MEDICATION, SAFETY AND WELFARE COMMITTEE MEETING

of the California Horse Racing Board will be held on Wednesday, June 19, 2019, commencing at 10:00 a.m., in the Baldwin Terrace Room at the Santa Anita Park Race Track, 285 West Huntington Drive, Arcadia, California. Non-committee Board members attending the committee meeting may not participate in the public discussion, official committee vote, or committee closed session.

AGENDA

Action Items:


2. Report and discussion on the relationship of high intensity racing and training with catastrophic injuries.

3. Discussion regarding required changes to CHRB rules with respect to the limitations of furosemide (Lasix) use beginning in 2020, as well as the need for related regulatory language as may be necessary to protect the health and welfare of the horse.

4. Discussion of the practice of maintaining track surfaces before, during, and after rain storms.

5. Discussion and action regarding the proposed amendment to CHRB Rule 1842, Veterinarian Report, to require such reports be submitted electronically.

6. Discussion and action regarding the proposed amendments to CHRB Rule 1843.3, Penalties for Medication Violations; CHRB Rule 1843.5, Medication, Drugs and Other Substances Permitted After Entry in a Race and CHRB Rule 1844, Authorized Medication, to codify the Board’s prior temporary suspension of authorized medication for all horses participating in all licensed horse racing meetings.
7. Discussion and action regarding the **proposed addition of CHRB Rule 1846.1, Veterinary Records for Horses Shipping into an Inclosure to Race**, to require trainers to make available to the official veterinarian or racing veterinarian, the previous 14 day veterinary treatment record.

8. Discussion and action regarding the **proposed addition of CHRB Rule 1866.2, Shockwave Therapy Restricted**, to provide procedures for the use of Extracorporeal Shock Wave Therapy (EWST) or Radial Pulse Wave Therapy within a CHRB inclosure.

9. Discussion and action regarding the **proposed addition of CHRB Rule 1867.1, Use of Bisphosphonates Prohibited**, to prohibit the administration of bisphosphonates to any horse within a CHRB inclosure.

10. **General Business:** Communications, reports, requests for future actions of the Committee.

Additional information regarding this meeting may be obtained from Jacqueline Wagner at the CHRB Administrative Office, 1010 Hurley Way, Suite 300, Sacramento, CA 95825; telephone (916) 263-6000; fax (916) 263-6042. A copy of this notice can be located on the CHRB website at [www.chrb.ca.gov](http://www.chrb.ca.gov). *Information for requesting disability related accommodation for persons with a disability who require aids or services in order to participate in this public meeting, should contact Jacqueline Wagner.*

**MEDICATION, SAFETY AND WELFARE COMMITTEE**
Madeline Auerbach, Chairman
Alex Solis, Member
Rick Baedeker, Executive Director
Jacqueline Wagner, Assistant Executive Director
STAFF ANALYSIS
REPORT AND DISCUSSION ON
CHRB/CAHFS POSTMORTEM PROGRAM,
FATALITY REVIEW PROGRAM
FOR FISCAL YEAR 2017-2018

Medication, Safety and Welfare Committee Meeting
June 19, 2019

BACKGROUND

Board Rule 1846.5, Postmortem Examination, provides that every horse which suffers a fatal injury on the racetrack in training or in competition, or which dies or is euthanized within an area under the jurisdiction of the Board, shall undergo a postmortem examination at a diagnostic laboratory which is under contract with the Board to determine the injury or sickness which resulted in euthanasia or natural death. The CHRB, in partnership with the California Animal Health and Food Safety Laboratory System (CAHFS) has operated the Postmortem Examination Program since February 1990 and has performed examinations on 7,061 horses as of June 30, 2018. The program has three primary objectives: 1) to determine the nature of injuries occurring in racehorses, 2) to determine the reasons for these injuries, and 3) to develop injury prevention strategies. To accomplish this, a broad, cooperative approach was organized involving the development of a contract with the CAHFS to perform a necropsy on every horse that died spontaneously or was euthanized on racetracks or at training facilities under the jurisdiction of the CHRB. The CHRB/CAHFS partnership has become a national and international model for the racing industry to improve the safety and welfare of racehorses.

RECOMMENDATION

This item is presented for Committee discussion. Dr. Francisco Uzal is prepared to make a presentation on the CHRB/CAHFS Postmortem Program, Fatality Review Program for fiscal year 2017-2018.
POSTMORTEM EXAMINATION PROGRAM

Conducted for the California Horse Racing Board
July 1, 2017–June 30, 2018

California Animal Health and Food Safety
Laboratory System

J.D. Wheat Veterinary Orthopedic
Research Laboratory

School of Veterinary Medicine
University of California, Davis
June 2019
Postmortem Examination Program

California Animal Health and Food Safety Laboratory System

J.D. Wheat Veterinary Orthopedic Research Laboratory

School of Veterinary Medicine
University of California, Davis
Davis, CA 95616
(916) 752-8700

June 2019

Equine Welfare and Racing Injury Prevention Committee

Jeff Blea, DVM
Jim Cassidy
Frosty Franklin, DVM
Gloria Haley
Ellen Jackson
Richard Mandella, Chair
Dino Perez
Tom Robbins
Jeff Salmon
Donald Smith, DVM
Rick Arthur, DVM, ex-officio
Rick Baedeker, ex-officio
Susan Stover, DVM, Ph.D., ex-officio
Francisco Uzal, DVM, Ph.D., ex-officio

Cover and Page 13 photos: Benoit Photo (www.benoitphoto.com)
Introduction

The Postmortem Examination Program has been in operation since February 1990, and has performed examinations on 7,061 horses, as of June 30, 2018. Initiated by the California Horse Racing Board (CHRB), the program is a partnership with the California Animal Health and Food Safety Laboratory System (CAHFS) to meet three primary objectives: 1) to determine the nature of injuries occurring in racehorses, 2) to determine the reasons for these injuries, and 3) to develop injury prevention strategies. To accomplish this, a broad, cooperative approach was organized involving the development of a contract with the CAHFS to perform a necropsy on every horse that died spontaneously, or was euthanized on racetracks or at training facilities under the jurisdiction of the CHRB. This visionary partnership has become a national and international model for the racing industry in an effort to improve the safety and welfare of racehorses.

Pathologists at the CAHFS' Davis, Tulare and San Bernardino laboratories conduct postmortem examinations and compile detailed information on each horse, which is then reported to the CHRB. A broad range of specimens are collected and shared with veterinary scientists in other departments of the School of Veterinary Medicine at the University of California, Davis (UC Davis). Specimens from selected cases from CHRB horses necropsied at CAHFS laboratories are frequently shipped to the J.D. Wheat Veterinary Orthopedic Research Laboratory at UC Davis for in-depth analyses. This helps to more precisely determine the causes and risk factors that led up to catastrophic injuries in racehorses resulting in their death or euthanasia. Funding for postmortem examinations and ancillary testing is provided by the CHRB. Racing associations provide transportation of the horses to the nearest laboratory facility, and additional studies are frequently funded by the Center for Equine Health at UC Davis, and by private sources.

Information from the tests and data gathered from the postmortem examinations are analyzed in efforts to elucidate the specific cause of catastrophic injuries. In addition to musculoskeletal injuries, medical causes of disease and/or death of racehorses (colic, pneumonia, etc.), which comprise between 70 and 80 percent of the submissions are also studied.
During the 2017-18 fiscal year, 138 horses were submitted to CAHFS as part of the CHRB Postmortem Program. This number is a significant decrease from the 207 horses over the fiscal year 2016-17, and continues with a significant reduction in fatalities initiated several years ago. This was also the lowest number of fatalities since the beginning of the program.

The graph below (Figure 1) shows the number of horses that have been submitted to the program since 1990 by fiscal year. The first year of the program (1990) began in February and does not represent a full fiscal year. The bar graph below shows that the number of horses submitted for the CHRB program had been increasing slightly almost every year until 2005-06, after which a decline, interrupted temporarily only during a few years, occurred.

The CAHFS’ Davis and San Bernardino laboratories performed all the necropsies during this fiscal year. At the time of submission, the CHRB track official categorizes the activity of the horse at the time of injury into one of three types: non-exercise, racing or training (Table 1).

<table>
<thead>
<tr>
<th>Activity at Time of Injury/Fatality</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Exercise</td>
<td>26 (19%)</td>
</tr>
<tr>
<td>Racing</td>
<td>65 (47%)</td>
</tr>
<tr>
<td>Training</td>
<td>47 (34%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>138 (100%)</strong></td>
</tr>
</tbody>
</table>

The vast majority of catastrophic injuries (81 percent), occurred during or immediately following training or racing. This is in agreement with previous years, in which most fatalities were exercise-related. The third category of fatalities, accounting for 19 percent of submissions, included horses in the non-exercise group. These were horses...
suffering primarily from medical conditions, such as colic, infectious diseases or other conditions, although a few musculoskeletal injuries occurred in the non-exercise group of horses.

As in the past, the vast majority of submissions (109; ~80 percent) during FY 2017-18 were Thoroughbreds (Table 2). Twenty-five of the horses submitted in 2017-18 (~18 percent) were Quarter Horses. This is a slight increase over the past two prior fiscal years (13 and 14 percent, respectively).

With very small numbers of other breeds, not enough data exists to allow comparison of injury rates among breeds for any predisposition to any particular type of injury or disease.

The number of horses submitted per month was variable, although there were no obvious clusters of submissions at any given month of the year (Table 2 and Figure 2). This is very similar to submission patterns over the last few years.

### Table 2. Submissions by Breed and Month

<table>
<thead>
<tr>
<th>Breed</th>
<th>Jul 17</th>
<th>Aug 17</th>
<th>Sep 17</th>
<th>Oct 17</th>
<th>Nov 17</th>
<th>Dec 17</th>
<th>Jan 18</th>
<th>Feb 18</th>
<th>Mar 18</th>
<th>Apr 18</th>
<th>May 18</th>
<th>Jun 18</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Breeds</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Quarter Horse</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>3</td>
<td>0</td>
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<tr>
<td>Standardbred</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Thoroughbred</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>14</td>
<td>7</td>
<td>6</td>
<td>12</td>
<td>109</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>16</td>
<td>13</td>
<td>12</td>
<td>12</td>
<td>11</td>
<td>17</td>
<td>7</td>
<td>6</td>
<td>15</td>
<td>138</td>
</tr>
</tbody>
</table>

### Figure 2. Number of Horses Examined by Month
The largest proportion of submissions (~71 percent) were horses between 2- and 4-years-old (Table 3). Approximately 17 percent of all racehorses submitted were 2-years-old or less. The number of horses submitted with catastrophic injuries or death dropped dramatically after the fourth year of age (Table 3 and Figure 3). This distribution is consistent with the age distribution that has been seen in prior years of the program. We cannot conclude if horses 5 years of age and greater are less susceptible to the injuries of racing because the total number of horses in each age group that are racing and training on facilities controlled by CHRB are not known to us.

**Submissions By Breed and Age**

**Table 3. Submissions by Breed and Age**

<table>
<thead>
<tr>
<th>Breed/Age</th>
<th>&lt;=2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>&gt;=9</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Breeds</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Quarter Horse</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Standardbred</td>
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<td>0</td>
<td>1</td>
<td>0</td>
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<td>2</td>
</tr>
<tr>
<td>Thoroughbred</td>
<td>14</td>
<td>46</td>
<td>19</td>
<td>14</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>109</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td>52</td>
<td>22</td>
<td>14</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>7</td>
<td>138</td>
</tr>
</tbody>
</table>

**Figure 3. Number of Horses Examined by Age**

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CHRB Postmortem Examination Program

2017–2018 Annual Report
Submissions By Gender

The gender distribution of the horses submitted during 2017-18 is shown in Table 4 below. Males represented 57 percent of the total group with 28 percent of males being intact (stallions) and 72 percent geldings. Females comprised 43 percent of the group, with the majority of them being intact, but one animal being neutered.

Table 4. Distribution of Horses by Gender and Category

<table>
<thead>
<tr>
<th>Gender</th>
<th>Non-Exercise</th>
<th>Racing</th>
<th>Training</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>11</td>
<td>29</td>
<td>19</td>
<td>59</td>
</tr>
<tr>
<td>Male</td>
<td>3</td>
<td>5</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>Gelding</td>
<td>12</td>
<td>31</td>
<td>14</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>65</td>
<td>47</td>
<td>138</td>
</tr>
</tbody>
</table>

INJURIES

As previously mentioned, the categories of injury represent the activity of the horse or circumstances at the time of the fatal or catastrophic injury. The largest cluster of fatal injuries, 71 percent, occurred in 2-, 3- and 4-year-old racehorses (Table 5). The age of the horses submitted for non-exercise related fatalities was also concentrated between 2 and 3 years of age and in horses 9 years of age or older (ponies).

Table 5. Category of Injury/Fatality by Age

<table>
<thead>
<tr>
<th>Category/Age</th>
<th>&lt;=2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>&gt;=9</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Exercise</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>Racing</td>
<td>5</td>
<td>29</td>
<td>13</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>65</td>
</tr>
<tr>
<td>Training</td>
<td>14</td>
<td>19</td>
<td>7</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>52</td>
<td>22</td>
<td>14</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>7</td>
<td>138</td>
</tr>
</tbody>
</table>

During this fiscal year, Thoroughbred horses suffered more racing (54) than training (44) catastrophic injuries (Table 6). This is similar to most previous years when the percentage of racing fatalities was comparable to that of training catastrophic injuries.

Quarter Horses suffered only two (8 percent) catastrophic injuries during training in this period. This is lower than the previous two years (18 and 17 percent, respectively), and similar to the years before when Quarter Horses' catastrophic injuries

Continued
during a training session were infrequent. Quarter Horse submissions during 2017-18 were slightly lower than the previous year (27 in 2015-16 and 29 in 2016-2017), in keeping with the slight decline that started several years ago. Figure 4 shows the historical number of Quarter Horses submitted to the program since its inception.

In 2017-18, ~82 percent of the total primary injuries or conditions in all breeds were due to musculoskeletal problems (Table 7, pg. 8), which is consistent with what has been observed in previous years. Of this group, ~86 percent of injuries affected the front or rear legs (Table 8, pg. 8). The injuries listed in these tables represent the primary injury to the horse.

Table 6. Category of Injury/Fatality by Breed

<table>
<thead>
<tr>
<th>Injury Class by Breed</th>
<th>Non-Exercise</th>
<th>Racing</th>
<th>Training</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Breeds</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Quarter Horse</td>
<td>12</td>
<td>11</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Standardbred</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Thoroughbred</td>
<td>11</td>
<td>54</td>
<td>44</td>
<td>109</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>65</td>
<td>47</td>
<td>138</td>
</tr>
</tbody>
</table>

Figure 4. Number of Quarter Horses Submitted to the CHRB Postmortem Program by Fiscal Year
In many cases, several primary findings for each horse submitted were recorded. Thus, the total number of reported injury types exceeds the number of horses submitted. This is especially true in severe injuries involving multiple bones in the limbs. In these cases, multiple related injuries, such as tendon and ligament ruptures are identified concomitantly.

Musculoskeletal injuries are most likely to occur during racing or training. Because these injuries are by far the most common, most of the investigative efforts at the University of California, Davis, have focused on causes and prevention of limb injuries.

Table 7. Organ Systems Affected

<table>
<thead>
<tr>
<th>Breed</th>
<th>CV</th>
<th>GI</th>
<th>MS</th>
<th>Nerv</th>
<th>Resp</th>
<th>Inte</th>
<th>Uro</th>
<th>WB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Breeds</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Quarter Horse</td>
<td>1</td>
<td>2</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>Standardbred</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Thoroughbred</td>
<td>0</td>
<td>3</td>
<td>96</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>109</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>6</td>
<td>113</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>10</td>
<td>138</td>
</tr>
</tbody>
</table>

CV = Cardiovascular; GI= Gastrointestinal; MS= Musculoskeletal; Nerv= Nervous; Resp= Respiratory; Inte= Integumentary; Uro= Urogenital; WB= Whole body.

Table 8. Musculoskeletal Structures Affected

<table>
<thead>
<tr>
<th>Structure Affected</th>
<th>Non-Exercise</th>
<th>Racing</th>
<th>Training</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Left Front</td>
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<td>26</td>
<td>20</td>
<td>46</td>
</tr>
<tr>
<td>Left Rear</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Right Front</td>
<td>0</td>
<td>25</td>
<td>12</td>
<td>37</td>
</tr>
<tr>
<td>Right Rear</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Pelvis</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Skull</td>
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<td>0</td>
<td>2</td>
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<td>Vertebra</td>
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<td>4</td>
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<td>Various Structures*</td>
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<td>7</td>
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<td><strong>60</strong></td>
<td><strong>45</strong></td>
<td><strong>115</strong></td>
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</table>

* Includes laminitis and/or tendinitis of one or more legs
### Table 9. Musculoskeletal Injury Type by Breed

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<th>Diagnosis</th>
<th>Horse</th>
<th>Thoroughbred</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Arthritis</td>
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</tr>
<tr>
<td>Carpal Fracture - Left</td>
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<tr>
<td>Carpal Fracture - Right</td>
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<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Fedlock Failure - Left Front</td>
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<td>Fedlock Failure - Left Rear</td>
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<tr>
<td>Fedlock Failure - Right Front</td>
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<td>Fetlock Failure - Right Rear</td>
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<tr>
<td>Humerus Fracture - Left</td>
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<td>Laminitis</td>
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<td>Metacarpus III Fracture - Right</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Metatarsus III Fracture - Left</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Metatarsus III Fracture - Right</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Myopathy</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Neoplasm</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>P1 Fracture - Left Front</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>P1 Fracture - Right Front</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P1 Fracture - Right Rear</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pastern Luxation - Left Front</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pelvis Fracture</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Radius Fracture - Right</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rib Fracture</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Scapula Fracture - Left</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Scapula Fracture - Right</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Skull Fracture</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Tarsus Fracture - Right</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tibia Fracture - Left</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tibia Fracture - Right</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Vertebra Fracture</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>98</strong></td>
<td><strong>116</strong></td>
</tr>
</tbody>
</table>
Track Surface and Musculoskeletal Injuries in Thoroughbreds

The distribution of musculoskeletal injuries in Thoroughbreds was evaluated when comparing the three types of track surfaces in which these horses performed. Table 10 shows the limb distribution of injuries in horses running on different surfaces. As before, these data show that for the current fiscal year the absolute number of injuries on dirt surfaces was higher than on other surfaces. Because the total number of horses racing on each surface is not known to CAHFS, it cannot be determined from this data whether the injury rates differ by track surface.

Table 10. Musculoskeletal Injury: Affected Limb by Track Type

<table>
<thead>
<tr>
<th>Structure Affected</th>
<th>Dirt</th>
<th>Synthetic</th>
<th>Turf</th>
<th>N/A*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Front</td>
<td>28</td>
<td>12</td>
<td>6</td>
<td>0</td>
<td>46</td>
</tr>
<tr>
<td>Left Rear</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Pelvis</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Right Front</td>
<td>26</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>Right Rear</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Skull</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Vertebra</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Various Structures**</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>23</td>
<td>13</td>
<td>10</td>
<td>114</td>
</tr>
</tbody>
</table>

*Injuries that did not occur on a racing/training surface. **Includes laminitis and/or tendinopathies of one or more legs.

Other Organ Systems Affected by Injuries

Cardiovascular:

Although heart failure is usually suspected in many cases of sudden death, this is rarely confirmed. The case listed as heart failure in this section is a rare case in which the condition was confirmed. The case of jugular thrombophlebitis was a horse in which a primary vein infection presumably associated with an intravenous injection, progressed to sepsis.

Gastrointestinal:

Of the gastrointestinal system diagnoses, intestinal displacements and colitis were the most frequently observed problems. The causes of the two colitis cases were thromboembolism and non-steroidal anti-inflammatory drugs.
### Other Organ Systems Affected by Injuries

#### Integumentary:
As usual, diseases of the integumentary system were rare during this reporting period.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulitis</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

#### Nervous:
Equine protozoal myelitis keeps occurring in racehorses, although at low prevalence.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equine Protozoal Myelitis</td>
<td>1</td>
</tr>
<tr>
<td>Undiagnosed Nervous Disease</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

#### Reproductive:
Diseases of the male reproductive system are rare occurrences in racehorses submitted for postmortem. This horse had spermatic corditis, likely secondary to castration, which progressed to peritonitis. This condition was caused by *Streptococcus equi* subs. *zooparasiticus*.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Reproductive Disease</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

#### Respiratory:
The number of respiratory disease cases in 2017-18 was low when compared with previous years. The cause of pneumonia in this case was determined to be bacterial although the species was not determined. Pulmonary hemorrhage is frequent in race horses, although these lesions are usually not severe enough to cause death of the horse.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>1</td>
</tr>
<tr>
<td>Pulmonary Hemorrhage</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

#### Whole Body:
The number of unexplained sudden deaths in horses was lower than previous years (12 cases reported in 2016-2017).

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaphylaxis</td>
<td>2</td>
</tr>
<tr>
<td>Hypovolemic shock</td>
<td>1</td>
</tr>
<tr>
<td>Unexplained sudden death</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>
During this period, CAHFS worked with CHRB in developing a Fellowship Training Program on the musculoskeletal system of horses. After a call for applications was made, a very enthusiastic and well-qualified candidate was selected and began work on August 1, 2018. Under the supervision of a pathologist, this fellow, who is based in the San Bernardino lab of CAHFS, performs all necropsies of CHRB horses submitted to the San Bernardino laboratory with a history of catastrophic musculoskeletal injuries. In addition, the fellow performs detailed examinations of musculoskeletal specimens from CHRB horses necropsied in Davis and Tulare, which are shipped to San Bernardino. The main goals of this program are to train veterinarians in the examination of the musculoskeletal system of racehorses, and to improve consistency and case documentation for the CHRB necropsy program.
OUTREACH AND PRESENTATIONS TO SCIENTIFIC MEETINGS

Racehorse pathology/Diagnostic special session. 60th Annual meeting of the American Association of Veterinary Laboratory Diagnosticians. San Diego, CA, October 2017. Chair: F. Uzal, L. Kennedy

SCIENTIFIC PUBLICATIONS


STAFF ANALYSIS
REPORT AND DISCUSSION ON THE
RELATIONSHIP OF HIGH INTENSITY RACING AND TRAINING
WITH CATASTROPHIC INJURIES

Medication, Safety and Welfare Committee Meeting
June 19, 2019

BACKGROUND

Several publications from Dr. Susan Stover’s Veterinary Orthopedic Research Laboratory at the School of Veterinary Medicine at UC Davis have demonstrated associations between catastrophic injuries and previous exercise history. Different exercise histories correspond to different injuries (e.g., fetlock breakdowns from humeral and scapular fractures). Dr. Stover will review for the Committee what is known about the relationship between catastrophic injuries for the Committee.

RECOMMENDATION

This item is presented for Committee discussion.
2. Report and discussion on the relationship of high intensity racing and training with catastrophic injuries.

Several publication from Dr. Susan Stover’s Veterinary Orthopedic Research Laboratory at the School of Veterinary Medicine at UC Davis have demonstrated associations between catastrophic injuries and previous exercise history. Different exercise histories correspond to different injuries (e.g., fetlock breakdowns from humeral and scapular fractures). Dr. Stover will review for the committee what is known about the relationship between catastrophic injuries for the committee.

```
Injury Development

physical activity
\[\rightarrow\]
microdamage

bone remodeling and modeling

adaptation

transient osteoporosis + physiologic activity

excessive activity

complete bone fracture
```
Injury vs Adaptation - 2 competing rates

- Rate of damage accumulation
- Rate of damage repair

![Graph showing injury and adaptation rates over time](image)

Susceptibility to Injury is Related to Bone Fatigue

- Rate of damage accumulation
  - Number of load cycles
  - Magnitude of loading
High Speed Exercise History

Training Intensity

Bone Fracture is Associated with Focal Porosity

<table>
<thead>
<tr>
<th>Group</th>
<th>BVF (%)</th>
<th>AMD (mgHA/cc)</th>
<th>TMD (mgHA/cc)</th>
<th>Th.N (#/mm)</th>
<th>Th.Th (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fractured</td>
<td>82.4 ± 14.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>685 ± 50&lt;sup&gt;a&lt;/sup&gt;</td>
<td>730 ± 23&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.1 ± 0.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.45 ± 0.15&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Intact</td>
<td>91.6 ± 12.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>728 ± 52&lt;sup&gt;b&lt;/sup&gt;</td>
<td>756 ± 21&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.2 ± 0.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.86 ± 0.31&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Control</td>
<td>94.2 ± 5.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>750 ± 33&lt;sup&gt;b&lt;/sup&gt;</td>
<td>771 ± 21&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.1 ± 0.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.99 ± 0.29&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Palmar Lesion

### High Speed Exercise History

<table>
<thead>
<tr>
<th></th>
<th>Non-PSB Death</th>
<th>PSB Fracture</th>
</tr>
</thead>
<tbody>
<tr>
<td># Works</td>
<td>21</td>
<td>26</td>
</tr>
<tr>
<td># Races</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Races/yr</td>
<td>4.7</td>
<td>6.4</td>
</tr>
<tr>
<td>Days since layup</td>
<td>46</td>
<td>153</td>
</tr>
</tbody>
</table>

High Speed Exercise History – Humeral/Scapular Fx

Simulate Exercise Induced Damage & Remodeling

Predicted Exercise History = Epidemiological Data

Highly susceptible after return from layup
- 71 X relative risk within a 10 day hazard period


Exercise and Damage Accumulation

Bone Fracture

Failure

Microdamage

Exercise

Training and Racing (# strides or furlongs)
Damage Develops Faster with Higher Intensity Exercise and Longer Distances

Remodeling Inhibits Bone Fracture
Effect of Layup

Bone Fracture

Training and Racing (# strides or furlongs)

Effect of Layup

Bone Fracture

Training and Racing (# strides or furlongs)
Maintaining Fitness

» Relatively little exercise is required to maintain bone mass

» The work must be relevant to the work the horse is expected to do

Training for Skeletal Health

» The skeleton incurs damage with exercise

» Higher speed works and races induce greater microdamage

» Damage is continually repaired but requires time for repair to be accomplished

» The intensity of training and racing, and thus accumulation of bone damage, must be lower than the rate of damage repair to maintain bone health

» Training and racing that exceed the rate of repair result in catastrophic bone fracture
Association between long periods without high-speed workouts and risk of complete humeral or pelvic fracture in thoroughbred racehorses: 54 cases (1991-1994).
Carrie TK1, Estberg L, Stover SM, Gardner IA, Johnson BJ, Read DH, Ardans AA.

Abstract
OBJECTIVE:
To determine whether a two-month or longer period without official high-speed workouts (lay-up) is associated with humeral or pelvic fracture in Thoroughbred racehorses.

DESIGN:
Reprospective study.

ANIMALS:
Thoroughbred racehorses in California that were euthanatized because of a complete humeral or pelvic fracture.

PROCEDURE:
Age, sex, activity, number of lay-ups, number of days from a race or official timed workout to fracture, number of days from end of last lay-up to fracture, mean duration of lay-ups, and total number of days in race training were compared between horses with humeral fractures and horses with pelvic fractures. A case-crossover study was used to estimate relative risk of fracture of the humerus or pelvis occurring within hazard periods of 10 and 21 days following lay-up, compared with periods following more regular participation in official racing or timed workout events.

RESULTS:
Horses with pelvic fractures were more often female, older, and had 0 or > or= 2 lay-ups. Horses with humeral fractures were typically 3-year-old males that had 1 lay-up. Horses with pelvic fractures had more total days in race training, fewer days from last exercise event to fracture, and a greater number of days from end of last lay-up to fracture than horses with humeral fractures. Return from lay-up was strongly associated with risk for humeral fracture during hazard periods of 10 and 21 days (relative risk = 71 and 45, respectively).

CLINICAL IMPLICATIONS:
Risk of humeral fracture may be reduced if horses are cautiously reintroduced into race training after lay-up.

High-speed exercise history and catastrophic racing fracture in thoroughbreds.
Estberg L1, Stover SM, Gardner IA, Drake CM, Johnson B, Ardans A.

Abstract
OBJECTIVE:
To investigate the relation between several racing speed history characteristics and risk of fatal skeletal injury (FSI) in racing Thoroughbreds.

ANIMALS:
64 Thoroughbreds euthanatized during a 9-month period in 1991 at a California racemeet because of a catastrophic fracture incurred while racing (cases), identified retrospectively. For each race in which an FSI occurred, 1 control horse was randomly selected from the noncatastrophically injured participants.

PROCEDURE:
Racing and officially timed workout histories were obtained for each horse. Several history characteristics were calculated to summarize racing career patterns and high-speed exercise schedules prior to date of injury and included age at first race, proportion of career spent laid up, average duration of laid up periods, average lifetime racing frequency, time from last lay up to date of injury, and total and rate of distance accumulated 1 to 6 months prior to date of injury. History characteristics associated with FSI were screened by paired t-test and studied in detail, using conditional logistic regression.

RESULTS:
High total and high average daily rates of exercise distance accumulation within a 2-month period were associated with higher risks for FSI during racing, yet career patterns, such as age at first race or total proportion of career spent laid up, were not found to be associated with risk for FSI. A horse that had accumulated a total of 35 furlongs of race and timed-work distance in 2 months, compared with a horse with 25 furlongs accumulated, had an estimated 3.9-fold increase in risk for racing-related FSI (95% confidence interval = 2.1, 7.1). A horse that had accumulated race and timed-work furlongs at an average rate of 0.6 furlong/d within a 2-month period, compared with a horse with an average of 0.5 furlong/d, had an estimated 1.8-fold increase in risk for racing-related FSI (95% confidence interval = 1.4, 2.6).

CONCLUSIONS AND CLINICAL RELEVANCE:
Thoroughbred racehorses that either accumulate large total high-speed distances or rapidly accumulate high-speed distances within a 2-month period may be at increased risk for FSI during racing.
This report summarizes the high speed exercise history for Case Horse. There are four parts to this report:

Part 1 is a graph that depicts the races and officially recorded high speed workouts for Case Horse over the horse's career. The graph is useful for visually assessing features of a horse's career like: career length, periods of layup, and exercise consistency. If Case Horse had zero recorded high-speed exercise events, this graph is not produced. Event histories for three breed, sex, age, and event-matched control horses are also plotted.

Part 2 includes graphs which illustrate Case Horse's exercise history alongside that of Control Horses. These graphs are useful for visually comparing periods of layup and specific rates of exercise in the horses' exercise histories.

Part 3 is a chronological listing of races and officially timed works beginning with the most recent event (race or work).

Part 4 is a chart that allows comparison of exercise variables between Case Horse and other racehorses of similar age, sex, and breed that did not die at the same time from an injury. Similar to comparing the results of a blood test to a range of normal values, the values for Case Horse can be assessed in the context of a normal range for 95% of a sample of similar racehorses that did not die during the same time as Case Horse.
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Part 4: Comparison of Exercise Variables between Case Horse and 184 Control Horses (4 year old, female, Thoroughbred) .............................. 9
Part 1: Graphical Representation of Individual High-Speed Exercise Histories

Races (filled circles), officially timed high-speed works (open circles), layups (line with endcaps, periods of time greater than 60 days in length without a race or timed work), and time of death (X) are illustrated over time (Career Time in months). With each event (race or work), the number of furlongs the horse exercised in that event is added to the number of furlongs exercised in all previous events.

Case Horse High Speed Exercise History

![Graphical representation of Case Horse High Speed Exercise History](image-url)
Part 1: Graphical Representation of Individual High-Speed Exercise Histories

Control 1 High Speed Exercise History

Control 1: Career Event History

Control 1: Races and Works Plotted Separately

Control 2 High Speed Exercise History

Control 2: Career Event History
Part 1: Graphical Representation of Individual High-Speed Exercise Histories

Control 2: Races and Works Plotted Separately

Control 3 High Speed Exercise History

Control 3: Career Event History

Control 3: Races and Works Plotted Separately
Part 2: Case and Control Horses Plotted Together

Matched Career Event Histories (Slopes Labeled)

Case and Control Horses' exercise event histories are plotted on the same axes. The plots are aligned by the match date (equal to the date of death of Case Horse). Lines segments indicate specific rates of exercise at the start of career, end of career (for Case Horse), and match date (for Control Horses). Event rates are calculated as the slopes of the plots over 2 to 5 events not spanning a layup period, in units of furlongs per month.
Part 2: Case and Control Horses Plotted Together

Career Event Histories for Case and Controls with Layups

Distance [Furongs] vs. Career Time [Months]

- **Case Races**: Red circles
- **Case Works**: Red crosses
- **Case Death**: Red X

- **Control 1 Races**: Green circles
- **Control 1 Works**: Green squares

- **Control 2 Races**: Blue circles
- **Control 2 Works**: Blue squares

- **Control 3 Races**: Black circles
- **Control 3 Works**: Black squares

- **206 days**
- **63 days**
- **96 days**
- **171 days**
Part 2: Case and Control Horses Plotted Together
Part 3: Case Horse’s Event History

REDACTED
Part 3: Case Horse's Event History

REDACTED
Part 4: Comparison of Exercise Variables between Case Horse and 184 Control Horses (4 year old, female, Thoroughbred)

Case Horse values are indicated by black or red symbols: circles indicate values considered normal for 95% of 4 year old, female, Thoroughbreds (n=184) (gray region) (black and red indicate within 1 and 2 SD, respectively, of mean value of controls), X’s indicate values outside of the normal range. Two and 3 year old case horses are also matched to control horses by the quarter in which the case horse died (Jan-Mar, Apr-Jun, Jul-Sep,Oct-Dec). Variables that are not calculable are not plotted (e.g. time between races for a horse with zero events). f=furlongs; yr=year; m=month; d=days.

^Rates are calculated over 2 to 5 events.
*Active Career Length is the career length excluding the time during layups.
Case Horse values are indicated by black or red symbols: circles indicate values considered normal for 95% of 4 year old, female, Thoroughbreds (n=184) (gray region) (black and red indicate within 1 and 2 SD, respectively, of mean value of controls), X's indicate values outside of the normal range. Two and 3 year old case horses are also matched to control horses by the quarter in which the case horse died (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec). Variables that are not calculable are not plotted (e.g. time between races for a horse with zero events). f=furlongs; yr=year; m=month; d=days.

^Rates are calculated over 2 to 5 events.
*Active Career Length is the career length excluding the time during layups.
STAFF ANALYSIS
DISCUSSION BY THE BOARD
REGARDING REQUIRED CHANGES TO CHRB RULES WITH RESPECT TO
THE LIMITATIONS OF FUROSEMIDE (LASIX) USE BEGINNING IN 2020,
AS WELL AS THE NEED FOR RELATED REGULATORY LANGUAGE
AS MAY BE NECESSARY TO PROTECT THE
HEALTH AND WELFARE OF THE HORSE

Medication, Safety and Welfare Committee Meeting
June 19, 2019

ISSUE

In March 2019, The Stronach Group and the Thoroughbred Owners of California (TOC) reached an agreement on several initiatives regarding racing and training at Santa Anita Park Race Track (SA) and Golden Gate Fields (GGF). One of the measures was limitations on the use of therapeutic furosemide (Lasix). All horses born in or after 2018 will race at SA and GGF with no race-day medication, including Lasix. This means that beginning in 2020 all two-year-old horses will race medication free. All horses born prior to 2018 will race at SA and GGF with the same guidelines, however, based on veterinary recommendations, Lasix will be permitted at a level of half the current Board-authorized maximum level. Also, in March 2019, the Board approved an agreement, pursuant to Rule 1581, Racing Secretary to Establish Conditions, between The Stronach Group and the TOC regarding entry conditions involving medication to be implemented by SA and GGF. Under the agreement, The Stronach Group would condition all remaining races run at SA and GGF to be run with reduced levels of Lasix (a maximum of 250 mg).

In April 2019, a group of racing entities, including Aqueduct, Belmont Park, Churchill Downs, Del Mar, Los Alamitos Race Course, Fair Grounds, Gulfstream, Keeneland, Oaklawn, Pimlico Race Course and Saratoga, formed a coalition and agreed to restrict the use of Lasix beginning next year. Starting in 2020, two-year-old horses will not be treated with Lasix within 24-hours of racing. In 2021, the prohibition on race-day Lasix will be extended to all horses running in any stakes race at participating tracks.

ANALYSIS

Furosemide, or Lasix, is a medication used for the treatment of Exercised-Induced Pulmonary Hemorrhage (EIPH) in race horses. EIPH refers to the presence of blood in the airways of the lung in association with exercise and is seen in race horses and other horses participating in equine sports. In March 2019, The Stronach Group and the TOC reached an agreement regarding the use of Lasix at SA and GGF. The agreement would reduce the maximum allowable level of Lasix for racing, which under Rule 1845, authorized Bleeder Medication, is 500 mg, to a level of no more than 250 mg.
Rule 1845, subsections (e) and (f) currently provide for a race-day level of Lasix of 250 mg of furosemide intravenously unless and alternative dose of not less than 150 mg and not more than 500 mg has been determined after consultation between the trainer, owner, or owner's veterinarian and the furosemide veterinarian. From 1991 to 2005, the maximum level of furosemide was 250 mg, but in 2005 the maximum level was changed to a level of not less than 150 mg to a maximum level of 500 mg in an effort to produce national uniformity. To accommodate the limitations of furosemide use beginning in 2020, the Board may wish to initiate an amendment to Rule 1845 to set the maximum level for race-day furosemide at 250 mg.

BACKGROUND

Business and Professions Code section 19440 provides that the Board shall have all powers necessary and proper to enable it to carry out fully and effectually the purposes of this chapter. Responsibilities of the Board shall include adopting rules and regulations for the protection of the public and the control of horse racing and pari-mutuel wagering. Business and Professions Code section 19562 states the Board may prescribe rules, regulations and conditions under which all horse races with wagering on their results shall be conducted in California. Business and Professions Code section 19580 requires the Board to adopt regulations to establish policies, guidelines, and penalties relating to equine medication to preserve and enhance the integrity of horse racing in California. Business and Professions Code section 19581 provides that no substance of any kind shall be administered by any means to a horse after it has been entered to race, unless the Board has, by regulation, specifically authorized the use of the substance and the quantity and composition thereof. Business and Professions Code section 19582 provides that violations of section 19581, as determined by the Board, are punishable as set forth in regulations adopted by the Board.

RECOMMENDATION

This item is presented for Committee discussion.
1845. Authorized Bleeder Medication.

The only authorized bleeder medication for the control of exercise-induced pulmonary hemorrhage (EIPH) shall be furosemide, and it shall only be administered by a single intravenous injection, in a dosage of not less than 150 mg and not more than 500 mg, on the grounds of the racetrack where the horse will race, and no later than four hours prior to the post time of the race for which the horse is entered. It shall only be administered to a horse that is registered on the authorized bleeder medication list.

(a) A horse is registered on the authorized bleeder medication list as follows:

(1) The trainer and the owner’s veterinarian shall determine whether furosemide is medically necessary to control EIPH and is not otherwise contraindicated for that horse; and

(2) Prior to entry for race, the official veterinarian approves form CHRB-194 (Rev. 01/16), Authorized Bleeder Medication and Medical History Request, which is hereby incorporated by reference, submitted to the official veterinarian by the trainer and owner’s veterinarian.

(b) Once registered, any horse that will be administered furosemide shall:

(1) Arrive on the grounds of the racetrack where the horse will race no later than five hours prior to the post time of the race for which the horse is entered; and

(2) Be assigned to a pre-race security stall prior to the scheduled post time for the race in which it is entered, and shall remain there until it is taken to the receiving barn or the paddock to be saddled or harnessed for the race.
(A) The pre-race security stall shall be identified by the posting of a form CHRB-234 (New 09/15), Detention Stall Sign, which is hereby incorporated by reference. The trainer shall post the Detention Stall Sign no later than eight hours prior to the post time of the race for which the horse is entered or, for a horse arriving from off the grounds of the racetrack, when the horse is placed in the pre-race security stall.

(B) While in the pre-race security stall, the horse shall be in the care, custody, control, and constant view of the trainer, or a licensed employee assigned by the trainer. The trainer shall be responsible for the condition, care and handling of the horse while it remains in the pre-race security stall.

(C) The official veterinarian may permit a horse to leave the pre-race security stall to engage in track warm-up heats prior to a race.

(c) Furosemide shall be administered only after:

(1) The trainer, owner, or the owner’s veterinarian has consulted with the furosemide veterinarian regarding the condition of the horse and the furosemide veterinarian has examined the horse sufficient to establish a veterinary-client-patient relationship within the meaning of California Code of Regulations, title 16, section 2032.1; or

(2) The trainer, owner, or owner’s veterinarian has consulted with the official veterinarian or racing veterinarian and the furosemide veterinarian has examined the horse sufficient to establish a veterinary-client-patient relationship within the meaning of California Code of Regulations, title 16, section 2032.1, and that the consulting official veterinarian or racing veterinarian directly supervises the furosemide veterinarian, or California registered veterinary technician, who administers furosemide.

(d) The person who administers furosemide pursuant to subsection (e)(1) of this regulation shall notify the official veterinarian of the treatment of the horse. Such notification shall be made on
form CHRB-36 (New 08/04), Bleeder Treatment Report, which is hereby incorporated by reference, not later than two hours prior to post time of the race for which the horse is entered.

(1) The trainer or a licensed employee of the trainer shall be present and observe the furosemide administration.

e The horsemen’s organization, trainers’ organization, and racing association shall enter into an agreement to provide for race-day furosemide administration. The agreement to provide for race-day furosemide administration shall be submitted to the Board in accordance with Rule 1433 of this Division. The agreement shall describe the racing association’s program for the administration of race-day furosemide, the minimum level of staffing necessary to carry out the program, and the projected costs to horsemen for such administration.

(1) Furosemide shall be administered by a furosemide veterinarian or California-registered veterinary technician under the direct supervision of the furosemide veterinarian. The furosemide veterinarian or California registered veterinary technician who provides race-day furosemide administration shall be employed by the racing association and shall not have a current business relationship, or prior veterinarian-client-patient relationship, with participating licensees within 30 days of the date he or she is employed to administer furosemide.

(2) All parties present during the administration of furosemide shall certify in writing that they have witnessed the furosemide administration by signing the form CHRB-36 (New 08/04), Bleeder Treatment Report. The furosemide veterinarian or California registered veterinary technician shall place the syringe used to administer furosemide in an evidence bag which will be sealed in front of the witnesses. The witnesses shall sign the sealed evidence bag. The syringe used to administer furosemide shall be provided to and securely stored by the Board in accordance with subsection (h) of this regulation.
(3) "Furosemide veterinarian" is defined as the veterinarian, licensed by the Board, and hired by the racing association to administer race-day furosemide to horses registered on the authorized bleeder medication list.

(4) "Owner's veterinarian" is defined as the veterinarian, licensed by the Board, and hired by the owner to provide veterinary care to horses.

(f) A horse registered to be administered furosemide shall receive 250 mg of furosemide intravenously unless an alternative dose of not less than 150 mg and not more than 500 mg has been determined after consultation between the trainer, owner, or owner's veterinarian, and the furosemide veterinarian pursuant to subsection (c).

(g) In the event of an adverse reaction or other emergency related to the administration of furosemide, the furosemide veterinarian, or California registered veterinary technician, who administered furosemide shall attend the horse until the arrival of the owner's veterinarian.

(h) The syringe used to administer furosemide shall be provided to and securely stored by the Board until all testing of the horse is completed. In the event of a positive test finding as defined in this article, the Board may order, or the owner or trainer may request, the retained syringe be tested for prohibited substances. The results of the test may be used in any action before the Board.

(i) A horse that has been administered furosemide must show a detectable concentration of the drug in post-race serum, plasma, or urine samples, as follows:

(1) The official laboratory shall measure the specific gravity of post-race urine samples to ensure samples are sufficiently concentrated for proper chemical analysis. The specific gravity of such samples shall not be below 1.010.

(2) If the specific gravity of the post-race urine sample is determined to be below 1.010, or if the urine sample is not available for testing, quantitation of furosemide in serum or plasma shall then
be performed. Concentrations may not exceed 100 nanograms of furosemide per milliliter of serum or plasma.

(j) A horse registered on the official authorized bleeder medication list must remain on the list unless the trainer or owner’s veterinarian requests the horse be removed. The request must be made using form CHRB-194 (Rev. 01/16), and must be submitted to the official veterinarian prior to the time of entry. A horse removed from the authorized bleeder medication list may not be placed back on the list for a period of 60 calendar days unless the official veterinarian determines it is medically necessary for the horse. If a horse is removed from the authorized bleeder medication list a second time in a 365-day period, the horse may not be placed back on the list for a period of 90 calendar days.

(k) If the official veterinarian observes a horse bleeding externally from one or both nostrils during or after a race or workout, and determines such bleeding is a direct result of EIPH, the horse shall be ineligible to race for the following periods:

• First incident -14 days;
• Second incident within 365-day period -30 days;
• Third incident within 365-day period -180 days;
• Fourth incident within 365-day period -barred from racing lifetime.

For the purposes of counting the number of days a horse is ineligible to run, the day after the horse bled externally is the first day of such period.

(l) The owner(s) of a registered horse shall:

(1) Pay all costs associated with the materials used in the administration of furosemide, including the syringe and medication, and reasonable administrative costs as set under the race-day furosemide agreement entered into by the horsemen’s organization, trainers’ organization, and the
racing association.

(2) Consent to the procedures in this section and agree that the pre-race examination conducted under the direction of the official veterinarian or racing veterinarian shall constitute a veterinary-client-patient relationship within the meaning of California Code of Regulations, title 16, section 2032.1.

Authority: Sections 19440 and 19562, Business and Professions Code.

Reference: Sections 19580, 19581 and 19582, Business and Professions Code.
Consensus Statements of the American College of Veterinary Internal Medicine (ACVIM) provide the veterinary community with up-to-date information on the pathophysiology, diagnosis, and treatment of clinically important animal diseases. The ACVIM Board of Regents oversees selection of relevant topics, identification of panel members with the expertise to draft the statements, and other aspects of assuring the integrity of the process. The statements are derived from evidence-based medicine whenever possible and the panel offers interpretive comments when such evidence is inadequate or contradictory. A draft is prepared by the panel, followed by solicitation of input by the ACVIM membership which may be incorporated into the statement. It is then submitted to the Journal of Veterinary Internal Medicine, where it is edited prior to publication. The authors are solely responsible for the content of the statements.

Exercise Induced Pulmonary Hemorrhage in Horses: American College of Veterinary Internal Medicine Consensus Statement


Background: Published studies of exercise-induced pulmonary hemorrhage (EIPH), when assessed individually, often provide equivocal or conflicting results. Systematic reviews aggregate evidence from individual studies to provide a global assessment of the quality of evidence and to inform recommendations.

Objectives: Evaluate evidence to determine: if EIPH adversely affects the health, welfare or both of horses; if EIPH affects the athletic capacity of horses; the efficacy of prophylactic interventions for EIPH; and if furosemide affects the athletic capacity of horses.

Animals: None.

Materials and Methods: Systematic review. A panel of 7 experts was formed to assess evidence in the peer reviewed literature addressing each of the 4 objectives. Methodology followed that of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE). Publications were assessed for quality of evidence by working groups of the panel, and a summary of findings was presented in tables. Recommendations were based on quality of evidence and were determined by a vote of the panel.

Results: Much of the evidence was of low to very low quality. Experimental studies frequently lacked adequate statistical power. There was moderate to high quality evidence that EIPH is progressive, is associated with lung lesions, that it adversely affects racing performance, that severe EIPH (Grade 4) is associated with a shorter career duration, that furosemide is efficacious in decreasing the incidence and severity of EIPH, and that administration of furosemide is associated with superior race performance.

Conclusions and clinical significance: Strong recommendation that EIPH be considered a disease and a weak recommendation for use of furosemide in management of racehorses with EIPH.

Key words: Bleeding; Lungs; Physiology; Respiratory.

Exercise-induced pulmonary hemorrhage (EIPH) is bleeding that occurs from the lungs of horses during exercise. It occurs in the majority of Thoroughbred and Standardbred racehorses and in many other horses subjected to strenuous exercise.

The perceived importance of EIPH and use of furosemide is illustrated by the results of an internet search for "bleeders in horses", 113,000 on "EIPH", 890,000 using "Lasix and horse", and 905,000 results for "furosemide and horse". Web of Science searches conducted on May 26, 2014 using the terms "exercise-induced pulmonary hemorrhage" or "exercise-induced pulmonary hemorrhage AND "horse" yielded 368 results, "EIPH" AND "horse" 224 results, and "furosemide or frusemi-
We performed a systematic review providing a series of findings and recommendations rather than a narrative assessment of the quality of evidence as the outcome of a systematic review have been recognized, leading to the development of GRADE methodology (Grading of Recommendations Assessment, Development and Evaluation) which provides a methodology for arriving at findings regarding the body of evidence and making recommendations based on these findings. In addition to considering the strength of evidence, the GRADE process considers a number of other factors when making a recommendation (see Supplementary material).

Because randomized controlled trials only rarely have been used in investigations related to EIPH, we expanded our consideration to studies of other designs. We also adopted the GRADE approach to evaluating the quality of evidence of individual studies and then developed a concise statement of our overall confidence in the results of all studies combined. Assessments of evidence included an assessment of the quality of the evidence and the direction of the effect.

Methods

The topic for this consensus statement was developed using policies and procedures of the American College of Veterinary Internal Medicine. The topic was selected after nomination from the ACVIM membership, and confirmed by the ACVIM Board of Regents. Nominations for membership of the consensus panel were solicited from leadership of the ACVIM and ECEIM, and composition and chair of the consensus panel were approved by the Board of Regents of the ACVIM. All members of the panel completed a conflict of interest declaration, which was provided to a representative of the Board of Regents of the ACVIM and the Chair of the panel. Potential conflicts of interest for each panel member are listed separately.

The consensus panel invited input to the process in an email to all members of the Large Animal Specialty and ECEIM on January 7, 2014. Three responses were received.

This consensus statement was developed by a systematic review of the scientific literature related to the 4 topics listed above. Consistent with the GRADE approach, a series of subsidiary outcomes were defined for each of the 4 main topics and were defined as either “critical” or “important”. Critical outcomes were those clearly directly related to the topic (e.g. race performance as a critical subsidiary outcome for the topic of “association of EIPH with performance”) whereas important outcomes were those related to mechanisms (e.g. blood gas tensions during strenuous exercise as an indirect estimate of the relationship of furosemide with performance, pulmonary fibrosis as an indicator of lung health) or indirect measures of a critical outcome (e.g. run time to fatigue on a treadmill, VO2 max as an indicator of athletic capacity). The scientific literature relevant to each of the subsidiary questions was then evaluated for relevance and strength of evidence and each study summarized in an “Evidence Profile” (EP) table. Studies then were aggregated into a “Summary of Findings” (SoF) table that summarized the available literature. Further details are available in the Supplementary material.

Exercise-induced pulmonary hemorrhage was defined as the presence of blood in the airways of horses after exercise. Blood could be detected by tracheobronchoscopic examination, or by enumeration of red blood cells or hemosiderophages in tracheal aspirates or bronchoalveolar lavage fluid. Exercise-induced pulmonary hemorrhage included both occult hemorrhage (evidence only on tracheobronchoscopic or cytologic examination of the airways)
and epistaxis. Throughout this document EIPH refers to either outcome (occult EIPH or epistaxis). Epistaxis refers specifically to the presence of blood at the nostrils after racing.

Responsibility for developing the initial search and evaluation of the literature was delegated to a working group for each topic. Each working group then provided Evidence Profile tables, Summary of Findings tables and a written summary for evaluation by the whole panel. Discussion among working group members occurred by email and teleconference. See Supplementary material for details.

Results

Consensus was achieved on all findings by a unanimous vote.

**Topic 1. What is the Impact of EIPH on Welfare and Health of Horses?**

Exercise-induced pulmonary hemorrhage often is cited as an important factor adversely affecting the health and well-being of athletic horses without provision of evidence supporting the contention. Evidence of systematic examination of affected horses for clinical abnormalities such as fever, cough, or abnormal lung sounds is sparse (Table 1).

**Critical Outcome. Does EIPH produce clinical signs?:** The clinical signs of EIPH often are considered to include: blood in the airways detected by either tracheobronchoscopy or examination of tracheal aspirates or bronchoalveolar lavage fluid, poor performance, epistaxis, abnormalities detected on ultrasonographic or radiographic examination of the thorax, coughing, increased respiratory rate, respiratory distress or changes in behavior. The diagnostic accuracy of these signs varies or has not been well-evaluated. Presence of blood in the airways of a horse after exercise is considered the gold standard for diagnosis of EIPH. Tracheobronchoscopic detection and grading of blood in the trachea or bronchi has been validated as a means of assessing the severity of EIPH (but not the severity of the underlying lesions) and has clinical utility in that it is associated with measures of performance. Athletic performance is likely a useful guide to the horse's health.

There is very low quality evidence that EIPH is not associated with coughing and coughing does not appear to be a reliable sign of the presence of EIPH detected by presence of hemosiderophages in tracheal lavage fluid. We located no reports of the frequency of coughing in horses with EIPH diagnosed by tracheobronchoscopy.

Epistaxis after exercise generally is considered an indication of EIPH although epistaxis can result from other causes (e.g. trauma to the head or upper airways, ethmoidal hematoma, guttural pouch mycosis). In the 3 reports of examination of horses with EIPH as evidenced by epistaxis, no evidence of causes other than pulmonary hemorrhage as the source of the blood was identified. There is moderate quality evidence that epistaxis during or soon after exercise is attributable to EIPH.

Radiographic examination of the thorax of horses can demonstrate the presence of densities in the caudal lung fields of some horses with EIPH. Many horses with EIPH have minimal to undetectable radiographic abnormalities and horses without a history of EIPH can have marked abnormalities. There is moderate quality evidence that radiographic examination has low sensitivity in detecting horses with EIPH. There is very low quality evidence that ultrasonographic examination has high sensitivity (86%) and low specificity (26%) for detection of EIPH. We identified no evidence regarding increased respiratory rate, respiratory distress, or changes in behavior as clinical signs of EIPH in horses after exercise.

**Finding: There is very low quality evidence of consistent clinical abnormalities in horses with EIPH, with the exception of presence of epistaxis after exercise for which there is moderate quality evidence.**

**Important Outcome. Does EIPH affect blood-gas exchange?:** Arterial blood gas tensions and blood (or plasma) lactate concentrations theoretically could be affected by EIPH. Four observational treadmill studies provided very low quality evidence that EIPH impaired arterial blood gas tensions during intense exercise. Studies were marked by inconsistency and imprecision and serious risk of bias.

Three prospective observational studies provide only very low quality evidence that EIPH is associated with higher blood lactate concentrations during exercise. Studies were marked by low numbers of horses, bias and inconsistency.

**Finding: There is very low quality evidence of an adverse effect of EIPH on arterial oxygen tension during exercise. There is very low quality evidence of an association between higher blood lactate concentrations and EIPH during strenuous exercise.**

**Critical Outcome. Is EIPH a cause of sudden death?:** Quality of evidence regarding the occurrence of sudden death was assessed subjectively because the published data were not appropriate for an EP or SoF. There is low quality evidence of an association between EIPH and sudden death of Thoroughbred horses during racing. Exercise-induced pulmonary hemorrhage occurs in the majority of horses during racing whereas sudden death occurs in 0.08 to 0.29 horses per 1,000 starts. Pulmonary hemorrhage was considered to have contributed to the sudden death during or shortly after racing or training of 50 of 143 horses for which there was confirmation of the cause of death. Other reports of association of pulmonary hemorrhage and death during racing are based on small numbers of cases. Although pulmonary hemorrhage can be present in horses that die suddenly, it is unclear if pulmonary hemorrhage is the primary cause of death or is secondary to another cause of death (e.g. acute heart failure resulting in sudden death and pulmonary hemorrhage). The risk of sudden death in horses with EIPH has not been determined in that an association between EIPH and subsequent sudden death during racing is unclear.

**Finding: There is low quality evidence that EIPH is causally associated with sudden death in race horses and we could locate no evidence of increased risk of sudden death in horses with EIPH.**
<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Study design (n)*a</th>
<th>Bias</th>
<th>Inconsistency</th>
<th>Indirectness</th>
<th>Imprecision</th>
<th>Control</th>
<th>EIPH</th>
<th>Absolute</th>
<th>Relative</th>
<th>Strength of evidence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does EIPH cause epistaxis?</td>
<td>III (3)</td>
<td>None</td>
<td>None</td>
<td>Not serious (I)</td>
<td>None</td>
<td>1605 total examinations</td>
<td>736 EIPH cases identified</td>
<td>NA</td>
<td>Incidence of epistaxis in EIPH positive horses 0-6.2%</td>
<td>Moderate</td>
<td>EIPH is associated with epistaxis. Frequency of other causes of epistaxis after exercise is unclear but appears to be low.</td>
</tr>
<tr>
<td>Presence of epistaxis after exercise</td>
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<tr>
<td>Presence of lesions on plain radiographs</td>
<td>III (4)</td>
<td>Serious (3)</td>
<td>Serious (4)</td>
<td>Serious (4)</td>
<td>Serious (4)</td>
<td>10</td>
<td>51</td>
<td></td>
<td></td>
<td>NA</td>
<td>low</td>
</tr>
<tr>
<td>Presence of changes detectable using ultrasonography</td>
<td>III (1)</td>
<td>Serious</td>
<td>NA</td>
<td>None</td>
<td>None</td>
<td>127</td>
<td>30</td>
<td></td>
<td></td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>Does EIPH cause coughing?</td>
<td>III (1)</td>
<td>None</td>
<td>NA</td>
<td></td>
<td></td>
<td>148</td>
<td>100 coughing horses</td>
<td>OR 0.05-3.5</td>
<td>NA</td>
<td>Very low</td>
<td>No demonstration of coughing in horses with EIPH</td>
</tr>
<tr>
<td>Evidence of EIPH as a cause of coughing horses</td>
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<tr>
<td>Does EIPH affect blood gas exchange and blood lactate concentrations?</td>
<td>III (3)</td>
<td>Serious – no power estimate or confidence intervals around effect</td>
<td>None</td>
<td>Serious</td>
<td>22</td>
<td>126</td>
<td>NA</td>
<td></td>
<td></td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>Blood gas tensions during intense exercise</td>
<td></td>
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<tr>
<td>Blood lactate concentration during intense exercise</td>
<td>III (3)</td>
<td>Serious – no power estimate or confidence intervals around effect</td>
<td>None</td>
<td>Serious</td>
<td>34</td>
<td>38</td>
<td>NA</td>
<td></td>
<td></td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>Does EIPH shorten the career of horses?</td>
<td>III (1)</td>
<td>No</td>
<td>NA</td>
<td>No</td>
<td>No</td>
<td>744</td>
<td>Grade 4 horses had 15.2 fewer starts than Grade 0 horses</td>
<td>NA</td>
<td>Moderate</td>
<td>P &lt; .001. No association between EIPH Grade and duration of career in months.</td>
<td></td>
</tr>
</tbody>
</table>
Table 1. (Continued)

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Study design (n)*·t</th>
<th>Bias (n)</th>
<th>Inconsistency</th>
<th>Indirectness</th>
<th>Imprecision</th>
<th>Number of horses</th>
<th>Treatment effect</th>
<th>Strength of evidence</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Is EIPH associated with inflammation of the lung?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Control</td>
<td>EIPH</td>
<td>Absolute</td>
<td>Relative</td>
</tr>
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<td>Does EIPH cause inflammation in the lungs?</td>
<td>II (4)</td>
<td>Not serious</td>
<td>None</td>
<td>Serious (4)</td>
<td>Not serious</td>
<td>29</td>
<td>66</td>
<td>Evidence of low-grade inflammation only in horses</td>
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<td></td>
<td>III (4)</td>
<td></td>
<td></td>
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<td>instilled with autologous blood. No active</td>
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<td>inflammation in EIPH-affected</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>animals</td>
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<tr>
<td>Does EIPH cause structural changes in the lungs?</td>
<td>III (7)</td>
<td>Not serious</td>
<td>None</td>
<td>Not serious</td>
<td>Not serious</td>
<td>10</td>
<td>101</td>
<td>All studies hemostasis, fibrosis and vascular</td>
<td>NA</td>
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<td></td>
<td>IV (1)</td>
<td></td>
<td></td>
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<td>remodeling in caudodorsal</td>
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<td>lung fields, 3 showed venous remodeling and</td>
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<td>2 changes in bronchioles</td>
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<td>Is EIPH a progressive condition?</td>
<td>III (4)</td>
<td>Serious - no</td>
<td>Serious</td>
<td>Serious -</td>
<td>Serious</td>
<td>569</td>
<td>788</td>
<td>Majority do not detect age effect, including</td>
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<td>power</td>
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<td>confidence</td>
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<td>on account of</td>
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<td></td>
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<td>around effect</td>
<td></td>
</tr>
<tr>
<td>Is increasing age associated with greater risk of EIPH?</td>
<td>III (1), IV (2)</td>
<td>Serious - no</td>
<td>Serious</td>
<td>Serious -</td>
<td>Serious</td>
<td>1,253,150</td>
<td>NA</td>
<td>Increased risk of epistaxis with increasing time</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>power</td>
<td>estimate or</td>
<td>confidence</td>
<td>intervals</td>
<td></td>
<td></td>
<td>spent racing or age.</td>
<td></td>
</tr>
<tr>
<td>Is increasing volume of racing (starts, racing years)</td>
<td>III (2)</td>
<td>Not serious</td>
<td>None</td>
<td>Not serious</td>
<td>Serious</td>
<td>27347</td>
<td>588</td>
<td>OR Epistaxis ~2.8x for horses 2, 3, 4+ years</td>
<td>1.2-3.3</td>
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<td>versus 1 year racing OR for EIPH of 1.8</td>
<td>1.1-2.8</td>
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<td>for ≥ 50 starts versus &lt; 40 starts</td>
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<tr>
<td>Does EIPH contribute to the pathogenesis of other diseases?</td>
<td></td>
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<td></td>
<td></td>
<td>Thoroughness. Evidence of increase in OR with</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>increasing volume</td>
<td></td>
</tr>
<tr>
<td>Is epistaxis heritable?</td>
<td>IV (2)</td>
<td>Moderate risk</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>170,234</td>
<td></td>
<td>Lifetime epistaxis risk</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reporting of results in available studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>improves evaluation of the studies</td>
</tr>
</tbody>
</table>

*n = number of studies included.

*Study design (see Supplementary item 5) : Type I - Randomized, placebo controlled, blinded field or clinical trials (high quality RCTs) conducted under conditions of racing or competing. Initial level of evidence - High. Type II - Randomized controlled intervention trials (low quality RCTs) including treadmill studies. Initial level of evidence - Moderate. Type III - Non-randomized controlled trials and prospective observational studies. Initial level of evidence - Low. Type IV - Case series and retrospective observational studies. Initial level of evidence - Very low.
Critical Outcome. Does EIPH shorten the career of horses?: The association of EIPH with duration or quality of racing career can be assessed using either EIPH grading or epistaxis as a marker of EIPH severity. The 1 study addressing the association of severity of EIPH and duration of racing career used a single endoscopic examination and provided moderate quality evidence that EIPH Grade 4 is associated with a shortened racing career of Thoroughbred race horses in Australia. Epistaxis is associated with retirement of horses from racing in Australia but whether this is attributable to biologic (i.e., disease) factors or is a consequence of the management of affected horses is unclear. There is moderate quality evidence that EIPH of Grades 1–3 is not associated with a shortened racing career.

Finding: There is moderate quality evidence that EIPH Grade 1–3 is not associated with a shorter racing career of Thoroughbred horses. There is moderate quality evidence that Thoroughbred horses with epistaxis or Grade 4 EIPH have shorter careers.

Important Outcome. Is EIPH associated with inflammation in the lungs?: Early descriptions of airway inflammation (bronchilitis) in EIPH lungs are not supported by more recent investigations. Experimentally, a single infusion of autologous blood into the airways is followed by increased numbers of alveolar macrophages and hemosiderophages and disappearance of blood with no residual inflammation at 14 days. Blood instilled repeatedly also is cleared rapidly and does not result in lesions characteristic of EIPH.

The evidence supporting airway inflammation as a cause of EIPH is very weak. During intense exercise, horses are more likely to bleed into regions of lung with local experimentally induced airway inflammation but the role this inflammation plays in the naturally occurring syndrome is unknown. In a large investigation of Thoroughbred racehorses examined monthly, airway inflammation was associated with EIPH as defined both by visible bleeding and hemosiderophages in tracheal wash fluid but the relationship of these observations to recent exercise or racing was not considered. Other large field investigations found no associations between EIPH score and airway inflammation, between cough (a sign of airway inflammation) and number of hemosiderophages, or between tracheal mucus score (a sign of lower airway inflammation) and EIPH score.

Finding: There is low quality evidence that EIPH leads to inflammation in either the pulmonary parenchyma or airways. There is very low quality evidence that inflammation causes EIPH.

Critical Outcome. Does EIPH cause lesions in the lungs?: Worldwide, lesions are present in the lungs of EIPH-affected horses retired from racing because of repeated exercise-associated epistaxis or EIPH. Similar but less severe lesions described in young horses in training need confirmation. Both gross and microscopic EIPH lesions are bilateral and most prevalent in the caudodorsal region of the lung. Lesions extend to varying degrees along the dorsal border, but never occur in the cranioventral regions. Gross lesions include discoloration of the pleural surface with underlying firm parenchyma that does not fully deflate in excised lungs. Pleural discoloration is a consequence of hemosiderin accumulation that is accompanied by pleural and septal fibrosis and angiogenesis. Vascular lesions include extensive remodeling of small pulmonary veins (100–200 μm outer diameter) characterized mainly by accumulation of adventitial collagen and, in some vessels, smooth muscle hyperplasia. In the most severely affected vessels, the vascular lumen is markedly decreased. The distribution of venous remodeling, hemosiderin, and fibrosis is similar to the distribution of pulmonary blood flow in the equine lung. Electron microscopy of lungs from recently exercised horses shows breaks in the capillary endothelium and basement membrane, interstitial and intra-alveolar accumulations of erythrocytes, and interstitial edema that are compatible with capillary stress failure consequent to high intravascular pressure.

Finding: There is high quality evidence that some horses with EIPH have extensive and characteristic pulmonary lesions.

Critical Outcome. Is EIPH a progressive condition?: There are no studies that report on the incidence of EIPH in a group of horses followed over the course of their career. There is low quality evidence that EIPH detected by endoscopic examination is associated with age when confounding factors, including the number of starts, are not accounted for in the statistical analysis. However, when the number of starts is included, age is not a risk factor for EIPH.

Similarly, there is moderate quality evidence that age is a risk factor for epistaxis when confounding factors are not taken into account. When career duration was included in analyses, years spent racing was a significant risk factor (although with considerable imprecision), whereas age was not.

Finding: There is moderate quality evidence that EIPH is progressive and related to load of racing.

Critical Outcome. Does EIPH contribute to the pathogenesis of other diseases?: We could identify no reports of studies investigating the relationship between EIPH and subsequent infectious or noninfectious lung disease.

Finding: We did not locate evidence that EIPH is associated with development of other lung diseases.

Critical Outcome. Is EIPH heritable?: Because EIPH of some form occurs in almost all racehorses, there is no phenotypic variance at the level of present/not present, rendering the question of heritability of EIPH likely irrelevant. There is low quality evidence that epistaxis is a heritable trait in racing Thoroughbreds. The quality of the evidence is considered to be very low because of difficulties with case identification, inability to exclude non-EIPH related epistaxis, inability to completely characterize pedigrees, and because the heritability measured might be for factors that facilitate the passage of blood from lungs to nostrils rather for those than influence the severity of EIPH.

Finding: There is no published evidence regarding the heritability of EIPH. There is very low quality evidence of an association of pedigree with occurrence of epistaxis.
**Topic 2. Does EIPH Affect Performance?**

The high incidence of EIPH has prompted speculation that EIPH is an important cause of impaired performance in Thoroughbred racehorses. Although this belief is strongly held by many horsemen and veterinarians involved in the care of racehorses, others have suggested that EIPH might be associated with superior performance, being reflective of greater racing effort. Evaluating the association of EIPH with performance requires establishing outcomes or measurements of performance during racing or on the treadmill (Table 2).

**Critical Outcome.** Is EIPH associated with the finishing position in a race?: Seven studies reported on the association of EIPH with finishing position in the race (1 with moderate level of evidence and 6 with low and very low level of evidence). Two studies determined that EIPH detected by tracheobronchoscopic examination was associated with the likelihood of having inferior finishing position races.\(^4,4^5\) One study examined 744 Thoroughbreds racing in Australia where race-day use of furosemide and nasal strips are prohibited.\(^4^5\) The other examined 1,003 individual Thoroughbred racehorses (2,118 tracheobronchoscopic examinations) that all received furosemide and had been diagnosed previously with EIPH.\(^4^6\) The study with the strongest evidence showed that horses that were EIPH negative or had EIPH grade 1 were more likely to win or finish in the first 3 positions.\(^4^5\) In the 5 studies showing no effect of EIPH on finishing position, pre-race furosemide prophylaxis status for horses was unknown in 4 and unreported in the fifth.\(^9,3^7,4^7,4^9\)

**Finding:** There is moderate quality evidence that moderate to severe EIPH in Thoroughbred race horses is associated with increased likelihood of inferior finishing position in a race.

**Critical Outcome.** Is EIPH associated with the finishing time in a race?: A single study examined 29 EIPH positive Standardbred horses that had at least 1 EIPH negative race.\(^4^8\) Their average racing times were compared between EIPH positive and EIPH negative horses and no statistical significant difference was detected. The report was of very low quality because of apparent low statistical power, nonrandom selection of horses, and racing time was recorded only in winners.

**Finding:** There is very low quality evidence of evidence that EIPH in Standardbred racehorses is not associated with finishing time in a race.

**Critical Outcome.** Is EIPH associated with the distance a horse finishes behind the winning horse in a race?: A single study evaluated the effects of EIPH on the distance a horse finishes behind the winning horse in a race.\(^4^5\) Horses with EIPH severity Grade ≥1 finished significantly further behind the winner than did horses with no evidence of EIPH. For horses with EIPH distance finished behind the winner was associated with grade of EIPH with higher grades finishing further behind the winner. Post hoc testing indicated significant difference in distance finished behind the winner with horses with grade 2 EIPH compared with no evidence of EIPH.

**Finding:** There is moderate quality evidence that Thoroughbred racehorses with more severe EIPH finish farther behind the winning horse in a race.

**Critical Outcome.** Is EIPH associated with race earnings?: A single study evaluated the effects of EIPH on a horse’s race earnings. Horses with EIPH severity grade ≤1 were about 3 times as likely to be in the highest decile for race earnings when compared to horses with EIPH severity Grade ≥2.\(^4^5\)

**Finding:** There is moderate evidence that severity of EIPH in Thoroughbred racehorses is negatively associated with a horse’s race earnings.

**Critical Outcome.** Is there a dose response relationship between the severity of EIPH and performance?: Three studies of horses racing on a racetrack reported evaluation of the effect of the severity of EIPH on performance.\(^4^5-4^7\) The 2 studies providing moderate quality evidence indicated a negative association of the severity of EIPH and performance.\(^4^6,4^7\) The strongest study found an apparent dose-response for distance finished behind the winning horse, but not for finishing position as measured categorically (i.e. winning or finishing in the top 3 positions).\(^4^5\)

**Finding:** There is low quality evidence of a dose-response relationship between severity of EIPH in Thoroughbred racehorses and severity of impaired performance.

**Topic 3. Are There Effective Prophylactic Interventions for EIPH?**

All investigations of the effect of drugs and nonpharmacological management of EIPH have focused on prevention (i.e. prophylaxis). There are no reports of the efficacy of treatments to decrease severity or progression of lung lesions of EIPH-affected horses nor are there reports of treatment of horses with EIPH (i.e. management of the short term clinical consequences of an episode of EIPH). Likewise, there are no reports of efficacy of interventions applied during training to prevent EIPH during racing.

**Critical Outcome.** Is furosemide effective prophylaxis for EIPH?: A number of low quality investigations conducted both on the treadmill and on the racetrack judged furosemide ineffective as a treatment for EIPH (Table 3).\(^5^0-5^2\) These studies simply judged the presence or absence of visible hemorrhage postexercise by endoscopy with no attempt to judge the severity of bleeding. Low quality studies demonstrated a decrease in the number of red blood cells in bronchoalveolar lavage fluid in horses performing standardized exercise tests on a treadmill.\(^5^3,5^4\) There was a decrease in severity of EIPH identified in 2 high quality investigations that endoscopically graded bleeding in large numbers of horses running on the racetrack.\(^5^5,5^6\)

**Finding:** There is high quality evidence that furosemide (0.5–1 mg/kg administered IV 4 hours before strenuous exercise) decreases the severity and incidence of EIPH.

**Important Outcome.** Does furosemide affect pulmonary vascular pressure?: Pertinent to EIPH, several moderate
Table 2. Summary of findings – Does EIPH affect performance?

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Study Design</th>
<th>Bias (n)</th>
<th>Limitations</th>
<th>Inconsistency</th>
<th>Indirectness</th>
<th>Imprecision</th>
<th>Results of EIPH</th>
<th>Dose response (graded)</th>
<th>Strength of Evidence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finishing position - Normal</td>
<td>III (7)</td>
<td>Low</td>
<td>Very different approaches to data analysis,</td>
<td>Inconsistencies</td>
<td>Nil</td>
<td>Minimal to moderate for pairwise comparisons in the high quality study. Serious for lower quality studies</td>
<td>High quality study for EIPH ≥ 1: OR for finishing = 4.0 (1.5–14.3). OR for finishing in top 3 = 1.8 (1.1–3.1). No difference found in lower quality studies</td>
<td>n = 49 horses: EIPH Mean = 2:04.1 (SD = 2.1 second), non-EIPH Mean = 2:03.3 (SD = 2.1 seconds)</td>
<td>Very low</td>
<td>Low power and confounding bias could have profoundly affected low-quality study</td>
</tr>
<tr>
<td>racing conditions</td>
<td></td>
<td>risk (1)</td>
<td>Most did not control for potential confounding</td>
<td></td>
<td></td>
<td></td>
<td>YES/NO</td>
<td>Not detected</td>
<td>Mod (n = 1)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>to High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low power</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>risk (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(n = 6)</td>
<td></td>
</tr>
<tr>
<td>Finishing time - Normal</td>
<td>III (1)</td>
<td>High</td>
<td>Low power, no control of potential confounding</td>
<td>N/A</td>
<td>Nil</td>
<td>Serious</td>
<td>n.s.</td>
<td>Not evaluated</td>
<td>Very low</td>
<td>Very low power</td>
</tr>
<tr>
<td>racing conditions</td>
<td></td>
<td>risk (1)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Distance</td>
<td>III (1)</td>
<td>Low</td>
<td>Low numbers of severely affected horses</td>
<td>N/A</td>
<td>Nil</td>
<td>Moderate for pairwise comparisons related to severe EIPH</td>
<td>Significant difference</td>
<td>Yes</td>
<td>Mod</td>
<td>Low numbers of severely affected horses</td>
</tr>
<tr>
<td>finished behind winning -</td>
<td></td>
<td>risk (1)</td>
<td></td>
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<tr>
<td>normal racing conditions</td>
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<tr>
<td>Race earnings</td>
<td>III (1)</td>
<td>Low</td>
<td>Low numbers of severely affected horses</td>
<td>N/A</td>
<td>Nil</td>
<td>Moderate for pairwise comparisons related to severe EIPH</td>
<td>Significant difference</td>
<td>Not reported</td>
<td>Mod</td>
<td>Low numbers of severely affected horses</td>
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<tr>
<td>(90th percentile or greater)</td>
<td></td>
<td>risk (1)</td>
<td></td>
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<tr>
<td>Dose Response</td>
<td>III (3)</td>
<td>Low</td>
<td>Very different approaches to data analysis,</td>
<td>Inconsistencies</td>
<td>Nil</td>
<td>Minimal to moderate for pairwise comparisons in the high quality study. Serious for lower quality studies</td>
<td>1 study found an effect in 1 outcome.</td>
<td>Mod (n = 1)</td>
<td></td>
<td>Confounding bias could have profoundly affected low-quality studies</td>
</tr>
<tr>
<td>Relationship between EIPH and</td>
<td></td>
<td>risk (1)</td>
<td>Most did not control for potential confounding, Low numbers of severely affected horses</td>
<td></td>
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<tr>
<td>Performance - Normal Racing</td>
<td></td>
<td>Moderate</td>
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<tr>
<td>Conditions</td>
<td></td>
<td>risk (2)</td>
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</tbody>
</table>
Table 3. Summary of findings of efficacy of furosemide and other interventions for prophylaxis of EIPH.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Study design (n)</th>
<th>Bias (n)</th>
<th>Inconsistency</th>
<th>Indirectness</th>
<th>Imprecision</th>
<th>Number of horses</th>
<th>Treatment effect</th>
<th>Strength of evidence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is furosemide an effective prophylactic treatment for EIPH?</td>
<td>I (2) Low No No No Yes 211</td>
<td>Absolute 65% of horses have decreased EIPH score after furosemide treatment</td>
<td>High</td>
<td>“High” evidence rating results from large n, randomized crossover trials, racing conditions, and scoring of tracheal blood post-exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EIPH quantified by scoring tracheal blood postexercise</td>
<td>Type II (3) Moderate No No No Yes 23</td>
<td>Furosemide reduced BAL RBC count</td>
<td>Low</td>
<td>The correlation between BALF RBC count and EIPH score is unknown.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EIPH quantified by blood in trachea post exercise (Yes/No)</td>
<td>II (4) High No No No Yes 19</td>
<td>No effect of furosemide NA</td>
<td>Very Low</td>
<td>None of these studies graded the severity of bleeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does furosemide affect pulmonary capillary blood pressure?</td>
<td>Direct measurement of pulmonary vascular pressures II (4) Low No No No Yes 30</td>
<td>Furosemide (1 mg/kg, IV) reduced Pcap to 79% of control</td>
<td>Moderate</td>
<td>In treadmill studies, furosemide consistently reduces pulmonary capillary pressure in exercising horses</td>
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</table>
quality treadmill investigations have consistently demonstrated that furosemide decreases pulmonary arterial and pulmonary wedge (left atrial) pressures and hence (calculated) pulmonary capillary and transmural pressure during intense exercise.²⁵⁻³¹,³⁷⁻⁴⁴ Such decreases in pressure might decrease the likelihood of capillary stress failure.³⁴

**Finding:** There is moderate quality evidence that furosemide reduces pulmonary vascular pressure during strenuous exercise.

**Critical Outcome.** Is aminocaproic acid an effective prophylaxis for EIPH? Two randomized, placebo-controlled treadmill studies found that aminocaproic acid (2–7 g, IV) given 2–4 hours before strenuous exercise test to fatigue did not decrease BALF red blood cells compared to saline placebo.⁶⁶⁻⁶⁷ However, both studies provided very low quality evidence because of outcome measure imprecision and indirectness (risk of bias), and small sample size (6–8 horses).

**Finding:** There is very low quality evidence that aminocaproic acid affects EIPH severity.

**Critical Outcome.** Are bronchodilators effective prophylaxis for EIPH? Clenbuterol administered IV alone or in combination with furosemide (10 minutes before exercise) does not affect pulmonary hemodynamics but drug effect on EIPH severity was not assessed. Nine days of clenbuterol treatment in resting horses after intrabronchial instillation of autologous blood did not result in significant change in numbers of red blood cells or hemosiderophages in BALF compared to control.⁶⁹ Another study with few horses showed no effect of atropine on EIPH and inconclusive results with ipratropium nebulization.⁷⁰ All studies provided very low to low quality evidence because of the low number of horses and lack of blinding.

**Finding:** There is very low quality evidence that bronchodilators affect EIPH.

**Critical Outcome.** Are corticosteroids effective prophylaxis for EIPH? One treadmill study reported that 3 days of dexamethasone did not prevent EIPH but EIPH severity was not assessed.⁷¹ Neither 9–10 days of inhaled beclomethasone nor oral prednisolone treatment changed either red blood cell number or hemosiderophages in BALF of resting horses after intrabronchial instillation of autologous blood.⁶⁹

**Finding:** There is very low quality evidence that corticosteroids affect EIPH severity.

**Critical Outcome.** Are nonsteroidal anti-inflammatory drugs effective prophylaxis for EIPH? Very low quality treadmill studies failed to detect an effect of either phenylbutazone (with furosemide) or flunixin meglumine on EIPH (evaluated as presence or absence of blood on endoscopic examination).⁶¹,⁷²

**Finding:** There is very low quality evidence that nonsteroidal anti-inflammatory drug treatment affect EIPH.

**Critical Outcome.** Is pentoxifylline an effective prophylaxis for EIPH? Two treadmill studies found that pentoxifylline had no effect on pulmonary hemodynamics when used alone or in combination with furosemide. An effect of pentoxifylline on EIPH (evaluated as pres-
ence or absence of blood on endoscopic examination) was not detected although EIPH severity was not assessed.58,73

Finding: There is very low quality evidence that pentoxifylline affects EIPH.

Critical Outcome. Are there other medications that are effective for prophylaxis of EIPH?: Carbazochrome (with furosemide),17,56 equine serum concentrate,75 conjugated estrogens,76 endothelin 1-A antagonist,76 nitric oxide,78 and sildenafil79 have been investigated as prophylaxis of EIPH in single studies for each drug. The studies are all of very low quality because they were conducted on a treadmill, used low numbers of horses, and the severity of EIPH was not assessed.

Although reportedly used in practice, we could locate no scientific evidence of the efficacy of aspirin or emulsifying wax.

Finding: The studies provided very low quality evidence that these drugs affect EIPH severity.

Critical Outcome. Do nasal strips prevent EIPH?: A low quality treadmill investigation assessing presence or absence of postexercise blood in the airways stated nasal strips were ineffective in preventing EIPH, however, the severity of bleeding was not graded.80 4 other studies, undertaken in a limited number of horses, showed that horses had a significant decrease in post-exercise BALF RBCs when exercised with nasal strips.53,54,81,82

Finding: There is low quality evidence that nasal strips decrease severity of EIPH.

Important Outcome. Are there other miscellaneous nonpharmacological treatments to prevent EIPH?: Neither herbal formulations83 nor inhaled water vapor84 showed evidence of efficacy in preventing EIPH. The studies were of very low quality.

Rest and water restriction before strenuous exercise have been recommended, however there is no scientific evidence that those practices decrease the incidence or severity of EIPH. Nonetheless, several racing jurisdictions have ruled to enforce rest periods ranging from 2 to 3 months for horses with epistaxis.

Finding: The studies provided very low quality evidence that herbal preparations or inhaled water vapor affect EIPH severity.

**Topic 4. Does Furosemide Affect Performance?**

A variety of outcome measures have been used in an attempt to assess performance in horses racing on a track (Table 4). However, standardization of measurements is difficult because numerous intrinsic factors (e.g., sex, age, horse quality, fitness level) and extrinsic factors (e.g., jockey, distance, track conditions, environmental conditions) vary among races and can create confounding bias in results. Control of extrinsic and intrinsic factors is more feasible when horses model race experiences by running on high-speed treadmill, but this model inherently limits the generalizability of results. Additionally, most treadmill studies suffer from small sample size and consequently have low statistical power. The ability to extrapolate performance data obtained during treadmill studies to actual performance during racing has not been established.

Most studies conducted on racetracks have used adjusted race time to cover a standardized distance as an outcome measure of performance85-90 whereas others have used finish position,85,89 racing speed or earnings.89 Treadmill studies have evaluated performance as distance covered or time that horses run until the onset of fatigue.74,91-93 Alternatively, or in addition, some treadmill studies have reported the effect of furosemide on the energetic cost of locomotion.91,94,95

**Critical Outcome. Does furosemide affect performance of horses running on a racetrack?:** Studies in Thoroughbred and Standardbred racehorses have been performed under natural racing conditions85,88-90 and under simulated racing conditions on a track.86,87 The study with the highest sample size (n = 22,589) found that mean estimated mile-equivalent race times were 0.56 to 1.09 second faster for horses receiving furosemide prophylaxis compared to horses not receiving furosemide.85 All 4 studies conducted during normal racing conditions were rated as providing moderate quality of evidence because design and analyses helped to minimize risk of bias, used relevant outcome measures (e.g., racing time adjusted for distance), were adequately powered, and showed consistent results. Two studies performed under simulated race conditions did not detect an effect of furosemide on performance as compared to placebo.86,87 However, both studies provided very low quality evidence because of outcome measure imprecision (risk of bias), small sample size (6-10 horses), and slow running speed achieved during race simulation.

Studies that investigated other performance measures, such as finish position, average racing speed, and race earnings also identified a consistent benefit for horses receiving furosemide before racing compared to untreated horses.85,89 The largest study evaluated sex differences, and found that the benefits of furosemide administration on performance were more marked in males and in horses ≤6 years old.85 These studies were considered to have moderate quality of evidence for these outcomes. No studies investigated the mechanism for superior performance.

Finding: There is moderate quality evidence that furosemide administered IV 4 hours prior to racing is associated with improved racing outcomes in Thoroughbred and Standardbred racehorses.

**Important Outcome. Does furosemide affect performance of horses running on a treadmill?:** Five studies examined the effect of furosemide administered to horses performing a standardized test on a high-speed treadmill. Two studies found statistically longer time to fatigue in horses treated with furosemide.92,93 Furosemide administration before a treadmill test improved the energetic cost of locomotion in 3 studies.91,94,95

Quality of evidence for all of these studies was rated down because relevance of performance on a treadmill compared to that on a racetrack is not known, considering that the effect of jockey or sulky and of other horses in the race cannot be replicated in the laboratory (indirectness). Also, performance on treadmill is typically
Table 4. Summary of findings concerning the effect of furosemide on performance.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Study design</th>
<th>Bias (n)</th>
<th>Inconsistency</th>
<th>Indirectness</th>
<th>Imprecision</th>
<th>Control (n)</th>
<th>FUR (n)</th>
<th>Treatment effect</th>
<th>Strength of evidence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance on the racetrack – Normal racing conditions</td>
<td>III (4)</td>
<td>Low risk (4)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>6,001</td>
<td>17,260</td>
<td>-0.12 to -1.09 s*</td>
<td>-0.68 to -0.88%</td>
<td>High</td>
</tr>
<tr>
<td>Performance on the racetrack – Simulated racing conditions</td>
<td>I (1)</td>
<td>Moderate risk (2)</td>
<td>No</td>
<td>Serious</td>
<td>Very serious</td>
<td>16</td>
<td>16</td>
<td>n.s.</td>
<td>Very low</td>
<td></td>
</tr>
<tr>
<td>Finish position in race</td>
<td>III (2)</td>
<td>Low risk (1)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>5,854</td>
<td>16,804</td>
<td>OR win = 1.4</td>
<td>N/A -26%</td>
<td>High</td>
</tr>
<tr>
<td>Treadmill performance</td>
<td>I (5)</td>
<td>Low risk (1)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>33</td>
<td>33</td>
<td>13.9 s</td>
<td>N/A</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

n.s., not statistically significant. *P < 0.05
judged based on the onset of fatigue which is a subjective assessment that can be influenced by lack of treatment concealment (imprecision).

Finding: There is low quality evidence that furosemide administered IV 4 hours before treadmill exercise results in delayed onset of fatigue and improved energetic cost of locomotion.

Discussion and Recommendations

The consensus panel found that there is good quality evidence that the presence of pulmonary lesions in racehorses is associated with epistaxis or repeated diagnosis of EIPH and low quality evidence of no effect of EIPH, excluding epistaxis, on well-being or health of horses. The presence of lesions in lungs of horses with EIPH substantiates our strong recommendation that EIPH be considered a disease and not a variably manifested normal result of strenuous activity in horses. There is only low quality evidence that the disease is progressive but the evidence allows the panel to make a weak recommendation that EIPH be considered a progressive disease, recognizing that further research is needed.

The panel found that there is high quality evidence that furosemide is effective in the prophylaxis of EIPH and makes a weak recommendation for its use in management of racehorses with this disease. The recommendation is weak because the panel recognizes that conditions for use of furosemide in some horses, such as racehorses, is regulated by racing jurisdictions that must consider a broad range of factors (not just efficacy) and that there continues to be extensive discussion among these stakeholders regarding policies and perceived need for furosemide prophylaxis.96

The panel makes no recommendation regarding other pharmacological interventions for the prophylaxis of EIPH because of the absence of studies or the very low to low quality of evidence.

The panel notes that many studies intended to test the efficacy of an intervention for prophylaxis of EIPH do not include adequate reporting of the details of the study to permit full evaluation of the quality of evidence, were likely to have a high frequency of Type 2 error rates because of small sample sizes, were conducted on a treadmill (with unknown relevance to actual competition), and did not assess dose–response relationships. Of particular concern to the panel was the large number of reports that had negative results (i.e., the study did not detect an effect of the intervention) but did not make an a priori attempt to establish adequate study size or to consider statistical power in interpretation of their results. Failure to detect an effect of the intervention in a study with inadequate statistical power is not the same as demonstration of no effect.

The panel found that there is moderate quality evidence that moderate to severe EIPH is associated with decreased athletic capacity by Thoroughbred racehorses. The panel found that there is high quality evidence that furosemide administration is associated with improved performance by Thoroughbred and Standardbred racehorses.

Footnote

4 www.google.com

Acknowledgments

Funded by ACVIM.

Conflict of Interest Declaration: Couetil: None disclosed. Hinchcliff: Travel and accommodation costs only paid to workshop in January 2013 hosted by California Thoroughbred Owners. No consulting or other contracts related to this consensus statement. No current research funding. Previous receipt of funds for EIPH research from the Grayson Jockey Club Research Foundation and the Rural Industries Research Corporation (Australia). Knight: Official Veterinarian Racing New South Wales, Australia; Official Veterinarian, Australian Turf Club. Morley: Dr. Morley has been compensated for speaking on topics related to EIPH in conferences and meetings conducted by the ACVIM, the American Association of Equine Practitioners, the Horseman's Benevolent Protection Association, California Thoroughbred Owners, and the Jockey Club. He has received funding for research related to EIPH from the Grayson-Jockey Club Research Foundation and the Racing Medication and Testing Consortium, and support-in-kind for research from the Daily Racing Form. He has no other interests in assets, products, or services related to this consensus statement, financial, or otherwise. Robinson: Travel and accommodation costs paid to speak at "International Summit on Race Day Medication: EIPH and the Racehorse (Belmont September 2011) and at workshop in January 2013 hosted by California Thoroughbred Owners. He has been a coinvestigator on an EIPH-related grant from Grayson Jockey Club Foundation. Sweeney: Pennsylvania State Horse Racing Commission (Chair 2008-2013, Member 2013 – present). van Erck: None disclosed.

Off-label Antimicrobial Declaration: Authors declare no off-label use of antimicrobials.

References


46. Costa MFM, Thomassian A. Evaluation of race distance, track surface and season of the year on exercise-induced pulmonary hemorrhage.

**Supporting Information**

Additional Supporting Information can be found online in Supporting Information:
There is no committee meeting material for Item 4
STAFF ANALYSIS
DISCUSSION AND ACTION REGARDING THE PROPOSED AMENDMENT TO RULE 1842. VETERINARIAN REPORT TO REQUIRE SUCH REPORTS BE SUBMITTED ELECTRONICALLY

Medication, safety and Welfare Committee Meeting
June 19, 2019

ISSUE

Board Rule 1842, Veterinarian Report, requires every veterinarian who treats a horse within the inclosure to report to the official veterinarian in writing in a manner prescribed by him the name of the horse treated, the name of the trainer of the horse, the time of treatment and any other information requested. The proposed amendment to Rule 1842 will remove the words “in writing” from the text and instead will require the treating veterinarian to use an electronic on-line form prescribed by the Board.

ANALYSIS

Board Rule 1842, Veterinarian Report, requires veterinarians to complete a confidential veterinarian report when treating a horse within the inclosure. The report asks for information regarding the name of the horse treated, the name of the trainer of the horse, the time and date of the treatment and any other information requested by the official veterinarian. The report is confidential, and its content may not be disclosed except in a proceeding before the stewards, or in an exercise of the Board’s jurisdiction. The required form is the CHRB-24, veterinarian Report. Under the current paper-based veterinary reporting procedure, the official veterinarians can easily become inundated with a high volume of CHRB-24s. The reports are hand-written, which does not guarantee legibility. In addition, there is no uniformity in the abbreviations used for different treatments. As an example, Lasix may appear as LXA, LXAM, LXW, BLAM or any number of acronyms. The CHRB-24 presents a problem with regards to drug violations or other issues, as it is cumbersome and time consuming to sort through them. While the official veterinarians usually understand the various abbreviations used, and can read the handwriting, Board investigators may have more difficulty. In addition, the lack of a database prevents a thorough analysis of the relationship between veterinary procedures and horses’ health and safety. The proposed amendment to Rule 1842 will require that veterinarians report treatments using an electronic on-line form prescribed by the Board. The electronic format is software developed by the Jockey Club. The CHRB Equine Medical Director has reported that the Jockey Club will provide the software, which provides reporting consistent with the CHRB-24, at no cost to the Board. Electronic reporting of veterinary procedures will have the advantage of being easier to manage, legibility, and will provide a data base that is easier to search for purposes of enforcement and analysis.

BACKGROUND

Business and Professions Code Section 19440 states the Board shall have all powers necessary and proper to enable it to carry out fully and effectually the purposes of this chapter. Responsibilities of the Board shall include adopting rules and regulations for the protection of the
public and the control of horse racing and pari-mutuel wagering. Business and Professions Code Section 19580 provides that the Board shall adopt regulations to establish policies, guidelines, and penalties relating to equine medication to preserve and enhance the integrity of horse racing in California. Business and Professions Code Section 19583 provides every veterinarian who treats a horse within the inclosure shall, in writing, on a form prescribed by the Board, report to the official veterinarian in a manner prescribed by him, the name of the horse treated, the name of the trainer of the horse, the item of treatment, any medication administered to the horse, and any other medication requested by the official veterinarian.

RECOMMENDATION

This item is presented for Committee discussion and action.

Every veterinarian who treats a horse within the inclosure shall, in writing on an electronic on-line form prescribed by the Board, report to the official veterinarian in a manner prescribed by him, the name of the horse treated, the name of the trainer of the horse, the time of treatment, and any other information requested by the official veterinarian. Any such report is confidential, and its content shall not be disclosed except in a proceeding before the stewards or the Board, or in exercise of the Board's jurisdiction.

Authority: Sections 19440, 19580 and 19583, Business and Professions Code.

Reference: Sections 19440, 19580 and 19583, Business and Professions Code.
STAFF ANALYSIS

DISCUSSION AND ACTION REGARDING THE PROPOSED AMENDMENTS OF
CHRB RULE 1843.3, PENALTIES FOR MEDICATION VIOLATIONS;
CHRB RULE 1843.5, MEDICATION, DRUGS AND OTHER SUBSTANCES PERMITTED
AFTER ENTRY IN A RACE AND
CHRB RULE 1844, AUTHORIZED MEDICATION,
TO CODIFY THE BOARD’S PRIOR TEMPORARY SUSPENSION OF AUTHORIZED
MEDICINE FOR ALL HORSES PARTICIPATING IN ALL LICENSED
HORSE RACING MEETINGS

Medication, Safety and Welfare Committee Meeting
June 19, 2019

ISSUE

In March 2019, pursuant to its authority under Rule 1844.1, Suspension of Authorized Medication, the Board suspended the authorized administration of eleven medications for all thoroughbred horses participating at Santa Anita Park (SA) and Golden Gate Fields (GGF). The presence of the suspended medications in a post-race test will be considered a violation of Board regulations. The proposed amendments of Board Rule 1843.2, Penalties for Medication Violations; Rule 1843.5, Medication, Drugs and Other Substances Permitted After Entry in a Race and Rule 1844, Authorized Medication, will codify the Board’s prior temporary suspension of authorized medication for all horses participating in all licensed horse racing meetings in California.

ANALYSIS

In March 2019, The Stronach Group called for zero tolerance on the use of race day medications at SA and GGF. At its March 2019 Regular Meeting, the Board authorized a suspension of the administration of eleven medications authorized under Rule 1844 for administration to horses entered to race. The suspension was for all thoroughbred horses participating at SA and GGF but would allow the Board to similarly extend the prohibition of authorized medication for any other breed, race or race meeting for 12 months pursuant to Rule 1844.1. The suspension began March 29, 2019 and will extend for the remainder of those race meetings. The suspended medications are: Phenylbutazone; Flunixin; Ketoprofen; Betamethasone; Dexamethasone; Diclofenac; Firocoxib; Methylprednisolone; Prednisolone; Triamcinolone Acetonide; and Isoflupredone. The proposed amendments of Board Rule 1843.3, Penalties for Medication Violations; Rule 1843.5, Medication, Drugs and Other Substances Permitted After Entry in a Race and Rule 1844, Authorized Medication, will codify the Board’s prior temporary suspension of authorized medication for all horses participating in all licensed horse racing meetings in California.

The proposed amendment to Rule 1843.3 will modify subsection (d) to add penalties for a fourth violation involving Category “C” substances. A fourth violation will require a minimum 15-day suspension and a fine of $2,500. Any subsequent violations will require a greater suspension and fine than the previous violation. In addition, the proposed amendment will remove Category “C” penalties for Rule 1844(c) NSAID violations as such substances will no longer be authorized for horses entered to race.
The proposed amendment to Rule 1843.5 will modify subsection (a) to change the rule’s definition of “entered.” Rule 1843.5 currently states a horse is deemed “entered” in a race 48 hours before post time of the running of the race. The proposed amendment provides that a horse is deemed “entered” at midnight the day entries close for the race. Subsection 1843.5(b) has been changed to state that only hay, and grain may be provided to the horse up until post time. Subsection (e) has been modified to delete electrolyte solutions and amino acid solutions as substances that may be administered by injection until 24 hours before the post time of the race. Subsection 1843.5(g), which allowed for the administration of phenylbutazone, flunixin and ketoprofen until 24 hours before the post time of the race, has been deleted. A new subsection (g) states that only water may be used to wash the horse’s mouth on race day.

The proposed amendment to Rule 1844 deletes subsections (c) and (d), which allowed for the administration of not more than one NSAID to a horse that is entered to race. This means that phenylbutazone, flunixin, ketoprofen or metabolites or analogues of the NSAIDs may no longer be present in post-race test samples. A new subsection 1844(c) states that not more than one glucocorticoid including adrenocorticotrophic hormone (ACTH) may be administered to a horse entered to race. Glucocorticoids are a class of steroid hormones used to treat inflammation. Subsection (e) has been amended to remove eight drug substances that with the NSAIDs under subsection 1844(c), constituted the eleven substances previously suspended by the Board. The substances are: Betamethasone; Dexamethasone; Diclofenac; Firocoxib; Methylprednisolone; Prednisolone; Triamcinolone Acetonide; and Isoflupredone.

BACKGROUND

Business and Professions Code section 19440 provides that the Board shall have all powers necessary and proper to enable it to carry out fully and effectually the purposes of this chapter. Responsibilities of the Board shall include adopting rules and regulations for the protection of the public and the control of horse racing and pari-mutuel wagering. Business and Professions Code section 19562 states the Board may prescribe rules, regulations and conditions under which all horse races with wagering on their results shall be conducted in California. Business and Professions Code section 19580 requires the Board to adopt regulations to establish policies, guidelines, and penalties relating to equine medication to preserve and enhance the integrity of horse racing in California. Business and Professions Code section 19581 provides that no substance of any kind shall be administered by any means to a horse after it has been entered to race, unless the Board has, by regulation, specifically authorized the use of the substance and the quantity and composition thereof. Business and Professions Code section 19582 provides that violations of section 19581, as determined by the Board, are punishable as set forth in regulations adopted by the Board.

RECOMMENDATION

This item is presented for Committee discussion and action.
1843.3. Penalties for Medication Violations.

(a) In reaching a decision on a penalty for a violation of Business and Professions Code section 19581, the Board, the board of stewards, the hearing officer or the administrative law judge shall consider the penalties set forth in subsections (d) and (e) of this Rule and any aggravating and mitigating circumstances. Deviation from these penalties is appropriate where the facts of the particular case warrant such a deviation, for example: there may be mitigating circumstances for which a lesser or no penalty is appropriate, and aggravating factors for which a greater penalty is appropriate.

(b) Mitigating circumstances and aggravating factors, which must be considered, include but are not limited to:

(1) The past record of the licensee regarding violations of Business and Professions Code section 19581;

(2) The potential of the drug(s) to influence a horse’s racing performance and the amount of the drug present;

(3) The legal availability of the drug and whether the drug was prescribed to the horse by a California Horse Racing Board (CHRB) licensed veterinarian;

(4) Whether there is reason to believe the responsible party knew of the administration of the drug or intentionally administered the drug;

(5) The steps taken by the trainer to safeguard the horse;

(6) The steps taken by an owner to safeguard against subsequent medication violations including, but not limited to, the transfer of the horse(s) to an unaffiliated trainer;

(A) “Unaffiliated trainer” means a trainer or an assistant trainer who is not related by blood, marriage or domestic partnership, or who is not or was never employed by the trainer from whose care such horse(s) were transferred.

(7) The probability of environmental contamination or inadvertent exposure due to human drug use or other factors;

(8) The purse of the race;

(9) Whether the drug found to be present in the official test sample was one for which the horse was receiving treatment as determined and documented through the process described in Rule 1842 of this division;
(10) Whether there was any suspicious wagering pattern on the race;

(11) Whether the licensed trainer was acting under the advice of a CHRB licensed veterinarian.

(c) The Board shall consider the classification of a drug substance as referred to in Rule 1843.2 of this division and the California Horse Racing Board (CHRB) Penalty Categories Listing by Classification, (Revised 4/15), which is hereby incorporated by reference, if a determination is made that an official test sample from a horse contained:

(1) Any drug substance, medication, metabolites or analogues thereof foreign to the horse, whose use is not expressly authorized in this division, or

(2) Any drug substance, medication or chemical authorized by this article in excess of the authorized level or other restrictions as set forth in the article.

(d) Penalties for violation of each classification level are as follows:
Penalties for violations due to the presence of a drug substance in an official test sample, which CHRB drug classification is categorized as warranting a Category A penalty are as follows:

<table>
<thead>
<tr>
<th>LICENSED TRAINER:</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; LIFETIME offense</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt; LIFETIME offense</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; offense</td>
<td>o Minimum one-year suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a three-year suspension. <strong>AND</strong>&lt;br&gt;o Minimum fine of $10,000 or 10% of gross purse (greater of the two) absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $25,000 or 25% of purse (greater of the two). <strong>AND</strong>&lt;br&gt;o May be referred to the Board for any further action deemed necessary by the Board.</td>
<td>o Minimum two-year suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a three-year suspension. <strong>AND</strong>&lt;br&gt;o Minimum fine of $20,000 or 25% of gross purse (greater of the two) absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $50,000 or 50% of purse (greater of the two). <strong>AND</strong>&lt;br&gt;o May be referred to the Board for any further action deemed necessary by the Board.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LICENSED OWNER:</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; LIFETIME offense in owner’s stable</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt; LIFETIME offense in owner’s stable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; offense</td>
<td>o Disqualification of horse and loss of purse. <strong>AND</strong></td>
<td></td>
</tr>
</tbody>
</table>
Category "B" Penalties

Penalties for violations due to the presence of a drug substance in an official test sample, which CHRB drug classification is categorized as warranting a Category B penalty are as follows:

<table>
<thead>
<tr>
<th>LICENSED TRAINER:</th>
<th>2nd offense (within two year time period)</th>
<th>3rd offense (within five year time period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st offense</td>
<td>Minimum 30-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 60-day suspension. AND/OR</td>
<td>Minimum 60-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 180-day suspension. AND/OR</td>
</tr>
<tr>
<td></td>
<td>Minimum fine of $500 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $10,000.</td>
<td>Minimum fine of $1,000 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $20,000.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LICENSED OWNER:</th>
<th>2nd offense in stable (within two year time period)</th>
<th>3rd offense in stable (within five year time period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st offense</td>
<td>Disqualification of horse and loss of purse. AND</td>
<td>Disqualification of horse and loss of purse. AND</td>
</tr>
<tr>
<td></td>
<td>Horse must pass a Board-approved examination pursuant to Rule 1846 before becoming eligible to be entered. AND</td>
<td>Horse must pass a Board-approved examination pursuant to Rule 1846 before becoming eligible to be entered. AND</td>
</tr>
<tr>
<td></td>
<td>Be subject to drug testing at the owner's expense and be negative for prohibited drug substances as defined in Rule 1843.1.</td>
<td>Be subject to drug testing at the owner's expense and be negative for prohibited drug substances as defined in Rule 1843.1.</td>
</tr>
</tbody>
</table>
**CATEGORY “B” PENALTIES FOR RULE 1843.6 TOTAL CARBON DIOXIDE (TCO₂) TESTING**

Penalties for violations due to exceeding permitted levels of TCO₂ as defined in Rule 1843.6 are as set forth below. All concentrations are for measurements in serum or plasma.

<table>
<thead>
<tr>
<th>LICENSED TRAINER:</th>
<th>1st offense TCO₂ (&gt; 37.0 mml/l-&lt;39 mml/l)</th>
<th>2nd offense TCO₂ (&gt; 37.0 mml/l-&lt;39 mml/l)</th>
<th>3rd offense TCO₂ (&gt; 37.0 mml/l-&lt;39 mml/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to a 30-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 60-day suspension.</td>
<td>Minimum 60-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 120-day suspension.</td>
<td>Minimum 90-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 180-day suspension.</td>
</tr>
<tr>
<td>AND/OR</td>
<td>Minimum fine of $1,500 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $5,000.</td>
<td>Minimum fine of $2,500 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $10,000.</td>
<td>Minimum fine of $5,000 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $15,000.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LICENSED OWNER:</th>
<th>1st offense TCO₂ (&gt; 37.0 mml/l-&lt;39 mml/l)</th>
<th>2nd offense TCO₂ (&gt; 37.0 mml/l-&lt;39 mml/l)</th>
<th>3rd offense TCO₂ (&gt; 37.0 mml/l-&lt;39 mml/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disqualification of horse and loss of purse.</td>
<td>Disqualification of horse and loss of purse.</td>
<td>Disqualification of horse, loss of purse and in the absence of mitigating circumstances, $2,500 fine.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LICENSED TRAINER:</th>
<th>1st offense TCO₂ (≥ 39.0 mml/l)</th>
<th>2nd offense TCO₂ (≥ 39.0 mml/l)</th>
<th>3rd offense TCO₂ (≥ 39.0 mml/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum 30-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 60-day suspension.</td>
<td>Minimum 60-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 180-day suspension.</td>
<td>Minimum 90-day suspension absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum of a 365-day suspension.</td>
</tr>
<tr>
<td>AND/OR</td>
<td>Minimum fine of $2,500 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $10,000.</td>
<td>Minimum fine of $5,000 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $15,000.</td>
<td>Minimum fine of $10,000 absent mitigating circumstances. The presence of aggravating factors could be used to impose a maximum fine of $25,000.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LICENSED OWNER:</th>
<th>1st offense TCO₂ (≥ 39.0 mml/l)</th>
<th>2nd offense TCO₂ (≥ 39.0 mml/l)</th>
<th>3rd offense TCO₂ (≥ 39.0 mml/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disqualification of horse and loss of purse.</td>
<td>Disqualification of horse and loss of purse.</td>
<td>Disqualification of horse, loss of purse and a fine ranging from a minimum of $5,000, up to a maximum of $20,000.</td>
</tr>
</tbody>
</table>
Penalties for violations due to the presence of a drug substance in an official test sample, which CHRB drug classification is categorized as warranting a Category C penalty, and for the presence of more than one non-steroidal anti-inflammatory (NSAID) in a plasma/serum sample, as defined in Rule 1844 of this division, and furosemide as defined in Rule 1845 of this division in an official test sample are as set forth below. All concentrations are for measurements in serum or plasma.

**LICENSED TRAINER:**

<table>
<thead>
<tr>
<th>1st offense</th>
<th>2nd offense (within 365-day period)</th>
<th>3rd offense (within 365-day period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Minimum fine of $500 to a maximum fine of $1,000 absent mitigating circumstances.</td>
<td>• Minimum fine of $1,000 to a maximum fine of $2,500, and up to a 15-day suspension absent mitigating circumstances.</td>
<td>• Minimum fine of $2,500 and up to a 30-day suspension absent mitigating circumstances.</td>
</tr>
</tbody>
</table>

Penalties for a fourth violation within a 365-day period shall require a minimum 15-day suspension and $2,500 fine. Penalties for any subsequent violation within a 365-day period shall require a greater suspension and fine than the penalty imposed for the previous violation.

**CATEGORY "C" PENALTIES FOR RULE 1844, AUTHORIZED MEDICATION (C)(1), (2), (3)**

Penalties for violations due to overages for permitted non-steroidal anti-inflammatory drug substances (NSAIDs) as defined in Rule 1844 (c) (1), (2) and (3) of this division. All concentrations are for measurements in serum or plasma.

The official veterinarian shall consult with the treating veterinarian in all violations of 1844 (c). If the trainer has not had an 1844 (c) violation within the previous three years, the board of stewards may issue a warning in lieu of a fine for violations of 1844 (c)(1), phenylbutazone, provided the reported level is below 5.1 mcg/ml.
(e) Violations due to the presence of a drug substance in an official test sample, which CHRB drug classification is categorized as warranting a Category “D” penalty, may result in a written warning to the licensed trainer and owner.
### CATEGORY “D” PENALTIES

<table>
<thead>
<tr>
<th>1\textsuperscript{st} offense (within 365-day period)</th>
<th>2\textsuperscript{nd} offense (within 365-day period)</th>
<th>3\textsuperscript{rd} offense (within 365-day period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of an official written warning to a maximum fine of $250.</td>
<td>Minimum of a $250 fine to a maximum fine of $500.</td>
<td>Minimum of a $500 fine to a maximum fine of $750.</td>
</tr>
</tbody>
</table>

(f) If a licensee has received a penalty for a Class A, B or C medication violation, and within a 365-day period has a subsequent lesser violation (e.g. an A violation followed by a B violation), the earlier violation shall count as a “prior violation” for the purposes of determining the penalty for the subsequent lesser violation.

(g) If a licensee has received a penalty for a Class B, C or D medication violation, and within a 365-day period has a subsequent greater violation (e.g. a D violation followed by a C violation), the earlier violation shall count as an aggravating factor for the purposes of determining the penalty for the subsequent greater violation.

(h) Any drug or its metabolite or analogue thereof found to be present in an official test sample that is not classified in Rule 1843.2 of this division shall be classified as a Class 1 substance and a Category “A” penalty until classified by the Board.

(i) The administration of a drug substance to a race horse must be documented by the treating veterinarian through the process described in Rule 1842 of this division.

(j) Any licensee found to be responsible for the administration of any drug substance resulting in a positive test may be subject to the same penalties set forth for the licensed trainer and his presence may be required at any and all hearings relative to the case.

(k) A licensee who is suspended because of a medication violation is not able to benefit financially during the period of suspension. This includes, but is not limited to, ensuring that horses are not transferred to licensed family members or, for any licensee whose suspension is for more than 30 days, to any other licensee who has been an employee of the suspended licensee within the previous year.

(l) “Licensed family members” means any person who holds an occupational license issued by the CHRB and who is related to the suspended licensee, or the licensee whose license is revoked, by blood, or
by marriage or domestic partnership, or who is related by blood to the spouse or domestic partner of such licensee.

(1) Licensed trainers suspended 60 days or more shall be banned from all inclosures under the jurisdiction of the CHRB. In addition, during the period of suspension, such trainer shall forfeit all assigned stall space and shall remove from the inclosures all signage, colors, advertisements, training-related equipment, tack, office equipment, and any other property.

(2) A trainer whose license is revoked shall be banned from all inclosures under the jurisdiction of the CHRB. In addition, such trainer shall forfeit all assigned stall space and shall remove from the inclosures all signage, colors, advertisements, training-related equipment, tack, office equipment, and any other property.

Authority: Sections 19440, 19461 and 19580, Business and Professions Code.

Reference: Sections 19461, 19580, 19581 and 19582, Business and Professions Code; and Section 11425.50, Government Code.
1843.5. Medication, Drugs and Other Substances Permitted After Entry in a Race.

(a) In this rule a horse is deemed "entered" in a race 48 hours before post time of the running of the race at midnight the day entries close for the race.

(b) Water, and feed, including hay, and grain, and feed supplements that do not contain prohibited drugs may be provided to the horse up until post time.

(c) Drugs, medications or any other substances shall not be administered by any means to a horse after it is deemed enter to race within 48 hours of the post time of the race in which the horse is entered except:

(1) Topical medications, (such as antiseptics, ointments, salves, leg rubs, leg paints, hoof dressings, liniments and antiphlogistics) which do not contain anesthetics or other prohibited drugs.

(d) Any drug, medication or any other substance found in a test sample taken from a horse which is not authorized under this rule shall be deemed a prohibited drug substance.

(e) Any of the following substances may be administered by injection until 24 hours before the post time of the race in which the horse is entered:

(1) Injectable Vitamins;

(2) Electrolyte-Solutions;

(3) Amino Acid-Solutions;
(4)(2) Tetanus Antitoxin or Tetanus Toxoid, if the horse has sustained a wound.

(f) Approved anti-ulcer medications may be administered until 24 hours before the post time of the race in which the horse is entered. A list of approved anti-ulcer medications, and route of administration, shall be posted at each racetrack in the office of the official veterinarian.

(g) One of the following non-steroidal anti-inflammatory medications may be administered until 24 hours before the post time of the race in which the horse is entered under Rule 1844 of this division:

1. Phenylbutazone;
2. Flunixin;

(h)(g) In addition to the substances named in subsection (c)(1), any of the following substances may be administered under Rule 1845 of this division within 24 hours of the post time of the race in which the horse is entered:

1. Furosemide;
2. Other Authorized Bleeder Medication.

(2) Only water may be used to wash the horse's mouth on race day.

(i) Drugs, medications or any other substances may not be administered to a horse by injection, via nasogastric tube (stomach tubing) or any other means after the horse is entered to race, except under these regulations.

Authority: Sections 19580, 19581 and 19582, Business and Professions Code.

Reference: Sections 19580, 19581 and 19582, Business and Professions Code; Section 337 f, g and h, Penal Code.
1844. Authorized Medication.

Consistent with the intent of these rules, drug substances and medications authorized by the Board for use may be administered to safeguard the health of the horse entered to race provided that:

(a) No person shall administer a drug substance to any horse entered to race except upon authorization of the official veterinarian in conformance with these rules.

(b) No drug substance, other than authorized bleeder medication, shall be administered to a horse entered to race within 24 hours of the race in which entered.

(c) Not more than one approved non-steroidal anti-inflammatory drug substance (NSAID) may be administered to a horse that is entered to race and shall be only one of the following authorized drug substances:

(1) Phenylbutazone in a dosage amount that the test sample shall contain not more than 2 micrograms of the drug substance per milliliter of blood plasma or serum.

(2) Flunixin in a dosage amount that the test sample shall contain not more than 20 nanograms of the drug substance per milliliter of blood plasma or serum.

(3) Ketoprofen in a dosage amount that the test sample shall contain not more than 2 nanograms of the drug substance per milliliter of blood plasma or serum.

(4) Metabolites or analogues of approved NSAIDs may be present in post-race test samples.
(d) If the official chemist reports that a blood test sample contains an authorized NSAID in excess of the limit for that drug substance under this rule, the official veterinarian shall, in conjunction with the veterinarian who administered or prescribed the authorized drug substance, establish a dosage amount or time of administration of the drug substance that will comply with the limits under this rule; or the official veterinarian may, if in his/her judgment no such reduced dosage amount or amendment to time of administration will result in a test sample level within the limits of this rule, withdraw authorization for the use of any one NSAID.

(c) Not more than one glucocorticoid including adrenocorticotropic hormone (ACTH) may be administered to a horse that is entered to race.

(e) Official urine test samples may contain one of the following drug substances, their metabolites and analogs, in an amount that does not exceed the specified levels:

1. Acepromazine; 10 nanograms per milliliter
2. Mepivacaine; 10 nanograms per milliliter
3. Albuterol; 1 nanogram per milliliter
4. Procaine; 25 nanograms per milliliter
5. Salicylates; 750 micrograms per milliliter
6. Clenbuterol; 140 picograms per milliliter, except for any horse participating in a quarter horse race for which no level of clenbuterol is authorized.
7. Detomidine; 2 nanograms per milliliter
8. Nandrolone; 1 nanogram per milliliter for geldings, fillies and mares; 45 nanograms for males other than geldings.
9. Boldenone; 15 nanograms per milliliter in males other than geldings.
10. Testosterone; 20 nanograms per milliliter in geldings.
(A) Testosterone at any level in males other than geldings is not a violation of this regulation.

(10) Testosterone; 55 nanograms per milliliter in fillies or mares (unless in foal)

(11) Butorphanol 300 nanograms per milliliter

(12) Official blood test samples may contain the following drug substances, their metabolites and analogs, in an amount that does not exceed the specified levels in serum or plasma:

1. Bethamethasone; 10 picograms per milliliter
2. Dantrolene; 100 picograms per milliliter
3. Detomidine; 1 nanogram per milliliter
4. Dexamethasone; 5 picograms per milliliter
5. Diclofenac; 5 nanograms per milliliter
6. Dimethylsulfoxide (DMSO); 10 micrograms per milliliter
7. Firocoxib; 20 nanograms per milliliter
8. Lidocaine; 20 picograms per milliliter
9. Methocarbamol; 1 nanogram per milliliter
10. Methylprednisolone; 100 picograms per milliliter
11. Glycopyrrolate; 3 picograms per milliliter
12. Prednisolone; 1 nanogram per milliliter
13. Triamcinolone Acetonide; 100 picograms per milliliter
14. Xylazine; 200 picograms per milliliter
15. Butorphanol; 2 nanograms per milliliter
16. Isoflupredone; 100 picograms per milliliter
17. Cetirizine; 6 nanograms per milliliter
18. Cimetidine; 400 nanograms per milliliter
(1149) Guaifenesin; 12 nanograms per milliliter

(1220) Omeprazole; 10 nanograms per milliliter

(1324) Ranitidine; 40 nanograms per milliliter

(Fe) Official blood test samples shall not contain any of the drug substances, or their metabolites or analogs listed in subsection (e)(1) to (6) and (e)(8) to (11).

(gh) Procaine, following administration of procaine penicillin, is an authorized medication provided:

(1) Official blood test samples shall not contain any procaine, or its metabolites or analogs in excess of 25 nanograms per milliliter.

(2) all procaine penicillin administrations have been reported pursuant to Rule 1842 of this division,

(3) procaine penicillin was not administered after entry to race,

(4) the horse was under surveillance for a minimum of six hours prior to racing.

(ji) All expenses related to surveillance and testing for procaine under subsection (h) of this regulation shall be paid by the owner of the horse.

Authority: Sections 19440 and 19562, Business and Professions Code.

Reference: Sections 19580 and 19581, Business and Professions Code.
STAFF ANALYSIS
DISCUSSION AND ACTION REGARDING
THE PROPOSED ADDITION OF
CHRB RULE 1846.1. VETERINARY RECORDS
FOR HORSES SHIPPING INTO AN INCLOSURE TO RACE
TO REQUIRE A RECORD BE AVAILABLE OF THE
PREVIOUS 14 DAY VETERINARY TREATMENT RECORD

Medication, Safety and Welfare Committee Meeting
June 19, 2019

ISSUE

Access to medical records for a horse can be important in determining whether it is sound for racing. When horses ship into a track within days of a race, such information is not often available to the official veterinarian or racing veterinarian making decisions on race day. Insuring that regulatory veterinarians have access to health records for horses shipping into the inclosure will result in them being better equipped to determine the soundness of horses for racing and training.

ANALYSIS

The proposed addition of Rule 1846.1, Veterinary Records for Horses Shipping in to Race, will require that the trainer submit to the official veterinarian or racing veterinarian the previous 14-day veterinary treatment record of a horse if the horse has not been stabled at a facility under the jurisdiction of the Board for 14 days prior to a race, or for 14 days prior to working off the veterinarian’s List. The veterinary record shall include the name of the horse, any medication, drug, substance or procedure administered or prescribed during the previous 14 days and the name of the prescribing veterinarian. The veterinary record shall be considered confidential and cannot be disclosed except in a proceeding before the stewards or the Board. Failure to provide accurate and complete veterinary records shall result in disciplinary action. The proposed addition of Rule 1846.1 is meant to help ensure the health and welfare of the race horse, and by extension the health and safety of those who must exercise, train or ride the horse in a race. Ensuring that regulatory veterinarians have access to veterinary records of horses shipping into the inclosure means that such veterinarians are better equipped to determine the soundness of the horses for racing or training. The proposed regulation will also facilitate dialogue between the private practice veterinarian and the official or racing veterinarian. In cases where a horse has been trained off the grounds of a CHRB licensed facility under the care or direction of the owner, and then shipped in a day or two before a race and placed with trainers who have little or no involvement in the prior care of the horse, access to the veterinary records provides a greater picture of the overall horse health.

BACKGROUND

Business and Professions Code section 19440 provides that the California Horse Racing Board shall have all powers necessary and proper to enable it to carry out the purposes of this Chapter. Business and Professions Code section 19562 states the Board may prescribe rules, regulations
and conditions under which all horse races with wagering on their results shall be conducted in California.

RECOMMENDATION

This item is presented for Committee discussion and action.
CALIFORNIA HORSE RACING BOARD
TITLE 4. CALIFORNIA CODE OF REGULATIONS
ARTICLE 15. VETERINARY PRACTICES
PROPOSED ADDITION OF
RULE 1846.1. VETERINARY RECORDS FOR HORSES SHIPPING IN TO RACE

Medication, Safety and Welfare Committee Meeting
June 19, 2019

1846.1 Veterinary Records for Horses Shipping in to Race.

(a) If a horse has not been stabled at a facility under the jurisdiction of the Board for 14 days prior to a race, or for 14 days prior to working off the Veterinarian’s List, the trainer shall submit to the official veterinarian or racing veterinarian the previous 14-day veterinary treatment record. The veterinary treatment record shall include:

(1) the name of the horse treated,

(2) any medication, drug, substance, or procedure administered or prescribed by a veterinarian during the previous 14 days, and

(3) the name of the prescribing veterinarian.

(b) Any such veterinary treatment record is confidential, and its content shall not be disclosed except in a proceeding before the stewards or the Board, or in exercise of the Board’s jurisdiction.

(c) Failure by the trainer to provide accurate and complete veterinary treatment records shall result in disciplinary action.

Authority: Sections 19440 and 19562, Business and Professions Code.

Reference: Sections 19440 and 19562, Business and Professions Code.
STAFF ANALYSIS
DISCUSSION AND ACTION REGARDING
THE PROPOSED ADDITION OF
CHRB RULE 1866.2, SHOCKWAVE THERAPY RESTRICTED,
TO PROVIDE PROCEDURES FOR THE USE OF
EXTRACORPOREAL SHOCK WAVE THERAPY (ESWT) OR
RADIAL PULSE WAVE THERAPY WITHIN A CHRB INCLOSURE

Medication, Safety and Welfare Committee Meeting
June 19, 2019

ISSUE

Extracorporeal shock wave therapy (ESWT) is a technology used for treating musculoskeletal problems, soft-tissue injuries and bone injuries in horses. The Board currently does not have a regulation governing the use of ESWT technology within the inclosure. The proposed addition of Rule 1866.2, Shock Wave Therapy Restricted, will put in place a regulation to provide guidelines and procedures for the use of ESWT within a CHRB inclosure.

ANALYSIS

ESWT is noninvasive. The Extracorporeal Shock Wave Therapy or Radial Pulse Wave Therapy machines transmit short, high energy pressure pulses to a select area of the body through a handheld probe. The operator may choose different levels of energy depending upon the purposes of the therapy. In horses, the therapy is often used to address orthopedic problems, especially tendon or ligament issues. A horse will usually receive a mild sedative to keep them still during the treatment. Shock wave treatments can act as on-site analgesia in the area where energy waves are targeted. It is not known how long such pain relief lasts, with estimates ranging from two to three days. Rule 1866.2 will provide guidelines and procedures for the use of ESWT within a CHRB inclosure. The proposed regulation provides that:

- ESWT machines must be registered with and approved by the official veterinarian.
- ESWT machines may only be used in designated locations within the inclosure.
- Treating veterinarians must keep a log of all shock wave therapy treatments that shall be available for inspection. The logs must include the horse’s identifying information, the area treated and the number of pulses.
- Horses receiving shock wave therapy treatment shall be placed on the Veterinarian’s List and cannot participate in a recorded workout for a number of days after treatment.
- Unless it has received prior approval, no horse may be brought on to a CHRB racing or training facility if it has received shock wave therapy in the last 30 days.
- The use and/or possession of an ESWT machine in violation of Rule 1866.2 is a prohibited practice and is subject to a Class “A” Penalty.

BACKGROUND

Business and Professions Code section 19440 provides that the Board shall have all powers necessary and proper to enable it to carry out fully and effectually the purposes of this chapter.
Responsibilities of the Board shall include adopting rules and regulations for the protection of the public and the control of horse racing and pari-mutuel wagering. Business and Professions Code section 19562 states the Board may prescribe rules, regulations and conditions under which all horse races with wagering on their results shall be conducted in California. Business and Professions Code section 19580 requires the Board to adopt regulations to establish policies, guidelines, and penalties relating to equine medication to preserve and enhance the integrity of horse racing in California.

RECOMMENDATION

This item is presented for Committee discussion and action.
1866.2 Shockwave Therapy Restricted

(a) All Extracorporeal Shock Wave Therapy or Radial Pulse Wave Therapy machines, hereinafter referred to as ESWT, must be registered with and approved by the official veterinarian before such machine is brought onto any CHRB racing or training inclosure.

(b) Only CHRB licensed veterinarians are allowed to use ESWT machines within a CHRB racing or training inclosure.

(c) ESWT machines are not allowed in the stable area. All treatments are to be conducted in a designated area approved by the official veterinarian responsible for that CHRB racing or training facility.

(d) The treating veterinarian shall keep a log of all ESWT treatments. The log shall be available for inspection by the official veterinarian, Stewards or CHRB investigators. The log shall include the horse’s tattoo, microchip number, or other identifying information if the horse is not tattooed or microchipped, the anatomical area treated, and the number of pulses administered.

(e) All ESWT treatments are to be reported on a separate Veterinary Confidential form (CHRB-24) to the official veterinarian by 10:00AM the day following treatment.

(f) Horses treated with ESWT will be placed on the Veterinarian’s List for ESWT treatment for XX days. The day after treatment is the first day on the Veterinarian’s List. The horse will be automatically removed from the Veterinarian’s List for ESWT on the (XX+1) day. A horse on the
Veterinarian's List for multiple reasons must meet whatever criteria is required for removal for those other reasons.

(g) Horses treated with ESWT may not participate in a recorded workout for XX days after treatment.

(h) No owner, trainer or licensee shall bring on to a CHRB racing or training facility a horse known to have received EWST in the last 30 days without prior approval of the official veterinarian.

(i) Any person participating in the use of ESWT and/or the possession of ESWT machines in violation of this rule shall be considered to have committed a Prohibited Practice and is subject to a Class A Penalty.

Authority: Sections 19440, 19562, and 19580, Business and Professions Code.

Reference: Sections 19440, 19562, and 19580, Business and Professions Code.
ISSUE

Bisphosphonates are a class of drugs that prevent the loss of bone density and are used in people to treat osteoporosis and similar diseases. In horses, bisphosphonates are used to treat similar problems, like navicular disease. However, bisphosphonates inhibit the normal bone repair process, so their use has been restricted to horses that are four or older. In younger horses, bisphosphonates could cause bones to become more brittle. Since 2015 the British Horse Racing Authority has restricted the use of bisphosphonates to horses over three-and-a-half years old, and the use of bisphosphonates in horses has been an issue of discussion internationally. The proposed addition of Rule 1867.1, Use of Bisphosphonates Prohibited, would prohibit the use of bisphosphonates in race horses within a CHRB inclosure.

ANALYSIS

The proposed addition of Rule 1867.1 will prohibit the administration of bisphosphonates within a CHRB inclosure. Under the proposed regulation, bisphosphonates may not be administered to any horse within the inclosure. The proposed regulation would also prohibit any licensee from bringing a horse that is known to have been administered a bisphosphonate within the previous six months into a CHRB inclosure. A proposed Racing Medication and Testing Consortium bisphosphonate regulation will have a similar six month stand down time, as six months is the best-informed estimate of inhibition of bone repair. The purpose is to prevent someone from taking a horse off-site, administering bisphosphonates, and bringing the horse back onto the grounds. Subsection 1867.1(c) allows for the use of methylene diphosphonate for nuclear imaging purposes. Methylene diphosphonate is used in combination with technetium 99m for the evaluation of benign and malignant skeletal conditions.

BACKGROUND

Business and Professions Code section 19440 provides that the Board shall have all powers necessary and proper to enable it to carry out the purposes of this chapter. Responsibilities of the Board shall include adopting rules and regulations for the protection of the public and the control of horse racing and parimutuel wagering. Business and Professions Code section 19562 states the Board shall adopt rules, regulations and conditions consistent with the provisions of this chapter under which horse races with wagering on the results shall be conducted in this State. Business and Professions Code section 19580 provides that the Board shall adopt regulations to establish policies, guidelines, and penalties relating to equine medication to preserve and enhance the integrity of horse racing in the state. Business and Professions Code section 19581 states no
substance of any kind shall be administered by any means to a horse after it has been entered to
race in a horse race, unless the Board has, by regulation, specifically authorized the use of the
substance and the quantity and composition thereof. Board Rule 1843, Medication, Drugs and
Other Substances, provides that no horse participating in a race shall carry in its body any drug
substance or its metabolites or analogues, foreign to the horse except as hereinafter expressly
provided. No drug substance shall be administered to a horse which is entered to compete in a
race to be run in this state except for approved and authorized drug substances as provided in these
rules.

RECOMMENDATION

This item is presented for Committee discussion and action.
1867.1. Use of Bisphosphonates Prohibited.

(a) Bisphosphonates may not be administered to any horse within a CHRB inclosure.

(b) No licensee shall bring into a CHRB inclosure a horse that has been administered a bisphosphonate within the previous six months.

(c) For nuclear imaging purposes, methylene diphosphonate may be administered when used in combination with the radionuclide technetium 99m.

Authority: Sections 19440, 19562, 19580 and 19581, Business and Professions Code.

Reference: 19440, 19580, and 19581, Business and Professions Code.
There is no committee meeting material for Item 10