# Improving Foal Care with Serum Amyloid A Testing

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FEB 2021

## Early detection of disease is critical in neonates

Foals are highly vulnerable and delicate compared to adult horses, making timely identification of disease particularly important for early intervention. Serum amyloid A (SAA) is a very sensitive biomarker for inflammation, especially that caused by infection, and can be tested horse-side to help identify problems early. Elevated SAA in neonatal foals can serve as an early indicator of potentially critical issues such as sepsis, respiratory disease, or diarrheal disease.[1,2]

## Test SAA as a part of standard neonatal health exams

Normal foals can have their SAA checked at the time they are tested for IgG. This allows early screening for any developing issues and provides a baseline for comparison if any clinical abnormalities do develop. If SAA is mildly elevated (20-100 µg/mL) this may be normal, as it can increase post-parturition/post-suckling.[1] However, they should be retested within 12-24 hours to ensure SAA is decreasing back to normal (<20 µg /mL).

Abnormal foals should be tested immediately upon presentation, and treatment considered even if only mild SAA elevation is observed (20-100 µg /mL).[1,2] If SAA is >100 µg /mL (or increasing) in any foal, further diagnostics and treatment should be pursued as an underlying condition is likely.[1]

## SAA is more reliable than fibrinogen or WBC count as a predictor of sepsis

Sepsis is one of the most problematic and urgent conditions in equine neonatal medicine. Rapid intervention is critical, therefore treatment is often based on presumptive diagnosis. Since SAA can be tested at point-of-care, it provides rapid, vital input when evaluating differential diagnoses and instituting appropriate therapy. It is reliably elevated in almost all foals with bacterial sepsis, unlike WBC/neutrophil count which may be low, high, or normal depending on the nature of sepsis.[2] Fibrinogen may also be more unpredictable as it decreases with consumption of clotting factors, which can occur in severe disease.[2]

WBC count and fibrinogen are still important basic parameters, however their potential variability also makes them less than ideal for monitoring treatment effectiveness. SAA can be particularly valuable in this respect, ast it will return to normal rapidly as foals recover. WBC count and fibrinogen generally take more time and are more unpredictable.[2]

## SAA improves *R. equi* screening protocols

Newer research has shown added value of incorporating SAA into screening protocols on farms endemic for *Rhodococcus equi*. On these farms, ultrasound screening is often used to identify foals with subclinical disease for proactive antimicrobial therapy. This has greatly improved the ability of veterinarians to detect any potentially affected foals and prevent clinical disease. However, about 80% of foals with subclinical ultrasound lesions never progress to clinical *R. equi*[3], even if left untreated. Further refinement of screening strategies would help decrease unnecessary antimicrobial use and the development of further antimicrobial resistance.

When used as part of such a screening program, SAA can help predict progression in foals with lesions on ultrasound.[3] Some earlier studies found that SAA alone did not reliably identify foals with subclinical disease, perhaps due to the chronic and localized nature of early *R. equi* abscesses.[4] However, when incorporated with ultrasound for on-farm screening, SAA improves the ability to identify foals that will progress to clinical illness versus those that should resolve without treatment, allowing more targeted use of antimicrobials.

## Hyperimmune plasma products may contain SAA

Results of SAA testing following administration of hyperimmune plasma should be interpreted with caution. Hyperimmune plasma products may contain a significant level of SAA which can affect systemic levels in foals. This is generally limited to mild elevations (<100 µg/mL) post-administration[5] and would be expected to decrease rapidly if there is no driving inflammatory stimulus for production by the foal itself. Rechecking SAA 24 hours later should reveal an identifiable drop in value in normal foals, and of course results should always be considered in light of physical exam and other clinical findings.

It is unknown whether normal commercial plasma contains any significant level of SAA, but it is less likely since donors are not standardly receiving repeated inoculations that would stimulate inflammation as with hyperimmune products.

## SAA testing can improve foal care with early, horse-side detection of inflammation caused by infection

Testing SAA gives veterinarians a horse-side tool to detect issues sooner and treat our most vulnerable patients faster and more effectively. Ultimately, diagnosis and treatment decisions are made through clinical judgement, based on the available evidence. SAA provides valuable input for this process, leading to improved medical care and foal health.

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## REFERENCES


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