

# Data on long-term pain provided by patients adds up to better care

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Credit: Jason Holley

Fifteen years ago, when professor of anesthesiology Sean Mackey, MD, PhD, began working in pain medicine, he found himself hampered by the lack of data available for each patient.

"Physicians go through a very laborious, very frustrating, trial-and-error process," he said. That's particularly true when treating [chronic pain](#), where doctors need information on patients' social and emotional well-being, as well as their physical symptoms.

Long-term pain can shift the behavior of the nervous, immune and inflammatory systems in ways that are challenging to predict or track. Loss of physical function can damage a patient's ability to function socially. It's easy for patients to get depressed, anxious and angry. Assessing all of these factors is crucial to recovery, but the [data](#) can be overwhelming for patients to provide and for physicians to assimilate.

"I used to pay [high school students](#) to scan pen-and-paper patient surveys over the weekend," said Mackey, who holds the Redlich Professorship. "The surveys took 45 minutes for patients to fill out, and we couldn't use the information in real time."

## Streams of data

So Mackey and his colleagues created a computer-based system that uses streams of data from many patients to help physicians provide the best care for individuals. "It has utterly changed the way we practice medicine at Stanford," he said.

The system, first used in 2012 in the Stanford Pain Management Center, adapts questionnaires as patients fill them in, skipping irrelevant questions and, as a result, speeding up the process. It also creates graphs displaying the patient's progress in various categories so both the doctor and patient can see it. More recently, the team has begun entering patients' genetic information, as well.

The program, called the [Collaborative Health Outcomes Information Registry](#), has since been adopted by other Stanford Medicine clinics and

now contains data from about 10,000 people. Physicians can use the data to analyze why some patients improve faster than others and what makes patients vulnerable to complications like depression or addiction to painkillers. The CHOIR team is using it to see which patients are most likely to be dissatisfied with their health-care services, then ensure these patients get more attention.

## **'The future of health care'**

Stanford's Division of Pain Management and the Center for Clinical Informatics developed CHOIR with support from the National Institutes of Health and the Redlich Pain Endowment. Mackey is sharing the software, which is open-source, nationwide. "The goal is to create a sharing ecosystem of modules," said Mackey. The University of Florida has created a module to integrate CHOIR data into [electronic medical records](#), and the Medical College of Wisconsin has contributed one that sends patients reminders using SMS texting. Ming-Chih Kao, MD, PhD, a Stanford clinical assistant professor of anesthesiology and of orthopedics, has developed several modules that together reduce the time physicians spend on the computer and increase time spent with patients.

"The vast majority of challenging medical conditions that we're facing now and into the future are chronic diseases," said Mackey. He said a shift to medical care aided by masses of health information provided by [patients](#) may be the most effective way to help those who are chronically ill. CHOIR is a powerful tool to accomplish this, he said.

"This is the future of [health care](#)," says Mackey. "What is novel now at Stanford is going to be commonplace in five to 10 years."

Provided by Stanford University Medical Center

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