NEJM Editorial Warns of Downside to 'Premature' Consumer Genomics Market

January 11, 2008
By Matt Jones,
a GenomeWeb staff reporter

NEW YORK (GenomeWeb News) - Several months after the launch of a handful of consumer genomics firms, the medical establishment has fired a volley in what could become a debate between companies trying to bring the genome into the home and physicians trying to treat these newly armed patients.

Testing services from companies like 23andMe, Navigenics, Knome, and DeCode Genetics are "premature attempts at popularizing genetic testing," according to an opinion article in yesterday's *New England Journal of Medicine*.

According to the article, these consumer-oriented tests "neglect key aspects of the established multifaceted evaluation of genetic tests for clinical applications" and could confound treatment or complicate doctor-patient relations.

While all of these companies claim that their tests should not be used as the basis for medical decisions, some physicians are concerned that customers for these tests will nevertheless begin seeking medical direction based on their results, according to the *NEJM* article.

The authors of the op-ed include Muin Khoury, director of the National Office of Public Health Genomics at the US Centers for Disease Control and Prevention; David Hunter, a professor of epidemiology and nutrition at the Brigham and Women's Hospital at Harvard Medical School; and Jeffrey Drazen, an environmental health professor at Harvard who also serves as *NEJM*'s Editor-in-Chief.

The article, "Letting the Genome out of the Bottle – Will We Get Our Wish?", makes the case that the medical field and the public will not be ready to deal with the implications of consumer genomics until more translational medicine connects information from the vast amount of genome-wide association data to personal genomes in meaningful ways.

Khoury told *GenomeWeb Daily News* today that the field as it stands now should be considered "recreational genomics."

"People think it's like a big social genomic party, but it's much more profound than that, [and] could have profound effects," he said.

Khoury and his co-authors note in the article that there are three important issues that consumer genomic testing needs to address before it can become part of medical care: analytic validity, clinical validity, and clinical utility.

Analytic validity, which is the ability of a test to "accurately and reliably measure the genotype of interest," depends on stringent quality controls. Even a very small error rate in sample can "result in hundreds of misclassified variants for any individual patient," the authors note.

Clinical validity, or the ability of the test to predict a disorder, is also questionable, the authors suggest, because many complex diseases are caused by multiple gene variants, interactions among these variants, and interactions between variants and environmental factors. "Thus, a full accounting of disease susceptibility awaits the identification of these multiple variants and their interactions in well-designed studies," the authors note.

The third issue — clinical utility — may have the greatest impact on patients, because that raises the question of what advice or treatment physicians ought to recommend based on the results of a genomic test.

“There are very few observational studies and almost no clinical trials that demonstrate the risks and benefits associated with screening for individual gene variants — let alone testing for many hundreds of thousands of variants,” the authors state. “Thus, any claim to clinical utility currently rests on the assumption that interventions that have proven successful in the general population will behave the same way in a genetically at-risk population.”

Many of these “interventions” are lifestyle changes like quitting smoking or getting more exercise, and are therefore “likely to be broadly beneficial in relation to many diseases, regardless of a person's genetic susceptibility to a specific disease,” the authors write.

Khoury told *GenomeWeb Daily News* that a personal genomic profile currently “doesn’t mean that much more than an alphabet soup.”

“If you’re willing to pay a thousand bucks for that and get a printout, that’s your choice,” he said, adding that some consumers may not know what they’re getting into, or how this market might develop.

“The bottom line here is that people are beginning to be concerned that there may be more harm than benefit,” Khoury explained. “And that’s why there have been calls for regulation” such as the Genetic Information and Nondiscrimination Act, which President George W. Bush has said he would sign but which has yet to make it to his desk.

Khoury and his co-authors said more translational research is needed that would connect genomic data to diseases and “show the meanings of these variants” before personal consumer genome profiles will be more useful in mainstream medicine

“All kinds of translational sciences need to come to bear,” added Khoury, who lamented the lack of these kinds of studies. “It’s not enough to discover something in a test-tube and say it’s ready for prime time,” he said.