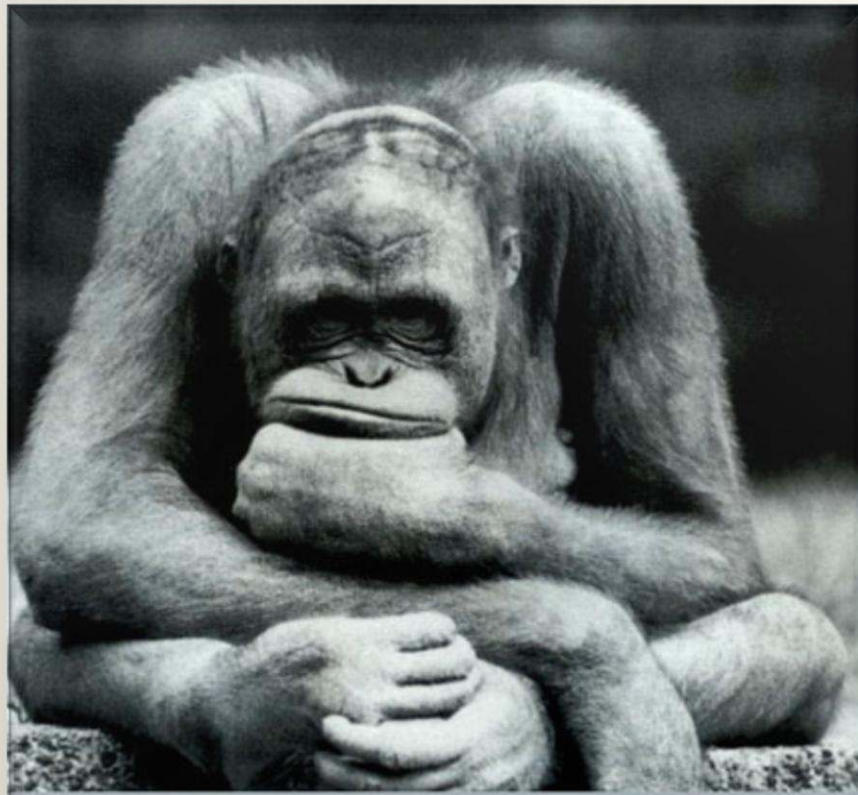


A review of the summit on  
race day medication and  
exercise induced pulmonary  
hemorrhage (EIPH)



If you think you have all the  
answers, your probably asking the  
wrong questions.



Oh what to do, what to doooo?

# What we know

- Horses Bleed (EIPH)
- Bleeding is the result of pathology (injury)
- Bleeding is the source of further pathology
- Furosemide (Lasix/Salix) works

# Disorders of the Respiratory System are:

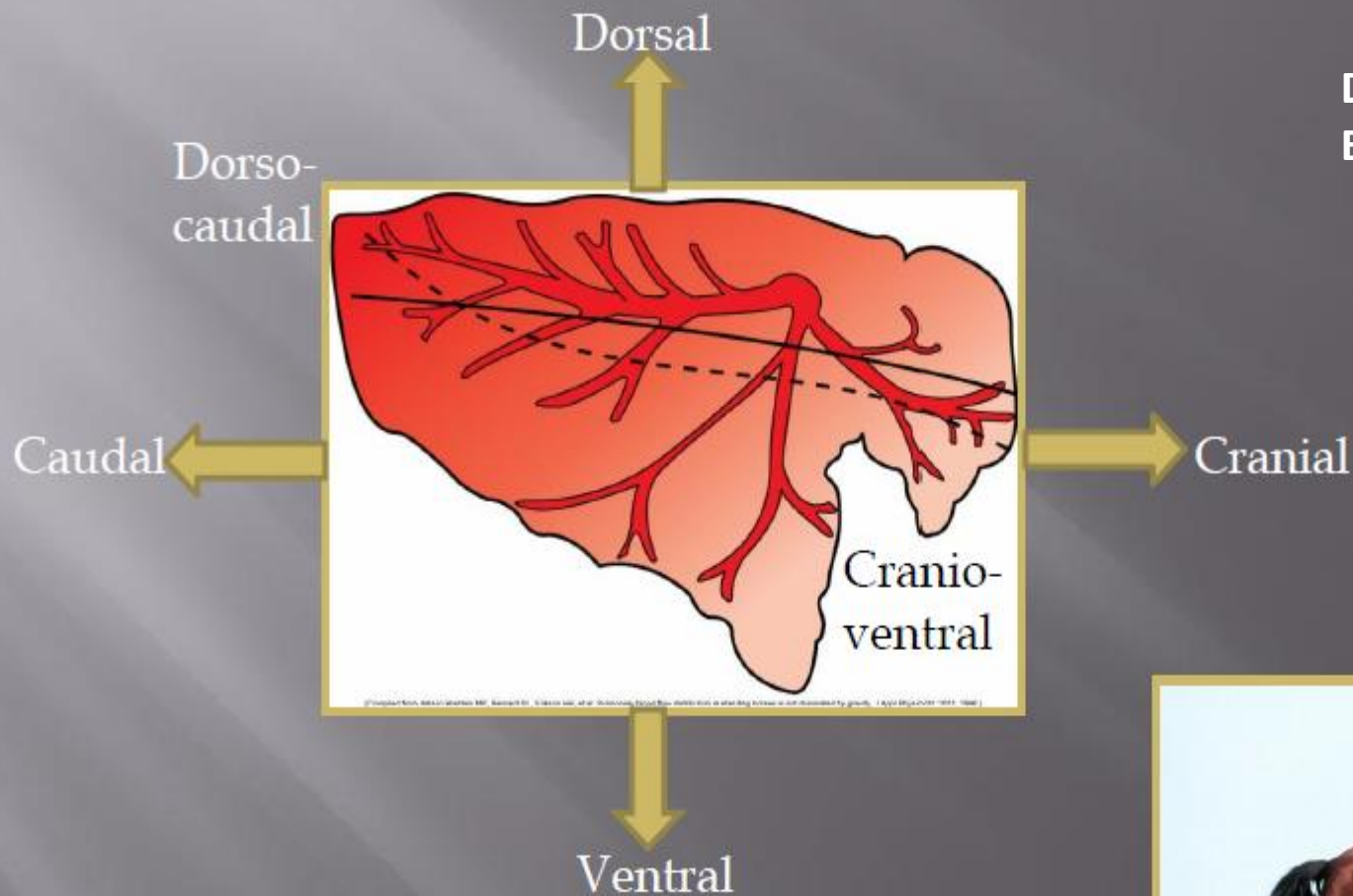
- › The **second most common** limiting factor for the athletic performance of horses
- › Often result in **major** economic losses for owners
- › Many horses are lost for performance or must be retired

# EIPH

- **EIPH** occurs in Thoroughbreds, Quarter Horses and Standardbreds
- During sprint racing
- Also observed in other high performance non-racing equine athletes e.g.
  - > Barrel, Cutting, Reining, Roping
  - > Polo
  - > Cross-country and 3-day event
  - > Show jumping and Hunter-jumper
  - > Steeplechase
  - > And even draft horses
- Has been noted in other species including dogs, camels and humans

# Horse lung terminology

Dr. Robinson  
EIPH Summit 2011







Dr. Robinson  
EIPH Summit 2011

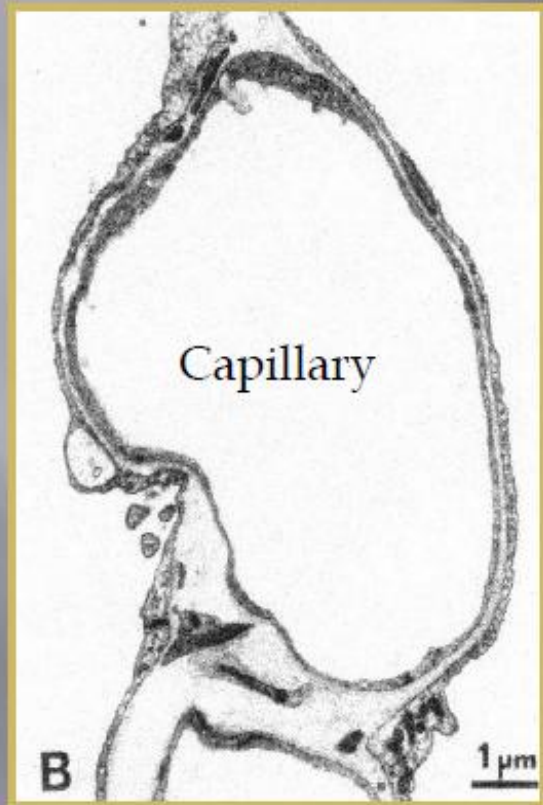
# Why does EIPH occur?

Facts about the heart and lungs during exercise

- |                         |                     |
|-------------------------|---------------------|
| ▣ Oxygen consumption    | 19 gallons/min      |
| ▣ Heart rate            | 220 beats/min       |
| ▣ Volume of blood/beat  | 3 pints             |
| ▣ Blood flow thru lungs | 75 plus gallons/min |



# Lung capillary



Control

- ▣ The wall of the capillary is 3/10000 mm thick
- ▣ Exposed to high pressure during exercise
- ▣ Capillary stress failure

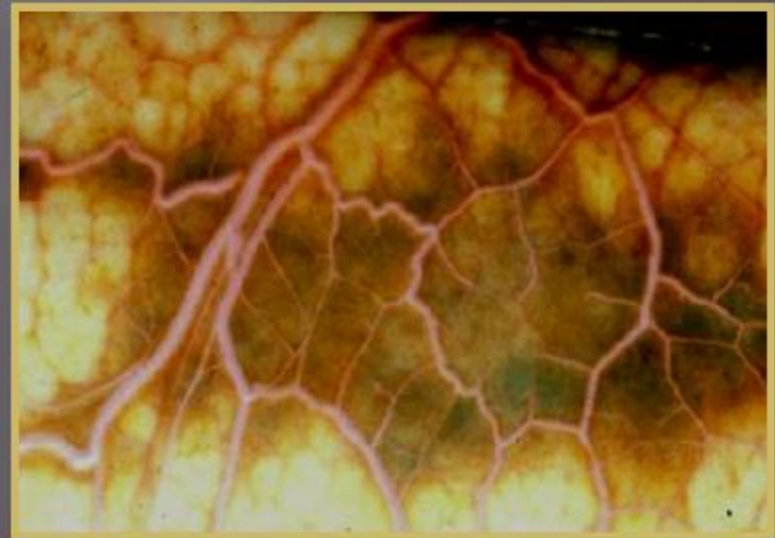
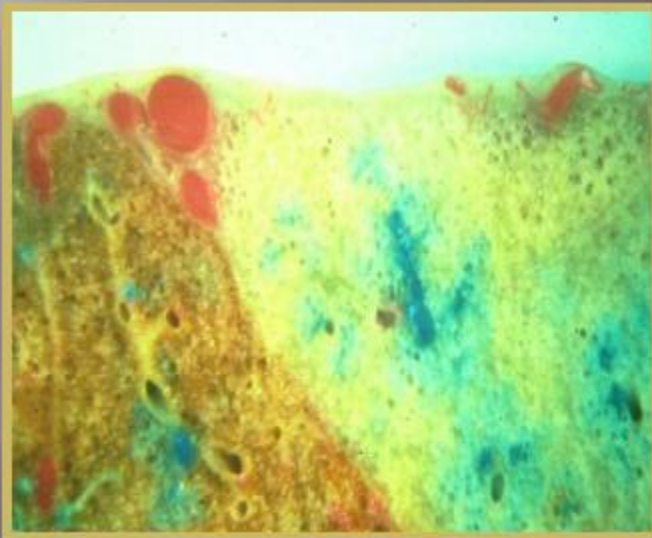
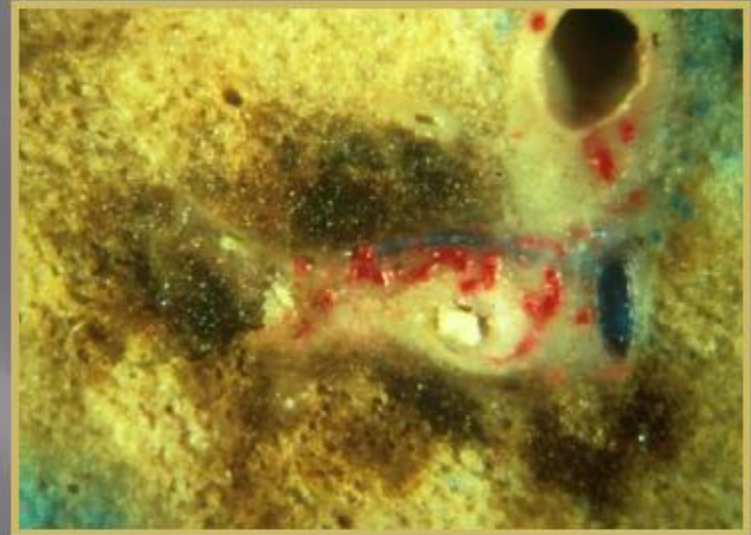
Dr. Robinson  
EIPH Summit 2011

# EIPH: pathology

*O'Callaghan et. al. 1987*

Dr. Robinson  
EIPH Summit 2011

- ▣ Hemosiderin
- ▣ Fibrosis
- ▣ Angiogenesis
  - (new blood vessels)
- ▣ Bronchiolitis

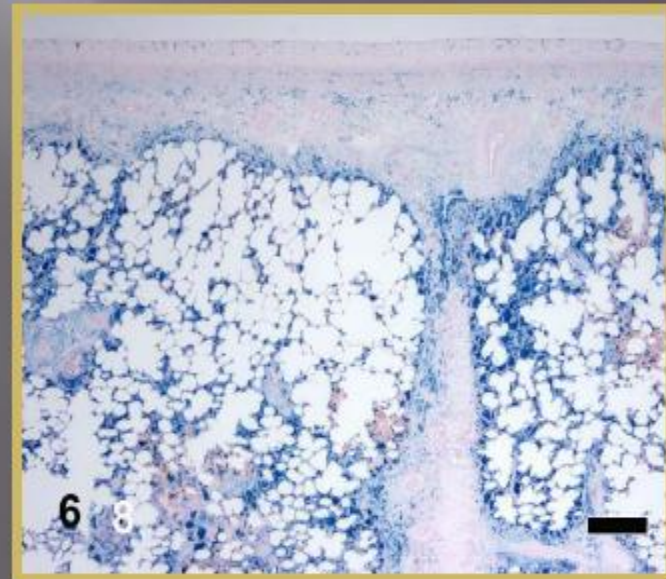
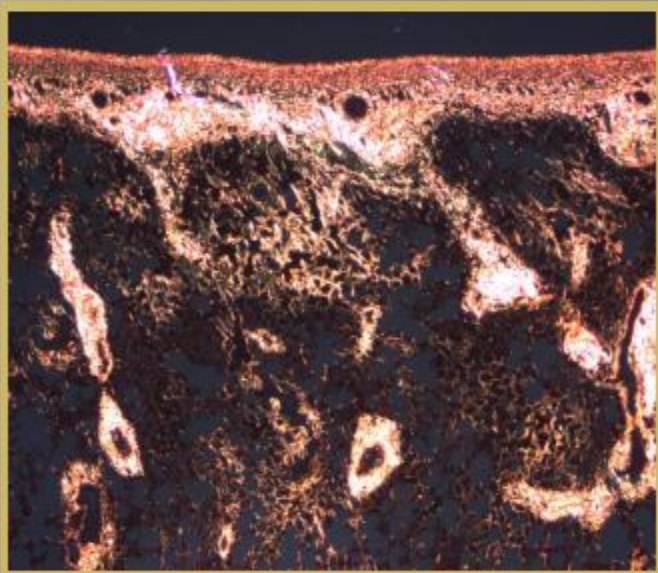




# EIPH - severe pleural and septal fibrosis

Dr. Robinson  
EIPH Summit 2011

- ▣ Hemosiderin causes fibrosis
  - Buschman and Ballard, Chest:104:293, 1993
  - Eagan et al., Resp Med 90:547, 1996







# A Summary of the Regulation of Bleeding by some Major Racing Authorities

Brian Stewart

Hong Kong Jockey Club

EIPH Summit 2011

<b>Racing Authority</b>	<b>1<sup>st</sup> Incident</b>	<b>2<sup>nd</sup> Incident</b>	<b>3<sup>rd</sup> Incident</b>	<b>Subsequent Bleeding Incident</b>
<b>Hong Kong Jockey Club</b>	Three month ban	3 Month Ban or Compulsory Retirement	Compulsory retirement	N/A
<b>Australia</b>	Three month ban	Compulsory Retirement	N/A	N/A
<b>New Zealand</b>	Three month ban	Compulsory Retirement	N/A	N/A
<b>Malayan Racing Association *</b>	Three month ban	Six month ban	Compulsory Retirement	N/A
<b>South Africa</b>	Three month ban	Six month ban	Compulsory Retirement	N/A
<b>Japan Racing Association</b>	One month ban	Two month ban	Three month ban	Three month ban
<b>Emirates Racing Association +</b>	21-day ban	60-day ban	60-day ban	60-day ban
<b>Macau Jockey Club</b>	21-day ban	21-day ban	21-day ban	21-day ban
<b>UK HRA</b>	None	None	None	None

\* The MRA rule provides that horses that race uneventfully three times after serving a ban for bleeding may revert to a lower 'bleeder' status for the purpose of the regulatory bans on racing for any future bleeding attack.

+ Proposed but not implemented by ERA

# Incidence of Post-Race Epistaxis

Brian Stewart  
Hong Kong Jockey Club  
EIPH Summit 2011

○ Hong Kong	4.7 / 1000 runners
○ Singapore	5.1 / 1000 runners
○ Victoria	1.5 / 1000 runners
○ NSW	2.0 / 1000 runners
○ UK (Flat)	1.3 / 1000 runners
○ N. America <sup>(a)</sup> (Pre-Lasix)	2.0 / 1000 runners
○ N. America <sup>(a)</sup> (Lasix)	0.6 / 1000 runners
○ N. America <sup>(b)</sup> (Lasix)	0.7 / 1000 runners
○ N. America <sup>(c)</sup> (Lasix)	0.7 / 1000 runners
○ N. America <sup>(d)</sup> (Lasix)	1.15 / 1000 runners
○ N. America <sup>(e)</sup> (Lasix)	0.12 / 1000 runners

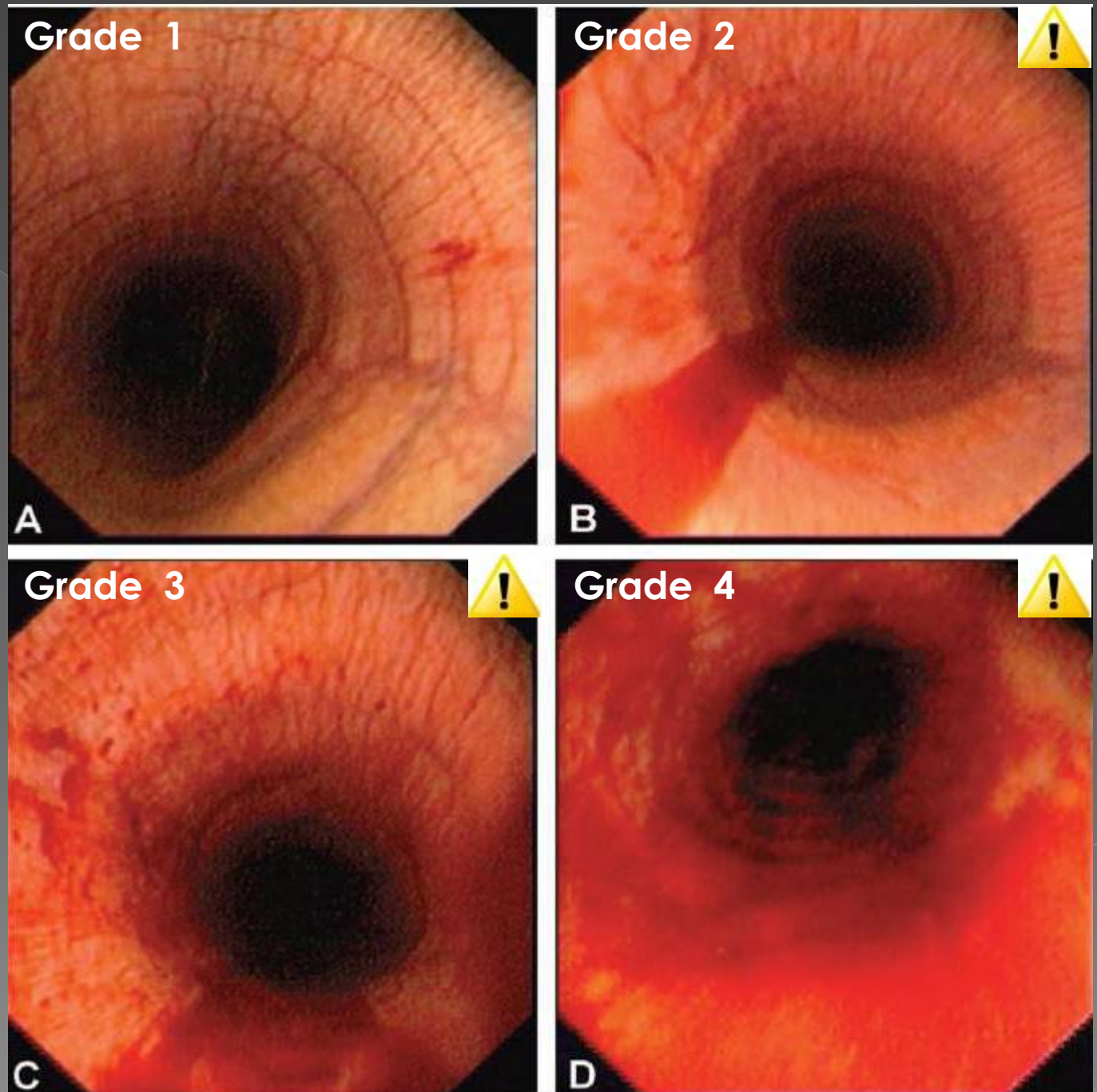


**Grade 0 – No Blood  
& Grade 1 – Trace  
amounts of blood  
do not affect  
performance**

**Grades 2-4  
Negatively  
impact  
performance**

**Drs. Hinchcliff,  
Morley, et al**

**AJVR, Vol 66, No. 4  
April 2005**





# Causes of Disappointing Racing Performances

Brian Stewart  
Hong Kong Jockey Club  
EIPH Summit 2011

- ◎ EIPHS ('3+/4+ blood on Scope within 5 minutes of racing) ~ 30%
  - ◎ Bleeder (epistaxis) ~ 8%
- But 59% of 'Bleeders' performed up to expectations.
- ◎ Irregular Heart Rhythm ~ 12%
  - ◎ Lameness ~ 25%

**EIPHS is an important cause of disappointing racing performances.**

◎ **Furosemide** Hinchcliff et al 2009 (JAVMA 235, 76-82)

- > Scores for endoscopic severity for EIPH were less severe after **furosemide with no 3 or 4**
- > Scores for endoscopic severity for EIPH **ranged from 1 to 4 in** horses after saline

**FOR THE 152 HORSES SCOPED AFTER BOTH RACES**

- > **57% HAD EIPH  $\geq$  1 WITH FUROSEMIDE AND NONE WAS A GRADE 3 TO 4**
- > **79% HAD EIPH AFTER SALINE**

Table 3—Cross-classification of scores for endoscopic severity of EIPH following racing in 152 Thoroughbred racehorses competing twice under similar conditions each time, except that furosemide (500 mg, IV) was administered prior to one race and a placebo (saline solution) was administered prior to the other.

<u>EIPH score</u> when administered <u>furosemide</u>	<u>EIPH score</u> when administered <u>placebo</u>					Total
	0	1	2	3	4	
0	21	32	10	2	0	65
1	10	32	21	11	1	75
2	1	3	4	3	1	12
3	0	0	0	0	0	0
4	0	0	0	0	0	0
Total	32	67	35	16	2	152

Potential EIPH scores ranged from 0 to 4. Distribution of scores differed significantly (Bowker symmetry test;  $P < 0.001$ ) between treatments.

Drs. Hinchcliff, Morley, and Guthrie  
JAVMA, Vol 235, No. 1, July 1, 2009

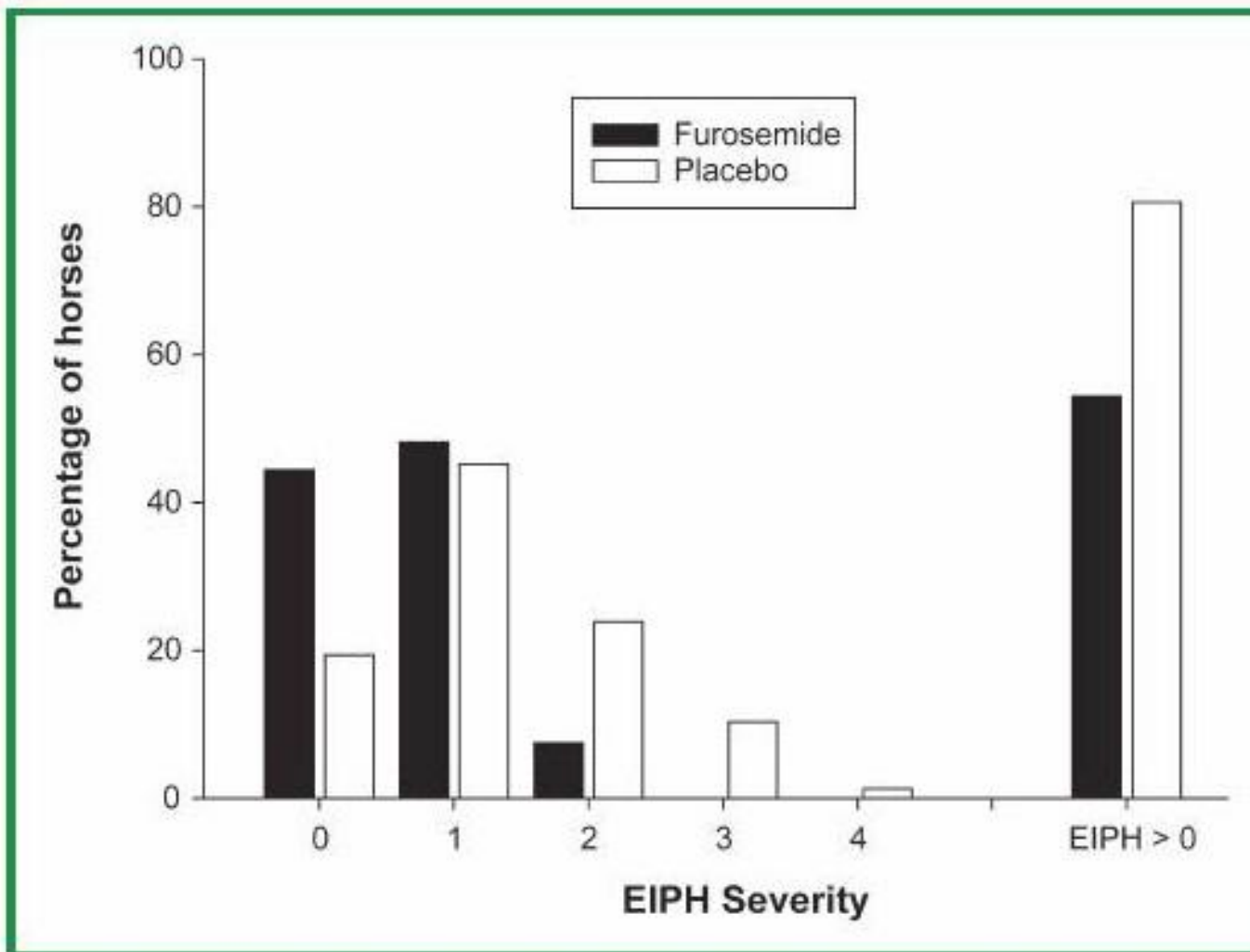


Figure 1—Distribution of scores for endoscopic severity of EIPH in Thoroughbred horses that raced following administration of furosemide (500 mg, IV; n = 161) or a placebo (saline solution; 156).

**Drs. Hinchcliff, Morley, and Guthrie**  
**JAVMA, Vol 235, No. 1, July 1, 2009**

# What about Grade 2 – 4 EIPH

- No Salix: **18 horses (or 12%) bled severely Grade 3 or 4**
- No Salix: **53 of 152 horses (or 35%) bled Grade 2 – 4**
- With Salix: **0 horses bled severely Grade 3 or 4**
- With Salix: **12 of 152 horses (or 8%) bled Grade 2**

# Most Evidence for Treatment of EIPH

- **Furosemide Hinchcliff et al 2009 (JAVMA 235, 76-82)**
  - > Study was randomized, placebo-controlled, crossover field trial
  - > Conducted in South Africa at a racing venue
  - > Horses assigned to fields of 9 to 16 horses
  - > Raced twice one week apart once on Lasix and once with saline control
  - > Other factors were identical (surface, jockey, length, etc.)
  - > After the race all horses were returned to the parade ring, tack removed and a tracheobronchoscopic examination was performed

# Most Evidence for Treatment of EIPH

- **Furosemide** Hinchcliff et al 2009 (JAVMA 235, 76-82)
  - > **RESULTS OF THIS STUDY INDICATED THAT PRERACE ADMINISTRATION OF FUROSEMIDE DECREASED THE INCIDENCE AND SEVERITY OF EIPH IN THOROUGHBREDS RACING UNDER TYPICAL CONDITIONS IN SOUTH AFRICA**
  - > **OVERALL (67.5%) OF THE HORSES THAT HAD EIPH AFTER SALINE HAD A REDUCTION OF EIPH SEVERITY SCORE OF AT LEAST 1 GRADE WHEN TREATED WITH FUROSEMIDE**



# Most Evidence for Treatment of EIPH

○ **Furosemide** Hinchcliff et al 2009 (JAVMA 235, 76-82)

- > **AGE, GENDER, DISTANCE RACED AND TREATMENT SEQUENCE DID NOT HAVE AN EFFECT ON EIPH**
- > **MEAN WEIGHT LOSS WAS 12.7 Kg +/- 0.33Kg WITH LASIX AND 5.4Kg +/- 0.28 Kg WITH SALINE**
- > **Did not identify an association between weight lost and prevention of EIPH**

# Diseases that might be related to EIPH

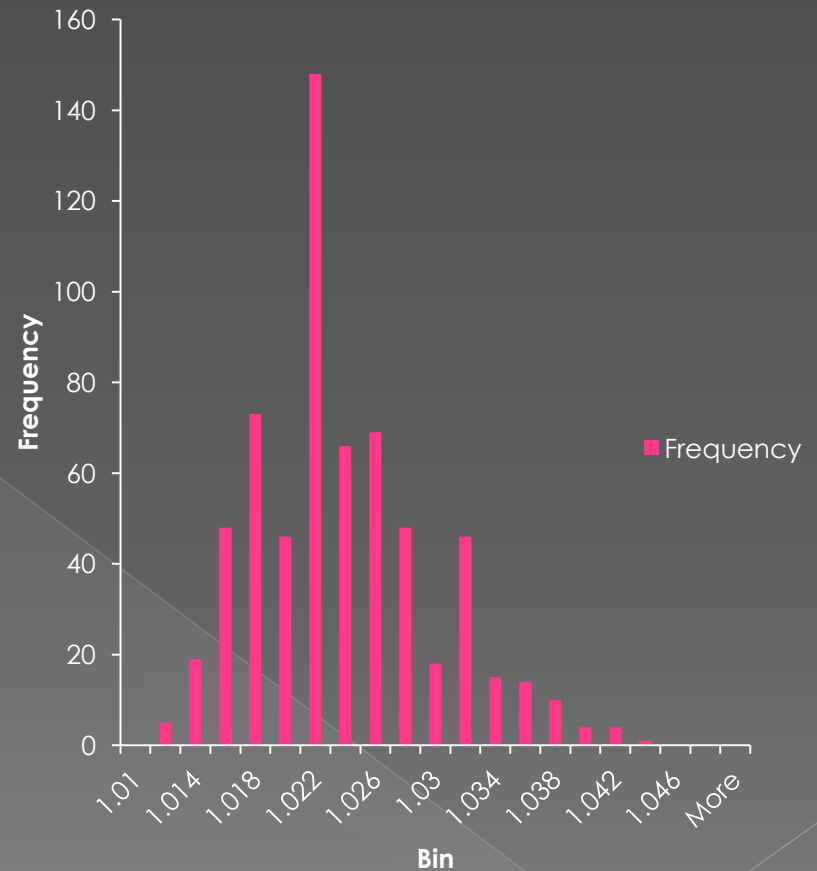
- As Dr. Robinson indicated part of the mechanism for EIPH may be related to other diseases affecting small airways
  - > If a horse has a **bacterial infection** then appropriate antibiotics could be useful in treatment of EIPH
  - > If a horse had **bronchconstriction** as a result of inflammatory or reactive airway disease use of bronchodilators such as Clenbuterol, Albuterol or others as inhaled or systemic administration

# Diseases that might be related to EIPH

- ◎ Another important problem is **pleuropneumonia**
- ◎ In my opinion **EIPH is one risk factor associated with development of this condition**
- ◎ For purposes of example I have included a typical case scenario

# Furosemide

Histogram



- **Dose Limitations**
  - > IV route only
  - > Dose from 100-500 mg
  - > Four hours or more before post-time
  - > Dose administered by regulatory vet
- **Regulatory controls**
  - > Specific gravity < 1.010 and
  - > Plasma or serum concentration over 100 ng/mL
- **Evidence for Compliance**
  - > **Urine specific gravity**
    - 635 consecutive urine samples from Thoroughbred horses racing on furosemide
    - Furosemide confirmed
    - Mode: specific gravity = 1.022
    - Fives values less than 1.012
    - All values greater than 1.010
  - > **Serum furosemide concentration**

Richard Sams, PhD EIPH Summit 2011  
Director  
HFL Sport Science, Inc.  
Lexington, Kentucky

# Conclusions

- Furosemide is widely used in race horses under controlled conditions
- Uncontrolled use of furosemide results in profound effects on drug concentrations in urine but negligible effects on drug concentrations in blood
- Effects on drug detection are largely eliminated when furosemide dosing is tightly controlled
- Samples are checked for adherence to furosemide dosing restrictions – evidence for compliance is good
- Adjunct medications are readily detected and do not interfere with test procedures
- Other race day medications are readily detected

Richard Sams, PhD EIPH Summit 2011  
Director  
HFL Sport Science, Inc.  
Lexington, Kentucky

# Influencing the results of competition

DENIS EGAN EIPH Summit 2011

Chief Executive – Irish Turf Club

Chairman – European Horserace Scientific Liaison Committee

- ❑ Lasix is performance enhancing as it reduces the possibility of a bleed
- ❑ Imposes an unfair advantage on normal unmedicated horses
- ❑ A bleeder is an acknowledged cause of deficiency in performance capacity and capability of the horse
- ❑ Lasix camouflages the actual physical health state of the horse and allows them to compete
- ❑ Lasix doesn't cure bleeding
- ❑ Is it right to allow compromised horses compete

# Influencing the results of competition

DENIS EGAN EIPH Summit 2011  
Chief Executive – Irish Turf Club  
Chairman – European Horserace Scientific  
Liaison Committee

- ❑ Each individual horse has its own inherent characteristics both positive and negative which directly influences its performances – medication will alter these factors
- ❑ Impacts on the formbook
- ❑ Perception – use of drugs in sport
- ❑ Cycling/weightlifting
- ❑ American Racing – tainted, loss of sponsorship?
- ❑ Not what we think – but what everyone else thinks
- ❑ People will vote with their feet



# Views – Owners, Breeders, Trainers

DENIS EGAN EIPH Summit 2011  
Chief Executive – Irish Turf Club  
Chairman – European Horserace Scientific  
Liaison Committee

- ⦿ Stallion quality disimproving
- ⦿ USA stallions who may have raced on lasix and bute not comparable to “clean” European stallions
- ⦿ Damage to genetic pool
- ⦿ Bleeders are bred
- ⦿ Horses not building up natural immunity
- ⦿ Solution to problems may not be medication
- ⦿ If USA is serious about the breed eliminate lasix now or face the consequences

# Why hasn't the HKJC introduced Race-Day 'Lasix' Medication?

- Race-day medication may be seen to be substitute (a 'crutch') for skilful training, veterinary input and horsemanship.
- A desire to achieve international harmonization of medication policy.
- Concerns about dehydration and electrolyte imbalance in sub-tropical conditions.

Brian Stewart  
Hong Kong Jockey Club  
EIPH Summit 2011



# Why hasn't the HKJC introduced Race-Day 'Lasix' Medication?

- Concerns about the impact of raceday medication, especially 'Lasix' on the consistency of racing performances.
- The principle that a race should be a test of the best athlete at that particular point in time.
- The 'degradation of the Thoroughbred breed'??

Brian Stewart  
Hong Kong Jockey Club  
EIPH Summit 2011

# Trainers views on bleeding

## Causes

DENIS EGAN EIPH Summit 2011  
Chief Executive – Irish Turf Club  
Chairman – European Horserace Scientific  
Liaison Committee

### ❑ Hereditary

- Bleeders are bred
- Genetic

### ❑ Stress – major cause

- Don't overstress
- Keep calm – gallop first
- Don't feed before work
- Quality of the groom
- Use lasix in training to build confidence

# Trainers views on bleeding

## Causes

DENIS EGAN EIPH Summit 2011

Chief Executive – Irish Turf Club

Chairman – European Horserace Scientific  
Liaison Committee

### ❑ Environment

- Keep clean and dust free
- Dust is a major cause of upper respiratory tract (URT) infection
- Bedding and feed must be top class
- Airflow

### ❑ Allergies

- Major cause of bleeding
- Weaken lungs
- Importance of fresh air
- Trained from the field



Curragh Training Grounds

# Summit committees

Post-summit committees have met to discuss options ranging from the administration of Salix by official veterinarians and increased security to a ban on all race day medications.

The RMTC meets August 4<sup>th</sup> to continue the process.

# My Opinion

- Bleeding is pathology.
- Whenever possible, pathology should be prevented.
- Bleeding has a significant impact on performance - horses that bleed grade 2+ are 4x less likely to win.
- EIPH impacts the health of our horses and our industry.





# New Bute Penalty Guidelines

**Trainer: 1<sup>st</sup> – Verbal warning to \$500**

**(2+ to 5) 2<sup>nd</sup> – Verbal warning to \$750**

**3<sup>rd</sup> – \$500 to \$1,000**

**(Over 5) 1<sup>st</sup> – \$1,000 absent mitigating**

**2<sup>nd</sup> – \$1,500 + 15-days**

**3<sup>rd</sup> – \$2,500 + 30-days**

# New Bute Penalty Guidelines

Owner: 1<sup>st</sup> – +/- Examination

(2+ to 5) 2<sup>nd</sup> – Must Pass Exam

3<sup>rd</sup> – DQ, Lost Purse, Exam

(Over 5) 1<sup>st</sup> – Must Pass Exam

2<sup>nd</sup> – DQ, Lost Purse,  
(Vet List – 45d, Exam)

3<sup>rd</sup> – DQ, Lost Purse, \$5,000,  
(Vet List – 60d, Exam)