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

Set priorities with your doctor based on your personal health risks.

A 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."

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.

How To Get Personalized Care

- **COMPLETE A FAMILY HISTORY** and leave a copy with your physician to file in your medical record.
- **DEVELOP A PERSONALIZED HEALTH PLAN** with your doctor that sets specific goals and includes recommendations based on your family history, age, sex, weight, fitness and lifestyle.
- **ASSESS YOUR HEALTH RISKS,** then discuss what steps you can take to avoid them, delay them or detect them early.
- **RESEARCH PRESCRIBED DRUGS.** Ask if the drug has been studied in individuals similar to yourself—for example, women, blacks, Asians, seniors or diabetics. Find out if there is anything in your personal or medical history that suggests a greater risk of side effects or the probability that one drug will work better for you than another.

The Right Drug For The Right Patient

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."

A family history captures not only shared genes but also shared environment, shared values, shared behavior and shared culture.

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

PHOTO BY PELAEZ/CORBIS; MODEL POSED FOR ILLUSTRATIVE PURPOSES ONLY

this personalized approach, "we have been able to take people who were miserable or near death and bring them back to a normal life."

For 20 years, Gary Burcham, a retired Navy pilot from Burbank, Calif., thought he was taking the right medication to protect his heart: a daily aspirin. But after he was diagnosed with a clogged artery, a new blood test, approved last year, revealed that he was "resistant" to aspirin's protective effects. "I had a false sense of security," says Burcham, 74, who now relies on another anti-clotting agent to prevent a heart attack.

Of the 25 million Americans who take aspirin to protect their hearts, as many as 30% may be getting little or no benefit for a variety of reasons, including subtle genetic differences. Scientists have identified similar variations that may make certain drugs for high blood pressure, multiple sclerosis, Alzheimer's and heart disease more or less effective in different people.

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

"This research provides a glimpse into the future," says Dr. Paul Ridker, director of Harvard's Center for Cardiovascular Disease Prevention, who recently identified two genetic abnormalities that lower the efficacy of a widely used cholesterol-lowering statin in certain individuals. "Personalized medicine promises to get the right drug in the right dose to the right patient."

Pinpointing Treatment

A personalized approach can make a life-or-death difference. Connor Pauly of Washington, Ill., was diagnosed with acute lymphoblastic leukemia in 2001. The 8-year-old developed severe complications to the treatment he received at St. Jude Children's Research Hospital in Memphis, Tenn. Then a test developed at St. Jude showed that Connor, like one in 10 people, had a bad version of the gene for an enzyme called TPMT, which helps break down cancer medications. With lower doses, Connor was able to continue chemotherapy—and eventually enter remission.

Using other genomic tools, cancer specialists have developed drugs that target specific cells within an individual's tumor. One in four women with breast cancer, for example, have tumors containing a particular gene called HER2. The breakthrough drug Herceptin targets receptors for HER2 to block the signals that cause cancer cells to grow. Other cancer drugs—such as Gleevec (for chronic myeloid leukemia), Iressa (for lung cancer)

continued

Taking Our Pulse

The PARADE/Research!America Health Poll

Taking Charge Of Our Own Health

This poll—the third in a series—takes a look at topics covered in this special issue, which focuses on the increasing emphasis on the individual in medical treatment and the growing involvement of patients in their care. The poll was conducted by the Charlton Research Co. and commissioned by PARADE and Research!America, a nonprofit public education and advocacy group. Here are some of the results:

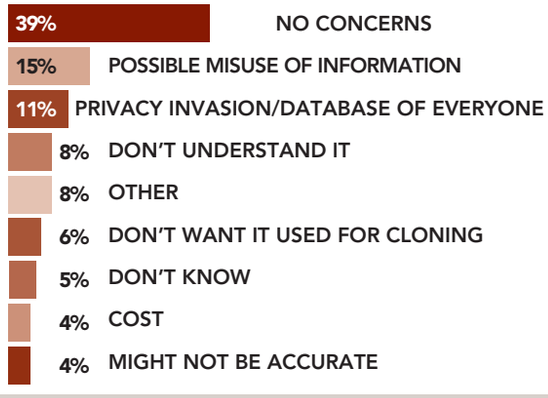
Personalized Medicine

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.

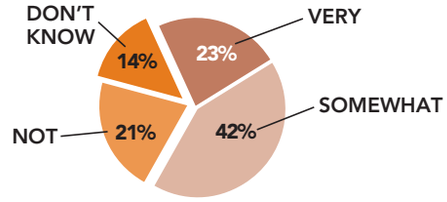
Would you be willing to pay more for genetically personalized health care?
34% said "yes";
57% said "no";
9% don't know.

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?



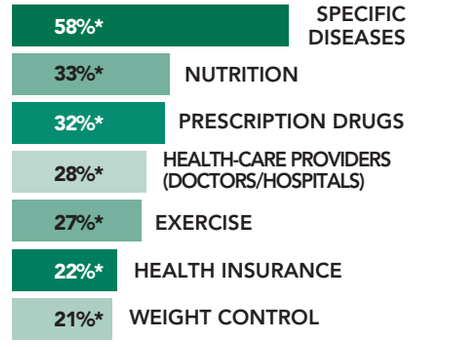
Online Medicine

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



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."

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

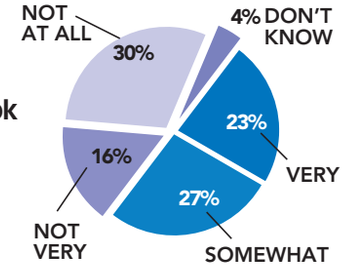


** Percent responding "yes."*

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?
One in 10 respondents answered "yes" to each question.

Have you ever asked your doctor or another health professional to let you see your medical records?
39% said "yes"; 61% said "no."

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



Our poll of 1000 people, representing a cross-section of Americans, has a sampling error of ±3.1%.

For more results of this PARADE/Research!America poll, visit *www.researchamerica.org* on the Web.

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."

Create A Family History

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."**