Uncover more about kidney health.

The 5-Patient Guide to SDMA

IDEXX

Kidney function is essential to maintaining systemic health.

Kidneys play an integral role in supporting other major body systems: blood pressure management, red blood cell production, hormonal balance, and clearance of daily toxins.[1] Understanding kidney health both in well patients and sick patients is a pillar of medical assessment. A robust evaluation allows for confident care in patients—from juvenile to geriatric—and should include all reliable screening diagnostics. In addition to creatinine and BUN, SDMA serves as a routine part of a robust evaluation of kidney health.[2] A low-impact, easily performed test on standard patient samples, SDMA is appropriate for all age groups in both well and sick patients.

Why SDMA?

SDMA provides an earlier flag of decline in kidney function. As glomerular filtration rate (GFR) declines, SDMA increases on average with a 40% loss and as little as 25% loss of kidney function versus creatinine, which does not increase until 75% of kidney function is lost.[3–5]

SDMA can be successfully used to help diagnose both primary and secondary kidney disease.[5–11] Remember, kidney disease is diverse and occurs on a continuum, with patterns of both chronic kidney disease and acute kidney injuries, both mild and severe, and they are often combined, contributing to each other. Including SDMA in different patient medical profiles can allow for early and consistent identification of changes in kidney health.[2–14]

The 5 patient profiles demonstrate how including SDMA to evaluate kidney health and function provides your patients and clients the most complete and consistent care.

5 types of patients. Kidneys can speak for all of them.

Why add SDMA testing more often? Well, kidneys have a lot to say about a patient's health. So let's take a look at patients who could benefit.

01 **Patients presenting for a wellness exam.**
SDMA contributes to wellness screening by improving early detection of changes in kidney function.

02 **Cats with hyperthyroidism.**
A significant number of cats with hyperthyroidism have concurrent kidney disease.

03 **Preanesthetic patients.**
Many seemingly healthy surgical patients may have underlying conditions that could complicate anesthesia or the surgical procedure.

04 **Patients who test positive for infectious and vector-borne disease exposure.**
Proper infectious screening in combination with evaluation of kidney health can better inform diagnosis and short- and long-term patient care.

05 **Patients in nonwellness cases.**
Acute or chronic illness often has systemic effects. Understanding the role of kidneys can inform better diagnostic and clinical decisions.

01

Patients presenting for a wellness exam.

Wellness screening is important for both identifying unknown health risks and confirming well status. A result within reference interval can be of great value for confirming health and establishing a patient baseline that allows for more individualized assessment in times of illness or provides early indications of change specific to that patient. SDMA as part of a wellness profile contributes to confirming health status, and it is a powerful screening tool to identify early trends and changes in kidney function.

Why is SDMA important in wellness cases?

The major purpose of wellness diagnostics is to reveal increased health risks in cats and dogs. These diagnostics harness the power of screening tests with excellent performance, easy access, and low costs to confirm health or identify early health risks. SDMA contributes to wellness screening by improving early detection of change in kidney function. As a sensitive, reliable, and earlier indicator of GFR impairment, increased

SDMA will often be the first indicator of kidney function decline.[3–6,15] An increase in SDMA should be investigated, as a single mild increase in SDMA can be a medical turning point and the first indication of ongoing kidney disease.[12] These key features of SDMA allow for early diagnosis and management of otherwise undetected kidney disease and potential recognition of other concurrent diseases.

Why should SDMA be included in blood work for every patient presenting for a wellness exam?

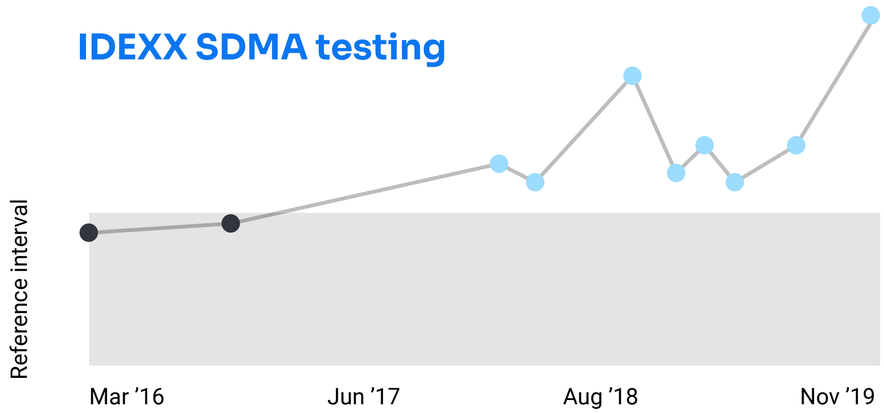
A lack of clinical signs does not indicate overall good health—only diagnostics can give you the full picture in fact, a recent data study by IDEXX that evaluated 167,593 canine and 54,211 feline wellness profiles found clinically relevant abnormalities across all life stages, including 1 in 5 mature adult dogs and 1 in 3 mature adult cats.[16] At risk is simply defined as a population where certain diseases states are more likely due to

Use case for wellness screening:

+ Previous unknown healthy, or minor medical, screening at appropriate and practical intervals.
+ SDMA is a powerful screening tool to identify early trends and changes in kidney function.

Life stage age ranges

Young adult: 1–3 years **Mature adult: 4–8 years** **Senior: 9+ years**	**Young adult: 1–6 years** **Mature adult: 7–9 years** **Senior: 10+ years**



environment, genetics, age, and other factors. Senior or geriatric animals, especially cats, are considered at risk for kidney function decline, which emphasizes the need to perform wellness screening in this population.

Is there a well population that SDMA is most impactful for?

While both dogs and cats benefit from a robust assessment of kidney function given its integral nature to systemic health, cats have a much higher prevalence of chronic kidney disease (CKD).[17,18] Because CKD is highly prevalent in cats, specifically as they age, and early stages of kidney disease often have no outward clinical signs, inclusion of SDMA in wellness diagnostic profiles can help discover disease earlier.[3–5] Early detection is the first step in appropriate intervention and therapy, which is exceptionally important for CKD in cats.[17,19]

02

Cats with hyperthyroidism.

Hyperthyroidism is the most common endocrinopathy affecting the geriatric feline population, with a prevalence of 6%–10% reported in cats greater than 10 years of age.[20] CKD is a common comorbidity in this population, it is estimated to occur in 15%–50% of hyperthyroid cats.[20–23] The hypermetabolic state caused by hyperthyroidism leads to reduced muscle mass, often confounding the diagnosis of CKD.[10,21] This means that finding a reliable and consistent marker for kidney function in hyperthyroidism is difficult.

Creatinine is a common kidney biomarker used in the diagnosis and monitoring of CKD in cats. Loss of muscle mass in hyperthyroid cats leads to decreased creatinine production, as creatinine is produced from muscle cells.[10] In cats with muscle loss, decreased creatinine in circulation can occur, causing creatinine to remain within reference interval in some cats with hyperthyroidism and concurrent CKD. The early diagnosis and treatment of CKD have a known positive impact on quality of life and survival time.[17,19,24]

SDMA is less affected by muscle mass and decrease in lean muscle mass, and therefore, it offers a great diagnostic solution in identifying underlying impacts on renal function.[10] This can help identify cats with early CKD more consistently, improving treatment choices and client conversations and expectations in hyperthyroidism.[21] The ability to identify cats with CKD prior to or at the onset of treatment for hyperthyroidism may influence the long-term management of hyperthyroidism as well as CKD.[20,24]

How does SDMA benefit cats in diagnosing, treating, and long-term care of hyperthyroidism?

Hyperthyroidism and CKD are common comorbidities in senior cats, and because of the prevalence of both disease states and the known impact on kidney function due to the hypermetabolic state, complete and consistent evaluation of kidney health is extremely important. Understanding if kidney disease is present prior to treatment is foundational in terms of what

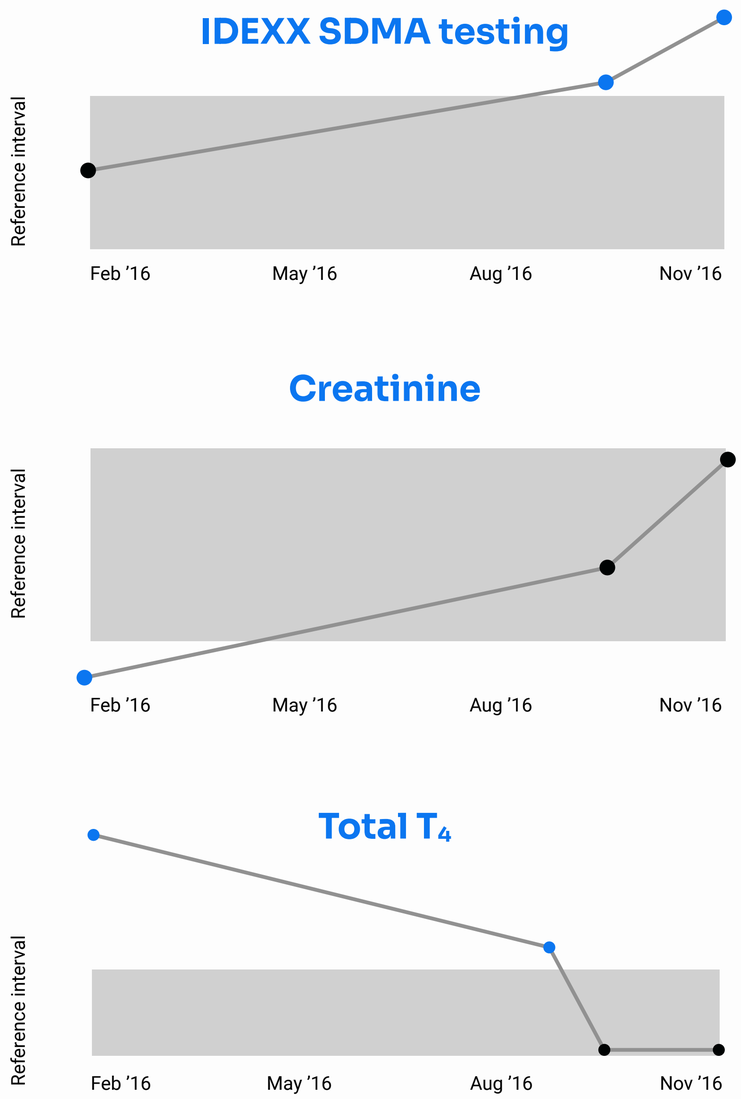
Symptoms consistent with hyperthyroidism in an older cat:*

+ Increased appetite
+ Weight loss
+ Poor hair coats
+ Increased activity or change in activity habits

*Rare but possible in younger cats.

Did you know?

+ SDMA adds to the body of evidence for kidney evaluation.
+ SDMA offers an additional tool for understanding kidney health, diagnosis of CKD, and resulting kidney function post-therapy in this disease state.



treatment protocol is chosen (medication, radioactive iodine [^{131}I] treatment, ablation, or surgical) and the potential for unmasking more significant kidney disease.[20] This knowledge helps set client expectations and predicts prognosis. Bodyweight can fluctuate pre- and posttherapy, which can make creatinine less reliable. Using SDMA in tandem will help gain a full picture of kidney health and strengthen conversations around expectation of CKD, as well as response to therapy and long-term care and needs. Cats with good posttreatment thyroid control may not fully regain lost muscle mass or not regain completely. SDMA, often being more reliable in cases of low muscle mass than creatinine, continues to offer an accurate picture of kidney health over time.[10]

Why should SDMA be included in blood work for every cat with hyperthyroidism?

A significant number of cats with hyperthyroidism have concurrent kidney disease, as both conditions are common in older cats.[20] Additionally, hyperthyroidism increases GFR, which can effectively hide renal dysfunction.[20] It is not uncommon for cats with both conditions to become azotemic after hyperthyroidism treatment, when GFR returns to normal.[25] Measuring SDMA along with thyroid diagnostics can help you detect kidney disease in these cats and make appropriate treatment choices.[10,21]

03

Preanesthetic patients.

Dogs and cats can present for anesthesia for a broad range of clinical needs: from spay and neuter, prophylactic dental, mass removal, to abdominal exploration. Despite that variety of drivers for anesthesia, the fundamental needs prior to anesthesia are to ensure the systemic health of an animal or understand compromises to organ systems that might lead to adjustments in care. Kidneys are considered an organ system of primary importance in anesthesia. Kidneys are responsible for blood pressure regulation, and blood pressure can be impacted by anesthetic choices.[1] Whether animals have normal or compromised kidney function, hypotensive events can be damaging, and therefore, understanding a patient's baseline function is a key component of good anesthetic choices. SDMA has been shown to identify decline in kidney function and often indicates early decline before other traditional kidney biomarkers.[3–5] SDMA used as part of a preanesthetic profile is a low-cost, low-impact method to broaden assessment of kidney function.

How does an increased SDMA improve my preanesthetic choices?

An increased SDMA indicates a decline in GFR.[3–5] Primary or secondary disease can be the cause, and SDMA may provide the opportunity to investigate a new problem or trend a known disease. In some scenarios, a mild increase in SDMA does not indicate a need to cancel anesthesia. If completed alongside a CBC and urinalysis with unremarkable results, often patients may proceed and the kidney profile can be rechecked in two weeks. If there are abnormalities such as anemia, reduced urine specific gravity, or increases in white or red blood cells in the urine, then a proper medical workup is likely warranted for elective procedures. Anesthetic choices should be considered, and it would be recommended that intraoperative intravenous fluids and blood pressure management be considered.[26,27] Animals undergoing anesthesia with a mild increase in SDMA

Did you know?

+ Preanesthetic profiles are appropriate for all age groups as understanding of kidney function is essential for anesthesia.
+ SDMA is a powerful screening tool to identify early trends and changes in kidney function and allows for patient-specific modifications and precautions with anesthesia.

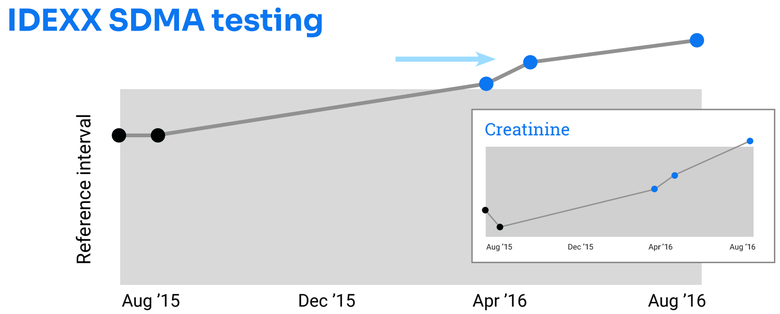


Figure 1. SDMA levels in a preanesthetic 6-year-old, neutered male beagle. Discovery of increased SDMA on preanesthetic blood work prior to mass removal procedure.

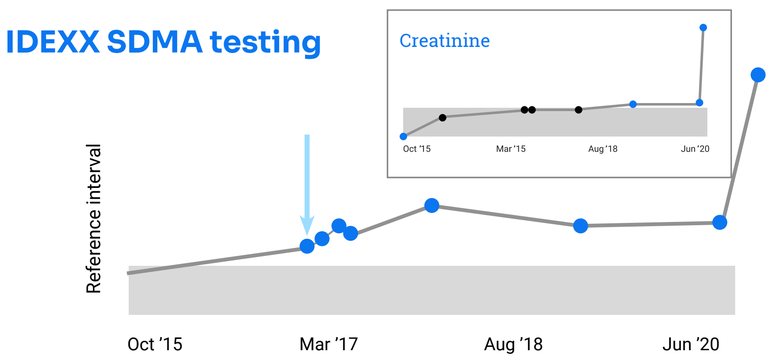


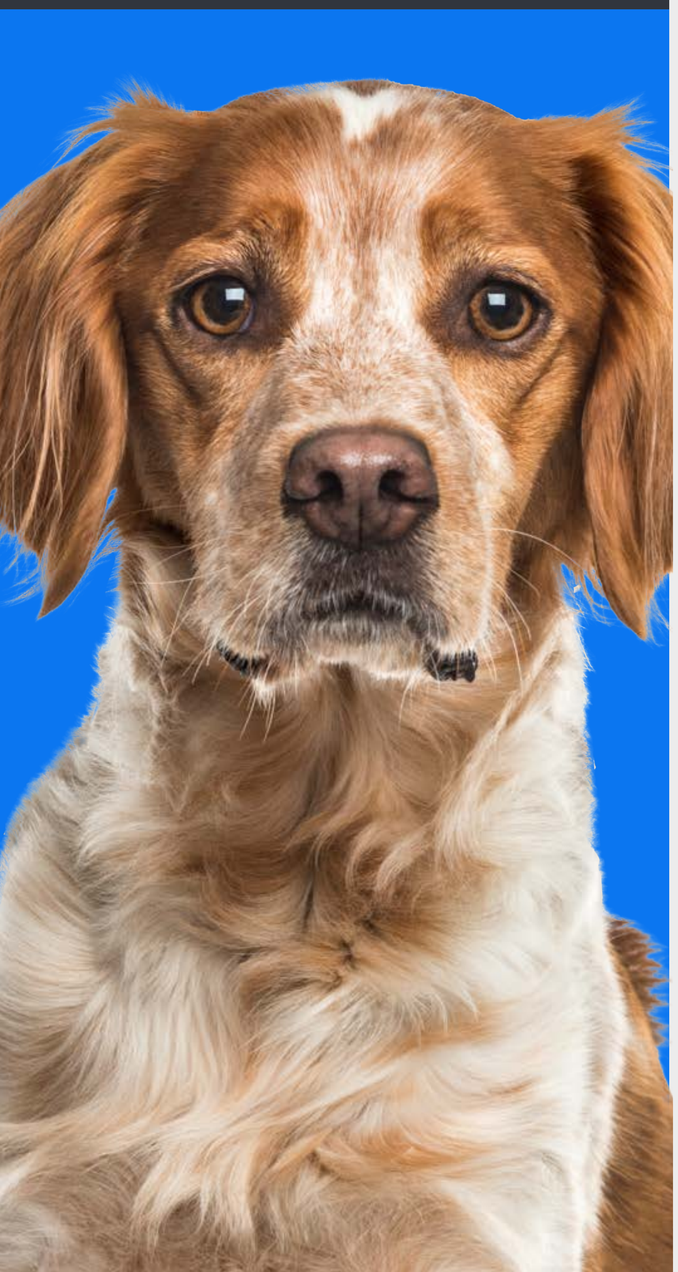
Figure 2. SDMA levels in a preanesthetic 5-year-old, neutered male Siamese. Discovery of increased SDMA on preanesthetic blood work prior to dental prophylaxis.

should return for a kidney profile recheck, including SDMA, in 5–7 days. Knowledge about kidney function prior to anesthesia can avoid long-term complications, and including SDMA in preanesthetic screening will add a sensitive indicator of GFR to better plan and initiate care on surgery day.

Why should SDMA be added to blood work for every preanesthetic patient?

Preanesthetic diagnostics are critical to detect conditions that could cause anesthetic complications or interfere with the healing process following surgery. Many seemingly healthy surgical patients may have underlying conditions that could complicate anesthesia or the surgical procedure. SDMA can improve recognition of at-risk patients and allow for well-informed and educated decisions regarding anesthetic choices and timing.

04



Patients who test positive for infectious and vector-borne disease exposure.

Infectious and vector-borne disease are a global medical issue. While exposure and disease often vary by geographic location, clinical response by the veterinarian always involves understanding systemic health. The kidneys are central to systemic health, and therefore, often affected concurrently by infectious disease.

Understanding kidney function status can be extremely important for treatment choices and long-term monitoring. SDMA can provide an early indication of decline in kidney function in these disease states or even be a clinical flag to investigate them in endemic areas.[3–5,7,9]

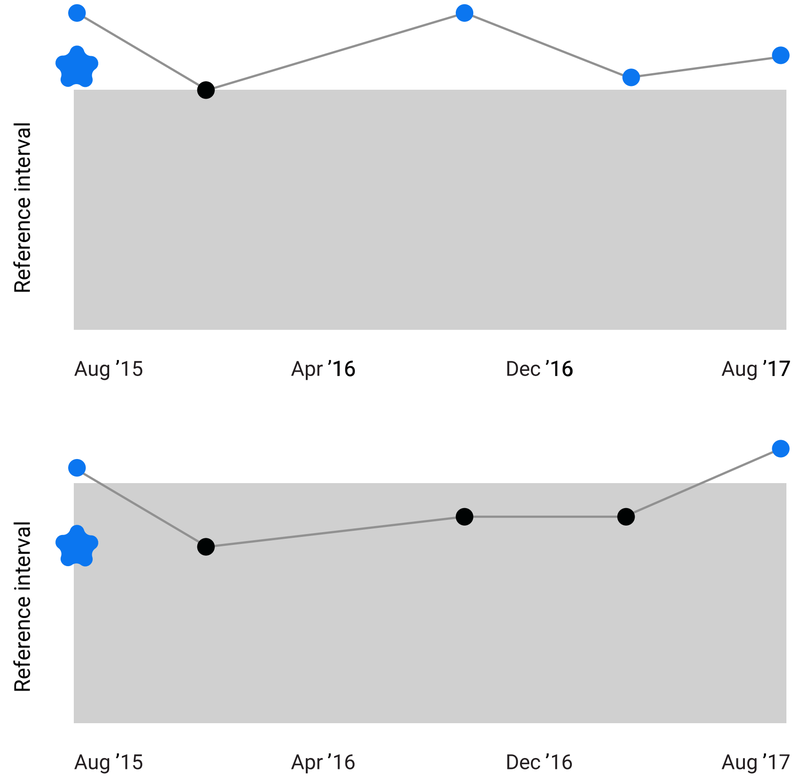
Most recently, there is strong support for understanding retrovirus status in cats, because it impacts overall systemic health and can also involve kidney health or be compounded by changes in kidney function. SDMA is

a powerful screening tool, and when included in evaluation of well and sick feline patients, it can help complete a baseline assessment for further care.

In dogs, there are known connections between certain vector-borne diseases and kidney function and long-term health. Two retrospective studies[7,9] were performed to determine if exposure to tick-borne disease is associated with an increased risk of kidney disease. These studies identified an association between dogs with positive Lyme disease or *Ehrlichia* test results and an increased risk for CKD in endemic areas. Dogs with a positive Lyme disease antibody test result had a 43% increased risk of developing CKD, and dogs with a positive

Did you know?

+ Infectious and vector-borne disease testing are part of standard medical profiles for both cats and dogs.
+ Using SDMA to understand kidney function can allow for diagnosis of early concurrent vector-borne diseases and understanding long-term implications or establishing baseline in clinically affected dogs and cats.



Serology

Heartworm antigen	NEGATIVE
Ehrlichia canis/E. ewingii	POSITIVE
Lyme (*Borrelia burgdorferi*)	NEGATIVE
Anaplasma phagocytophilum/A. platys	NEGATIVE

+ 5-year-old golden retriever
+ Diagnosed in August 2015, clinical signs, first positive
+ Treated appropriately
+ With appropriate monitoring, SDMA identified decline in function with persistent increase in SDMA, which supported a final diagnosis of CKD

Figure 3. Increased SDMA in a vector-borne disease patient.

Ehrlichia antibody test result in *Ehrlichia canis*-endemic areas had a 112% increased risk of developing CKD. Although the studies do not allow inference of a causal relationship, they indicate a statistically significant association between tick-borne disease and CKD.[7,9]

Why is SDMA important for dogs with vector-borne disease?

Studies indicate a significant association between dogs with positive Lyme or *Ehrlichia* exposure in endemic areas and an increased risk for CKD.[7,9] Screening patients exposed to ticks with a chemistry profile that includes an SDMA test strengthens the evaluation of kidney health.

As SDMA is a sensitive and specific biomarker of kidney function, including it in chemistry profiles can help identify early change to kidney function that may be a complication of previous vector-borne disease exposure or active disease.

Why should SDMA be added to blood work for every patient who tests positive for vector-borne exposure or infectious diseases such as FIV and FELV in cats?

SDMA adds to the robust evaluation of kidney function. Both knowing the state of the disease and understanding long-term management of kidney health can be essential for patient care and client communication. This is no different for patients with exposure to retroviruses or vector-borne disease. In some cases, an increased SDMA may be a signal that leads to the recognition of concurrent disease. Including SDMA testing with diagnostic profiles for patients who test positive for exposure to tick-borne disease can increase awareness of long-term health considerations.[7,9,28]

05

Patients in nonwellness cases.

More than 1 million chemistry profiles run on nonwellness cases at IDEXX Reference Laboratories (i.e., sick visits, rechecks, and preanesthetic profiles, but excluding wellness visits) revealed SDMA to be the third-most-common abnormality.[14] SDMA was elevated in 17% of chemistry profiles. This supports SDMA's essential importance in the chemistry profile, as it identifies more patients with possible decline in kidney function and kidney disease. While SDMA and creatinine should always be paired, increased creatinine was only seen in 8% of cases as an abnormality—strengthening the evidence of how important SDMA is to the full evaluation of kidney and systemic health.

Why is SDMA important for patients presenting for a nonwellness visit?

The kidneys are a central pillar for systemic health. Primary and secondary kidney disease can impact patient well-being and survival. Understanding kidney function will allow for informed and directed medical decisions. In the case of primary disease, early identification can lead to improved quality

and quantity of life. In concurrent illness, understanding kidney status can affect treatment choices and long-term follow-up. SDMA can contribute to the assessment of nonwell patients or patients presenting for a procedure, and it can give added confidence in medical decisions, patient care, and client communications.

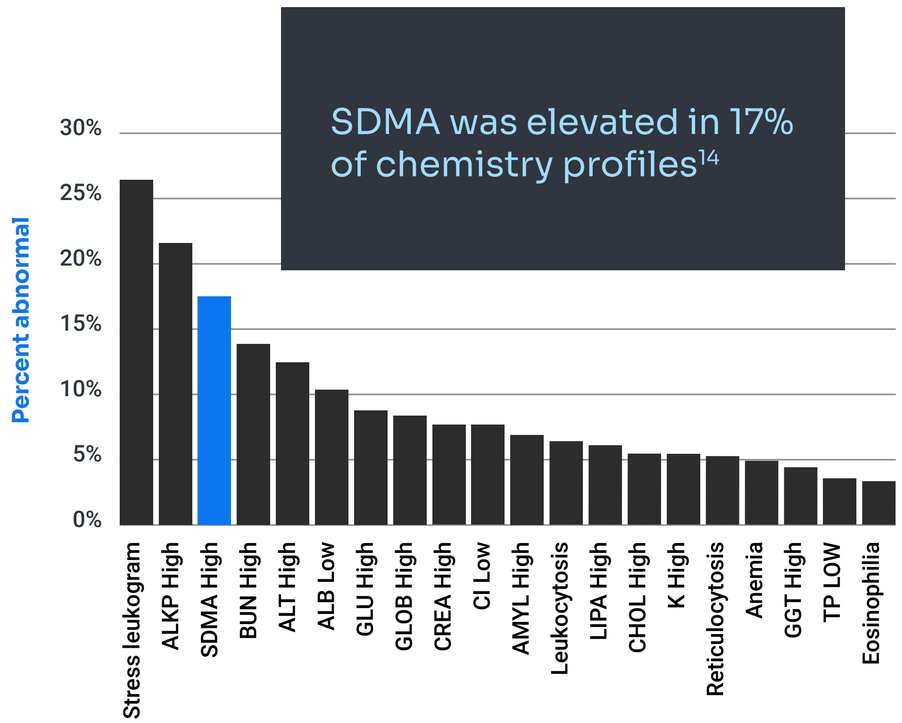
Does CKD fall into this category? How important is SDMA in my CKD evaluation?

Yes, CKD in cats and dogs should be considered part of the assessment in sick patient evaluation. While CKD can be subtle with little to no clinical signs, it can contribute to acute or chronic events that bring animals to the clinic quite sick.[29,30] While cats have a higher prevalence of CKD, greater than 60% in cats over 9 years of age, diagnosis and treatment in dogs is very important.[4,17,31] There are many management tools for kidney disease in both dogs and cats.[32] Early diagnosis is a key part of

Did you know?

+ More than 1 million chemistry profiles across all ages in cats and dogs run on medical cases at IDEXX Reference Laboratories (i.e., sick visits, rechecks, and preanesthetic profiles, but excluding wellness visits) revealed SDMA to be the third most common abnormality.[14]

+ This supports SDMA's essential importance in the chemistry profile, helping to identify decline in kidney function and kidney disease.

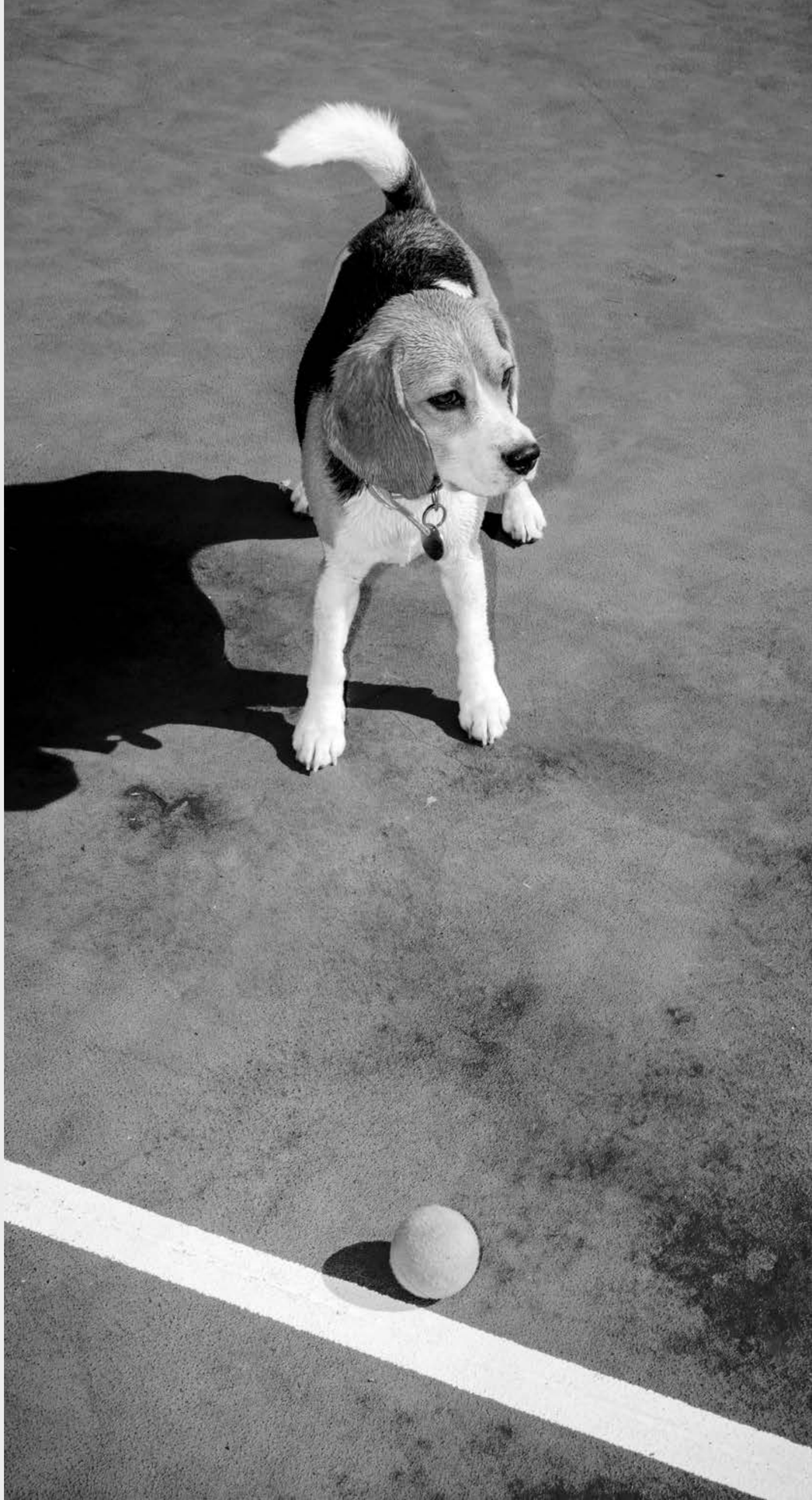


slowing progression of this irreversible condition. Confirmed CKD as the primary disease without any treatable secondary causes, such as infection in the urinary tract or infectious disease, is the first step, and then International Renal Interest Society (IRIS) CKD staging and treatment choices. Remember, IDEXX SDMA testing is incorporated into both the dog and cat IRIS CKD diagnosis and staging guidelines.[33] SDMA can be used to monitor long-term and help to expand understanding of kidney health over the course of disease. Inclusion of SDMA in both cats and dogs for diagnosis, treatment, and long-term monitoring in CKD is recommended.

Why should SDMA be added to blood work for every patient presenting for a medical reason?

Knowing whether your medical patient has concurrent kidney disease is important for treatment success and long-term patient management. In addition, early diagnosis of kidney disease provides the best chance to slow progression, possibly prolong your patient's life, and preserve the human-animal bond.

Find support and resources including a helpful algorithm on what to do with your SDMA result at idexx.com/SDMAresults.



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