

## CENTER FOR HEALTH SYSTEMS INNOVATION

---

### **OSU's Center for Health Systems Innovation: A mission to transform rural and Native American health care**

Residents of Coal County in Southeastern Oklahoma are living, breathing examples of the challenge of providing health care to rural Oklahomans. According to an analysis by the Tulsa World, Coal County had fewer practicing physicians than any county in the state.

For every 100 people in Coal County, there are only 0.17 physicians available to provide health care. Compare that to Oklahoma County with 4.11 physicians for every 100 people, making it the highest per capita count.

The numbers translate into a startling inequity of access to medical care for Coal County. The lack of health care access is pervasive across much of rural Oklahoma. If just scheduling a doctor's appointment is a challenge, how big of an obstacle is finding a specialist?

It's a situation that Oklahoma State University's Center for Health Systems Innovation is working to improve.

Launched two years ago by OSU, the center is focused on using innovation to achieve better health care outcomes for rural Oklahomans, said Dr. William Paiva, executive director.

"Our vision is to transform rural and Native American health," Dr. Paiva said. "And we accomplish this with a two-part mission to, first, improve how we deliver health care in those markets, and second, mine a large dataset donated to us by the Cerner Corporation."

Paiva is the longtime manager of the Oklahoma Life Science Fund, a venture capital fund that invests in innovative health care technologies. He describes his mission with the center as complementary to his role as fund manager. The Life Science Fund and the OSU center are both focused on health care innovation.

The OSU center operation was endowed with a \$6 million gift from Neal Patterson, Cerner co-founder and CEO. Patterson is an OSU alumnus and founding board member of the Center for Health Systems Innovation. The Cerner Corp. is the nation's largest stand-alone maker of health information technology systems.

In OSU's announcement of the center's establishment, Patterson said, "We're going to innovate our way to a different kind of health care delivery."

That's the mission that Paiva has accepted as executive director.

Today, the center has been attacking the health care delivery challenge through OSU approved projects currently being executed and tested in the field and by sifting through the massive health database donated by Cerner. The database is a HIPAA compliant database that draws data from 490 hospitals nationwide and contains the clinical information for more than 50 million patients.



“We have clinical events data, laboratory data, pharmacy data, admission data and billing data,” Dr. Paiva said. “It’s a treasure-trove of data, and we just received a new update that includes ICD-10 codes.”

Researchers will be able to use the secure clinical database to build predictive models and clinical decision support algorithms and apply them to real world situations. For example, an algorithm might be developed to help primary care physicians assess a diabetic patient’s progress in battling a condition like debilitating eye disease.

“Think about a rural marketplace where there are primary care shortages and no ophthalmologists,” Dr. Paiva said. “This algorithm can run in a primary care setting so they can actually manage a patient’s diabetic retinopathy from their existing laboratory data, circumventing the need for rural ophthalmologist.”

“We were able to build this because we have 5.3 million clinical encounters from 1.4 million diabetic patients with diabetic retinopathy in our database,” he said. “And this is only one example of what we are developing. This database is a phenomenal asset for Oklahoma State University, and this work could not be accomplished without these data.”

The center employs a staff of 15 full time employees and more than 20 graduate students. The center engages faculty, undergrads, graduate and medical students and working health care professionals from OSU and elsewhere to develop and implement innovative ideas to solve the health care delivery problems faced in rural and Native American health care.

“We take great pride in not only identifying the challenges we are facing in rural and Native American markets and identifying or developing solutions to address those issues, but more importantly, implement those solutions,” Dr. Paiva said. “At the end of the day, we want to change health care in these markets by implementing these solutions and move the meter.”

The center is conducting three events annually to support rural and Native American health innovation.

“Our first event was a Rural Health Innovation Weekend, which is very similar to the Startup Weekends that some of us have participated in throughout our lives in innovation and entrepreneurship,” he said.

The Rural Health Innovation Weekend drew 91 participants from several states. They were organized into teams that focused on solving particular health care problems plaguing rural Oklahoma.

“We organized those 91 people into nine innovation teams that developed any number of projects, everything from patient monitoring technology to clinical decision algorithms to help with patient management,” Dr. Paiva said. “Many of those projects have actually now transitioned to our implementation engine at the center where we are working to develop protocols and test them in the field.”

More recently, a health care “maker” event was held in which participants were trained in maker health approaches and then created their own innovative tools using what Dr. Paiva described as “off-the-shelf” and commonly available products. Experts in the “maker” innovation approach were brought in from Massachusetts Institute of Technology to provide leadership and inspiration for this exciting new category for innovation.

Next up: a “hackathon” this fall in which a big chunk of data will be available on the web for two months for participants to develop insights to improve health care.

“It’s really going to be a wide open event where people can mine the data,” Dr. Paiva said. “We’re going to turn it over to the people and let them figure out what it is they are interested in. Ultimately, we will have awards for the most interesting insights. Think of it as our own X-prize for rural health data”

The center’s success won’t be measured in the number of academic publications it spawns, he said.

“How will I measure success at the end of the next five years?” Dr. Paiva asked. “Did we improve health care and reduce costs through the implementation of innovative delivery models and information technology solutions to the targeted populations we seek to focus upon?”

“Oklahoma State University will be the nexus for rural and Native American health innovation, and it will become the Silicon Valley of health care data analytics,” he said. “And we have the opportunity to do that with this large dataset, because it’s a differentiating asset for us.”

So maybe the number of physicians doesn’t grow substantially in rural Coal County Oklahoma over the next five years. But armed with groundbreaking knowledge uncovered by OSU’s Center for Health Systems Innovation, the doctors who are there may be able to achieve better health outcomes for the county’s residents with the resources they have.

And that will definitely be a measure of success for the center and the citizens of Oklahoma.

[Watch the video](#)