

To know or not to know: Decision making in genetic testing

By Philip Buchanan, PhD, FACMG, and Jeffrey Taska, MS

Albert Einstein was as astute in his comments on the human condition as he was in shaping our concept of the physical world. He once pointed out that if we knew what we were doing, it would not be called research, would it? Years later, we are reaping the fruits of genetic research. This genetic cornucopia includes not only advances in our understanding of the basic science of genetics, but also the rewards of being able to test for, treat, and in some cases, cure genetic conditions.

But for patients whose lives may be impacted by genetic conditions, the decision-making process involved in genetic testing and the results they receive can be confusing. A prime example is carrier screening for cystic fibrosis (CF), which the American College of Obstetricians and Gynecologists (ACOG) recently recommended be offered to individuals with a family history of CF and couples in whom one or both partners are Caucasian and are planning a pregnancy or seeking prenatal care. This ACOG recommendation also states that although CF is more common in Caucasians and Jewish individuals, screening should be made available to all couples regardless of racial or ethnic background.

For health care providers, routine CF screening programs need to be designed and implemented. For patients, the CF decision-making process is not an easy one to navigate. Over a thousand mutations have been found in the CFTR gene that causes CF. Current analysis can detect about 97% of mutations in the Jewish population and 90% of those in Caucasians. Hence, screening cannot absolutely reassure a patient that he or she is not a CF carrier. While a baby must inherit a CF mutation from both parents in order to be affected, a definitive prognosis cannot be given for all the thousands of combinations of mutations an individual might inherit. In addition, there are genes other than CFTR that can modify the severity of the disorder.

CF was once considered universally lethal and some affected infants die shortly after birth. We now know the variability of CF is more complex than that and can produce very mild or clinically undetected symptoms. Imagine a couple who are both found to be CF carriers by routine screening. They began their pregnancy having never heard of CF and now are pursuing prenatal CF diagnosis through amniocentesis.

Their fetus is discovered to have both the parental mutations, but one of the mutations is rare and its clinical effect is not well known. We cannot use our crystal ball to predict this baby's life expectancy or the severity of symptoms. Some couples might decide not to continue a pregnancy based on this information. Some couples who are technical optimists might elect to continue the pregnancy in the hope a cure for their baby's condition will be found soon. Exciting technologies, including gene therapy to replace a non-working CFTR gene with a working gene, lung transplantation, or a drug to correct the chloride transport imbalance (which causes the symptoms of CF) are being researched or have already shown some success.

Individuals who are concerned about their chances of being a carrier of CF or other genetic conditions are encouraged to pursue genetic counseling and also to discuss genetic testing with their physicians. In order to help couples through the maze of CF testing, ACOG recommends that patients with a family history or mutations discovered by carrier screening be referred to a genetics professional for counseling, test interpretation, and estimation of risks.

GeneCare Medical Genetics Center, in Chapel Hill, NC offers carrier and prenatal DNA testing with a panel of the 32 most common CF mutations, as well as genetic counseling for CF and other genetic conditions. For more information call (919) 942-0021 or 1-800-277-4363 or visit us online at www.genecare.com.