

A photograph of a couple in bed, viewed from the side. The woman is in the foreground, wearing a light blue and white striped shirt, with her back to the camera. The man is behind her, also in a striped shirt, looking towards the right. They are lying on a bed with blue and white striped pillows and a blue blanket. The lighting is soft and blue-toned, creating a calm atmosphere.

The Secret of Sleep:

Making Restful
Nights a Reality

For millions of people around the world, sleep is a luxury.

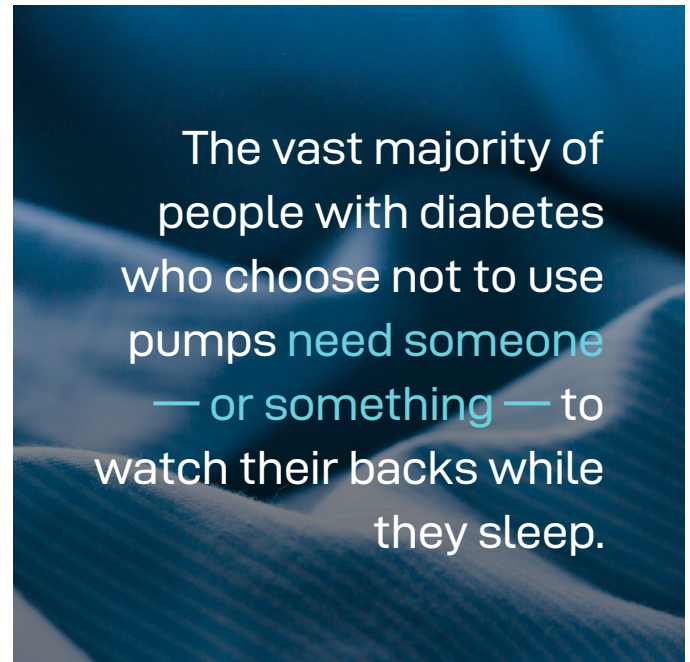
That's especially true for people with diabetes, specifically those who use multiple daily injection (MDI) therapy for insulin, who think about nighttime challenges every day. Research¹ shows MDI users rank complications related to a lack of sleep as their number one frustration with diabetes treatment.

For many people with diabetes (PWD) and their loved ones, a good night's sleep is an elusive gift often just out of their reach. PWDs who use MDI need a solution to their sleep challenges that doesn't require changing their preferred approach to diabetes management and buying an expensive, complex insulin pump.

We can do better.

Improving quality of sleep won't just lead to peaceful, restful nights for PWDs. Better sleep can be a game changer for the diabetes community — improving health, happiness, and overall quality of life.

¹ Seagrove Partners proprietary research for Luna Health, December 2021



Diabetes from A to Zzzs

People with diabetes know the challenges they face at night go much deeper than reduced glycemic control and time in range. For the vast majority who don't have access to insulin automation, including all insulin pen users, being deprived of sleep can wear them down to the point where they feel anxiety about going to bed at night, fearing frequent interruptions and unexpected blood glucose (BG) readings in the morning. Living like this can leave them drained the next day.

More than 37 million people in the United States have type 1 or type 2 diabetes. At the beginning of 2022, about 7 million of those were on insulin therapy, and only 700,000 were using pumps. That might be why one out of two people with type 2 diabetes and 35% of people with type 1 diabetes say they struggle with sleep. The vast majority of people with diabetes who choose not to use pumps need someone — or something — to watch their backs while they sleep.

The Difference a Good Night's Sleep Makes

Lack of sleep is a major problem, but we all know the benefits of good, regular sleep. How can it be more accessible for PWDs on MDI?

Getting high-quality, regular sleep is a critical component to any diabetes treatment plan. Good sleep not only eliminates the most common diabetes-related frustrations but is also vital to keeping blood glucose under control. Think about the importance of sleep for all people, regardless of chronic conditions. Lack of sleep can cause a weakened immune system, impaired mental clarity, high blood pressure, and an overall decrease in quality of life.

However, when sleep quality improves, PWDs start their days off stronger and more productive. It's easier to exercise and stay healthy. They're able to focus better. Sleep has even been shown to [dramatically improve memory](#).



Good sleep doesn't have to be a pipe dream for people with diabetes. The cycle of poor sleep can be reversed. And when the cycle stops, PWDs can use the positive momentum restful sleep brings to power healthy habits.

Moreover, good sleep comes with [a host of other benefits](#):

- Fewer illnesses and better immune health
- An easier time losing weight/maintaining a healthy weight
- Lower risk of heart disease
- Lower stress during the day
- Clearer thinking

Giving PWDs the power of sleep improves nearly every area of their lives.

Filling the Sleep Gap

MDI users keep their BG in check during the day with several tools. But almost nothing can help them do the same at night. People who use automated insulin pumps are the only ones protected while they sleep.

Unless MDI users take the perfect amount of long-acting insulin, nearly impossible to achieve on a consistent basis, there is no support to help with variations in blood glucose at night. One study found PWDs using MDI were only in range 52% of the time during sleep.² That means almost half of their nighttime hours were spent with BG levels that make it more difficult to find restful sleep.

². Continuous glucose monitoring in adults with type 1 diabetes: Real-World Data from the German/Austrian DPV Registry, August 2020

One common strategy is to raise BG before going to sleep, sometimes to the point of hyperglycemia, to keep it from dropping throughout the night. But this strategy is ineffective because it fails to meet [standards of care set by the American Diabetes Association](#) by raising BG levels regularly. Plus, raising BG regularly to counteract sleep difficulties can [increase A1C over time](#) — a major setback for PWDs who track A1C to improve their health.

The only recourse they have is to remain attached to a continuous glucose monitor (CGM), which can cause sleep interruptions since it alerts a user to a BG problem they can fix only by waking up. Without a device to actually provide insulin, it's just another roadblock to uninterrupted sleep.

Reversing the Poor Sleep Cycle

High and low BG disrupts sleep, [which then makes it harder to manage BG](#) — some call this the diabetes rollercoaster. Wouldn't you be frustrated if the issue that makes it hard to sleep got worse when you were tired and sleep deprived? What if a night-time solution could tackle this cycle head on for people on MDI?

The Daily Peaks and Valleys of the Diabetes Rollercoaster

If poor sleep or insomnia continues unabated, the rollercoaster ride goes on. But that next big hill won't just make it harder to sleep. It makes it harder to deal with diabetes too. PWDs with sleep struggles can experience the following:

- An increased need to urinate, leading to frequent interruptions during the night
- Irregular breathing, raised heart rates, sweating, and shaking

MDI users and other PWDs with sleep issues can also develop obstructive sleep apnea (OSA), which [affects about two thirds of those with type 2 diabetes](#). During OSA, tissue or muscles like the tongue block a person's upper airway during sleep. Sometimes a person's ability to breathe will be reduced — other times it stops entirely.

Ultimately, [healthy sleep and the ability to successfully control BG](#) are inextricably linked. Yet, for MDI users, it can feel like the diabetes device market has forgotten this simple fact. With so many solutions for people who use pumps, MDI users, who make up over 90% of the insulin-requiring market, and their families are left alone in the dark.

Long-term Problems Require Long-term Solutions

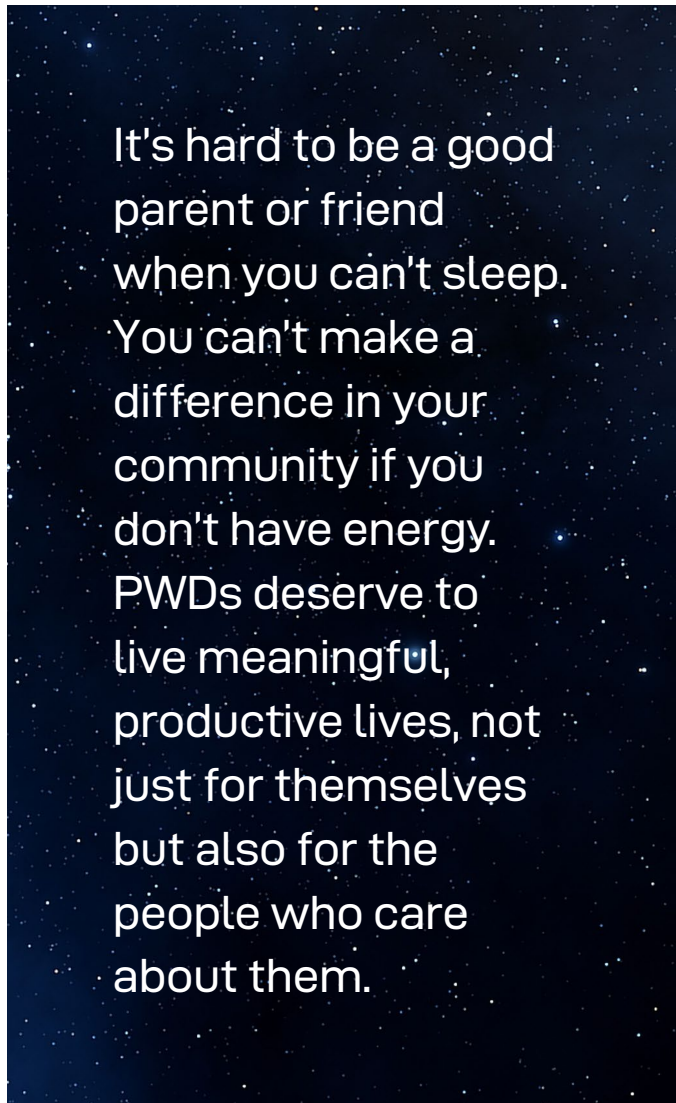
The issues that arise when PWDs don't get enough sleep aren't just short-term. Certain diabetes-related complications can become more serious for the sleep deprived:

- Higher blood pressure that increases the risk of [diabetes-related heart issues](#), including heart failure
- Reduced ability to fight off infections that can lead to unpleasant and dangerous conditions like [thrush](#)
- Struggles with weight loss, heart disease, and kidney disease

The most common long-term complication for PWDs who have trouble sleeping is increased insulin resistance. Over time, PWDs who experience increased insulin resistance must use more insulin to treat high BG, making it harder to stay in range. A dose that once kept them in range throughout the night might not do the job, making it more likely their sleep will be disrupted and they will wake up with high or low BG in the morning.

Complications like these don't just affect PWDs. They affect their families, loved ones, friends, and coworkers. We have all experienced insufficient sleep. We become more irritable, less creative, and less able to enjoy what makes us happy — in serious cases it can mean extended hospital stays.

It's hard to be a good parent or friend when you can't sleep. You can't make a difference in your community if you don't have energy. PWDs deserve to live meaningful, productive lives, not just for themselves but also for the people who care about them.



Better Quality Sleep for Better Health

PWDs who get their insulin through MDI therapy deserve a solution to help them control their glucose at night. Treatment that is effective only during waking hours isn't enough. They work too hard to manage their blood glucose and stay healthy during the day. They need and deserve more. And PWDs and their health care providers are ready for a solution.

According to market research, 76% of people with type 1 diabetes and 84% of people with type 2 diabetes are likely to purchase a device that can bridge the treatment gap for them.³

Health care providers are even more adamant that a solution is necessary for people using MDI therapy in their care. A survey of 111 health care providers found the majority (84%) were "extremely" or "very" interested in learning more about a device that could improve overnight BG control for people with type 1 and type 2 diabetes.⁴

A sleep solution must also account for the reasons many people stick to MDI therapy instead of switching to a pump to alleviate sleep issues. Switching to a pump is not always possible or cost-effective, and learning how to use one can be a complicated and stressful process. And many MDI users enjoy not being tethered to a pump all day, every day.

3. dQ&A Concept Test and Conjoint Analysis for Luna Health

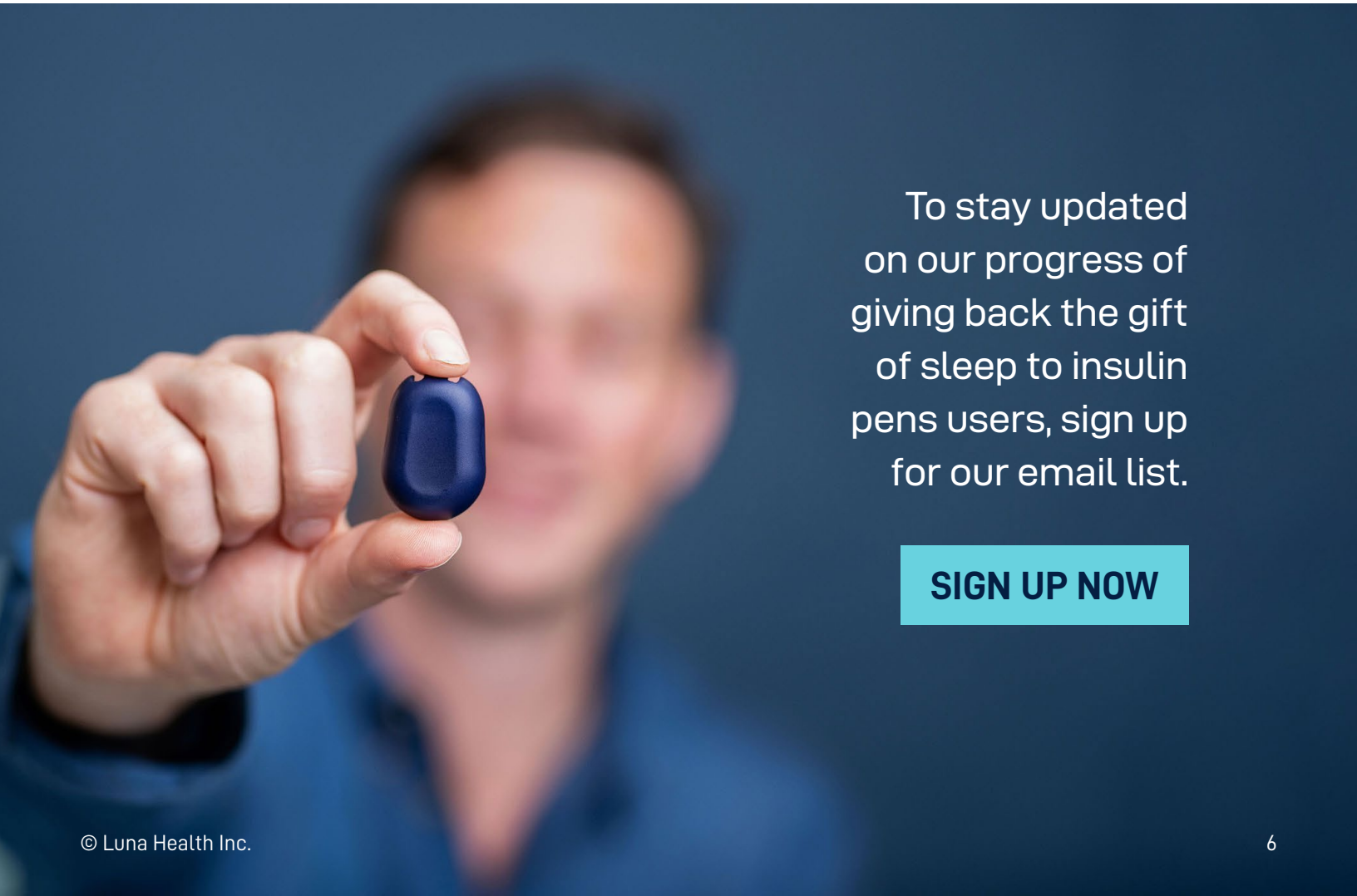
4. Seagrove Partners proprietary research for Luna Health, December 2021

What if there was another option for insulin pen users? A solution that could automatically keep them in range while they sleep. A solution that could be used on the PWD's terms, on the nights when they want to use it? That's the vision of Luna Health: to deliver the incredible benefits of automated insulin delivery to the masses. Simpler to use, more discreet, more affordable.

As a medical device startup founded by people who know what it's like to live with diabetes, Luna Health strives to improve the lives of PWDs who use insulin pens by giving

them better nights for better days. We want to reduce the burden for those who use MDI by unlocking the power of restful, uninterrupted sleep. Our vision is for PWDs to be able to put their treatment on autopilot throughout the night.

Improvements to physical and mental health, the ability to manage diabetes, and the feeling of being back in control are all possible with a good night's sleep. But the feeling of laying your head down to rest without anxiety or fear may be the greatest gift of them all.



To stay updated on our progress of giving back the gift of sleep to insulin pens users, sign up for our email list.

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