

VETERINARY MEDICAL DIAGNOSTIC PROGRAM

JANUARY 1, 2014 TO DECEMBER 31, 2014



Supported by the
Oklahoma Horse Racing Commission



Oklahoma-Breeding Development Program



Conducted by the
Oklahoma Animal Disease Diagnostic Laboratory
Center for Veterinary Health Sciences
Stillwater, OK
May 12, 2015



CENTER FOR VETERINARY HEALTH SCIENCES
Healthy Animals — Healthy People

Veterinary Medical Diagnostic Program

Supported by: **The Oklahoma Horse Racing Commission (OHRC)**

Conducted by: **The Oklahoma Animal Disease Diagnostic Laboratory (OADDL)**
Center for Veterinary Health Sciences
Oklahoma State University

Reporting Period: **January 1, 2014 through December 31, 2014**

Introduction

This report summarizes the case submissions and diagnostic findings of the Veterinary Medical Diagnostic Program for the period starting January 1, 2014 and ending December 31, 2014.

The Veterinary Medical Diagnostic Program, initiated in 1997, serves to: 1) investigate and document the types of injuries sustained by horses involved in horse racing and in race training related activities on racetracks that fall under OHRC jurisdiction; 2) monitor this population of migrating horses for the presence of any epizootic disease(s) that may pose a threat to Oklahoma's horse industry; and 3) evaluate the overall effects of all other aspects (including diet and stress) of racing and race training on the health and well being of Oklahoma's racehorses. This program is the result of an alliance formed between the Oklahoma Horse Racing Commission (OHRC) and the Oklahoma Animal Disease Diagnostic Laboratory (OADDL).

All horses that die or must be humanely euthanized on any of the three Oklahoma racetracks that fall under the OHRC jurisdiction are to be submitted to OADDL for a comprehensive necropsy examination. Results of necropsy examination are reported to the OHRC office in Oklahoma City with a copy sent to the Official OHRC Veterinarian at the submitting racetrack. The necropsy examination includes: 1) a complete necropsy and gross examination of the carcass including microscopic examination of tissues (histopathology) if necessary; 2) a thorough examination of all injuries, including an analysis of pre-existing conditions that may have led to the occurrence of the injury; 3) microbiology testing in cases where infectious diseases are suspect; and 4) toxicology testing as dictated by the OHRC.

For the calendar year 2014, a total of fifty-five (55) horses were submitted to OADDL under the Veterinary Medical Diagnostic Program. This is a reduction in submissions by 5 horses from 2013 and by 23 horses from 2012. Four (4) animals died and fifty-one (51) animals were humanely destroyed, see Table 1. A summary of OADDL's necropsy findings follow. For the remainder of this report individual tracks are identified by initials: Remington Park (REM), Fair Meadows Tulsa (FMT) and Will Rogers Downs (WRD). These reports have all been previously submitted to the commission.

Table 1: Total Equine Mortality – 2014

	REM	FMT	WRD	TOTAL
DIED	1	0	3	4
EUTHANIZED	36	6	9	51
TOTAL	37	6	12	55

Total equine mortality submissions were decreased in 2014 and were decreased from both FMT and WRD (14 & 18 in 2013). There was an increase of 9 animals submitted from REM, which submitted 28 horses in 2013.

Submissions:

A total of fifty-five (55) horses from Oklahoma racetracks were submitted to OADDL for examination during the 2014 calendar year. The total number of animals submitted was reduced in 2014. Table 2 (below) indicates the total submissions for the joint OADDL:OHRC necropsy program for the years 2004-2014.

Table 2: Total Necropsy Submissions, OADDL:OHRC Necropsy 2004-2014

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Submissions	41	53	73	70	61	60	78	70	78	60	55

Monthly Distribution of Submission:

Table 3 (below) represents the distribution of submissions from each racetrack, sorted by month. The monthly fluctuation of cases most likely coincides with the number of racing days and training activity. During 2014 there was a significant peak in submissions in September (11) followed by April, May and October.

Table 3: Monthly Distribution of Necropsy Submissions for 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
REM	0	3	5	5	5	1	1	2	7	4	1	3	37
FMT	0	0	0	0	0	2	4	0	0	0	0	0	6
WRD	0	0	0	2	1	1	0	0	4	2	2	0	12
Total	0	3	5	7	6	4	5	2	11	6	3	3	55

Table 4 (next page) shows the monthly submissions by horse breed. During this reporting period, Quarter Horse (QH) and Thoroughbred (TB) submissions were nearly equal and accounted for 93% (51/55) of the animals submitted. Peak submission months (>4 horses/month) were noted in Sprint Breeds in March, April and May. There was a submission peak for Thoroughbred (TB) animals in September, when 7 animals or 28% (7/25) of this breed were submitted.

Table 4: Monthly Distribution of Necropsy Submissions by Breed for 2014

Breed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TB	0	1	0	2	1	2	2	2	7	4	1	3	25
QH	0	2	4	4	5	2	2	0	3	2	2	0	26
American Paint	0	0	1	1	0	0	1	0	1	0	0	0	4
Total	0	3	5	7	6	4	5	2	11	6	3	3	55

Gender and Breed of Horse:

Table 5: Submission by Breed 2014

	Number of Horses
Thoroughbred	25
Quarter Horse	26
American Paint	4
Appaloosa	0
Total	55

The Breed distribution of necropsy case submissions to OADDL for 2014 is presented in Table 5 to the left. No Appaloosa horses were submitted again in 2014. Quarter Horse and Thoroughbred breed submissions were nearly equal, similar to 2012 reporting period. There were 8 fewer Quarter Horses, 2 fewer American Paints and 5 more Thoroughbred horses

submitted than in 2013. Gender submissions are presented in Table 6 (below) and geldings (neutered males) again predominate at 58% (32/55). Gelding submissions were higher for all breeds and all the American Paint horses submitted in 2014 were gelding. Female submissions were reduced to 16, down from 25 submitted in 2013.

Table 6: Gender and Breed of Submissions 2014

		REM	FMT	WRD	TOTAL
Male	Thoroughbred	3	0	1	4
	Quarter Horse	2	1	0	3
Female	Thoroughbred	6	0	1	7
	Quarter Horse	4	1	4	9
Gelding	Thoroughbred	10	2	2	14
	Quarter Horse	10	1	3	14
	Am. Paint	2	1	1	4
Total		37	6	12	55

The distribution of racehorse submissions arranged by age, breed and track during 2014 is shown in Table 7 (next page). This data is also segregated by breed per request of breed registries. Our Oklahoma data continue to indicate larger numbers of 2-3 year old animals in total mortality in 2014 (67%). Quarter Horses accounted for the largest number of 2 and 3 year old submissions in 2014 and all American Paints were in this age group. No "sprint" type horses (Quarter Horse, Paint, Appaloosa) older than five years were submitted in 2014. There may be more animals in the two- and three-year old age group in active training and racing in Oklahoma, and thus are the greater at risk population.

Table 7: Age of Horse and Breed 2014.

		REM	FMT	WRD	Total
Two year old					
	Thoroughbred	5	0	1	6
	Quarter Horse	5	2	3	10
	Am. Paint	2	0	1	3
Three year old					
	Thoroughbred	6	1	1	8
	Quarter Horse	5	1	3	9
	Am. Paint	0	1	0	1
Four year old					
	Thoroughbred	3	1	0	4
	Quarter Horse	3	0	0	3
Five year old					
	Thoroughbred	3	0	1	4
	Quarter Horse	3	0	1	4
Six year old					
	Thoroughbred	1	0	0	1
Seven year old					
	Thoroughbred	0	0	1	1
Fifteen year old					
	Thoroughbred	1	0	0	1
Total		37	6	12	55

Age of Horse (years) by Breed:

Table 8 below simplifies the 2014 necropsy submissions by age and breed. This information was requested by the Commission during presentation of the 2006 report.

Table 8: Age (years) of Horse and Breed 2014.

Breed	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	15 yr	Total
Thoroughbred	6	8	4	4	1	1	1	25
Quarter Horse	10	9	3	4	0	0	0	26
American Paint	3	1	0	0	0	0	0	4
Total	19	18	7	8	1	1	1	55

In 2014 there were near equal numbers of Quarter Horse and Thoroughbred fatalities for ages 2 through 5. There were however reduced numbers of 2 and 3 year old Quarter Horses and 4 year old Thoroughbreds compared to 2013. Unfortunately, there was a significant increase in 2 and 3 year old Thoroughbred submissions compared to 2013. The total number of 2 and 3 year old animals was slightly increased over-all from 2013 (15 & 17 respectively in 2013).

Fatal Event by Age (in years):

Table 9: Fatal Event by Age (years) 2014

Age	Racing	Training	Non-exercise	Total
2	14	3	2	19
3	14	3	1	18
4	7	0	0	7
5	3	2	3	8
6	1	0	0	1
7	1	0	0	1
15	0	0	1	1
Total	40	8	7	55

This section describes the fatal event (determined by OHRC history and OADDL necropsy) as compared to age of the horse. The categories included are animals injured during racing, routine training, accidents and those dying of non-exercise or “natural” disease conditions (combined). This category is continued for 2014 in Table 9 to the left. Oklahoma continues to report more race day fatalities than training

fatalities compared to some other jurisdictions. This reflects the large number of animals that train off-site of OHRC facilities. In 2014 compared to 2013: racing cases were decreased by 8, training cases increased by 7, and non-exercise cases reduced by 1.

Fatal Event by Breed:

This year we again report the fatal event categories by breed in Table 10 (below). All breeds reported highest fatalities for racing, but this may represent a bias in the current necropsy program. Race day mortality remains the primary submission to the OADDL:OHRC necropsy program, 40/55 (73%) of submissions. The majority 85% (22/26) of the Quarter Horse and all American Paint fatalities occurred on race day. There was an increase in Thoroughbred training fatalities in 2014, up from 1 animal in 2013 and no Quarter Horse or American Paint training fatalities submitted. Non-exercise submissions were reduced by 1 animal from the 2013 reporting period.

Table 10: Fatal Event by Breed 2014:

Breed	Racing	Training	Non-exercise	Total
Thoroughbred	14	8	3	25
Quarter Horse	22	0	4	26
American Paint	4	0	0	4
Total	40	8	7	55

Complete tabulation of category of death and breed by Track is presented in Table 11 on the next page:

Table 11: Fatal event by breed and track 2014.

		REM	FMT	WRD	Total
RACE DAY					
	Thoroughbred	10	2	2	14
	Quarter Horse	14	3	5	22
	Am. Paint	2	1	1	4
	Before Race				
	Thoroughbred	1	0	0	1
	Quarter Horse	0	0	0	0
	Am. Paint	0	0	1	1
(after finish or)	During Race				
	Thoroughbred	7	2	2	11
	Quarter Horse	13	3	5	21
	Am. Paint	2	1	0	3
	Finished Race				
	Thoroughbred	2	0	0	2
	Quarter Horse	1	0	0	1
TRAINING					
	Thoroughbred	8	0	0	8
	Quarter Horse	0	0	0	0
Non-Exercise					
	Thoroughbred	1	0	2	3
	Quarter Horse	2	0	2*	4
TOTAL		37	6	12	55

The majority of race day deaths, 95% (38/40), occurred during or immediately following problems encountered during a race in 2014. One Thoroughbred and one American Paint sustained skull fractures in the paddock prior to a race. One Quarter Horse died after acute illness following a race that was consistent with Clenbuterol toxicity/rhabdomyolysis. Non-exercise submissions included one Quarter Horse that died of colic the night following the running of a race (*). Two REM Thoroughbred horses were euthanized 6 days following race day injury.

GOAL 1: INVESTIGATE AND DOCUMENT TYPES OF INJURIES:

Distribution of Fatal Activity and Track:

Table 12: Fatal Activity by Track - 2014

TRACK	Racing	Training	Non-exercise	Total
REM	26	8	3	37
FMT	6	0	0	6
WRD	8	0	4	12
Total	40	8	7	55

Table 12 (previous page) reports a summary of activity for case fatalities for each of the three submitting tracks. Training submissions increased in 2014, and all were Thoroughbred horses from REM. Table 13, below, further separates the total fatalities in a different manner based on final necropsy analysis. Cause of death is divided into categories of natural disease states (non-exercise related and accidents), cases of exercise induced pulmonary hemorrhage (EIPH) and finally conditions involving musculoskeletal injury. The horse that died of a metabolic exertional rhabdomyolysis is included as a separate entry for 2014.

Table 13: Cause of Death by Track - 2014

	REM	FMT	WRD	Total
Natural Disease/Non-Exercise/Accident	3	0	4	7
EIPH (bleeder on RACE DAY)	1	0	1	2
Post-Race Metabolic Death	1	0	0	1
Musculoskeletal Injury	32	6	7	45
Racing:	24	6	7	37
Training:	8	0	0	8
Total	37	6	12	55

The majority of “injuries” sustained by athletic horses affect the musculoskeletal system. In 2014, 82% (45/55) of the submissions were related to musculoskeletal system injury. This method of separating racetrack injuries has been used in most other jurisdictions world-wide. By this means of segregation, it is possible to assess the Catastrophic Musculoskeletal Injury Index (CMI) utilized to evaluate over-all incidence of racing exercise associated injury. The total number of racing fatal musculoskeletal injuries submitted decreased by 8 horses (from 45) in 2013.

Exercise Induced Pulmonary Hemorrhage:

Exercise induced pulmonary hemorrhage (EIPH), or “bleeders” in the horse remains an enigma affecting racehorses and other equine athletes. This condition has been reported since early history in the horse and research efforts remain directed at the underlying pathophysiology, treatment and management of this condition. The condition is typically not reported as an “injury” in most jurisdictions since the majority of these cases are not fatal. Identification systems for “bleeders” are in place in Oklahoma. During 2014 there were two submissions where EIPH was confirmed as the cause of death on race day. One was a 7 year old Thoroughbred in a Claiming Race at WRD and one a 3 year old Quarter Horse in a Derby Trial at REM. Both of the EIPH cases were submitted in April.

Musculoskeletal Injury:

As seen in Table 13, the majority (82%) of the total fatalities were related to musculoskeletal disorders, essentially unchanged from 2003. Table 14 (below) displays the distribution of limb injuries sustained by animals during racing or race training, pre-race injuries but excludes EIPH horses and accidents which involved the limbs. This data is also segregated by breed, track and limb in 2014. There were slightly more injuries in right front than left front limb in 2014 (18 vs 14 respectively). Similar but more dramatic right front distribution was reported in 2013 and 2011. There were 4 bilateral forelimb injuries which all occurred during racing with only one reported in a Thoroughbred. Three hind limb and 6 musculoskeletal injuries from other sites were submitted in 2014.

Table 14: Limb injury by breed and racing/training 2014.

	REM		FMT		WRD		TOTAL		Sum
	Race	Train	Race	Train	Race	Train	Race	Train	
Right Front									18
TB	5	4	0	0	0	0	5	4	9
QH	3	0	1	0	4	0	8	0	8
A.Paint	1	0	0	0	0	0	1	0	1
Left Front									14
TB	4	2	1	0	1	0	6	2	8
QH	5	0	0	0	0	0	5	0	5
A.Paint	1	0	0	0	0	0	1	0	1
Bilateral Front									4
TB	0	0	1	0	0	0	1	0	1
QH	1	0	2	0	0	0	3	0	3
Left Hind									
TB	0	2	0	0	0	0	0	2	2
Right Hind									
QH	1	0	0	0	0	0	1	0	1
Other									6
TB	1	0	0	0	0	0	1	0	1
QH	2	0	0	0	1	0	3	0	3
A.Paint	0	0	1	0	1	0	2	0	2
TOTAL	24	8	6	0	7	0	37	8	45

Musculoskeletal Disorder – All Racing or Race Training Injuries:

The complete reporting of injury site is included in Table 15 on the next page. Breed is distributed by Thoroughbred (TB) and Sprint breeds (Quarter Horse, American Paint, Appaloosa) designated “Spnt.” Surveys and research in other racing jurisdictions have reported increased injury to the front limbs and identified injuries to the distal limbs (distal to the carpus) as the most common injury in the racing equine athlete. This table includes race and training injuries, pre-race injury and EIPH but excludes accidents involving the limbs. None of the EIPH cases in 2014 sustained musculoskeletal injuries.

Multiple injury sites were noted at necropsy in some carpal and fetlock cases; where the primary bone fracture was not definitively identified.

Table 15: All Fatal Injuries during Racing or Race Training & Track 2014

Injury	REM		FMT		WRD		Total		Sum
	TB	Spnt	TB	Spnt	TB	Spnt	TB	Spnt	
Fetlock Failure:	11	6	1	0	1	1	13	7	20
Front:	11	5	1	0	1	1			
Hind:	0	1	0	0	0	0			
Carpal Fracture:	2	2	0	2	0	2	2	6	8
Cannon (Metacarpus):	3	2	0	1	0	0	3	3	6
Front (MCIII):	1	2	0	1	0	0			
Hind (MTIII):	2	0	0	0	0	0			
Pelvis/Vertebrae (L-S):	0	2	0	1	0	1	0	4	4
E.I.P.H.	0	1	0	0	1	0	1	1	2
Scapula:	0	1	0	0	0	1	0	2	2
Skull:	1	0	0	0	0	1	1	1	2
Humerus:	0	1	0	0	0	0	0	1	1
Short Pastern (P2):	1	0	0	0	0	0	1	0	1
Coffin Bone (P3):	0	0	1	0	0	0	1	0	1
Post-Race Rhabdomyolysis	0	1	0	0	0	0	0	1	1
Total	18	16	2	4	2	6	22	26	48

Distal forelimb injuries accounted for 75% (36/48) of total fatal musculoskeletal injuries in 2014. Two of these fractures involved distal phalangeal bones in two Thoroughbred animals. One of these cases in a TB had marked long toe/low heel morphology with corrective shoes (palmar branches of shoes removed). Fetlock injuries were most frequent 42% (20/48) and were increased from 17 reported in 2013. Compared to all horses in 2013, fetlock injuries more than doubled at REM (6 to 17) however were reduced at FMT and WRD for 2014. In addition, there were more intra-articular condyle fractures of MCIII noted in the fetlock, particularly in Thoroughbreds in this reporting period. Fractures involving the carpus were second most frequent (8/48 - 17%) similar to previous reporting years, however the total number was decreased by over half, from 17 reported in 2013. Carpal fracture submissions were reduced for all breeds at all tracks compared to the 2013 report. There were 6 cannon bone fractures in 2014 compared to 5 in 2013, and three were bilateral front cannon (1 TB, 2 QH) all of which occurred during racing. Two of the cannon case submissions were unilateral hind cannon bones (MTIII) in Thoroughbreds and both associated with training accidents. There were fewer lumbo-sacral vertebral fractures in 2014 (4) compared to 2013 when 6 were submitted. The continued identification of lumbo-sacral fractures in Sprint Breed horses remains a concern first reported in the 2013 report.

Continued monitoring of limb injuries is important for Commission Veterinarians, Track Veterinarians, Track Management and Groundskeepers to improve and ensure a safe racing environment. The increased occurrence of front fetlock injuries in 2014 could be utilized for the remainder of 2015 race meets.

GOAL 2: MONITOR FOR EPIZOOTIC DISEASE:

In Table 13 from page 7, there were 7/55 (13%) of submitted fatal cases reported due to non-exercise related activities, natural diseases and accidents. These animals include cases with potential infectious or communicable disease important to all animals competing, training or residing in the racetrack environment. Table 16 (below) documents these cases based on final necropsy analysis at OADDL.

Table 16: Non-Exercise, Natural Disease, Accident by Track-2014

Disease Condition:	
Liver necrosis, elevated tissue Iron levels, 5 yr, QH, gelding, REM	Euth
GI, SI strangulation, endotoxemia, 5 yr, TB, gelding, WRD	Died
Accident unloading from trailer, tendon laceration, 3 yr, QH, filly, REM	Euth
Accident loose on grounds in AM, Fracture L radius, 2 yr, TB, colt, WRD	Euth
GI impaction + Chronic Pleuritis, 15 yr, TB, gelding, REM (pony horse)	Euth
GI colon torsion, raced previous day, 2 yr, QH, filly, WRD	Euth
Colitis, necrotizing, 5 yr, QH, mare, WRD	Died
Total	7

In 2014 the majority of non-exercise associated submissions were again associated with gastrointestinal disorders 57% (4/7). Most of these horses were reported in the history to have exhibited colic symptoms and some received veterinary treatment prior to death or euthanasia. One mare from WRD had gross and microscopic evidence of inflammation (colitis) however cultures were negative for Salmonella bacteria. There were two accidents which resulted in fatality in 2014. One Quarter Horse filly at REM was injured while unloading from the trailer and one Thoroughbred colt at WRD was found loose on the grounds with a fracture. Acute respiratory diseases were not submitted for examination in 2014, however one 15 year old Pony Horse TB from REM had gross evidence of pleuritis at necropsy. This animal was euthanized due to GI clinical signs and screening for respiratory pathogens did not identify common infectious or communicable pathogens. One interesting case of acute iron toxicity was noted in 2014 (see toxicology section).

No Salmonella, Streptococcus equi (Strangles), Equine Herpes Virus, West Nile virus, Eastern Equine Encephalitis or Equine Piroplasmiasis was identified during routine testing of necropsy samples in 2014. The disease surveillance emphasis for the cooperative OADDL:OHRC program is vital to the Oklahoma racing industry. There is bias in the current program, however, in that only necropsy examinations are being performed. Monitoring cases for infectious diseases will continue in 2015.

Drug Testing (TOXICOLOGY):

Since the initiation of the cooperative OADDL:OHRC Diagnostic Program, some toxicology analysis has been performed, at the request of the OHRC. Following the 2010 report renewal meeting (May 2011) the OHRC requested cancelation of the OADDL toxicology portion of the program. The performance of routine toxicology testing by OADDL was suspended May 1, 2011 however; toxicology continues to be performed at Commission request on a case by case basis. Samples including urine, eye fluid and synovial fluid are harvested and retained according to OADDL policy, and toxicology remains available on all cases at the request of OHRC.

In 2014, samples from two cases were forwarded to a Racing Reference Laboratory for further testing. One was a three year old Quarter Horse gelding that collapsed following a 400 yard Derby Race at REM in April, with exertional rhabdomyolysis. This horse was managed medically at the track for an extended period of time however was euthanized due to lack of clinical response and prognosis. Screening of both aqueous humor and urine samples identified: Clenbuterol, Methocarbamol, Guaifenesin in addition to some other drugs, Dexamethasone, Prednisolone, Flunixin, Xylazine and Naproxin. Quantitative levels were not determined in these samples, and some of these medications reflect treatment for the myopathy. The clinical history and gross necropsy findings (myoglobinuria) support severe exertional rhabdomyolysis in this case. Exertional myopathy occurs in many animal species and can frequently be fatal. This syndrome has been described secondary to strenuous exercise, associated with some genetic diseases and associated with some medications/toxins, including Clenbuterol (see Footnote 1).

The second case submitted for toxicology was a 6 year old Thoroughbred gelding injured during a 6 furlong race at Remington Park in September. This animal suffered a catastrophic right front fetlock fracture confirmed at necropsy along with significant chronic arthritis in other joints including an osteophyte in the right carpus. Analysis of synovial fluid identified Methylprednisolone by LC-MS/MS below the confirmation limit (approximately 18 and 25 pg/ml in 2 different joints). Quantitative testing was not performed and no other drug classes reported although this animal had been euthanized with barbiturates.

A third toxicology case in 2014 was in a five-year-old Quarter Horse that raced at REM. This gelding developed acute illness persisting three days following a race with signs including: rhabdomyolysis and neurologic signs. Necropsy confirmed acute liver necrosis and toxicology testing determined 559.03 ppm Iron in liver. The normal range in horse liver is 100-300 ppm, and toxic range 600-1000 ppm (Puls, "Mineral Levels in Animal Health"). Acute iron toxicity was considered the final diagnosis in this case.

GOAL 3: OVERALL RACEHORSE HEALTH:

The overall health and well being of the Oklahoma racehorse population remains a stated goal of the joint OADDL:OHRC Program. Of particular interest is the hoof anatomy/morphology/angle and shoeing characteristics of the equine population. This examination is attempted on all submissions, including non-exercise related deaths and pony horse/outrider animals. Table 17 (below) displays the hoof/shoeing data compiled during the 2014 time period. The abnormalities are quantitated for 2014 and also reported by breed (rather than track) at the request of breed associations.

Hoof Anatomy/Shoe Characteristics:

Table 17: Hoof Anatomy and Horse Shoe Characteristics - 2014

		Thoroughbred	QH/Pnt/App	TOTAL
Toe Grabs:				
	Front < 5mm	17	19	36
	Front > 5mm	0	11	11
	Hind < 5mm	6	5	11
	Hind > 5mm	10	21	31
Shoes Not Examined:		7	0	7
Hind Shoes Not Examined:		8	4	12
Flat shoe/Barefooted:		1	0	1
Toe/Heel Length	Normal	3	11	14
Long toe/low heel	Mild	7	8	15
	Moderate	10	7	17
	Marked	4	4	8
	Not reported	1	0	1
Under-run heels	Normal	3	8	11
	Mild	12	11	23
	Moderate	7	10	17
	Marked	2	1	3
	Not reported	1	0	1
Corrective shoe (bar, branch removed)		3	0	3
Squared toe		7	2	9
Pads		4	2	6

A concerted effort was made to record the hoof morphology and shoeing characteristics on all horses submitted under the OADDL:OHRC Program in 2014. There was an interest in this topic generated during the Commission meeting in 2007 (for year-end report 2006). Long toe grabs were present on front feet of 11 animals in 2014, all were in

Sprint Breeds but this was fewer than reported in 2013 (14). The majority of toe grabs on hind shoes were long (>5mm). Shoes were not examined on 7 horses and hind shoes not examined on 12 animals in 2014. The older Pony Horse from REM did not have shoes when presented for necropsy. Over-all there were 53% (29/55) set of hooves evaluated as “normal” or “mild” with respect to toe length, heel length and symmetry. This figure is basically unchanged from 2012. Abnormal hooves, corrective shoes and asymmetry were reduced from reporting in 2013. All horses submitted in 2014 with corrective shoes were Thoroughbred and rim/full pads were of noted in both breed groups.

Gastric Ulcers:

Table 18: Gastric Ulcers - 2014

	Thoroughbred	QH/Pt/Ap	TOTAL
None	4	17	21
Mild	3	7	10
Moderate	11	1	12
Marked	5	1	6
Not Reported	2	4	6
Total	25	30	55

Monitoring of gastric ulcers continues to be a component of the OHRC:OADDL Diagnostic Program. Table 18 presents the data compiled during 2014 regarding gastric ulceration in the Oklahoma racehorse diagnostic program. This data is presented by breed at the request of registry participants, with Thoroughbred compared to combined “sprint” horses (Quarter Horse, American Paint, Appaloosa). Comments regarding gastric ulcers were not reported in six cases in 2014. This may reflect either none present or cases unable to be evaluated due to autolysis. Of the 49 animals with gastric lesions reported, 43% (21/49) had no gastric ulcers and 20% (10/49) had only mild gastric ulcers identified. Twice as many moderate ulcers were noted than severe gastric ulceration. More severe ulcers (moderate or marked) were detected in Thoroughbreds (16) than in the Sprint Breeds (2). This breed variation may reflect age, as there were more older Thoroughbred horses submitted for necropsy. Seven of 11 Thoroughbreds (64%) older than 5 years had significant gastric ulcers present. These numbers were very similar to those reported in 2013. Trainers, owners and veterinarians should continue to recognize the importance of gastric ulcers in overall horse health.

Fatal Injury and Track Location:

Table 19: Race Fatality by Track Location 2014

	REM	FMT	WRD	Total
Finished Race	10	2	1	13
Home Stretch	1	1	0	2
At Finish/Finish	2	1	2	5
At/Out of Starting Gate	4	0	2	6
Near Turn	1	0	1	2
Far Turn	2	0	0	2
1/2 Pole	1	0	0	1
1/4 Pole	0	1	0	1
3/8 Pole	2	0	0	2
In Saddling Paddock	0	0	1	1
Not Reported	11	1	1	13
Total	34	6	8	48

The reporting of location on a racetrack where a catastrophic injury occurs to a racehorse has been utilized by several racing jurisdictions to improve overall safety for equine competitors. This data is compiled as part of the cooperative OADDL:OHRC diagnostic program but is also reliant upon submission of this data from Commission/Track personnel. The 2014 data for track location is included in this report as Table 19 (above) and includes, training deaths and bleeders. This data was not provided on the submission form in 12/48 (25%) of the cases. In 2014, three fatalities occurred off of the track surface following a race and could not be reported. In addition, many of the training day facilities were attended by Private Veterinary Practitioners and track location was not specified. The location most frequently reported remained at, near or following the finish line (18/36 – 50%) for all tracks. The second most frequent location reported was at or immediately out of the starting gate (6), including all four lumbar spine fractures in Sprint Breeds. Unfortunately, the reporting is not standardized between regulatory officials, and is difficult to interpret. The OADDL has re-designed the submission form to include a diagram of track surface in an attempt to improve reporting of the track location in these cases for 2015. More in-depth analysis and standard reporting of track location will continue to be an objective of this program.

Race Fatality and Class of Race:

Table 20: Race Fatality by Class of Race & Breed – 2014

	REM		FMT		WRD		Total		TOTAL
	TB	Q/P/A	TB	Q/P/A	TB	Q/P/A	TB	Q/P/A	
Maiden claiming	2	2	0	2	0	1	2	5	7
Claiming:	6	3	2	1	2	1	10	5	15
\$0-4999	0	0	0	0	0	0	0	0	
\$5000-7499	2	0	1	0	1	0	4	0	
\$7500-9999	1	1	0	0	0	1	1	2	
\$10,000-19,999	3	3	1	3	1	1	5	7	
\$20,000-up	2	1	0	0	0	0	2	1	
Futurity/Derby Trial	0	5	0	1	0	0	0	6	6
Futurity/Derby Final	0	2	0	0	0	1	0	3	3
Allowance	1	2	0	0	0	2	1	4	5
Stakes	0	1	0	0	0	0	0	1	1
Maiden Race	1	0	0	0	0	1	1	1	2
Training Race	0	1	0	0	0	0	0	1	1
Total	10	16	2	4	2	6	14	26	40

In the 2006 year-end report to OHRC, OADDL included data regarding class of race, this data was continued in 2014. The 40 race fatality cases (including EIPH & myolysis cases) are displayed with respect to class of race in Table 20. Requests from OHRC in 2009 to stratify the claiming price are included in this table. In addition, this table also indicates class of race by breed, as requested in 2010. Thoroughbreds (TB) are in one column and Quarter Horse, Paint, Appaloosa (Q/P/A) in another. The claiming value tabulation includes both Claiming and Maiden Claiming races. During 2014 approximately one-half of fatalities were in claiming races 55% (22/40). A majority of claiming race submissions were in the \$10-19,999 range, with claiming price of \$5000-7,500 the second largest class submitted. This number of \$5-7,500 Claimers is reduced from what was reported in 2013 (10). Slightly more Thoroughbred horses were submitted from Claiming Races than Sprint Breeds (12 vs. 10). Only 2 Thoroughbred horses were submitted from Stakes, Allowance or Derby Races in 2014. The great majority of horses submitted from these racing classes were Sprint Breeds, and primarily Quarter Horses, 78% (14/18) (2 American Paints in Claiming Races). There was an increase in the number of Futurity/Derby Trial and Finals submissions in 2014 to 9, compared to 2013 (2). Fewer cases were submitted from Allowance and Maiden Races than in 2013.

Race Fatality and Distance of Race:

The Breed Registry Associations provided information for 2014 that stratified the number of horses starting at different distances. This information is included in the 2014 report as a new analysis. Tables 21a (below) and 21b (following page) contain the total number of race fatalities submitted to OADDL in relation to race distance and surface. These tables include Pre-Race fatalities (1 TB REM, 1 Paint WRD) but excludes EIPH (TB WRD, QH REM) and metabolic case (QH REM). Separate tables include Thoroughbred (Table 21a) and Sprint Breeds (Table 21b). This raw data is summarized for both Thoroughbred and Sprint breeds in the far right column as total fatalities per 1000 starters. Although there were a total of 252 Appaloosa starters in 2014, there were no fatalities from this breed submitted to OADDL, thus the Appaloosa breed is not included in the first 3 tracks of table 21b, but are represented in the "Total" population at risk in the frequency Total Sprint breeds (QH, PT, AP). Conclusions from this single year are uncertain as the raw numbers are quite small for some categories. Additional analysis from previous or future years may be beneficial.

Table 21a: Thoroughbred Race Fatality, Number of Starters, Distance 2014:

Race Distance	REM		FMT		WRD		Total	
	#Fatalites/ #Starters	Fatalities per 1000	#Fatalites/ #Starters	Fatalities per 1000	#Fatalites/ #Starters	Fatalities per 1000	#Fatalites/ #Starters	Fatalities per 1000
Races on DIRT								
3 fur	0/7	0	-	-	-	-	0/7	0
4 fur	-	-	0/377	0	-	-	0/377	0
5 fur	0/272	0	-	-	0/80	0	1/352	0
5-1/2 fur	1/866	1.15	1/88	11.4	0/582	0	2/1536	1.30
6 fur	2/1283	1.56	0/335	0	1/733	1.36	3/2351	1.28
6-1/2 fur	2/314	6.37	0/169	0	-	-	2/483	4.14
7 fur	0/223	0	-	-	-	-	0/223	0
1 mile	2/890	2.25	1/251	3.98	0/678	0	3/1819	1.65
1mi70yds	1/578	2.25	-	-	0/200	0	1/778	1.25
1-1/6 mi	0/55	0	-	-	0/12	0	0/67	0
1-1/8 mi	0/22	0	-	-	-	-	0/22	0
1-3/16 mi	-	-	-	-	0/18	0	0/18	0
Races on TURF								
5 fur	0/214	0					0/214	0
7-1/2 fur	0/350	0					0/350	0
1 mile	2/342	5.84					2/342	5.84
1-1/16 mi	0/198	0					0/198	0
1-1/8 mi	0/23	0					0/23	0

Table 21b: Sprint Horse (QH & PT) Race Fatality, Number of Starters, Distance 2014:

Race Distance in yards	REM (Q,P)				FMT (Q,P)				WRD (Q,P)				Total (Q,P,A)	
	#Fatalites/#Starters		Fatalities per 1000 Starters		#Fatalites/#Starters		Fatalities per 1000 Starters		#Fatalites/#Starters		Fatalities per 1000 Starters		#Fatalites/#Sprit Starters	Fatalities per 1000
	QH	PT	QH	PT	QH	PT	QH	PT	QH	PT	QH	PT		
110	1/9	-	111	-	-	-	-	-	1/36	0/8	27.8	0	2/53	37.8
220	0/9	-	-	-	0/10	-	-	-	0/71	-	-	-	0/90	0
250	1/604	1/94	1.66	10.6	0/262	0/46	0	0	0/275	0/33	0	0	2/1308	1.53
300	3/1077	1/264	2.78	3.79	0/460	0/138	0	0	0/641	0/145	0	0	4/2725	1.47
330	0/803	0/61	0	0	2/241	1/53	8.30	18.9	4/229	0/96	17.5	0	7/1485	4.71
350	5/1001	0/193	4.19	0	1/450	0/90	2.22	0	0/602	0/34	0	0	6/2370	2.53
400	0/355	0/20	0	0	-	-	-	-	0/230	1/37	0	27.0	1/642	1.56
440	0/160	0/12	0	0	-	-	-	-	0/49	-	0	-	0/221	0
550	0/98	0/4	0	0	-	-	-	-	0/83	-	0	-	0/185	0
870	2/210	-	9.52	-	0/136	0/18	0	0	0/171	0/5	0	0	2/540	3.70

For 2014 summary reporting, the Sprint Races at 110 and 220 yards will not be addressed. The fatality rate calculation per 1000 starters revealed State-wide increases above 2.0 for Thoroughbred horses at 6-1/2 furlong and 1 mile Turf races and for Sprint breeds at 330, 350 and 870 yards. There are numerous variables which could affect this rate calculation including number of horses available and number of races available. The information may be beneficial however when determining the track arrangement, gate placement and other factors.

Similar data is available at the “Equine Fatality Summary” of the “Equine Injury Database” through The Jockey Club for Thoroughbred racing (Footnote 2). Table 22 below is a presentation of Oklahoma Thoroughbred race day fatalities in that format. This table includes one pre-race fatality and two post-race fatalities from REM not included in the 2014 Jockey Club summary.

Table 22: Thoroughbred Race Fatality per 1000 starters (EID Format) - 2014

Surface:	REM		FMT		WRD		Oklahoma Total	
	#Fatal/#Starter	Fatal per1000	#Fatal/#Starter	Fatal per1000	#Fatal/#Starter	Fatal per1000	#Fatal/#Starter	Fatal per1000
Turf	2/1127	1.77					2/1127	1.77
Dirt	8/4510	1.77	2/1220	1.64	1/2303	0.43	11/8033	1.37
Distance:								
<6f	1/1359	0.74	1/465	2.15	0/662	0	2/2486	0.80
6-7-1/2f	4/2170	1.84	0/504	0	1/733	1.36	5/3407	1.47
8f & up	5/2108	2.37	1/251	3.98	0/908	0	6/3267	1.84

Chronic Musculoskeletal Lesions:

Complete identification of pre-existing or chronic changes in the musculoskeletal system continues to be documented in the OADDL:OHRC diagnostic program. This analysis was completed on most animals submitted, regardless of history in 2014. There were 15 fatal race day or training cases submitted in which significant pre-existing or chronic joint/bone lesions were present, reduced from 21 in 2013. Twelve were race day submittals, one was a training injury, and two were non-exercise related deaths. There were 12 geldings, 2 females, and 1 stallion, 9 Quarter Horses, 5 Thoroughbreds and 1 American Paint and submittals came from REM (9), WRM (4) and FMT (2). Ages of these horses were 2 years (3), 3 years (3), 4 years (4), 5 years (3), 6 years (1) and 7 years (1). Extensive chronic arthritis, evaluated as moderate to marked, or marked in severity were selected for these cases. Joint margin chip fractures larger than 1.0 cm were increased in 2014. There were 6 cases of significant carpal chips (2 TB, 4 QH) and 7 cases with significant fetlock chips (1 TB, 5 QH, 1 PT). Significant chronic suspensory ligament changes were present in 2 animals, both were Thoroughbreds. Subchondral bone hemorrhage (Osteopenia/bruise) with thinning of cartilage in the distal front MCIII was identified in 3 cases (2 TB, 1 QH). One 5 year old Thoroughbred at REM raced with a surgical implant (screw) in the contralateral limb to fatal injury site. This surgical repair appeared quiescent and healed, however there was significant chronic suspensory ligament change in the ipsilateral limb. Significant chronic lesions were present in the horse that had acute liver necrosis (REM, QH), one animal injured in the gate pre-race (REM, QH) and one animal that died following colic the day of a race (WRD, QH). This information will continue to be tabulated and submitted to OHRC but a concerted effort is needed by all in racing to ensure that animals are ready for strenuous work.

Final reports were issued to OHRC on individual cases regarding pre-existing lesions and other conditions preceding death. Review of these cases by OHRC or submitting Track officials is part of the usefulness of the necropsy program. There are several medical and surgical equine hospital facilities within easy access of all three tracks in Oklahoma however; and it should be the goal of breed registries and horsemen's groups to ensure appropriate medical care for all animals in the racing industry.

SUMMARY:

Table 23 (next page), presents musculoskeletal fatality per racing day for Oklahoma tracks from 2006 to 2014. This value was reduced State-wide in 2014 calendar year to 0.191, the first time it has been below 0.200 since 2009. There was dramatic decrease for FMT and WRD and an increase for REM during this reporting period.

Table 23: Number of Musculoskeletal Fatalities per Number of Race Days

		Catastrophic Musculoskeletal Fatality	Number of RACE DAYS	Catastrophic Musculoskeletal Fatality per Race Day	
TOTAL	2006	44	264	0.167	
	2007	46	265	0.174	
	2008	39	265	0.147	
	2009	40	238	0.168	
	2010	51	211	0.242	
	2011	44	211	0.208	
	2012	45	211	0.213	
	2013	45	211	0.213	
	2014	40	209	0.191	
	Remington Park	2006	23	118	0.195
		2007	14	119	0.118
		2008	16	117	0.137
		2009	23	117	0.197
		2010	22	117	0.188
2011		21	117	0.179	
2012		26	117	0.222	
Blue Ribbon Downs	2006	7	71	0.098	
	2007	16	70	0.229	
	2008	5	70	0.071	
	2009	8	43	0.186	
	Fair MeadowsTulsa	2006	10	33	0.303
		2007	11	34	0.324
		2008	15	34	0.441
2009		3	34	0.088	
2010		15	34	0.441	
2011		9	34	0.265	
2012		8	34	0.235	
Will Rogers Downs	2006	4	44	0.091	
	2007	5	42	0.119	
	2008	3	44	0.068	
	2009	6	44	0.136	
	2010	14	60	0.233	
	2011	14	60	0.233	
	2012	11	60	0.183	
2013	13	60	0.217		
2014	8	58	0.138		

Conclusions from the 2014 year-end report indicate that Oklahoma racetracks remain an active and an improved environment for equine athletes. During 2014, there were 37 race day musculoskeletal fatalities, 2 EIPH fatalities and 1 post-race fatal rhabdomyolysis case. Lumbo-sacral fractures (4) in Quarter Horses were again noted and increased Thoroughbred condylar fractures of MCIII were noted in fetlock cases.

The number of starters by breed was again graciously provided by Breed Registries in 2014, and is presented below in Table 24. For all breeds and tracks, the number of available horses was approximately double the number of starters, indicating most animals had more than one race start in 2014.

Table 24: Number of Starters by Breed and Track 2014

Breed	REM	FMT	WRD	Total
Thoroughbred	5637	1220	2303	9160
Sprint Breeds Total	5073	1960	2836	9869
Quarter Horse	4326	1559	2387	8272
American Paint	648	339	358	1345
Appaloosa	99	62	91	252
Total	10,710	3180	5139	19,029

A more classic analysis of catastrophic musculoskeletal injury used by most racing jurisdictions is the Catastrophic Musculoskeletal Injury Index (CMI). This is a more traditional manner of comparing injury statistics and is calculated as the number of Catastrophic Musculoskeletal Injuries per 1000 horses starting to race. The information is presented in table form below, Table 25, segregated by breed, race track and State-wide total. The Sprint Breeds (Quarter Horse, American Paint, Appaloosa) are combined in this comparison chart for CMI.

Table 25: CMI by Breed and Track 2014:

	REM	FMT	WRD	TOTAL
Number Musculoskeletal Fatality during RACE:				
Thoroughbred	10	2	1	13
Qtr/Pnt/App	14	4	6	24
Total:	24	6	7	37
Total number of STARTERS:				
Thoroughbred	5637	1220	2303	9160
Qtr/Pnt/App	5073	1960	2836	9869
Total:	10,710	3180	5139	19,029
CMI "index" – number per 1000 starters				
Thoroughbred	1.77	1.64	0.43	1.42
Qtr/Pnt/App	2.76	2.04	2.12	2.43
TOTAL	2.24	1.89	1.36	1.94

The previous CMI is an attempt to correlate with what is reported in other jurisdictions, a four year summary appears in Table 26 (below). We are fortunate in Oklahoma to have cooperation between breed associations, regulatory associations, practicing veterinarians and diagnosticians in performing analysis. The number of “starters” per race will remain critical in determining any further factors regarding over-all racing safety. Nationwide statistics predict a range of this CMI index around 2.0 and Table 24 demonstrates Oklahoma remains in line with this figure with a “State-wide” index of 1.94. This value is the lowest since 2011 and indicates improvement over-all in fatal injury rate. This State-wide decrease is the result of rather dramatic reduction in CMI for both FMT and WRD, while there was an increase at REM. The increase at REM is associated with a 25% increase in CMI for Sprint Breeds. There are many factors which may be associated with the State-wide decrease, however 2014 did have the institution of “pre-race” veterinary examinations. Continued diligence by the industry remains warranted, with increased attention to Sprint Breeds State-wide. Oklahoma is unique in that we have nearly equal numbers of both Thoroughbreds and Quarter Horses/Paints/Appaloosas competing; and the continued 2014 elevation in Sprint Breed injury rate is noteworthy.

Table 26: CMI by Breed and Track 2011 – 2014.

Breed	REM				FMT				WRD				TOTAL			
	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
TB	1.98	2.90	1.84	1.77	2.98	1.58	1.58	1.64	2.30	1.39	1.58	0.43	2.20	2.30	1.73	1.42
Q/P/A	1.71	1.94	2.18	2.76	2.23	2.32	4.53	2.04	2.19	2.21	3.10	2.12	1.97	2.10	2.92	2.43
Total	1.86	2.45	2.00	2.24	2.51	2.05	3.38	1.89	2.24	1.82	2.39	1.36	2.08	2.20	2.34	1.94

Limb of injury was predominantly the right front in 2014. Anatomic location of injury for 2014 period had fewer carpal injuries and EIPH cases than 2013. The identification of lumbo-sacral spine injury in Sprint Breeds and a significant increase in Sprint Breed injuries over-all continued in 2014. This Sprint Breed injury rate is a concern. Thoroughbred injury rates declined at all tracks in 2014, and was below 1.50 State-wide. This is an excellent trend and very well may reflect the funding of an additional Regulatory Veterinarian to assist in “pre-race” examinations at Remington Park. Disease surveillance did not identify reportable diseases in 2014. Monitoring of hoof anatomy, shoe characteristics, gastric ulcers and the presence of chronic limb lesions continued and was forwarded to OHRC upon completion of each case. Reporting of summary cases which may be considered Animal Welfare issues were continued in this 2014 Annual Report. New comparisons of injury data to OHRC racing information and expansion of breed differences was continued in hopes of extending the scope and impact of this program’s usefulness.

The Oklahoma Animal Disease Diagnostic Laboratory remains proud to be included as an integral part of the Veterinary Medical Diagnostic Program in cooperation with the Oklahoma Horse Racing Commission. The OADDL remains committed to accomplishing the goals outlined for this project and pleased to support the important racing and equine industries of the state.

Respectfully submitted,

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Oklahoma Animal Disease Diagnostic Laboratory

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Publication:

Andrea L. Beisser, BA; Scott McClure, DVM, PhD, DACVS; **Grant Rezabek, DVM, MPH**; Keith Soring, DVM; Chong Wang, PhD; "Evaluation of frequency and risk factors associated with catastrophic musculoskeletal injuries in Quarter Horses at two Midwestern racetracks"; in JAVMA, Nov. 15, 2014, Vol. 245, #10, pp 1160-1168.

Footnotes:

1. "Effects of Clenbuterol on Skeletal and Cardiac Muscle in Horses", by Dr. Jessica A. Thompson, A Thesis for Degree of Master of Science, Veterinary Medical Sciences, Louisiana State University, August 2009.
2. Equine Fatality Summary; Equine Injury Database; Initiative of the Jockey Club:
<http://www.jockeyclub.com>

SUMMARY TABLE: Veterinary Medical Diagnostic Program

	Racing	Training	Non-exercise	Accident	TOTAL
Remington Park:					
2004	10	1	2	0	13
2005	14	5	3	2	24
2006	25	5	2	1	33
2007	14	5	3	2	24
2008	16	7	2	2	27
2009	23	4	3	1	31
2010	23	13	7	0	43
2011	24	2	5	2	33
2012	28	9	5	0	42
2013	22	1	5	0	28
2014	26	6	3	2	37
Fair Meadows:					
2004	6	1	4	0	11
2005	5	0	0	0	5
2006	11	0	0	0	11
2007	11	2	1	0	14
2008	15	0	2	0	17
2009	3	1	1	0	5
2010	15	0	0	0	15
2011	11	0	1	0	12
2012	8	1	1	0	10
2013	11	2	1	0	14
2014	6	0	0	0	6
WillRogersDowns:					
2005	0	1	0	0	1
2006	5	2	1	2	10
2007	5	1	1	0	7
2008	3	1	1	0	5
2009	6	2	2	0	10
2010	16	2	2	0	20
2011	16	4	5	0	25
2012	13	7	4	2	26
2013	15	1	1	1	18
2014	8	0	3	1	12