

★ **October Shout Out!** ★

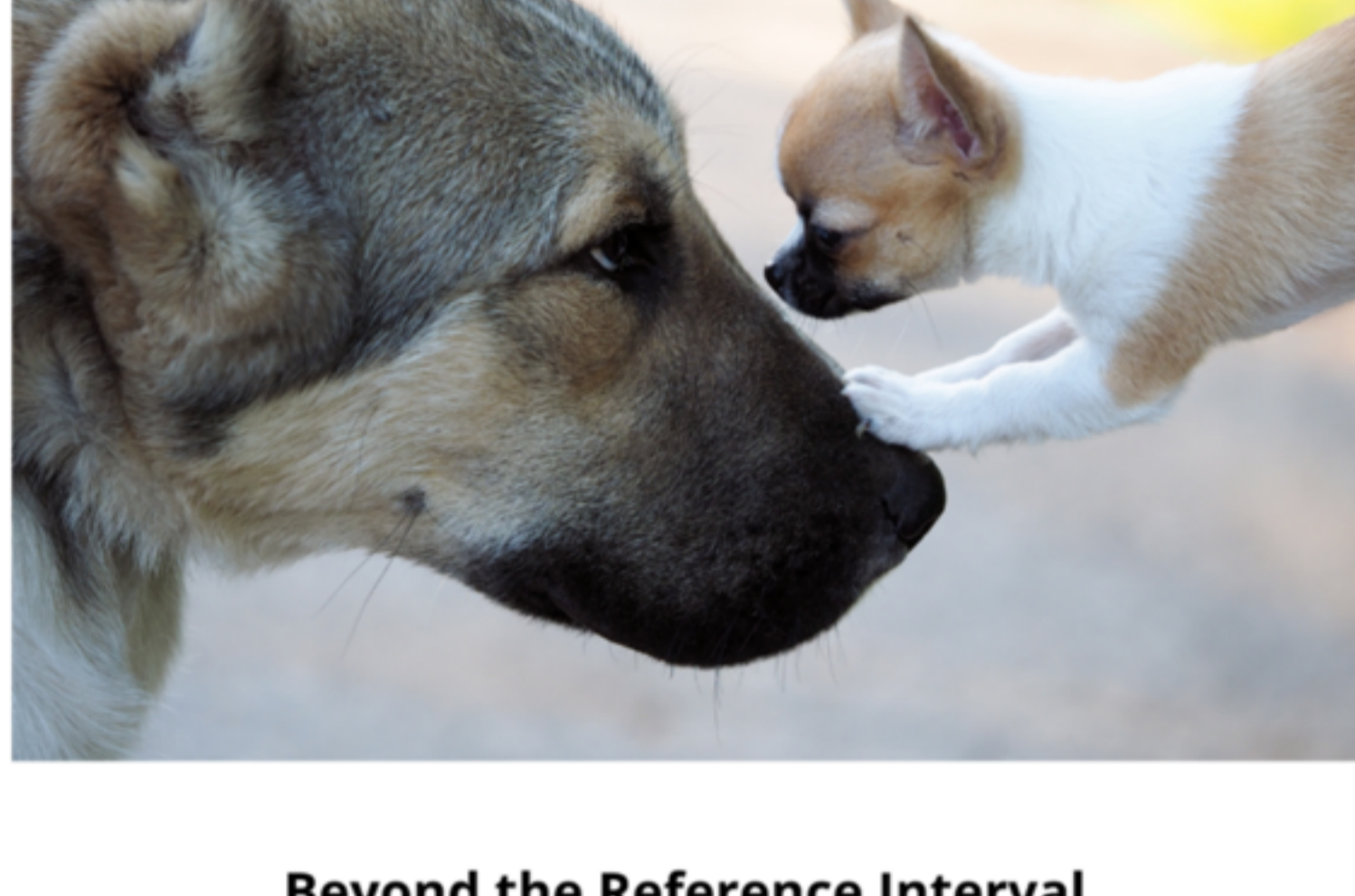
**A Shout Out to the Vet Techs High Five!**

- "Out of Range" but within Range  
Warm and Fuzzy Biologic Variation
- Hypercreatininemia in Foals  
Spurious or Acute Renal Failure?
- Cats are Not Small Dogs  
Xylitol



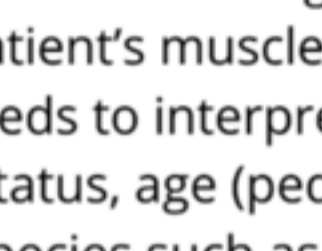
I may be out of the clinic but I am definitely not out of earshot. I frequently hear the praises regarding the indispensable veterinary technicians working with my husband or colleagues. From having six hands, mental telepathic powers, Marie Kondo organizational skills, enviable client communication methods, the magic touch for blood draws to huge hearts caring for pets and owners alike. A sincere thanks for everything you do and a "high five" to all of you from myself - Julie Armstrong and the staff at True North. Your work is appreciated all year round and well deserved to be celebrated this month.

Happy Vet Tech Month!!



**Beyond the Reference Interval.**  
Warm and fuzzy biologic beings have an individual range.

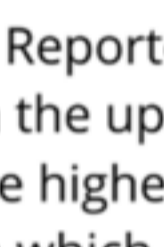
Every day you are looking at blood results. Is it a quick scan checking for flagged results or are you also noting individual trends? When it comes to creatinine, do a quick mental scan of the variables that affect creatinine and note the trends. This is important in paediatric, middle age to senior patients as well as those patients with chronic diseases. There is potential information to gain by looking at individual trends.



Creatinine is an important marker of glomerular filtration rate and corresponds to a patient's muscle mass. Despite the reference range, one needs to interpret the creatinine in response to hydration status, age (pediatric), breed (large well-muscled breed across species such as greyhounds, draft horses or Maine Coons), and body weight (including muscle condition score).

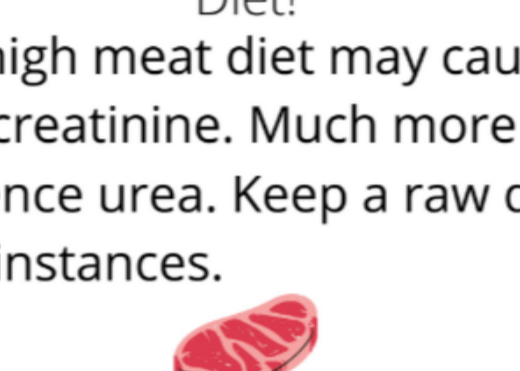
Hydration Status

Dehydration over 5% is generally expected to raise creatinine. A corresponding physical examination is also expected to detect dehydration when over 5%.



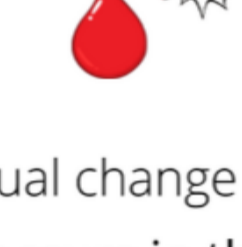
Breed

A healthy male greyhound can have a creatinine significantly above the reference range. Reported values note up to potentially 30% higher than the upper limit. In general larger breeds are expected to have higher creatinine than smaller breeds, but there is overlap which is another reason to consider each patient's trends together with clinical status and a urine analysis.



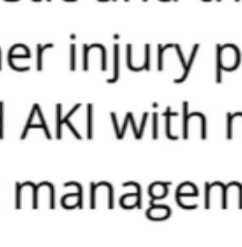
Diet!

A raw or other very high meat diet may cause a mild post prandial increase in creatinine. Much more commonly diet type and timing will influence urea. Keep a raw diet influence in mind in certain rare instances.



Artifact

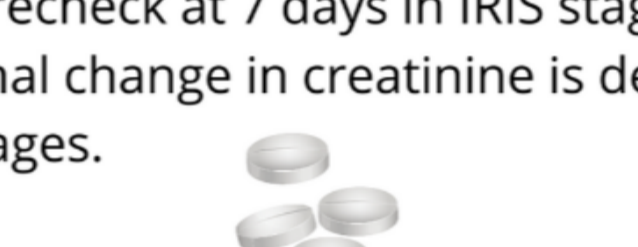
Noting whether or not there was mild to marked hemolysis is important as this can falsely decrease creatinine.



When could a small individual change in creatinine be significant? Acute kidney injury (AKI) occurs in the setting of acute or chronic illness and may have more than one cause. AKI can mean subclinical injury with or without functional impairment, resulting in no or only a slight change in serum creatinine. Detecting early stages of acute kidney injury directs a clinician's focus on taking all diagnostic and therapeutic steps possible in hopes of preventing further injury progression. As shown in human studies, even mild AKI with minor symptoms can have consequences for patient management.



Case examples would include monitoring after exposure to a known nephrotoxins (NSAIDs, aminoglycosides or grapes) or in patients with endotoxemia, sepsis, circulatory shock, or trauma. In chronic kidney disease patients we should consider any event that might have compromised the kidneys such as GI upset and dehydration as a risk for acute kidney injury.



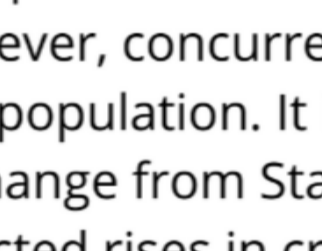
Drug Monitoring

When instituting angiotensin receptor inhibitor (ACEI) or angiotensin receptor blocker (ARBs) therapy for protein losing nephropathy one should only permit up to a 25-30% rise in creatinine upon recheck at 7 days in IRIS stage 1/2 patients. Essentially minimal change in creatinine is desired in more advanced IRIS stages.



Pediatrics and Neonates

One to two month old puppies or kittens with a creatinine in the top end of the reference range is a concern. These patients are expected to be in the lower half of the reference range.



Treating Hyperthyroid Patients.

An increased creatinine from baseline is not unexpected in a previously hyperthyroid patient that is clinically fantastic and has gained weight. However, concurrent renal disease is common in this patient population. It is not necessarily unexpected to note a change from Stage 1 to Stage 2 IRIS kidney disease. Unexpected rises in creatinine should be investigated more thoroughly with respect to hydration status, risk factors for progression of renal disease (stones, infection, drug exposure, comorbid disease flares) and over suppression of the clinical hyperthyroidism. A low T4 should ideally always be paired with a TSH level.



**References:**  
 1. <http://vetbiologvariation.org/database-tables-dog>  
 2. <http://www.iris.kidney.com/guidelines/keyword.html>  
 3. Schott HC 2nd, Esser MM. The Six Adult Horse: Renal Clinical Pathologic Testing - a Urinalysis. Vet Clin North Am Equine Pract. 2020 Apr;36(1):121-134. doi: 10.1016/j.cveq.2019.12.003. Epub 2020 Feb 6. PMID: 32037140.  
 4. <https://eclinpath.com>



**Spurious Hypercreatininemia and Foals**

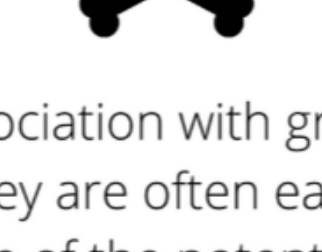
It is rare that we are running a minimum data base on a 1 or 2 day old kitten or dog however it is not uncommon in a 1 day old foal. A neonatal foal can have spurious hypercreatininemia at birth which declines within the first 48 hours. It is expected to resolve within 72 hours as it is theorized to be secondary to decreased creatinine clearance in utero and not due to abnormal renal function. Furthermore, it has been commonly noted in foals with concurrent neonatal encephalopathy. On the contrary, significant concern exists if there is either concurrent high urea and potassium, or declining urine production along with persistent hypercreatininemia over 24-72hrs; this is more likely to indicate acute renal failure.

Quay CP, Hekimik S, Sotek HC, 1 and Eari BS (2019). Spurious Hypercreatininemia 24 neonatal foals (2009-2008). Journal of Veterinary Emergency and Critical Care, 2(1): 244-250.

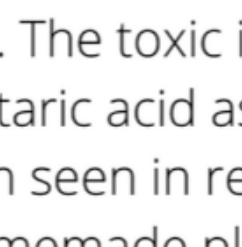


**How much Xylitol is Toxic to Cats?**

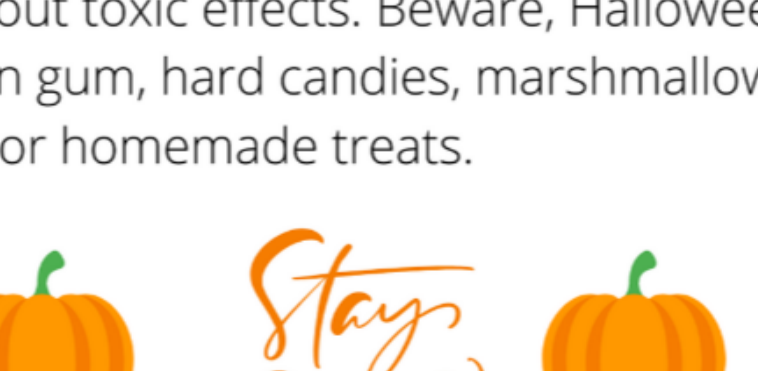
It is almost Halloween, as such the topic of toxins associated with sweets is a common one. Cats in general are less likely to be indiscriminate eaters but it can occur. My first cat would eat marshmallows if you let her. Her successor developed an unprecedented indiscriminate ravenous appetite of food and foreign material secondary to an adrenal tumor. Curiously in a recent National Animal Poison Control review, cats ingested more "glow sticks or jewelry" than dogs. The toxic agent is dibutyl phthalate which is extremely nasty tasting as soon as it is encountered. Cats often show salivation, hyperactivity and aggressive behaviour. Luckily they typically recover quickly with supportive care.



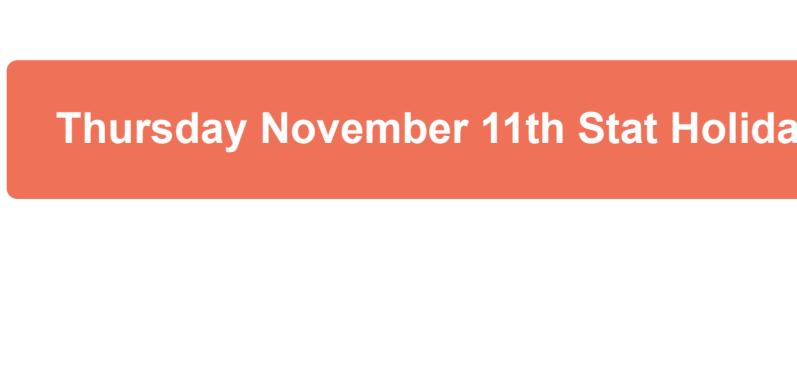
In brief what sets cats apart from dogs? Cats are more susceptible to oxidative injury from acetaminophen, onions and vampire thwarting garlic than dogs. In fact there is absolutely no safe dose of acetaminophen in cats.



Acute renal failure in association with grapes is primarily a risk in dogs because they are often eager to eat them and some owners may not be aware of the potential harm from even a few grapes. If you have a cat masquerading as a beagle, that does not mean they should be allowed to eat raisins or grapes as there are rare anecdotal reports of acute renal failure in cats when many raisins have been ingested. The toxic ingredient in raisins and grapes is thought to be tartaric acid as similar episodes of acute renal failure have also been seen in relation to dogs consuming cream of tartar (for e.g. homemade playdough) or large amount of tamarinds (a paste-like sweet-sour fruit) used in cooking.



Xylitol at doses of 100mg/kg of body weight (bw) can cause hypoglycemia in dogs while doses approaching 500mg/kg bw are associated with liver failure and possibly death. On the contrary, a study in 6 healthy cats showed they tolerated doses of up to 1000mg/kg without toxic effects. Beware, Halloween candy with xylitol could be in gum, hard candies, marshmallows, peanut butter, lollipops or homemade treats.



**References:**  
 Jancsó A, Karcsoni Z, Füzesi G, Gere E, Szeber A, Berényi A, Fodor K, Szabó G, Vágócsai P. Effects of a.s. administered xylitol in cats. J Vet Pharmacol Ther. 2018 Jun;41(5):409-414. doi: 10.1111/jvp.12479. Epub 2018 Feb 11. PMID: 29436661.  
<https://www.aapccpo.org/sites/default/files/2019-08/20190801.pdf>

Thursday November 11th Stat Holiday



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