Bridging the gap in precision medicine

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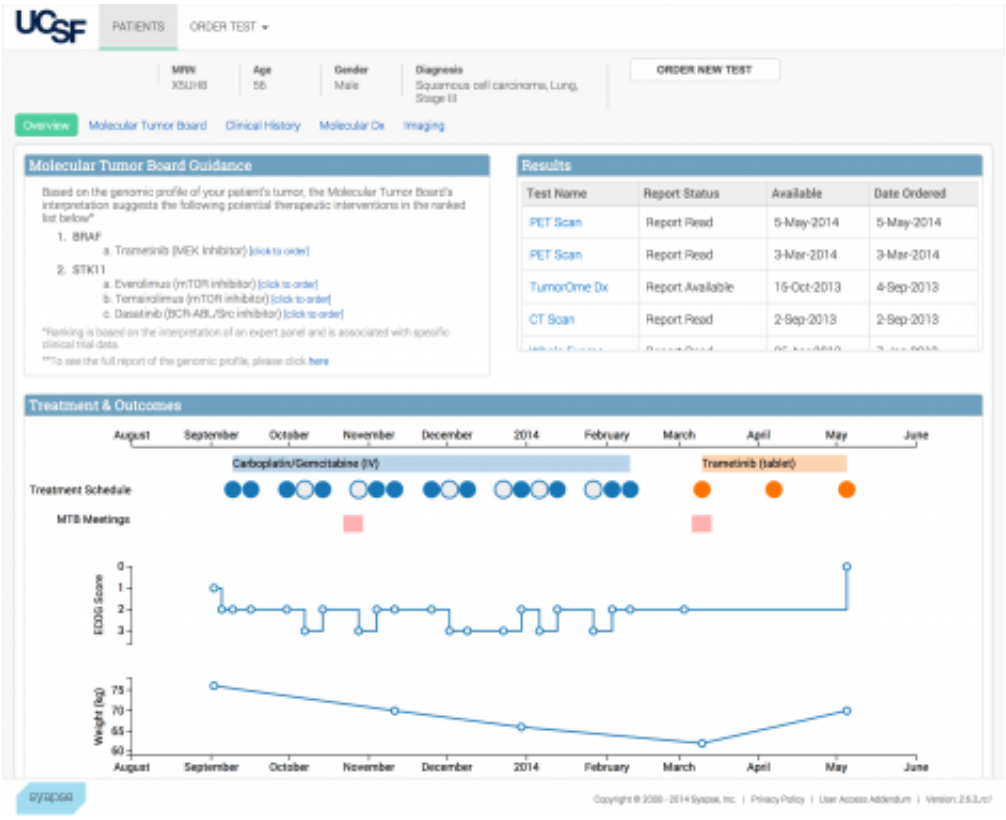

Syapse has built an easy-to-read, actionable interface for physicians within UCSF's existing electronic medical records

For entertainment giants such as Netflix and HBO, there's an oft-cited concept known as "the last mile."

It refers to the performance bottleneck that can arise in the short, final stretch of cable that links their vast, sophisticated server farms to the

humble jack on a subscriber's wall.

More than a decade after the immense promise unleashed by the completion of Human Genome Project, precision medicine has struggled with its own "last mile." Despite major leaps in the field as a whole, the technical work needed to integrate a patient's genomic information into the day-to-day practice of medicine has lagged far behind.

This month, UCSF is unveiling its bridge across that persistent gap.

Through its Genomic Medicine Initiative (GMI), UCSF has integrated data from a comprehensive cancer genetic testing program into the electronic medical records of patients at the UCSF Medical Center. Not only does it allow for continuity of care with all testing and treatment results tied to the same electronic record, but it also allows physicians and researchers to identify larger patterns in the data that can lead to the development of better treatments – which is known as precision medicine.

"Many major medical institutions, including UCSF, have long had the science and the technology to generate genomic test results," said Kristen McCaleb, PhD, program manager for the GMI who partnered with the Helen Diller Comprehensive Cancer Center on the project. "The problem we've had is a lack of IT infrastructure to return those results to the clinicians who order the tests in a clearly actionable, doctor-friendly format.

This new project is a powerful new cloud-based software platform built in partnership with Palo Alto-based Syapse that seamlessly unites genomic testing and analysis, personalized treatment regimens, clinical data, and outcomes data, and – crucially – integrates all of these features directly into APeX, UCSF Medical Center's Epic-based electronic medical record (EMR) system.

"Genomics has the potential to dramatically improve patient care in oncology, but the full promise of precision medicine cannot be realized without a software platform to bring genomics to the point of care," said Jonathan Hirsch, who founded Syapse six years ago as a 23-year-old Stanford University graduate student. "It is critical that genomic data be integrated with the patient's medical history and presented to the clinician within the workflow of their EMR."

One of the Most Comprehensive Genetic Tests for Cancer

A major feature of the UCSF-Syapse partnership is that, beginning in the spring of 2015, UCSF oncologists will be able to order through patient EMRs the "UCSF 500," a panel of more than 500 gene mutations that have been implicated in a range of cancers.

The assembly of the UCSF 500 wouldn't have been possible without UCSF's medical oncologists collaborating with Syapse to define which genomic alterations in which cancer types can be best treated with targeted therapies.

"The collaboration between the UCSF Helen Diller Family Comprehensive Cancer Center and Syapse is just one example of what the UCSF Genomic Medicine Initiative, launched two years ago, is doing to bring genomics to bear on clinical medicine," said Robert Nussbaum, MD, director of the GMI. "We are excited with the results and look forward to using it to improve the care of our patients here in the Cancer Center."

When completed, test results from the UCSF 500 will automatically appear in a Syapse-powered window in the EMR, and from there, physicians can trigger consultation by a newly formed Molecular Tumor

Board, a group of expert physicians and researchers that can recommend customized treatment plans for each patient.

These recommendations are recorded in Syapse alongside the physician's decisions, and the patient's clinical course will be continuously tracked. The resulting information is displayed to the physician in an easy-to-understand graphical format, and clinical notes and summaries are automatically populated in the EMR.

Learning from the Data

Because the Syapse system is cloud-based, on Amazon Web Services (AWS), physicians and members of the Molecular Tumor Board can query a patient's test results in real time against the latest entries in UCSF's knowledge-base, which is also drawn from public genetics, oncology and clinical trial databases, as well as the current scientific literature. AWS was selected for its robust security, support for compliance with medical information privacy laws, scalability and redundancy, Hirsch said.

A de-identified version of each patient's clinical history from APeX and information on how patients respond to treatments is simultaneously added to a dedicated clinical research knowledge-base within Syapse, so future recommendations of the Molecular Tumor Board for any patient's case will always be informed by the latest clinical experience.

Because APeX is based on Epic, a widely used EMR system, the new platform is easily scalable, and could easily capture clinical data from many medical centers in a consistent, easily accessible form, said Hirsch.

"Our top priority is benefitting our patients today, but if we can begin to collect and leverage the knowledge we gain from each positive patient outcome, and combine our experience with that of others doing similar

work worldwide, future patients may be able to sidestep conventional therapies and go directly to the best targeted therapy as a first-line treatment," McCaleb said.

"And that would be truly powerful."

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