

# Western States Trail Foundation

## Setting the Standard:

**70 Years of “Raising the Bar” for Safety Standards and Equine Health Evaluation**

**70 Years of WSTF-Sponsored Studies to Assess Endurance Horse Performance**

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Information Compiled by Jerry Wittenauer and Kathie Perry



*“To do all things necessary to provide for detailed methodical Veterinary examinations of horses for the collection and publication of this scientific data, for beneficial use by the Veterinary profession.”*

Anchored by the strongest of instructions (above) among our founding Articles of Incorporation, the Western States Trail Foundation has worked since its inception to bolster our understanding of factors that affect the health and welfare of our Endurance horses, in this, the toughest test of equine strength and stamina in our sport. We learn from our sponsored studies, we learn from studies conducted by others, and we adapt our “best practices” for ride management, with the goal of maximizing a successful outcome for horse and rider.

## I Evolution of Ride Management Best Practices

A strong “Head Veterinarian” has been an integral part of the management of the Annual Tevis Ride since its earliest days. Leveraging Wendell Robie’s close connections to the UC Davis Veterinarian Program, our earliest veterinarians were in-fact, Deans of the UC Davis Veterinary School. The Head Veterinarian at the Tevis Ride recruits and coordinates the deployment of the veterinarian team for ride day (typically 16 veterinarians for the recent rides), communicates to the riders that horse welfare is front-and-center, establishes consistent standards for equine evaluation for the Ride, and oversees the judging for the annual Haggin Cup. Our past Head Veterinarians Include:

1955-57	John Wheat
1958	Robert Bushnell
1959	Murray Fowler
1960-61	Don Jasper
1962-63	Richard Barsaleau
1964	Murray Fowler
1965-66	Richard Barsaleau
1967-1972	Murray Fowler
1973-74	Hank Cook
1975	Murray Fowler
1976	Hank Cook
1977	Murray Fowler
1978	Jerry Gillespie
1979	John Hughes
1980-83	John Zimmerman
1984-90	Todd Nelson
1991-99	Mitch Benson
2000-04	Jamie Kerr
2005-16	Greg Fellers
2017-24	Mike Peralez



Lynne Glazer Imagery

Evolving Safety Standards for Equine Welfare Guided by our Board of Governors and its Rules and Veterinary Committees that oversee the Annual Tevis Cup Ride, incorporating “Lessons Learned” from our observations at the Ride each year, and embracing results of systematic veterinarian studies of Endurance Horses, our best practices for managing our equine partners has continued to evolve:

**Major Milestones at the Tevis Ride for Equine Welfare – Steadily Raising the Bar:**

- 1955 - Ride Inaugurated with a philosophy that all participants were under the control of the ride veterinarian. A pulse standard of “72” was established.
- 1962 – Ride held with 1-hr holds at Robinson Flat, Michigan Bluff, and Ponderosa Bridge
- 1964 – Haggin Cup instituted to reward the horse finishing in the best condition.
- 1974 – Pulse Standard lowered to “68”
- 1995 – “Gate into hold” implemented, requiring horses to pulse down prior to entering their vet hold.
- 2010 – The practice of “Mandatory Vet Re-Check” one-hour post-completion is implemented.
- 2013 – For the first time, treatment Vets stationed at 6 sites along the course to offer immediate care to distressed horses, rather than time-consuming transport to a treatment site.
- 2014 – Pulse standard lowered from 68 to 64 for vet checks during the ride.
- 2014 – The concept of “Body Condition Score” incorporated onto the rider Vet Card for the first time. Only BCS scores of 4-7 are allowed to participate in the ride.
- 2014 – For the first time, the Vet Card is updated to record “gut sounds” in all 4 quadrants.
- 2023 – Campaign for “soft illumination” on night rides (red headlamps or green glow sticks on breast collar) to reduce equine stress associated with bright white headlamps.
- 2023 – Pre-staged large animal rescue equipment and trained rescue personnel at safety-critical areas along the ride route – greatly improving the “response time” in the event of a distressed-horse emergency.
- 2023 – use of GPS trackers for entrants becomes “mandatory” – assuring the fastest-possible access to horses or riders in distress.



Our campaign to promote “soft illumination” for night riding



Pre-staged veterinarians and rescue kits for quick response to distressed horses on ride day.

## II Bibliography:

### WSTF-Sponsored Vet-Led Studies on Endurance Horse Performance

The Western States Trail Foundation is proud to sponsor methodical, veterinary-led studies of Tevis horses – with the goal to develop a better understanding of factors contributing to a successful completion for the event. Our financial support covers the costs associated with clinical supplies and laboratory analyses. The veterinarians and their teams who lead these studies typically donate their time – and we are grateful! The results of our WSTF-sponsored studies are documented and presented in peer-reviewed Veterinary Journals, discussed at AERC Conventions for both general audiences and Vet Continuing Education seminars, and published for broad awareness in the AERC *Endurance News* and the annual *Tevis Forum*. A bibliography of these published studies - since 1999 - is provided below.

1. Garlinghouse, Susan and Melinda Burrill (1999), Relationship of Body Condition Score to Completion Rate during 160 km Endurance Races, *Equine vet J. Suppl.* **(30)**, pp 591-595.

*360 horses participating in the 1995 and 1996 Tevis Cup Endurance Ride were evaluated. This study conclusively showed that the Henneke Body Condition Score of the horse is a determining factor in a successful completion. The weight of the rider or the ratio of rider weight to horse weight had no correlation with finish success, finish time, or finish placing. Horses with body condition scores of 3.0 or less were unlikely to finish the ride.*

<https://beva.onlinelibrary.wiley.com/doi/epdf/10.1111/j.2042-3306.1999.tb05290.x>

2. Fielding, C. Langdon, K. Gary Magdesian, Chloe Meier, Diane Marie Rhodes, and Jill C. Higgins, (Oct 2009), Clinical and biochemical abnormalities in endurance horses eliminated from competition for medical complications and requiring emergency medical treatment: 30 cases (2005–2006), *J of Veterinary Emergency and Critical Care*, **(19)**5, pp 473-478.

*30 horses removed from the Tevis ride for metabolic reasons were evaluated, treated, and released to their owners. The prognosis for treatment and recovery of distressed endurance horses in this ride is good.*

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1476-4431.2009.00441.x>

3. Fielding, C. Langdon, K. Gary Magdesian, Chloe Meier, and Diane Marie Rhodes, (June 2012), Clinical, hematologic, and electrolyte changes with 0.9% sodium chloride or acetated fluids in endurance horses, *J of Veterinary Emergency and Critical Care* **(22)**3, pp 327-31.

*12 Tevis horses requiring emergency medical treatment in the form of IV fluids were evaluated in this study from 2007 to 2010. Two different types of IV fluid were used, and resultant changes in blood chemistry were assessed. The results of this trial provide further insight into a recommended “best practice” for fluid therapy of distressed endurance horses.*

<https://onlinelibrary.wiley.com/doi/10.1111/j.1476-4431.2012.00745.x>

4. Fellers, Greg (2013), From the Ride's Head Veterinarian, *Tevis Forum*, pg 56.

*It is described that the 2013 Ride will have treatment vets deployed at 6 different locations along the course (for the first time) so as to immediately treat distressed horses rather than awaiting trailer transport to a treatment site. The in-ride blood analysis study is described and will be conducted again for the 2013 Ride. A post-ride evaluation of horses pulled for lameness (by Karen Hassan) found that a predictable variable was poor shoeing quality among the lame horses.*

<https://teviscup.org/tevis-forums/>

5. Garlinghouse, Susan (2014), Body Condition Scoring the Tevis Horse (And Why it Matters), *Tevis Forum*, pg 36.

*A summary of years of study for weight factors (horse, rider, tack) affecting Tevis performance. The principle correlating factor for "success" has been found to be the Body Condition Score for the horse. Use of BCS scoring was introduced to Tevis starting with the 2014 Ride, based on this research.*

<https://teviscup.org/tevis-forums/>

6. Fielding, Langdon (2014), Veterinary Research Project Continues in 2014, *Tevis Forum*, pg 31.

*A summary is provided for the 2013 blood-draw study, conducted on selected horses at Robinson Flat. It was found that horses with a low chloride value (electrolyte loss) and a high protein level (dehydration) were likely to be withdrawn from the ride at a subsequent vet check (80% correlation). Horses that completed the ride during the multiple years of this study, will have their year-to-year blood analysis results examined for trending analysis.*

<https://teviscup.org/tevis-forums/>

7. Fellers, Greg (2014), From the Ride's Head Veterinarian, *Tevis Forum*, pg 13.

*An overview is provided for changes to examination standards being applied starting with the 2014 Ride. Changes include lowering the pulse standard from 68 to 64, implementation of Body Condition Scoring and the criteria that a score of 3 or less or 8 or more will not be allowed to participate, recording of gut sounds on the rider vet card for all four quadrants at each vet check. It is noted that this will be the 4<sup>th</sup> year of the mandatory post ride re-check of horses within 2 hrs of completion.*

<https://teviscup.org/tevis-forums/>

8. Fellers, Greg (2015), From the Ride's Head Veterinarian, *Tevis Forum*, pg 13.

*A brief overview of the multiyear study to conduct in-ride blood analysis to predict likelihood of a successful ride outcome. It is planned to conduct this study once again for the 2015 ride.*

<https://teviscup.org/tevis-forums/>

9. Fielding, Langdon and Magdesian, Gary (2016), Tevis Research Past, Present, and Future, *Tevis Forum*, pg 34.

*Brief overview provided of the results of veterinarian-led studies at the Tevis Ride for over 40 years.*

<https://teviscup.org/tevis-forums/>

10. Fellers, Greg (2016), From the Ride's Head Veterinarian: The Blood Draw Study in Review, *Tevis Forum*, pg 13

*A summary is provided for blood draw studies conducted at the Tevis Ride in the years 2012 through 2015. It was demonstrated that a blood draw and evaluation could be conducted within 25 minutes at the Robinson Flat vet hold, with the results used to advise riders as to the health and welfare of their horses. Results were found to have some predictive value for likelihood of Ride completion.*

<https://teviscup.org/tevis-forums/>

11. Fielding, Langdon, Chloe Meier, Greg Fellers, K Gary Magdesian, (Jan 2017), Ability of clinicopathologic variables and clinical examination findings to predict race elimination in endurance horses, *American Journal of Veterinary Research* (78)1, pp 50-56.

*101 Endurance Horses participating in the 2013 Tevis Ride were evaluated at the 30 mile checkpoint (blood analysis and clinical observation) to determine predictive factors for a successful event completion. Factors that allow for a prediction of overall elimination are identified.*

<https://avmajournals.avma.org/view/journals/ajvr/78/1/ajvr.78.1.50.xml>

12. Herten, Jeff (2017), Veterinarians: The Unsung Heroes of the Tevis, The Early Years 1955-1964, *Tevis Forum*, pp 36-37.

*A summary of veterinarians and veterinary practices in the early years of the Tevis Ride.*

<https://teviscup.org/tevis-forums/>

13. Fielding, Langdon and Magdesian, Gary (2017), Tevis Research 2016: A Unique Project, *Tevis Forum*, pg 27

*20 horses at the 2016 Tevis Ride were evaluated (via blood analysis) for changes in electrolyte concentration and hydration parameters. Blood samples were collected pre-ride and at multiple points during the ride. Insights were gained as to how these parameters vary during the course of the ride and whether or not the observed variations could be correlated with successful completion of the Tevis Ride.*

<https://teviscup.org/tevis-forums/>

14. Esser, Melissa and Schott, Hal (2018), Tevis Research 2017: Update on the Michigan State University GI Ultrasound Study, *Tevis Forum*, pg 29-31.

*Endurance horses at the 2017 Tevis Ride were evaluated with a portable ultrasound imager to evaluate if ultrasound could detect decreased GI motility in the stomach and small intestine of Endurance horses. Preliminary results indicate that portable ultrasound is useful as a quick and non-invasive tool to evaluate a metabolic colic at the ride site.*

<https://teviscup.org/tevis-forums/>

15. Allen E Page, John C. Stewart, C. Langdon Fielding, and David Horohov (Aug 2019), The Effect of a 160-Kilometer Competitive Endurance Ride on Inflammatory Marker mRNA Expression in Horses, *J of Equine Veterinary Science*, **(79)**, pp 45-49.

*77 horses from the 2018 Tevis Ride were enrolled in this study. Blood sample for mRNA and genetic analyses were collected before, during, and after the ride. For the genetic markers that were evaluated, no differences were observed between horses that successfully completed the ride and those horses that were withdrawn during the course of the ride.*

<https://www.sciencedirect.com/science/article/abs/pii/S0737080619303260>

16. Gillespie, Jerry R. (April, 2020), The Tevis Hydration Study: Preliminary Results, *Endurance News*, April 2020, pg 35.

*Horses were evaluated during the 2019 Tevis Cup Ride for weight loss. Weight measurements were collected pre-ride, post-ride and at established veterinary holds during the ride. In this “Part 1” article, the weight-loss data is presented along with some preliminary conclusions. A more thorough interpretation of the results is presented in “Part 2” of this study (below).*

17. Gillespie, Jerry R. (June, 2020), The Tevis Hydration Study – Part 2: Dehydration and other factors affecting performance of horses at the 2019 Tevis, *Endurance News*, June 2020, pg 35.

*Horses selected for evaluation at the 2019 Tevis Cup Ride showed significant (average loss of nearly 50 lbs) weight loss in the first 35 miles of the event, followed by more-or-less steady weight measurements for the remainder of the ride. The change in weight is attributed to dehydration. It was shown that the top 20 fastest horses in the ride exhibited less dehydration than the remaining finishers in the ride. It was shown that horse that were pulled from the ride had greater dehydration than horses that continued in the ride. The role of dehydration in combination with other factors (training, ambient conditions, pacing) is also discussed.*

18. 2019 Friends of Tevis Recipients (2020), *Tevis Forum*, pg 8

*Awards presented to Dr. Gary Magdesian and Dr. Langdon Fielding for their veterinary research studies on Endurance horses.*

<https://teviscup.org/tevis-forums/>

19. Fielding, Langdon (2020), Colic in Endurance Horses, *Tevis Forum*, pg31

*Brief overview provided for causes of colic in Endurance horses and prevention strategies.*

<https://teviscup.org/tevis-forums/>

20. Fielding, Langdon and K Gary Magdesian (Dec 2021), Changes in electrolyte concentrations and hydration status in endurance horses following transport and an overnight stay prior to competition, *American J of Veterinary Research* **(82)**12

*19 horses entered in the 2016 Tevis Cup ride were subjected to blood analysis prior to transport to the ride, and at multiple points prior to the start and during the ride. Observations are provided for changes in blood electrolyte concentration as a result of transportation and ride events.*

<https://avmajournals.avma.org/view/journals/ajvr/82/12/ajvr.20.11.0193.xml>

21. Fielding, Langdon (2022), Intravenous Calcium and the Endurance Horse, *Tevis Forum*, pg 68.

*Evaluation of 18 horses requiring treatment with IV fluids as a result of withdrawal from the 2021 Tevis Ride for metabolic reasons. Half of the horses received a supplement of calcium added to their IV fluids. This group was found to have improved heart rate and certain muscle enzyme concentrations relative to the control group.*

<https://teviscup.org/tevis-forums/>

22. Fielding, Langdon C., Emma L. Deanne, Dustin S. Major, Jennifer Mayer, Juliette Love, Michael S. Perez, K Gary Magdesian (May 2023), Effects of Calcium Supplementation to resuscitation fluids in endurance horses: a randomized, blinded, clinical trial, *J of Veterinary Internal Medicine* (37)3, May 2023, pp 1216-1222.

*16 horses eliminated from the Tevis Cup Endurance Ride for metabolic problems and requiring IV fluid therapy were selected for the study. It was found that calcium supplementation led to a decreased heart rate but impaired improvement in gastrointestinal sounds.*

<https://doi.org/10.1111/jvim.16715>

