A blood glucose profile (or curve) is a graph of blood glucose levels over time. It is the most effective way to determine the type, dose, and frequency of administration of insulin, necessary to keep the blood glucose at acceptable levels. Each cat responds very differently to insulin, and so the appropriate insulin therapy must be determined for each individual cat. In addition, a cat's insulin needs may change dramatically over time, so blood glucose profiles may need to be performed periodically for the lifetime of the cat.

Blood glucose profiles are necessary because each cat reacts differently to the types of insulin, dosage, and intervals at which insulin is given. By performing a blood glucose profile, we can determine if an insulin was effective, when the peak effect occurred (i.e., when the glucose level was at its nadir (lowest point), how long the effect lasted, and the degree of fluctuation in the glucose level. Changes can then be made in the type of insulin, the dosage or the dosing intervals in order to maintain the blood glucose at the optimal level throughout a 24-hour period. In some cases, up to five or more blood glucose curves may need to be performed before a satisfactory regimen is determined. Because of the cost, abbreviated profiles (fewer samples) are sometimes used. In addition to the blood glucose profile, the response of the cat is noted. The amount the cat is eating, drinking, and urinating; activity level; and weight all help determine if the insulin regimen is effective.

How is a blood glucose profile performed?

To perform a blood glucose curve, a blood sample is taken to check the blood glucose level, the cat is fed and the insulin is administered. Additional blood samples are taken at regular intervals throughout the day to monitor the blood glucose level. It is recommended that a cat be on that specified insulin dose for 4-7 days before the glucose profile is performed to give her body time to equilibrate.

Diet and exercise greatly affect the cat's need for insulin. During the regulation process, it is important to feed the cat the same food, in the same amounts, at the same time, that it will be fed at home. The cat's activity level should also mirror what she will be doing at home. The timing of the administration of insulin should also be consistent with when the owner will be able to give the insulin at home.

How is the blood glucose measured?

The glucose level in the blood is determined through laboratory testing. This may occur in your veterinarian's office, or the sample may be sent to an outside laboratory. Since we want to take only very small amounts of blood from the cat, the use of a hand-held glucometer at your veterinarian's office is recommended. To use this device, several drops of the blood sample are placed on a chemically-impregnated paper strip. A chemical reaction occurs that changes the color of the strip depending upon the amount of glucose present. The wavelength of the color is read by placing the strip in the glucometer.

Why can't we just measure the amount of glucose in the urine?

Glucose will appear in the urine of cats if the blood glucose level goes over 260-310 mg/dL; the normal blood glucose level is 55-160. (In dogs, glucosuria occurs if the blood glucose level exceeds 180-220 mm/dL.) A determination of blood glucose tells us what the blood glucose level is at that particular time. A urine glucose test does not tell us what is going on at the time the urine sample was obtained; it is an average of the glucose level in the urine which was formed since the cat last urinated - that could be 8 or more hours ago. Insulin dosages should NOT be changed based solely on urine glucose levels.

What special problems do cats pose when performing a blood glucose profile?

Some cats may have stress-induced hyperglycemia (high blood sugar). Under stress (such as being in a veterinary office), these cats can rapidly develop high blood glucose levels (300-400 mg/dL). The fact a cat is hospitalized and having her blood drawn can dramatically change her blood sugar levels. The dose of insulin needed to 'regulate' her while she is stressed in the veterinary hospital may be much different than the dosage necessary to maintain a good blood glucose level when she is comfortably at home.

In addition, it is sometimes difficult to get cats to eat well when they are hospitalized. In performing a glucose curve we want the cat to eat the same amount of food it would at home, at the same time it would at home. Eating must also be coordinated with when the insulin is administered. We generally want the cat to eat at approximately the same time the insulin is given.

For these reasons, many veterinarians will hospitalize a diabetic cat for up to six days before performing a blood glucose curve. This acclimates the cat to the hospital, the cat will hopefully be eating normally, and the results of the glucose profile should be more reflective of the insulin needs of the cat once she goes home. Many things may be done to decrease the cat's stress, including the use of intravenous catheters or very small needles to draw the blood. If the results are to be accurate, cats cannot be sedated or tranquilized while performing a blood glucose profile.