#### **Insulin Therapy for Diabetes**

### What is Insulin?

Insulin is a hormone that helps control blood sugar levels. If you have diabetes, your body may not make enough insulin or may not use it properly, so insulin therapy can help manage blood sugar.

#### Who Needs Insulin?

Type 1 Diabetes: Insulin is essential because the body does not produce it.

Type 2 Diabetes: Needed if diet, exercise, and medications do not control blood sugar.

Gestational Diabetes: Pregnant women may need insulin for safe blood sugar levels.

Temporary Use: During illness, surgery, or stress, some may need insulin short-term.

# **Types of Insulin**

Different types of insulin vary by how quickly they start working and how long they last:

**Rapid-Acting Insulin**: Begins to act in 15 minutes and lasts 3-5 hours. Used to control blood sugar spikes after meals (e.g., lispro, aspart, Fiasp). Usually taken before or immediately after a meal

**Short-Acting Insulin**: Starts to act in 30 minutes and lasts 5-8 hours. Slower than rapid-acting (e.g., regular insulin). Taken before meals

**Intermediate-Acting Insulin**: Starts to act in 2-4 hours and lasts 12-16 hours. Often taken twice daily for steady control between meals (e.g., NPH insulin). Usually taken twice a day

**Long-Acting Insulin**: Start to acts in 1-2 hours and lasts 24+ hours, keeping blood sugar steady between meals (e.g., glargine, degludec). Usually taken once a day.

**Combination insulin**: A mixture of rapid-acting or short-acting insulin and intermediate-acting insulin. It covers both mealtime and background insulin needs (e.g., HuminsulinR 30/70, Novomix 30/70). Typically taken twice daily before breakfast and dinner.

### **Insulin Concentrations**

Common insulin strengths include 40 IU/ml, 100 IU/ml, and 300 IU/ml.

### **Types of Insulin Delivery Systems**

There are different delivery systems available, offering flexibility based on lifestyle and personal preference.

Syringes: Traditional and accurate but requires careful measuring.

Note: Match the syringe to insulin concentration: use a 40 IU syringe for 40 IU/ml insulin and a 100 IU syringe for 100 IU/ml insulin.



Insulin Pens: Pre-filled or reusable pens, convenient and often less painful, but more expensive.

**Insulin Pumps:** Small, computerized devices worn on the body that provide continuous insulin. Good for those needing close control, though costly.

# **Insulin Injection Technique**

Proper technique ensures insulin works effectively and minimizes discomfort. Follow these steps:

#### 1. Choose an Injection Site



Common Sites: Inject into the fatty tissue under the skin.

Abdomen: Preferred for fastest absorption, at least 2 inches from the belly button.

Thighs: Front or outer thigh, halfway between hip and knee.

Upper Arms: Back or outer arm area.

Buttocks: Upper outer buttock.

Rotate Sites: Change injection areas to avoid tissue damage (lumps). Avoid reusing the same spot more than once every few weeks.

#### 2. Prepare Your Supplies

Wash Hands: Prevents germs from entering the site.

Check Insulin:

Roll the vial gently if insulin is cloudy (e.g., intermediate-acting insulin). Do not shake.

Check for particles or discoloration in clear insulin (e.g., rapid-acting or long-acting insulin).

Needle and Syringe: Ensure a fresh, sterile needle for each injection.

### 3. Prepare the Dose

With a Syringe:

Draw air into the syringe equal to your dose, insert into the vial, push the air in, and then draw up the insulin.

Check for air bubbles, and remove them by tapping.

With an Insulin Pen:

Attach a new needle, prime the pen by dialing a small dose (1-2 units) and pressing until insulin flows, then set the correct dose.

#### 4. Injection Process

Pinch the Skin (Optional): For longer needles or thinner layers of fat, gently pinch skin to avoid muscle.



The method of lifting up (pinching) a skin fold. The correct way is ticked with *green*; the wrong ways are *crossed with red*. Only moderate pressure should be exerted on the skin

Insert Needle: Hold at a 90-degree angle (or 45 degrees for thin adults/children).



Inject Insulin: Push the plunger or pen button slowly to deliver the full dose. Keep the needle in for 5-10 seconds to ensure absorption.

# 5. Remove the Needle and Dispose Properly

Remove the needle at the same angle used to inject.

Avoid Rubbing: Rubbing may interfere with absorption; instead, press with a tissue if needed.

Insulin Storage

Store insulin as directed.

Unopened insulin should be kept in the refrigerator.

Opened insulin can be stored at room temperature in a cool, dry area for up to 28 days.

# Hypoglycemia

One of the most common side effects of insulin therapy is **hypoglycemia**, or **low blood sugar**. This occurs when your blood sugar drops too low, usually below **70 mg/dL**.

### **Causes of Hypoglycemia:**

- Too much insulin: If you take more insulin than your body needs, it can lower your blood sugar too much.
- Missed meals: Skipping meals or eating less than usual can cause blood sugar to drop after taking insulin.
- Excessive exercise: Physical activity can lower blood sugar, especially if you don't adjust your insulin or eat extra food.
- Alcohol: Drinking alcohol without eating can lead to low blood sugar.

# Symptoms of Hypoglycemia:

- Mild symptoms: Shaking, sweating, dizziness, hunger, irritability or mood changes, fast heartbeat or palpitations
- Severe symptoms (when blood sugar gets dangerously low): Confusion, seizures, loss of consciousness (fainting)

# How to Treat Hypoglycemia:

- If the patient conscious and able to eat or drink: Consume 15-20 grams of fast-acting carbohydrates, such as 3–4 glucose tablets or ½ cup of fruit juice or 1 tablespoon of sugar
- Wait 15 minutes and check blood sugar again. If it's still low, repeat the treatment.
- If you're unable to swallow or unconscious, the patient should be taken to the nearest hospital as soon as possible for iv glucose

# Preventing Hypoglycemia:

- Monitor blood sugar regularly to catch low blood sugar early.
- Take insulin as prescribed, but adjust dose based on meals, activity, and other factors, as directed by your endocrinologist.
- Always carry a fast-acting carbohydrate, like glucose tablets or sweets or chocolate, to treat low blood sugar quickly.

### Conclusion

Managing insulin therapy requires careful attention to the types of insulin you're using, how to administer it properly, and how to handle **hypoglycemia** (low blood sugar). By following the right techniques and being aware of the signs of low blood sugar, you can keep your diabetes under control and stay safe. Always work closely with your endocrinologist to adjust your insulin doses as needed, and do not hesitate to reach out to them if you have questions or concerns about your insulin therapy