Closer Look

Executive Highlights

- A new Medtronic-IBM partnership will combine the Watson supercomputer and Medtronic's incredible volume of diabetes data to advance diabetes care on three main fronts: (i) integrated care; (ii) artificial pancreas algorithm enhancement; and (iii) dynamic, personalized care plans for type 1 and type 2 diabetes.

- We see the news as an encouraging partnership to tackle many challenges in the field: personalizing therapy; gleaning insights from Big Data (particularly when it is unstructured); aiding time pressed providers; and stemming rising costs.

Today, Medtronic Diabetes continued its major string of recent news (DreaMed artificial pancreas algorithm licensing; Diabeter clinic acquisition; Glooko investment) by announcing a new partnership with IBM. Though details are still being worked out, the partnership will leverage IBM's Watson supercomputer (which famously beat two Jeopardy champions in 2011) and Medtronic's incredible volume of diabetes data to advance diabetes care on three main fronts: (i) integrated care (e.g., identifying at-risk patient populations, such as ER admits for a hypo event that are likely to return to the hospital); (ii) artificial pancreas algorithm enhancement; and (iii) dynamic, personalized care plans for type 1 and type 2 diabetes. In short, the partnership brings hefty computing power to Medtronic Diabetes' Big Data to hopefully produce meaningful insights. This comes at a particularly important time as the company seeks to move beyond selling pumps and CGMs to providing broader integrated care with a notable type 2 as well as type 1 focus (as well as with a less intensively managed as well as more intensively managed focus).

We believe the partnership has a lot of potential in diabetes, especially as we think about smart algorithms/ analytics working alongside clinicians to drive better therapeutic change. IBM's Watson has done some interesting work in oncology with partner Memorial Sloan Kettering (MSK), as we understand it - Watson analyzes a patient's medical information against a vast array of data, including expert training from MSK physicians, cancer case histories, established treatment guidelines, and published research to provide individualized, ranked, evidence based treatment options at the point of care. Certainly, the challenges in oncology are very reminiscent of those in diabetes - growing demand for services, fewer providers, and an explosion of medical data (doubling every three years) that is difficult to interpret and analyze. The vision of a smart computer giving a provider recommendations with degrees of confidence - based on the overwhelmingly broad scientific literature and a very narrow, individualized patient case - is exciting, particularly in diabetes.

Though it's hard to know what products or services will come out of today's announcement - and when we will see them - we see the news as an encouraging partnership to tackle many challenges in our field: personalizing therapy; gleaning insights from Big Data (particularly when it is unstructured); keeping up with the pace of new clinical data and treatment algorithms; aiding time pressed providers; and stemming rising costs. Based on the three focus areas, it sounds like population management (perhaps running real-time algorithms on CareLink or the future Bluetooth-enabled Guardian Mobile CGM system), more advanced artificial pancreas algorithms (hopefully adaptive), and clinical decision support for physicians are logical application areas. Check that out!

- **There are a few specific details on IBM's Watson that make it particularly exciting in diabetes:**
    - Watson can understand the English language (Natural Language Processing) and analyze unstructured data (80% of the world's total data, as cited in this IBM case study);

- ◦ Watson can learn over time (e.g., incorporating the latest symptoms and test results on individual patients, the latest medical research, and the newest clinical trial outcomes);

- ◦ Watson is housed in the cloud on IBM's servers, meaning numerous devices can access it (i.e., no need for a massive no-site server); and

- ◦ Watson is open source, meaning anyone developing products can work with IBM to use the technology. The company's page on Watson shows applications in healthcare, finance, retail, and the public sector.

- **A 2013 Forbes piece put forward an interesting assessment of the promise of Watson: "Watson doesn't tell a doctor what to do, it provides several options with degrees of confidence for each, along with the supporting evidence it used to arrive at the optimal treatment.** Doctors can enter on an iPad a new bit of information in plain text, such as "my patient has blood in her phlegm," and Watson within half a minute will come back with an entirely different drug regimen that suits the individual. IBM Watson's business chief Manoj Saxena says that 90% of nurses in the field who use Watson now follow its guidance." This piece really got at some of the potential advantages and certainly sparked some fascinating thinking.

- **We are optimistic that this approach could provide better outcomes at lower costs, something that has certainly seem to have captured the fancy of Medtronic Diabetes President Hooman Hakami, who discussed this extensively in our recent interview on the Diabeter clinic acquisition.** As a reminder, Medtronic's new strategy is to expand beyond pumps and sensors to become a broader diabetes management company - today's announcement certainly continues that trend as the company seeks to serve 20 million patients globally by 2020, an approximate 20-fold increase (!) from the current installed base of ~700,000 patients worldwide.

- **MobiHealthNews cited an impressive example of Watson's abilities in the field of kinase research**, explaining that the global field of kinase researchers had historically produced one therapeutic target a year. And then? "We fed Watson all of the kinase research, just unstructured text of those journal articles and MedLine abstracts and stuff like that. And it found six high probability targets in one go. Just because it was able to consume all of everyone's knowledge simultaneously, draw the connections, find co-ocurrences and, with a practitioner, with people who know this kind of research, it's just invaluable."- John Wolpert, IBM

Close Concerns Questions

Q: What are the (any!) financial details of the agreement?

Q: How will Medtronic build Watson into specific products?

Q: How long will it take for Watson-enabled products to come to market?

Q: How will Watson dovetail with the recent Diabeter acquisition?

Q: How can Watson help with drug development and will it be able to assess which targets will be most successful?

-- by Adam Brown and Kelly Close