DCRI CENTER FOR PREDICTIVE MEDICINE

Using Novel Data Sources for Real-world Impact

WHO WE ARE

The Duke Clinical Research Institute (DCRI), the world's largest academic clinical research organization and part of the Duke University School of Medicine, is known for conducting groundbreaking multinational clinical trials, managing major national patient registries, and performing landmark outcomes research. DCRI's Center for Predictive Medicine (CPM) aims to improve patient care through the development and application of novel approaches to quantify and communicate risk.

WHAT WE DO

The availability of electronic health records (EHR), clinical trial data, claims data, and other shared data has opened exciting new opportunities in predictive medicine. Use of predictive analytics to assess the risk of future disease offers tremendous benefits to individual patients as well as to the clinical research and healthcare communities as a whole.

HOW WE DO IT

FRAME THE RESEARCH QUESTION

Define the research question.

- Collaborate with clinical partners to frame the research question and identify the population of interest.

TURN COMPLEX DATA INTO SMART DATA

Identify data sources.

- Apply expertise with novel and complex data sources to match appropriate data source to the research question and population.
- Create and validate analytic datasets.

Analyze the data.

- Apply statistical methods and techniques appropriate to the research question.
- Implement methodological research techniques related to meaningful use of EHR data, high-dimensional data, and risk prediction.

IMPACT CLINICAL PRACTICE AND PATIENT HEALTH

Disseminate results.

- Collaborate with clinical partners to accurately interpret and present results.
- Facilitate integration of risk-prediction models into EHR.

Why DCRI?

- World's largest academic research organization (ARO)
- Nonprofit focused on outcomes, not revenues
- Partnership with the Duke University Health System
- Access to Duke's clinical excellence and thought leadership
- History of successful collaborative projects
- Experience with diverse technologies and indications
- Talented statistics and programming teams
- Recognized innovators
- Pragmatic approach to projects

Champions of Collaboration

CLINICAL THOUGHT LEADERS

CENTER FOR PREDICTIVE MEDICINE

INFORMATICIANS

COMMUNITY

DCRI **CENTER FOR PREDICTIVE MEDICINE**

Find out more about the DCRI Center for Predictive Medicine.

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Examples of our experience in applying novel data sources to answer complex questions include the following:

DUKE DATA

- Link data sources within Duke's health system, including Duke Databank for Cardiovascular Disease, Duke Echo Lab Database, MRI and Cardiac Computed Tomography databases, and healthcare encounters from Duke's EHR to provide analysis for publications.

EHR DATA

- Validate electronic phenotype algorithms for outcomes and procedures including hospitalization for heart failure, stroke, acute MI, diabetes, CKD, HIV diagnosis, revascularization, and death.
- Use Duke EHR data to provide clinicians with real-time risk assessment of sepsis and other adverse outcomes in the hospital setting.

CLAIMS DATA

- Process MarketScan claims data using advanced programming techniques to handle large datasets.
- Link Centers for Medicare and Medicaid Services claims data with clinical trial data.

CLINICAL TRIALS

- Support primary and secondary analysis of clinical trial data for more than 530 publications in peer-reviewed journals since 2000.
- Pool clinical trial datasets around specific disease indications to leverage increased power to answer research questions not possible from a single data source.

OBSERVATIONAL DATA

- Pool datasets from five NHLBI-funded cohort studies to develop and validate risk-prediction models for cardiovascular outcomes.
- Use the CDC's National Health and Nutrition Examination Survey data to describe the distribution of biomarkers in patients with a history of MI and correlate with standard risk factors.

COMBINED DATA

- Create and validate risk-prediction models across multiple data sources, including MarketScan, pooled NHLBI cohort data, and registry data.
- Apply predictive value of discharge codes in Duke EHR data to calibrate estimated encounter rates based on MarketScan data.

Duke Clinical Research Institute | FROM **THOUGHT LEADERSHIP** TO **CLINICAL PRACTICE**