

Monitoring Glucose Regulation in Dogs and Cats

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Monitoring is crucial to determining your pet's proper insulin dose. Much monitoring can be done at home and it is possible to save a great deal of money by doing so; however, some tests simply must be done at the veterinarian's office. We will now review important parameters that one must keep an eye on if diabetic regulation is to be achieved long term. Consider keeping a notebook with weekly (if not daily) notations regarding some of these parameters, or use one of several smartphone apps are available for tracking glucose measurements. The more information you have when it is time to see the vet, the better.

[Download](#) a printable monitoring diary in a PDF format.

Both [AlphaTrack](#) and [Vetsulin](#) offer on-line tracking apps and other useful resources.

Alternatively, the Freestyle Libre system (description below) uses a scanner that tracks numerous trends and allows them to be printed, emailed and synced to your smart phone.

Clinical Improvement

The hallmark signs of diabetes mellitus are excessive water consumption, excessive urination, excessive hunger and weight loss. It is not necessary to measure your pet's water consumption as the fluid requirement will change with exercise level, environmental temperature, and other factors. Still, make a mental note about whether your pet's appetite, thirst, and urine production are normal, increased or decreased. If you are keeping a notebook, consider making a daily notation in this regard. It is subjective somewhat but good to note.

Additional Resources

- [Diabetes Mellitus: Introduction](#)
- [Cataracts in Diabetic Dogs](#)
- [Diabetic Ketoacidosis in Dogs and Cats](#)
- [Diabetic Cat Diet](#)
- [Diabetic Dog Diet](#)
- [Glargine \(Lantus\) and Detemir \(Levemir\) Insulin](#)
- [Insulin Administration in Cats](#)
- [Insulin Administration in Dogs](#)
- [Insulin Alternatives](#)
- [Hard to Regulate Diabetic Cats](#)
- [Hard to Regulate Diabetic Dogs](#)
- [Home Testing of Blood Glucose for Diabetic Cats](#)
- [Flash Glucose Monitoring in Cats and Dogs](#)



Photo Courtesy Depositphotos

Your pet's body weight is less subjective. If your pet is small enough, consider weighing your pet every couple of weeks. As your pet comes into regulation, weight will be gained. A well-regulated pet will maintain body weight. Keep body weights recorded in your notebook or log.

Glucose Monitoring

In a perfect world, glucose monitoring is performed at home. Pets are most comfortable at home and good glucose measures are not altered by stress. Further, by doing glucose curves at home the owner is spared the expense of the vet visit. Traditionally, glucose monitoring is done using a drop of blood obtained from an ear vein or foot pad, similar to how human diabetics use a spring-loaded lancet device to prick their finger. More recently implantable probes have made glucose monitoring at home much simpler for many pet families. Details on both systems are provided below.

The glucose curve indicates how long the dose of insulin is lasting (which in turn indicates whether the type of insulin being used is correct) and how high and low the glucose levels go (which in turn indicates if the dose being used is correct). Initially curves are performed every 1-2 weeks until regulation is achieved. It takes 1-2 weeks for a pet to adapt to a dose of insulin and that dose cannot be evaluated prior to that time period.

Glucose curves can be performed at home or in the hospital. For a curve, glucose levels are sampled starting with the first insulin dose of the day and continuing every two hours until the next insulin dose. This process typically takes 10-12 hours.

If glucose monitoring is being done at home regularly, it is especially important to check glucoses prior to giving an insulin dose so as to avoid creating a low blood sugar incident.

Find out from your veterinarian how low a glucose level should be in order to indicate that you should skip the insulin.

The Freestyle Libre Device

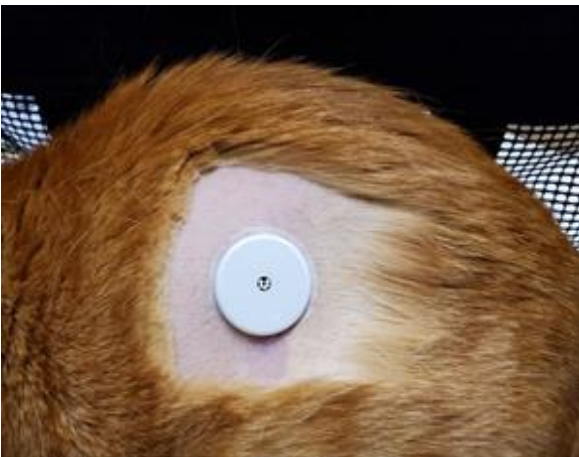


Photo courtesy of Dr. Wendy Brooks

The Freestyle Libre device is a human glucose monitoring system that can be adapted to dogs and cats easily. For pets, a spot is shaved, usually on the shoulder or flank, and a round glucose sensor is implanted such that the sensor monitors tissue glucose levels. The provided scanner can wirelessly communicate with the sensor. In this way, glucoses can be checked simply by scanning the pet and no blood collection is needed. The sensor must be replaced every two weeks (generally done at the vet's office as shaving the skin is involved). The kit and sensors can be obtained from most human pharmacies. Your veterinarian must prescribe the system for you.

This [video](#) shows the implantation process and how the Freestyle Libre is worn.

- If your pet is very active, the sensor can be dislodged and, in that situation, a new one must be implanted. A dislodged sensor cannot be re-implanted. Wearing a pet sweater or using some bandage material helps prevent this problem.

- Tissue glucose levels lag behind blood glucose levels by about 15 minutes. This is unlikely to come into play but could in event of a low blood sugar episode.

The Glucometer and Lancets

In a more traditional form, a glucometer can be used to monitor pet glucoses at home. This involves obtaining a small blood sample with a lancet device and doing so on a regular basis. Not every owner is able to accomplish this feat and not every pet is amenable to the process, but many people and pets are perfectly fine with it.

Human glucometers used to be used to monitor dog and cat blood sugars. The problem with doing this is that accuracy at lower values was not reliable. Trends were easy to see but more precise measurements were not possible to obtain. Today, there are several veterinary glucometers on the market and we recommend buying one of these for best results.

The meter comes as a kit and provides links to instructional videos along with written/illustrated guides. Blood collection instructions are also included. A test strip is inserted in the meter and a drop of blood is touched to it. The glucose value is displayed in a few seconds.

See a [video](#) of a cat having a suitable blood sample drawn (provided by Dr. Margie Scherk).

Taking Blood: Watch it Done

To see how to use the Alphatrak meter, watch this [video](#) from Caledon Mountain Veterinary Hospital.

To Do a Curve at Home

- Be sure to check glucose before feeding and before insulin is given. This is probably the most important glucose reading of the curve.
- Note the time of each glucose level, note the time of each feeding and the time the insulin is given.
- Check blood glucose levels every 2 hours until it is time for the next insulin level.
- At the end of the curve, provide the information to your veterinarian so that insulin dosing adjustments can be made.



Photo by
MarVistaVet

To Do a Curve in the Animal Hospital

- Find out if you are to feed your pet first at home first. Some pets do not eat normally in the hospital which can alter the curve but some veterinarians prefer you to bring the food with you and leave it with the pet. Definitely bring the pet's insulin and syringes as you will probably need to demonstrate your insulin administration technique.
- The veterinary staff will run a pre-insulin glucose level.
- After this is drawn, they will observe how you draw up and administer the insulin confirming that you are doing it correctly.
- The pet is then left with the food for the day and the veterinary staff will check blood glucose levels every 2 hours.
- Pick up your pet and receive new dosing instructions at the end of the day.

Ketones

Everyone knows that food provides our bodies with fuel. Most of our tissues can burn stored fat, though our brains (and a few other tissues) have no use for fat and must burn glucose. In normal life, there is plenty of glucose to feed our brains and plenty of fat to feed the rest of our bodies and our metabolism runs happily along but in times of starvation problems start: we deplete stored glucose and we burn fat rapidly and desperately.

Ketones are a by-product of intense fat burning. The brain is able to use ketones as an alternative to glucose which is a good thing. The problem is that intense ketone production leads to metabolic pH changes leading to acidic blood and dangerous electrolyte imbalances.



Photo by MarVistaVet

When diabetes mellitus is complicated by infection or other problems, ketoacidosis can result. This is a serious complication that can lead to expensive hospitalization and even death. It is helpful to monitor your pet's urine for ketones.

Ketostix are urine dipsticks when indicate the presence of ketones in urine. Only a drop of urine is needed. Dip the ketostick in the urine and look for a color change. A color guide is present on the bottle of dipsticks. This need not be done every day if the pet seems to be doing well but when it is done record the results in the monitoring notebook if you have one.

Urine dipsticks to detect ketones are available at most drug stores and can be used for home monitoring. Seeing ketones in urine for three days or more in a row warrants a visit to the veterinarian.

Occasional ketones are not an alarming finding in a diabetic pet but if ketones are found in urine three days in a row or if the patient showing ketones seems ill (poor appetite, vomiting etc.) then the pet should see the vet right away. In such a situation, [diabetic ketoacidosis](#) is likely occurring and serious treatment is likely needed.

Ketostix can be purchased at any drugstore.

Collecting your Pet's Urine

Using Ketostix is simple enough but you will need a sample of the pet's urine. For dogs this is best done as a two-person job.

Male Dog

A male dog's urine can be collected on a walk using a cup. The male dog is walked and when he lifts his leg to urinate, the second person simply catches the urine in the cup. This can be done with one person with some practice. It may be helpful to bend a metal coat hanger so that it can hold a paper cup on one end and have a long handle on the other end or invest in a "grabber reacher" as shown below to hold the cup.

Female Dog

A female dog is a bit trickier and you may need a second person to slip a small paper

plate under the dog as she urinates. Again, it is helpful if a second person manipulates the plate and uses the ketostick so that the person holding the leash does not have to manage all these tasks at once. If only one person is available, the “grabber reacher” shown below may be helpful.

Cats

For cats, a piece of cellophane tape can be placed over the litter box and some urine will be caught there even if the cat digs in the box. Only a drop of urine is needed for the test so even if the cellophane is wrinkled up hopefully a drop can still be obtained. Alternatively a very small amount of litter can be placed in the box. The cat will still understand what he is supposed to do but not all the urine will be absorbed by the litter.

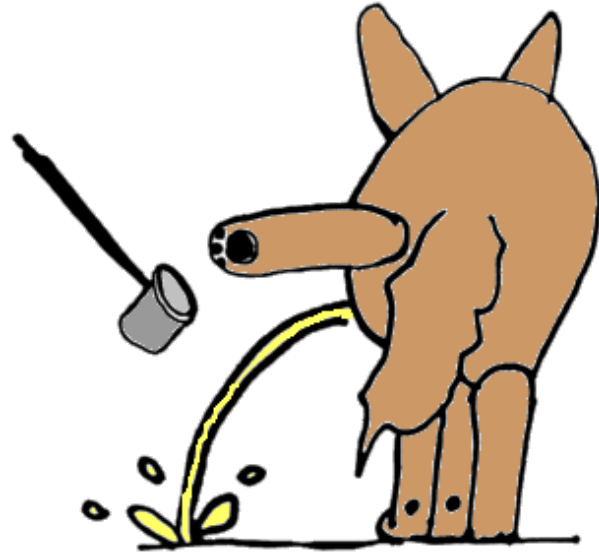


Illustration by Wendy Brooks, DVM

It is not necessary or particularly even desirable to monitor urine glucose with dipsticks. The contents of the urinary bladder represent several hours of urine production thus making interpretation of urine glucose challenging. In the past urine glucose monitoring has been recommended and certainly there is nothing wrong with collecting more information but it can be confusing to decipher and should be considered optional.

Other Tests

Your pet will still need regular veterinary check ups, typically every six months after regulation has been achieved. Obviously, if your pet seems sick or if the symptoms of diabetes seem to return, then your pet needs to be checked right away.

Urine Culture

It is largely inevitable that sugar will spill into your pet’s urine, possibly even for a short time daily. Sugar in urine is highly encouraging to bacteria and [urinary tract infections](#) are common in diabetic pets. Often symptoms are difficult to discern at home so periodically performing urine cultures is a good practice in ruling out latent infection.

Fructosamine Level

Measuring fructosamine is a helpful way to help monitor glucose control and, if for whatever reason, it is not possible to run glucose curves this would be the next best thing. Blood glucose fluctuations leave a metabolic mark that lasts a week or two. Measuring fructosamine gives a sense of the average blood glucose over the previous couple of weeks. Control is designated “excellent,” “good,” “fair,” “poor,” or “prolonged hypoglycemia.” Of course, because the fructosamine is looking at averages, it will not distinguish excellent control from wide swings from very high to very low glucose readings. Still, even with this limitation, fructosamine is good to include in periodic monitoring tests.

A basic blood panel and urinalysis should also be expected when the pet returns for regular check up and evaluation.

Related resources

- [Insulin Administration in Cats - February 18, 2021](#) 

- [Insulin Administration in Dogs - January 19, 2021](#)
- [Hard to Regulate Diabetic Dogs - September 2, 2020](#)
- [Diabetic Ketoacidosis in Dogs and Cats - August 31, 2020](#)
- [Insulin Alternatives - October 15, 2019](#)
- [Cataracts in Diabetic Dogs - August 25, 2019](#)
- [Glargine \(Lantus\) and Detemir \(Levemir\) Insulin - August 6, 2019](#)
- [Diabetes Mellitus: Introduction - May 19, 2019](#)
- [Hard to Regulate Diabetic Cats - August 20, 2018](#)
- [Diabetic Cat Diet - July 17, 2018](#)
- [Diabetic Dog Diet - May 3, 2018](#)
- [Home Testing of Blood Glucose for Diabetic Cats - November 24, 2014](#)

URL: <https://veterinarypartner.vin.com/doc/?id=4952916&pid=19239>

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