As medicine is becoming more customized, care can be fine-tuned to work with a patient’s unique genetic makeup. The key: Know your family history.

Treatment Tailor-Made For You

By Dianne Hales

A NEW TOOL IN THE BATTLE AGAINST DISEASE IS AVAILABLE now—a genom-ic test is available now—a family history, says Dr. Muin Khoury, director of the Office of Genomics and Disease Prevention at the Centers for Disease Control and Prevention (CDC). “It captures not only shared genes but also shared environment, shared values, shared behavior and shared culture. You have half your genes in common with your parents, brothers and sisters. That’s 15,000 genes—more than we can study with any lab test.”

A thorough family history—which reveals family susceptibilities to particular diseases—can lead a doctor to run specific screenings or DNA tests and to customize a patient’s treatment. (See box at left.)

Beyond identifying risks, scientific advances are pinpointing the medications that will do the most good with the fewest side effects. “What’s exciting is the exponential growth in tools that allow us to personalize medical care to a much greater degree than ever before,” says Dr. Hal Barron, chief medical officer of Genentech, a pioneer in biotechnology.

For most patients with most health problems, doctors traditionally have prescribed the same treatments. If one medication fails—which happens about 50% of the time—they change doses or try another drug. “Trial and error remains standard practice,” says Dr. Stephen Liggett, a professor of medicine at the University of Cincinnati. But he notes, “With asthma, which affects 15 million Americans, trial and error can mean years of misery. With a problem like congestive heart failure [a decline in the heart’s pumping ability], trial and error can be fatal, because half of patients die within five years.”

Over the last decade, Liggett’s lab has developed tests to identify the genetic variations that affect an individual’s response to medications for asthma and congestive heart failure. Using

PAP TEST EVERY THREE years is standard medical advice for women over 21. But this recommendation could jeopardize the lives of women like Cathy McCarty, 41, of Marshfield, Wis. “I’m one of three girls, and both of my sisters have had cervical cancer,” she explains. “Because of my family history, I will go in annually for a Pap smear for the rest of my life.”

Increasingly, physicians are moving beyond “one size fits all” guidelines and relying on family history and an ever-growing number of sophisticated blood tests to offer “personalized” medical care tailored to each patient’s genetic makeup. “Nothing is more personal than DNA,” says McCarty, director of the Personalized Medicine Research Center at Marshfield Clinic, which is collecting blood and DNA samples from thousands of patients for cutting-edge research that, as she puts it, “could change the clinical practice of medicine.”

Personalized medicine is not new, but advances in genomics (the study of the entire set of human genes) are taking it to a new level. “The ultimate genomic test is available now—a family history,” says Dr. Muin Khoury, director of the Office of Genomics and Disease Prevention at the Centers for Disease Control and Prevention (CDC). “It captures not only shared genes but also shared environment, shared values, shared behavior and shared culture. You have half your genes in common with your parents, brothers and sisters. That’s 15,000 genes—more than we can study with any lab test.”

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New tests can identify which individuals will respond well to a particular medication.

**Personalized Medicine**

Would you be willing to contribute a sample of your DNA to a national databank to be used only for health-related research?

- 48% said “yes”;
- 42% said “no”;
- 10% don’t know.

Would you want to be genetically tested to determine which medications might be most effective and safest for you?

- 62% said “yes”;
- 34% said “no”;
- 4% don’t know.

Researchers recently finished mapping the human genome and now can analyze one’s complete genetic makeup. What concerns, if any, do you have about genetic testing?

- 39% said “no”;
- 33% said “yes”;
- 28% don’t know.

How useful have you found health information on the Internet to be?

- 23% very useful;
- 14% somewhat useful;
- 21% not at all useful.

Have you ever used the Internet to look for information on these topics?

- 58% for specific diseases;
- 33% for nutrition;
- 32% for prescription drugs;
- 28% for health-care providers (doctors/hospitals);
- 27% for exercise;
- 22% for health insurance;
- 21% for weight control.

*Percent responding “yes.”

Have you ever used e-mail to communicate with your doctor or health-care provider? Has your doctor ever suggested you visit a Web site for additional information?

- 48% said “yes”;
- 33% said “no”;
- 10% don’t know.

Do you belong to an online support group for a specific medical condition, such as arthritis, cancer or diabetes?

- 3% said “yes”; 97% said “no.”

How useful would it be if you could look at your personal medical records online?

- 30% not at all useful;
- 23% very useful;
- 16% somewhat useful.

Our poll of 1000 people, representing a cross-section of Americans, has a sampling error of ±3.1%.
and Tarceva (for lung and pancreatic cancer)—also hone in on specific cancer cells found in some patients. And a new field of “pharmacogenomics” is producing highly targeted drugs for common diseases such as psoriasis.

“This is a new era in medicine,” says Dr. Ralph Snyderman of Duke University, which launched a personalized health-care program for its employees last January. “People think that genomics will have an impact in their children’s lifetime, but it is happening now. I urge them to rush to take advantage of it for the sake of living longer, healthier lives.”

Someday, a DNA scan from a single drop of blood may tell you the diseases you’re most likely to develop. A family history can do the same—now.

“Family history may be the single greatest risk factor for disease,” says Dr. Paula Yoon of the CDC’s Family Health Initiative, which encourages consumers to complete a family history and discuss it with their doctors. “Charting your family history enables you to set priorities based on your personal health risks.”

Knowing that you have a relative with, say, colon cancer could mean that you should start screening 10 years earlier. Yet doctors average less than 2.5 minutes discussing family history and rarely include a family tree in a patient’s file.

- The CDC’s Family History Initiative provides information. Go to www.cdc.gov/genomics/fhix.htm to learn more.
- To create a family history, visit the Mayo Clinic site at www.mayoclinic.com and search for “family history.”