

Your cat has been diagnosed with chronic renal failure or insufficiency.

Approximately 200,000 tiny structures (nephrons) in the kidneys eliminate waste products and regulate electrolytes in the body. Chronic Renal Failure (CRF) results when these nephrons begin to die off and waste products and electrolytes can no longer be processed effectively. The waste then accumulates in the cat's body. In effect, a cat in CRF is being poisoned by the waste that the kidneys are unable to filter. Electrolyte imbalances, anemia and blood pressure problems may also occur as the kidneys continue to deteriorate.

The Kidneys

The kidneys have five primary functions:

- Filtering waste products from the body (primarily urea and creatinine).
- Regulating electrolytes (potassium, calcium, phosphorus and sodium).
- The production of erythropoietin, which helps to stimulate the bone marrow to produce red blood cells.
- The production of renin, an enzyme that controls blood pressure.
- Production and concentration of urine

Symptoms of CRF

CRF can only be accurately diagnosed with clinical tests. There are some symptoms and behaviors that indicate the likelihood of CRF and, if these are observed, the cat should be tested as soon as possible.

The most telling signs are increased thirst (polydipsia) and excessive urination (polyuria). As the condition progresses, your cat may experience loss of appetite, nausea and vomiting, weight loss, poor hair coat and emaciation. Only 30% of kidney capacity is needed for normal functioning. Therefore, no symptoms will be seen until approximately 70% of renal function is lost. It is important to begin treatment as soon as the first symptoms appear.

Even with diet control, drugs and fluid therapy, you will eventually see at least some of the symptoms on the following list. Not all cats will exhibit all symptoms.

Excessive urination, Increased thirst, Nausea and gagging, Licking lips, Grinding or cracking sound in jaw, Vomiting (both clear/foamy liquid and food), Drooling, Dehydration, Hunching over the water bowl, Stomach irritation (uremic gastritis), Constipation, Loss of appetite, Weight loss, Muscle wasting, Emaciation, Poor hair coat, Halitosis (ammonia smell), Lethargy, Sensitivity to sound, Eating litter, Weakness, Depression, Oral ulcers, Detached retinae, Convulsion, low temperature, coma (end-stage)

Chronic vs. Acute Renal Failure

Renal failure may be either chronic or acute. Chronic Renal Failure (CRF) is a progressive, irreversible deterioration of kidney function. Because cats hide their illnesses and the very early signs of CRF are subtle, this disease may only be recognized when the patient reaches the 70% deterioration level and more dramatic symptoms are observable. The seemingly sudden onset may appear to be an acute condition but is most often a crisis point of CRF. By comparison, Acute Renal Failure (ARF) is characterized by an abrupt shutdown of kidney function, most often accompanied by oliguria (reduced urine production). The primary causes of ARF in cats are:

urinary obstructions, infectious diseases, trauma, and the ingestion of toxins - the most common one being ethylene glycol which is contained in antifreeze. ARF is extremely serious and can quickly become fatal. Immediate veterinary treatment is imperative. Though the prognosis is usually poor, if damage has not been too severe and medical treatment is aggressive, it may be possible for normal kidney function to be restored.

Age-related Deterioration

CRF is one of the leading causes of illness and death in older cats. If your cat is age seven or older, it's a good idea to check for CRF during each annual exam with a blood test, urinalysis and blood pressure measurement. With early detection, proper diet, and hydration, cats may remain happy and active for quite some time before the inevitable decline.

What Causes CRF?

CRF may have one or more causes. The common contributing factors are age, genetics, environment, and disease. In recent years, more attention has been directed towards high blood pressure, low potassium levels, acidified diets, and dental disease as possible contributors to the development of CRF. Hyperthyroidism, a hormonal disorder, can cause CRF. Research has indicated that some breeds have a higher rate of CRF than others. Although CRF can occur at any age, it is usually a disease of older cats. With dietary improvements in cat food, advances in feline medical care and more cats living indoors, cats are now living much longer and their bodies eventually wear out just as human bodies do.

NOW WHAT??

Make sure your feline friend has access to water at all times. Some cats prefer fresh water, some cats prefer aged water. Try water offered in clear glass bowls or even drinking glasses filled to the top, offer water from slowly dripping taps, from commercially available "water fall"-type waterers, from shallow wide bowls that don't force the cat to touch his whiskers to the rims. Some cats will drink more water if mixed with a little green tea, cream, chicken broth, or CET Aquadent solution. Canned food has the initial effect of increasing water consumption.

Avoid things that stress your cat. Cats are easily stressed by things that don't seem stressful to us. Now is not the time to adopt a new kitten. Try avoiding houseguests until your cat is stabilized. Moving to a new home, adding or moving furniture or draperies, changing work schedules, going on vacation, traveling with your cat are all stressors to a cat.

Work hard at getting your cat on the correct diet. Depending on the circumstances, it may be best for your cat to be on a reduced protein diet. High protein diets cause the remaining nephrons to be overworked and the wastes that arise from protein metabolism quickly accumulate and cause nausea. If you are trying to encourage your cat to eat, do not offer high protein items such as tuna, chicken, beef, etc. Calories are acquired from three types of food: protein, fats and carbohydrates. So offer your cat foods that might have higher calories in the forms of fats and carbs. Examples are buttered rice, fatty chicken broth, green peas, ice cream, whipping cream, half-and-half, fish oils, fatty meats such as liver and steak trimmings. Also, you need to split big meals into multiple small meals. Protein from smaller, more frequent meals is easier to handle by the overworked kidneys since the proteins arrive at the kidneys in smaller doses more evenly spread over time. Some cats that have been eating their special diet well may suddenly decide to stop eating it. There might be several reasons for this. The two most likely reasons are food aversion and gastric acid accumulation. Food aversion occurs when the cat becomes nauseous after experiencing a "spike" of protein wastes after eating a large meal. The nausea is instinctively associated with that particular diet and may be triggered in future offerings of the same food. The best example of how food aversion works in humans might be the nausea associated with the odor or even the thought of a particular food or drink used to recover from a hang-over or a severe illness. Rotating through several different brands of diets designed to aid in renal failure may help. Gastric acidity accompanies the metabolic changes that occur from CRF

and may cause the cat have a "stomach ache". There are drugs that can help reduce the acidity. Be sure to mention inappetance or food aversion to the veterinarian at the scheduled rechecks (or even before with a phonecall, if it is severe.)

Work hard at getting your cat the needed medications. Let's face it- it ain't easy giving a cat pills. Your veterinarian is aware of this problem and will work hard at finding the right form of delivery and the most palatable drugs to ensure your cat is getting the medications it needs. You could try hiding medications in butter, yogurt, vanilla ice cream, crushed into canned foods, and hidden in "pill pockets". But did you know that some drugs can be delivered by gels applied to the ears? Or that some pharmaceutical companies specialize in compounding medications into tasty treats? Sometimes, certain medications can be gotten in powder form and shaken in a ziplock baggy with dry food, or mixed into canned food. Let your veterinarian know of any difficulties you are experiencing so that you can arrive at a solution that does not stress out your cat, you, and that special relationship you enjoy with your feline buddy.

Make the scheduled rechecks. Besides the aforementioned trouble shooting, your cat is going to need regular visits with the veterinarian. As your cat progresses thru the stages of renal insufficiency (and eventually into renal failure) there will be changes occurring that may necessitate the addition of other medications or treatments. Some drugs are best given in a staggered fashion, rather than all at once, and some of the drug dosages will need to be adjusted based on the results of follow up bloodwork. Other conditions such as arrhythmias (irregular heart beats) and retinal detachments (resulting in blindness) may develop and need to be monitored and treated accordingly. Some diseases such as hyperthyroidism or kidney stones will need to be ruled out as the cat improves and may have caused the CRF in the first place. As your cat becomes more stable, dental disease may need to be addressed to prevent the continued loss of renal function thru sepsis or bacterial toxins accumulating in the blood from diseased gum tissue. Bloodwork will be performed at these visits to monitor electrolytes, anemias, and the toxins that might accumulate from a failing kidney.

Your cat's **first recheck** will be in one week. At this visit, we may need to give your cat some additional fluids to help remove wastes that have accumulated in the blood. We will see how your cat has adjusted to his new diet and how well he is accepting his medicines and we will add two more medications. One, Benazepril, to improve the kidneys functioning ability, gently lower blood pressure, decreases protein loss, and has been shown to slow the progressive deterioration of the kidney. The other, either calcitriol OR a phosphate binder, will help avoid bone loss and stabilize calcium in the blood. These drugs are added this week because they work better and have less side effects if added to your cats therapeutic regimen at a later date.

A thyroid level will be run to see if hyperthyroidism might be the cause of the CRF. An ultrasound of your cat's kidneys can be performed to look for renal stones that might be causing trouble as well, and the size of the kidneys can be accurately measured and might help with predicting how well your cat may do in the future.

Your cat's **second recheck** should occur around week three, or two weeks from the first recheck. At this visit, we will measure the levels of renal wastes present, electrolytes, blood pressure, packed cell volume, and a run a test called TCO₂. These tests are important because they will tell us how to adjust your pet's medication dosages. If the blood pressure is high, we will examine the retinas to check for hemorrhages or detachments. If present, we will need to add other drugs to lower the blood pressure more aggressively, to prevent vision loss. Based on the amount of renal wastes present, we may give more subcutaneous fluids, and add some more medications to help reduce these wastes. If the packed cell volume shows that your pet is anemic, we will add some iron supplements or begin treatment with erythropoetin to stimulate the bone marrow to build red blood cells, depending on the severity of anemia.

The **third recheck** should be performed around four to six weeks later, depending on how your cat is doing. If your cat is doing well, schedule the appointment closer to the six week mark. The same tests will be performed as in the second recheck. Adjustments to existing

medications may be made. Additional medications or treatment strategies may be added based on your cat's result.

After these initial visits, your cat will be scheduled for **regular rechecks** every three months. These visits will essentially be the same as the last two. We will be making adjustments to your cat's treatments based on results of testing. The goals of these visits will be to give your cat the best quality of life, for the longest time possible, as your pet fights this chronic condition.