

QUICK REFERENCE GUIDE TO DIABETES FOR HEALTH CARE PROVIDERS

A special project of the Michigan Diabetes Outreach Network

Chapter 7 Insulin and Type 1 Diabetes

Some insulin must be available at all times for persons with type 1 diabetes. Insulin doses may be reduced but usually should never be completely eliminated; to do so can be life threatening.

Starting Insulin Doses - Diagnosis and stabilization

At diagnosis, the initial objectives of therapy are dependent on the degree of illness (e.g. resolving DKA, eliminating symptomatic hyperglycemia). Glycemic targets should be approached gradually.

The table below provides useful starting points for the total daily dose of insulin: Treatment should begin with 0.6-0.75 units of insulin per kg of body weight per day. This calculation should be modified based on activity level and physical condition of the client.

Client	Dose (units/kg/day)
Conditioned athlete	0.5
Motivated exerciser, Women in 1 st phase menstrual cycle	0.6
Women in last phase menstrual cycle Women in 1 st trimester of pregnancy Adult, mildly ill Child starting puberty	0.7
Women in 2 nd trimester of pregnancy Child in mid-puberty Adult with severe or localized infection	0.8
Women in 3 rd trimester of pregnancy Adult ill with bacterial infection	0.9
Women at term of pregnancy Adult with severe bacterial infection Child at peak pubescence	1.0
Child at peak pubescence who is ill	1.5-2.0

Adjusting initial dosages

Initial dosages are often higher the first couple of weeks until the client becomes more insulin sensitive. Adjustments are made based on results of the client's blood glucose monitoring. At the very least, the client should monitor 4 times per day, before each meal and at bedtime. In order to avoid hypoglycemia, they should also check between meals and at 3:00 am (once per week).

A few weeks after diagnosis, some experience a "honeymoon phase" where some endogenous insulin is excreted. This may be discovered by repeated incidences of hypoglycemia. An adjustment of the initial dosage will need to be made usually in the range of 0.2-0.6 units/kg/day. Gradually, the client's insulin requirements will increase after this phase which may last up to two years.

Adjustments in food intake or insulin dose are often needed for activity (see Chapter 4 Physical Activity and Diabetes).

General Principles of Insulin Therapy

The goal of insulin therapy is to achieve near normoglycemia and to avoid severe hypoglycemia.

Research shows that keeping blood glucose levels as close to normal as possible resulted in the development of significantly fewer complications. However, tight control needs to be balanced to eliminate hypoglycemic occurrences. Normal insulin secretion is characterized by continuous background or basal insulin release and bursts of insulin following food intake to cover the blood glucose rise.

Basal Insulin: accounts for about 40-50% of the total daily insulin secretion. It can be best mimicked by giving long-acting insulin (glargine or detemir) once or twice a day or by delivering short or rapid-acting insulin continuously by an insulin pump.

Prandial (Meal time) Insulin: typically comprises about 50-60% of the total daily dose. This can be given via rapid-acting analogs or the short-acting insulins.

Glycemic Goals:

The first step in determining an insulin regime is to establish glycemic goals. For most clients, this means that more than 50% of their home blood glucose monitoring results should fall within the following ranges:

Preprandial: 70-130 mg/dl

Bedtime: 100-140 mg/dl

Postprandial (1-2 hours): < 180 mg/dl

These goals should be individualized according to client age, health status, history of hypoglycemia, lifestyle and personal goals.

All persons with type 1 diabetes should be put on a regimen of at least 3 insulin injections per day. See Chapter 8 for sample insulin regimens for type 1.

References: American Diabetes Association (2007). Practical Insulin-a handbook for prescribing providers. Second Edition