

# Questions and Answers About Insulin Pump Therapy

## FACT SHEET

### Q: What is an insulin pump?

**A:** An insulin pump is a pager-size device that delivers insulin around the clock, much like a healthy pancreas. In addition, patients can start or stop insulin delivery upon demand to normalize blood sugar (glucose) levels. Insulin pump therapy is the most advanced method for precise and adjustable insulin delivery, and is an exceptional alternative to multiple daily injections (MDI) for the treatment of diabetes. Commercial insulin pumps are external devices that are not implanted in the body.

### Q: How does an insulin pump work?

**A:** An insulin pump holds a reservoir with a two-to-three day supply of insulin, which is delivered through an infusion set—a tiny disposable tube and a soft cannula that is typically inserted under the skin in the abdominal area. Infusion sets are generally changed by the patient every two-to-three days.



An insulin pump automatically delivers a constant rate of insulin – called a “basal rate” – to keep glucose levels in the desired range between meals and overnight. An insulin pump is easy to program and users can customize a variety of insulin delivery rates to match their individual lifestyle needs. With an insulin pump, needles are not required to deliver insulin. At the touch of a few buttons, patients can deliver extra insulin (called a “bolus”) to prevent excessive rises in glucose levels.

### Q: What is a “smart” insulin pump?

**A:** Smart insulin pumps have built-in dosage calculators that manage the complex diabetes math for patients. Smart pumps consider the amount of insulin still “active” in a patient’s body prior to recommending an insulin dosage. This helps patients avoid potentially dangerous hypoglycemic episodes caused when too much insulin is delivered. Smart insulin pumps are designed to simplify diabetes management for patients.

### Q: Is insulin pump therapy proven for controlling glucose levels?

**A:** Insulin pump therapy is a proven method of reducing A1C levels in diabetes patients. An A1C measurement is a report card for glucose control – it discloses the average amount of glucose in the blood, typically over a two-to-three month period. Industry guidelines recommend that patients maintain A1C levels of seven percent or below order to live longer, healthier lives. In fact, for every one percent drop in A1C, diabetes complication rates reduce by more than 25 percent. Near-normal glucose control, which can be achieved with an insulin pump, can also delay the onset of complications from diabetes by an average of 15 years and prolong life an average of five years. Diabetes-related complications include blindness, kidney failure, amputation, impotence, coma and heart disease.

Insulin pump therapy helps patients maintain near-normal glucose control with less frequency of hypoglycemia (low glucose level) compared to injection therapy. Clinical studies have proven that insulin pumps can reduce severe hypoglycemia by up to 85 percent and mild-to-moderate hypoglycemia by nearly 60 percent, compared to multiple daily injections.

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### Q: Can children use insulin pump therapy?

**A:** Since insulin pump therapy delivers precise insulin dosages to the body, infants and children can benefit from this important therapy. Parents of children with diabetes can set the “child block” feature so that curious fingers do not deliver insulin unintentionally. In fact, parents can deliver insulin to their children using a remote control programmer that uses radio frequency to communicate with the insulin pump.

Several pediatric studies have shown that insulin pump therapy helps improve glucose control in children, including a decreased risk of hypoglycemia. A 2004 Yale study showed that insulin pump therapy was significantly more effective in controlling glucose levels in pediatric patients (as measured by A1C) than multiple daily injections using long-acting insulin. The insulin pump group significantly lowered their A1C to 7.2 percent (from 8.1 percent), while the injection group dropped to 8.1 percent (from 8.2 percent). After the study, 75 percent of patients using the injection therapy replaced their current therapy with an insulin pump. (The study size included 32 patients, ages 8–21.)

### Q: What are the benefits of insulin pump therapy over multiple daily injections (MDI)?

**A:** Insulin pumps are associated with greater predictability, individualization, flexibility, quality of life and improved glucose control.

#### Predictability

- MiniMed insulin pumps deliver insulin precisely and accurately in .05 or 0.1 unit increments, which is nearly impossible with traditional injection therapy.
- An insulin pump uses only rapid-acting insulin, which is absorbed very predictably by the body. Absorption of rapid-acting insulin varies less than three percent compared to long-acting basal insulin in which absorption varies up to 32 percent. Absorption variability can make it more difficult for patients to maintain healthy glucose control.

#### Individualization

- Insulin pump therapy allows users to program different basal profiles throughout the day. Insulin pump users typically use two-to-three basal profiles to control their glucose levels.
- An increased rate of insulin can be programmed during early morning hours when nearly 90 percent of type 1 diabetes patients experience high glucose levels. Insulin injections simply do not allow for this type of individualization.

#### Flexibility

- An insulin pump provides “just-in-time” delivery. Insulin pump users can adjust insulin delivery to accommodate meals, exercise schedules or lifestyle needs. In contrast, insulin delivered by multiple daily injections cannot be adjusted once it is dispensed.
- Insulin pump users can “eat what they want, when they want” – something almost unheard of in patients using multiple daily injections who follow rigid lifestyle and meal schedules.
- Patients who inject insulin four times a day will end up injecting insulin 1,460 times in a year. In contrast, insulin pump users generally change their infusion sets every two to three days – that’s an average of 146 times a year – which means less pain and greater flexibility for patients.



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While 92 percent of the MDI patients recommended injection therapy at the start of the study, only 63 percent recommended MDI upon completion of the trial. In contrast, 100 percent of the trial's insulin pump users recommended insulin pump therapy. Additional studies have shown that 97 to 98 percent of insulin pump users remain on insulin pump therapy once they have started.

### Quality of Life

A randomized, controlled, crossover trial in 11 European centers (272 patients) recently assessed the quality of life among insulin pump and MDI users. While all scores deteriorated in the MDI group, the insulin pump group showed the following positive results:

- Greater treatment satisfaction.
- A significant reduction in diabetes-related worry.
- A significant improvement in the perception of mental health.
- Greater flexibility in terms of eating habits, lifestyle flexibility and sleep patterns.