WASHINGTON HORSE RACING COMMISSION EQUINE HEALTH AND SAFETY REPORT 2021

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WHRC Racing Statistics

Racing and Training Days

Washington had one 49 day race meet in 2021 at Emerald Downs (EMD) from May 19 to September 26, 2021, with one day cancelled due to the high risk from excessive ambient temperature. The 49 day meet was a 32%-increase from the pandemic curtailed 38 race days of 2020. Prior to the shortened meet of 2020, 63 race days had been scheduled in 2020. Although an increase from 2020, the scheduled 50 race days in 2021 was a decrease of 25% from the 67 days of 2019 and 2018. ***(figure 1)*** Following 2020 when the number of training days was increased, 2021 had 185 training days, the fewest over the last 10 years. Sun Downs (SUD) did not conduct a race meet in 2021 due to the Covid-19 pandemic.

Figure 1: Number of: Race Days, Training Days, Races, Starters 2012-2021

	2012	2013	2014	2015	2016	2017	2018	2019	2020	**2021**
Racing Days	81	75	73	70	70	72	67	67	38	**49**
Training Days	187	218	215	215	202	210	210	200	230	**185**
Races	690	665	641	647	599	604	558	547	391	**417**
Starters	4390	4427	4022	4438	4450	4223	3927	3737	2905	**2707**

Total: Races, Races per Day, Starters per Race, and Starters

- Races: In 2021 there were four hundred seventeen (417) races, a 6% increase from the three hundred ninety one (391) of 2020.
- Races Per Day: There was an average of 8.1 races per day in 2021, a 21% decrease from the 10.3 in 2020.
- Total Starters: There were 2,707 total starts at EMD in 2021, a 9% decrease from the 2,905 in 2020. This continues a trend, following a 22% decrease from the 3,737 starts in 2019.
- Average Starters Per Race: There was an average of 6.48 starters per race in 2021, a 13% decrease from 2020 with 7.43 starters per race.

In summary, although the total number of races increased from 2020 to 2021, due to the decreased average number of races per day, and starters per race, the total starts decreased.

Sample Collection and Analysis

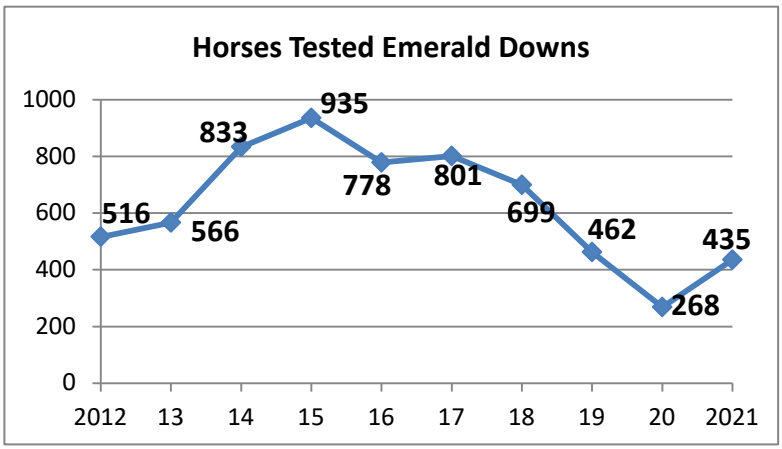
Laboratory and testing changes

In 2021 Industrial Laboratories Inc. of Wheat Ridge Colorado was selected as the WHRC contract lab. In June 2021 the WHRC reversed budgetary testing constraints beginning in 2019, continuing into 2020 and June of 2021. During that time WHRC 63.5% of samples collected were submitted for analysis. From June 24, 2021 all samples collected were submitted for analysis.

Post race sample collection

Post race samples were collected from four hundred eighty eight (488) horses, an 11% increase from the four hundred thirty two (432) horses sampled in 2020. Samples were collected from all first place finishers, as well as other horses selected by the Board of Stewards for testing. Continuing from 2019 and 2020 budgetary constraints, at the conclusion of each race day the Board of Stewards selected races which would be shipped for testing. Beginning June 24, 2021 all samples were analyzed. Horses in Stakes races finishing first and second were selected and tested, a curtailment of testing the first 3 finishers, due to Covid-19 regulations to limit the number of persons in the Test Barn.

Figure 2: Horse Blood Samples Submitted EMD 2012-21



Post race sample analysis

From the four hundred eighty eight (488) horses sampled, four hundred thirty five (435) or 89% were analyzed, a 38% increase from the two hundred sixty eight (268) horses analyzed in 2020. As previously mentioned, beginning in mid-June, the WHRC began analyzing all samples collected; reversing the declining trend of samples tested beginning in 2015. ***(figure 2)***

Total Carbon Dioxide samples (TCO_2)

Eleven (11) pre race samples were collected for Total Carbon Dioxide (TCO_2) testing, a 10% increase from the nine (9) samples of 2020.

Medication Threshold Violations

Twenty four (24) medication violations were reported in 2021, a 500% increase from the four (4) violations of 2020. As the significant increase of violations was due to fourteen (14) Dexamethasone (DEX) violations, factors contributing to the DEX violations were investigated.

Review of trainer practices revealed that one (1) DEX violation was attributed to oral administration by the trainer. Daily treatment reports submitted by attending veterinarians reported that one (1) violation was due to administration of DEX at 48 hours instead of WHRC recommended (based on Racing Medication Testing Consortium guidelines) administration time of 72 hours. One (1) violation was reported in a ship-in horse, as such no medication record was available. Eleven (11) DEX violations were due to administration of more than twice the WHRC recommended dosage, at the less than recommended 48 hours pre race. WHRC withdrawal recommendations caution the use of oral medications including DEX as well as recommending administration dosage and timeline. [1] Click here to see the WHRC Withdrawal Time Recommendations

Of the eleven (11) DEX violations, five (5) had also received trichlormethiazide (TRI), a medication containing additional DEX which further increased the dosage of DEX administered at 48 hours. As the TRI was manufactured by a compound pharmacy and not subject to rigorous FDA manufacturing standards, the WHRC analyzed TRI samples supplied by attending veterinarians at EMD for DEX concentrations. The compounded product contained dexamethasone acetate, a compound for which a reference standard does not exist; as such the lab was unable to report DEX concentrations. It is relevant to note that a reference standard for dexamethasone acetate does not exist because dexamethasone acetate is

[1] ***WHRC Withdrawal Time Recommendations 2021***

not an approved product. It is also pertinent to note that the DEX withdrawal recommendations are based upon the dexamethasone sodium phosphate formulation.

Another factor potentially contributing to the cluster of DEX violations may be the reinstitution of analysis of all collected samples. Beginning June 24 greater numbers of samples were tested; reports of medication violation began within 3 race days of this practice.

Other violations reported were three (3) for methocarbamol, and three (3) for betamethasone, two (2) for phenylbutazone (PBZ), one (1) for triamcinolone, and one (1) for dantrolene. ***(figures 3,4)*** Both PBZ violations were due to oral administration, when considering that one (1) DEX violation was attributed to oral medication, in conjunction with these PBZ violations, this was a significant improvement from 2019 when ten (10) violations were attributed to the use of oral medication administration (see WHRC Withdrawal Time Recommendations 2021 regarding oral medication administration).

Figure 3: Number of Violations 2012-21

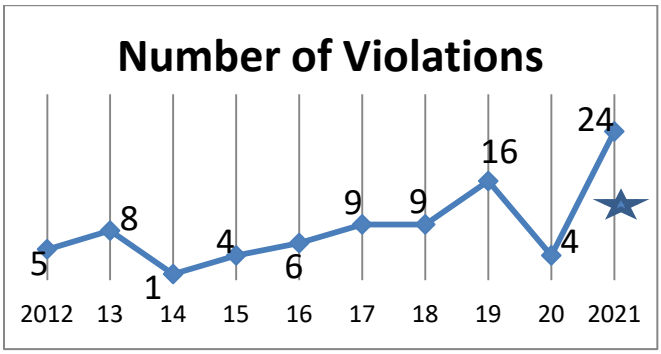


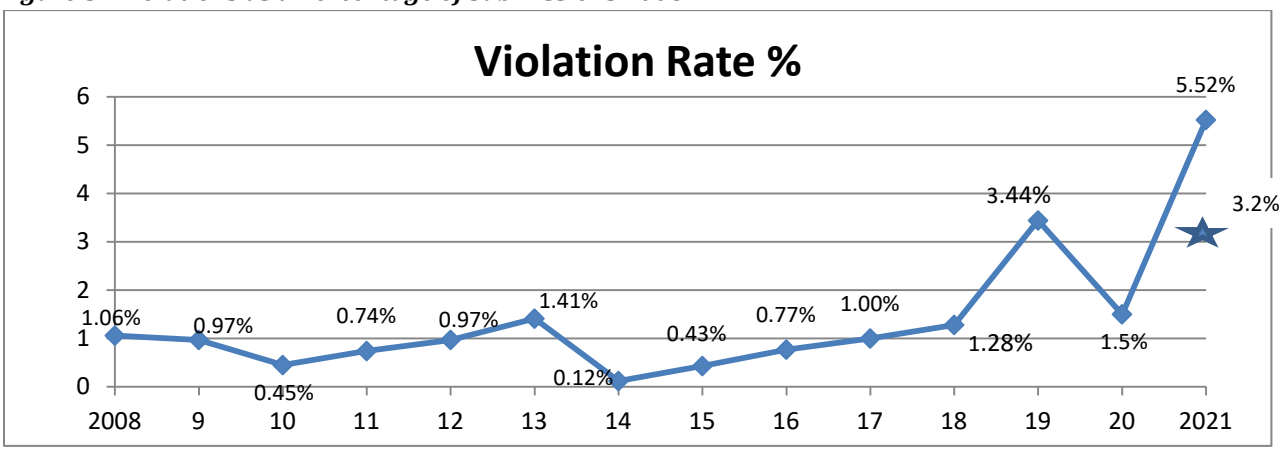
figure 4: Emerald Downs Threshold Violations 2020-21

Medication	**Family**	**2021**	2020
Dexamethasone	Corticosteroid	**14**	
Methocarbamol	Muscle relaxant	**3**	
Betamethasone	Corticosteroid	**3**	2
Phenylbutazone (PBZ)	NSAID	**2**	1
Triamcinolone	Corticosteroid	**1**	
Dantrolene	Muscle relaxant	**1**	
Acetanilide	NSAID (unapproved)		1

Violation Percentage of Submissions

With twenty-four (24) violations measured as a percentage of the four hundred thirty five (435) horses tested, 2021 had a 5.5% violation rate, a significant increase from previous years. If the DEX violation cluster are viewed as an aberration from previous years, without them violation total numbers (10) and percent of submission (3.2%) were similar to 2019 {noted by ★}. Both 2019 and 2021 had more than double the violation percentages than previous years. ***(figures 3,4,5)***

Figure 5: Violations as a Percentage of Submissions 2008-21



Violations by RCI Class

As RCI Penalty Class increases, the potential for altering a horse's performance decreases and as such penalties decrease. Therefore RCI Class 4 violations are less severe than RCI Class 3. With all violations in 2021 being Class 4, it continues a trend from 2018 in which Class 4 medications were the predominant violation class. In comparison, the majority of violations of 2017 were from Class 3 medications. ***(figure 6)***

Figure 6: Violation by RCI Class 2017-21

Medication	Family	RCI Class	2021	2020	2019	2018	2017
Betamethasone	Corticosteroid	Class 4	3			2	
Dexamethasone	Corticosteroid	Class 4	14		1		
Triamcinolone	Corticosteroid	Class 4	1				
Phenylbutazone	NSAID	Class 4	2	1	7		
Methocarbamol	Muscle relaxant	Class 4	3		4		
Dantrolene	Muscle relaxant	Class 4	1				
Flunixin	NSAID	Class 4				1	1
'Stacking' NSAIDS	NSAID	Class 4		2	1	3	
Furosemide	Diuretic	Class 4				1	
Trichlormethiazide	Diuretic	Class 4			4		
Acetanilide	NSAID (unapproved)	Class 4		1			
Xylazine	Sedative	Class 3				2	0
Clenbuterol	Bronchodilator	Class 3					6
Stanozolol	Anabolic steroid	Class 3					2
Cannabidiol	Anti-epileptic, analgesic	Class 2			1		
Methamphetamine	Stimulant	Class 1			1		

Health and Safety Statistics

Fatalities

Status at Time of Fatality

There were fourteen (14) fatalities at Emerald Downs in 2021. Fatalities are sent to Washington Animal Disease Diagnostic Laboratory (WADDL) Necropsy and Pathology section for comprehensive post mortem examination. Blood analysis of fatalities associated with racing was by the WHRC contract lab which reported no medication violations.

Two (2) fatalities were from conditions unrelated to racing or training. Seven (7) fatalities were associated with racing, and five (5) fatalities were associated with training. ***(figures 7, 8)*** Of the seven (7) fatalities associated with racing, humane euthanasia was carried out by WHRC veterinarians on five (5) horses on the track, attending private veterinarians humanely euthanized two (2) horses in the barns.

Racing Associated Fatalities

Seven (7) fatalities occurred as a result of musculoskeletal injuries sustained during a race in 2021 a significant increase from 2020 with zero (0) racing associated fatalities, but similar to total numbers from 2012-2019. (***figures 7,8,9)*** Racing associated fatalities from musculoskeletal failures consisted of:

- Four (4) with fractures of the front proximal sesamoid bones: two (2) with left front biaxial sesamoid fractures, one (1) with right front biaxial sesamoid, and one (1) with left front medial sesamoid.
- Two (2) with carpal bone fractures: both horses having left radiocarpal and 3rd carpal bone fractures.
- One (1) with front bilateral distal sesamoidean ligament rupture.

Four (4) racing associated musculoskeletal fatalities had findings consistent with chronic mechanical overloading and another two (2) had pre existing injuries contributing to the musculoskeletal failure.

With two thousand seven hundred seven (2,707) total starts there were 2.58 fatalities per 1000 starts. Although the total numbers of racing associated fatalities were lower than most previous years (with the exception of 2014, 2017, 2020), as there were fewer starts, fatalities per 1000 starts was second only to 2009. (***figures 7,8,9)***

Figure 7: Fatalities: Total, Per 1000 Starts 2009-21

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	**2021**
Racing Days	91	90	82	81	75	73	70	70	72	67	67	38	**49**
Starters	6058	5429	4898	4390	4427	4022	4438	4450	4223	3927	3737	2905	**2707**
Racing fatalities	16	9	10	8	8	5	11	8	6	9	7	0	**7**
Fatalities/1000 starts	2.64	1.65	2.04	1.80	1.81	1.24	2.47	1.80	1.42	2.29	1.87	0	**2.58**
Training fatalities	8	12	5	4	4	8	4	4	4	2	3	7	**5**
Non racing fatalities	10	10	9	8	4	4	5	3	8	7	6	6	**2**
TOTAL	35	31	25	20	16	17	20	15	18	18	19	13	**14**

Figure 8: EMD Racing Fatalities 2007-21

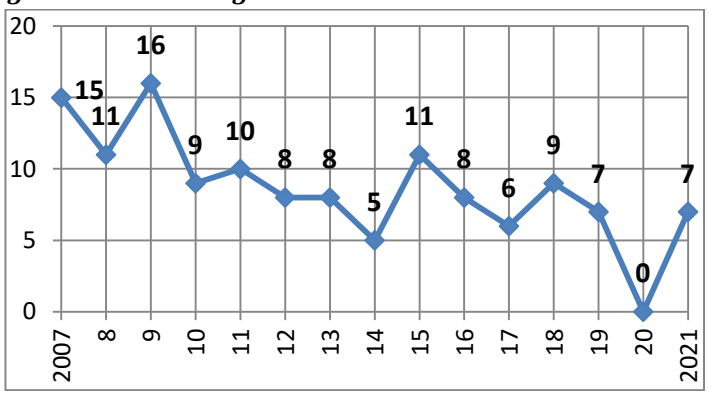
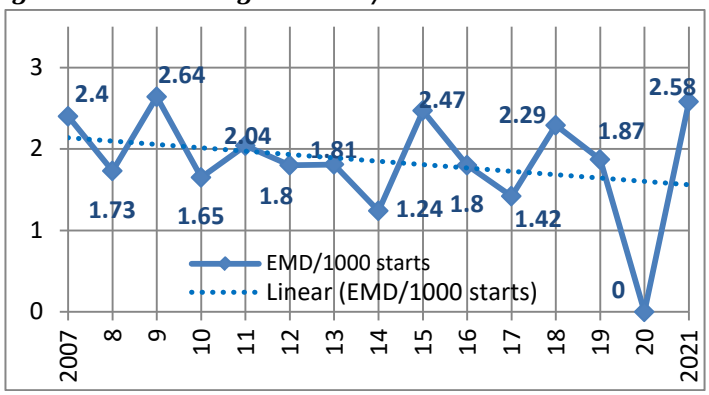


Figure 9: EMD Racing Fatalities/1000 Starts 2007-21



The 2021 fatality per 1000 starts of 2.58 at EMD is significantly greater than the average for EMD from the years 2007-2020 of 1.8 as well as the national rate for 2020 of 1.49 on dirt tracks [2]. ***(figure 10)***

[2] ***http://jockeyclub.com/pdfs/eid_12_year_tables.pdf***

Although numerically greater in 2021, the fatalities per 1000 starts trend since 2007 has been a statistically significant ***decreasing*** linear slope depicted by the blue dotted line ***(figures 9, 11)***. During the years 2009-2020 (years available nationally) the slope at which this rate has been decreasing has been steeper nationally than at EMD, but from 2017-2021 are virtually identical ***(figure 11)***

Figure 10: Fatalities: EMD/1000 starts; National/1000 starts on dirt tracks 2007-21

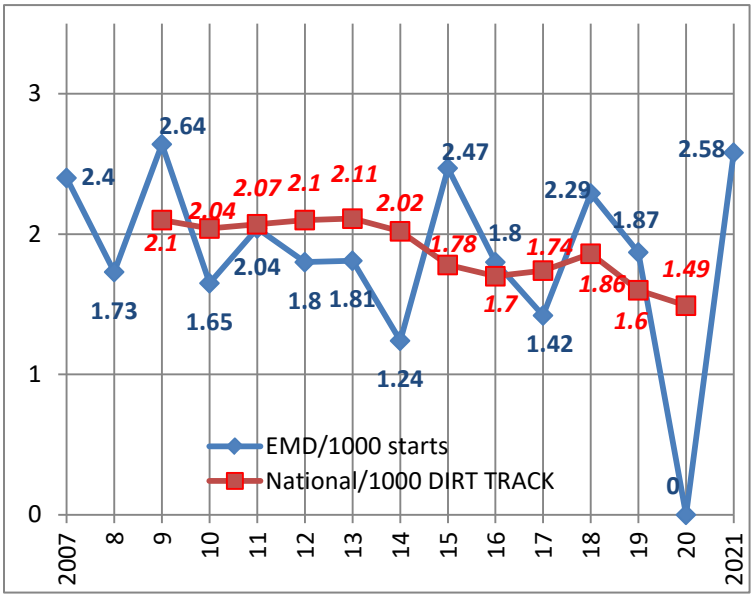
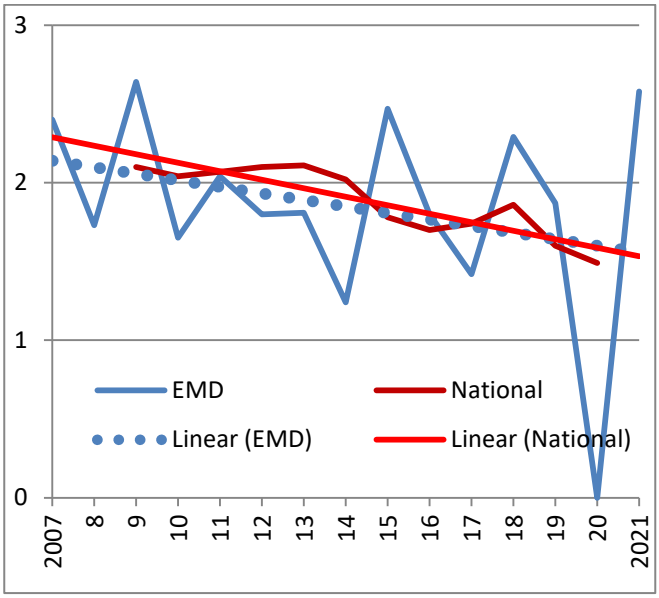


Fig 11: EMD & National/1000 starts dirt tracks linear trend 2007-21



Training Fatalities

Five (5) musculoskeletal failure fatalities were associated with training in 2021 a significant decrease from 2020 with nine (9) training associated fatalities, but greater than 2017, 2018, and 2019 with four (4), two (2), and three (3) training fatalities respectively. ***(figure 7)*** One (1) fatality occurred in May, three (3) in June, and one (1) in September.

The fatal musculoskeletal failures consisted of:

- Three (3) horses fractured their proximal sesamoid bones: One (1) horse with right front biaxial sesamoid fractures, one (1) horse with left front biaxial fracture, and one (1) horse with left front medial sesamoid fracture.
- One (1) horse fractured the left radiocarpal, intermediate, and accessory carpal bones, and the right 3rd metacarpal bone.
- One (1) horse fractured both scapulas.

One (1) training associated musculoskeletal fatality had findings consistent with chronic mechanical overloading, and another had a pre existing injury contributing to the musculoskeletal failure.

Pre-existing Injuries and Fatalities

Correlation and direct links between racing fatalities and factors potentially contributing to the fatalities are frequently difficult to make. However there is a very strong statistical correlation between catastrophic injuries and pre-existing injury. Although the presence of a pre-existing injury does not necessarily indicate that it contributed to a fatal injury, they often do. In 2021, the majority of musculoskeletal fatalities had findings consistent with chronic mechanical overloading; five (5) associated with racing, one (1) associated with training.

Risk Factors for Racing Fatal Musculoskeletal Injury (FMSI)

Factors known to increase the risk of fatal musculoskeletal injuries (FMSI) from racing have been researched and published. Some are well known and include previous history on veterinarian's list (VL). Others are not as well known, e.g. the accumulation of excessive high speed furlongs (race or timed works). Specifically, a horse with 35 high speed furlongs during the previous 2 months have a 3.9 fold risk of fatal injury compared to a horse accumulating 25 furlongs. Additionally, a horse accumulating 0.6F/day of high speed furlongs during last 2 months has a 1.8 greater risk than a horse with 0.5 F/day.[3] Although excessive high speed furlongs are statistically linked to racing FMSI, these risks have not been statistically linked to FMSI during training. That a connection exists would seem intuitive as high speed-furlongs both from racing and timed works are included in the above statistics. This is discussed further in the section below: ***Anti inflammatory Medication, Cyclic Loading, and Musculoskeletal Injury*** under the Veterinarian's List section below.

Prior to their occurrence, all seven (7) of the racing FMSI and four (4) of the five (5) training FMSI had from 1 to 4 factors raising their risk for racing fatal musculoskeletal failure and are listed below. ***(figure 12)*** Although these risk factors ***have not*** been statistically linked to FMSI sustained during training, further investigation is warranted as it may provide additional data as to any connection between these risk factors and training musculoskeletal fatalities.

Fig 12: Risk factors for racing fatalities

	RACING FATALITES							***TRAINING (A-D unraced)***				
	1	2	3	4	5	6	7	A	B	C	D	E
Excess Accumulation of high speed work									X			
New Trainer				X								X
Layoff > 60 days	X	X	X	X	X			X	X			X
First time starter 4 year old									X4yo	X6yo		
Quick turnaround (10 days)						X		X	X			
Drop in Class			X									
Previous VL history			X				X					
Less than 2 works/races in 30 days				X						X		X
No works since last race > 14 days	X				X	X	X					X

Non racing Fatalities

Two (2) horse fatalities were due to illness unassociated with racing or training, both unresponsive to extended treatment, one (1) for pleuritis, and one (1) for intractable septic osteomyelitis.

Veterinarian's List (VL)

In 2021 forty (40) horses were placed on the VL at EMD, a 37% decrease from the sixty (60) horses in 2020, as well as a decrease from 2019 and 2018. Two (2) of these horses were placed on the VL multiple times. The magnitude of the decrease compared to 2020 is amplified when considering that 345 more horses were examined during morning inspections in 2021. ***(figure 13)***

A significant percentage of FMSI have pre existing pathology contributing to the fatality. Although racing fatalities are relatively rare events with less than 1.5 horses per 1000 horse starts nationally, and the 2.58 per 1000 starts at EMD in 2021, preventing them is a primary and fundamental concern of all stakeholders. Due to their low incidence, it is difficult to find causative or predictive "cause and effect" factors which contribute to their occurrence.

[3] ***High-speed exercise history and catastrophic racing fracture of Thoroughbreds. Estberg L, et al. Am J Vet Res 1996:57(11)1549-55***

The veterinarian's list (VL) does provide a strong association between the incidence of racing related injuries and their impact on the racing career of a horse. Numerous studies have reported that inclusion on the VL for unsoundness increases the risk of fatal injury, as well as non fatal injury, leading to interruptions in, or the end of a racing career of a horse. Horses with a history of being on the VL have: significantly longer interval to their next race, more will not race in 6 months or 12 months than horses never on VL, and have a 2-3 times greater interval to their next race compared to horses who have not appeared on the VL.

Because the incidence of horses placed on the VL occurs in far greater numbers than fatalities, examining the circumstances and condition of horses placed on the VL may provide information on factors responsible for injury. These factors may progress into injuries which contribute to a musculoskeletal fatality at a future date, or far more commonly, non fatal injuries that add to the attrition of race horses in the EMD horse population. Consequently, injured horses regardless if placed on the VL or not, warrant close scrutiny. WHRC leads the industry regarding rules formulated for private veterinarians, trainers, and official veterinarians regarding the accumulation of information impacting horse health and safety. Unfortunately these rules have been met with almost complete obstruction. Disregard for these rules and will be discussed in greater detail below.

VL and Delay or End of Racing Career:

If entry into a race is an indication that a horse is believed to be sound for racing, horses put on the list during morning inspections and the post parade, had injuries that trainers either did not detect, or believed to be minor.
In 2021 thirty one (31) horses were placed on the VL before the race

- Twenty three (23) from morning exam
- Eight (8) from post parade

Of these thirty one (31) horses- seventeen (17) or 55% remain on the VL

When considering all forty (40) VL horses in 2021, eighteen (18) horses, or 45% worked off successfully, one doing so twice, five (5) haven't completed a timed work or raced following their successful work off the VL. These horses have either been retired from racing or have an extended delay of their racing careers.

Having 55% of horses placed on the VL from morning exam and post parade in 2021 and subsequently withdrawn from racing is an indication that although the degree of their unsoundness were initially subtle, they were serious enough to result in either prolonged layoff or retirement.

Conversely, the ease with which a horse works off the VL may be viewed as an indication as to the severity of the problem contributing to its placement on the list. As such, horses able to work off at the earliest opportunity have a less impactful injury, compared to a horse either requiring multiple works, or having a layoff extending into months , or resulting in retirement.

Vigorous objection is often made to scratches from morning exam or post parade. Working horses off the VL quickly may add validation of those objections, and differences of opinion. Although 2021 saw a slight improvement in horses working off the VL from morning exam and post parade compared to 2020 when less than 1/3 did so, having 55% of these horses unable to work off may be viewed as invalidation of many of these objections. In previous years the majority of horses placed on VL during morning exams and post parade successfully worked off.

Circumstances When Placed on VL

The VL numbers reported here include horses placed on the EMD VL in 2021 for musculoskeletal conditions of unsoundness. These do not include trainer scratches, which are put on the list but not required to work off, or starting gate scratches, which are usually not placed on the VL or required to work off.

Horses placed on the VL after a race more frequently sustained injuries which resulted in greater delays, or an end to their race careers than horses placed on the VL from morning exams or post parade. As such, detection of unsound horses prior to the race is preferred. In 2021, only one (1) of the seven (7) horses placed on the VL after the race has worked off the VL or had a timed work, with that horse subsequently retired from racing. This is similar to 2020 when thirteen (13) horses were put on the VL after the race; none have returned to racing.

Other considerations aside from injury factor into the decision regarding layoff or retirement; however considering the numbers of the last few years, they indicate a persistent and increasing problem of attrition due to injury and although 2021 was an improvement compared to 2020, there remains a need for improvement.

Placement on the VL for any unsoundness is recognition of a sports injury. Sports injury is a significant source of attrition resulting in a delay or an end of an athletic career. The time of placement on the VL, is potentially a reflection of the severity of the injury, if considered from the perspective of a horse's ability to recover from injury and work off the VL.

In 2021 two thousand six hundred eight (2,608) horses were examined during morning exams, a three hundred forty five (345) increase from 2020. Due to pandemic issues impacting the days of the week racing was conducted, and the inability to secure official veterinarians, one hundred eighty five (185) horses, or 6.6% of the horses entered, were not examined on the morning of their races. ***(figures 13, 14)***

- **Morning exam**: ***Twenty three (23)*** horses were placed on the VL during morning inspection, a 30% decrease from the thirty three (33) horses in 2020. As a percentage of the total horses placed on the VL, 58% (of the 40 total) were from morning inspection in 2021, comparable to 55% (of the 60 total) in 2020. In 2021, two (2) horses were not presented for morning exam and were placed on the VL and are required to work off the list. ***(figure 16)***
- **Post Parade (receiving barn to starting gate)**: ***Eight (8)*** horses were placed on the VL from the Post Parade, a 20% decrease from the ten (10) horses in 2020. As a percentage of the total horses placed on the VL, 20% (of the total 40) were from post parade in 2021 compared to 17% (of the total 60) in 2020.
- **After Race:** ***Seven (7)*** horses were placed on the VL after the race, a decrease from the thirteen (13) after the race in 2020. As a percentage of the total horses placed on the VL, 18% (of the total 40) were after the race in 2021, compared to 22% (of the total 60) in 2020. Three (3) of these horses left the track by ambulance.
- **Not Presented for Examination**: ***Two (2)*** or 5% of the forty (40) VL horses were placed on the VL because they were not presented for examination. This was a decrease from 2020 when four (4) horses weren't presented.

Figure 13: Examined, not examined, and Veterinarian's List

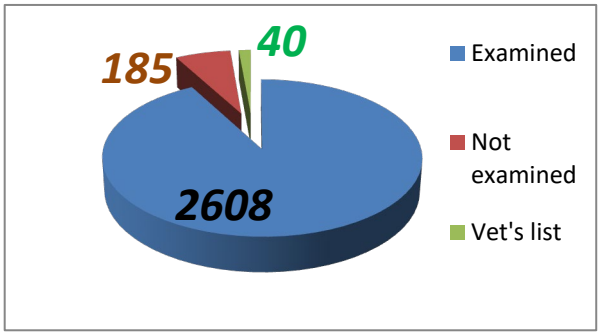
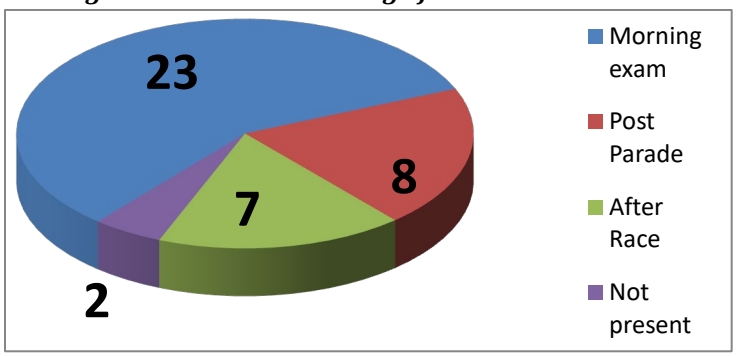


Figure 14: Vet's List- Timing of inclusion on List



VL By Month

Historically the placement of a horse on the VL occurs in a similar pattern both monthly, as well as the numbers of horses placed during morning exam, post parade, and after the race observations. In contrast to historical trends, during the last two years, rather than VL inclusions decreasing in the second half of the meet, as they did in July, August, and September of 2018-19, the number of inclusions onto the VL in 2021 and 2020 remained relatively unchanged from July through September in 2020, or increased in the latter months of the meet. ***(figures 15,16)***

- May-Three (3): Two (2) ***morning exam*** (***AM***). One (1) ***Post parade*** (***PP***).
- June- Seven (7): Three (3) AM. Two (2) PP. Two (2) ***After race*** (***AFTER***)
- July- Eleven (11): Eight (8) AM. Two (2) PP. One (1) AFTER.
- August- Nine (9): Six (6) AM**. Two (2) PP. One (1) AFTER.
- September- Ten (10): Four (4) AM. Two (2) ***not presented*** for AM. Two (2) PP. Two (2) AFTER.

Figure 15: Veterinarian's List by Month 2018-2021

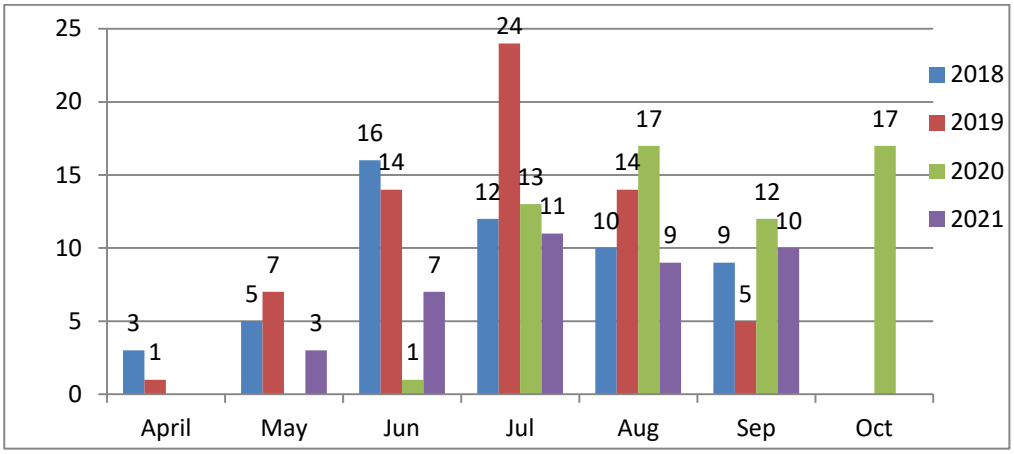
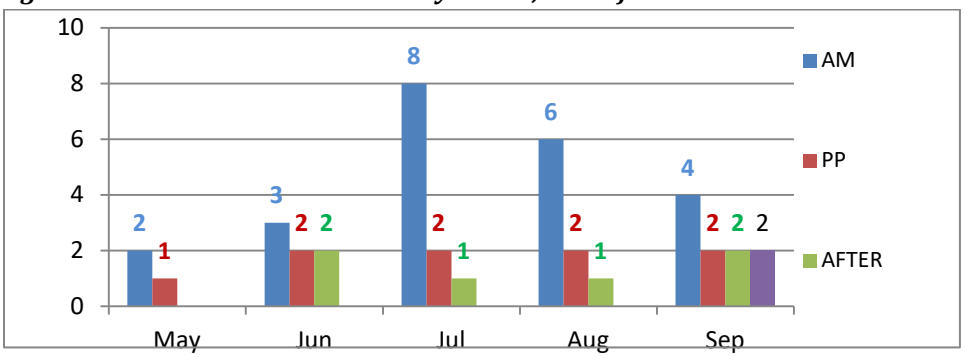


Figure 16: 2021 Veterinarians List by Month, time of inclusion



Working Off the VL

Horses placed on the VL for lameness, 'soreness', unsoundness, and on occasion injuries, are required to work off the list and may do so seven days after being placed on the list. The work must be a minimum distance determined by an official veterinarian in a time comparable for the track condition that day. The horses undergo an exam by the official veterinarian after the work and occasionally before the work. Blood is tested and may not exceed WHRC medication racing thresholds. Of the forty (40) horses placed on the VL at EMD in 2021, only eighteen (18) or 45% worked off successfully. Two (2) of these successful horses, were subsequently placed on the VL one or more times, one (1) of which remain on the list.

Working off VL on first attempt

Delays in racing career

Horses placed on the VL and successfully working off on their first attempt had delays in their racing career. The ability to work off shortly after placement on the VL may suggest that a horse had a less severe issue resulting in for their inclusion onto the VL. Conversely, a long interval to working off or failure in an attempt to work off suggests a more serious issue.

Of the eighteen (18) horses placed on the VL in 2021 and successfully working

- Sixteen (16) or 40% of the 40 VL horses - successful on their first attempt
- Average time on the VL *35.2 days*
- Range 7 to 94 days

Success on first attempt: morning exam, post parade, after the race

- Morning exam: Twenty three (23) scratched
  - Nine (9) or 39% successful on their first attempt

Two (2) horses were placed on VL for not being present for morning exams, neither attempted to work off.

- Post parade: Eight (8) scratched
  - Five (5) or 63% successful on first attempt
- After race: Seven (7) placed on VL
  - One (1) worked off

Longer delays in racing career

Horses working off the WHRC list from previous years, or requiring multiple attempts to work off, had extended interruptions of their racing careers.

- In ***2020*** Sixty (60) horses put on the VL at EMD
- Of these, twelve (12) or 20% worked off ***in 2021***, eight (8) of them at EMD and four (4) at other jurisdictions.
- Average time on VL *232 days*
- Range 118-335 days

Horses on VL in other jurisdictions which worked off at EMD had similar delays in racing career.

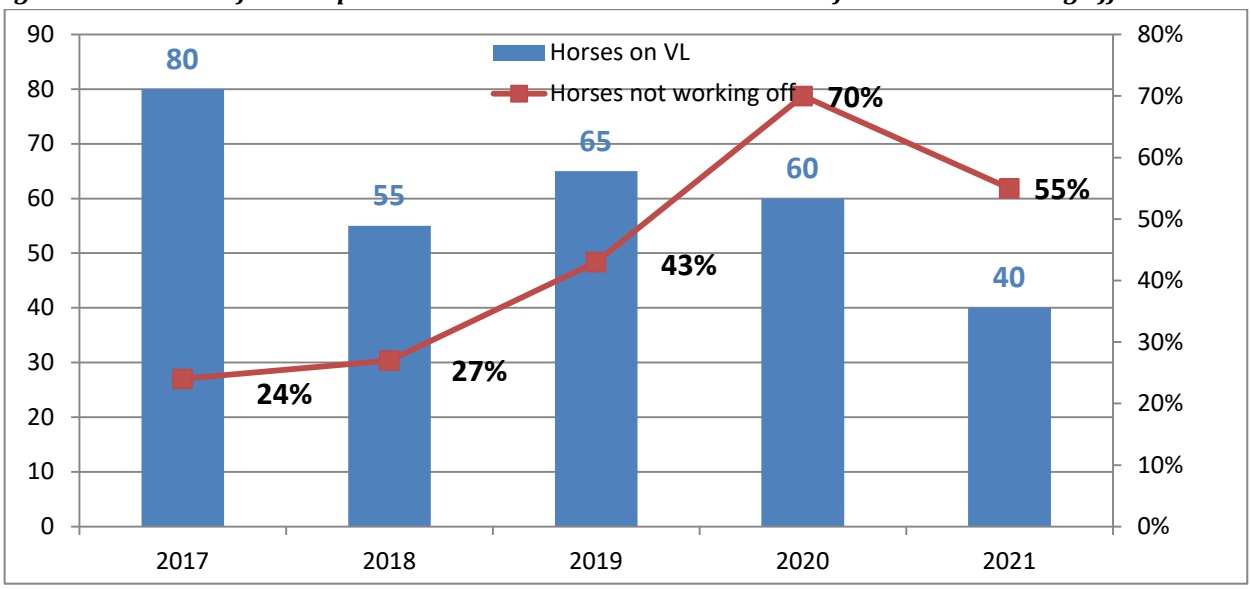
- Successful at their first attempt at EMD on VL average of 148 days.
- Horses requiring multiple attempts times at EMD on VL average of 141 days.

Attrition of Racehorse Population; Horses Unable to Work Off the VL

As mentioned above, twenty two (22) or 55% of the forty (40) horses placed on the VL in 2021 remain on the VL. If historical patterns continue as they have been, most are likely retired as they have not recorded timed works since placement on the VL and the writing of this report.

Decisions to layoff or retire horses on the VL may not be due solely to injury, however if we able to analyze that population of horses we might find ways to lessen the impact. As it is, this trend which began to increase in 2019, continues to be a significant contribution to racehorse attrition. Viewed in conjunction with decreased breeding numbers, it should raise concern and incentive to manage training practices as well as sports injuries differently. Understanding the details of these injury based retirements is the cornerstone to address it. ***(figure 17)***

Figure 17: Number of horses place on Veterinarian's List and Percent of horses not working off



All the above horses have been removed from racing, the majority permanently. Other horses have also been retired due to injury, but as they were unobserved by an Official Veterinarian, were not placed on the VL. The subject of racehorse attrition was discussed in a presentation at the Global Symposium on Racing in December 2021 by Dr. Susan Stover a professor at UC Davis and Chair of Horseracing Integrity and Safety Act (HISA) Racetrack Safety Committee, estimated that the attrition rate of racehorses in the U.S. is 3% per month, costing owners nearly $82 million every month.[4] The loss due to injury attrition of owners in Washington is unknown as the number of horses that were retired but not on the VL due to injury is unknown. Information regarding their injuries was unreported as required per WAC 260-28-295 and further discussed below in the Concerns and Recommendations section. The number of unreported horses retiring due to injury and unsoundness appears to be a greater number than the horses placed on the VL and retiring, but as it is unreported cannot be accurately assessed.

Timing of placement on VL and retirement from racing *(figures 18,19)*

As mentioned above, the time of race-day a horse was placed on the VL had differing consequences on its racing career. Of the forty (40) horses placed on the VL:

- **Morning exams**: Twenty three (23) scratched from these exams,
  - Comprising 58% of all horses placed on the list

[4] ***https://www.paulickreport.com/news/ray-s-paddock/takeaways-from-tucson-hisa-talk-dominates-global-symposium-on-racing/***

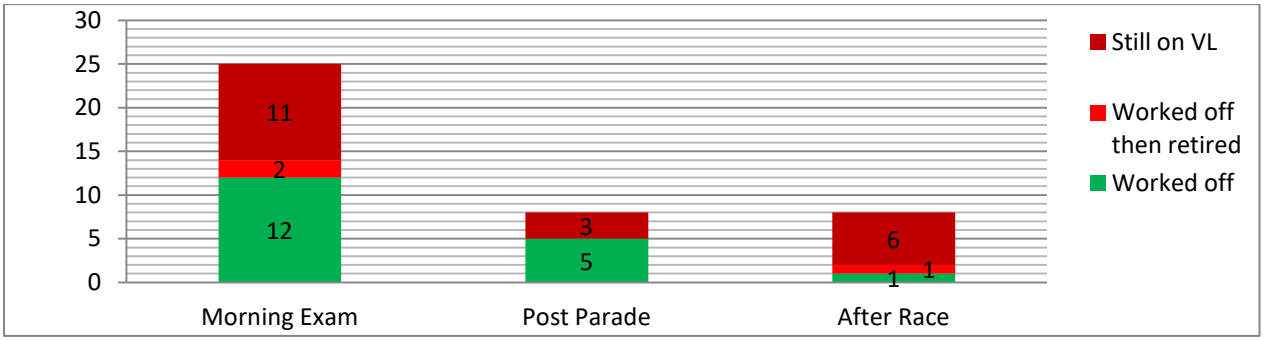
- Eleven (11) or 48% (of horses scratched in morning exam) ***did not return to racing***
- Twelve (12) worked off the VL
  - At least two (2) horses successfully working off were withdrawn from racing at a later date.
- Nine (9) never attempted to work off
- Two (2) failed in their attempt to work off

- **Post Parade**: Eight (8) horses were placed on the VL from the post parade
  - Comprising 20% of all horses placed on the list
  - Three (3) or 43*%* of horses placed on the list from post parade ***did not return to racing***
  - Five (5) horses worked successfully and were removed from the VL
  - Two (2) never attempted to work
  - One (1) failed to work off

- **After the race**: Seven (7) horses were placed on the list after the race
  - Comprising 18% of all horses placed on the list
  - Six (6) or 86% of horses placed on the list after the race ***did not return to racing***
  - One (1) horse worked off the VL but *was withdrawn from racing at a later date.*
  - Six (6) horses, did not attempt to work, several vanned off, and believed to have career ending injuries.

- **Not presented for exam:** Two (2) horses were placed on the list as they were not presented for examination. Neither has completed a timed work as of the time of this report

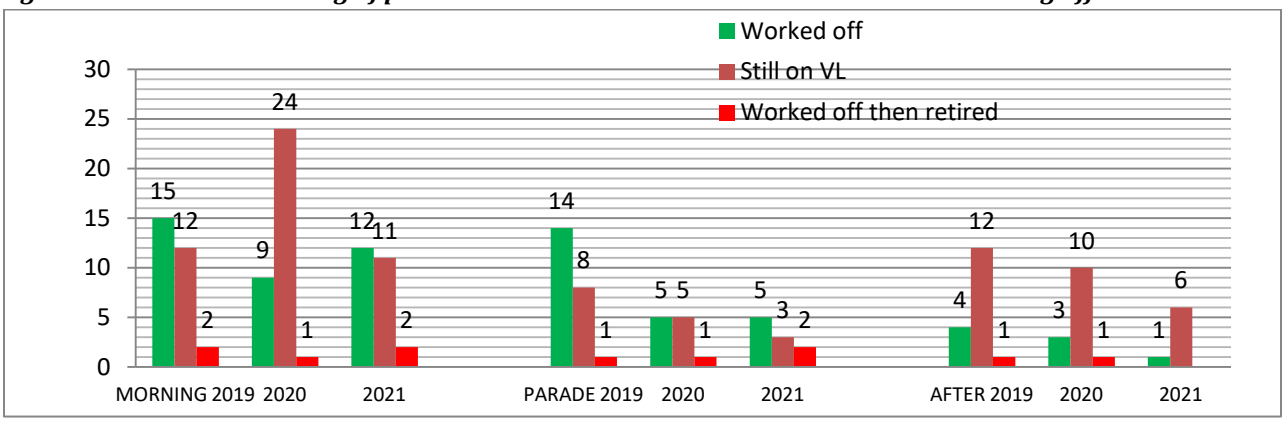
Figure 18: 2021 Timing of placement on Veterinarian's List and success at working off



Although 2021 showed an improvement from 2020 and 2019, racehorse attrition from horses placed on the VL during mornings in 2021 have been, and continue to be, a significant source of horses unable to work off, on extended layoff, and unfortunately and to a greater extent, an end of their racing career.

These horses were entered and believed to be sound for racing. However the majority of them were found to have lameness which apparently remained unresolved. The incidence of scratches and VL inclusions decreased in 2021 but continue to be a problematic contribution to racehorse attrition. The differences from 2019 through 2021 are best displayed graphically. ***(figure 19)***

Figure 19: 2019-2021 Timing of placement on Veterinarian's List and success at working off



Fifty five percent (55%) of horses placed on the VL were unable to work off as of the writing of this report, while this represents an improvement from 2020; it is still greater than previous years and continues a troublesome trend especially considering other industry factors impacting racehorse attrition.

Anti Inflammatory Medications, Cyclic Loading, and Musculoskeletal Injury

Dr. Susan Stover in her presentation at the 2021 Global Symposium on Racing previously mentioned, agreed that fatalities aren't the only concern. In addition to her comments on attrition of racehorses she reported that some form of pre-existing condition was detected in almost 90% of racing related fatalities. Adding that other factors increasing risk included corticosteroid injections, recent lameness and abnormalities in pre race exams.

Intra articular corticosteroid (IACS) and non steroidal anti inflammatory drugs (NSAID) do not cause musculoskeletal injury or fatalities. However, the NSAID phenylbutazone has been shown to increase ***risk*** for fatal musculoskeletal injury.[5] Also, horses injected with IACS have been shown to be at increased risk of additional injury for 49 days following injection.[6] These increased risks, although being a factor for jurisdictions imposing a pre race stand downs for intra articular injections and NSAID's, do not explain the mechanism of action in which anti inflammatories are linked to injury.

Horses racing and training at high speed produce large loads on their musculoskeletal system of bones, cartilage, joints, tendons, and ligaments. Both fatal and non fatal musculoskeletal injuries in the racehorse are mostly due to repetitive loading (also known as cyclic loading) from high speed exercise and resultant tissue fatigue. [7] [8] [9] [10] Fatigue of any material, be it musculoskeletal or metal aircraft components, are a result of repeated high energy loading and the

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[5] ***Association between the administration of phenylbutazone prior to racing and musculoskeletal and fatal injuries in Thoroughbred racehorses in Argentina. Zambruno et.al. JAVMA 2020:257(6): 642-647***

[6] ***Musculoskeletal injury rates in Thoroughbred racehorses following local corticosteroid injection. Whitton RC, et.al. Vet J 2014:200(01): 71-16***

[7] ***Patterns of stress fractures associated with complete bone fractures in race horses. Stover SM, et al. Proc AAEP 1993:39, 131-2***

[8] ***Physical activity: Does long-term high-intensity exercise in horses result in tendon degeneration? Birch HI, et.al. J Appl Phys 2008:105, 1927-33***

[9] ***Third metacarpal condylar fatigue fractures in equine athletes occur within previously modeled subchondral bone. Whitton RC, et.al. Bone 2010: 47 826-31***

[10] ***Preexisting lesions associated with complete diaphyseal fractures of the third metacarpal bone in 12 Thoroughbred racehorses. Gray SN, et. al. J Vet Diag Invest 2017: 29(4) 437-41***

inevitable degradation of the material by the repetitive cyclic loading. This ***YouTube*** video shows the progression of material fatigue, crack formation, and catastrophic failure of steel.[11]

One example of the result of cyclic loading is bone fatigue, a well documented cause of racing fatalities. The damage caused is by repetitive high speed or cyclic loading resulting in bone edema, micro fractures and weakening of bone. [12] A more recent publication from Dr. Stover's laboratory showed that proximal sesamoid bone fracture, the most common fatal racing musculoskeletal injury, is the acute result of chronic cyclic loading injury resulting in bone loss and failure of the sesamoid.[13] The damage to bone is slow in onset and the final injury not associated with a 'bad step'.

As sesamoid/fetlock injuries are the most common racehorse musculoskeletal fatality, and IACS promotes cyclic loading without appropriate time to heal, in 2021 the California Horse Racing Board prohibited any intra articular injections within 14 days of racing and extended that to 30 days for injections in the fetlock joint. This rule was extended to horses in training, prohibiting training within 10 days of fetlock injections. Preliminary results suggest that these practices may have significantly contributed to their dramatic reduction in racing and training fatalities.

In 2021 eight (8) or 67% of musculoskeletal fatalities from racing and training had evidence of pre existing injury. Six (6) of which had evidence of chronic mechanical overload, with another two (2) having preexisting microscopic injury. Mechanical overload was suspected in two (2) other fatalities, but the degree of maceration and dirt embedding into tissues precluded microscopic examination required for that diagnosis.

Two (2) fatalities had a history multiple IACS administration in the joint which would subsequently fail. However, as veterinary records of horses do not follow the horse through different jurisdictions, and are therefore unavailable for review, an accurate investigation into the prevalence of corticosteroid usage in these horses is not possible.

Additional indirect but relevant evidence that cyclic loading and its resultant tissue fatigue and failure occur, is demonstrated by the predictable and repeated anatomical location and patterns of injury. For example: both equine scapular and humeral fractures have highly predictable pre existing patterns of bone fatigue with predictable location of fracture lines.
In a similar manner, Thoroughbred racehorses compared to harness horses experience characteristically different types of cyclic loading, tissue fatigue, and subsequently different tissue pathology and injuries. As a consequence of cyclic loading, the most common fatal injury in the Thoroughbred racehorse in the United States are front limb proximal sesamoid bone fractures , while the Standardbred racehorse most commonly sustains non fatal suspensory ligament injury. When these tissue fatigue related injuries progress into catastrophic failures, they may occur without previous lameness, or lameness associated with another anatomical location. Recognition of fatigue related injuries before they develop into a non fatal end of career injuries could dampen the worsening attrition trend of VL horses at EMD.

Finally, the link between IACS, cyclic loading, and injury can be best demonstrated by considering that IACS are extremely effective at decreasing inflammation and pain, but have no efficacy at decreasing tissue fatigue if rest is not initiated. Anti inflammatory medication decreases heat, pain, and swelling, the hallmarks of inflammation, but they do not address the origin of that inflammation. What anti inflammatory IACS injection and NSAID medications do is to influence a trainer's decision to either continue high speed exercise or begin a less traumatic low intensity exercise. As a

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[11] ***YouTube video*** ***demonstrating steel fatigue, crack formation, failure*** ***https://www.youtube.com/watch?v=hASl6d3z3BM***
[12] ***Bone fatigue and its implications for injuries in racehorses. Martig S, et.al. Eq Vet J 2014:46 408-15***
[13] ***Subchondral focal osteopenia associated with proximal sesamoid bone fracture in Thoroughbred racehorses. Shaffer SK et.al. Eq Vet J 2021, Mar;53(2):294-305. https://pubmed.ncbi.nlm.nih.gov/32474944/***

result the horse remains at a higher risk of musculoskeletal injury than it may have if the training workload decision was made with observations of the horse without the effect of these medications.

Veterinarian's List – Intra articular Corticosteroid (IACS) Anti Inflammatory Medications

Similar to competitive athletes of any species, as the competitive season progresses the incidence of sports injuries increases. As a direct consequence, anti-inflammatory medication is administered at an increased frequency as the race meet progresses. In the previous meet of 2020 the administration of IACS has followed a predictable pattern at EMD; as the season progresses, with the interval between joint injection and racing decreasing, if a horse received multiple injections the interval between injections decreased, and the incidence of injections per horse increased. These corticosteroid administration intervals may be correlated with another parameter indicating injury: horses placed on the VL. ***(figure 21)***

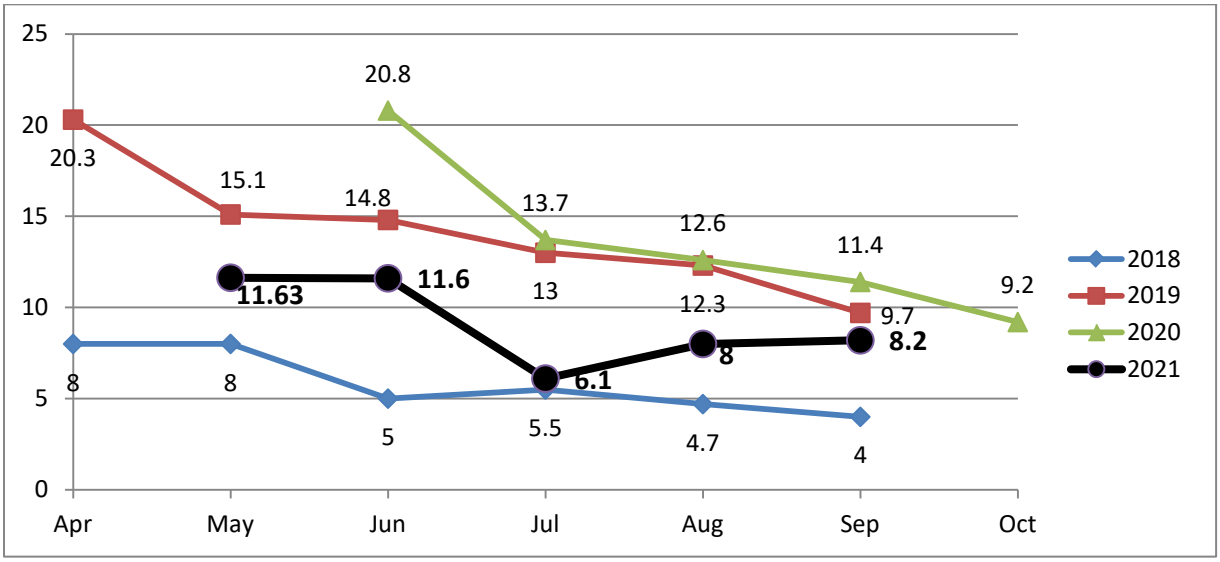
Interval between IACS and racing

The recurring pattern of the interval between IACS and racing is evident to different degrees from 2018- 2020, ***(figure 21)*** yet differs slightly in 2021 ***(figure 22)***. There has been improvement during these years; in 2018 thresholds were decreased for both steroidal and NSAID's, however a one year grace period on violations of these lowered thresholds was in effect resulting in the interval between IACS injection to race day remaining unchanged from previous years.

The interval in 2018 averaged 8 days in April, and decreased to 4 days in September. In 2019 the averages in the interval more than doubled, beginning in April at 20.3 days and ending in September at 9.7 days. One explanation for this dramatic increase in this interval between 2018 and 2019 was the possibility of violation as the 2018 grace period expired. An almost identical interval pattern continued into 2020 beginning at 20.8 days at the beginning of the meet in June, and progressively decreasing until the end of meet at 9.2 days in October. ***(figure 21)***

In 2021 a different pattern emerges for this IACS injection to racing interval. ***(figure 22)*** At the beginning of the meet in May the average is 11.63 days, decreasing to 6.1 days mid season in July, and then increasing in August (8 days) and September (8.2 days). It would seem plausible that the increased interval between IACS and racing in August and September may have been in reaction to the cluster of dexamethasone violations reported in July and discussed above.

Figure 20: Days between corticosteroid joint injection and race 2018-2021

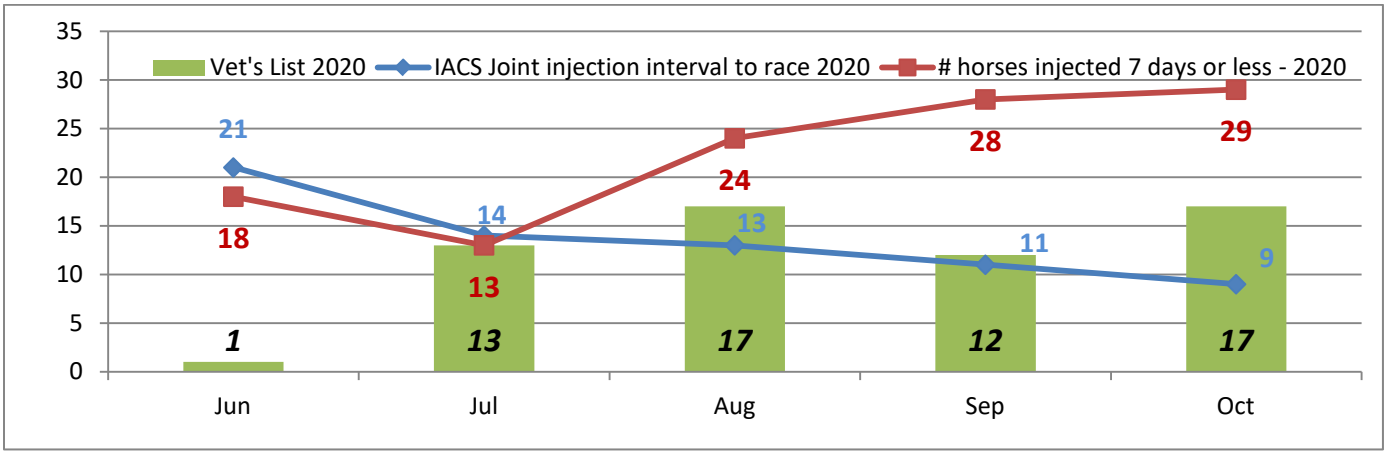


Number of horses receiving IACS less than 7 days before the race

In addition to reviewing the average interval between IACS injection and racing, another manner in which to get an idea of the prevalence of the use of IACS is to look at the number of horses receiving these medications 7 or fewer days before the race along with VL inclusion numbers in both 2020 and 2021. ***(figures 21, 22)***

Comparisons between 2020 and 2021 reveal differing patterns. VL inclusion numbers show similar ratios as the season progresses in both years. However, in 2020 as the season progresses the number of horses receiving IACS injection 7 days or less before racing continued to increase till the end of the meet. In 2021 following a mid season peak in July the numbers decreased monthly until the end of the meet. If historical patterns are any indication, this pattern will return to those seen in previous years. As mentioned, this change was likely influenced by the cluster of medication violations reported in July.

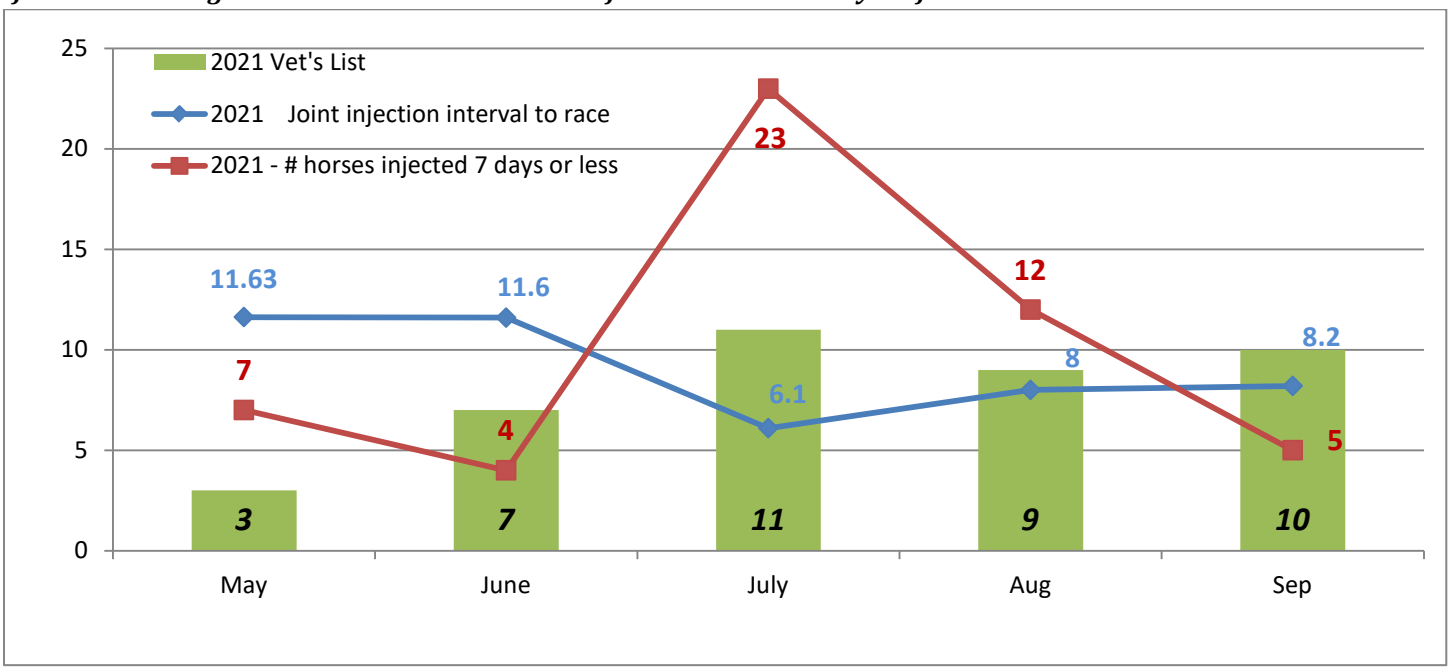
Figure 21: 2020 Days between intra articular (joint) corticosteroid injection and race, inclusion onto vets list, number of horses receiving intra articular corticosteroid injection less than 7 days before the race.



In 2020 the monthly average of the interval between IACS injection and racing declined as the meet progressed. ***(figure 21)*** In 2021 although the number of horses receiving IACS closer to racing didn't increase as the season progressed as it did in 2020 , the average interval started at a lower average than 2020 of 11.6 days, decreased to 6.1 days in July, and increased to 8.2 days in October. ***(figure 22)***

Although the average interval between an IACS injection and race day improved from 2020, it is noteworthy to point out that throughout the meet horses were receiving IACS in as little as 3 days before the race. Review of attending veterinarian veterinary treatment reports in conjunction with the trainers to which the horses belonged, it appears that many IACS injections took on a 'pre race' treatment regimen, in repeatable recognizable patterns, utilizing smaller doses closer to racing.

Figure 22:* 2021 *Days between intra articular (joint) corticosteroid injection and race, inclusion onto vets list, number of horses receiving intra articular corticosteroid injection less than 7 days before the race.



Equine Medical Director Concerns and Recommendations

Concerns:

- **A 55% attrition rate of horses on the veterinarian's list unable to work off is a troublesome trend. Other industry and market forces (e.g. foaling numbers) which previously worked to increase racehorse numbers have dramatically decreased. As such, all options to lessen racehorse attrition, including alteration of training protocols, especially the widespread usage of anti inflammatories during training, must be considered.**

- **Current practices of anti-inflammatory medication usage impact a trainer's ability to evaluate a horse's condition without pain relief. This hinders the trainer's observations and impacts the decision to either continue high speed exercise, or begin a less traumatic lower intensity exercise program.**
    - **The use of NSAID's as a 'pre-race' regimen has been occurring for decades and results in treatment for a race rather than a health related condition.**
    - **Use of lower doses as close as 3 days before racing continues and the practice is expanding.**
    - **Many intra articular corticosteroid treatment patterns indicate a 'pre-race' protocol, rather than a treatment for a condition. This 'pre race' administration practice is increasing.**

- **Due to the strong association between fatal musculoskeletal injury and pre existing injuries, the identification of horse with career delaying injuries along with the nature of their injury is of concern and stipulated by multiple existing WHRC rules.**

- **The WHRC leads the nation with rules focusing on meaningful health and safety measures for the horse. At its core, the WHRC rules require the official veterinarian maintain a health record of each horse inspected. Additional rules specify the measures available to the WHRC as well as clear instructions to trainers and private veterinarians as to how to contribute to this end.**
    - **WAC 260-70-540 Equine Medication Program - Veterinarian's reports**
        - ***(f) Any other information required by the official veterinarian***
    - **WAC 260-70-570 Equine Medication Program- All horses are subject to inspection**
        - ***(2)(e) Any other inspection deemed necessary by official veterinarian***
    - **WAC 260-28-280 Trainer- Reporting sickness of horse**
        - ***A trainer must immediately report any sickness or illness of any of his or her horses to an official veterinarian***
    - **WAC 260-28-295 Trainer Responsibility**
        - ***(7)(h) Promptly reporting the serious injury and/or death of any horse at locations under the jurisdiction of the commission to the stewards and the official veterinarian***.

- **Concerns of track surface continue to be expressed to official veterinarians. Unfortunately many concerns contradicted each other as they ranged from soft to hard track surface, and on occasion both simultaneously.**

- **Horses sustaining injuries during training were not placed on the Veterinarian's List or required to be examined by an official veterinarian and work off the list.**

- **An almost complete lack of licensee compliance with WAC 260-70-540, WAC 260-70-570, and WAC 260-28-295 made any recommendation or assessment of track related injury unreliable. The full impact of injuries on the attrition of horses from racing is unknown and appears to be significantly greater than what is known by the official veterinarian from horses on the veterinarian's list.**

- **The culture of hiding everything from the official veterinarian is outdated, unsustainable, and for the sake of the horse, and the industry must change.**

Recommendations:

- **The influence of NSAID's intra articular corticosteroid injection on horse injury is primarily due to its effects enabling horses to continue high speed cyclic loading, without adequate time to recover from tissue fatigue. This illustrates the necessity of the ARCI Model Rule adopting a 14 day or longer stand-down for joint injection along with a 48 hour stand-down for anti inflammatory administration.**
  - **Adoption of a 14 day stand down between intra articular injection and racing *and prior to working off the Veterinarian's List* is recommended.**
  - **Adoption of a 48 hr stand down between NSAID administration and racing *and prior to working off the Veterinarian's List* is recommended**

- **Once horses are placed on the veterinarian's list, all had a delay in their racing careers, with a majority retired from racing. To decrease these numbers**
  - **It is recommended that as the meet progresses, horses exercising at high speed be evaluated by trainers without the benefit of anti inflammatories.**
  - **Alteration of training practices without the use of anti-inflammatory medication should be considered especially if a horse has risk factors for fatal musculoskeletal failure**

- ✓ **Non compliance with Trainer Responsibility rules of reporting injury continues.**
  - **It is recommended that a rule requiring a veterinarian to report any injury requiring twenty one or more days of rest be reported.**
  - **Increased enforcement is recommended to improve compliance with WAC:260-28-280, 260-28-295, 260-70-540, and 260-70-570. Rules requiring reporting of serious injury and illness by trainers.**

- **It is recommended that a rule be adopted requiring all ship in or newly arrived horses provide a 30 day medical record, along with a *365 day record of corticosteroid joint injection and lameness diagnostics*, at entry time or arrival, whichever is first.**