"Most doctors behind learning curve on Genetic Tests"-USA TODAY

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By Rita Rubin, USA TODAY
GREENWICH, Conn. - It's ironic that Steven Murphy's medical practice is located in this town's Putnam Hill historic district.
His Maple Avenue building, the Dr. Hyde House, is a cozy hodgepodge of architectural styles, with stone and stucco walls, a double bay corner window and orange clay roof tiles. It has housed doctors' offices for a century.
Although Murphy's surroundings may be old-fashioned, his practice is not. Murphy, a board-certified internist who writes a blog called The Gene Sherpa, is one of a small minority of doctors who use genetic tests to help manage their patients' care.
"The majority of people we see have a very strong family history of X, Y or Z disease," says Murphy, who'll be 34 this week. He doesn't bring up genetic testing until after taking a detailed personal and family medical history and assessing such risk factors as cholesterol and blood pressure. "I tell them there are lots of ways to dig deeper. Then I also tell them the limitations."
Other patients show up with the results of personal genome tests, costing upward of $1,000, they had ordered online from companies such as 23andMe and Navigenics. They want to know what it all means. "We like to call it the thousand-dollar genome with the million-dollar interpretation," Murphy says.
Having trained in genetics as well as in internal medicine, he's much further on the learning curve than most doctors.
Since the Human Genome Project was completed in 2003, the introduction of new genetic tests has far outpaced the ability of doctors - who typically have little training in genetics - to figure out what to do with them. Some tests are marketed to help predict disease risk, others to determine how patients might respond to certain medications.
"This is going to become a very big part of mainstream medicine, and we really aren't ready for it," says human geneticist Michael Christman, president and CEO of the Coriell Institute for Medical Research, a non-profit research center in Camden, N.J.
A deluge of data
Eric Topol, director of the Scripps Translational Science Institute in La Jolla, Calif., cites what he calls "a really great paradox."
"Ask patients 'whom do you trust with your genomic data?' and 90% say their physicians," Topol, a cardiologist, says. Yet, when Medco Health Solutions, the pharmacy benefit manager, and the American Medical Association surveyed more than 10,000 doctors, only 10% said they felt adequately informed and trained to use genetic testing in making choices about medications.
That physician survey was conducted two years ago, but Topol, Christman and others in the field doubt much has changed.
Take the blockbuster drug Plavix. In March, the Food and Drug Administration added the strongest type of warning, a black box, to the label of Plavix, which is taken by millions of Americans who have had stents inserted to keep their coronary arteries open. Plavix is supposed to reduce the risk of blood clots in those stents, but, as the boxed warning notes, some patients might not effectively convert the drug to its active form in the body.

The warning points out that a genetic test can identify those patients, who might need a higher dose of Plavix or a different drug. Yet, Christman says, "even in tertiary academic medical centers, you don't have routine testing for Plavix efficacy."
On the other hand, Topol says, doctors have ordered 250,000 $100 tests for a gene called KIF6, tests that were aggressively marketed. One KIF6 variation was thought to raise heart disease risk by up to 55%, but, Topol says, a study this month in the Journal of the American College of Cardiology shot that down.
Considering that there are thousands of genetic tests, doctors might be forgiven for feeling overwhelmed, especially because so many questions remain.
"We have way more data than we have knowledge," says Clay Marsh, a lung and critical-care doctor who directs the Center for Personalized Health Care at The Ohio State University College of Medicine in Columbus. "The biology is struggling to keep up with the technology."
Though some diseases, such as sickle cell and cystic fibrosis, are caused by mutations in a single gene, many common conditions arise from the interplay of a variety of genes and lifestyle and environmental factors, not all of which have been identified.
"Having a family history of heart disease increases your risk of heart disease more than some of these (genetic) markers they test for," Murphy says. "Then, just because you have that marker doesn't mean that's what caused the heart disease in your family. That's one thing I teach residents: No gene is an island."
Right test for one patient
Murphy's first patient on a sunny fall afternoon sat in her home nearly 1,000 miles away, in the village of Niantic, Ill., smack dab in the middle of that state.
Wanda Conner, 72, never met a medication that agreed with her. She heard about the Genelex test for five genes involved in drug sensitivity from her dental hygienist and figured it might provide some answers. So she swabbed some cells from her cheek and mailed them to the company's lab in Seattle.
Besides seeing his own patients, Murphy reviews test results by phone for Genelex customers. He scrolled through Conner's on his computer. Turns out that she carried variations in three of the genes for which she was tested that could affect her response to certain medications.
Murphy touched on types of drugs that Conner wouldn't process normally if taken. He advised her to stay away from SSRIs, or selective serotonin reuptake inhibitors, a class of antidepressants, and cautioned her that she might experience side effects if she took beta-blockers, a heart medication. He promised to fax his report to her doctors.
"They're fascinated with this," Conner says of her doctors in Illinois, "but they don't know much about it. In fact, I probably know more than they do."
Christman's and Topol's organizations hope to change that. "The purpose of our study ... is to determine the best practices, from soup to nuts, in using personal genome information in clinical care," Christman says. "What are the best information technology systems to deliver this?"
For example, he says, when it comes to genetic factors affecting drug response, it probably makes more sense for pharmacists, not genetics counselors, to advise doctors or patients.
The Coriell Personalized Medicine Collaborative is halfway toward its goal of enrolling 10,000 people. Many are doctors. "We're measuring a lot of genetic information about them," Christman says. Genetics counselors explain the results, usually by e-mail or phone, which participants seem to prefer over a face-to-face visit.
The next 5,000 participants will have already been diagnosed with breast or prostate cancer or heart disease. The cancer patients will be recruited through Fox Chase Cancer Center in Philadelphia, the heart disease patients through Ohio State.

Coriell is sharing only results that patients or their doctors can do something about. Expert committees meet twice a year to review the latest findings about different genetic markers. "If somebody came out with an effective cure for Alzheimer's," Christman explains, "then we would report Alzheimer's risk."

In a related study, Coriell is investigating how best to educate doctors about genetic testing and how that affects what they do with results.

Meanwhile, Scripps plans to launch the College of Genomic Medicine, a free online physician training and accreditation program, early next year, Topol says. To become accredited, he says, doctors will spend five to eight hours reviewing materials developed by an international group of leaders in the field and then take a "highly interactive" test.

The genomic medicine college was born at last year's TEDMED, an annual medical technology and health care conference. There, Topol says, both he and Gregory Lucier, CEO of the San Diego-based Life Technologies, a leading supplier of gene-sequencing equipment to academic laboratories, delivered talks about the need to get the medical community up to speed.

As a result, the Life Sciences Foundation, the company's philanthropic arm, awarded Scripps a $600,000 grant to develop the genomic medicinecollege.Topolexpects interest in the program will be high.

"Consumers are coming into their physician with their genomic data," he says. "Physicians don't want to be trumped in their knowledge by the patient they're looking after. Instead of playing catch-up, they need to be in the leading front of knowledge."