

Analysis of Successful Completion of Endurance Horses and Riders Undergoing the Tevis Cup 160-km Ride from 2016-2021

Maranda Hernandez, Vivian Huynh, Holly M. Greene
 Department of Animal & Veterinary Sciences
 Don B. Huntley College of Agriculture

Introduction

- Established in 1955, the Tevis Cup is the largest long-distance endurance ride competition on the West Coast where equine athletes ride 120-160 km within 24 hours
- Arabian horses dominate the population
- Concentration of Type I and Type II muscle fibers have a direct correlation with stamina and endurance
- Goal: Identify patterns to help with conditioning and future completion rates



Image 1. Competitors traverse through the Sierra Nevada Mountain range through rocky hills and flowing rivers.

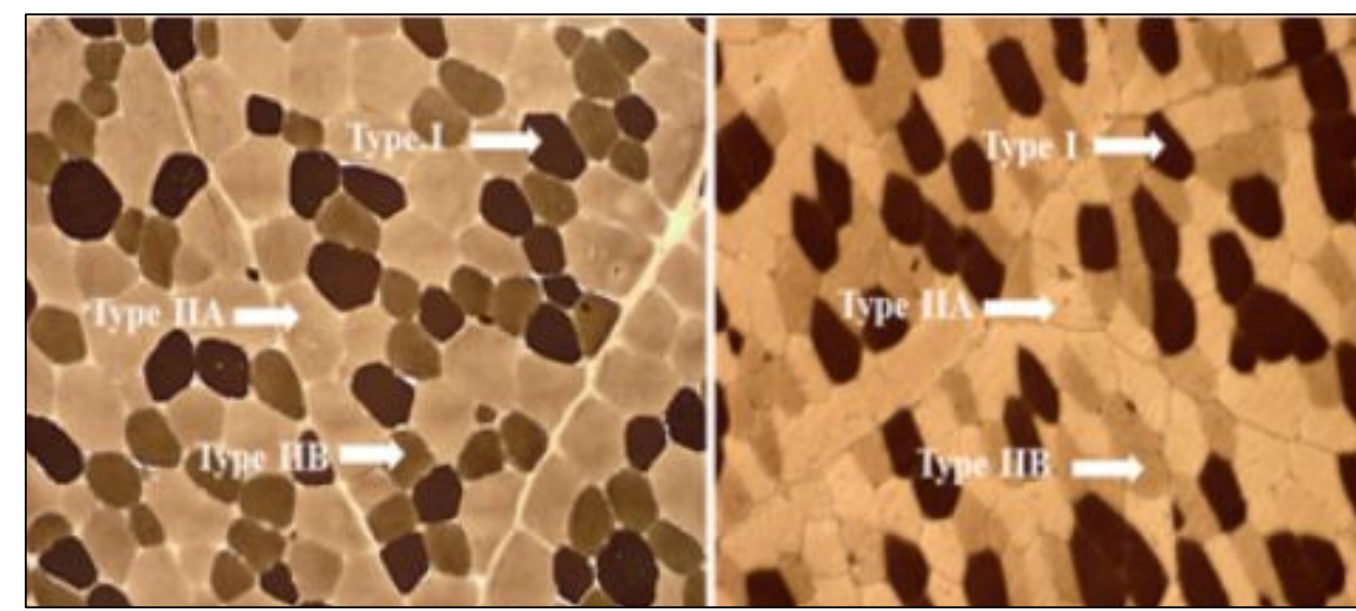


Image 2. Type I tissues exceed oxidative capacity with increased mitochondria directly correlating with less muscle fatigue and enhanced performance.



Image 3. A veterinarian is performing a physical exam at one of various vet checks on the trail.

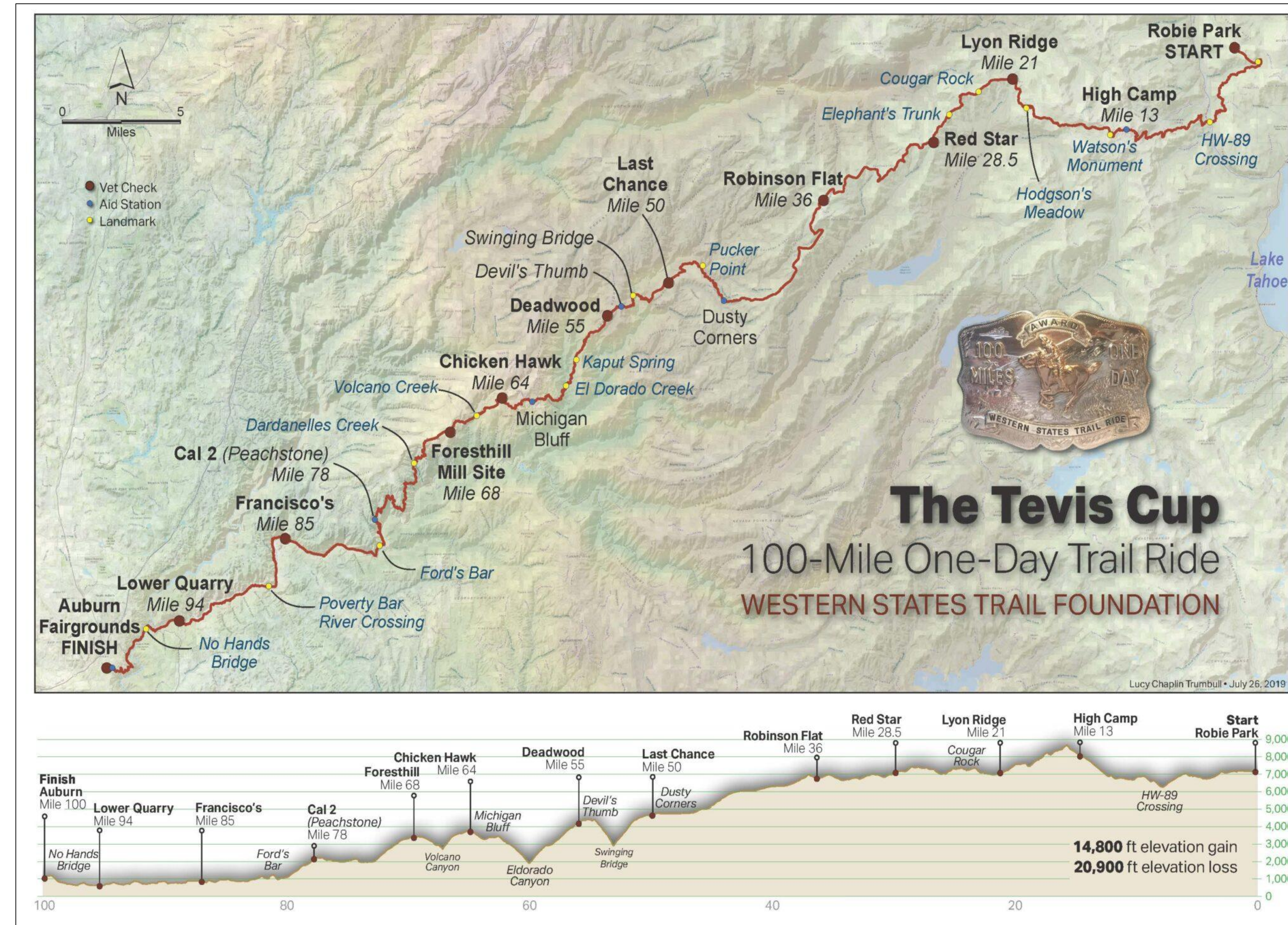


Image 4. Horses and their riders travel from Truckee to Auburn, California traveling upwards of 9,000 feet in elevation.

Results (continued)

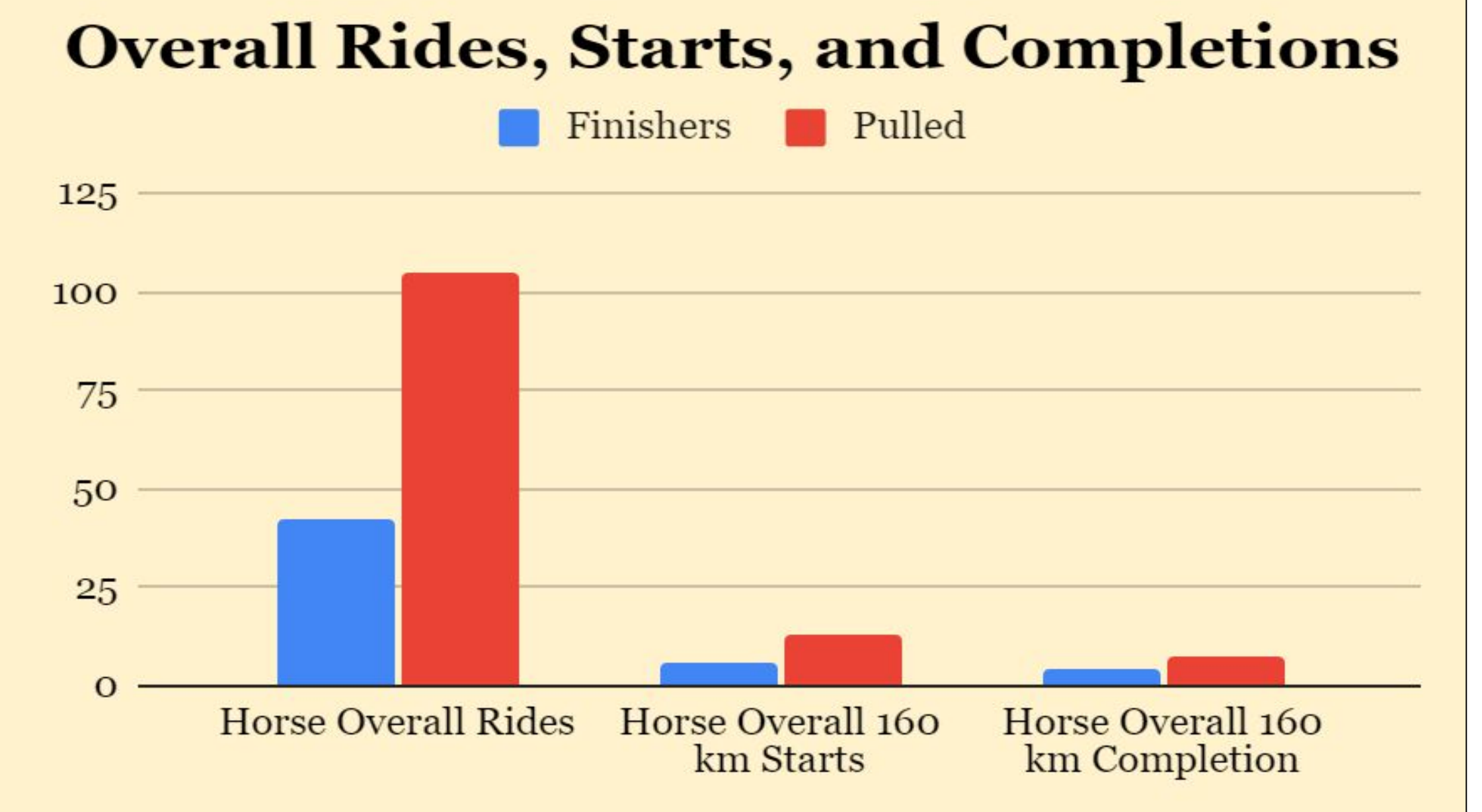


Figure 5. Horse overall parameters depicting finishing competitors well conditioned

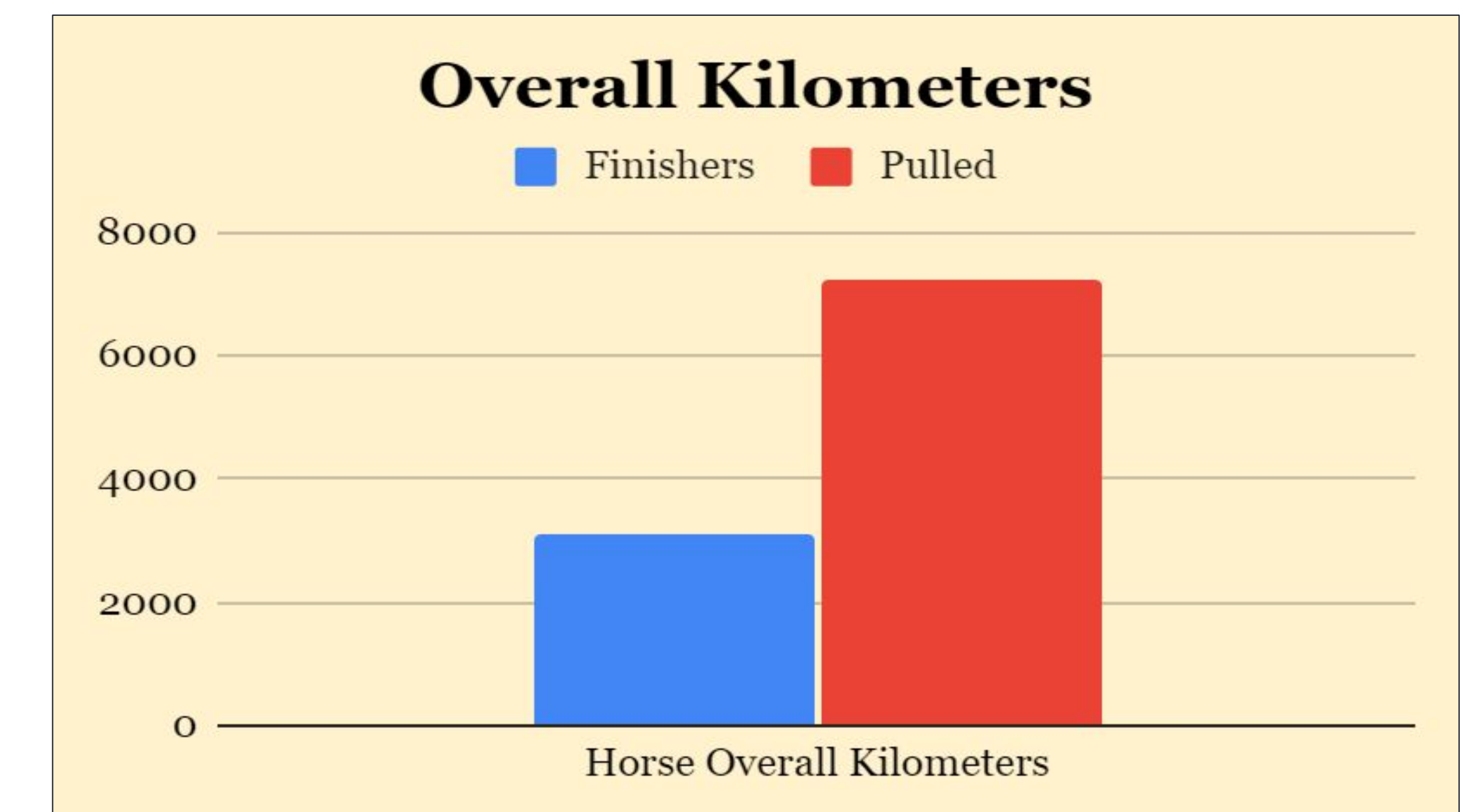


Figure 6. Repeated ANOVA univariate analysis shows the P value is 0.93 which means that there is a significant difference in breeds. Furthermore, there are more Arabians completing the ride.

Results

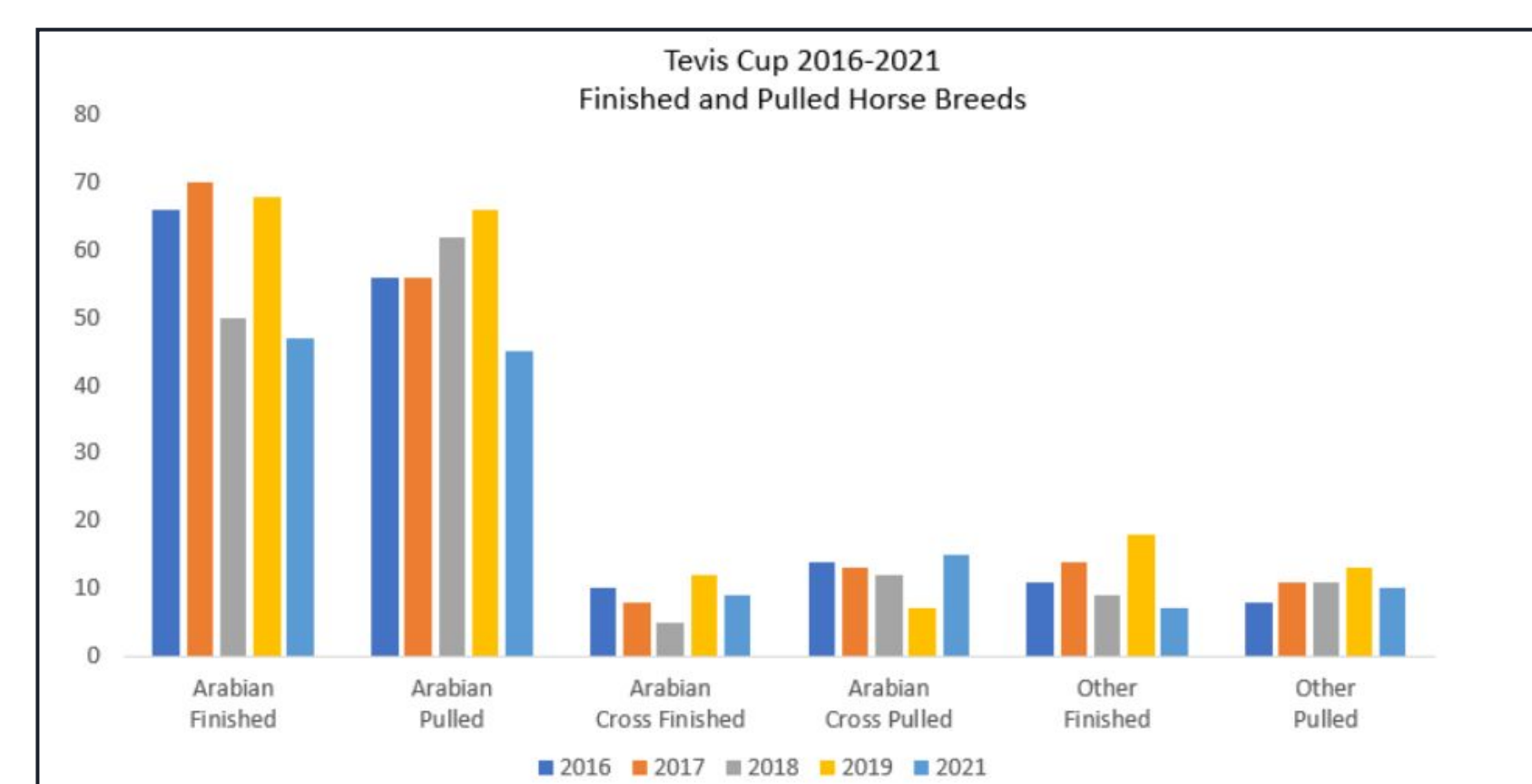


Figure 1. Finished and pulled horse breed data was compiled into three groups Arabians, Arabian crosses, and Other to differentiate the finished and pulled data sets. When looking at statistics, with a p-value of 0.290, by year, there is no significant difference between breeds of finished and pulled horses.

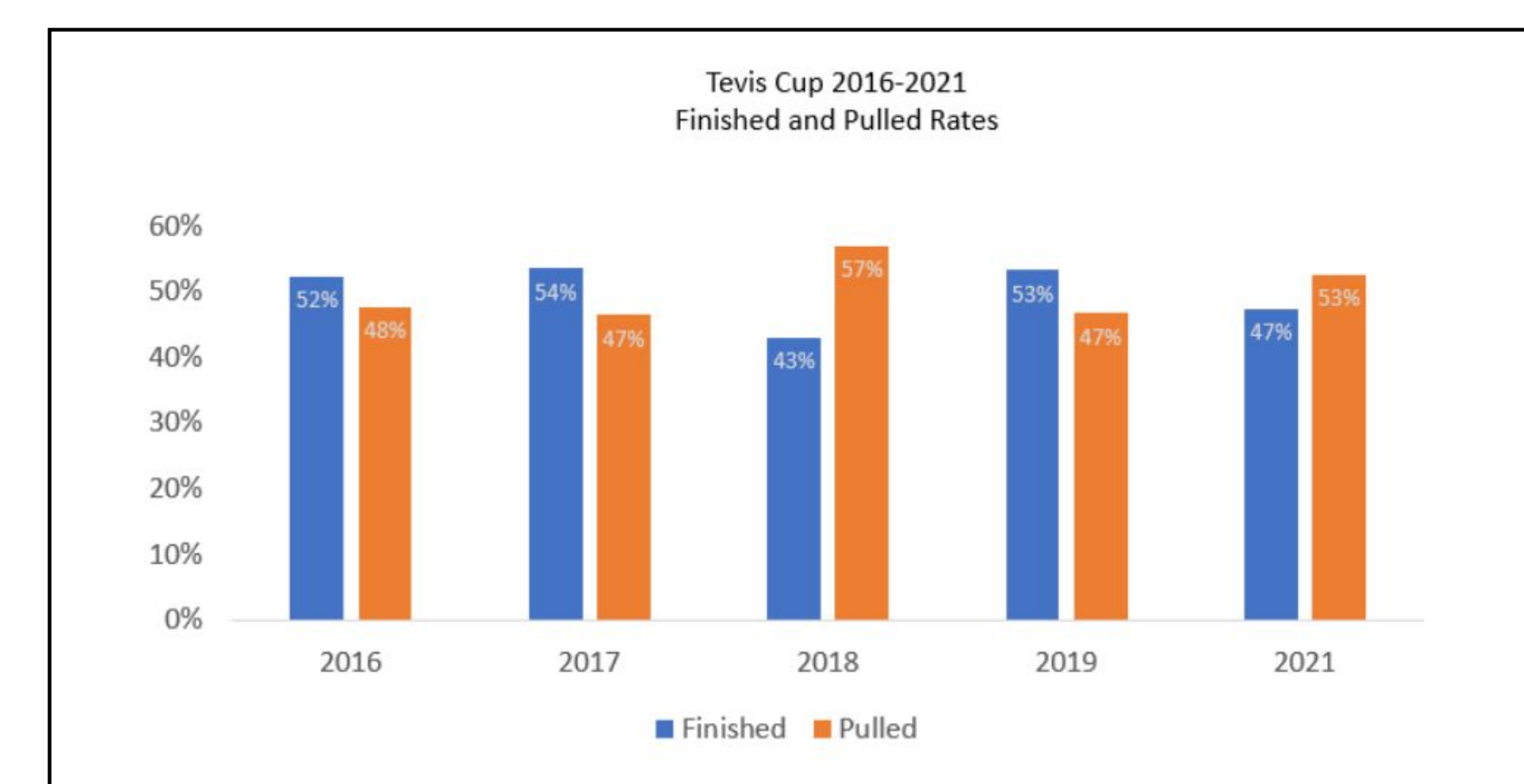


Figure 2. In accordance with year, the p-value of 0.960 notifies that there was no statistical difference to be found between the years of finished and pulled rates. Focusing on the year 2018, has the highest pull rate at 57.00% and least percentage of finish rates at 43.00%.

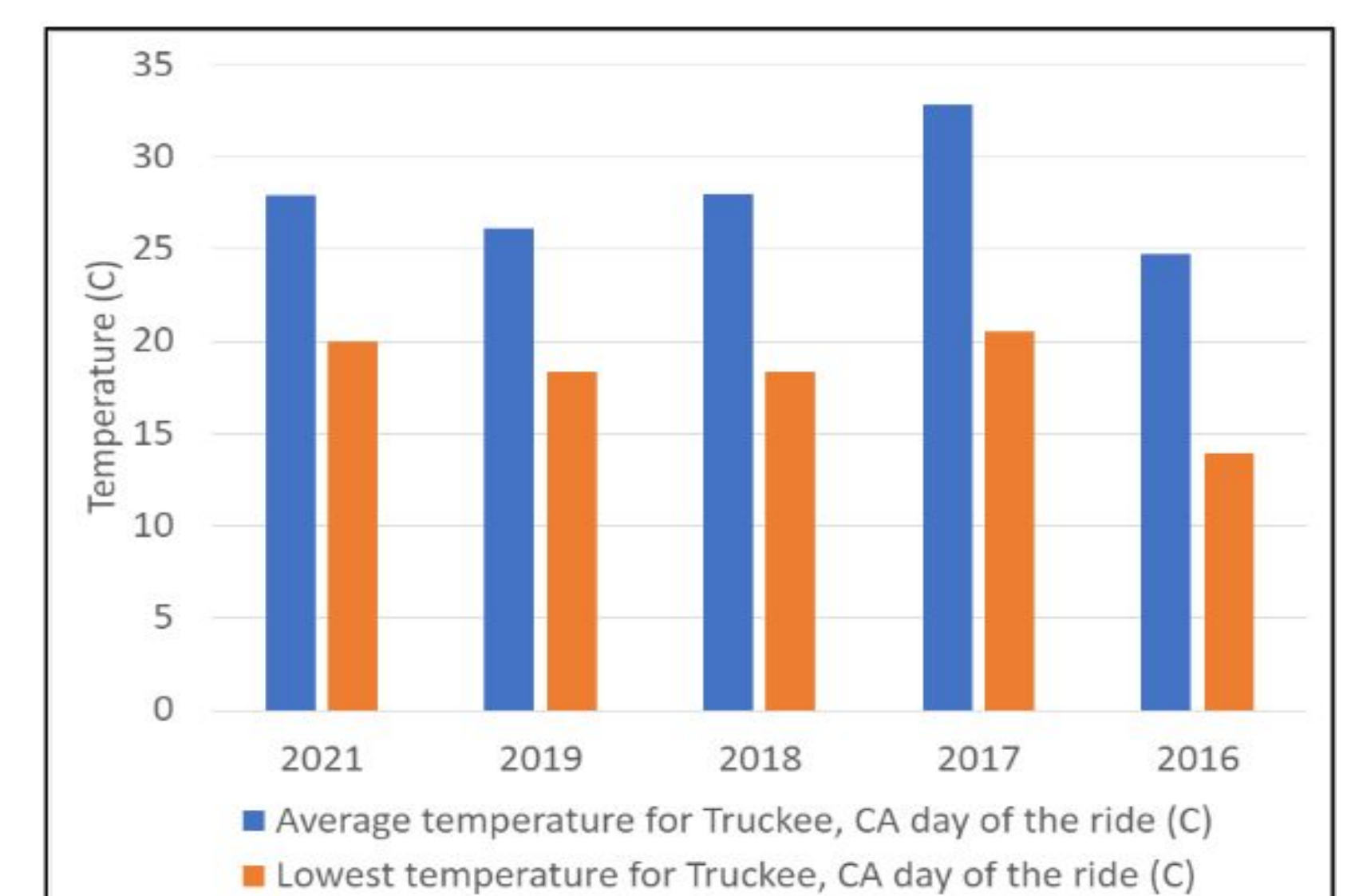


Figure 3. Temperature Overtime

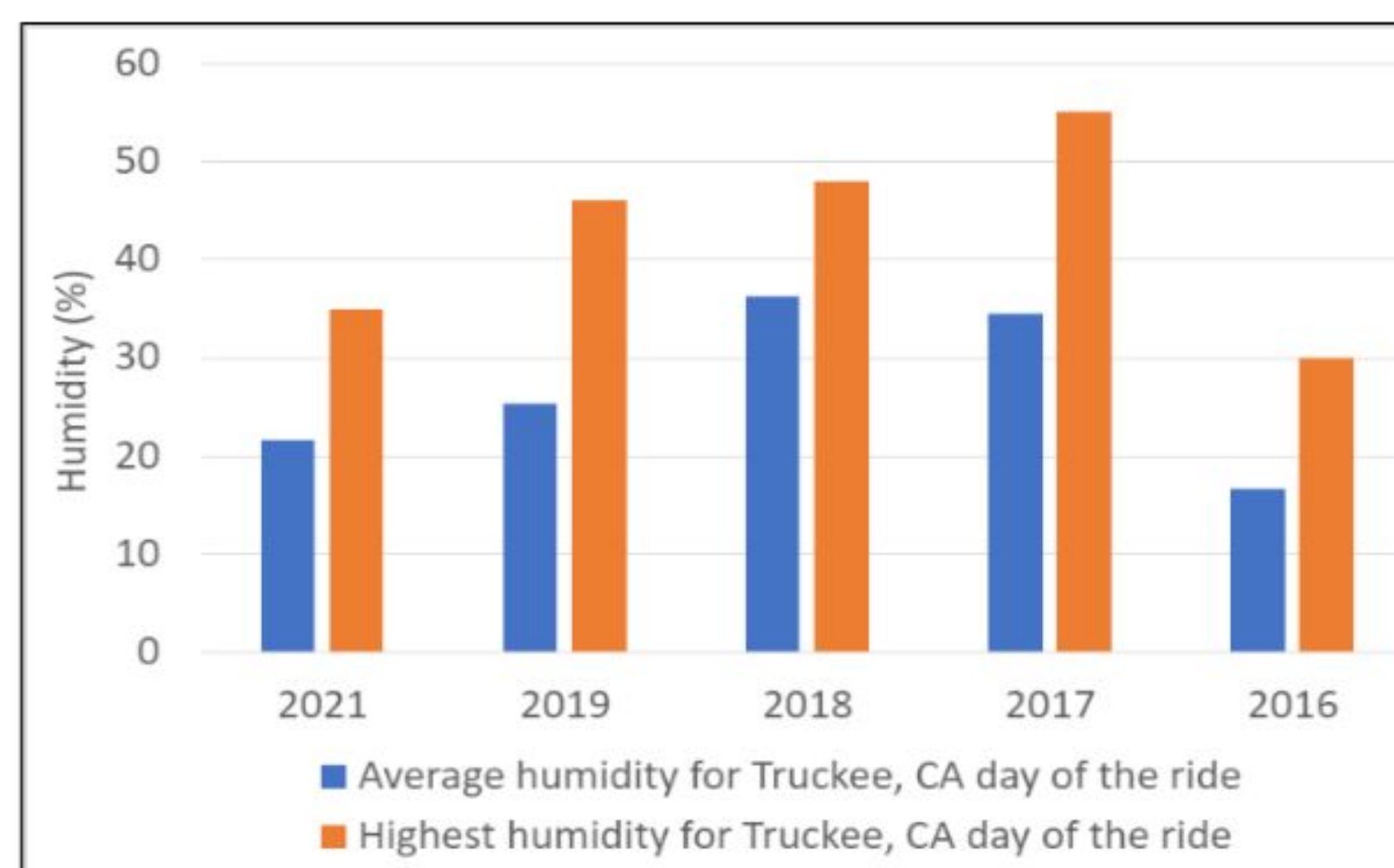


Figure 4. Humidity Overtime

Methodology

- Data collected from Tevis Cup and American Endurance Ride Conference: 2016-2021
- Holistic performance variables
- Multivariate and single variate ANOVA
- Comparative analysis to find consistent patterns in the data set overtime.
- One sample t-test through SPSS using data from Weather Underground

Variable	Label
Year	Year Riding Season
Cases	Pulled Horses
Pull Code	Reason for Failure
Pull Location	Place Where Horse was Pulled Including Distance Traveled
Sex	Sex of Horse: Mare, Stallion, Gelding
Breed	Breed of Horse: Arabian, Arabian-cross, etc.

Table 1. Sample of Variables Defined

Conclusion

- Completion Rates from 2016 - 2021: 57.73%, 53.49%, 42.96%, 53.27%, and 47.37%, were not different (P = 0.99).
- Arabian horses were an outlier in the data set having a higher rate of completion in comparison to other competitors.
- Gelding horses were prominent finishers in data set.
- Temperature and humidity overtime did not significantly affect completion results. Increased temperature can cause an increase of respiration and factor into horses being "pulled" from the ride.
- Further studies can focus on environmental impacts such as terrain.

References

Bhatt, Priya Nikhil. Epidemiological analysis of risk factors preventing completion of the Tevis Cup, 2004
 Coombs, S. L., & Sams, F. R. (2012). Endurance riding in 2012: Too far too fast? The Veterinary Journal, 194(3), 270-271. <https://doi.org/10.1016/j.tvjl.2012.10.027>
 Lawrence, J. S., Hines, K., Moser, L., Powell, D., Bell, M. Observations on body weight and condition of horses in a 150-mile endurance ride. Equine Veterinary Science 1992;12:320-324.
 The Old Dominion Equestrian Endurance Organization (n.d.). Collective wisdom for endurance riding: Everything You Ever Wanted To Know About Endurance Riding. Retrieved September 24, 2021, from <http://www.olddominionrides.org/EndurancePrimer/01.html>.
 The Tevis Cup. Globetrotting. (2016, August 8). Retrieved February 22, 2022, from <https://www.globetrotting.com.au/the-tevis-cup-100-miles-in-24-hours/>
 Wolford, J. (2020, April 28). The end of the Cavalry: Expert how-to for English Riders. Retrieved October 8, 2021, from <https://practicalhorsemannag.com/personalities/the-end-of-the-cavalry>
<https://www.flickr.com/photos/teviscup/362595972/in/album-7215768477855783/>