Inhaled Insulin for Children and Adolescents: A Summary of the INHALE-1 Study and What Families Should Know

The recent INHALE-1 study explored whether inhaled insulin could help children and adolescents with diabetes manage their blood glucose (blood sugar) as effectively as traditional injected insulin at mealtimes. The inhaled insulin studied was Afrezza, a dry-powder insulin that is breathed in through a small handheld inhaler. Researchers wanted to know whether inhaled insulin, which works faster, could also be used safely in children and adolescents.

Since the study was conducted the FDA has approved inhaled insulin in May 2026 for adults and children aged six years and older living with diabetes.

What is inhaled insulin?

Inhaled insulin is a dry powder insulin that is inhaled using a small handheld device. Instead of injecting rapid-acting insulin before meals, a person breathes in the insulin right when a meal begins to help manage the rise in blood glucose from food.

One of the biggest differences between inhaled insulin and rapid-acting injected insulin is the speed at which they work.

Injected rapid-acting insulin usually:

- Onset in 15 minutes
- Reaches its peak in about one hour
- Lasts between two to four hours

Inhaled insulin works faster:

- Onset in about 10-15 minutes
- Reaches its peak around 30 minutes
- Lasts between 1.5-3 hours

Because of this faster action, inhaled insulin can often be taken right when a meal begins, rather than needing to inject insulin ahead of time. A shorter duration means the insulin lingers less in the body and a lower risk of hypoglycemia (low blood glucose).

Inhaled insulin does not replace long-acting insulin, which is currently available only as an injection.

Who was in the study?

Researchers studied 230 children and adolescents ages 4-17, living with either type 1 diabetes or type 2 diabetes, taking insulin and using a continuous glucose monitors (CGM) about 70% of the time. Half of the participants used inhaled insulin at mealtimes, while the other half continued using injected rapid-acting insulin. Both groups continued using long-acting insulin as part of their regular diabetes care. Some study exclusions included if participants had:

- A recent blood transfusion
- A recent history of asthma, or any other pulmonary disease
- A history of serious diabetes complication in the last year
- A recent respiratory tract infection
- A recent episode of DKA
- A recent event of severe hypoglycemia
- Current pregnancy
- Use of antiadrenergic drugs (ex: clonidine)
- Current eating disorder
- Smoking, including vaping, cigarettes, marijuana
- Current use of drug or alcohol abuse

What did the study find?

Overall, the ability to manage blood glucose was similar in both groups. However, a few differences stood out. Participants of the study using inhaled insulin reported greater satisfaction with their treatment (Pooled treatment satisfaction, a p-value of 0.004).

Children and adolescents using inhaled insulin also gained less weight during the study. Over the 26 weeks, the group using injected insulin had a BMI increase of 4% more than the inhaled insulin group. This may be due to the rapid action of the inhaled insulin and less hypoglycemic (low blood glucose) events.

What about safety?

Because inhaled insulin enters the lungs, researchers carefully monitored lung health during the study. After six months, lung function remained similar in both groups, and no serious lung-related complications were reported.

Most side effects reported were consistent across the two groups. The most common side effect was a mild cough after inhaling the insulin. A small number of study participants, approximately 10%, left the study or stopped using inhaled insulin for reasons such as, cough or dissatisfaction with blood glucose management or became ineligible for that study.

What are some considerations?

Inhaled insulin leaves the body faster than injected rapid-acting insulin. Because of this, some children may need additional correction doses if blood glucose levels rise after meals.

Inhaled insulin may not be recommended for children with certain lung conditions, such as asthma, they were not included in the study. Doctors will check lung function before prescribing it.

The Bottom Line

Inhaled insulin offers another option for managing diabetes in children and adolescents. This study showed that children and adolescents had similar blood glucose management results, higher satisfaction for participants and less weight gain over six months.

As with any diabetes treatment plan, the best approach is what works best for your child. Regular conversations with your child's doctor and other members of their health care team can help ensure the insulin is being used correctly and help determine whether the current treatment plan—and the type of insulin being used—continues to work well.