Washington Horse Racing Commission

2007 Equine Health and Safety Report

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Executive Summary

The 2007 Equine Health and Safety Report is submitted to the Washington Horse Racing Commission (WHRC) as required by WAC 260-70-510. The report has three parts:

1. Equine medication testing
2. Postmortem examinations of racehorses
3. Plans for the equine health and safety program

During the 2007 racing season the stewards issued rulings on twenty medication violations at Emerald Downs: twelve for overages of permitted medications (phenylbutazone), three for presence of prohibited class 4 substances, three for improper medication, and two for failure to submit required forms on time. Another ruling was issued for a medication violation at the Sundowns (class C) nonprofit racetrack for presence of a class 2 substance.

With the data collected in 2007, the WHRC now has seven years of data available for analysis. The data from postmortem examinations indicates the majority of fatalities (68.0%) occur during training or racing. The average fatalities per year for the three largest categories are 11.7 during racing, 7.4 during training and 8.4 in the barn area. The total number of fatalities increased in 2007 to thirty-five from twenty-eight. Twenty-seven of the fatalities had thirty-six musculoskeletal injuries. The number of musculoskeletal injuries exceeded the seven-year average by fifty-two percent and the number of limb injuries exceeded the average by forty-two percent.

In September 2007 Emerald Downs management contracted with a national expert who found that high clay content was causing the track surface to stiffen up faster, which was aggravated by higher than usual rainfall. Emerald Downs added an inch of sand prior to the 2008 racing season to dilute the amount of clay in the track surface.

Goals for the postmortem program include (1) determining the nature of injuries, (2) determining the cause of injuries, and (3) developing preventative strategies. The partnership between WHRC and Washington State University (WSU) College of Veterinary Medicine focuses on providing accessible data for equine health research. Veterinarians at Emerald Downs are also participating with thirty-one other racetracks in an Equine Injury Reporting System. In addition, the Commission took action to limit the height of toe grabs on thoroughbreds in an attempt to reduce the potential for injuries.

The report concludes with a number of issues for further consideration by the WHRC.

- Should the ARCI model rule on equine medication penalties be adopted?
- Should necropsies be performed on pony horses and outrider horses?
- Should funding for research projects be focused?
- Should a thorough evaluation be conducted on this report and the necropsy program?

Introduction

The WHRC and its veterinary staff are committed to the health and safety of horses racing in Washington. The 2007 Equine Health and Safety Report is submitted to the WHRC pursuant to WAC 260-70-510. The annual report includes data on equine medication violations, equine medication and treatment, and a review of the WHRC's list of quantitative medication levels.

This was the seventh complete year that the postmortem program has been in operation. This report provides an overview of the WHRC equine health and safety program and consists of three parts:

1. Equine medication testing;
2. Postmortem examination of racehorses; and
3. Plans for the equine health and safety program.

In addition, annual approval for the 2008 racing season is requested from the WHRC for the list of "WHRC Approved Equine Split Sample Drug Testing Laboratories," which can be found in the Appendices on page 28. The list of laboratories and prices remain unchanged from the 2007 racing season.

In 2005 the WHRC was able to assume responsibility for the full cost of the postmortem program due to the increased revenues generated by advance deposit wagering (RCW 67.16.260). In addition these funds allowed the WHRC to implement Magnetic Resonance Imaging (MRI) examinations. MRI studies have been conducted on limbs from fifty-three racehorses over the past two years.

Part 1. Equine Medication Testing

Equine medication testing is required by chapter 260-70 WAC to protect the integrity of horse racing, to ensure the health and welfare of animals under the jurisdiction of the WHRC, and to safeguard the interests of the public and participants in racing.

The equine testing program tests the winner of each race, the winner plus second and third place finishers in stakes races, horses selected at random, and those horses whose action or performance raises questions or concerns from the Stewards or official Veterinarians. Blood and urine samples are collected by WHRC staff and shipped to Truesdail Laboratories, Inc. for testing. Laboratory reports are provided to the WHRC veterinary staff and violations are forwarded to the Stewards for possible enforcement action.

During the 2007 race meet Stewards at Emerald Downs issued rulings on twenty medication violations as follows:

12 - overages of phenylbutazone, a permitted medication;

3 - for presence of class 4 substances (one methocarbamol and two betamethasone);

3 - for improper medication administration; and

2 - for failure to deliver furosemide treatment forms at the required time.

Table 1a provides a four-year summary of Stewards' rulings on equine medication violations at Emerald Downs. In 2007 there was another ruling for a medication violation at the Sundowns (class C) nonprofit racetrack for presence of a class 2 substance (hydroxychlorpromazine). (See Table 1b for the equine medication violations at the nonprofit racetracks.)

Table 1a. Stewards' Rulings on Medication Violations at Emerald Downs, 2004-2007

Violation	2004	2005	2006	2007
Overages on permitted medications	13	22	15	12
Presence of prohibited substances	1	4	3	3
Improper medication administration	2	2	4	3
Failure to deliver forms on time	1	1	1	2
Presence of contraband items	1	0	1	0
Total	18	29	24	20

Table 1b. Stewards' Rulings on Medication Violations at the Nonprofit (class C) Racetracks, 2004-2007				
Violation	**2004**	**2005**	**2006**	**2007**
Overages on permitted medications	1	2	3	
Presence of prohibited substances				1
Improper medication administration				
Failure to deliver forms on time				
Presence of contraband items				
Total	1	2	3	1

The permitted medication rule, WAC 260-70-640 (see Appendices), allows one non-steroidal anti-inflammatory drug (NSAID) to be administered no closer than twenty-four hours before post time. The three permitted NSAIDS are flunixin (banamine), ketoprofen (ketofen), and the traditional NSAID, phenylbutazone. In April 2008 WHRC staff will propose that the WHRC increase the threshold concentration of flunixin to 50 ng/ml from 20 ng/ml.

Over the next several years the Racing Medication and Testing Consortium (RMTC) is expected to provide concentration thresholds for forty-four medications to the Model Rules Committee of the Association of Racing Commissioners International (ARCI). The establishment of these concentrations is being determined by scientific research. If adopted by the ARCI, these thresholds will be submitted to the WHRC for adoption in Chapter 260-70 WAC. Current quantitative threshold levels for medications and environmental contaminants are listed in WAC 260-70-630, Threshold Levels (see Appendices). Amendments to the threshold levels were adopted in February 2008 by the WHRC based on model rules developed by RMTC and supported by ARCI. These amendments set concentration levels for androgenic-anabolic steroids and take effect June 1, 2008.

At its December 2005 board meeting the ARCI adopted the equine medication penalty model rule proposed by the Model Rules Committee. The equine medication penalty model rule was developed by the RMTC. WHRC staff proposed the model rule as amendments to Chapters 260-70 and 260-84 WAC. However, the WHRC voted on January 11, 2007 to not adopt the national model rule on equine medication penalties. The veterinary staff recommends that the WHRC adopt the equine medication penalty model rule as written.

Part 2. Postmortem Examinations of Racehorses

Goals

Through a public-private partnership with the Washington Horsemen's Benevolent and Protective Association (HBPA), Northwest Racing Associates, LP (Emerald Downs), and Washington Animal Disease Diagnostic Laboratory (WADDL) at Washington State University College of Veterinary Medicine, the WHRC established a postmortem program to examine horses that died at Emerald Downs. These include horses that have suffered catastrophic injuries during racing and training, and those who died from illness or from no apparent cause.

The goals of the postmortem program are to:

1. Determine the nature of injuries suffered by racehorses in the state;
2. Determine the causes of those injuries; and
3. Develop preventive strategies for reducing the number of injuries.

The postmortem program began in 2001 as a joint effort of Washington's horse racing industry including the HBPA, Emerald Downs, WHRC and WADDL. The WHRC provides staff and a refrigerated truck for transportation of deceased horses.

In prior years the local HBPA, Emerald Downs and WADDL shared some of the costs for the postmortem program. However, beginning in 2005 the WHRC assumed responsibility for the full cost of operating the program. In 2006, the WHRC enhanced the postmortem program to include two of the recommendations adopted by the WHRC in June 2005: (1) increase the amount and availability of the postmortem program data to WHRC veterinary staff, faculty and researchers at WADDL; and (2) implement Magnetic Resonance Imaging (MRI) as an enhanced tool in diagnosing limb injuries. Where possible, horse fatalities from the nonprofit race meets were sent to WADDL beginning in 2006.

At the April 13, 2007 WHRC meeting Dr. Russell Tucker, Veterinary Medicine Teaching Hospital, Washington State University, gave a presentation on the radiology (MRI) work performed in 2006. Dr. Tucker recommended that comprehensive histomorphology analysis be conducted on tissue samples collected from sites identified by MRI. The WHRC supported Dr. Tucker's proposal and cost estimates, and approved its inclusion in the necropsy program at the July 12, 2007 WHRC meeting.

When a horse dies at Emerald Downs, WHRC staff transport the horse by truck to WADDL for postmortem examination. At WADDL, each horse is systematically examined and detailed injury information and pertinent clinical data are recorded. Various specimens from the necropsies are shared with faculty at WSU College of Veterinary Medicine for analysis of specific injuries. Final reports are submitted to WHRC veterinary staff and are available to be shared with the owner, trainer and

practicing veterinarian. Copies of the necropsy reports are posted on the WHRC server for review by WHRC veterinarians, but are not accessible to the public.

The postmortem examination program is addressing the following areas:

1. It is educating trainers, owners, veterinarians, as well as WSU faculty and students on the nature and causes of injuries to racehorses.
2. The data provides a factual basis when answering inquiries about the death of racehorses.
3. The data has provided the cause of death for all fatalities except for five that have been classified as undetermined:
    a. Two occurring in the barn area;
    b. Two during training; and
    c. One post race.
4. It can also provide early notice of serious infectious diseases.
5. As more data is collected, statistically significant information will be available to assist in developing preventive strategies to decrease injuries to racehorses.

Statistical Reports

This report summarizes postmortem results for calendar years 2001-2007. The data from this period is fulfilling the first goal of the program - determining the nature of injuries.

Table 2. Status at Time of Fatality, 2001-2007

Year	2001	2002	2003	2004	2005	2006	2007	Total	Percent	Average
Racing	9	13	10	8	18	10	14	82	41.6%	11.7
Starting Gate	0	0	0	1	0	1	1	3	1.5%	0.4
Training	8	6	8	3	8	8	11	52	26.4%	7.4
Paddock	1	0	0	0	0	0	0	1	0.5%	0.1
Barn	5	8	13	8	7	9	9	59	29.9%	8.4
Total	23	27	31	20	33	28	35	197	100.0%	28.1

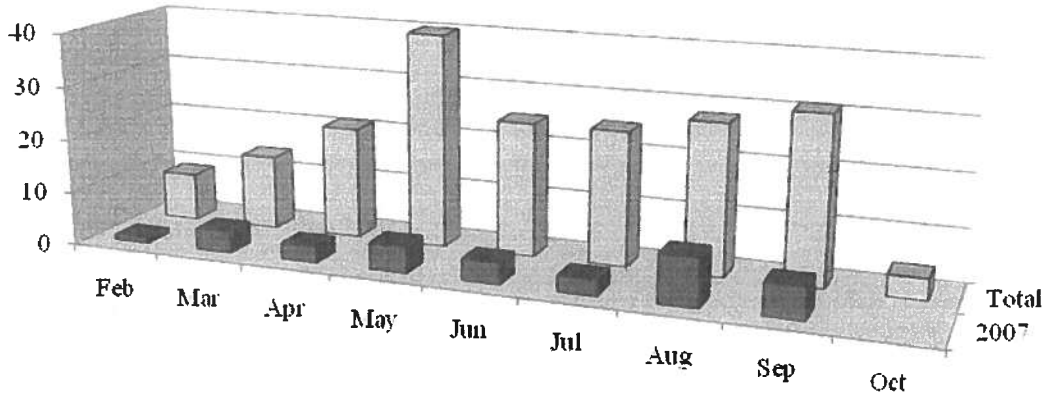
Table 2 shows the fatalities by status at the time of the incident, indicating the majority of fatalities (68.0 percent) are during training or racing. The average fatalities per year for the three largest categories are 11.7 during racing, 7.4 during training and 8.4 in the barn area. The total number of fatalities increased in 2007 to thirty-five from the prior year at twenty-eight.[1]

[1] Fluctuations are likely to occur by year due to the relatively small number of incidents in each category.

Table 3. Number of Racing Days, Training Days, Races & Starters, 2001-2007									
Year	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Total**	**Average**
Racing Days	96	91	91	90	101	90	91	650	93
Training Days	226	224	231	231	258	238	241	1,649	236
Races	854	829	830	813	925	822	824	5,897	842
Starters	6,684	6,457	6,069	5,894	7,237	6,252	6,252	44,845	6,406
Racing Fatalities	9	13	10	9	18	11	15	85	12.1
Fatalities/1,000 Starts	1.35	2.01	1.65	1.53	2.49	1.76	2.40	1.90	1.90

Table 3 provides data on the number of live race days, training days and starters by year at Emerald Downs. The statistics for 2007 are similar to the seven-year averages, except there was an increase in racing fatalities.[2]

Chart 1. Fatalities by Month, 2001-2007



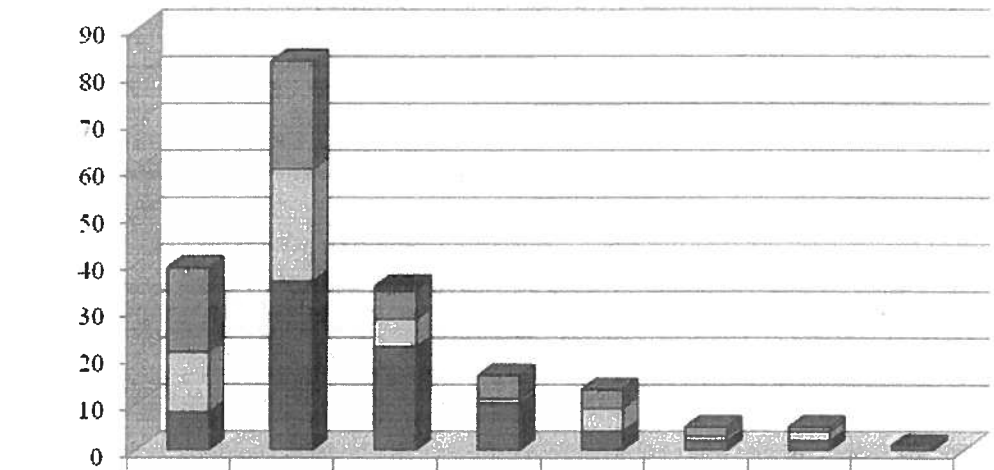
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
2007	1	4	3	5	4	3	9	6	
Total	9	14	21	40	25	25	28	31	4

Chart 1 is a summary by month showing that the majority of fatalities over the past seven years have occurred in May, although late season injuries are also common. Note that all of the fatalities in March and August 2007 were limb fatalities (see Chart 6).

Chart 2 shows that the majority of fatalities were three year olds.

[2] Note that starting gate fatalities are included with racing fatalities as summarized from here on in this report.

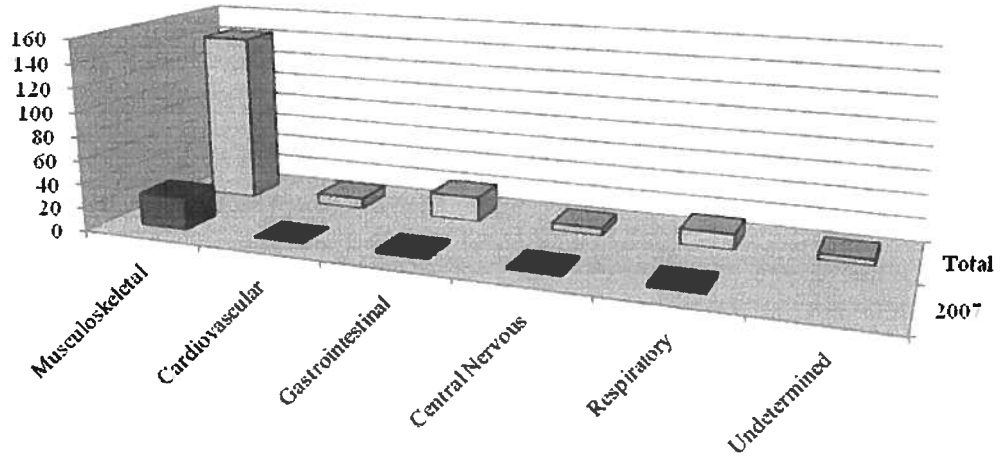
Chart 2. Fatalities by Age and Status, 2001-2007



	2	3	4	5	6	7	8	9
Paddock			1					
Barn	18	23	6	5	4	2	1	
Training	13	24	6	1	5	1	2	
Racing	8	36	22	10	4	2	2	1

Age of Horse

Chart 3. Organ Systems Affected, 2001-2007



	Musculoskeletal	Cardiovascular	Gastrointestinal	Central Nervous	Respiratory	Undetermined
2007	27	1	3	2	2	
Total	143	9	21	6	13	5

Chart 3 shows that approximately 72.6 percent of the fatalities (143 of 197) over the past seven years were due to injuries of the musculoskeletal system.

- Musculoskeletal – In 2007 there were 27 horse fatalities with 36 injuries. This is an increase over 2006 when 18 horses had 21 injuries. The data for Chart 3 is displayed below in Table 4.
- Cardiovascular – One death was a pony horse on the grounds that had an immunemediated disease.
- The three gastrointestinal tract fatalities included one gastric perforation, one with colitis, and one with mesenteric torsion.
- The central nervous system fatalities included one with meningoencephalities (cause unknown) and one EPM (equine protozoalmeningoencephalitis).
- Respiratory fatalities included one pneumonia and one hemorrhage.

Table 4. Data for Chart 3 - Organ Systems Affected, 2001-2007

	2001	2002	2003	2004	2005	2006	2007	Total	Percent	Average
Musculoskeletal	17	20	20	15	26	18	27	143	72.6%	20.43
Cardiovascular	3	1	2	2			1	9	4.6%	1.29
Gastrointestinal	1	1	3	3	4	6	3	21	10.7%	3.00
Central Nervous	2	1	1				2	6	3.0%	0.86
Respiratory		4	3		3	1	2	13	6.6%	1.86
Undetermined			2			3		5	2.5%	0.71
Total	23	27	31	20	33	28	35	197	100.0%	28.14
Difference from Average	(5.1)	(1.1)	2.9	(8.1)	4.9	(0.1)	6.9	-		
Percent Difference	-18%	-4%	10%	-29%	17%	-1%	24%	0%		

Musculoskeletal Injuries

Musculoskeletal injuries include those occurring to all muscles, tendons, ligaments, joints and bones. Some horses had more than one injury; therefore, the total number of injuries may be greater than the number of horses. In 2007 twenty-seven horses had a total of thirty- six injuries.

The largest category, musculoskeletal injuries, is further broken down in Table 5.

- The largest number (38) for the last six years was due to injuries of the suspensory apparatus (7 suspensory ligament and 31 sesamoid bone injuries).
- The 27 horse fatalities in 2007 had 36 musculoskeletal injuries which exceeded the average by 12.3 or 52 percent.
- Of these, 83.2 percent were to the front limbs (119 of 143), as shown on Chart 4. The number of limb injuries exceeded the seven-year average by 8.6 or 42 percent.

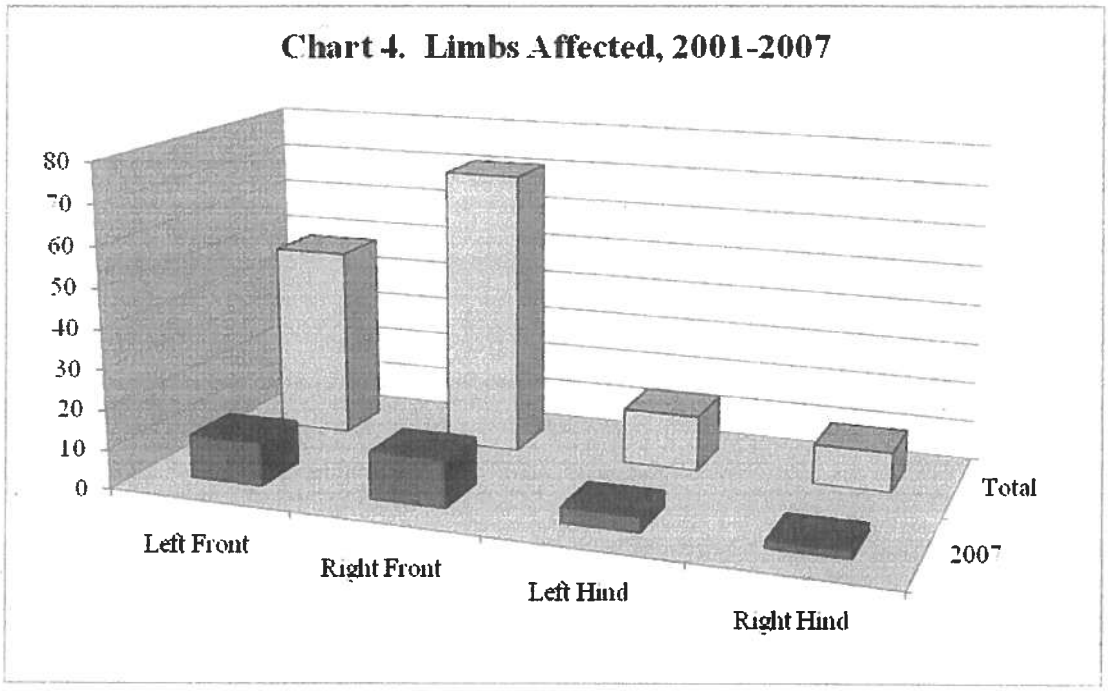
- Injuries to the right front limbs are more common than left front. In 2007 left front injuries (11) were higher than the seven-year average (6.86) – see data table for Chart 4.

Table 5. Musculoskeletal Injuries, 2001-2007

Year	2001	2002	2003	2004	2005	2006	2007	Total	Per-cent	Aver-age
Carpus	2	4	4	1	9	4	5	29	17.5%	4.1
Humerus	2	1	3	1	6	2	3	18	10.8%	2.6
Scapula	0	4	0	0	2	0	2	8	4.8%	1.1
Metacarpal	2	2	3	3	2	1	5	18	10.8%	2.6
Metatarsal	2	0	0	0	1	1	2	6	3.6%	0.9
Pastern	3	3	3	2	4	5	1	21	12.7%	3.0
Sesamoids	4	3	5	4	5	2	8	31	18.7%	4.4
Suspensory	0	1	1	0	2	1	2	7	4.2%	1.0
Tibia	1	1	0	1	0	0	2	5	3.0%	0.7
Vertebra	1	0	1	0	1	0	1	4	2.4%	0.6
Laminitis	1	0	0	0	1	2	0	4	2.4%	0.6
Flexor Tendon	0	0	1	0	3	1	1	6	3.6%	0.9
Olecranon	0	0	0	1	0	0	0	1	0.6%	0.1
Pelvis	0	0	0	1	0	1	1	3	1.8%	0.4
Rib	0	0	0	0	1	0	0	1	0.6%	0.1
Skull	0	0	0	0	0	1	1	2	1.2%	0.3
Femur	0	0	0	0	0	0	1	1	0.6%	0.1
Muscle Laceration	0	0	0	0	0	0	1	1	0.6%	0.1
Total	18	19	21	14	37	21	36	166	100.0%	23.7
Percent	10.8%	11.4%	12.7%	8.4%	22.3 %	12.7%	21.7 %	100.0 %		
Difference from Average	(5.7)	(4.7)	(2.7)	(9.7)	13.3	(2.7)	12.3	-		
Percent	-24%	-20%	-11%	-41%	56%	-11%	52%	0%		

According to an article published in the Washington Thoroughbred magazine,[3] Emerald Downs management contracted with a national expert who found that "the higher clay content in the track surface was causing the track surface to stiffen up faster." This was aggravated by higher than usual rainfall during the 2007 racing season. Concerns about the track surface contributing to the increase in musculoskeletal injuries were discussed at the December 10, 2007 WHRC meeting. Emerald Downs added an inch of sand prior to the 2008 racing season to dilute the amount of clay in the track surface.

[3] "Emerald Downs Racetrack Surface Report and Maintenance Plans for 2008," Washington Thoroughbred, Washington Thoroughbred Breeders Association, January/February 2008 (Vol. 62, No. 1), pp. 40-41.

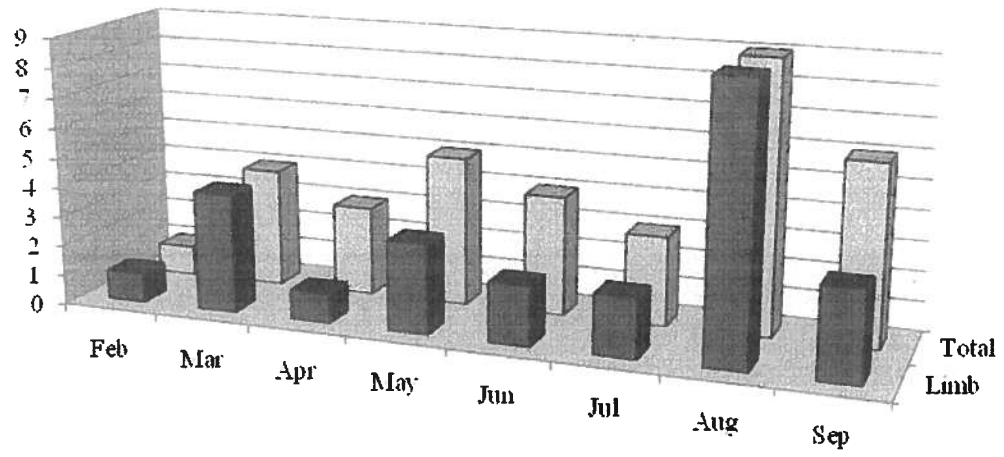


The following table shows the annual data from Chart 4. The number of limb injuries exceeded the seven year average by 8.6 or forty-two percent.

Table 6. Data for Chart 4 - Limbs Affected, 2001-2007										
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Total**	**Percent**	**Average**
Left Front	3	7	10	6	5	6	11	48	33.6%	6.86
Right Front	9	12	8	5	18	7	12	71	49.7%	10.14
Left Hind	3	4	2	0	1		4	14	9.8%	2.00
Right Hind	1	2	1	3	0	1	2	10	7.0%	1.43
Total	16	25	21	14	24	14	29	143	100.0%	20.43
	(4.4)	4.6	0.6	(6.4)	3.6	(6.4)	8.6	-	Difference from Average	
	-22%	22%	3%	-31%	17%	-31%	42%	0%	Percent Difference	

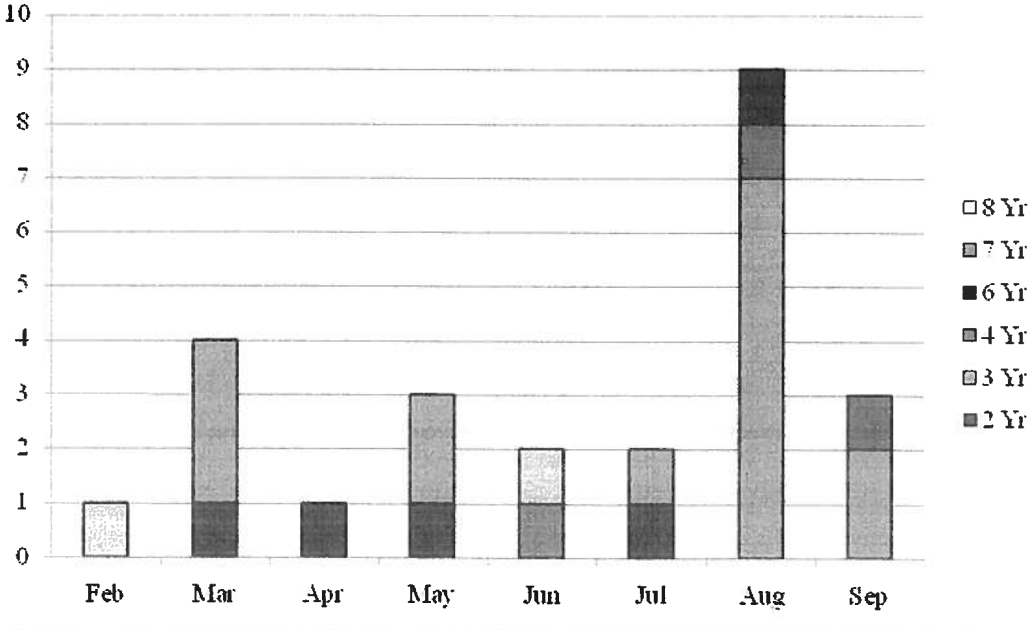
Chart 5 shows the monthly pattern of limb fatalities that occurred in 2007 as compared to total fatalities for 2007. The majority of late season fatalities were due to limb injuries. Chart 6 shows limb fatalities by age and month for 2007 (see Appendices for data table).

Chart 5. Limb vs. Total Fatalities by Month, 2007



	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Limb	1	4	1	3	2	2	9	3
Total	1	4	3	5	4	3	9	6

Chart 6. Limb Fatalities by Age & Month, 2007



As shown in Chart 7, there are more catastrophic injuries in lower claiming ($12,500 or less) and stakes races (see Appendices for data table).

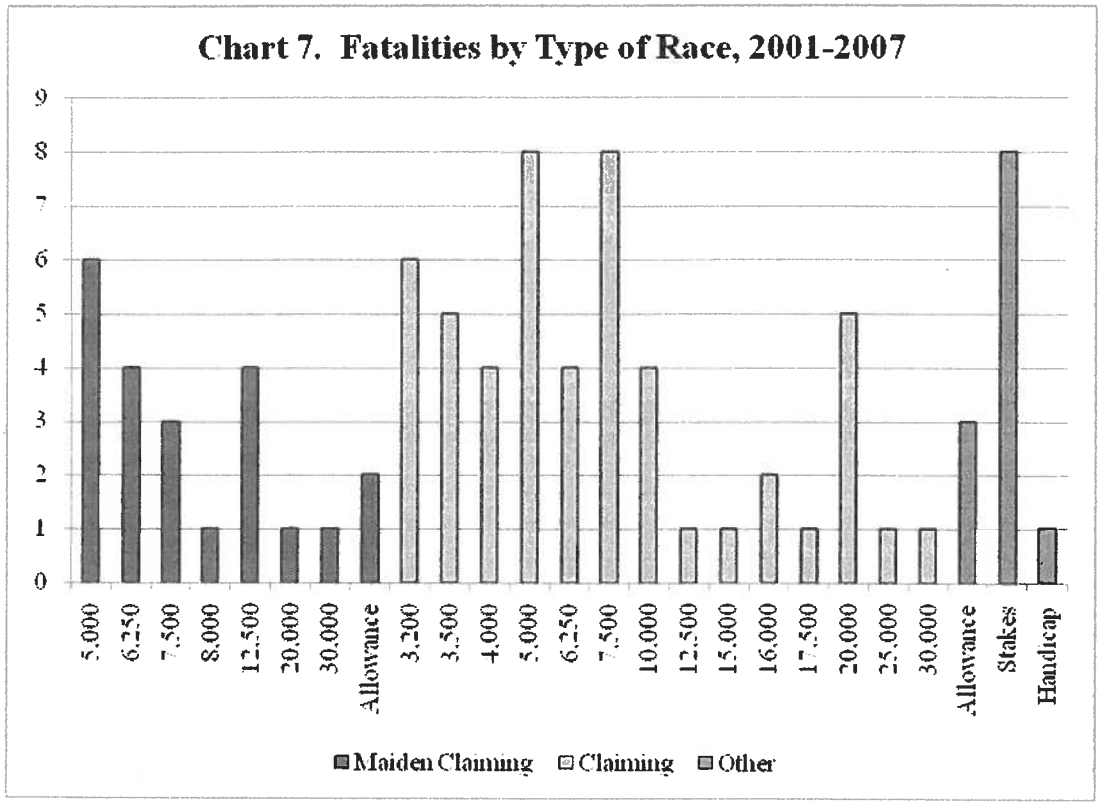


Chart 8 shows the distance from the start of the race in furlongs (1/8 of a mile) for fatal injuries with sprint races 6.5 furlongs or less and route races longer than 6.5 furlongs. Chart 9 shows the location of fatal injuries on the track by sixteenth pole marker. (See Appendices for data tables on Charts 8 and 9.)

Chart 8. Distance from Start of Race (Sprint/Route), 2001-2007

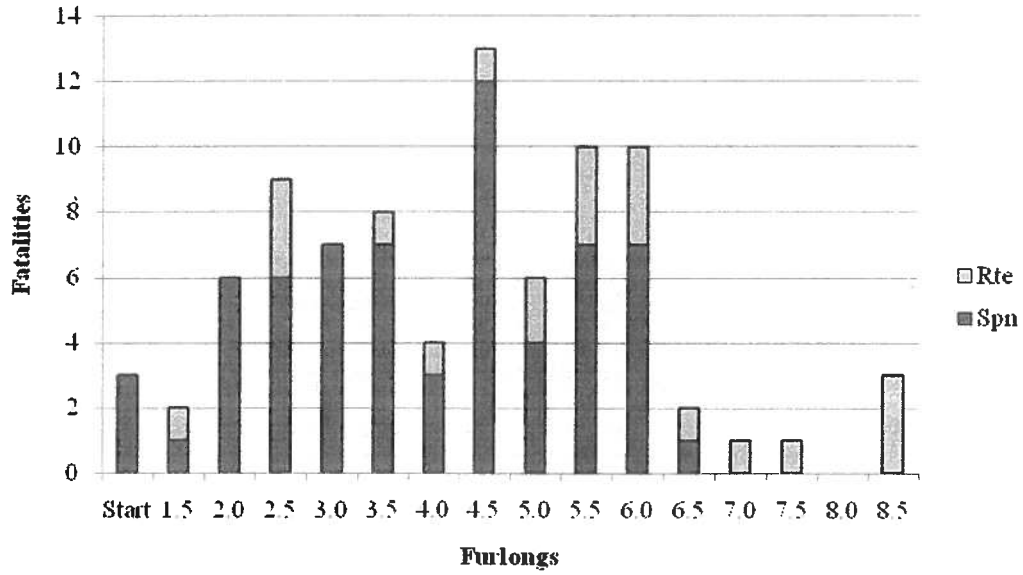
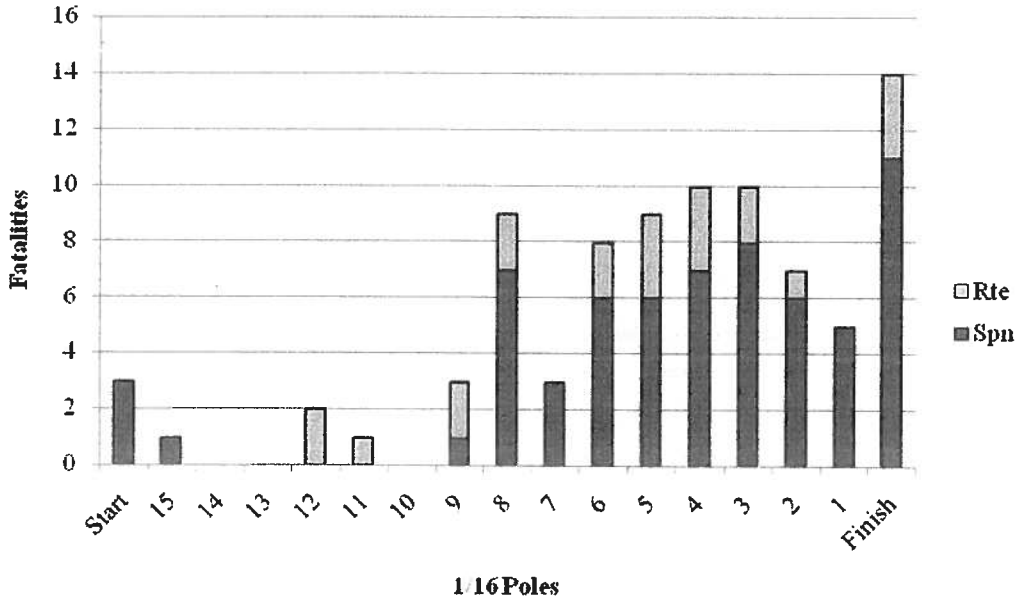


Chart 9. Location on Track (Sprint/Route Races), 2001-2007



Part 3. Plans for the Equine Health and Safety Program

Much information on the health and safety of racehorses is being collected and analyzed. Fortunately, the horse racing industry is becoming more cooperative at sharing knowledge in an attempt to improve the health and safety of racehorses.

Progress on Goals

The WHRC has had three goals since the beginning of the postmortem program in partnership with WSU and the horse racing industry:

1. **Determining the nature of injuries.** There has been an ongoing effort over the last seven years to gather enough data for analytical purposes. There may be sufficient data to draw preliminary conclusions and recommendations.
2. **Determining the cause of injuries.** This goal was significantly assisted when the WHRC was able to use revenues from advance deposit wagering (RCW 67.16.260) to implement Magnetic Resonance Imaging (MRI) examinations at the WSU College of Veterinary Medicine. During the past two years fifty-three cases have been analyzed using MRI (nineteen in 2006 and thirty-four in 2007). It is anticipated that it will take about five years to gather sufficient MRI data for analysis. Thus far the findings from WSU research are similar to what Dr. Sue Stover has found at UC Davis where well over ninety percent of catastrophic injuries have evidence of pre-existing injury at the site of complete fracture.[4]
3. **Developing preventative strategies.** This goal is being addressed in many different ways. The Grayson-Jockey Club Research Foundation has coordinated and underwritten the Welfare and Safety of the Racehorse Summit whose members have identified critical issues that affect horse health and/or shorten the career of racehorses. The Foundation has developed action plans to address each issue, and has created a web site to more widely distribute the scientific research to industry stakeholders. National research has found that toe grabs were present in 90.5 percent of horses who experienced catastrophic injuries.[5] With the adoption of limits

[4] Reported in an interview with Dr. Stover, "Welfare and Safety of the Racehorse Summit" newsletter, published by the Grayson-Jockey Club Research Foundation (Issue 1, July 2007), page 2.

[5] A PowerPoint presentation by Bill Casner (April 2007) cites the following sources in order of use: "Postmortem Evaluation of Homotypic Variation in Shoe Characteristics of 201 Thoroughbred Racehorses." Kane, A.J. et al. AJVR.57: 1141-1146, 1996. "Underrun Heels and Toe-Grab Length as Possible Risk Factors for Catastrophic Musculoskeletal Injuries In Oklahoma Race Horses." Balch, Olin k. et al. vol.47, AAEP Proceedings, 2001. "Risk Factors for and Outcomes of Noncatastrophic Suspensory Apparatus Injury in Thoroughbred Racehorses." Hill AE, Stover GM, et al. JAVMA. 218: 1136-1144, 2001. "Horseshoe Characteristics as Possible Risk Factors for Fatal Musculskeletal Injury of Thoroughbred Racehorses." Kane, A.J. et al. AJVR. 57:1147-1152, 1996.

to toe grab heights on thoroughbreds for the 2008 season by the WHRC, it is hoped there may be a reduction in injuries and fatalities.

Progress on Objectives

Progress continues at gathering and analyzing information to improve the Washington equine health and safety program and benefit the horse racing industry. Racehorse injuries have been considered in the past to be just an unfortunate part of the sport. Through advances in medicine, technology and research many of these injuries may become predictable and thus preventable. As more data is analyzed, new technology developed and more research conducted, the future may realize a decrease in injuries to our equine athletes.

Drug Testing Standards and Practices

The ARCI has sponsored this program since 1981. It is designed to improve the efficiency of laboratories that conduct performance animal drug testing. This is accomplished through research that provides testing and confirmation methodology on difficult-to-detect drugs. Laboratories are checked for competency through a double-blind sample testing program. The ARCI has categorized over 700 drugs used in racing into five different classes depending on potency (narcotic in class 1 – therapeutics in class 5) and has recommended standard fines and suspensions for violations. The WHRC has supported this program for at least ten years and provided a contribution of $11,000 in 2007.

Equine Injury Reporting System

Last year the veterinarians at Emerald Downs began participating with thirty-one other racetracks in the Equine Injury Reporting System developed by Dr. Mary Scollay, DVM, Senior Association Veterinarian, Calder Racecourse. This program is conducted in coordination with the Jockey Club and the Grayson-Jockey Club Research Foundation, and was initiated from the action plans coming from the Welfare and Safety of the Racehorse Summit in October of 2006. Reporting criteria includes any horse's condition that requires regulatory intervention prior to racing (the prerace exam, and the gate or post parade scratch), during and after racing. The data collected is encrypted to keep the identity of horses, racetracks, and trainers confidential. The data is forwarded by Dr. Scollay to the Jockey Club for entry into the database, and will be analyzed by an epidemiologist for comparative purposes. It is hoped that researchers will find this data useful in focusing research efforts that will ultimately reduce injuries in racehorses. Last year Washington reported thirty-three horses injured during racing, fifteen of which were catastrophic.

The following news was reported at the second Welfare and Safety of the Racehorse Summit on March17, 2008:

> Dr. Mary Scollay, the track veterinarian at Gulfstream Park and Calder Race Course, reported on the initial results of information compiled from injury and fatality reports from regulatory veterinarians at 42 racetracks. During the reporting period, there were 244 fatalities from 123,890 starters on dirt, for a ratio of 1.96 per 1,000 starts. For the tracks with synthetic surfaces, the ratio of 58 fatalities from 29,744 starts was 1.95 per 1,000 starts ratio, a figure Scolay said "almost floored me" because the two numbers were so close to each other.[6]

This compares to a ratio of 15 fatalities for 6,252 starts or 2.40 per 1,000 starts for racing at Emerald Downs in 2007. However, the seven-year average in Washington is more consistent with the national average at 1.90 racing fatalities per 1,000 starts – see Table 3.

As Washington continues to participate in the Equine Injury Reporting System, more information will be available from the Jockey Club's extensive history on each horse. As this data is compiled it is hoped that WSU researchers will be able to access the data to develop better questions leading to better research and ultimately less injury to racehorses.

Musculoskeletal Injury Reporting Form

Last year the WHRC initiated confidential musculoskeletal injury reporting of any horse on the backside requiring withdrawal from training for ten days or more. This year more veterinarians have agreed to help collect this data, thus providing a more accurate picture of which injuries are occurring and the attrition rates experienced.

WHRC/WSU Data Sharing Partnership

The Equine Licensing and Management System (ELMS) has been modified to allow a variety of different queries using up to 155 data fields in the equine health and safety module. All information is consolidated into one database that can be accessed via secure password from any authorized user. WHRC staff is working with WSU staff to incorporate the WSU postmortem report into the equine health and safety module for the WHRC database. The database is structured so that sensitive information such as the horse's name, owner, trainer, etc. is restricted. WSU data for 2007 was entered into the ELMS database prior to the 2008 racing season.

[6] Reported on www.bloodhorse.com by Ron Mitchell, March 17, 2008 .

MRI (Magnetic Resonance Imaging)

Dr. Russell Tucker, Director of Radiology VMTH, Washington State University, gave a presentation to the WHRC on April 13, 2007 on radiology (MRIs) of racehorse breakdowns at Emerald Downs for 2006. He explained the process for MRI examinations, and gave an overview on looking for pre-existing injuries, objectives of the program, materials and methods and reporting of the gross necropsy results. He summarized the complexity of racehorse deaths, how valuable the detection of sub-clinical injuries are, and how more analysis of lesions detected by MRI need to be completed. This is important since more than seventy percent of the fatal injuries resulted from catastrophic breakdowns (see Chart 3). Dr. Tucker recommended standardizing the protocols for imaging and necropsy and having MRIs read by multiple people. He concluded that analysis of current data will improve future studies and continued data collection will enable analysis of factors associated with racetrack breakdowns.

At the July 12, 2007 meeting the WHRC reviewed correspondence from Dr. Tucker regarding the cost estimates for the histomorphologic analysis of collected tissues at WSU. Dr. Tucker estimated the costs to be between $200 and $300 per horse on most cases. This would result in an expenditure of approximately $6,000-$9,000 for the 2007 race season. The Commissioners supported continuing the MRI studies as a priority within the WHRC budget.

During the past two years fifty-three MRI studies have been conducted from necropsy horses sent to WSU (nineteen in 2006 and thirty-four in 2007). Dr. Tucker recommends continuing these studies for at least five years to have enough data for analysis. WSU will also investigate sharing MRI studies with researchers at UC Davis to augment the data for these studies. Dr. Tucker plans to give a report to the WHRC later in the 2008 season.

Training History Questionnaires

WSU college of Veterinary Medicine faculty developed a survey questionnaire which is distributed by the HBPA to the trainer of a horse euthanized. The trainer is asked to forward the completed questionnaire directly to the WSU College of Veterinary Medicine. The WHRC does not have access to these questionnaires.

Special Studies

In 2006, the WHRC provided a $42,446 grant to Dr. Robert K. Schneider at WSU for "An Evaluation of a New Surgical Treatment for Desmitis of the Proximal Insertion of the Suspensory Ligament in Horses." A progress report on this study was presented to the WHRC on March 13, 2008, and the final report is expected in the fall of 2008. The clinical component has been completed and the project is in the final stages of data collection and statistical analysis. Six horses had the surgical treatment performed on one limb and were placed in a six-month rest and

rehabilitation program. Healing was evaluated with ultrasound, MRI and lameness examinations. After six months the suspensory ligaments were analyzed to determine if there was an increase in cellularity and healing in the injured ligament. The MRI examinations and videotaped lameness examinations were reviewed by experienced veterinarians who were not advised when the horses were treated and which limbs were treated. The results of the research will be presented by Dr. Matthew Brokken as his Masters of Science project in the summer of 2008 and submitted for publication to Veterinary Surgery.

Questions from Data

Many anomalies in the data were noticed while preparing this report. Naturally, this leads to some speculation as to what causes the anomalies. Speculation is helpful in identifying potential causes, but more research may be necessary to resolve these questions. The following are examples of questions which derived from presentation of the data.

- Chart 1 is a summary by month showing that the majority of fatalities over the past seven years have occurred in May, although late season injuries are also common. Note that all of the fatalities in March and August 2007 were limb fatalities (see Chart 6). Some factors associated with increased risk of catastrophic injury include type of horseshoe, racing frequency, duration of career, number of starts per year, intensity of racing and training, type of track surfacing, and pre-existing osseous lesions. Repetitive injuries (i.e., stress fractures) may cause most catastrophic injuries. After a bone is injured it takes the body ten to fourteen days to dissolve that bone and then another sixty to ninety days to rebuild it. During this rebuilding process the bone is more porous which contributes to catastrophic injuries.
- Chart 2 shows that the majority of fatalities were three year olds, presumably because more three year olds race than other ages. The way races are classified does not clearly distinguish the age of horses. In 2007 there were 713 horses starting who ran as two-year-olds, 1,729 three-year-olds, 3,474 three-year-olds and upward, and 336 four-year-olds and upward.
- Injuries to the right front limbs are more common than left front. It is hypothesized that this is due to the counter-clockwise travel on the racecourse putting more pressure on the right front limbs. In 2007 left front injuries (11) were higher than the seven-year average (6.86) – see data table for Chart 4.
- Chart 5 shows the monthly pattern of limb fatalities that occurred in 2007 as compared to total fatalities for 2007. The majority of late season fatalities were due to limb injuries. Chart 6 shows limb fatalities by age and month for 2007 (see Appendices for data table).
- Emerald Downs management contracted with a national expert who found that "the higher clay content in the track surface was causing the track surface to

stiffen up faster." This was aggravated by higher than usual rainfall during the 2007 racing season. Concerns about the track surface contributing to the increase in musculoskeletal injuries were discussed at the December 10, 2007 WHRC meeting.

- As shown in Chart 7, there is a definite distribution of more catastrophic injuries in lower claiming and stakes' races (see Appendices for data table). This might be due to conformation as well as to older horses that have multiple problems. It might also be due to the number of horses running in lower claiming races. A preliminary examination of the data reveals that over the last seven years 68.2 percent (58/85) of the racing fatalities were in claiming races at $12,500 and lower. In 2007 ten of fifteen fatalities (66.7 percent) were in claiming races at $12,500 and lower. The horses running in claiming races at $12,500 and lower was 59.7 percent of total horses racing in 2007. Similar patterns appear to exist between maiden claiming and regular claiming races. The biggest anomaly in 2007 (and perhaps historically) is that two of fifteen fatalities (13.3 percent) were in stakes races, which only accounted for 3.3 percent of horses racing.
- National research has found that toe grabs were present in 90.5 percent of horses who experienced catastrophic injuries. With the adoption of limits to thoroughbred toe grab heights for the 2008 season by the WHRC, it is hoped there may be a reduction in injuries and fatalities.

Issues for Further Consideration

The data collection for the past seven years has mainly focused on the nature of injuries. Less is known about the causes of injuries; hence it is difficult to develop effective preventive strategies for reducing injuries. This report concludes with a number of issues for further consideration by the WHRC. These items were brought up in the discussion or evolved from analysis of the data.

- Annual approval for the 2008 racing season is requested from the WHRC for the list of "**WHRC Approved Equine Split Sample Drug Testing Laboratories**," which can be found in the Appendices on page 28. The list of laboratories and prices remain unchanged from the 2007 racing season.

- **Should the ARCI model rule on equine medication penalties be adopted?** The WHRC has adopted changes in concentration standards recommended by the Racing Medication and Testing Consortium (RMTC) and the Model Rules Committee of the ARCI. The horse racing industry benefits from having consistent national concentration standards which are scientifically based. Would similar benefits derive from adopting medication penalties consistent with the model rule? [7]

[7] This issue was last reviewed by the Commission in January 2007. At that time the Commission decided not to adopt the ARCI model rule on equine medication penalties into Chapter 260-84 WAC.

- **Should necropsies be performed on pony horses and outrider horses?** One death last year was a pony horse on the grounds that had an immunemediated disease. Questions arise as to (1) whether non-racing horses should be included in the statistics, and (2) whether non-racing horses should be forwarded to WSU for necropsies? (Note that the pony horse was autopsied to determine cause of death because it was kept in the barn with thoroughbreds.)

- **Should funding for research projects be focused?** Due to limited funding available should the WHRC consider only funding research projects that analyze the necropsy data, MRI data, histomorphologic analysis and possibly combining the data with other necropsy programs (e.g. UC Davis)? The intent is to develop preliminary recommendations about reducing injures or specific data that needs to be collected to develop scientifically based conclusions and recommendations.

- **Should a thorough evaluation be conducted on this report and the necropsy program?** Now that seven years of data has been collected on horse fatalities and necropsy analysis of horse fatalities, it may be a good time to conduct a thorough review of the data, the report, and the necropsy program. This program evaluation could consider a number of questions:
    - Is the trend information summarized in the report meaningful?
    - What does the trend information reveal about the nature of injuries, causative factors, and prevention strategies?
    - Is the right data being collected? (Are there any data elements no longer needed?)
    - Are there other factors that ought to be included in the necropsy program?
    - Will data sharing with other jurisdictions help leverage the limited sample size?
    - Is the WHRC interested in funding this program evaluation?
    - Is there a university that would be willing to undertake this evaluation?
    - Are there preliminary or conclusive findings and/or recommendations that can be determined from the data.

WAC 260-70-610 Storage and Shipment of Split Samples.

(1) Split samples obtained in accordance with WAC 260-70-600 (2)(b) and (c) will be secured and made available for further testing in accordance with the following procedures:

(a) A split sample must be secured in the test barn in the same manner as the primary sample acquired for shipment to a primary laboratory. The split samples will be stored until the primary samples are packed and secured for shipment to the primary laboratory. Split samples will then be transferred to a freezer at a secure location approved by the executive secretary.

(b) A freezer used to store split samples will be closed and locked at all times except as specifically provided by these rules.

(c) A freezer for storage of split samples may only be opened to deposit or remove split samples, for inventory, or for checking the condition of samples.

(d) An official veterinarian will maintain a split sample log that must be used each time a split sample freezer is opened. The log will record the following:

(i) The name of the person opening the split sample freezer;

(ii) The purpose for opening the freezer;

(iii) The split samples deposited or removed from the freezer;

(iv) The date and time the freezer was opened;

(v) The time the freezer was closed; and

(vi) A notation verifying that the lock was secured after the freezer was closed.

(e) If at any time it is discovered that the split sample freezer failed or samples were discovered not in a frozen condition, an official veterinarian must document this discovery on the split sample freezer log and immediately report this to the executive secretary.

(2) A trainer or owner of a horse having been notified that a written report from a primary laboratory states that a substance has been found in a specimen obtained pursuant to these rules may request that a split sample corresponding to the portion of the specimen tested by the primary laboratory be sent to another laboratory approved by the Commission. The request must be made in writing and delivered to the stewards not later than forty-eight hours after the trainer of the horse receives written notice of the findings of the primary laboratory. The split sample must be shipped within seventy-two hours of the delivery of the request for testing to the stewards.

(3) The owner or trainer requesting testing of a split sample is responsible for the cost of shipping and testing. A split sample must be removed from the split sample freezer, and packaged for shipment by an official veterinarian or designee in the presence of the owner, trainer, or designee. Failure of the owner, trainer or designee to appear at the time and place designated by an official veterinarian to package the split sample for shipping will constitute a waiver of all rights to split sample testing. Prior to shipment, the split sample laboratory's willingness to provide the testing requested and to send results to both the person requesting the testing and the commission, must be confirmed by an official veterinarian. Arrangements for payment satisfactory to the split sample laboratory must also be confirmed by the owner or trainer. A laboratory for the testing of a split sample must be approved by the commission. The commission will maintain a list of laboratories approved for testing of split samples.

(4) Prior to opening the split sample freezer, the commission must provide a split sample chain of custody verification form. The split sample chain of custody verification form must be completed and signed by the representatives of the commission and the owner, trainer or designee. A commission representative will keep the original and provide a copy to the owner, trainer or designee.

The split sample chain of custody verification form must include the following:

(a) The date and time the sample is removed from the split sample freezer;

(b) The sample number;

(c) The address where the split sample is to be sent;

(d) The name of the carrier and the address where the sample is to be taken for shipment;

(e) Verification of retrieval of the split sample from the freezer;

(f) Verification of each specific step of the split sample packaging in accordance with the recommended procedure;

(g) Verification of the address of the split sample laboratory on the split sample package;

(h) Verification of the condition of the split sample package immediately prior to transfer of custody to the carrier; and

(i) The date and time custody of the sample is transferred to the carrier.

(j) The split sample chain of custody verification form must be signed by both the owner's representative and an official veterinarian or designee to confirm the packaging

of the split sample.

(5) The exterior of the package must be secured and identified with initialed tape, evidence tape or other means to prevent tampering with the package. The owner, trainer or designee may inspect the package containing the split sample immediately prior to transfer to the delivery carrier to verify that the package is intact and has not been tampered with.

(6) The package containing the split sample will be transported to the location where custody is transferred to the delivery carrier charged with delivery of the package to the commission approved laboratory selected by the owner or trainer.

[Statutory Authority: RCW 67.16.020 and 67.16.040. 07-07-036, § 260-70-610, filed 3/12/07, effective 4/12/07; 06-09-009, § 260-70-610, filed 4/10/06, effective 5/11/06; 05-07-067, § 260-70-610, filed 3/11/05, effective 4/11/05. Statutory Authority: RCW 67.16.020. 03-11-018, § 260-70-610, filed 5/12/03, effective 6/12/03. Statutory Authority: RCW 67.16.040. 96-10-001, § 260-70-610, filed 4/17/96, effective 5/18/96.]

WAC 260-70-630 Threshold levels.

(1) The following quantitative medication levels are permissible in test samples up to the stated quantitative levels:

Procaine	25 ng/ml urine
Benzocaine	50 ng/ml urine
Mepivacaine	10 ng/ml urine
Lidocaine	50 ng/ml urine
Bupivacaine	5 ng/ml urine
Clenbuterol	25 pg/ml serum or plasma
Acepromazine	25 ng/ml urine
Promazine	25 ng/ml urine
Salicylates	750,000 ng/ml urine
Albuterol	1 ng/ml urine
Pyrilamine	50 ng/ml urine
Theobromine	2000 ng/ml urine

The official urine test sample may not contain more than one of the above drug substances, including their metabolites or analogs, in an amount exceeding the specified level. Official blood test samples must not contain any of the drug substances listed above, including their metabolites or analogs, except for the threshold amount established in this rule.

(2) Certain substances can be considered environmental contaminants in that they are endogenous to the horse or that they can arise from plants traditionally grazed or harvested as equine feed or are present in equine feed because of contamination during

the cultivation, processing, treatment, storage or transportation phases.

(3) Certain drugs are recognized as substances of human use and addiction and which could be found in a horse. The following are permissible in test samples up to the stated quantitative levels:

Caffeine	100 ng/ml serum or plasma
Benzoylecgonine	50 ng/ml urine
Morphine Glucuronides	50 ng/ml urine

(4) If the preponderance of evidence presented in a stewards ruling conference shows that a positive test is the result of environmental contamination or inadvertent exposure due to human drug use, that evidence should be considered as a mitigating factor in any disciplinary action taken against the trainer.

[Statutory Authority: RCW 67.16.020 and 67.16.040. 06-09-009, § 260-70-630, filed 4/10/06, effective 5/11/06; 05-07-067, § 260-70-630, filed 3/11/05, effective 4/11/05. Statutory Authority: RCW 67.16.020. 04-05-095, § 260-70-630, filed 2/18/04, effective 3/20/04; 03-11-019, § 260-70-630, filed 5/12/03, effective 6/12/03. Statutory Authority: RCW 67.16.040. 96-10-001, § 260-70-630, filed 4/17/96, effective 5/18/96.]

WAC 260-70-640 Permitted Medication.

Trainers using permitted medication in the care of their horses are subject to all rules governing such medications. Failure to administer permitted medication to a horse on a program of permitted medication is a violation of these rules.

(1) The use of one of three approved nonsteroidal anti-inflammatory drugs (NSAIDs) is permitted under the following conditions:

(a) The drug may not exceed the following permitted serum or plasma threshold concentrations, which are consistent with administration by a single intravenous injection at least twenty-four hours before the post time for the race in which the horse is entered:

(i) Phenylbutazone - 5 micrograms per milliliter;

(ii) Flunixin - 20 nanograms per milliliter;[8]

(iii) Ketoprofen - 10 nanograms per milliliter.

(b) No NSAID, including the approved NSAIDs listed in this rule, may be administered within the twenty-four hours before post time for the race in which the

[8] A WAC amendment proposed by WHRC staff to increase the flunixin threshold concentration to 50 ng/ml is on the agenda for the Commission meeting on April 10, 2008.

horse is entered.

(c) The presence of more than one of the three approved NSAIDs, with the exception of phenylbutazone in a concentration below 1 microgram per milliliter of serum or plasma or any unapproved NSAID in the post-race serum or plasma sample is not permitted. The use of all but one of the approved NSAIDs must be discontinued at least forty-eight hours before the post time for the race in which the horse is entered.

(2) Any horse to which a NSAID has been administered is subject to having a blood and/or urine sample(s) taken at the direction of an official veterinarian to determine the quantitative NSAID level(s) and/or the presence of other drugs which may be present in the blood or urine sample(s).

[Statutory Authority: RCW 67.16.020 and 67.16.040. 07-07-036, § 260-70-640, filed 3/12/07, effective 4/12/07; 06-09-009, § 260-70-640, filed 4/10/06, effective 5/11/06; 05-07-067, § 260-70-640, filed 3/11/05, effective 4/11/05. Statutory Authority: RCW 67.16.040. 96-10-001, § 260-70-640, filed 4/17/96, effective 5/18/96.]

WHRC Approved Equine Split Sample Drug Testing Laboratories

Approval is requested for the following split sample drug testing labs for the 2008 racing season. The prices listed are the split sample lab prices quoted by each lab. These prices are subject to change and will be verified prior to shipping a split sample.

Industrial Laboratories
4046 Youngfield St.
Wheat Ridge, CO 80033
Phone: (303) 287-9691
Contact: Petra Hartman, Laboratory Manager petra@industriallabs.net
NSAID Quantitation: $150
Urine: $400

Racing Chemistry Veterinary Diagnostic Laboratory, Iowa State University
Ames, IA 50011
Phone: (515) 294-0508
Contact: Dr. Walter Hyde, Ph.D., Director
NSAID Quantitation: $225
GC/MS: $450-$650 plus $150 for quantitation
LC/MS: $650-$750 plus $150 for quantitation

LSU Equine Medication Surveillance Laboratory, School of Veterinary Medicine
Skip Bertman Drive
Louisiana State University
Baton Rouge, LA 70803
Phone: (225) 578-3602
Contact: Dr. Steve Barker, Director
sbarker@mail.vetmed.lsu.edu
Blood or urine: $400
LC/MS call for quote

Texas Veterinary Medical Diagnostic Laboratory
Drawer 3040
College Station, Texas 77841-3040
Phone: (979)845-3414 (979)845-9011
Contact: Mr. Kenneth Peck, Director
k-peck@tvmdl.tamu.edu
NSAID Quantitation: $250 (Bute)
$600 (Flunixin)
Urine: $400 non quantitated
LC/MS: $600 semi-quantitation
$1200 full quantitation

Michigan Department of Agriculture
Laboratory Division
Equine Drug Testing Section
1615 South Harrison Road
East Lansing, MI 48823
Phone: (517) 337-5082
Contact: Dr. Steve Reh, Director
Bradley J. Skiba, Supervisor
skibab@michigan.gov
Blood or urine: $500

Center for Tox Services
1819 W. Drake Drive, Suite 102
Tempe, Arizona 85283
Phone: (480) 345-7454
Contact: Jeanne B. Mahoney, Director
NSAID Quantitation: $150
GC/MS: $400
LC/MS: $400-$800

Dalare Associates
217 S. 24th St.
Philadelphia, PA 19193
Phone: (215) 567-1953
Contact: Mr. Joseph Strug, Director
joestrug@aol.com
NSAID Quantitation: $250
Urine: $500
LC/MS: $1000-$1500

Racing Laboratory
College of Veterinary Medicine
University of Florida
1200 S.W. 34th St.
Gainesville, Florida 32607
Phone (352) 392-4700, ext 3700
Contact: Margaret H. Wilding, Associate Director
NSAID Quantitation: $200
Urine GC/MS: $400
Urine LC/MS: $1000

Data Tables for Selected Charts

Table 7. Data for Chart 6 - Limb Fatalities by Age & Month, 2007								
	2 Yr	3 Yr	4 Yr	5 Yr	6 Yr	7 Yr	8 Yr	Total
Feb							1	1
Mar	1	3						4
Apr	1							1
May	1	2						3
Jun						1	1	2
Jul	1	1						2
Aug		7	1		1			9
Sep		2	1					3
Oct								0
Total	4	15	2	0	1	1	2	25

Table 8. Data for Chart 7. Fatalities by Type of Race, 2001-2007									
Type	Price	2001	2002	2003	2004	2005	2006	2007	Total
Mdn Cl	5,000	2	1	1				2	6
Mdn Cl	6,250	1	2	1					4
Mdn Cl	7,500					2		1	3
Mdn Cl	8,000		1						1
Mdn Cl	12,500					2		2	4
Mdn Cl	20,000						1		1
Mdn Cl	30,000					1			1
Mdn	Allowance	1						1	2
Claiming	3,200		2	3	1				6
Claiming	3,500					2	2	1	5
Claiming	4,000					3	1		4
Claiming	5,000	1	1	2	1	2		1	8
Claiming	6,250	1	1	1	1				4
Claiming	7,500				2	2	2	2	8
Claiming	10,000		1	1	1			1	4
Claiming	12,500				1				1
Claiming	15,000					1			1
Claiming	16,000		1		1				2
Claiming	17,500						1		1
Claiming	20,000		1		1	1	1	1	5
Claiming	25,000		1						1
Claiming	30,000						1		1
	Allowance	1					1	1	3
	Stakes	2	1	1		2		2	8
Starter	Handicap						1		1
	Total	9	13	10	9	18	11	15	85

Table 9. Data for Chart 8, Distance from Start of Race (Sprint/Route Races), 2001-07																
Furlongs	2001		2002		2003		2004		2005		2006		2007		Total	
	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte

Start							1				1		1		3	0
1.5	1									1					1	1
2.0	1		1		1				2				1		6	0
2.5	1		1		1			1	2	2			1		6	3
3.0			1				1		1		1		3		7	0
3.5		1	1				1		3		1		1		7	1
4.0		1			1		1						1		3	1
4.5	1		2		1		1		3		3		1	1	12	1
5.0			1		2	1		1					1		4	2
5.5	1		3	2					1		2			1	7	3
6.0					2			1	3		1		1	2	7	3
6.5					1			1							1	1
7.0												1			0	1
7.5				1											0	1
8.0															0	0
8.5		2										1			0	3
Total	5	4	10	3	9	1	5	4	15	3	9	2	11	4	64	21
Annual		9		13		10		9		18		11		15		85

Table 10. Data for Chart 9, Location on Track (Sprint/Route Races), 2001-07

1/16 Poles	2001		2002		2003		2004		2005		2006		2007		Total	
	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte	Spn	Rte
Start							1				1		1		3	0
15									1						1	0
14															0	0
13															0	0
12								1		1					0	2
11										1					0	1
10															0	0
9		1	1					1							1	2
8	1	1			2				2				2	1	7	2
7	1								1				1		3	0
6	1		1			1	1	1	1		2				6	2
5			1	2			1		1				3	1	6	3
4			1				1	1	3		1	1	1	1	7	3
3	1		1		2				1	1	2		1	1	8	2
2			1	1	2		1		1				1		6	1
1	1		3						1						5	0
Finish		2	1		3				3		3	1	1		11	3
Total	5	4	10	3	9	1	5	4	15	3	9	2	11	4	64	21
Annual		9		13		10		9		18		11		15		85