



Inhaled Insulin with Closed Loop Systems

REVIEWED BY CWD'S CLINICAL DIRECTOR

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One of the biggest challenges for people with diabetes has been finding ways to get insulin into the body that do not require injections. This has proven to be more difficult than people anticipated, but there is an option for inhaled insulin for adults with diabetes (the studies in children ages 4-18 are still ongoing).

Why would I want to inhale insulin?

One of the major benefits of inhaled insulin is its rapid onset, meaning it starts working very quickly. Since it is absorbed in the lungs, it gets into the bloodstream within a few minutes as opposed to 15-20 minutes that injected insulin can take to absorb. This is a HUGE benefit for people who have a hard time remembering to pre-bolus or if you're eating at a restaurant when the timing of food arrival can be unpredictable.

Injections are obviously a bit uncomfortable but can also cause scar tissue to develop. Using inhaled insulin as an alternative could allow the scar tissue to heal. Other advantages: helps people with diabetes who have fears or phobias related to needles, ease of use for lifestyle or job requirements, flexibility with meal or snack schedule, and quick to absorb without a long duration in the system (or "tail").

How does it work?

The inhaled insulin that is on the market now is called Afrezza, made by a company called MannKind. There is a small inhaler device that you place cartridges of inhaled insulin into and then breathe in when you want to take a dose of insulin. The inhaler lasts for 15 days, then should be changed out for a new one.

The cartridges of insulin are shown in the above photo from Afrezza's website and come in doses of 4 units, 8 units and 12 units. These doses may sound big and even scary, but the amount of inhaled insulin you take compared to injected is a little different. Here is the conversion rate:



Why add in Afrezza if I'm on a Hybrid-Closed Loop System?

There are many times when it could be beneficial to use Afrezza even while using a HCL system. This being said, please consult your healthcare team before trying this – they may have different recommendations based on your diabetes. For me, I have tried it in a couple of different scenarios.

Scenario 1: Stubborn Highs – let's say your blood sugar has been riding the upper 200's, low 300's for a few hours and it's just not budging. (Winter holiday eating, I'm looking at you.) This is a great time to utilize Afrezza. Not only will it help bring you down quickly, but it doesn't stack quite the same way that injected insulin does. Don't get me wrong, it does add insulin on board, but it really only lasts 1-3 hours at the most versus the 3-6 hours of rapid-acting injected insulin. I did this a few times and did

Injected Mealtime Insulin Dose (Units)	Afrezza® Starting Dose Units (Units)	Anticipated Afrezza® Dose* (Units)
Up to 4	4	4-8
5-8	8	8-12
9-12	12	12-20
13-16	16	16-24
17-20	20	20-32
21-24	24	24-36

*calculation based on 1.5 conversion rate from injected insulin

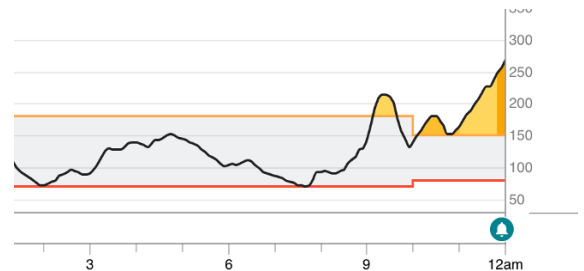
choose to follow the advice of my endocrinologist who suggested giving an “air bolus” with my pump (currently wearing Tandem with Control-IQ) so that it would track the insulin on board (IOB) and keep me safe.

Scenario 2: Meal time bolus – Again, the timing of my trying Afrezza could not have been better with the winter cold and holidays settling in. There were many meals with very high glycemic index options being served and timing was uncertain where Afrezza was perfect. This is another occasion where your provider may want you to give an “air bolus” with your pump, and I did that most of the time, but sometimes when I had snacks with Afrezza I did not and I did not find that I had any issues personally.

My challenges with Afrezza

Nothing is perfect, and this was no exception. My biggest personal challenge was coughing with inhalation, which I was not expecting to be as persistent. The recommendations to help reduce coughing are to hold the inhaler at a 30-degree angle and try taking a drink of water before and after inhalation. These did help reduce the coughing I experienced, but it is not a perfect system.

The other challenge was more complex meals/meals with high fat. There was an evening I decided it would be a good idea to try Afrezza with pizza, which is something I do not eat very often. The results were mixed – I went a little bit low then high later on. To be fair, I should have anticipated this, and I did try an extended bolus on my pump for the later hours but it just wasn’t quite enough.



Overall impression

The process of getting Afrezza was really simple and there is a manufacturer’s coupon so that you can get it for \$35 for a month’s supply – which is great! The device is small, sleek and simple to use. The dosing is super simple, and I’m not so insulin sensitive that I was worried about lows with higher doses. I still need to do some more experimentation but have really enjoyed adding this to my diabetes toolbox. It’s especially rewarding for the quick reduction of highs. And when I say quick, I don’t mean so quick that you feel symptomatic, which can happen of course, but did not for me. If you’re struggling with your current routine, consider asking about Afrezza and see if it helps.