CLOSER LOOK

MEMORANDUM

MannKind 2Q17 - Afrezza sales rise 25% sequentially to $1.5 million, driven by new therapy starts; New trial launched on One Drop digital platform - August 8, 2017

Executive Highlights

- Sales of MannKind's inhaled insulin Afrezza totaled $1.5 million in 2Q17, up 25% sequentially from a base of $1.2 million in 1Q17. Afrezza's share of total mealtime insulin prescriptions (TRx) grew 23% between 1Q17 and 2Q17, while its share of new-to-brand prescriptions (NRx) grew 36%.
- Just before the call began, MannKind and One Drop announced plans to launch the A-ONE RCT, investigating the effect of integrating Afrezza and the One Drop digital diabetes care platform. A drug-device combo - nice! Management spoke much more about this joint project with One Drop during Q&A.
- As of June 30, MannKind had $43.4 million in cash remaining, down from $48 million at the end of 1Q17.

Yesterday afternoon, MannKind provided its 2Q17 financial update in a call led by newly-minted CEO Mr. Michael Castagna. Afrezza (inhaled mealtime insulin) posted $1.5 million in net sales, marking a 25% sequential increase from $1.2 million in 1Q17. Management noted that sequential growth would have been 55% without a few one-time accruals in 2Q17, and also emphasized that MannKind records Afrezza revenue based on prescriptions rather than product dispensed to wholesalers. 2Q17 represents the fourth full quarter in which MannKind-branded Afrezza has been on the market and sold by company reps as opposed to a contracted sales organization, following termination of the Sanofi partnership in January 2016 and relaunch of the product by MannKind in August 2016. Since then, sales have been (understandably) somewhat sluggish as the company works to establish a commercial infrastructure, but we're glad to see sequential revenue growth in 2Q17 following an 8% sequential decline in 1Q17. Moreover, management shared that Afrezza's share of total mealtime insulin prescriptions rose 23% in 2Q17 compared to 1Q17. Even more notable was the 36% sequential growth in new-to-brand prescription share (NRx), and management explained that the Afrezza business is being driven by new prescribers and new therapy starts. In other words, more patients initiating prandial insulin therapy are starting to choose Afrezza, and given the positive patient feedback that's been collected to-date (largely on social media), management is optimistic that MannKind's inhaled insulin will retain these patients and continue to grow its market share by volume. CEO Mr. Castagna remarked confidently that he's "really happy with the progress we've made in Q2," that Afrezza was "destined to be a blockbuster" from the beginning, and that "if Sanofi had kept the foot on the gas with Afrezza, this would easily have been a $30 million-$50 million drug in the first 12-18 months of launch."

We appreciate the ambition, though we still see a long road ahead for Afrezza to gain commercial traction and to meaningfully grow MannKind's business. We do believe Afrezza could benefit many people with diabetes who need a mealtime insulin with faster onset/offset, which lowers hypoglycemia risk. MannKind has filed with the FDA for an ultra-rapid-acting label claim, and a decision is expected by September 30. If approved, this ultra-rapid-acting designation would allow MannKind to ramp up its marketing around Afrezza's faster onset/faster offset, which we believe could substantially boost sales. We eagerly await FDA's regulatory ruling on this front.

- **Just before the call began, MannKind and One Drop announced plans to launch the A-ONE RCT, investigating the effect of integrating Afrezza and the One Drop digital diabetes care platform.** More drug-device combos are good to see. The announcement notes that

this trial is the first step of the companies' collaboration, first announced back in May. In the study, 400 people with type 2 (who are not currently enrolled in a diabetes education/coaching program and who have never taken Afrezza) will be randomized to either Afrezza+One Drop Premium or One Drop Premium alone. Now that is a cool design and there is clear upside here for One Drop. (MannKind risks no incremental benefit over One Drop alone, so this is more of a gamble for them.) As a reminder, the Premium offering entails unlimited strips and 24/7 in-app support from CDEs. One Drop's VP of Health & Behavioral Informatics Dr. Chandra Osborn said the trial will start upon receipt of IRB approval, expected sometime in September. Outcomes metrics will include changes in A1c, quality of life, self-care, and treatment satisfaction. We would bet that real-time coaching + mobile education will absolutely improve the use of Afrezza, but the question is, will it be better than use of One Drop alone - particularly when the primary endpoint is A1c? We hope the answer is yes - many who use Afrezza swear by it, noting the blunted postprandial highs and fewer lows than injectables. We would love to see professional CGM leveraged in the study, to ensure these post-meal excursions (highs and lows) are captured. For One Drop, positive data would add to a growing body of literature consisting of nine peer-reviewed outcomes shared at medical meetings (see two from ADA 2017 here and here) and a paper in press at JMIR Diabetes ("Using the One Drop Mobile app is associated with reduced A1c"). Assuming the results indicate Afrezza+One Drop Premium is more effective than One Drop Premium alone, would the two companies commercialize a bundled product to entice payers?

- **In other clinical trial updates, management shared that the STAT study (conducted by several diabetes thought leaders including Drs. Satish Garg, Bruce Bode, and Anne Peters) has enrolled 20 out of 60 patients so far.** This trial will compare time-in-range between Afrezza and Novo Nordisk's NovoRapid (insulin aspart) using CGM. We were very excited about this project when management first-announced STAT in 1Q17, and we're pleased to see a swift study start. MannKind's ADD-1 dose optimization trial of Afrezza is slated for a 4Q17 start, which is delayed from July or August 2017 as management stipulated in the company's 1Q17 update. The APEX trial (n=600) will probe patient experience on Afrezza, and is scheduled to start in November 2017. The long-term safety study is on track for a 2018 start. The company is still in the planning stages for its pediatric phase 3 trial - and conversations with FDA are ongoing to determine what Afrezza's pediatric clinical program should look like - but management stated that this study will also begin sometime in 2018. Protocol for a PK study of Afrezza in pediatric type 1 patients is nearly finalized, and this trial is scheduled to begin in 2H17, as is a closed loop study at Yale.
    - **Management outlined a clear clinical strategy for Afrezza, with all these trials aimed at answering specific questions:** What's the optimal dosing regimen for this inhaled prandial insulin? What is Afrezza's PK/PD profile in different patients? How can the product be integrated with digital health platforms, and with CGM? What are the applications of Afrezza to closed loop, and to a pediatric patient population? How do A1c, postprandial excursions, time-in-range, and outcomes with Afrezza compare between phase 3 clinical trials and the real world? We interpret this comprehensive approach and continued commitment to clinical development as another indication of MannKind's confidence in Afrezza, despite commercial challenges.
- **According to management, Afrezza is now reimbursed for 70% of people on commercial health insurance plans in the US.** Management also emphasized increased participation in MannKind Cares, the company's patient assistance program to reduce out-of-pocket costs related to Afrezza. On average, patients paid $39/month for an Afrezza prescription in 2Q17, and management underscored that one-third of patients paid <$15/month. More troubling is the exclusion of Afrezza from the UnitedHealthcare formulary - we recommend you read this stirring blog post written by a patient who couldn't get coverage for Afrezza despite benefiting enormously from the product (which further reinforces positive patient feedback for MannKind's inhaled insulin). Mr. Castagna explained to us that UnitedHealthcare restricts access to Afrezza in favor of Novo Nordisk's insulins and specifically NovoRapid (insulin aspart). Despite concerted efforts from

MannKind to negotiate, the PBM will only reimburse Afrezza for patients who are physically or visibly disabled, which is extremely troubling from our view. Mr. Castagna expressed marked disappointment about this, but shared the bright side that many people under the umbrella of the CVS Health formulary have been able to access Afrezza.

- **The company's plans to file Afrezza in Brazil remain on schedule for a regulatory submission by end of year,** with a potential approval by end of 2018. During Q&A, management suggested that international expansion is not as high of a priority right now as growing Afrezza sales in the US, which we think is smart.
- **As of June 30, MannKind had $43.4 million in cash remaining.** This is down from $48 million at the end of 1Q17. The company's press release mentions a $51.7 million loss in 1H17, which corresponds to a loss of $0.53/share, though this is a smaller margin of loss vs. 1H16 ($54.8 million and $0.62/share).

Questions and Answers

Q: Can you talk a little bit more about the upcoming label change, and maybe give us a sense of timing? How do you expect this to impact revenue in 2017 and 2018?

A: The label change has three major aspects: (i) First, we'll have the ability to articulate that the drug starts working within five minutes. (ii) The second part is that we can articulate Afrezza works faster than the competition. (iii) And third, we're asking for a different category for this product altogether. The importance of this label change commercially will vary from 2H17 to 2018 and beyond. We expect an approval by the end of 3Q17, so this will be a Q4 event in terms of launch and impact. Depending on which combination of these three activities happening, we hope to see accelerated growth post-label change. For example, if we were to get a different category, that opens up a lot of the managed care access and it takes us out of the bucket that we're currently restricted to by the competition. It also could dramatically change Medicare Part D coverage. When it comes to speed of onset, saying Afrezza works within five minutes is so important, which is part of why we're running these trials right now with Dexcom CGM. Being able to show clinical data to support this speed will be great. Then, saying that Afrezza gets out of your body faster will also be valuable. That's something that's been bothering us since launch, that we can say we get into the body faster, but can't necessarily say that we work any faster. Basically, we'll finally be able to articulate the true profile of this insulin product.

Q: Following-up on the international expansion you mentioned in Brazil, do you have any plans for the Asian markets, or China in particular? How is MannKind thinking about these additional markets with the new commercial team in place?

A: Earlier this year, when commercial growth wasn't clear to everybody, it was very hard to think about international markets. Now that we have shown early success of our commercial team, we can put more resources into other markets. Obviously different markets around the world have dramatically different price points, but we'll continue to talk to various partners in key markets. We'll probably need a second study for Japan. India and China are two great markets with tremendous unmet need - for example, there are probably 80 million patients with diabetes in India with average A1c >10%. We have an innovative idea for insulin, and I think it could do well in other markets. So, we'll continue to look at that and to consider business opportunities in international markets. These are also opportunities to help us turn around our inventory faster, as we think about scaling up the manufacturing plant.

Q: I'd like to get a better feel for the One Drop collaboration. Is there anything you can add to what's been publically disclosed? What are you trying to do here, and how will this impact usage and patient management?

A: When we announced our memorandum of understanding back in Q2, it was really focused on coaching and education of patients, and I have been thinking about how Afrezza could benefit from the One Drop platform. It's also a cost-effective way to explore Afrezza in type 2 patients. It will show how we can dose and titrate and build coaching within the app. We spent a lot of time in Q2 thinking about a membership-based model, because we knew the cost of insulin is high for many patients. We looked at the membership model of

unlimited insulin test strips, and we're interested in how you could build out an insulin-based subscription service with a product like Afrezza. There are challenges to this (government pricing, how to juggle managed care contracts, high-deductible health insurance, etc.), but we'll continue to push forward on this one. The last part of the collaboration is around Bluetooth technology, and we think this is an important future direction for medicine in diabetes. Plus, with the label change coming from FDA, we're optimistic that this study will give us data to show that we have real-time control.

Q: You've mentioned sales force expansion, growing payer coverage, the One Drop collaboration, the label update, and international expansion, as well as upcoming clinical data. Can you rank these in order of importance for moving the needle on the Afrezza business?

A: Great question. I think getting Afrezza to success here in the US is priority number one, two, and three. I believe we'll continue to see acceleration as we fine-tune our sales tactics and recruit more talented people onto our team. We have probably seven field openings around the country right now, and we're not in a rush to fill them, because we want to make sure we have the right type of people on the bus. As Afrezza revenue starts growing, we're hopeful that more people gain the confidence to invest for future expansion opportunities. International expansion is probably by third priority, and my second one is the label change because this could bring huge upside. That upside may not be realized directly in the month after we get it, but there really is a lot of potential upside here in terms of what we can say and how doctors understand/ communicate about this product to their patients.

-- by Payal Marathe and Kelly Close