

## Bristol-Myers Squibb turns to an AI startup to accelerate cancer research

By [Casey Ross @caseymross](#)

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Mel Evans/AP

Bristol-Myers Squibb ([BMY](#)<sup>1</sup>), seeking to re-energize its cancer pipeline, is turning to an artificial intelligence startup for help, inking a deal to use the firm's analytical tools and "real-world" patient data to better target and accelerate clinical trials.

The deal with Concerto HealthAI, a Boston-based firm backed by the \$1 billion [SymphonyAI](#)<sup>2</sup> fund, is an effort to infuse real-world evidence from medical practices across the U.S. into Bristol's research. Concerto uses data from CancerLinQ, a national repository of information on cancer patients, to search for patterns that may inform drug development.

Concerto said the three-year contract is valued in the tens of millions of dollars but declined to be more specific. For Bristol, that is a drop in the bucket compared to its [pending \\$74 billion bid](#)<sup>3</sup> to buy Celgene, a move [largely driven](#)<sup>4</sup> by a desire to combine the firms' cancer drug portfolios.

The Concerto deal is part of a broader effort by pharmaceutical companies to shake up the unwieldy and expensive drug development process by using machine learning to analyze data from multiple sources,

including real-world clinical settings. On average, it takes 12 years and [\\$2.6 billion](#)<sup>5</sup> to develop a new drug and get it to market in the U.S.

“It’s smart for large players in pharma to be partnering with entities that are connecting the dots in new ways “ said Dr. Daniel Kraft, faculty chair of medicine at Singularity University, a Silicon Valley-based tech incubator and educational organization. Kraft, who does not have a relationship with Bristol or Concerto, added: “Big Pharma is incentivized quarter to quarter in ways that don’t always match the pace of innovation, so this can help them reinvent themselves.”

Bristol’s most recent foray into the immunotherapy market underscores the challenges of developing cancer therapies. In 2016, a big study of its drug, Opdivo, failed to show a benefit in previously untreated patients with non-small cell lung cancer, and in January, the company [withdrew its application](#)<sup>8</sup> with the Food and Drug Administration to use Opdivo in combination with another drug to treat certain patients. Opdivo is still a success for Bristol — it’s used to treat patients with melanoma, Hodgkin lymphoma, and certain head and neck cancers, among others — but is losing market share to [Merck’s Keytruda](#)<sup>9</sup>.

Jeff Elton, chief executive of Concerto, said its services will inform Bristol’s research by identifying patients who are not well served by existing drugs and helping to design studies to develop novel therapeutic approaches.

“We’re really trying to pull the data together ... so real-world insights can become part of the questions you pose and the decisions you make all the way across the continuum of how you do research,” said Elton, adding that the firm combines data from CancerLinQ with information from insurance claims and other sources.

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Bristol is the latest of many pharmaceutical companies to explore the use of machine learning to improve research. Merck and Boehringer Ingelheim have teamed up with [Numerate](#)<sup>10</sup>, which advertises its approach to “data-driven drug design”; Pfizer inked a deal with IBM Watson to accelerate drug discovery in immuno-oncology; and Roche [paid \\$1.9 billion](#)<sup>11</sup> to acquire [Flatiron Health](#)<sup>12</sup>, an oncology-specific electronic health record company the curates real-world data for research. Several other companies have signed up with multiple AI vendors to augment their research capabilities.

While the technology is attracting significant investments, the extent of the benefit remains unclear. Machine learning experts said generating novel insights is especially challenging in oncology, where the task requires data scientists to compile and curate vast amounts of clinical, genetic, and molecular data that are housed in different formats by competing institutions.

“To be honest, I haven’t seen really good examples where all this data has been converted into actionable evidence,” said Pratik Shah, a principal research scientist who leads the Health 0.0 machine learning research group at the Massachusetts Institute of Technology.

He said machine learning is useful for analyzing broad data sets and making high-level generalizations, but its utility diminishes as questions get narrower, and the data become scant and of lower quality.

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“The real value of machine learning is for applications in health care without very narrow outcomes, which is what [pharmaceutical] companies usually and unfortunately go after,” Shah said. He added that it is especially important for pharma companies as well as other researchers to be transparent in their use of machine learning and the type and diversity of data they are relying on.

“There should be some accountability for what your algorithm is doing,” Shah said. “Data standards and benchmarking should be established before any actionable evidence is going to come out of this.”

Elton emphasized that his company is focused on open data collaboration with its clients and outside partners. He also noted that the FDA recently [affirmed its commitment](#) <sup>15</sup> to incorporating more data from real clinical settings to improve regulatory decisions and surveillance of products after they reach the market.

“This will change how [pharmaceutical companies] do clinical development and post-approval studies,” he said. “We’re moving into a value- and outcome-centric world. Patients and health systems will be huge beneficiaries of that.”

## About the Author



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