

QUICK REFERENCE GUIDE TO DIABETES FOR HEALTH CARE PROVIDERS

A special project of the Michigan Diabetes Outreach Network

Chapter 8

Sample Insulin Regimens and Other Drugs Used in the Treatment of Diabetes

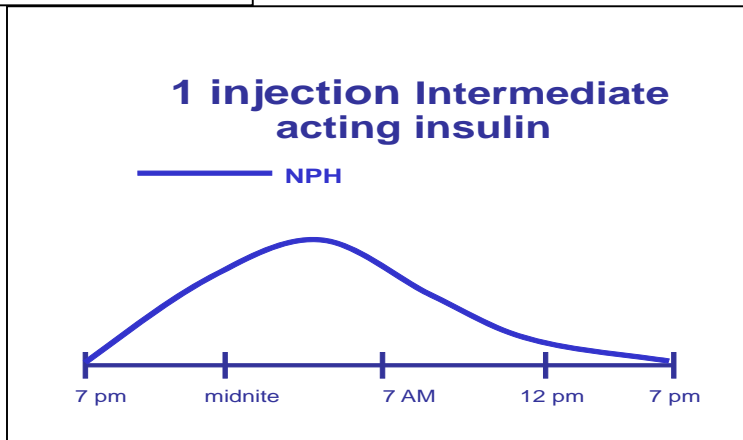
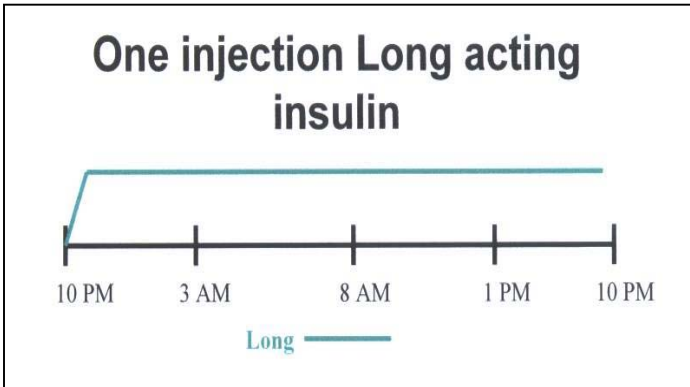
There are many different insulin regimens in use. The following are samples of regimens used for both type 1 and type 2 diabetes. The table below identifies the types of insulin discussed in this chapter. See Chapter 7 for goals of insulin therapy and target blood glucose recommendations.

Rapid-acting	Short-acting	Intermediate-acting	Long-acting	Pre-mixed
Apidra Humalog Novolog	Regular	NPH	Lantus Levemir	70/30 70/30 mix 75/25

Commonly used insulin programs for type 2 diabetes

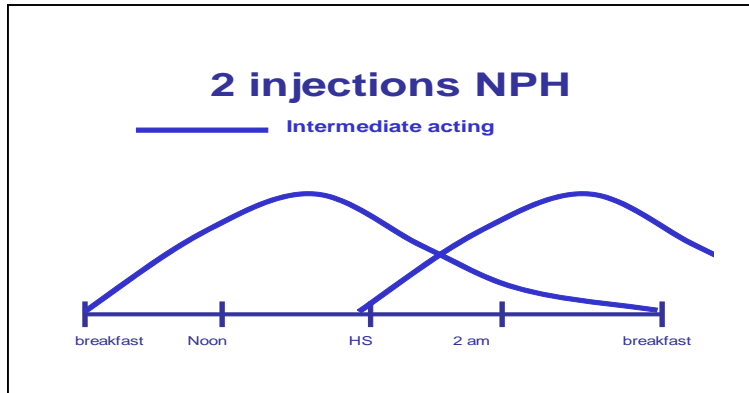
1. Problem: Fasting Blood Glucose Levels too high

- A. One injection of long-acting or intermediate-acting insulin at bedtime used as monotherapy or in conjunction with oral meds. This helps reduce the liver's release of glucose overnight and bring fasting glucose levels into target ranges.

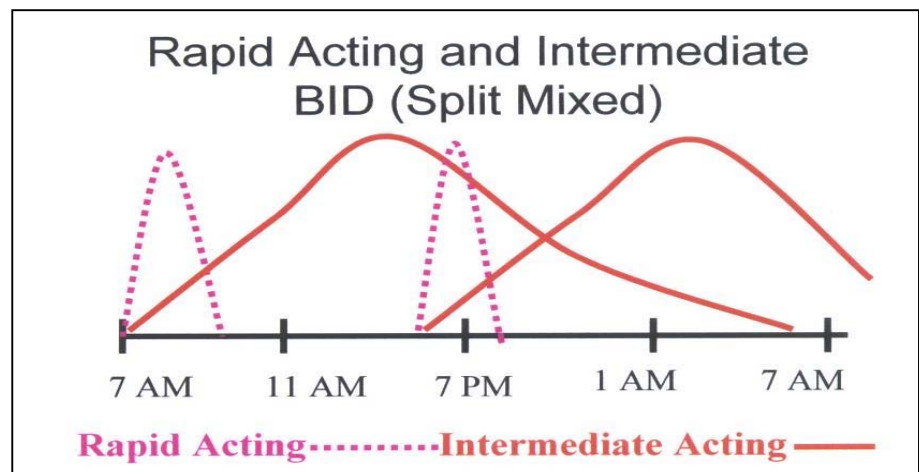
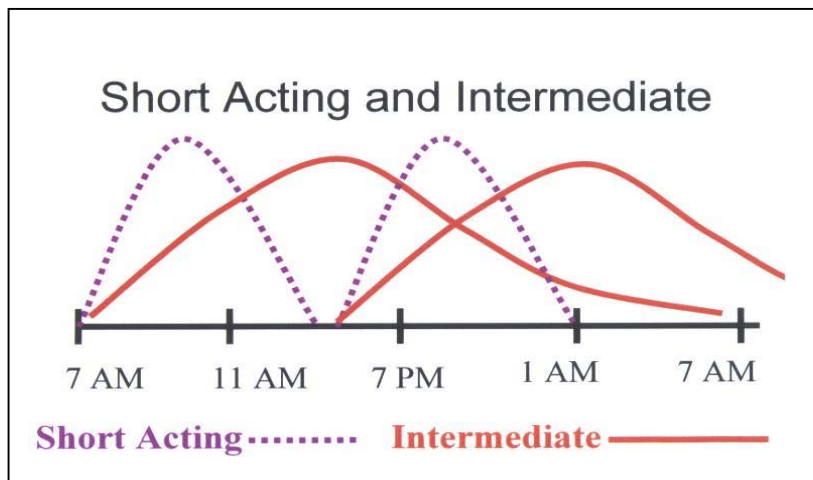


2. Problem: Glucose values during day out of target, fasting levels in target range

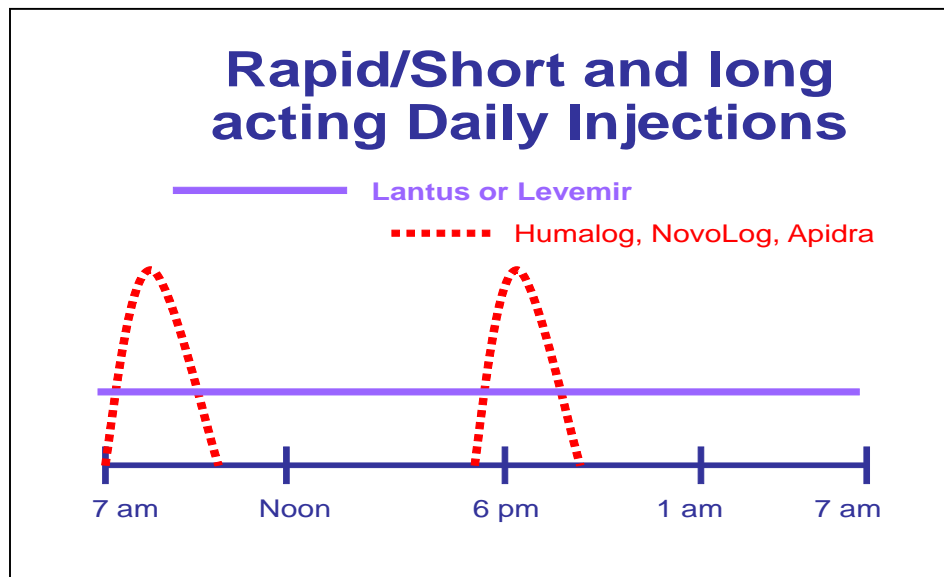
- A. Adding a second injection of intermediate-acting insulin in the morning, while continuing the HS dose.



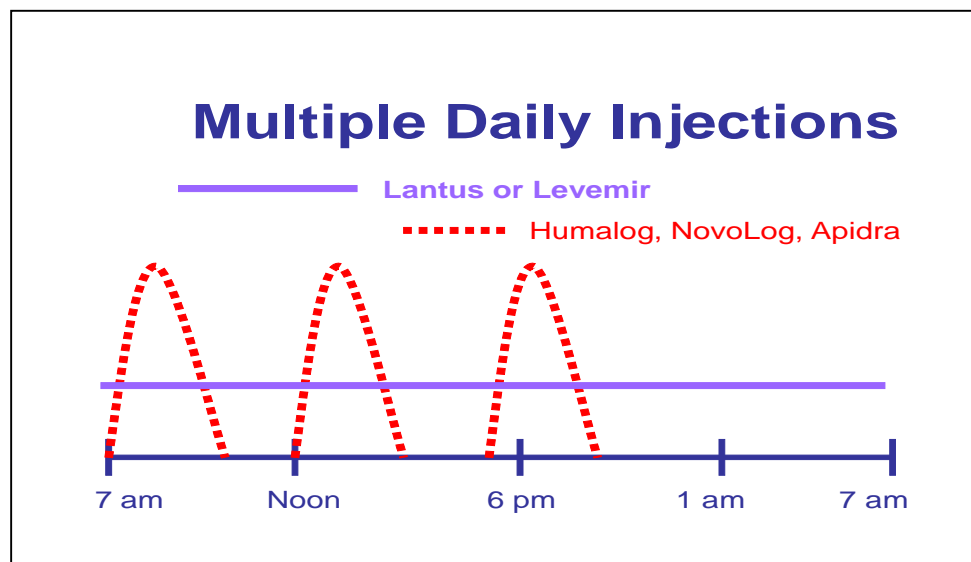
- B. Adding short-acting or rapid-acting to the intermediate-acting insulin dose before breakfast and before evening meal. Can use premixed insulin, but doing so will reduce flexibility of doses.



- C. Adding short-acting or rapid-acting to the long-acting insulin (Not commonly used in type 2 diabetes)



- D. Adding fast-acting before each meal/snack, along with long-acting in am or HS.

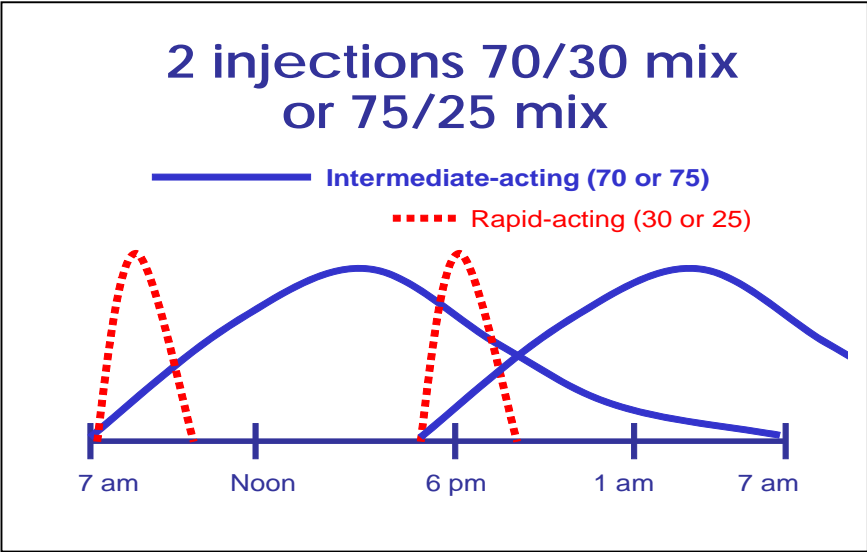
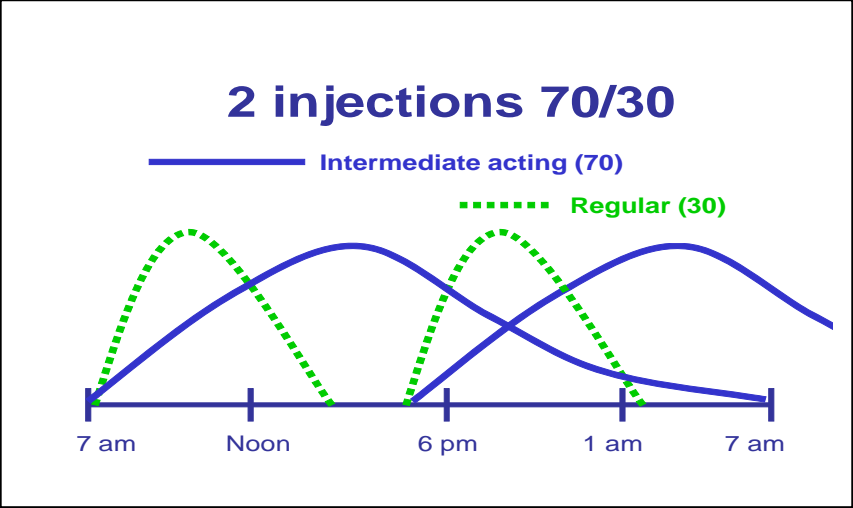


Commonly used insulin programs for type 1 diabetes

A. 2 injections per day

Advantages: less injections per day

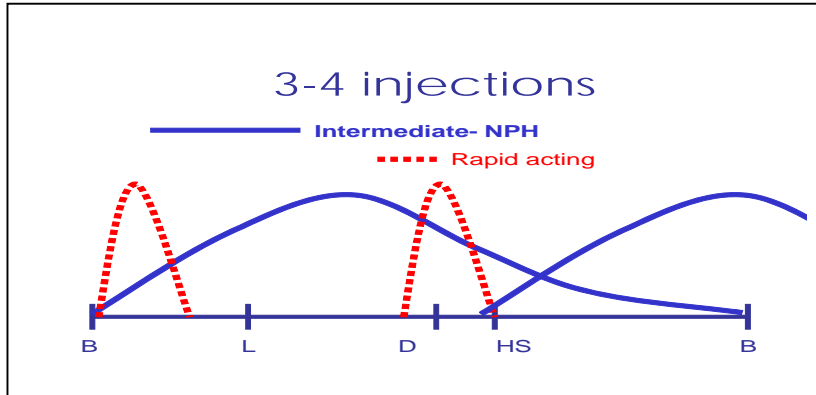
Disadvantages: NPH at dinner often does not last the night; inflexibility for food and activity



B. 3 Injections per day- 70/30 Mix at breakfast, rapid or short acting at dinner and NPH at HS

Advantages: better overnight control, flexibility at dinner

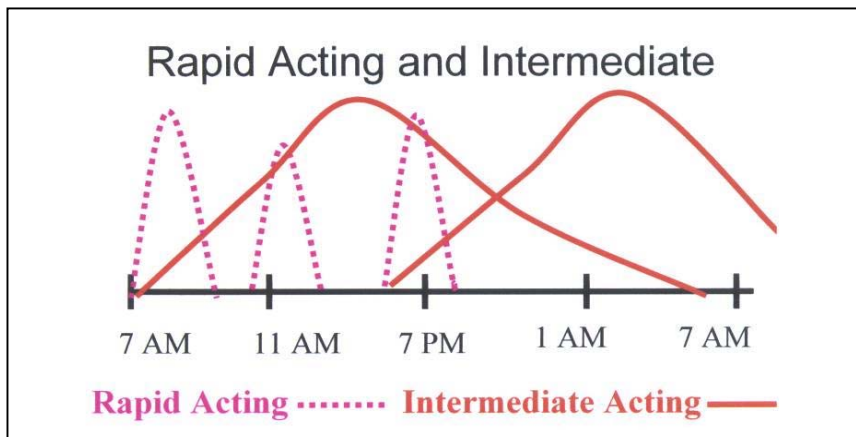
Disadvantages: inflexible at midday, possible hypoglycemic when peaks interact



C. 4 Injections per day- NPH and rapid or short acting at breakfast, rapid acting at dinner and NPH at HS

Advantage: better overnight control, flexibility at breakfast and dinner

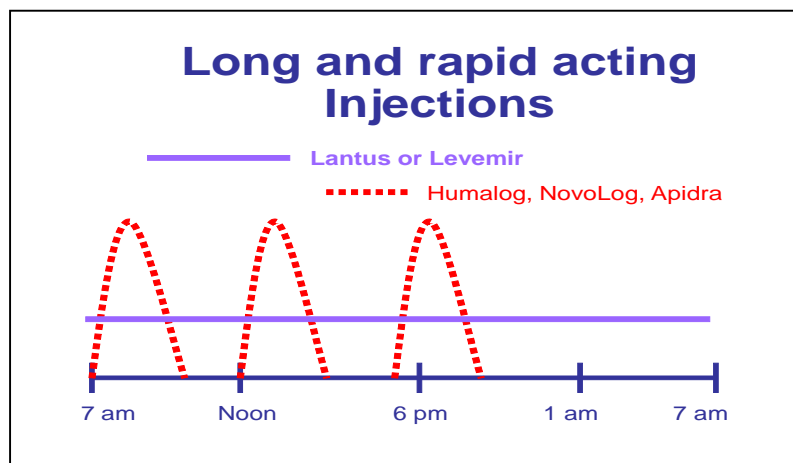
Disadvantages: inflexible at midday, possible hypoglycemic when peaks interact



D. 4 injections per day- long acting at HS and rapid acting at B, L and D

Advantage: better overnight control, flexibility at breakfast, lunch and dinner

Disadvantages: multiple injections



Comparison of Rapid Acting Insulin Analogs and Short Acting Insulin

- Can generally make a 1:1 substitution (rapid for short)
- Rapid is associated with lower postprandial blood glucose and quicker correction of hyperglycemia
- Fewer hypoglycemic episodes with rapid;
- Faster recovery from hypoglycemia with rapid
- High fat meals or gastroparesis – short may be best choice
- High carbohydrate meals – rapid more effective to lower postprandial blood glucose (BG) excursions
- Decreased need for between meal snacks when using rapid
- Rapid can be given immediately after the meal when food intake is not predictable.
- May need more basal insulin when using rapid versus short
- Rapid may be superior for:
 - insulin pump use
 - those using long-acting for basal and rapid before meals and snacks

Correction Insulin Doses

There are several methods for making corrections to pre-meal rapid or short-acting insulin dose in response to out of target blood glucose levels. Persistent out of target fasting blood glucose levels require adjustment to the basal insulin night dose.

If glucose levels out of target:	Adjust this insuliin
Post breakfast or Pre lunch	Pre breakfast rapid or short-acting insulin
Post lunch or Pre supper	Pre lunch rapid or short-acting insulin or the morning intermediate-acting insulin
Mid-afternoon	Morning intermediate-acting or long-acting insulin
Post supper or bedtime	Pre supper rapid or short-acting insulin
Early morning or fasting	Evening intermediate or long-acting insulin

Adjunct Therapies for Type 1 Diabetes

Pramlintide acetate was released for use in 2005 and is used in addition to insulin and/or analogs to assist in gaining better control of blood glucose levels in both type 1 and type 2 diabetes. Pramlintide acetate (Symlin®) is a synthetic analog of human amylin. Amylin is a hormone also made and secreted by the beta cells, and therefore completely lacking in persons with type 1 diabetes. In those without diabetes, it is secreted along with insulin to control post-prandial blood glucose levels. Its anti-hyperglycemic effects include:

- Slowing gastric emptying
- Suppressing glucagon release, resulting in less glucose release from the liver.
- Regulation of food intake due to modulation of appetite.

Pramlintide acetate is administered by subcutaneous injection prior to meals to mimic normal levels. Injection technique is the same as that for insulin. It cannot be mixed with insulin and may require pre-meal insulin be reduced to prevent hypoglycemia. Side effects may include nausea, vomiting, dizziness, indigestion, stomach pain, decreased appetite and fatigue. Its use is contraindicated in those with gastroparesis, hypoglycemia unawareness, women who are pregnant or breastfeeding and children. Vials in use can be stored at room temperature (less than 77°F) for 28 days and then discarded. Vials not in use should be stored in the refrigerator and discarded after the expiration date.

References:

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

American Diabetes Association), *Practical Insulin-A handbook for prescribing providers*. 2nd Edition. (2007)

American Diabetes Association, *Medical Management of Type 1 Diabetes*. 5th Edition. (2008)