CLOSER LOOK

MEMORANDUM

FDA approves 14-day wear, one-hour warmup version of Abbott's FreeStyle Libre for adults 18+ (non-adjunctive); Launch in the "coming months" - July 27, 2018

Executive Highlights

- **This morning, Abbott announced FDA approval of a 14-day FreeStyle Libre (real-time) with one-hour warmup for adults (ages 18+). It is approved as a BGM replacement (non-adjunctive).** The system is expected to launch in participating pharmacies and through DME suppliers "in the coming months." This brings the US version of FreeStyle Libre on par with the OUS version, drastically improving user experience - two sensors per month rather than three and a 12x shorter warmup time. It also presumably gives Abbott's margins a nice bump, assuming pricing remains ~$120/month for sensors.
- **Remarkably, in a four-site study (n=95), the 14-day factory-calibrated Libre's MARD was 9.4%, vs. 9.7% for the 10-day US version.** Clearly, Abbott has shown no deterioration in accuracy in tandem with 1/12th the warmup time and 40% greater wear duration - a huge positive that now takes it ahead of Dexcom's G6, which has 10-day wear and a two-hour warmup. We wonder if Abbott made tweaks to the algorithm to enable better early-wear period accuracy. Though the 14-day version wasn't filed through the 510(k) iCGM pathway, we do wonder if it would meet the accuracy special controls.
- **Abbott's Indications and Important Safety Information page specifies that patients should still check with a fingerstick during the first 12 hours post-starting a new sensor.** This clause could be how Abbott pushed the reduced warmup time through FDA while extending sensor wear and maintain factory cal and non-adjunctive labeling. We also applaud the Agency for allowing the compromise, which will allow patients to proceed at their own risk when dosing off of Libre in the first 12 hours.
- **FreeStyle Libre is now reimbursed at least partially in 30 countries, up from ~20 in January.** Per last week's call, FreeStyle Libre now has a remarkable 800,000+ global users and a projection of >1 million by the end of the year. Wow!

In a fantastic and unexpected update, Abbott announced this morning that FDA has approved FreeStyle Libre for 14-day wear with a one-hour warmup and an insulin dosing (non-adjunctive) replacement claim in adults 18+ years. The update - which now mirrors features in the version that's been in Europe since 2014- will launch through participating pharmacies and DME suppliers in the US "in the coming months." What a victory for people with diabetes and Abbott to obtain extended wear and slash warmup time 10 months (to the day!) after the 10-day wear, 12-hour warmup version was initially approved back in September. Presumably, the 10-day Libre will be phased out of the US once the 14-day version ramps.

Notably, the US 14-day FreeStyle Libre is actually a tiny bit *more* accurate than the 10-day version, with an overall MARD of 9.4% vs. the 9.7% of the 10-day (in prior studies). The new MARD data comes from a four-center accuracy study of the 14-day Libre in 95 people with diabetes (80 type 1s, 15 type 2s).

It's impressive that Abbott has obtained 1/12th the warmup time and 40% longer wear, yet comparable accuracy. Though not a perfect comparison, the similar version in Europe had a higher MARD of 11.4% vs. BGM in the pivotal CE Mark trial. We wonder if Abbott made some tweaks on the software end to improve accuracy. We're also interested to see accuracy metrics, particularly in the hypoglycemia zone, in the first 12 hours of wear and days 11-14.

The diminished warmup time is a big victory, which is now half as long as Dexcom's and Medtronic's two-hour warmup. With the 10-day version, the half-day warmup made it so patients had to go without CGM for 12 hours three times per month. While overlapping wear times with two readers was an option, we doubt many actually did it in practice). The 14-day version's Indications and Important Safety Information does specify that patients should check with a fingerstick during the first 12 hours post-starting a new sensor - we wonder if this clause was likely the lynchpin in securing approval. Presumably the move to a 12-hour warmup was an initial compromise to get the first factory calibrated CGM approved with a non-adjunctive claim.

Getting to 14 days is also a big deal, since it's 40% longer wear than Dexcom's G6. Dexcom plans to do a 2H18 trial for 14-day wear for G6/Verily gen one, but it will need to maintain the rigorous iCGM accuracy benchmarks. Even if it can achieve that near-term, this gives Abbott a meaningful near-term advantage on sensor wear in the US.

Abbott has not commented on pricing, though we wouldn't be surprised if per-month sensor pricing remains at ~$120 per month, with most commercially-insured patients paying $40-$75 per month. Assuming the software alterations don't boost cost of goods sold significantly, jumping from three sensors per month (~$40 per sensor) to two sensors per month (~$60 per sensor) should translate to a meaningful improvement in Abbott's margins. The margins on the Medicare front, where therapeutic CGM manufacturers (Dexcom, Abbott) receive ~$250 per month, will grow even further. On the other hand, Abbott could further improve affordability by maintaining the ~$40 per sensor, placing monthly cash pricing at ~$80 and adding pricing pressure in the market.

- **It's also unclear if, with the improved accuracy, 14-day FreeStyle Libre now meets FDA's standards for class II integrated CGM (iCGM), though it was not filed with that indication in mind.** The 10-day version falls short of the hypoglycemia standard, which requires accuracy within ±15 mg/dl over 85% of the time (lower bound of 95% confidence interval). In hypoglycemia, 10-day FreeStyle Libre is currently within ±15 mg/dl between 45%-72% of the time according to the label (confidence interval not specified). The current "flash" version of FreeStyle Libre also doesn't meet the continuous data transmission stipulation of the iCGM special controls, so even if the accuracy bar is now met, Abbott will need to wait for the next-gen Libre or for that criteria to be lifted (some feel that it could be, since CGM-based MDI dosing support may not require continuous data transmission).
- **We learned at Keystone that Abbott has filed a pediatric claim (ages 4+) for FreeStyle Libre, which, in light of this development, likely pertains to the 14-day version.** Also possibly lending support to this conclusion is that a currently-recruiting US pediatric study in ages 6+ has a primary outcome of accuracy "up to 14 days." We'd be fairly surprised if Abbott had both a 14-day filing and a 10-day pediatric filing with FDA simultaneously.
- **The press release shared that FreeStyle Libre is at least partially or fully reimbursed in 30 countries, up from 20 in January.** To quote CEO Mr. Miles White on last week's 2Q18 call: "The reimbursement has been very good. Just about everything about this is going better than planned." The press release also reiterated that there are >800,000 FreeStyle Libre users in 43 countries.
- **When asked about US timing for LibreLink (reader app) and LibreLinkUp (remote monitoring app), Abbott reps replied: "We are building out the FreeStyle Libre platform, including apps. Timing is contingent on regulatory approval."** As of February, those apps became available for iPhone and Android in 12 EU countries. No US timing has ever been shared, though the response hints that the apps could currently be under FDA review.
- **With this approval, Abbott again pulls ahead of Dexcom in terms of needle (non-implantable) CGM wear duration in the US.** Medtronic's Guardian Sensor 3 is approved for seven-day wear, Dexcom's G6 shuts off at 10 days (though DIY users have figured out how to restart G6 via four different ways), and of course Senseonics' Eversense was approved just before ADA for

90-day implantation. Given the need for a new G6 14-day wear trial in 2H18, it seems unlikely that Dexcom could get an approval to extend G6 to 14 days this year.

- **14-day approval bodes very well for Abbott's next-gen continuoous CGM,** which will drive Bigfoot's hybrid closed loop and MDI auto-titration systems, and could feasibly also launch as a standalone. At Friends for Life, Bigfoot CEO Jeffrey Brewer said that the next-gen Abbott FreeStyle Libre CGM with Bluetooth is coming "sooner than people realize."

-- by Brian Levine, Adam Brown, and Kelly Close