

BioCentury

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TOOLS & TECHNIQUES

OPTIMIZING OUTREACH

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After spending six years developing and testing its technology, **Prognos** has officially launched its commercial tool that uses laboratory, imaging and other data to predict which patients are the best candidates for marketed therapies.

Prior to its launch in January, Prognos had been building its data registry and working with biopharma companies to test the tool, which produces weekly reports highlighting physicians with patients who are candidates for a company's drug.

"The weekly report goes to the company's desk and says, 'Here's the doctors and how many patients they have that fit the criteria for your drug,'" said CEO Sundeep Bhan. "Then they can compare the number of newly diagnosed or relapsed patients for Dr. Smith vs. Dr. Jones and see who they want to devote their commercial resources to."

Prognos (formerly Medivo Inc.) developed its tool from anonymized patient-level data compiled from 45 billion lab records obtained from companies such as **Quest Diagnostics Inc.** and **Laboratory Corp. of America Holdings**. The data include demographic information as well as laboratory results, information on the tests that were ordered and even the types of platforms used to perform the tests and the actual results.

Based on these data, Prognos developed machine-learning algorithms that can predict which patients are most at risk for a particular disease, as well as those patients most likely to relapse on a therapy or not respond to their current treatment.

"We've automated the collection and normalization of all of this data from initial screening all the way through testing and diagnosis so we can now predict with high confidence where patients are and if they're on a certain trajectory based on early tests that are done," said Bhan. "For example, we can predict if the patient will get diagnosed with NSCLC or if they'll relapse."

Prognos has diagnostic information for about 100 million patients across 35 diseases.

"In some cases, we've been tracking these patients for seven or eight years, and we can see what their trajectories look like and compare that to historical data to predict where these patients are at in their disease journey," he said.

The goal is to identify patients before treatment decisions are made and enable drug companies to fine-tune their commercial strategies.

The company has conducted case studies in non-alcoholic steatohepatitis (NASH) and HCV to demonstrate the tool's predictive ability.

In 2015, Prognos presented data at the American Association of Clinical Endocrinologists annual meeting where it analyzed laboratory results from 225,444 patients with diabetes. It found that abnormal AST and abnormal ALT measures were most predictive of a diabetic patient's risk for NASH.

Based on this finding, the tool was able to predict that patients with elevated AST and ALT were 2.5-3 times more likely to develop NASH than patients with abnormal results on other tests such as abnormal alkaline phosphatase, or abnormal creatinine levels ($p < 0.01$).

Also in 2015, the company and partner **AbbVie Inc.** presented a case study where Prognos used its tool to identify patients who had tested positive for HCV but had not yet been treated.

AbbVie was able to use the data to identify healthcare professionals with HCV patients who were candidates to start therapy. Results were presented at the Pharmaceutical Management Science Association annual conference.

Prognos is focusing its tool on rare diseases and cancer.

For its pharma clients, the company builds a predictive tool and algorithms for different disease subtypes based on the approved indication of the client's drug.

For example, if a client has a drug for second-line non-small cell lung cancer, "we'll develop the tool to identify those patients who are at risk of or who have just relapsed. Then we run that on a regular basis," Bhan said.

The detailed weekly reports outline how many newly diagnosed or newly relapsed patients fit the criteria for a given therapy and who the treating physicians are.

Although the patient-level data are anonymized, Prognos does know which treating physician ordered the tests on which the predictions are based.



“WE CAN SEE WHAT THEIR TRAJECTORIES LOOK LIKE AND COMPARE THAT TO HISTORICAL DATA TO PREDICT WHERE THESE PATIENTS ARE AT IN THEIR DISEASE.”

SUNDEEP BHAN, PROGNOS

Bhan said the company is working with more than 18 companies on 26 drugs. It has disclosed one biopharma partner, [Biogen Inc.](#); details of that partnership are not disclosed.

Tests like FoundationOne from [Foundation Medicine Inc.](#) can help physicians match patients to specific targeted therapies for cancer. But the Prognos tool allows the companies to go directly to the physician and doesn't rely on one specific type of diagnostic tool or test.

Bhan said the tool can be used to predict whether a patient has a rare disease, or is likely to have one, based on early lab results, demographic information and other patterns in the data.

“A lot of these are ignored or misunderstood diseases and doctors have to do the right tests to correctly diagnose, but with machine learning, we can predict which of these patients are at high risk,” he said.

SCALING

Prognos plans to expand its tool to 60 rare disease and cancer indications, and potentially move it upstream in drug development, over the coming two years.

Prognos also is working with payers to use the platform to help them identify patients who might need an alternative or additional therapy or some other intervention to improve their outcome.

“We're helping them to understand what's going on earlier so that they can intervene through care management plans and outreach to their provider network to help get better care to patients faster,” Bhan said.

The company has disclosed a partnership with [Cigna Corp.](#)

Prognos is also exploring the use of its platform to help companies identify patients for clinical trials. But first it wants to establish a beachhead in the commercial space.

“This year is really about scaling on the pharma and commercial side. The platform would be the same and the analytics would be the same, but we have to decide when to enter the clinical trials space, and we're exploring more specific opportunities in that market this year,” Bhan said. ■

COMPANIES AND INSTITUTIONS MENTIONED

AbbVie Inc. (NYSE:ABBV), Chicago, Ill.
American Association of Clinical Endocrinologists, Jacksonville, Fla.
Biogen Inc. (NASDAQ:BIIB), Cambridge, Mass.
Cigna Corp. (NYSE:CI), Bloomfield, Conn.
Foundation Medicine Inc. (NASDAQ:FMI), Cambridge, Mass.
Laboratory Corp. of America Holdings (NYSE:LH), Burlington, N.C.
Pharmaceutical Management Science Association, Lexington, Ky.
Prognos, New York, N.Y.
Quest Diagnostics Inc. (NYSE:DGX), Madison, N.J.

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