The Chan Soon-Shiong Institute for Advanced Health

LAUNCH OF THE NATION'S FASTEST GENOMIC SUPERCOMPUTING PLATFORM REDUCES CANCER GENOME ANALYSIS FROM MONTHS TO SECONDS --ONE PATIENT EVERY 47 SECONDS

Bringing genomic medicine into clinical practice by placing supercomputers in the hands of physicians at point of care

Washington, D.C., October 3, 2012 – Dr. Patrick Soon-Shiong, Chairman of NantHealth and the Chan Soon-Shiong Institute for Advanced Health announced a revolutionary advance in cancer treatment that will reduce the necessary time for analysis from 8 weeks to an unprecedented 47 seconds per patient. For the first time, oncologists can compare virtually every known treatment option on the basis of genetics, risk, and cost – before treatment begins, not after.

Alongside Senator Bill Frist, MD, of the Bipartisan Policy Center and J. Michael McGinnis, MD of the Institute of Medicine and Doctors Helping Doctors, Dr. Soon-Shiong reported on the successful real-time analysis of the largest collection of tumor genomes in the United States, of 6,017 cancer genomes from 3,022 patients with 19 different cancer types, in the record time of 69 hours. Genomic analysis has taken an average of 8 to 10 weeks to complete. That delay leads not just to less efficient, more costly care, but sometimes to the wrong course of treatment altogether – and, thus, higher mortality. *"Incorrect care that leads to loss of life is unacceptable,"* said Dr. Soon-Shiong, *"and from today onward, it will no longer be necessary."*

Oncologists currently prescribe a course of cancer treatment based on the anatomical location of the cancer. Yet a patient with breast cancer could benefit from the positive results discovered from a patient with lung cancer, if the underlying molecular pathways involving both cancers were the same. The inability to utilize genomic sequencing to guide treatment has been due to the inability to convert a patient's DNA into actionable information in actionable time.

But by collaborating with Blue Shield of California, the Chan Soon-Shiong Institute for Advanced Health, the National LambdaRail, Doctors Helping Doctors, Verizon, Bank of America, AT&T, Intel, and Hewlett-Packard, NantHealth has built a supercomputer-based high-speed fiber network that will not only provide thousands of oncology practices with life-saving information, but do so in *exponentially* faster time. *"Doctors will finally be able to provide higher-quality treatment in a dramatically more efficient, effective, and affordable manner."*says Dr. Soon-Shiong.

"It currently takes approximately two months and tens of thousands of dollars to perform the sequencing and analysis of a single cancer patient's genome. We can't reduce the cost of care and improve outcomes in cancer if we don't have the capability to know the right treatment for the right patient before treatment begins. We needed a national supercomputing infrastructure that brings genomic medicine into clinical

practice. By placing supercomputers in the hands of physicians, that need is now a reality." said Dr. Soon-Shiong.

Accuracy will also be radically improved. Among NantHealth's partner oncologists utilizing its fact-based software platform (eviti - http://www.eviti.com) the number of cases where doctors have made incorrect recommendations has dropped from 32% to virtually zero. *"With this patient-centered, fact-based approach to collecting and analyzing data, millions more patients will have a better chance of beating cancer,"* Dr. Soon-Shiong emphasized. Over the past 12 months over 2,000 oncology practices representing 8,000 oncologists and nurses have successfully installed and utilized this fact-based (eviti) software platform, positively impacting thousands of cancer patients lives.

THE RESEARCH PROCESS

In July 2012, NantWorks' scientific team (Five3 Genomics – http://www.Five3Genomics.com) collected 6,017 tumor and germline exomes, representing 3,022 cancer patients with 19 unique cancer types. The sample collection included: 999 breast cancer; 1,156 kidney and bladder cancer; 985 gastrointestinal cancer; 744 brain cancer; 745 lung cancer; 670 ovarian, uterine, and cervical cancer; 436 head and neck cancer; 177 prostate cancer; 70 melanoma cancer; and 35 blood tumor samples.

This massive amount of data totaled 96,512 gigabytes and was successfully transferred and processed via our supercomputing, high-speed fiber network in 69 hours. This overall transfer speed represents a stream of one sample every 17.4 seconds, and the supercomputer analysis for genetic and protein alterations between the tumor and normal sample completed every 47 seconds per patient.

Given the nation's estimated cancer rate of 1.8 million new cases in 2012, this infrastructure now brings the capability of analyzing 5,000 patients per day.

He noted that medicine has continued to make dramatic advances, but the *delivery* of medicine has lagged far behind, stuck in a world where information is trapped, patterns get missed, and patients suffer. Powered by advanced supercomputing technology and wireless mobile health, the network has become one of country's fastest genomic platforms with connectivity to over 8000 practicing oncologists and nurses. *"This revolution in healthcare is long overdue - converging 21st century medical science with 21st century technology,"* Dr. Soon-Shiong concluded.

Through NantHealth's genomic analysis network, doctors can finally make cancer treatment more efficient, more effective, and more affordable for more patients. And with public and private partners equally as committed to reshaping the way doctors deliver healthcare and treat cancer, there are no limits to what this health information breakthrough might lead to for all cancer patients.

A network of major cancer centers including those at City of Hope, John Wayne Cancer Institute, and Methodist Hospital in Houston, have contributed to this collection of over 6,000 genomes, which also included the entire collection of exome samples from The Cancer Genome Atlas.

About NantWorks

The core mission of NantWorks, LLC, is to converge a wide range of technologies to accelerate scientific discoveries, enhance research and improve healthcare treatment and outcomes. Founded and led by Dr. Patrick Soon-Shiong, NantWorks is building an integrated fact-based, genomically-informed, personalized approach to the delivery of care and the development of next generation diagnostics and therapeutics. For more information, see www.nantworks.com

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