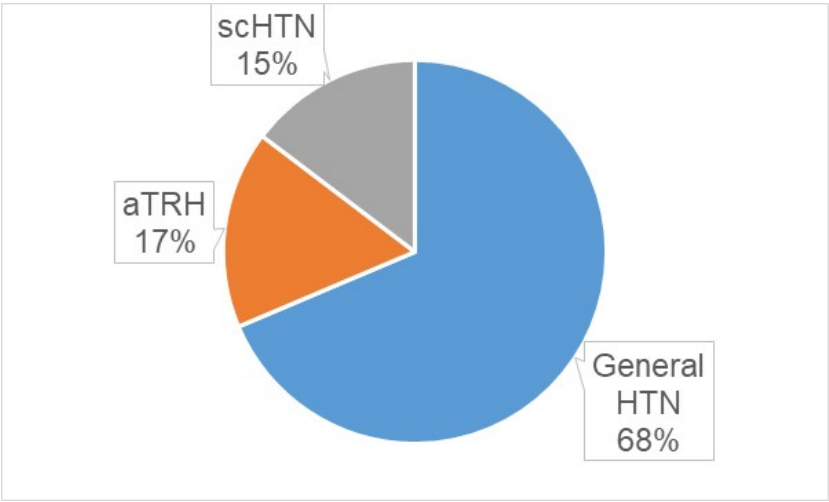
HARVEST
- NETWORKID
- DATAMARTID

LAB_HISTORY
- LABHISTORYID
- LAB_LOINC

A Computable Phenotype for apparent Treatment Resistant Hypertension (aTRH)

Caitrin W. McDonough, PhD, MS, University of Florida

- Algorithms developed for aTRH and stable controlled hypertension (scHTN)
- scHTN defined as BP control at 80% of encounters over 3 years
- Algorithms confirmed and revised through iterative manual chart review process
- Final aTRHN algorithm PPV of 99.1% and final scHTN algorithm PPV of 96.5%
- Most common source of misclassification was related to documentation of historical medications



- Application of algorithms to OneFlorida Data Trust HTN population
  - 17% aTRH
  - 15% scHTN

NIH National Heart, Lung, and Blood Institute

McDonough CW et al. *Pharmacoepidemiol Drug Saf.* 2020

COVID-19: The PCORnet® Study of Post-Acute Sequelae of SARS-CoV-2 Infection

Betsy Shenkman, PhD (MPI)

- Part of the NIH PASC Consortium to rapidly advance scientific knowledge about recovery after acute SARS-CoV-2 infection and optimal treatments for PASC.

- To develop a single, unified, PCORnet Real-world Data (RWD) Repository that will support both the **Adult** and **Pediatric** PCORnet-PASC studies.
  - quantifying the incidence and prevalence of PASC,
  - phenotyping and subphenotyping,
  - determining risk and mitigating factors, and
  - understanding healthcare utilization patterns

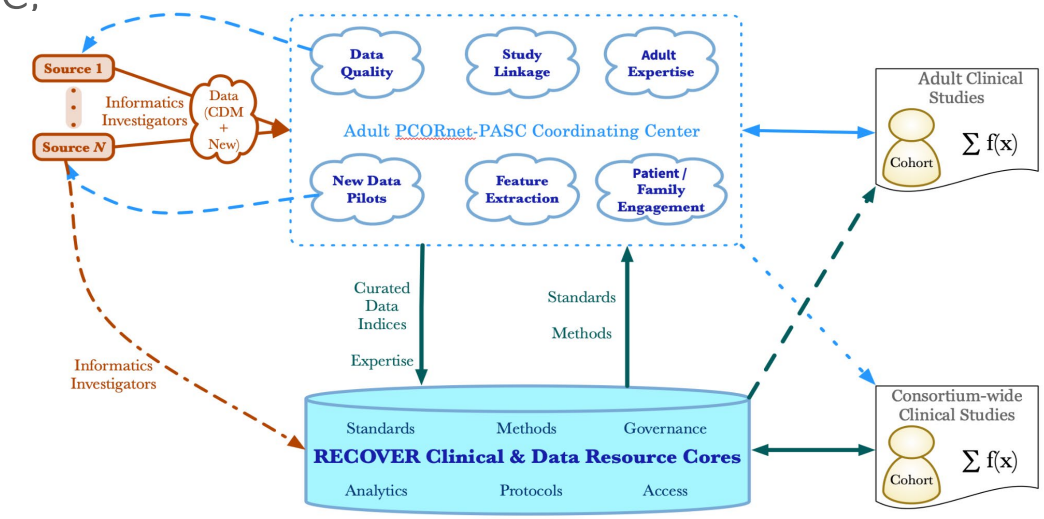


Figure. Data Architecture

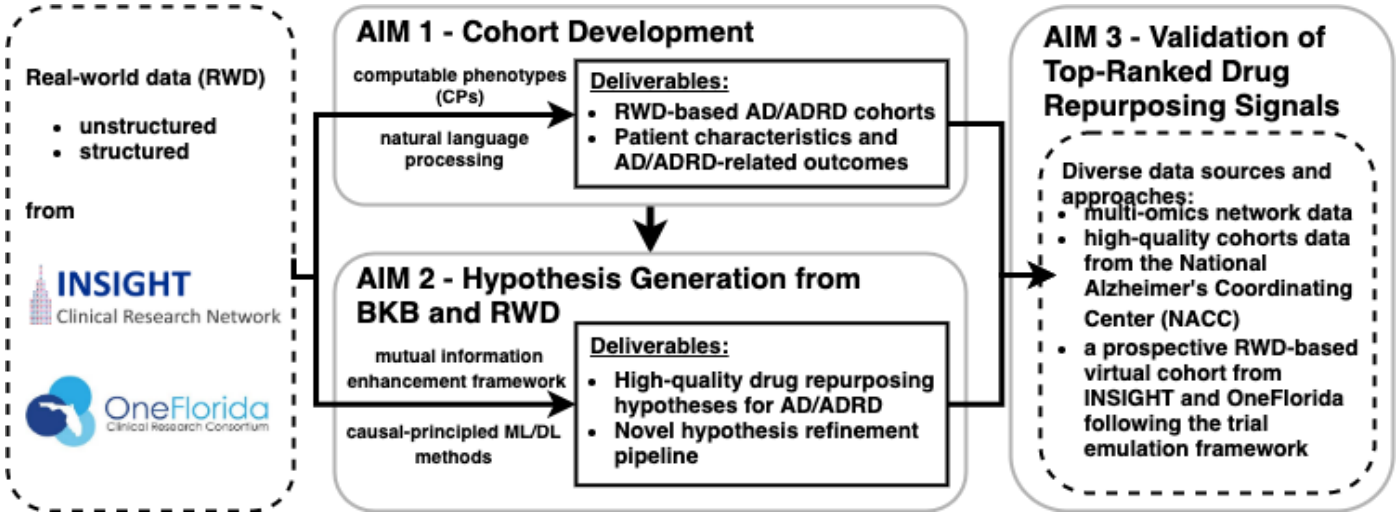
National Institutes of Health
Turning Discovery Into Health

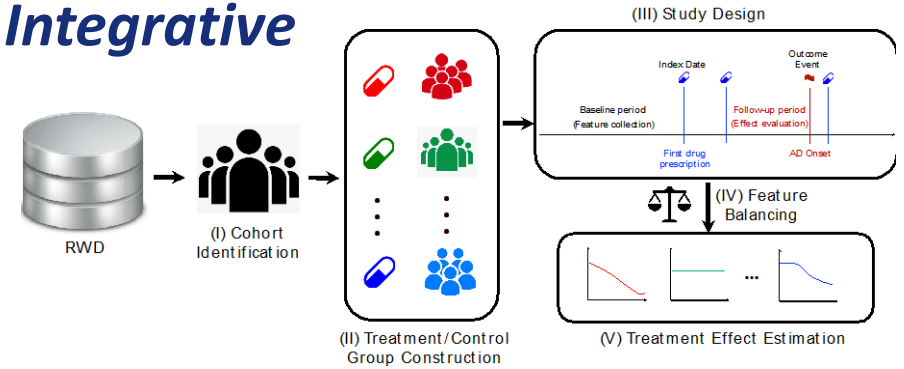

Computational Drug Repurposing

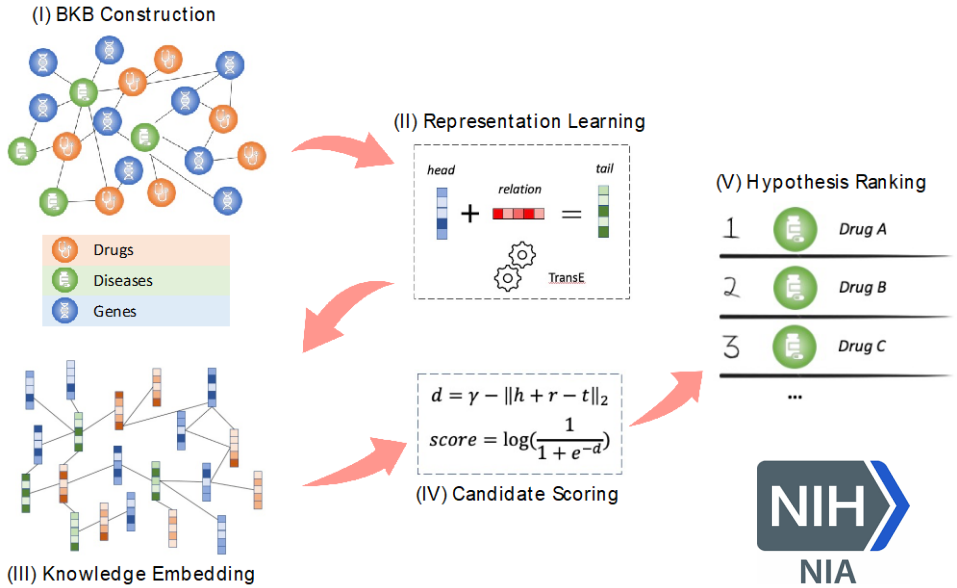
Jiang Bian, University of Florida/OneFlorida
Fei Wang, Weill Cornell Medicine/INSIGHT

R01: *Computational Drug Repurposing for AD/ADRD with Integrative Analysis of Real-World Data and Biomedical Knowledge*

- Combining machine learning (ML) and causal inference to estimate treatment effects from RWD
- Integrative learning from both biomedical knowledge base (BKB) and RWD to generate high-quality drug repurposing hypotheses







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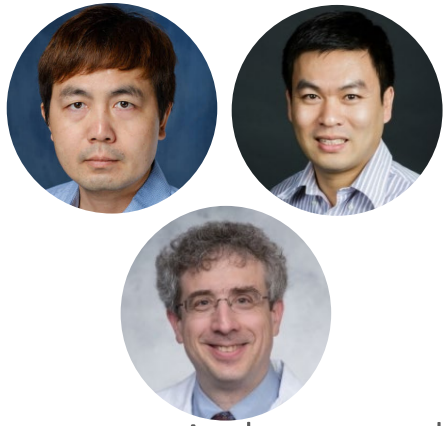


PANDA-MSD: Predictive Analytics via Networked Distributed Algorithms for Multi-System Diseases

Jiang Bian, PhD, University of Florida; Yong Chen, PhD,
Peter Merkel, MD, University of Pennsylvania (PIs)

- A clear need to reduce dangerous and costly delays in diagnosis, particularly of rare multisystem diseases.
  - granulomatosis with polyangiitis (~74 per million);
  - psoriatic arthritis (PsA) (~2,500 per million)

- Novel privacy-preserving distributed algorithms
- Methods to develop clinically-useful diagnostic aids that are both scalable to other rare and/or complex diseases and adaptable to any integrated learning health system.
- Novel tools readily accessible to any CTSA data hub or other data networks (such as PCORnet, OHDSI)

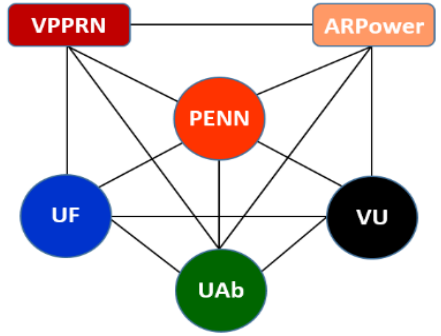


Figure 1. Collaborations within the Research Team.

Sites/Partners:

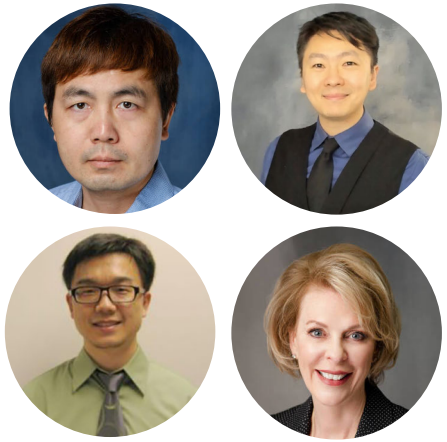
- Univ. of Florida
- Univ. of Pennsylvania
- Vanderbilt University (Russel Rothman)
- **Univ. of Alabama (Jeffrey Curtis)**

- OneFloirda
- STAR
- ARPower
- VPPRN

NIH National Center for Advancing Translational Sciences

STAR Stakeholders, Technology, and Research CRN

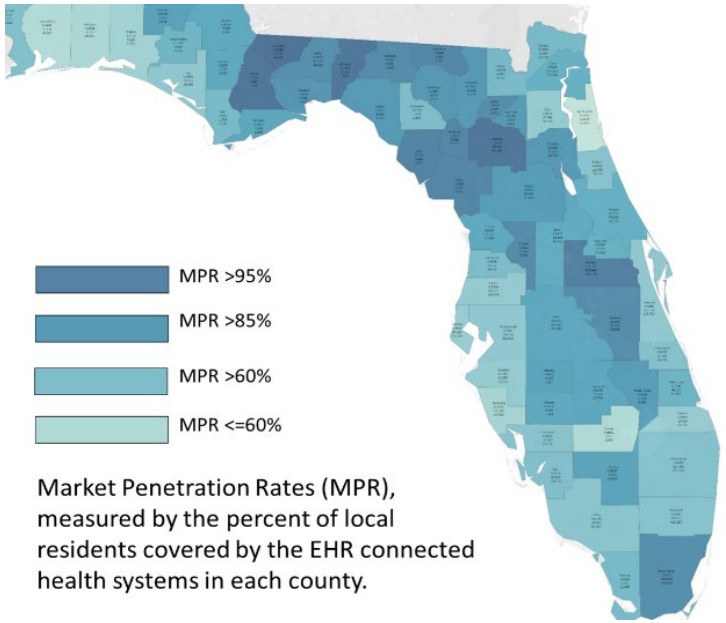
Figure 3



Assessing the Burden of Diabetes By Type in Children, Adolescents and Young Adults (DiCAYA)

Jiang Bian, PhD; Hui Shao, MD, PhD; Yi Guo, PhD; Elizabeth A Shenkman, PhD. (PIs)

Using OneFlorida EHRs to Assess the Burden of Diabetes in Children and Adolescents in Florida



Market Penetration Rates (MPR) by county for OneFlorida for children and adolescents

1. A national task-force to monitor young diabetes across 8 sites.
   - Florida ▪Cornell ▪Geisinger ▪IUPUI
   - Kaiser ▪ PEDSnet ▪Colorado ▪USC
2. CP development for young diabetes within OneFlorida CDRN.
3. Population representative assessment.
   - "Market penetration Map (see figure)"
4. Real-time Surveillance on young diabetes

OneFlorida+

Clinical Research Consortium