Vice President Biden Launches the Genomic Data Commons

By Piers Nash

On June 6, Vice President Joe Biden visited Chicago to launch the National Cancer Institute’s Genomic Data Commons (GDC), built and housed at the University of Chicago. The GDC contains 4.1 million megabytes of data from approximately 14,500 individuals along with a powerful new set of tools developed to enable researchers to find and access the exact data they need to accelerate their research. The GDC immediately became the largest repository of standardized cancer genomic data ever assembled.

Vice President Biden toured the new GDC headquarters in the newly converted technology space within the ballrooms of the historic Shedd Aquarium in Hyde Park. Biden went on to publically announce the GDC at the American Society of Clinical Oncology Annual Meeting, emphasizing it as a foundational effort of the Cancer Moonshot Initiative.

Driven by Data

Genomics, the study of our complete genetic material, is a rapidly developing field. Since the sequencing of the first human genome was completed in 2003 at a cost of $2.9 billion, the cost of sequencing has plummeted as new technology has transformed the field. It now costs just over $1,000 to sequence an individual’s genome, or the genome of their cancer.

The knowledge obtained can be incredibly powerful, transforming not only our understanding of cancer, but presenting the opportunity to match treatment to the specific genetic drivers of an individual cancer, as well as adjust doses according to how well a given individual can tolerate specific therapies.

Cancers are complex genetic diseases that manifest differently in each individual. To understand cancers and how to treat them with the latest therapies, vast amounts of data are increasingly needed. Yet, making use of this data remains an almost overwhelming challenge. Data files may be hundreds of gigabytes in size, and analysis can take days or weeks.

And, having data isn’t enough. As National Institutes of Health Director Francis Collins stated during a panel on the Cancer Moonshot at the 2016 World Economic Forum, “It’s not enough to say that we are in a big data era for cancer. We also need to be in a big data access era.”

Building the Foundation

Just over two years ago, University of Chicago Medicine Comprehensive Cancer Center faculty member Robert Grossman, PhD, undertook this ambitious project with the aim of transforming cancer research by breaking down the silos of genomic data and replacing them with a national resource to power discovery. The simple but powerful idea developed by Grossman and colleagues used the latest in scalable database and storage technology to develop a feature-proof, open-source system to integrate and store data from around the country. The GDC makes cleaned and standardized data that was previously difficult or impossible to access available to researchers around the world. Accomplishing this feat was no simple task. The files are numerous and very large and the methods used to gener-ate them often varied.

Funded by the National Cancer Institute (NCI) and aligned with the Comprehensive Cancer Center, Dr. Grossman rapidly assembled a talented technical team of 25 programmers, developers, systems engineers and bioinformaticians to tackle the first big challenge: build the largest standardized set of cancer genomics data ever assembled. The result—Genomic Data Commons holds all legacy genomic data generated by NCI-funded projects.

Enabling Precision Medicine

Analysis of genomic and clinical data at this scale may identify new drug targets for various cancers, help us understand cancers better and begin to predict how individuals will respond to specific therapies.

Down the road, doctors could one day identify optimal combinations of therapies for any individual’s cancer and tailor treatments to achieve the best possible outcome—an approach that’s central to the White House’s Precision Medicine Initiative. This may not mean a “cure,” because, as with any disease, this is not always possible. But, it will be a vast improvement when every patient receives the very best treatment to give them more—and better—days.

The technology of the GDC is a foundation for a Data Commons that will someday encompass much more than cancer genomics—adding imaging, patient...
A few of our newly launched clinical trials include:

- **Thalidomide and Lenalidomide for Patients With Relapsed Multiple Myeloma (THALIDOMIDE):** A phase III trial of thalidomide and lenalidomide for patients with relapsed multiple myeloma.
- **A Phase II Study of Aprotinin for Patients With Carcinoma of the Prostate:** A phase II trial of aprotinin for patients with carcinoma of the prostate.
- **A Phase III Trial of Bevacizumab and Docetaxel for Patients With Metastatic Breast Cancer:** A phase III trial of bevacizumab and docetaxel for patients with metastatic breast cancer.
- **A Phase III Trial of Nivolumab and Ipilimumab for Patients With Metastatic Renal Cell Carcinoma:** A phase III trial of nivolumab and ipilimumab for patients with metastatic renal cell carcinoma.
- **A Phase II Trial of Pembrolizumab for Patients With Metastatic Renal Cell Carcinoma:** A phase II trial of pembrolizumab for patients with metastatic renal cell carcinoma.

Open Cancer Clinical Trials

Patient enrollment is underway for more than 350 clinical trials at the University of Chicago Medicine Comprehensive Cancer Center. A complete listing of these trials can be found at [http://cancer.uchicago.edu/ASCO2016.pdf](http://cancer.uchicago.edu/ASCO2016.pdf).
Several Comprehensive Cancer Center faculty members were recipients of the Biological Sciences Division’s 2016 Distinguished Faculty Awards, selected by members of the Faculty Advisory Committee.

1. Gini Fleming, MD, professor of medicine, received the Distinguished Clinician Senior Award.
2. William Dale, MD, PhD, associate professor of medicine, received the Distinguished Leader in Program Innovation Senior Award in Clinical Sciences.
3. M. Eileen Dolan, PhD, professor of medicine, received the Distinguished Educator/Mentor Basic Sciences Award.
4. Thomas Gajewski, MD, PhD, professor of pathology and medicine, received the Distinguished Investigator (Senior Award). Dr. Gajewski has also been named the first American Cancer Society-Jules L. Plangere Jr. Family-Foundation Professor in Cancer Immunotherapy. Dr. Gajewski’s lab will receive $80,000 per year for five years to study the use of integrative genomics to identify mechanisms of resistance to immunotherapy.
5. Theodore Karrison, PhD, associate professor of public health sciences, was elected President of the Society for Clinical Trials. He will serve one year as President-Elect, beginning June 2016, then one year as President starting with the 2017 meeting in Portland, followed by one year as Past-President.
6. Akash Patnaik, MD, PhD, has joined the University of Chicago Medicine and the Comprehensive Cancer Center as an assistant professor of medicine. Dr. Patnaik specializes in genitourinary cancers and his research focuses on translating novel therapies from the laboratory to early stage clinical trials.

This spring, the Comprehensive Cancer Center participated in the American Cancer Society’s (ACS) Relay For Life and the Bladder Cancer Advocacy Network’s (BCAN) Amp Up! walk.

The University of Chicago Colleges Against Cancer chapter hosted the ACS Relay For Life event on campus, raising almost $20,000. The Cancer Center Crusaders team raised $874, and team captain Dr. Kathy Goss spoke at the opening ceremonies.

Dr. Gary Steinberg served as captain of the Comprehensive Cancer Center BCAN team and spoke at the event, which was the largest in the nation. The team raised more than $7,800 for bladder cancer research.

New MR Scanner Opens Door for Imaging Research

In June, the University of Chicago welcomed the arrival of a new Philips Ingenia 3.0T Magnetic Resonance (MR) system, which was installed on the third floor of the University’s MRI Research Center in the medical center’s “Q” corridor.

The scanner, including its massive 5-ton magnet, was lifted six stories over Abbott Memorial Hall by a crane and delicately deposited into the MRI Center through a temporary opening in the north side of the building.

The new scanner will play an important role in innovative research, including clinical trials led by Comprehensive Cancer Center researchers.

Read more: https://sciencelife.uchospitals.edu/2016/06/28/new-mr-scanner-opens-door-for-imaging-research/

UChicago Hosts Cancer Moonshot Summit

The Comprehensive Cancer Center hosted a Cancer Moonshot Summit on June 29 as part of Vice President Biden’s national call. The University of Chicago was selected as one of 10 sites to co-host an official regional summit with the U.S. Dept. of Health and Human Services and American Cancer Society Cancer Action Network. About 100 researchers, patients, advocates, legislators, donors and community members gathered to discuss ways to work together to double the rate of progress toward cancer cures.

Pictured (from left): Donald Vander Griend, PhD, assistant professor of surgery, Michelle Le Beau, PhD, Arthur and Marian Edelstein Professor of Medicine and director of the University of Chicago Medicine Comprehensive Cancer Center, and Cynthia Chernew, University of Chicago Cancer Research Foundation Women’s Board member, participate in a breakout session discussion.

(Photo by David Christopher)
The University of Chicago Cancer Research Foundation Associates Board held its annual Fund the Fight fundraising gala on April 16 at the Moonlight Studios in Chicago’s West Loop. More than 200 young philanthropists took part in the fun-filled event, which featured a robust silent auction. Bluewater Kings kept the crowd on the dance floor throughout the evening, while Dr. Stefani Spranger, of Dr. Thomas Gajewski’s lab, captivated attendees with conversations about their innovative work on immunotherapy.

SAVE THE DATES!

The UCCRF Women’s Board will celebrate 50 years of the Grand Auction on November 12, 2016. The gala is the most prestigious and longest running auction event in Chicago history. The Board has raised over $17 million for cancer research, which has enabled researchers to leverage additional grant funding of over $45 million. To learn more visit: cancerboard.org

Women’s Board
50th Annual Grand Auction
Saturday, November 12, 2016
The Four Seasons Hotel
Chicago, IL

Other upcoming fundraising events:

Auxiliary Board
Bloomingdales Fall Fashion Show
Thursday, September 29, 2016
Bloomingdales Old Orchard
Skokie, IL

For more information, please contact kcoady@bsd.uchicago.edu.