Kaiser Permanente
Research

Decision-support tools
Creating tools to reduce risk and improve care

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Ten or 20 years ago, when physicians had a question about a condition, they might have pulled a dusty textbook off the shelf and searched the index. Or grabbed the informational index cards from the pocket of their white doctors' coats. That's what Ben Broder, MD, PhD, now regional assistant medical director of Quality and Clinical Analysis, did in the early 2000s before Kaiser Permanente Southern California had electronic health records in Kaiser Permanente HealthConnect®.

Today, physicians have electronic health records and electronic alerts and assessment tools to help them find the answers they are looking for—much more quickly and efficiently. They also can determine a patient's risk of developing a health condition with these new tools.

Dr. Ben Broder has been part of the evolution of physician decision-support tools from index cards to electronic assessments embedded in patient records.

Decision-support tools make complex calculations

"Decision-support tools on the computer allow us to do much more complicated calculations to determine risk for heart disease and cardiovascular disease," Dr. Broder said. "It's not new; it's just a different way of managing it. And you probably could never have enough index cards to stuff in your pocket now."

These tools are often created collaboratively by researchers and physicians who discover the need in real-world practice, find the answers using real-world data, and then create simple-to-use models to prompt the best care possible for real-world patients.

Decision-support tools can be simple

"At its simplest, a decision-support tool flashes a reminder in the patient's electronic health record about drug allergies or the need for a test," said Michael K. Gould, MD, MS, the director of the Division of Health Services Research & Implementation Science for the Department of Research & Evaluation.

More complex decision-support tools help physicians predict patient outcomes and give them information on how to reduce risk, Dr. Gould said.

It takes time to develop decision support

Dr. Gould has been working on a decision-support tool to prevent venous thrombo-embolism for about 4 years. VTE is a blood clot that starts in a vein, often in the deep veins of the leg. If the thrombus breaks off it can flow into the lungs, which can be fatal.

Physicians try to prevent clots with blood-thinning medications, compression stockings, and devices placed around the legs that intermittently fill with air to compress the legs.

The model extracts information from the patient's electronic health record and asks the physician a few simple questions to then predict the risk that the patient will develop a VTE while in the hospital or shortly after discharge.

Cover: Dr. Luis Moreta-Sainz and Dr. Michael Gould collaborate to create decision-support tools that help physicians determine which treatments are the most likely to help patients.

Decision-support tools often begin with research

Dr. Gould began with a study that looked at VTE risk factors, patients' preventive care, and who developed blood clots. Then, he assembled a cohort of 250,000 patients who were admitted to a KPSC hospital between 2010 and 2014.

"We found that a quarter of the VTEs occurred during the hospital stay, and half of them within a month of discharge. The rest occurred 1 to 3 months after discharge," he said.

Armed with this information, Dr. Gould developed the model in conjunction with a regional quality group and a collaborative of clinicians from each of KPSC's 15 medical centers. The work was directed by a regional steering committee.

Clinicians are becoming more comfortable using risk models

"I think people are increasingly more comfortable using quantitative risk models to help make these decisions," Dr. Gould said. "And with electronic health records, we have the ability to provide information at the point of care to allow physicians and patients to make better decisions."

One of the biggest challenges can be to convince busy physicians to use the tools once they are created.

"We want to create tools so the busy clinician doesn't have to leave their workspace, go to an external website, or do any additional work such as checking boxes or providing information," Dr. Gould said.

Testing is key to successful implementation

Akshay Manek, MD, chief of hospital medicine at the Panorama City Medical Center, is one of several people who helps to avoid those pitfalls by testing the tools before they go into routine use.

"In the first iteration of this model, I had to put the patient's information in a second time and that's a no-no," he said, "so it went back."

The next step was to use it during a patient workup. The model popped out a risk score with recommendations for care.

"You see the score and it does influence you," Dr. Manek said. "If you don't have something warning you, 'this is a high-risk patient,' you may decide not to add the prophylactic medicine. But if an alert is telling you the patient is at high risk, you know to be concerned."

The tool is now available to clinicians throughout the Southern California Region.

Tools prove valuable in the emergency department

Adam L. Sharp, MD, MS, an emergency medicine physician and researcher, has introduced tools to reduce antibiotic prescribing for sinusitis and to reduce unnecessary head CT scanning for patients with minor trauma.

In 2014, Dr. Sharp began working on a decision-support tool to determine which patients who came to the emergency department with chest pain—and who had not had a heart attack—should be admitted to the hospital and which could go home.

"I had been to many hospitals and found it's addressed in such a subjective way by each physician that I realized we should use a more evidence-based standard, at least as our default," Dr. Sharp said, noting, "there are always exceptions to any clinical decision rule."

After getting agreement with the emergency medicine chiefs, Dr. Sharp researched the literature and found several different standards. He chose a pre-existing tool called HEART that was developed in the Netherlands and validated in Europe because it rated

Dr. Akshay Manek, who practices at Panorama City Medical Center, tests the decision-support tools to work out issues before they go into routine use by physicians.

patients on a simple 1-to-10 scale. HEART is an acronym for history, EKG, age, risk factors (such as weight, smoking, family history), and initial troponin, which is an indicator of heart muscle damage.

In spring 2016, HEART was launched in KP HealthConnect to help direct physician management of chest pain.

Decision-support tool assesses risk

With these tools, physicians quickly get information on whether the patient had low, moderate, or high risk of a heart attack, and see recommendations based on the risk.

"For example, if a patient is low risk, there's no reason to necessarily be hospitalized or observed in the hospital," Dr. Sharp said. "The patient would follow up with their primary care doctor."

Patients in the high-risk group would be the ones most likely to benefit from hospitalization and cardiology consultation, he added.

In the first year of implementation, the number of low-risk patients with chest pain being admitted or stress tested dropped from 12% to 5%.

Some tools aimed at patients

Sometimes tools are created for patients, not physicians. One example is when the team who developed the KPSC online patient portal, Online Personal Action Plan, created an order button for colorectal cancer screening kits. If patients pressed the button, they received a kit they could do at home. Those who didn't push the button still received the kit as part of the regional mail-based strategy.

The team asked R&E research scientist Erin Hahn, PhD, MPH, to determine whether pressing the button made a difference in the colon cancer screening completion rates.

"The team members are innovators," Dr. Hahn said. "I thought it was a cool idea. Would people be more likely to complete the test if they ordered it, like a buying a product online, than if they passively received it at home?"

Pushing a button increased completion rates

"When we looked at the very raw data, people who pushed the button completed their kit faster. And they had a much higher completion rate," she said. "Around 30% or 40% typically complete the test sent passively, versus 80% of those who pushed the button.

Dr. Hahn did deeper analysis to determine whether pushing the button compelled people to complete their screening or if those people were just more likely to complete the test anyway. She found that introducing the button resulted in several thousand members completing a kit who had not completed it the year before.

She is looking forward to broadening the idea to ask whether this type of commitment could make a difference in other areas such as overdue lab orders and mammograms.

Key to success: fulfilling an unmet need

Dr. Gould said that the most important factor in the success of decision-support tools, whether it be for the clinician or the patient, is whether it fills an unmet need in the real world of health care.

"It takes a lot of work and effort to develop these tools," he said. "But it is worth pursuing if we can have a positive impact on practice and patients."

Wahid Wakach and Dr. Erin Hahn collaborate on a new online patient tool.