In closing, said Barton, "There are some very unique differences in clinical pathologic parameters between neonates and mature horses. We really need to use age appropriately to avoid incorrect interpretations."

Liver enzyme concentrations are often greater in neonates than in adult horses, and serum bile acids concentrations are significantly higher than adults' for the first few weeks of life, making foals appear jaundiced, said Barton. While elevated bilirubin levels typically indicate excessive red blood cell destruction, neonates are not at risk for this, as they are born with a full complement of red blood cells. However, during the first days of life, bilirubin levels can be elevated due to other factors, such as the inability of the neonate's liver to clear these waste products.

Electrolytes are also different between neonates and adults. Neonates are born with higher levels of calcium and phosphorus, and these levels may still be higher than adult levels for several months. This is because the foal's body is accustomed to the placenta providing these nutrients, and it takes time for the foal to adjust to independent nutrition.

Antibodies from the mare's colostrum are typically low in neonates, as they are just beginning to produce their own antibodies. However, this can lead to a unique situation where the foal is more susceptible to infections, as it lacks the protection of maternal antibodies. This is why it is important for veterinarians to be familiar with what is normal for neonates, and to consider age-appropriate interpretation of laboratory values.

Further, neonates typically don't urinate for the first six to 12 hours after birth, which also delays creatinine clearance. These values do not indicate renal dysfunction as long as they decrease steadily over time.

Electrolyte levels in neonates are fairly stable and similar to those of adult horses. The only exception is phosphorus, which is usually higher in neonates due to the skeletal growth that occurs during the first year of life.

White blood cell counts are typically lower in neonates than in adults, as they have a reduced ability to fight infections. However, the neutrophil count may be higher due to the cortisol surge right before birth. Coagulation parameters also differ between neonates and adults, with neonates having lower antithrombin activity and higher fibrinogen levels. Platelet counts are usually the same as or higher than adults' for the first few days of life, but may decrease over time.

Red blood cell counts are typically higher in neonates due to the last bit of blood the dam's placenta transfers. However, the hemoglobin level may still be lower than adult levels, as the foal's body is adjusting to the lower oxygen demand of a neonate.

Therefore, foals look anemic compared to adults, Barton said. "This physiological anemia we see in foals is not harmful, and if values get below normal (20% compared to normal adult values of 35%), then we investigate it."

These values refer to the percentage of red blood cells compared to the total blood volume. Neutrophil counts may also be lower in neonates due to a reduced immune response. However, this is not always the case, and some neonates may have higher neutrophil counts due to the cortisol surge right before birth.

Barton also noted that some breeds have different red blood cell indices. The degree of anemia in a foal may not be as severe in draft foals as in light breeds, whereas Arabians' anemia may be more pronounced. Lymphocyte counts, on the other hand, are typically the same or lower in neonates due to the reduced immune response.

Red blood cell indices are important in understanding the oxygen-carrying capacity of the blood. The hematocrit (the ratio of red blood cells to plasma) is usually higher in neonates due to their lower plasma volume. However, this can also be due to the last bit of blood from the dam's placenta.

The plasma hemoglobin (a measure of the oxygen-carrying capacity of the blood) is typically lower in neonates due to their higher plasma volume. However, this can also be due to the cortisol surge right before birth.

These differences are important to understand when interpreting laboratory values, as incorrect interpretation can lead to misdiagnoses. It is important to consider age-appropriate interpretation of laboratory values, and to use age-appropriate markers when interpreting data.