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DATA DIAGNOSIS

William Paiva, Ph.D., executive director of the Oklahoma State University Center for Health Systems Innovation. [PHOTO PROVIDED BY OCAST]

OSU's Center for Health Systems Innovation uses big data to tackle rural health issues

Jim Stafford

OK INNOVATIONS

TULSA — Suppose that you are a resident of the rural community of Ottawa in far northeastern Oklahoma. You are a diabetic.

During a visit to a primary care physician at the local rural health care clinic, the doc gathers your demographic information and collects blood and urine samples.

After assessing the lab samples and demographic profile, the doctor delivers his diagnosis. You are suffering from a degenerative eye disease known as diabetic retinopathy and need to see an ophthalmologist as soon as possible to preserve your vision.

The diagnosis was made before you make the 100-

MORE ONLINE

To watch a video about Oklahoma State University Center for Health Systems Innovation, go online to Oklahoman.com.

mile drive to see a specialist in Tulsa. And the doctor wasn't just playing a hunch to arrive at the diagnosis.

This is an example of how diagnostic health care can be derived via analytics taken from non-identifiable electronic medical records of 63 million patients nationwide. The massive database belongs to the Center for Health Systems Innovation (CHSI) at Oklahoma State University.

"Think about it," said William Paiva, Ph.D., executive director of the four-year-old Center for Health Systems Innovation. "A diabetic patient is in a rural setting. A primary care doctor

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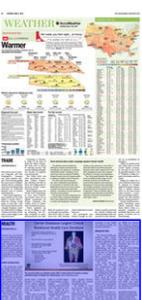
HEALTH

can now say, you need to go to an ophthalmologist because based on the data it appears you have diabetic retinopathy. Previously, what he would tell the patient is you need to go see an ophthalmologist in case you have diabetic retinopathy, knowing full well that very few of them do."
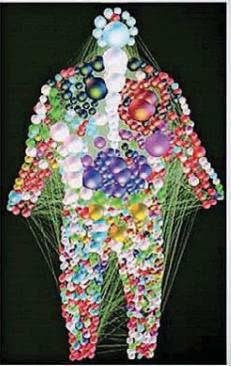
Center startup story

OSU created the Center for Health Systems Innovation after the health care database was donated to the university by the late Neal Patterson, an alumnus who founded the Cerner Corp. based in Kansas City, Missouri. Cerner calls itself the "world's largest health information and technology company," with revenue of $4.8 billion in 2016.

The Cerner Health Facts Database contains clinical data collected from patients across the United States over an 18-year period. Paiva, a molecular biologist by training and former venture capitalist, was recruited to build the center, which has grown from one employee to 28 today.

CHSI spent 18 months mining the data from the health care database and building a predictive tool that allows physicians to make an accurate diagnosis based largely on demographics, co-morbidity and data collected from lab work. The center is working to validate the predictive model through an ongoing clinical trial.

CHSI "sits" between OSU's Spears School of Business and the OSU Center for Health Sciences, merging business with health care research and clinical practice.

"We decided to focus on two areas," Paiva said. "The first is rural health care, and the second is health analytics. Our mission is to transform rural and Native American health, and our vision is to do that through implementation of new health care delivery models and analytical solutions."

Mining the data

The massive health care database under CHSI's control allows it to tackle an almost unlimited number of health care related issues. The Center has collaborations with large national health care companies that are interested in what it is doing. Academic researchers have also partnered with CHSI to mine the data.

The center also has involved OSU students and entrepreneurs who brainstorm new health care delivery solutions for rural Oklahomans that can be applied to rural residents across the United States. CHSI held a series of rural startup weekends during which participants came up with solutions to real world rural health care challenges.

For instance, CHSI contracts with rural physicians to manage and track the health care outcomes for 25,000 Medicaid patients.

"We have case manag-ers within our organization, which are a group of nurses and licensed clinical social workers," Paiva said. "They provide case management to ensure those patients get their prescriptions filled, get to the specialist, get the treatment, get the post-acute care treatment they are supposed to get."

The gift of the database by Neal Patterson and creation of the Center for Health Systems Innovation has put OSU at the cutting edge of an emerging area of health care analytics.

"This is a brand-new industry," Paiva said. "We've got a head start and have a real competitive advantage. It sounds extreme, but I really do believe that we can be one of the Silicon Valleys of rural health innovation and health care analytics because of the jump we got with this core asset that was Neal's vision."

Jim Stafford writes about Oklahoma innovation and research and development topics on behalf of the Oklahoma Center for the Advancement of Science & Technology (OCAST).

Cerner Database Largest Clinical Relational Health Care Database

- The largest relational database on health care covering the US over 16 years
- Over 63 million unique patients
- Comprehensive source of de-identified, real-world, HIPAA-compliant data
- Industry's only data set that includes comprehensive record with:
  - pharmacy data
  - laboratory data
  - clinical events data
  - admission data
  - billing data

"While the individual man is an insoluble puzzle, in the aggregate he becomes a mathematical certainty"
- Winwood Reade

SPEARS SCHOOL OF BUSINESS OKLAHOMA STATE UNIVERSITY

The massive health care database under CHSI's control allows it to tackle an almost unlimited number of health care related issues. [PHOTO PROVIDED BY OCAST]