

# Evaluating Pain Response of Metritic versus Healthy Cows

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## INTRODUCTION

Pain responses may cause physiological and behavioral changes, and these changes can impact the welfare and productivity of the animal. Visceral pain is characterized by diffuse, non-localized pain of the viscera that can be referred to nearby locations and is associated with motor and autonomic reactions (Cervero, 1999). Inflammation of the female reproductive tract can produce visceral pain (Cervero, 1999), and diseases of these organs have proven to be painful.

Metritis is an infection of the uterus that commonly affects dairy cattle after parturition, characterized by inflammation of the uterine wall (Sheldon et al., 2005). Metritis is associated with lower conception rates and greater culling rates due to failed conceptions (Sheldon et al., 2005), along with lower milk production, lower feed intake, and less competitive behavior at the feed bunk (Huzzey et al., 2007).

Mechanical stimuli, such as tissue palpation, are accepted methods to produce a pain response (Ness and Gebhart, 1990). Using such an approach with metritic cows could be useful in assessing pain associated with this health disorder.

## Objective

The objective of this study was to compare the pain response of metritic versus healthy cows using passive rectal palpation.

## Hypothesis

We predicted that cows diagnosed with metritis would show a greater back arch when compared to healthy cows in response to the passive rectal palpation.

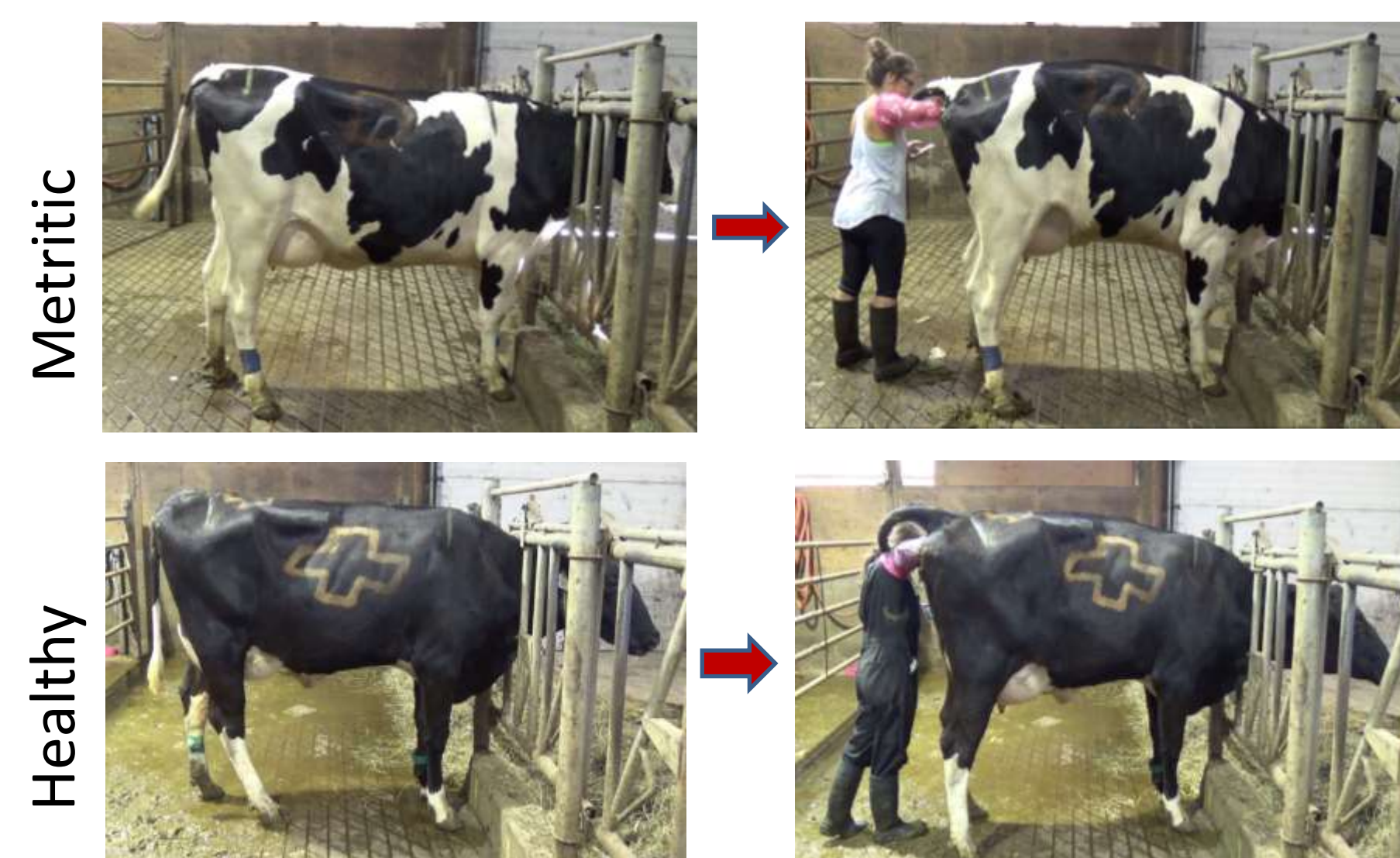


Figure 1A. Baseline back arch, resting phase

Figure 1B. Induced back arch, passive rectal palpation

## METHODS

After parturition, cows were subjected to systematic health checks starting 3 d after parturition and continuing every 3 d for 18 d. Data for metritic cows was collected on day of diagnosis, healthy cows were recorded at random.

### Health Check:

- A passive rectal palpation (PRP) and vaginal examination were conducted to assess the health status of cows, using the 0 to 4 scoring system of Huzzey et al. (2007).
- Healthy cows (n=29) were given scores 0,1; metritic cows (n=23) received scores of 2 to 4.

### Passive Rectal Palpation:

1. Evacuate the feces (30 - 40 sec),
2. 1 min break allowed for back arch to get to normal (Figure 1A)
3. Entered the rectal cavity; hand rested above the location of uterus in a stand-still position (20 sec) (Figure 1B)

### Video recording

- During PRP, a side view camera was used to record the body posture, particularly the back arch.

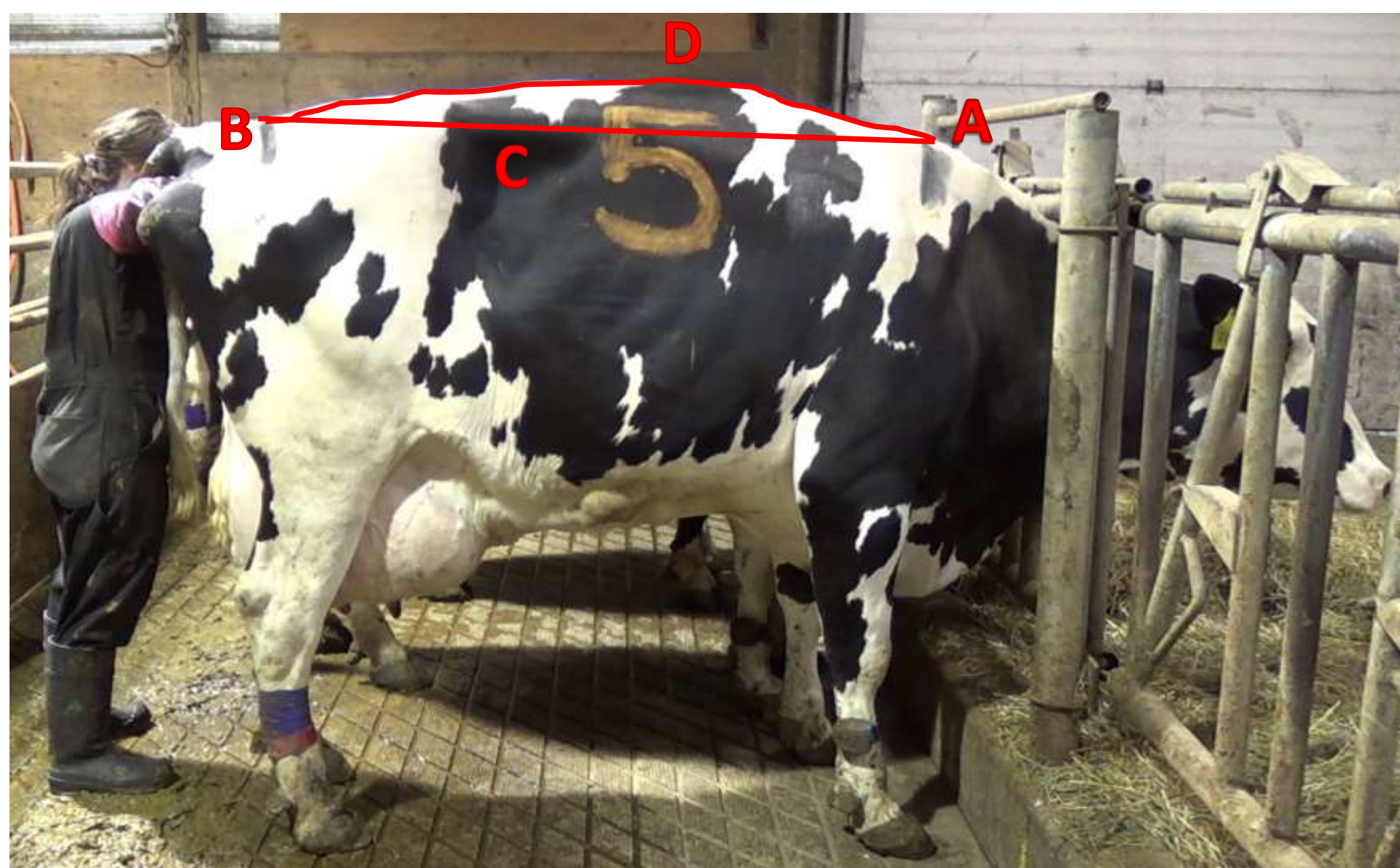


Figure 2. Visual representation of how back arch area was determined during passive rectal palpation.

### Snapshot selection

- The Back Arch was defined by: Straight line (C) from the thoracic (A) to coccygeal (B) vertebrae (Figure 2).
- A second line (D) outlined the curve of the spine to connect the two points.
- Area was selected and measured using Adobe Photoshop CS6 (Adobe Systems, San Jose, CA, USA) to determine a pixel count which was then converted to cm<sup>2</sup>.
- Total Area (cm<sup>2</sup>) - average value of the area for 4 snapshots at the 4, 8, 12, and 16 s of PRP.

## RESULTS

As expected, metritic cows had a greater VD score than healthy cows (3.48 vs. 0.86,  $P < 0.0001$ ; Figure 3). Metritic cows also displayed a greater back arch than healthy cows when rectally palpated (566 vs. 771 cm<sup>2</sup>,  $P < 0.01$ ; Figure 4).

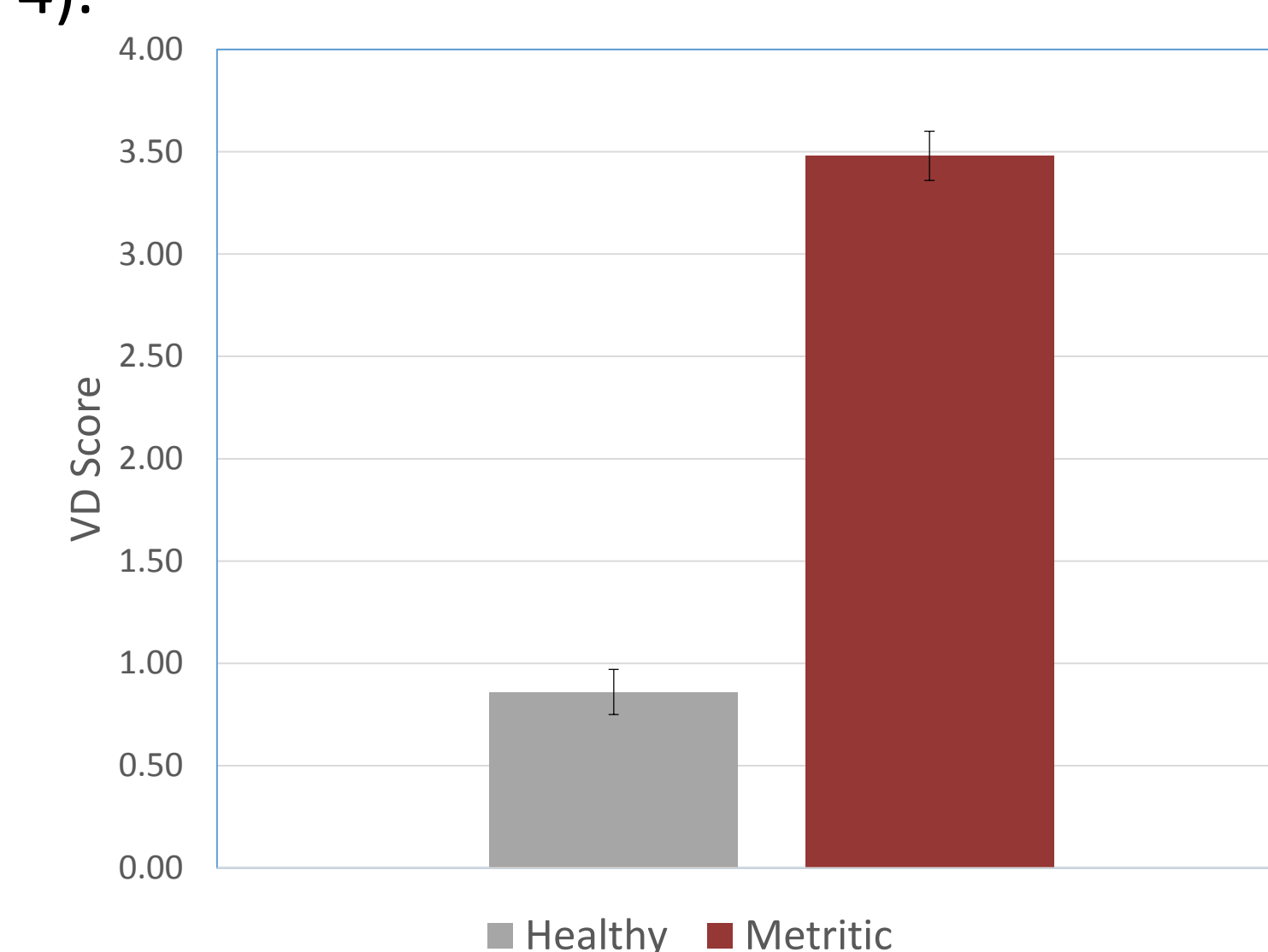


Figure 3. Vaginal discharge (VD) score for healthy and metritic cows.

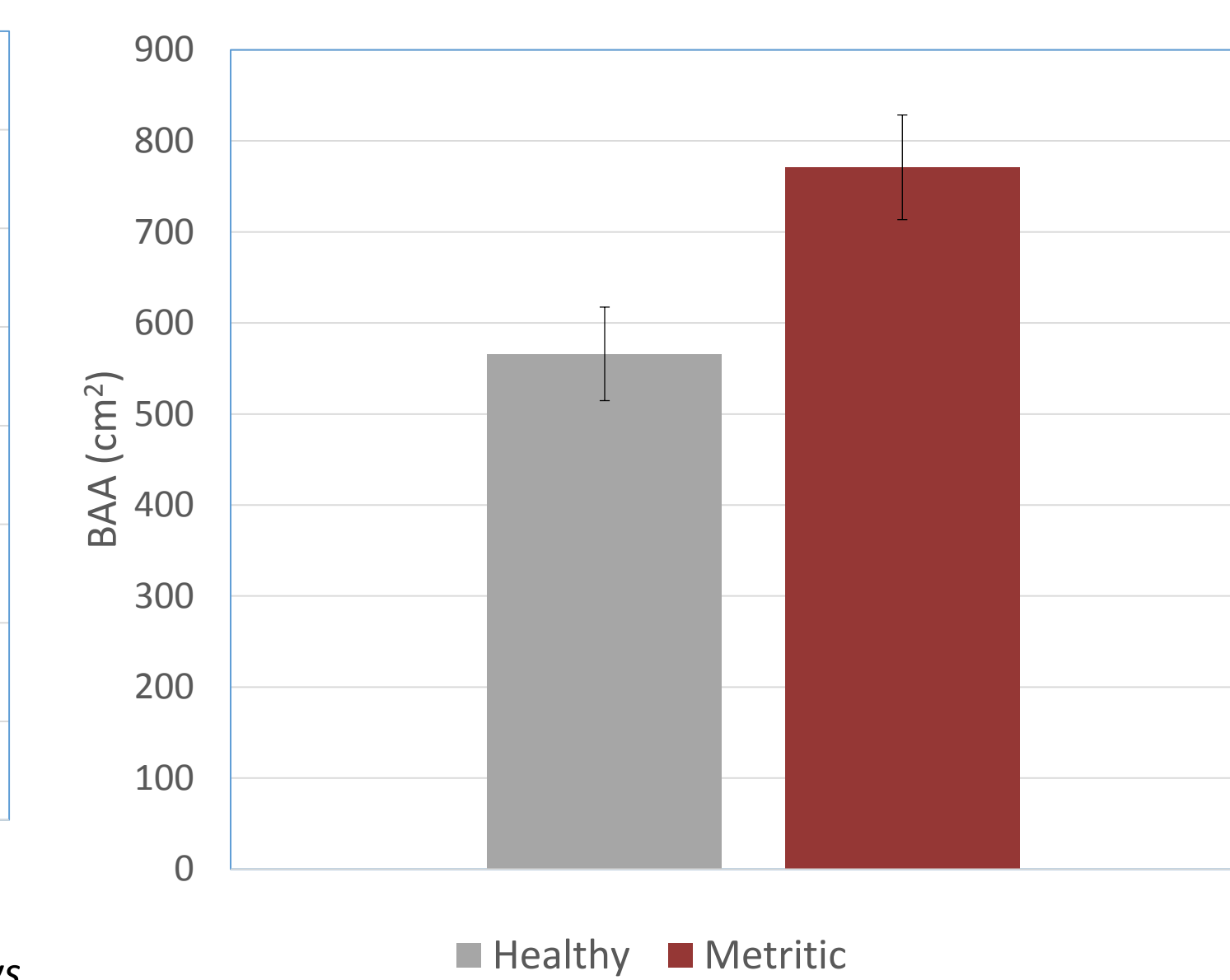


Figure 4. Back arch area (BAA) for healthy and metritic cows.

## CONCLUSIONS

The vaginal discharge of a cow is useful in determining metritis, and this was the factor used in our study to identify healthy versus metritic cows. A passive rectal palpation can be used to determine the visceral pain associated with metritis by assessing the back arch of dairy cattle. Metritic cows are in a higher state of visceral pain when palpated than healthy cows as represented by the greater back arch. The ability to use palpation and back arch measurements may provide another measure to determine the pain associated with reproductive diseases.

Cows diagnosed with metritis may benefit from treatment, such as with a non-steroid anti-inflammatory drug (NSAID), to reduce the pain associated with the disease. Further studies are necessary to determine the effects of such treatments on visceral pain associated with metritis.

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