



Cancer Whole-Genome and Transcriptome Test Expands NYGC's Clinical Services

Dec 07, 2018 | [Monica Heger](#)

SAN FRANCISCO (GenomeWeb) – The New York Genome Center has launched a clinical whole-genome and transcriptome sequencing test for cancer patients, with [recent approval](#) from the New York State Department of Health.

While such comprehensive testing is largely believed to be the future of cancer genomics it is not yet widely offered. According to Vaidehi Jobanputra, NYGC's director of molecular diagnostics, many of the center's founding members had been interested in such a test. "Ultimately, whole-genome sequencing will be the test of choice," she said.

The NYGC researchers described the [analytical validation](#) of their assay last month in the *Journal of Molecular Diagnostics* and Jobanputra said that the version that will be offered as a service will essentially be the same as the assay described in the publication, except that the team is migrating the test over to Illumina's NovaSeq from the HiSeq X Ten.

Although NYGC expects much of the initial demand to come from oncologists affiliated with its member institutions, the test is available for anyone to order and Jobanputra said it has already received orders from outside institutions.

She declined to disclose the price of the test. Regarding reimbursement, she said that the NYGC does not bill third-party payors but the ordering hospital. It is then up to the provider to determine the billing strategy for payors, although she noted that NYGC would work with providers and patients to secure reimbursement where possible.

Turnaround time for the assay is six to eight weeks, Jobanputra said, but "faster turnaround time is available in urgent cases."

The NYGC provides a clinical report to the oncologist that includes the "standard of care therapy for each cancer type best fitting the patient's genomic profile," she said, as well as information about clinical trials and experimental therapies that patients with these genomic variants might be eligible for. The NYGC uses an in-house developed drug-to-gene database to match variants with treatment options, which are then manually prioritized by the NYGC clinical team.

Jobanputra said that the NYGC decided to pursue whole-genome and transcriptome sequencing of tumors because that would allow them to detect all relevant mutations, including structural and copy number variants, point mutations, and gene fusions. In addition, she said, patients' germline DNA will be sequenced.

A number of research groups have noted the importance of sequencing germline DNA along with tumor DNA to help avoid [false positives](#) and extract [more utility](#) from the testing.

In addition, many germline mutations have implications for both the patient and their family members. NYGC will report back both cancer-related germline mutations and, if the patient wants those results, germline mutations in the 59 genes recommended for testing by the American College of Medical Genetics and Genomics, Jobanputra said.

She noted that while a number of the high-penetrance cancer risk genes, such as the BRCA or Lynch syndrome genes, may be analyzed with gene panels, or if a patient has a relevant family history, there are also a number of moderate-risk genes that are not frequently tested, such as ATM and CHEK2, that still could have clinical implications. "But since we do whole-genome sequencing, we're able to detect both the high- and moderate-risk genes," she said. If a cancer patient has mutations in any of these risk genes, family members can be screened who may not have been otherwise, she said, and asymptomatic individuals with mutations in genes that confer a moderately increased risk can undergo more frequent screening.

In addition, some of the germline mutations have therapy implications for patients. Mutations in the BRCA genes, for instance, confer resistance to PARP inhibitors, and mutations in mismatch repair genes indicate that a patient may benefit from immune checkpoint inhibitors.

Patients also have the option to consent to their de-identified data being used for research, Jobanputra said, and the NYGC team is discussing the potential of performing follow-up studies regarding patient outcomes and clinical utility of the test. She said that the team has not yet made a decision about whether it will pursue US Food and Drug Administration clearance of the test.

While clinical cancer genomic tests have been progressing from a handful of genes to ever larger panels and exomes over the years, it's unclear what the demand for a test as comprehensive as the NYGC's will be, however. A number of oncology gene panels have been available from companies such as Foundation Medicine or through academic medical centers, but whole-genome sequencing for cancer patients has tended to be offered primarily in clinical research settings, such as the University of Michigan's [Mi-Oncoseq program](#).

Arul Chinnaiyan, director of the Michigan Center for Translational Pathology at UM, said that aside from its clinical research-based Mi-Oncoseq program, the university also offers NGS testing for cancer patients through its CLIA-certified and CAP-accredited laboratory, but those tests are predominantly panel-based. For instance, it offers Thermo Fisher Scientific's OncoPrint targeted hotspot panel, a 1,700-gene tumor/normal panel plus whole transcriptome sequencing that is based on the Mi-Oncoseq pipeline and is geared toward metastatic patients, and a hereditary cancer panel. Around 3,500 cases have been analyzed via the Mi-Oncoseq protocol, and Chinnaiyan noted that "one major issue and challenge is that we have not been able to get insurance reimbursement for such a comprehensive test."

NantHealth, which markets a whole-genome and transcriptome sequencing test, called GPS Cancer, [recently reported](#) that orders of its test fell in the third quarter to 461 from 642 in the previous quarter and that it has struggled to gain reimbursement for it. NantHealth CEO Patrick Soon-Shiong even said that the firm would scale back its test to a 400-gene panel in order to obtain reimbursement.

Tempus, a Chicago-based cancer informatics and precision medicine company, also [recently said](#) that it struggles to get paid for its comprehensive sequencing tests. Among its products are a tumor/normal exome sequencing test and a tumor transcriptome sequencing test.

Keith Stewart, director of the Mayo Clinic's Center for Individualized Medicine, agreed with Jobanputra that "whole-genome sequencing is inevitably where we'll end up," but he also said that there are currently a number of challenges that could hinder adoption. "There are cost issues that need to be ironed out," he said, and "for a lot of clinicians, a whole genome is information overload."

Mayo Clinic Laboratories does not offer a commercial whole-genome oncology test and relies on traditional FISH and cytogenetics testing. But it does offer targeted gene panels, as well as MP-seq, a low-coverage sequencing test designed to focus on structural variant detection.

Nonetheless, Stewart said, sequencing costs are coming down, although costs for running whole genomes are "very volume dependent, like filling seats on an airplane." And increasingly, it is the interpretation that is the most expensive. "Over time, I think [whole-genome] is where the world is going," he said. "NYGC being a first mover in the space, it's a bold move."

Filed Under [Sequencing](#) [Cancer](#) [Molecular Diagnostics](#) [Clinical Sequencing](#) [Genomics: Clinical Implementation](#) [North America](#)
[NYGC](#) [NGS](#) [RNA-seq](#) [whole-genome sequencing](#)

[Privacy Policy](#). [Terms & Conditions](#). Copyright © 2018 GenomeWeb LLC. All Rights Reserved.