

QUICK REFERENCE GUIDE TO DIABETES FOR HEALTH CARE PROVIDERS

A special project of the Michigan Diabetes Outreach Network

Chapter 9

Education for Beginning an Insulin Regimen

Overcoming Fears

- Determine what barriers may be: fear of injections; cost; fear of complications; fear of hypoglycemia; social concerns; weight gain?
- Educational topics to cover:
- Discuss how insulin works to lower blood glucose levels and the benefits of insulin therapy
- Consider a referral to a diabetes educator to address fears of injecting, social concerns, weight gain, and hypoglycemia or for advanced skills such as:
 - Mixing 2 insulins in the same syringe
 - Pattern management
 - Insulin adjustments for physical activity, sick days, and differing amounts of carbohydrate intake
- Education will help overcome fears. Topics to cover: proper storage, mixing insulin, dose preparation, administration, safe needle disposal and managing hypoglycemia.

Proper Storage of Insulin

- In general, insulin vials in use can be stored at room temperature (59°-86°F) for 1 month. Back stock should be kept refrigerated but never frozen.
 - Some analogs recommend <77°F (check package insert)
- See manufacturer guidelines for cartridges, pre-filled pens.
- Avoid freezing temperatures and temperatures above 86 degrees.
- Insulin should not be left in cars or checked in airline baggage.

Do not use Insulin if:

- Sediment is present.
- Clumping or frosting is apparent.
- Clear insulin is cloudy or discolored.
- It is beyond the expiration date.
- Stored improperly.

Mixing Insulin

- Glargine and detemir should not be mixed with other insulins
- Regular, Lispro, Aspart, Glulisine and NPH can be mixed - some premixed insulins are available for those unable to mix insulin for themselves.
- Glulisine mixed with NPH must be injected immediately after mixing
- Always draw up Regular or rapid-acting insulin first when mixing insulins.

- Insulin mixed at home should be administered immediately after mixing.

Preparation of Dose:

- Determine method of insulin delivery: syringe, pen device or needle free injector
- Individuals with dexterity or visual problems may have trouble drawing up a dose. Consider the insulin pen device or the syringe magnifier.
- Match the syringe to the amount of the dose. The unit markings on the side of the syringe differ depending on what the syringe holds: 30 units (3/10 cc), 50 units (1/2 cc) or 100 units (1cc).
- Needles are shorter and vary from 3/16 inch to ½ inch. The gauge is important for comfort. Most insulin syringes are available in the smaller 30 or 31 gauge.
- If injecting cloudy insulin, roll the bottle between hands until it is uniformly cloudy
- Never shake insulin
- Use room temperature insulin to reduce irritation at the injection site.
- Draw air into syringe per the amount of insulin to be drawn up, then inject that air into the bottle and draw up correct amount of insulin.
- Tap to get rid of air bubbles.

Correct administration

- Sites to use in descending order of absorption: abdomen, upper arm, outer thigh and buttocks.
- Clean site with soap and water or alcohol swab.
- Abdomen may be used for most injections, but rotations around abdominal area must occur. Do not inject within a 2" radius of navel.
- Inject into subcutaneous tissue.
- 90 degree injection angle works for most. Children and very thin adults may need to use a shorter syringe length or 45 degree angle.
- Massaging injection site is usually not recommended.
- Avoid injecting into an area that will soon be used in an activity or one that has just been used as absorption is increased.
- Avoid injecting immediately before using sauna, hot tub or hot shower as temperature may increase absorption speed of insulin.

Safe disposal of syringes and needles

- Disposal of syringes and testing supplies varies by city, country, and state. Call your local health department or trash collector.
- Never throw used syringes or lancets into the trash.
- Do not recap needles
- Put your syringe and used lancet into a sharps container or hard plastic or metal container with a secure lid
- Discuss reusing syringes and needles if cost is an issue. This should not be done when injecting insulin glargine and pramlintide acetate.
- Syringes and needles are NOT RECYCLABLE.
- Needle disposal devices are also available.

Recognition of hypoglycemia and corrective actions to be taken

- See Chapter 18 for hypoglycemia signs, symptoms and treatment.

Insulin and Insulin Analogs

Type of Insulin (Trade Name)	Appearance	Onset (hours)	Peak (hours)	Duration (hours)	When to administer
Rapid Acting					
Lispro (Humalog®)	Clear	0.25 - 0.5	0.5 - 4	4 - 6	0 -15 min before meals*
Aspart (Novolog®)	Clear	< 0.5	1 - 3	3 - 5	0 -15 min before meals*
Glulisine (Apidra™)	Clear	0.25	0.5 - 1.5	3 - 5	0 -15 min before meals*
Short Acting (Regular)					
Humulin® R, Novolin® R	Clear	½ - 1	2 - 3	6 - 8	30-45 minutes before meals
Intermediate Acting					
NPH, Humulin® N, Novolin® N	Cloudy	2 - 4	6 - 10	14 - 18	Before am & pm meals or before am meal & at HS
Long Acting					
Glargine (Lantus®)	Clear	1	No peak	Up to 24	am or HS Do NOT mix
Detemir (Levemir®)	Clear	~1	No peak	Up to 24	Once or twice daily
Combinations					
Humulin® 50/50	Cloudy	½ - 1	2½ - 5	14 - 18	Before breakfast & dinner
Humulin® 70/30	Cloudy	½ - 1	1½ - 16	14 - 18	Before breakfast & dinner
Novolin® 70/30	Cloudy	½	2 - 12	Up to 24	Before breakfast & dinner
Humalog® Mix 75/25	Cloudy	< ½	1 - 6½	~ 22	Before breakfast & dinner
Novolog® Mix 70/30	Cloudy	< ½	1 - 4	Up to 24	Before breakfast & dinner

The action time of any insulin may vary in different individuals or at different times in the same individual. Variables include size of dose, injection site, physical activity and body temperature.

References:

American Diabetes Association (2008). Clinical Practice Recommendations. *Diabetes Care*, Vol 31 (1).

Mensing C et al. The Art and Science of Diabetes Self-Management Education 2006,
American Association of Diabetes Educators, Chicago, Illinois.
Product labeling information