# Comparison of neonatal beef calf blood chemistry with adult bovine reference intervals

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## Introduction

- Pre-weaning beef calf death loss is 5.5% in the United States (USDA-APHIS, 2017).
  - Of those calves, approximately one-third die in the first 24 hours of life (USDA-APHIS, 2010).
- Reference intervals represent values that are expected from a healthy animal and are a common tool used by veterinarians to indicate pathologic changes (George et al., 2010).
- Established reference intervals are often based off of samples acquired from adult cattle (Brun-Hansen et al., 2018).
- There are currently no published reference intervals specifically for neonatal beef calves.

## Materials & Methods

- Jugular blood samples were obtained from 161 beef calves born during fall 2015 (n=26), spring 2016 (n=44), spring 2017 (n=49), and fall 2017 (n=42).
  - Samples were obtained at 0 (n=137), 6 (n=112), 12 (n=106), 24 (n=116), and 48 (n=147) hours of age.
  - 0 hour samples were taken after standing but pre-suckling.
  - Calves were born to both primiparous and multiparous Bos taurus dams.
- Complete chemistry profile analysis using a Beckman Coulter 400e Chemistry System at the UMVMDL was performed on each serum sample.
- Neonatal beef calf reference intervals were calculated in Microsoft Excel by using the 97.5 and 2.5 percentiles from each chemistry panel.

## Objective & Hypothesis

**Objective:** To calculate reference intervals for neonatal beef calves from 0-48 hours of age and to compare those values to the current adult bovine reference intervals used by the University of Missouri Veterinary Medical Diagnostic Laboratory (UMVMDL).

**Hypothesis:** Reference intervals for neonatal beef calves from 0-48 hours of age will differ from adult bovine reference intervals established by the UMVMDL.

## Results

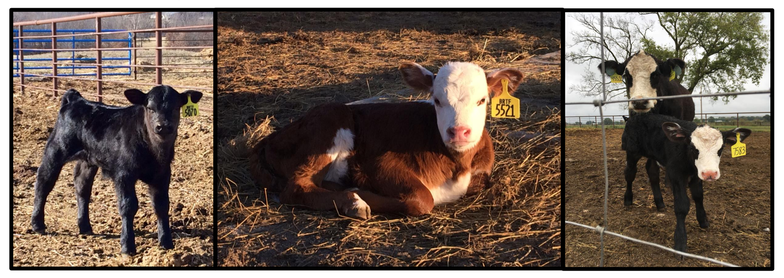
**Percent of calves outside of the UMVMDL adult bovine reference intervals at one or more sampling hour**

| | |
|---|---|
| Glucose | 63.98% |
| Calcium | 100% |
| Phosphorus | 64.60% |
| Magnesium | 69.57% |
| Potassium | 98.14% |
| Chloride | 9.32% |
| Bicarbonate | 42.86% |
| Anion Gap | 62.73% |
| Sodium | 49.07% |
| Total Protein | 96.89% |

| | |
|---|---|
| Globulin | 92.55% |
| Urea Nitrogen | 49.69% |
| Creatinine | 97.51% |
| Albumin | 100% |
| Total Bilirubin | 76.40% |
| Direct Bilirubin | 88.20% |
| Aspartate Aminotransferase | 96.27% |
| Gamma-Glutamyl Transferase | 94.41% |
| Creatine Kinase | 90.68% |

## Conclusions

- Neonatal beef calves go through many rapid metabolic changes within the first 48 hours of life.
- It is not appropriate to use adult bovine reference intervals for neonatal beef calves, but instead reference intervals should be established specific to neonates.



## Results

- **Figures show means ± SEM**
- **Shaded areas indicate:**
  - **UMVMDL Adult Bovine Reference Intervals**
  - **Calculated Neonatal Beef Calf Reference Intervals**
  - **Overlap Between Reference Intervals**