

July 01, 2014

NIH Pumps \$43M into Undiagnosed Diseases Network to Target Rare Disorders with Genomic Medicine

By [a GenomeWeb staff reporter](#)

NEW YORK (GenomeWeb) – The National Institutes of Health plans has awarded six clinical research institutions \$43 million to create a National Human Genome Research Institute-led network that will use genomic medicine to investigate rare and undiagnosed diseases.

NHGRI said today the funding for the Undiagnosed Diseases Network, provided by the NIH Common Fund, expands the Undiagnosed Diseases Program that has been running at the NIH Clinical Center for six years.

These six major US institutions, each of which will receive an estimated \$7.2 million over four years, will be able to evaluate many more patients suffering from undiagnosed diseases than the NIH Clinical Center could, and they will link together researchers and share genomic and clinical data.

The new UDN members to receive the funds include Baylor College of Medicine; Duke University; Stanford University; the University of California, Los Angeles; Vanderbilt University Medical Center; and a joint group at Boston Children's Hospital, Brigham and Women's Hospital, and Massachusetts General Hospital.

These institutions will make up "a national network of experts" that will use genomics and other methods including robust clinical evaluations to "solve ultra-rare medical problems," NHGRI Director Eric Green said in a telebriefing today.

The program aims to take advantage of the recent drop in cost of sequencing to investigate the genomes of patients who have mysterious conditions, or very rare diseases, in order to put a name to their disorders, study them, and potentially develop new cures or repurpose existing ones based on genetic information .

"Along with robust clinical evaluations, genomics will play a central role in the UDN's mission," NHGRI Director Eric Green said in a statement today.

"Often, patients have a lot of physical complaints and no objective diagnoses. Our goal is to use the latest tools to make a diagnosis that spans the clinical, pathological and biochemical spectrum to uncover the basic genetic defect," William Gahl, NHGRI's clinical director, director of the UDP, and co-director of the UDN working group, said in a statement.

During the telebriefing, Green added that "the first diseases to yield to the power of genomics have been rare diseases, usually those caused by a mutation in a single gene," Green said in a telebriefing today. "When I say 'yield', I mean that researchers have been able to identify individual gene mutations that cause diseases. Those discoveries have, in some instances, led to new therapeutic approaches."

Researchers so far have discovered the genomic bases for 5,000 rare disorders, Green said, but the research community is "still in the hunt" for an additional 2,000 to 3,000 Mendelian disorders. This research network will focus on the "rarest of disorders," he said, noting that these diseases may affect fewer than 50 people in the world, and may have never before been discovered or diagnosed.

Once patients are admitted to a UDN center, they will undergo a week-long clinical assessment that may include genome or exome sequencing, other medical tests, and consultations with specialists.

"The team also will evaluate the impact of genetic counseling and genomic test results on patients and families to develop best practices for conveying this information," UCLA said in a statement.

This expansion to create the clinical arm of the UDP will draw upon the expertise of a range of clinical research groups, and will create new opportunities for collaborations among clinical investigators. The physicians involved in the UDN will gather and share clinical and lab data, including genomic information, clinical observations, and information about environmental exposures.

Since the UDPD launched six years ago it has enrolled roughly 600 children and adults at the NIH Clinical Center, where a multidisciplinary team has diagnosed around 100 patients, discovered two previously unknown diseases, and identified 15 genes that were not previously associated with any other human disease, NHGRI said.

Much of the network's data sharing will be handled by Harvard Medical School, which is serving as the UDN Coordinating Center, and these data will be stored in multiple public repositories, NHGRI said.

"We selected all of these sites to have broad general expertise. All of these sites will be able to see patients within any clinical specialty," added Anastasia Wise, program director for NHGRI's Division of Genomics Medicine.

Wise also said the network also will include a series of core laboratories that each UDN institution will have access to, which will provide services such as the genome or exome sequencing for all of the UDN patients.

The network will test out its operating procedures in its first year, and will progressively expand its patient recruitment through 2017, when each network member will be admitting around 50 patients per year.

Meantime, patients who want to apply to have their cases reviewed will continue to use the existing NIH application pipeline.

Gahl said NIH created the program because the Office of Rare Disease Research "received so many calls from patients who lacked diagnoses," and noted that "there has never been a shortage of referrals to the program."

The UDP so far has logged nearly 10,000 inquiries from patients and physicians over the past six years, and has admitted 750 patients at the NIH Clinical Center , Gahl said.

The center has performed genetic analysis for around 1,600 patients and their family members, and has conducted exome sequencing for about 900 patients. There currently is a waiting list of two to six months for patients to be admitted to the program.
