Canine Diabetes Mellitus:
Understanding and taking the fear away from diabetes

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Understanding and taking the fear away from diabetes

Your dog has been diagnosed with *Diabetes Mellitus* (DM). Please know that you are not alone, the estimated incidence of diabetes in dogs is 1 in 100-200; this is an approximation based on various variables such as veterinary clinic and region studied. Although the management of DM seems, initially, overwhelming, we will work together as a team to achieve the best control possible for your dog. Diabetes is a treatable condition and your pet can live a normal, healthy and happy life. Our goal is to empower you by helping you to understand DM and how to regulate it and our veterinarians and technicians will help you regulate and monitor your diabetic dog.

Educating yourself about diabetes as well as keeping updated on diabetes will help both you and your pet. It may seem intimidating at first—there is a lot to learn about the various aspects of diabetes and its treatment—but you can start first by learning the basics and building upon that foundation. Please remember to *always* ask questions. If there is something you do not understand about diabetes, no matter how simple you think it is, you need to ask and find out the answer. Doing so can save your pet’s life. Having a basic understanding of diabetes enables you to provide better care for your pet and will also aid you in communicating effectively while participating in the decision making process with us.

Caring for your diabetic pet requires a strong commitment. You will be providing a high level of care for your pet on a daily basis—administering medication, feeding a proper diet and monitoring your pet’s behaviour and blood glucose. You are also responsible for finding a trained care-giver to care for your pet whenever you are away for an extended period of time. By being committed to caring for your diabetic pet you will help maintain their health and continue to enjoy their love and companionship.

In order to define and understand *Diabetes Mellitus* (DM), we need to understand the role insulin plays in the body:

- Animals convert ingested food to sugar (glucose) which is the body’s main source of food. The body’s cells need to have energy (glucose) continuously available to them because cells do not store their own supply of glucose.
- Insulin supplies cells with glucose by bringing glucose from the bloodstream into the cell. Insulin, produced by the islet cells of the pancreas, is a hormone that is responsible for regulating blood concentrations of glucose. The pancreas pumps insulin into the blood stream for distribution to cells.
In non-diabetic animals, insulin controls the blood concentrations of glucose by preventing glucose production by the liver and by placing excess glucose from food into body stores.

The brain contains specialized cells that control appetite. As mentioned above, all cells—including brain cells—require glucose as their energy source. The brain becomes sugar deprived without insulin which is why animals also feel hungry, PP (polyphagia), because glucose does not get into the brain. As a result, the brain cells produce a signal for the animal to consume more food in order to supply them with energy. Unfortunately, regardless of the increase in appetite and amount of food consumed, the brain cells, without insulin, lack access to glucose.

Without insulin to deliver glucose to every cell, the body’s cells “starve.” Animals may lose weight because they breakdown stores of fat and the protein in muscles in order to produce glucose and ketones (an alternative fuel) in the liver. Excessive production of ketones by the liver can result in a condition called ketoacidosis. ¹

A deficiency of the hormone insulin or insensitivity to it results in a group of conditions known as Diabetes Mellitus (DM):

- Diabetic animals have insufficient amounts of insulin; they do not have enough insulin to switch off glucose production by the liver or to efficiently store the excess glucose derived from energy giving foods.
- As a result, the concentration of glucose in the blood rises, if it exceeds beyond the regular levels (10.0-12.2 mmol/l in dogs), the kidneys let the glucose leak into the urine. Glucose does not enter the urine alone; because glucose is a large molecule, it will take water from the body with it. This loss of glucose in the urine causes abnormally large volumes of urine to be produced. Accordingly, losing excessive amounts of water in urine results in increased thirst, PD (polydipsia), increased consumption of water and increased urination, PU (polyuria).

¹ Ketoacidosis: A condition where the animals are usually collapsed, dehydrated and smell of ketones (similar to the smell of nail polish remover). These dogs will require much more intensive therapy than regular diabetic dogs including intravenous fluid and special soluble insulin therapy. Treating diabetic ketoacidosis can often be an intensive care situation.
Signs of Diabetes

- Increased thirst
- Increased urination
- Increased appetite
- A poor coat
- Tiredness and/or weakness
- Cataracts
- Depression
- Abdominal pain
- Exercise intolerance
- Recurrent infections may also be signs of diabetes.

Some contributing factors to diabetes in dogs:

- High carbohydrate and/or poor diets
- Obesity
- Inactivity
- Stress
- Hyperthyroidism
- Insulin resistance: the body’s inability to respond to and use the insulin it produces.
- Another predisposing factor can be the sex of an animal. Female dogs are affected twice as often as male dogs.
- Steroid use (glucocorticoids) causes a smoldering diabetic. It does not cause diabetes outright, but if your pet is in the early stages, it will bring the condition to the forefront (clinical DM).
- Progesterone use
- Pancreatitis
- Decreased insulin production: protein (amyloid) deposits into pancreas decreasing number of insulin producing cells.
- Genetic predisposition: the dog breeds listed below have an increased risk of developing diabetes. These are dog breeds in which veterinarians most commonly diagnose diabetes. Please keep in mind that reports may be biased due to breed popularity and there are many
more cross-breed dogs that also have an increased risk of developing diabetes. However, pedigree analysis has identified a genetic predisposition in Keeshonds and Samoyeds.

Keeshond    Hungarian puli
Poodles      Golden retriever
Samoyed     Miniature pinscher
Husky        Old English sheepdog
Daschund     Springer spaniel
Alaskan malamute    Schipperke
Miniature schnauzer Finnish spitz
Chow chow     West Highland white terrier
Beagle        Cairn terrier
Doberman      Pug
Labrador retriever

Diagnostics of Diabetes

In addition to taking a sample of your dog’s blood to run a wellness screen, we need to confirm diabetes by checking fructosamine levels as well as performing a urine analysis to check for infection and urinary glucose.²

Regulating Diabetes

Your well-being is important

During the beginning, caring for a diabetic pet can be emotionally stressful and frustrating. You may worry about how much you are upsetting your pet by administering medications, feeding a new diet and by generally changing the overall routine. If you are experiencing any personal anxiety about the injections call us—we are here to help you.

These changes to your pet’s life may be challenging at first and your pet may become upset or not act as lovingly towards you as usual. However, all the changes are necessary to keeping your pet healthy and will soon become incorporated as part of you and your pet’s daily routine. You will also probably discover, after the beginning, that the bond between you and pet becomes even stronger with all the extra care and attention that you give your pet. Remember to celebrate the progress made—even the

² The fructosamine test is a blood test that is used to measure the average level of glucose control over the past few weeks.
little steps forward—and to shower your pet with affection letting them know how much joy they bring into your life.

**How we monitor diabetics**

1. Blood glucose curves (#1 importance)
2. Clinical signs—PU/PD/PP and energy level (#2 importance)
3. Fructosamine or glycosylated haemoglobin blood test
4. Body weight

**First Step: Returning home after your pet has been diagnosed with DM**

1\(^{st}\) day:
Give insulin. Check blood glucose in 8-10 hours and once again just before the second injection.
If blood glucose is less than 5 → do not give insulin and call the clinic.
For any other number (blood glucose is equal to or greater than 5) → continue for 4 days giving insulin twice daily, allowing body to adjust to insulin; then do blood glucose curve.

**Blood glucose curve**

The blood glucose curve is a curve in which the blood glucose levels are plotted against time. The curve shows the changes in your dog’s blood glucose levels after insulin has been injected. The vertical axis represents the blood glucose reading in millimoles per litre (mmol/l) and the horizontal axis represents the time in hours. The first blood sample is taken prior to feeding and insulin injection; blood samples will be taken at least every 2 hours (if not every hour) for up to 24 hours. Record glucose level and time reading was taken. Once complete, call clinic to provide the results so that your vet can make a blood glucose curve.

Your vet will use the blood glucose curve to help determine:

- When the insulin given to your dog starts working (if it starts working).
- The efficiency of the insulin dose in reducing the blood glucose concentration.
- How low your dog’s blood glucose falls; how long, following insulin injection, it takes for your dog’s blood glucose to fall.
- Length of time insulin works in your dog.

**Checklist:**
- Wellness screen
- Fructosamine
- Urine analysis
Your vet then uses this information to:

- Monitor your dog’s response to the insulin dose; particularly during the beginning of treatment or following a change in the insulin dose.
- Determine whether your dog should receive insulin injections once daily or twice daily.
- Probe further by investigating the situation if your dog does not appear to be responding to insulin treatment (which can occur after a period of stability).

**The Perfect Curve**

- The lowest point (nadir) occurs ½ way through dosing interval (5-6 hours after insulin).
- The lowest point is 4.4-6.7 mmol/l.
- Return to a BG of 13.9 mmol/l by 12 hours.
- Figure 1 shows an example of a blood glucose curve.

An example of a blood glucose curve:

![Image](image.png)

**Figure 1.** Ideal blood glucose curve in a treated diabetic dog. Insulin was administered at 8:00am.

BG curves are best done at home given that most pets are usually more relaxed in their home environment than at the clinic. Our veterinarians and technicians will help you feel comfortable performing the curve at home.

Using the monitor at home allows you to test as needed, as often as needed, avoiding trips to the vet clinic or emergency clinic. Using the monitor at home also allows you to better regulate the insulin dose and predict the rebound effect, also known as the Somogyi effect.
The rebound effect is a stress hyperglycemia from events such as hospitalization and multiple venipuncture. It can result in insulin overdose because you see a high glucose reading on the monitor and then you adjust the insulin to a higher level. After you give the insulin, you find the blood glucose drops to very low levels. What happens is the BG drops below 3.3 mmol/l; cortisol, epinephrine and glucagons kick in and cause the BG to rise very high and it stays that way for a long time. It looks like you have an uncontrolled diabetic but it usually means that insulin resistance is developing. We will need to see your pet in the clinic to change the insulin and to start over again from the beginning.

**Low blood sugar**

Keep sugary syrup such as liquid honey, corn syrup or maple syrup on hand as there is always a risk that a diabetic patient will develop low blood sugar. Signs of low blood sugar include:

- Weakness and staggering resembling a drunken state: your pet may walk with a wobbly, uncoordinated gait
- Seizures or coma
- Or even being unusually quiet.

If your pet has signs suggestive of low blood sugar, rub some liquid honey, corn syrup or maple syrup on the gums or offer a meal if they are able to eat. Do not pour large amounts of syrup in the mouth of an animal that is not fully conscious as the syrup may be inhaled into the lungs. It is important to contact us immediately (or contact an emergency clinic immediately if we are closed) if there is no improvement seen in 15 minutes as a significantly low level of blood sugar is an immediate threat to life and needs to be dealt with as an emergency situation.

As mentioned in the introduction, caring for a diabetic pet means that you will need to make special arrangements for whenever you are away from home for any extended period of time. Make sure to use a trained care-giver who has knowledge of managing diabetes and someone you trust completely. The care-giver must be able to properly administer medications, ensure feeding, observe your pet’s behaviour, and call the vet or take your pet to the vet clinic in case of an emergency. If your close friends and family are not trained in caring for a diabetic pet, you can find a technician that provides in-home care or board your pet at a competent boarding facility or at a veterinary clinic.

Please remember to add a medical alert tag to your dog’s collar.
Information on insulin

- Only use the insulin prescribed by us.
- Do not change the dosage or the schedule without consulting first with us. The type of insulin and the daily dose are unique to the needs of each patient.
- It is important to give your dog insulin injections at the same time each day.
- Always refrigerate your unopened and opened vial of insulin; before use, always check to make sure your vial of insulin is not frozen.
- Insulin products need to be treated with care:
  - You must thoroughly mix insulin prior to use
  - Never freeze, heat or vigorously shake insulin—roll vial of insulin back and forth, never shake!
- Always keep a spare vial of insulin in your fridge.
- Always check the expiration date on your vial of insulin.

Insulin Injections

1. Drawing insulin and injecting insulin involves a special technique—never attempt to inject insulin if you have not received proper instruction on how to do so. Our technicians are always here for you to provide you with demonstrations.

2. You can start by practicing giving injections to objects until you are comfortable using needles, syringes and drawing accurate amounts of fluid into a syringe. For example, you can practice by injecting an orange using a syringe filled with water.

3. Very important: check to ensure there are no air bubbles in the syringe before injecting your dog with insulin.

4. Pick a different spot (injection site) each day.

5. Always reward your dog with patting and praise for being good and sitting quietly. Positive attention coupled with the first meal of the day will help make the insulin injections a part of your pet’s daily routine.

6. It is not recommended to apply alcohol to the skin prior to injection as it will not really “sterilize” the skin. Moreover, by starting with dry skin, you will immediately know whether you have made an error if the skin is wet after injection.

7. Syringes and needles are “single use” only.
8. Place the needle guard over the needle before disposal. Keep a sharps container (a puncture-proof container) for disposing used needles—make sure this is safely kept away from children and pets; you can drop off your used needles at the clinic for proper disposal.

**Figure 2.** Insulin syringe

The syringe you use to inject insulin consists of four parts (see Figure 3):

1. Cap (needle guard)
2. Needle
3. Barrel
4. Plunger

The photos in this handout (as well as the entire handout) can be viewed online:

The small gradations indicate 1 unit. The arrow, in Figure 4, is pointing to 12 units.

Major gradations indicate 5 units on the syringe (Figure 4). In Figure 4, you can view 5, 10, 15, 20, 25, 30, 35 and 40 units on the syringe.
The small gradations indicate 1 unit. For example, the arrow is pointing at 12 units.

Major gradations indicate 5 units.

35 units

40 units

Figure 4. Understanding gradations on syringe

The correct dose of insulin is measured from the needle end, or “0” on the syringe barrel, to the end of the plunger nearest the needle (Figure 5). Looking at Figure 5, the correct dose of insulin is 17 units.
Make sure you are aware of the correct way of measuring dose of insulin, as shown above in Figure 5.

Shown below, is an incorrect way of measuring dose of insulin (Figure 6). The method is incorrect; excess insulin, 22 units, has been measured because the dose of insulin has been measured from the needle end ("0" on the syringe barrel) to where the plunger is furthest from the needle. The correct method of measuring would yield 17 units, where the plunger is nearest the needle.

Figure 5. Measuring correct dose of insulin
Figure 6. Example of incorrectly measuring dose of insulin

Figure 7 shows insulin injection sites for dogs.

Figure 7. Insulin injection site
In Figures 8 and 9, Anne, our technician shows an insulin injection site (scruff) on her dog Pepper.

**Figure 8.** Insulin injection site: the scruff (aerial view). Pepper is our lovely model.

**Figure 9.** Insulin injection site: the scruff (side view). Thank you Pepper for being our model.
Homecare

Preparing Supplies

1. Collect all supplies:
   - Glucose meter
   - Test strips
   - Needle
   - Warming cloth
   - Gauze square or cotton ball
   - Petroleum jelly (optional)—a thin layer of petroleum jelly helps blood to form into a droplet. This is especially helpful for pets with dark or longer fur.

2. Insert test strip into the meter and press “on” to power on the meter.
3. Check for accurate code and switch code if necessary.
4. The following are areas to obtain a blood sample:
   - Ear—used for dogs and cats
   - Leg callous—dogs only
   - Paw pad—sometimes used for dogs and (less often) cats
   - Inner part of upper lip or upper gum (both near/above the canine tooth)—dogs only; make sure area is completely dry as saliva may dilute blood sample.

Ear (Figure 10):
- Make sure the ear is clean and dry.
- Locate the marginal ear vein—shining light from behind ear may help.
- Warm the ear to increase blood flow by using a warm cloth, or gentle rubbing of ear between your fingers to create friction.
- Place cotton ball on the opposite side of the area to be pricked to give you some bulk and leverage.
- Remove the round cover of the needle (or use lancet) and prick the outside of the ear.
- Bring the meter and test strip to the blood, the unit will wick the blood onto the strip.
- Once you have completed the test, apply gentle pressure to stop blood flow with a gauze square or cotton ball.
Figure 10. Obtaining blood sample from the ear. Thank you Pepper for helping us!

Leg callous on elbow of dog (Figures 11 and 12):

- Have your dog standing.
- Clean and dry the area. If using petroleum jelly, apply a thin layer.
- Remove the needle cover and press needle (or lancet) on to skin firmly.
- Bring the meter and test strip to the blood and allow blood to wick onto the strip.
- Once you have completed the test, apply gentle pressure to stop blood flow with a gauze square or cotton ball.
Paw pad (Figure 13):

- Lay your dog down (prevents your dog from losing balance).
- Clean and dry the foot pad. If using petroleum jelly, apply a thin layer.
- Remove the needle cover and use the needle (or lancet) to prick the paw pad.
- Bring the meter and test strip to the blood, the unit will wick the blood onto the strip.
- Once you have completed the test, apply gentle pressure to stop blood flow with a gauze square or cotton ball.
Inner part of the upper lip (Figure 14) or upper gum (Figure 15):

- From the outer lip, slide your index finger under and gently pull lip outward. The middle finger and thumb will help keep area taunt.
- Make sure the area [inner part of upper lip (above/near the canine tooth) or upper gum (above the canine tooth)] is clean and dry as saliva may dilute blood sample.

Figure 13. Obtaining blood sample from paw pad. Thank you Monty for being our wonderful model!

Figure 14. Obtaining blood sample from the inner part of the upper lip (above/near the canine tooth). Pepper is our model.
Figure 15. Obtaining blood sample from the upper gum (above the canine tooth). Thank you Pepper for helping us.

**How often to monitor**

Do a weekly BG curve until your dog is stable. Once control is established (optimal BG), you can monitor your dog with one of the following options unless otherwise specified:

- Daytime BG curve once monthly
- BG test two times per day just prior to feeding and insulin administration

We recommend checking your dog’s fructosamine levels every 2 to 4 months.

**Alternative Therapy for Diabetes**

Using herbal therapies in early diagnosed diabetics may be helpful but herbal therapies are less likely to benefit cases of advanced diabetes. There are ongoing trials using herbals for diabetes to determine how herbals function biochemically.

Herbals that have anti-glycemic effects in the early stages are:

- Cordyceps
- Gymena, which helps regenerate B islet cells.
- Corn silk
- Rehmannia, which ramps up insulin signalling and reduces pancreatic inflammation by reducing C-reactive protein.
- Cornus
Ginseng, which increases production of insulin and decreases glucose absorption from the gut lumen.

Astragalus

White atractylodes helps glucose uptake into the cell.

Some Chinese herbal formulas contain these therapies and the formula varies depending on the clinical picture. An obese hot patient would not take the same formula as a thin, chilly diabetic.

Some examples of herbal formulas used in diabetics are rehmannia 6, rehmannia 8 and Bu zhong yi qitang.

**Diabetes & diet**

- Diabetes creates a problem with the body's ability to metabolize protein, fat and carbohydrates.

- The goal is to use diet to minimize postprandial fluctuations in blood glucose level (minimizing fluctuations in blood glucose level that occur after eating).

- Diet consists of low glycemic index foods; no dry, no gravy canned, no semi-moist foods and no grains unless they are advised for feeding by us and are of high glycemic index whole grains.

- Diet consists of low processed foods, preferably raw, that has been slightly warmed.

- Home-made diets must be consistent in formulation so as to avoid glucose fluctuations and allow for ease of insulin dosing.

- Diabetics will require higher levels of certain nutrients such as vitamins and antioxidants. Given that every pet is different, we will discuss the vitamins and antioxidants appropriate for your pet.

- Nutritional requirements will vary for the overweight and the underweight patient.

**Protein**

Diabetic nephropathy, also known as Kimmelstiel-Wilson disease, is an uncommon complication in dogs and cats. Protein restriction is not recommended for dogs and cats unless there is a pre-existing kidney disease. Protein is used to replace fat and carbohydrate in the diet as fat increases insulin resistance and decreases glucose tolerance. Increased protein supports the production of...

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3 Diabetic nephropathy, the kidney disease associated with long-standing diabetes, is characterized by a progressive increase in proteinuria and decline in glomerular filtration rate (GFR), hypertension, and a high risk of cardiovascular morbidity and mortality.
glucose by the liver (gluconeogenesis) especially in the cat. Glucose produced by the liver is released slowly into the blood stream thus avoiding the fluctuations of glucose seen when a pet is fed a carbohydrate based diet. Reduced carbohydrate also shifts the metabolism from glucose oxidation toward fat metabolism. Diets need to be altered in pets with concurrent illnesses such as kidney disease, pancreatitis or liver disease.

**Fat**

Excess fat may cause hepatic lipidosis and hypercholesterolemia. Restricted fat helps with weight loss in the overweight diabetic. Good quality fats such as monosaturated fat slows gastric emptying which aids in the control of blood sugars. As stated earlier, too much fat can increase insulin resistance.

**Carbohydrate**

Feed low glycemic index carbs. Whole grain starch is low glycemic index, anything processed and white is high glycemic index and is to be avoided. Rice is high in amylose and has a higher glycemic index as compared to barley which has a low glycemic index and is high in beta glucan. Low glycemic carbs also provide more fiber.

**Chromium**

This trace mineral is essential for glucose metabolism. Patients low in chromium will benefit from low level supplementation.

**Timing of meals**

If insulin is given in the morning, the first meal is fed before the insulin injection. If the pet refuses to eat, the injection can be withheld. This protects the pet from insulin induced hypoglycaemia, which is life threatening. Doing a blood glucose curve allows you to determine the peak activity of the insulin and allows you to determine when to feed the remaining three or four meals. If the postprandial glucose (glucose level after eating) rises to 10 or higher, then the meal size should be reduced and smaller meals should be fed more frequently. If the blood glucose goes below 5 at its peak activity time (usually 6-8 hours after dose) then another meal should be made available to the pet within 1 to 2 hours if not as soon as the level is discovered to be too low.

*Diet must be consistent; food must be given at the same time everyday.*

*Your dog will require both soluble and insoluble fiber in their diet.*

*It is important to talk to your vet before making any changes to your pet’s diet.*
Exercise

- Normal to moderate exercise is fine. For hardworking dogs, do not overexert initially.
- It is important to talk to us before making any changes in exercise.
- Equally important, your pet’s exercise should be moderately regulated and consistent in order to keep the insulin needs as consistent as possible.

Cost

It is important to consider the cost of caring for a diabetic pet. Any additional health problems and your pet's size will affect the cost of caring for a diabetic pet.

Treatment stages:
1. Initial diagnostic work-up.
2. Stabilization
3. Maintenance

Questions & Answers

Can I still use a vial of insulin if it freezes?
No. Freezing will damage the insulin molecules and reduce the efficacy of the product. If a vial of insulin accidentally freezes in the fridge, discard the frozen vial and use a new vial of insulin.

What should be done if I miss giving an insulin dose or make a mistake during the injection?

- You forgot to give insulin
- Your pet suddenly moves during an injection
- You are not certain if your pet received the correct insulin dose
- Your pet received an incomplete portion of their dose

Give the correct dose of insulin when it is next scheduled. If an entire dose is missed, your pet will be fine. However, if a portion of a dose was given and you give another dose immediately, you risk overdosing your pet. Missing a dose of insulin or underdosing is preferable to overdosing on insulin.

What should be done if my pet refuses to eat or is vomiting?

Contact your veterinarian or local veterinary emergency clinic immediately. It is better to bring your pet to the veterinarian than to ignore a serious complication.
Is it safe for a dog with diabetes mellitus to receive a general anaesthetic?

It is usually required for animals to have an empty stomach before they are anaesthetized. A diabetic pet that has not been fed needs far less insulin. We will advise you how much insulin to give your pet before being admitted for the procedure, or, we may wish to administer a reduced dose of insulin for you. Diabetic pets are usually placed on intravenous fluid therapy (IV fluids) during procedures requiring anesthesia. Many non-diabetic animals undergoing anesthesia also receive IV fluids during their procedure. Apart from requiring a reduced amount of insulin and fluid therapy, your diabetic dog is not at any additional risk from anaesthesia than a normal dog of the same age.

Some helpful websites

http://www.diabetes.org/

http://animaldiabetes.com/

Intervet:

http://www.cat-dog-diabetes.com/

Pet diabetes glossary of terms:

http://www.sugarpet.net/glossary.html


http://www.essexanimalhospital.ca/docs/Diabetes Mellitus in Dogs and Cats.pdf

http://www.petdiabetes.net/

Information on diabetes in:

French: http://www.caninsulin.fr/
German: http://www.caninsulin.de/
Italian: http://www.caninsulin.it/
Spanish: http://www.caninsulin.es/
Special Considerations

Using insulin and correct dietary management will help regulate your pet. However, diabetic animals are more susceptible to other health problems such as:

- An increased incidence of infections (especially bladder infections)
- Slowed healing
- Cataracts
- Gastrointestinal dysfunction
- Kidney disease
- Heart disease
- Pancreatitis
- Nervous system disorders.

Given the above, you can appreciate the importance of monitoring and remaining up to date on all aspects of your pet’s health.

You should not breed a female animal that is diabetic because it is extremely difficult to control diabetes during pregnancy and may result in a life-threatening situation.

Never increase insulin without consulting with us. Please call an emergency clinic if we are closed.

If your diabetic dog displays any of the following signs:

- Excessive drinking
- Excessive urination or inappropriate urination in the house
- Reduction in or loss of appetite
- Weakness, seizures or severe depression
- Behavioural change, muscle twitching or anxiety
- Constipation, vomiting or diarrhea
- Signs of a bladder infection (passing frequent small amounts of urine, straining to urinate, blood in the urine)
- Swelling of the head or neck

Contact us—or, if we are closed, the nearest veterinary emergency clinic (please see next page)—for possible adjustment of the insulin dose or treatment of additional medical problems.
## EMERGENCY CLINIC CONTACT LIST

**CENTRAL (24/7):** [Veterinary Emergency Clinic (VEC South)](tel:416-920-2002) at 416-920-2002

**EAST (24/7):** [Toronto Veterinary Emergency Hospital (TVEH)](tel:416-247-VETS (8387))

**WEST (24/7):** [Mississauga-Oakville Veterinary Emergency Hospital](tel:905-829-9444)

**NORTH:** [Veterinary Emergency Clinic of York Region](tel:905-953-5351)

Open Monday-Thursday from 7:00 pm to 8:00 am; Friday/Sat/Sunday from 5:00 pm to Monday 8:00 am; 24 hour service is available during holidays.

**NORTH:** [Veterinary Emergency Clinic (VEC North)](tel:416-226-3663)

Open weeknights from 7:00 pm to 8:00 am; 24 hour service is available during weekends and holidays.
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