

- News
- Technology
- Markets
- Your Money
- Opinion
- At Leisure
- Home Page
- Take A Tour
- Subscribe
- In Today's Paper
- Portfolio
- Setup Center
- Discussions
- Site Map
- Help
- Contact Us

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Preventing the Tragedy of Misdiagnosis

Kaiser, VA Lead Effort To Provide Doctors With Tools That Help Improve Accuracy

When she was three years old, Isabel Maude had a worsening fever that was dismissed as complications from chicken pox by the family doctor. Even after she began vomiting blood and developed a purplish swelling in her groin, a local emergency room failed to check for other infections. Only when she collapsed in delirium was she rushed to a larger hospital where doctors finally diagnosed her with two deadly infections—toxic shock syndrome and necrotizing fasciitis, a flesh-eating bacteria. Hospitalized for nearly seven weeks, she had multiple organ failure, required 22 defibrillations, and was left with a gaping wound in her stomach that required extensive plastic surgery.

From deadly cancers that go undiscovered until it's too late to misread symptoms of chest pain that end in fatal heart attacks, diagnostic errors are the Achilles' heel of medicine—yet little has been done to prevent their deadly toll.

Now, with growing concern about costly malpractice claims from missed, delayed or wrong diagnoses, two of nation's largest health-care providers, the Veterans Administration and managed-care giant Kaiser Permanente, are leading new efforts to improve diagnostic accuracy. They are embarking on system-wide initiatives aimed at the most common lapses in the diagnostic process, including failure to order the right tests, create proper follow-up plans, obtain complete medical histories or perform adequate physical exams.

To address such glitches, Kaiser and the VA are turning to a variety of new tools, including Web-based "decision support" programs to help doctors by offering an array of possible diagnoses they might not have considered or prompting them to perform appropriate tests on patients with certain symptoms.

One such system, known as Isabel (isabelhealthcare.com), was co-developed in London by Isabel Maude's father, Jason Maude, former head of equity research at a financial-services firm.

Had doctors considered a secondary infection in the first place—not uncommon with chicken pox—and started antibiotics, Isabel's condition might have resolved quickly, says Joseph Britto, then an attending physician at St. Mary's, the London hospital that eventually made the correct diagnosis. Rather than take legal action, the Maudes developed the idea of an online diagnostic aid with Dr. Britto. (Isabel, now 11, is a "happy and healthy child now," her father says.)

Both Kaiser and the VA are pilot-testing the Isabel system, which is already in use

by a small but growing number of other hospitals, doctor offices and medical-information companies around the world. Once symptoms are entered into a computer, Isabel typically presents 10 diagnoses on the first Web page, and an additional five to 10 on subsequent pages, up to a total of 30, in no particular order.

Though at Kaiser some doctors have protested that the system takes extra time and presents too many diagnoses that aren't relevant, a study of Isabel by Mark Graber, the chief of medical service at the VA Medical Center in Northport, N.Y., found that Isabel suggested the correct diagnosis in 98% of the cases. Dr. Graber says decision-support systems can help doctors avoid falling victim to "premature closure"—the tendency to focus on one diagnosis that seems to explain all of the symptoms, then stop considering other possibilities.

Glitches in the System

Studies show that diagnostic errors occur in 10% to 30% of cases, and generally stem from flaws in doctors' thinking, glitches in the health-care system, or some combination of both. While many diagnostic errors don't cause serious harm, errors that potentially could have changed a patient's outcome are found in 5% to 10% of all autopsies, according to a 2002 study funded by the Agency for Healthcare Research and Quality. In one Kaiser case study, a cardiologist failed to review an abnormal chest X-ray faxed to his office by an emergency-room doctor; he denied ever seeing it and failed to follow up with the patient who later died of lung cancer.

Diagnostic errors are among the largest causes of paid malpractice claims at both Kaiser and the VA, but studies show an industrywide problem. Last month, a study of 300 closed malpractice claims published in the *Annals of Internal Medicine* found that 59% involved diagnostic errors that harmed patients and 30% resulted in death.

The closed malpractice-claims dockets are filled with horror stories, such as a 56-year-old California real-estate broker who suffered brain damage and had to have both legs amputated below the knees after ER doctors misdiagnosed his aortic dissection as angina, delaying treatment of this surgical emergency. Colon and breast cancers are among the most frequently misdiagnosed or overlooked, leading to shortened life spans and premature deaths.

Under the Radar

Still, Dr. Graber, who is also associate chairman of the department of medicine at the affiliated State University of New York at Stony Brook, says such errors have "barely been on the radar screen," compared with more obvious errors like wrong-site surgeries. Dr. Graber is one of several VA experts looking for ways to reduce diagnostic error such as ensuring critical test results reach the right doctor and are acted on in a timely manner.

Dropping the Ball

Some examples of diagnostic errors that arose from slip-ups by doctors and hospitals, based on a survey of medical literature:

- **Lack of follow up**—Failure to follow patients after surgery misses recurrent colon cancer
- **Failed oversight of care systems**—Multiple X-rays not read in timely manner; films lost or misplaced
- **Faulty information processing**—Missed cancer of pancreas in patient with radiating back pain, attributed to reflux
- **Failure to communicate test results**—Biopsy report of cancer never communicated to patient who missed appointment
- **Insufficient knowledge or skills**—Missed diagnosis of complete heart block; misread electrocardiogram
- **Failure to verify diagnosis**—Wrong diagnosis of osteoarthritis in patient found to have drug-induced lupus
- **Clinician sloppiness**—Doctor known to commonly skip elements of physical misses gangrenous toes
- **Faulty data gathering**—Delayed diagnosis of abdominal aortic aneurysm; incomplete history questioning
- **Failure to gather new data**—Missed colon cancer in patient with declining blood counts, attributed to gastritis

Sources: Department of Veterans Medical Affairs Center, Northport N.Y.; State University of New York, Stony Brook

With more than 10,000 known medical conditions and symptoms that are often hard to distinguish, doctors often can't synthesize everything they need to make an accurate diagnosis. Because physicians are rarely challenged by patients, peers or subordinates, they can develop a dangerous combination of "overconfidence and complacency," says Dr. Graber, who is hosting a meeting in Naples, Fla., next week with other experts to explore how to raise awareness of the problem with doctors.

Failure to diagnose often happens when patients see several different health-care providers who don't communicate, or when patients' complaints aren't taken seriously—such as a patient who shows up with chest pains but doctors don't test for cardiac disease. In analyzing the diagnostic process recently, Kaiser found that doctors sometimes didn't correctly interpret patient symptoms, such as a nursing mother whose breast lump is dismissed as a clogged milk duct from a breast pump—and turned up nine months later with a four-centimeter breast mass.

Doug Bonacum, vice president of safety management at Oakland, Calif.-based Kaiser, says the managed-care giant launched an internal Diagnostic Reliability Improvement Initiative 2½ years ago to ensure that "all the dots are connected." Key to the effort is Kaiser's new electronic-medical-record system, which can track lab tests and referrals, and send results and reminders about follow-up visits directly to patients via secure email messages.

"There are so many things that can go wrong from trying to get patients in for an exam, to follow-up after treatment that we need to take a more systemic approach," says Mr. Bonacum.

Adding the Isabel system costs \$180 per bed per year for a hospital, or about \$54,000 a year for an average 300-bed hospital, and \$500 a year for individual physicians and group practices. Doctors who have been using Isabel at hospitals around the country say it is of special help in teaching medical residents.

When making rounds with residents of children with "tricky symptoms," Richard Chinnock, chairman of pediatrics at the Loma Linda Children's Hospital in Loma Linda, Calif., says he will ask, "Did you guys Isabel this? Are you comfortable you thought of everything?" At Yale University's Yale-New Haven Children's Hospital, physician-in-chief Margaret K. Hostetter says the Isabel program is used "to get residents to broaden their thinking" and to consider such issues as whether a child

with fever and rash should be evaluated not only for infections but also for juvenile rheumatoid arthritis or lupus.

"This is really a culture change for doctors," says Stephen Borowitz, a specialist in pediatric gastroenterology at the University of Virginia Children's Hospital, another Isabel user. "We have to face that we can't really know it all or carry all the medical knowledge in our heads."

As part of its new electronic-medical-record system, Kaiser is also pilot-testing a diagnostic aid for the emergency department called the Emergency Medicine Risk Initiative, designed by Chicago-area patient-safety and risk-management concern Sullivan Group. The Web-based tool prompts doctors and nurses to ask a series of questions, order certain tests and record their actions on a chart for patients that show up with high-risk symptoms such as chest pain, shortness of breath and childhood fevers that could be signs of serious illness but are often misdiagnosed. The prompt chart ensures that staffers consider rare conditions, but also forces them to document in an electronic medical record or paper chart that they have covered all the bases by checking off their steps.

'Consider Everything'

While the program can be cumbersome and time-consuming, it can help prevent potentially dire misses. "If it's an obvious heart attack in a 50-year-old male who shows up sweaty with crushing chest pain it's usually a no-brainer," says Tony Carnevale, emergency-room chief for Kaiser Permanente's Sunnyside Medical Center in Portland, Ore., one of the pilot-test sites. "But if it's a 45-year-old female who says she isn't feeling so great or an 85-year-old with nausea, you might miss the diagnosis if you don't consider everything."

[Return To Top](#)

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