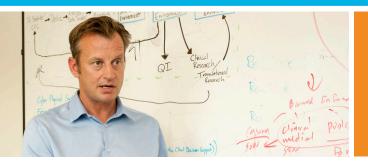# INNOVATE
EVIDENCE-BASED MENTAL HEALTH RESEARCH

From Big Data to Treatment

The era of big data is here and it has significant consequence for health care. Doctors collect a mass of information during each patient visit, all of which is now documented through electronic medical records. For the five University of California Health Systems that means over 14.5 million patient records from across California. This is big data. Yet, even more important than the volume of patient data collected, is how it's used to improve patients' lives.

Nicholas Anderson, Cardiff Professor of Informatics in the Department of Pathology and Laboratory Medicine at UC Davis, sees potential to reveal mental health patterns and trends using big data. Anderson received one of

23 Research Pilot Awards from the Behavioral Health Center of Excellence for the study, "Developing Population-Scale Analytics to Evaluate Long-Term Health Care Utilization and Co-morbidities Associated with Autism Spectrum Disorders."

A Virtual Cohort

The University of California Health System, which includes UC Davis, UC Irvine, UC Los Angeles, UC San Diego, and UC San Francisco, has developed a program called UC ReX (University of California Research eXchange) which houses de-identified data on demographics, diagnoses, procedures, labs, medications, vital signs and vital status from patients at the 5 UC Health Systems. Anderson's project will use this program to develop a database consisting of all patients diagnosed with Autism Spectrum Disorder

(ASD) in the UC Health System. With this database, the research team will be able to look at events before and after an ASD diagnosis and visualize trends in treatment plans and co-occurring diagnoses. The data will provide a snapshot of current health care utilization on a large scale that can be compared to historical reports on the prevalence of ASD. Anderson is curious to find out if the UC Health System data will validate or contradict current guidelines for ASD treatment. The pilot project looks at autism first because it has a high prevalence and is relatively well categorized; yet, the model can be applied to other serious mental illnesses.

Privacy

Privacy is a notable concern when researchers have access to large amounts of patient data. However, with UC ReX all patient information

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>
> *-Nick Anderson, Ph.D.*
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> *Professor, Department of Pathology and Laboratory Medicine*

is de-identified and stored separately and securely, without the ability to trace information back to any particular individual. In addition to the security benefit, this creates an opportunity for researchers to step back and look at the big picture for patients across California, as opposed to small independent cohorts.

Health and research benefiting each other

Large-scale data analytics will elucidate patterns in health care utilization across the diverse socio-economic and geographical landscape of California. Armed with this knowledge, clinicians and researchers can develop targeted interventions, explore new associations, combat disparities, improve outcomes and reduce health care costs.

"If we can have these tools where mental health practitioners are aware of patterns in diagnoses across California, that will inform clinical care and then we have health and research benefiting each other," explained Anderson.

He believes researchers should start with data design to foster truly innovative projects. "Are we doing our design with the best available resources, are we validating with the largest patient cohorts, are we engaging across all available data where patients exist in the world? If we aren't doing that then we are going to continue to have small, hyper-focused research."

The University of California and the Behavioral Health Center of Excellence bring together academics and delivery systems to optimize the incorporation of evidence-based practices throughout the state. Anderson explains this opportunity in relation to his research.

"With the heterogeneous and geographically-distributed California population, there is a unique opportunity to apply methods of large-scale data analysis to focus policy and characterize availability of care throughout the state," he said. There's value in investing in analytics to fuel large-scale epidemiology and visualize patterns in mental health.

What is learned can be extrapolated to the community to serve people with mental illnesses better, faster and more effectively.

Resources

UC Davis Center for Health and Technology: ucdmc.ucdavis.edu/cht

University of Californa Research Exchange (UC ReX): ucrex.org

Behavioral Health Center of Excellence at UC Davis

UC Davis launched the Behavioral Health Center of Excellence in October 2014 to advance mental health research and policy with initial funding from the Mental Health Services Act. The Innovate series highlights the Center's $4.3 million Research Pilot Award program.

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