

# Improving horse Health and welfare



Naomi Cogger  
EpiCentre, Massey University

Acknowledgements  
Chris Riggs from the HKJC



香港賽馬會  
The Hong Kong Jockey Club

# Outline

- The Hong Kong Jockey Club
- The data
- Completed work
  - Bleeding and racing performance
  - Impact of tie back surgery
- Work in progress

# The Hong Kong Jockey Club

## History

### Happy Valley



1846



1971



2008

# The Hong Kong Jockey Club

## History

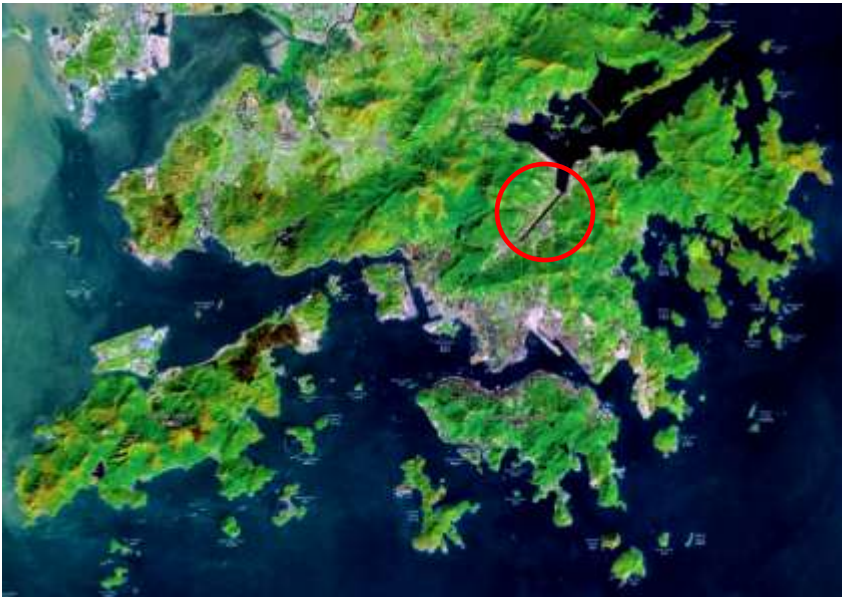
1970s – need for expansion



# The Hong Kong Jockey Club

## History

Sha Tin – 1970s





# The Hong Kong Jockey Club

## History

Sha Tin



# The Hong Kong Jockey Club

Happy Valley

- Club Head-quarters
- Racecourse



# The Hong Kong Jockey Club

Sha Tin

## Main racing complex

- Turf and all weather tracks (racing & training)
- Permanent stabling
- All training and associated facilities (Equine Hospital)





# The Hong Kong Jockey Club

## Future

2014 – Opening new training complex in Conghua, Guangdong



# The Hong Kong Jockey Club

## Racing

- 78 race meetings/year
- 730 races
- 9,136 runners
- US\$93 million in prize money
  - Average US\$128,000 per race
- 68% horses win prize money



An Australian study found in their first year of racing, half the horses earned no more than A\$450, and 39% earned \$0.

Data 2007/08 season

# The Hong Kong Jockey Club

## The Business

- Attendance
  - ST: 29,600 (per meeting)
  - HV: 17,300
- Turnover - US\$8.8 billion
- Tax – US\$1.1 billion



Data 2007/08 season

# The Hong Kong Jockey Club

## The Core

- Attendance
  - ST: 29,500 (per meeting)
  - HV: 17,400
- Turnover - US\$8.3 billion
- Tax – US\$1.6 billion
- Contribution to charities – US\$125 million





# Top Global Equine Athletes



香港賽馬會  
The Hong Kong Jockey Club



Fairy King Prawn



Vengeance Of Rain



Sacred Kingdom



Silent Witness



Good Ba Ba



Absolute Champion



# The Hong Kong Jockey Club

## Trainers

- 24: 13 local: 11 "imported"  
(GB, AUS, NZ, SAF)



# The Hong Kong Jockey Club

## Stable Facilities

- Maximum of 60 horses each trainer
- Self-contained air-conditioned, multi-storey stable blocks, sand yard, walker



# The Hong Kong Jockey Club

## Track Facilities

- Shared training facilities
  - All-weather and turf training tracks
  - Sand trotting ring
  - Equine swimming pool
- Shared veterinary services





# The Hong Kong Jockey Club

## Horses

- 1432 horses in training (1200 any one time)
- 98% male (79% geldings; 19% entire)
- 28% replaced annually



# The Hong Kong Jockey Club

## Horses

- 1432 horses in training (1100 any one time)
- 98% male (79% geldings; 19% entire)
- 28% replaced annually
- All horses imported
  - AUS 35%
  - NZ 35%
  - GB & IRE 23%
  - ARG; BRZ; CAN; USA; FR; GER



# The Hong Kong Jockey Club

Veterinary care

Two veterinary departments

# The Hong Kong Jockey Club

## Veterinary care

### 1. Veterinary Regulation and International Liaison



# The Hong Kong Jockey Club

## Veterinary care

### 1. Veterinary Regulation and International Liaison

- Assist racing control
- Oversee collection of official samples
- Liaise over quarantine issues
- Perform pre- and post-race horse inspections
- Review "fitness to race"

# The Hong Kong Jockey Club

## Veterinary care

1. Veterinary Regulation and International Liaison
2. Veterinary Clinical services

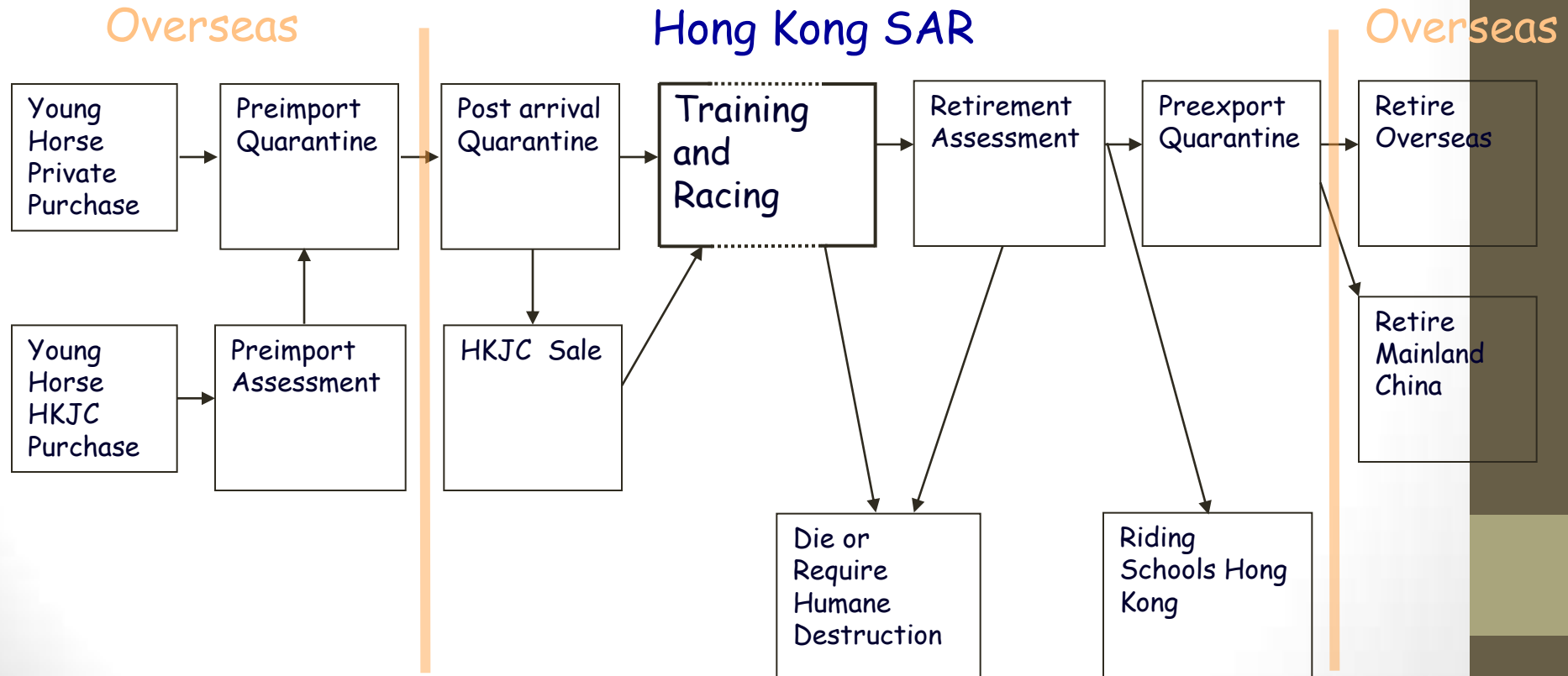


# Department of Veterinary Clinical Services



# The Hong Kong Jockey Club

## Horses





# The Hong Kong Jockey Club

## The Import Process

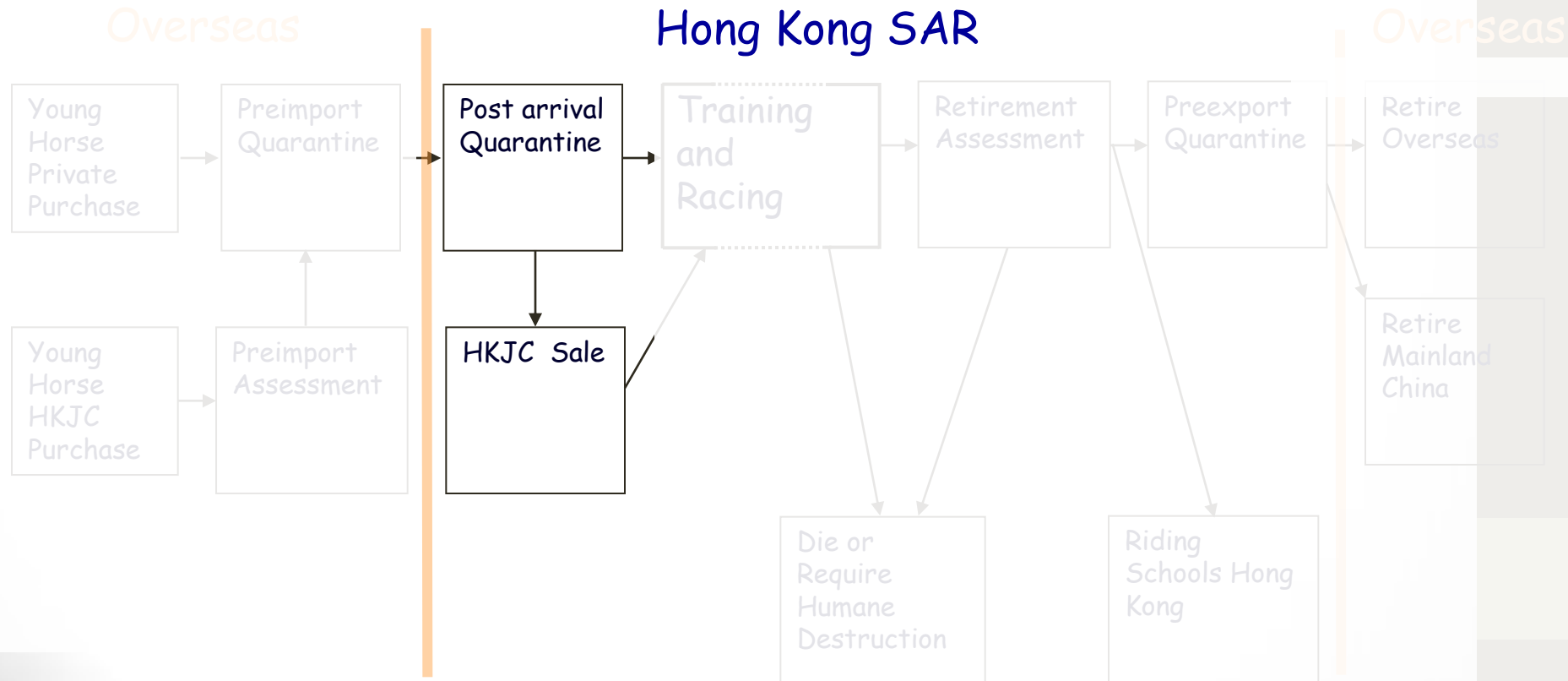
### Transport

- Usually in batches
- Throughout year
- Met at airport by vet
- Transport direct to quarantine



# The Hong Kong Jockey Club

## Horses



# The Hong Kong Jockey Club

## The Import Process

### Post-Arrival quarantine

- HKJC
- 14 days
- Vaccination: Flu, Herpes, Jap B, Tetanus
- Blood tests, parasitology
- Throat swabs
  - “Strangles”
  - Flu



# The Hong Kong Jockey Club

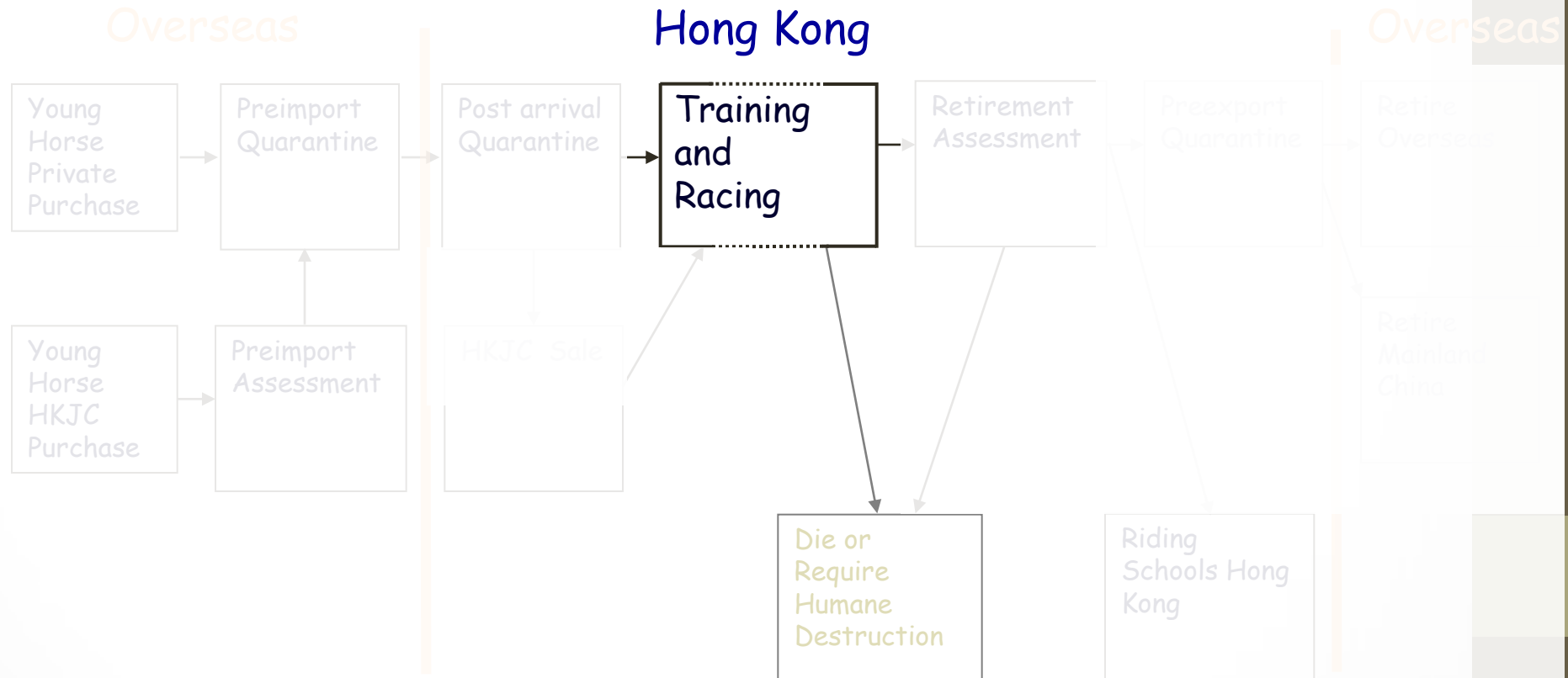
## Hong Kong International Sale

- Club purchases ~32 yearlings globally
- Broken & pre-trained, NZ, Aus, UK, USA
- 2 High-profile breeze-up sales in March and December



# The Hong Kong Jockey Club

## Horses





# Department of Veterinary Clinical Services

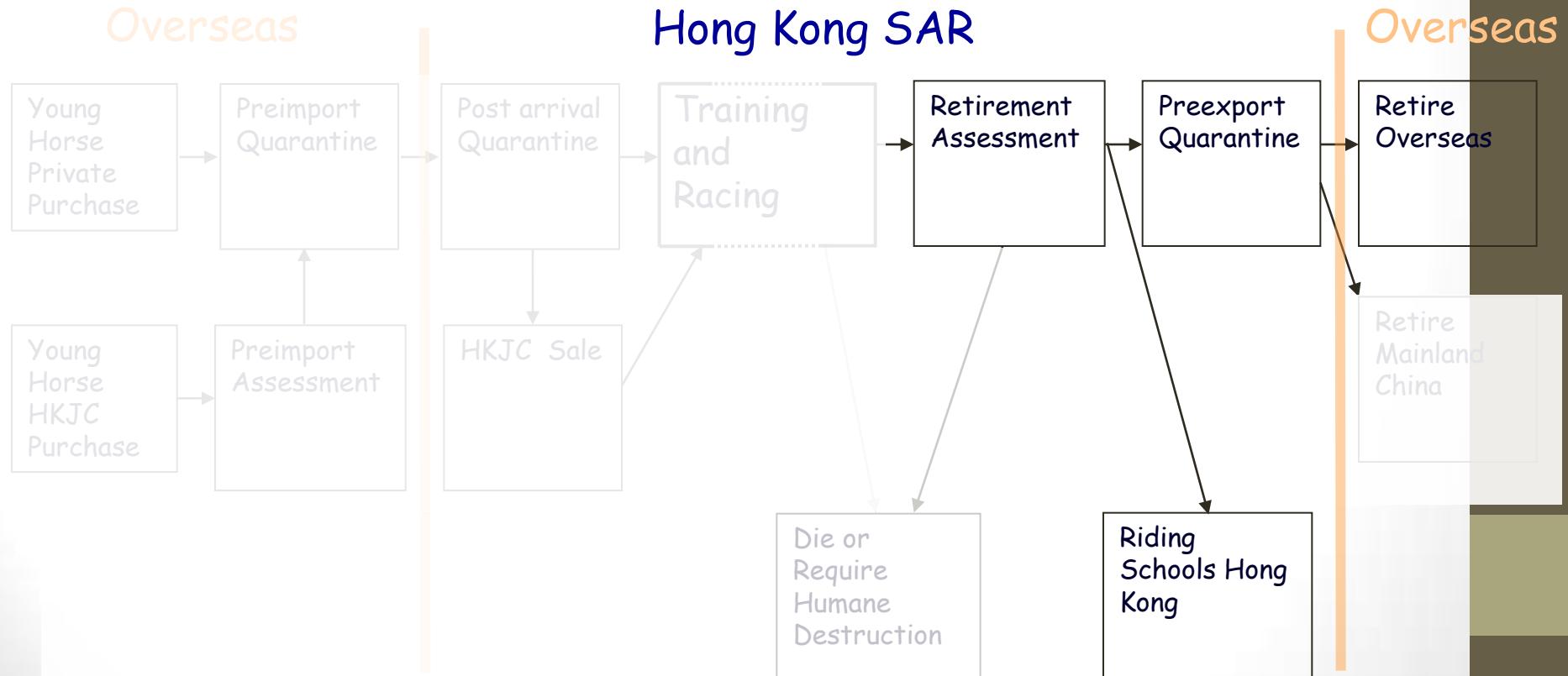
- Routine health care of horses





# The Hong Kong Jockey Club

## Horses



# The Hong Kong Jockey Club

## Management on retirement

- Exported overseas



Fair King Prawn being checked prior to export to NZ

# The Hong Kong Jockey Club

## Management on retirement

- Exported overseas
- Retrained at Beas River Equestrian Centre for general riding



# The Hong Kong Jockey Club

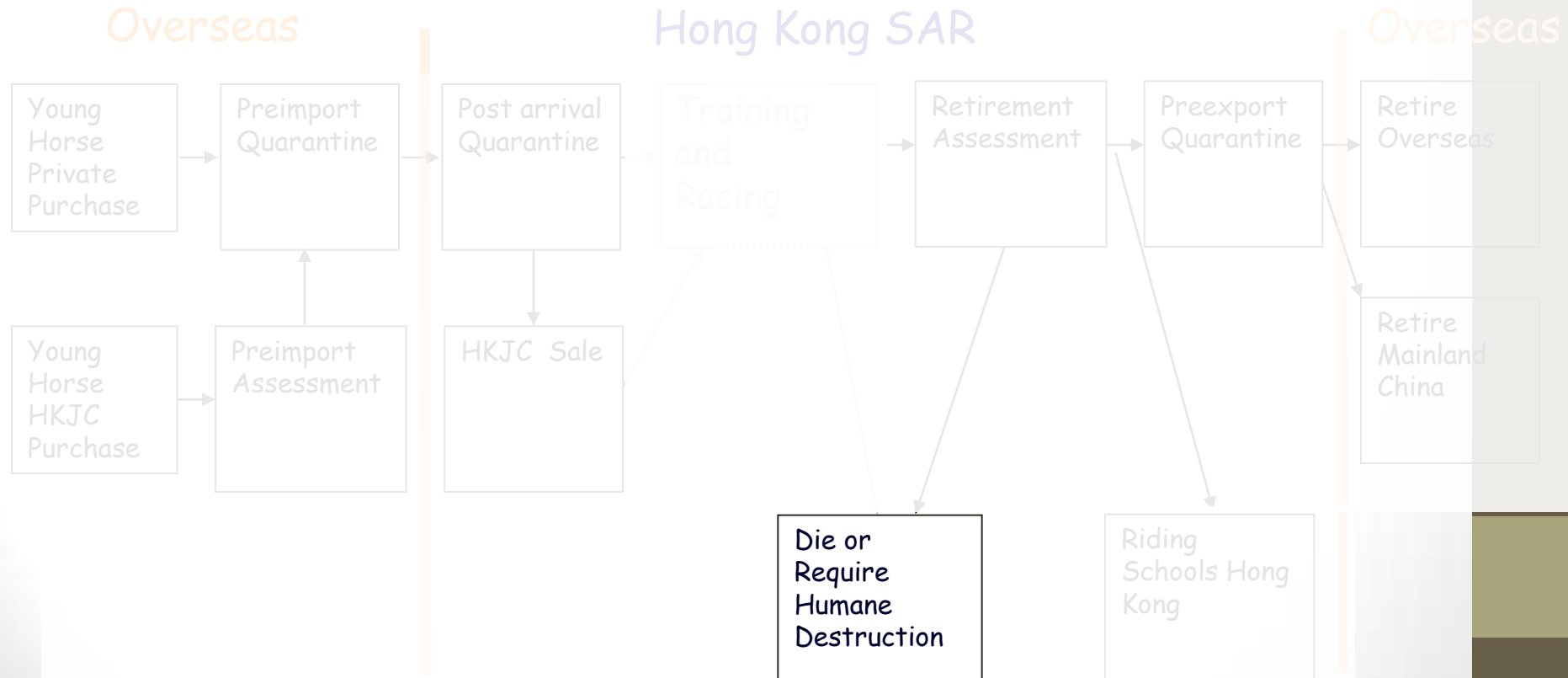
## Management on retirement

- Ten riding schools in Hong Kong



# The Hong Kong Jockey Club

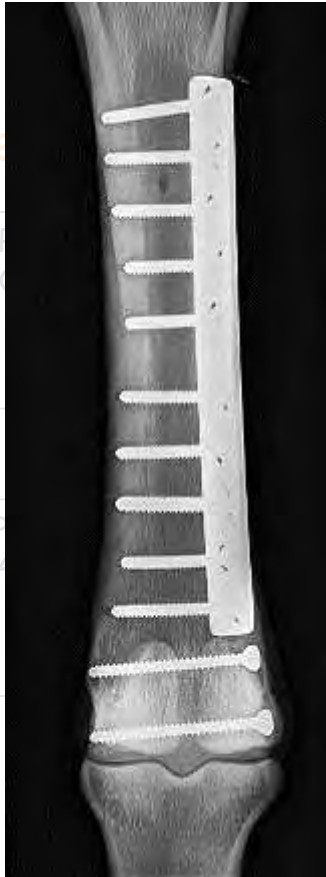
## Horses





# The Hong Kong Jockey Club

## Horses



Young Horse  
Private  
Purchase

Young Horse  
HKJC  
Purchase

Arrival  
Quarantine

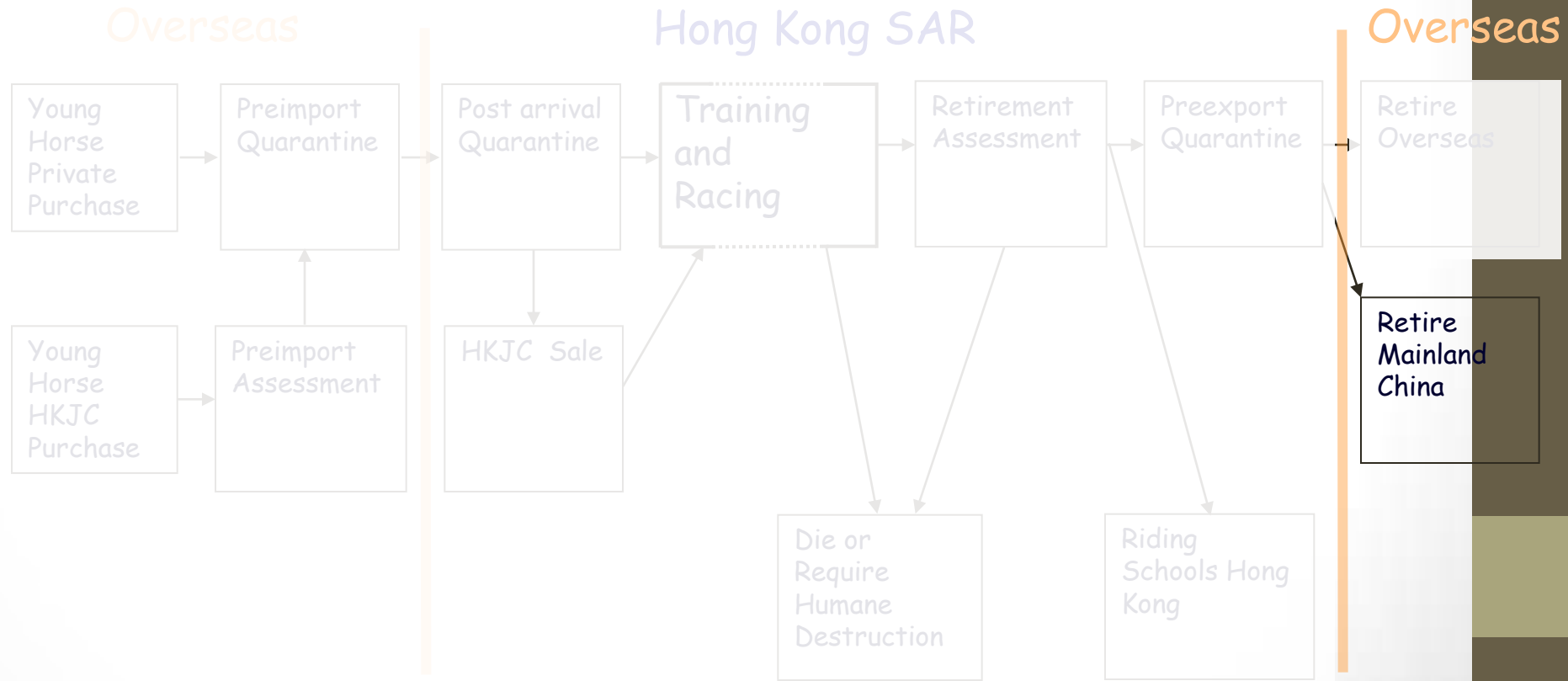
C Sale

Die or  
Require  
Humane  
Destruction

Riding  
Schools Hong  
Kong

# The Hong Kong Jockey Club

## Horses



# The Hong Kong Jockey Club

## Horses



Overseas

Retire  
Overseas

Retire  
Mainland  
China

# Outline

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  - Bleeding and racing performance
  - Impact of tie back surgery
- Work in progress

# The Hong Kong Jockey Club

## Veterinary Management

- Integrity
- Openness

The Hong Kong Jockey Club - Microsoft Internet Explorer

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Address http://www.hkjc.com/eng/ghk/hkjcve/record.asp

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Horse Racing

Racing News Racing News & Features Betting Guide & Features

Racing Information - Horses - Veterinary Records

Veterinary Records of Declared Starters	OVD Procedures and Common Veterinary Problems	Veterinary Records Database	Trainers Database
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**Veterinary Records of Declared Starters on Wednesday, May 07, 2008**

Race No.	Horse Name	Brand No.	Date	Details	Passed On
<b>Race 1</b>					
2	STY SHOW DRAVE Y	B388	05/04/2008	Unacceptable performance	18/04/2008
<b>Race 2</b>					
1	MULTI EXPRESS	098	12/01/2008	Lame right fore	02/05/2008
5	BUSS STAR	E3 1	02/02/2008	Unacceptable performance	18/04/2008
<b>Race 3</b>					
3	REAL SURPRISE	E301	05/03/2008	Injured while being transported to Happy Valley	10/03/2008
4	RACING SPIRIT	E105	09/04/2008	Substantial mucocoeus in the trachea on scope	29/04/2008
<b>Race 4</b>					
STY 1	LEADER	G12	13/03/2008	Substantial blood in the trachea after racing and lame right fore the following morning	03/04/2008
<b>Race 6</b>					
6	MY LUCK	E256	28/02/2008	Lame left fore	08/04/2008

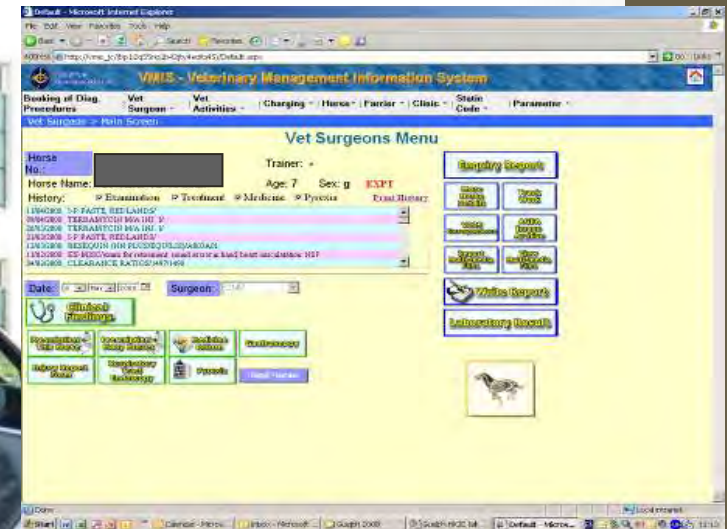


# The Hong Kong Jockey Club

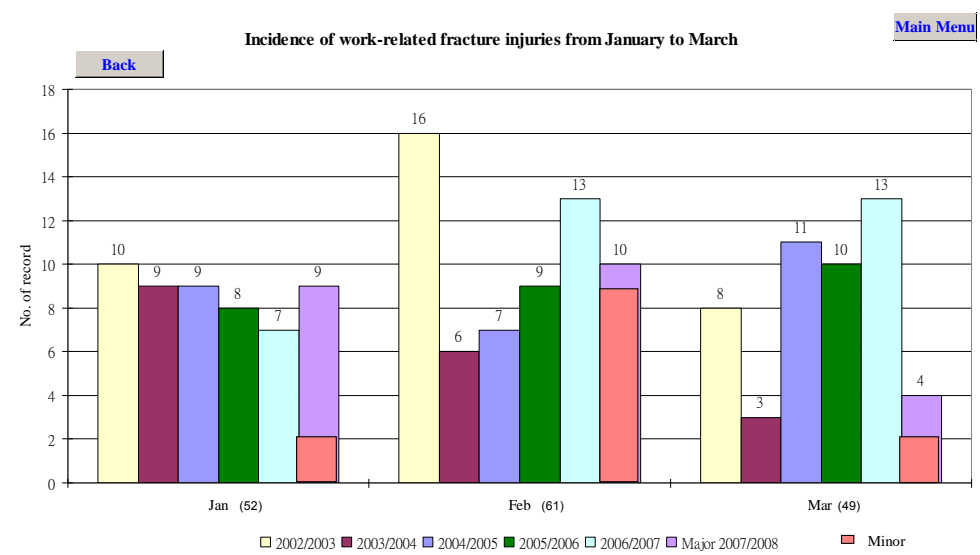
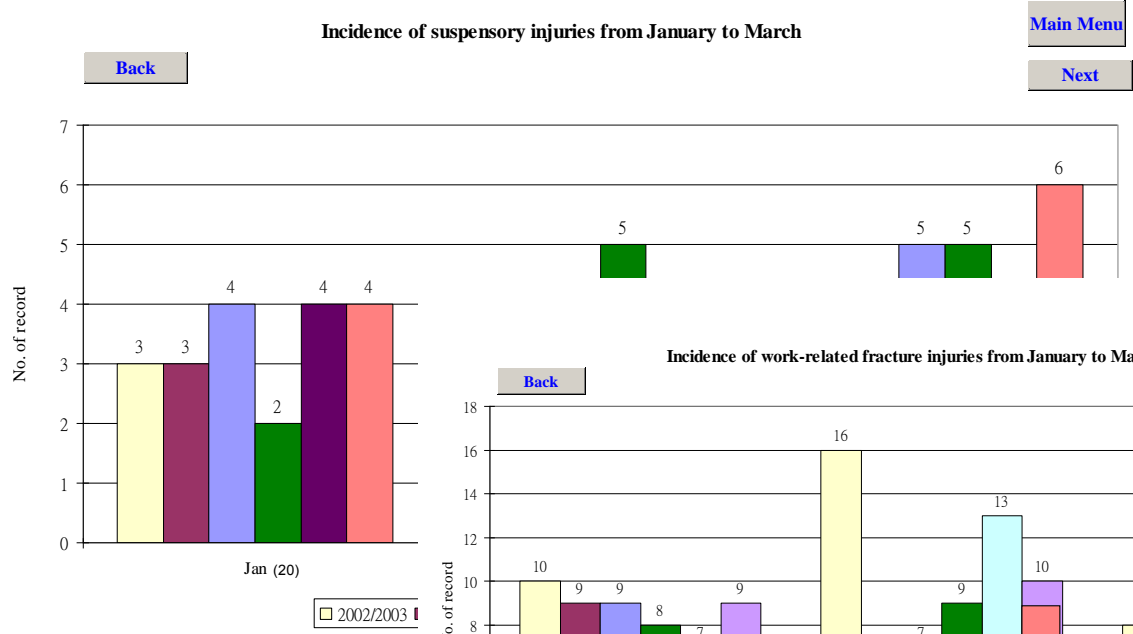
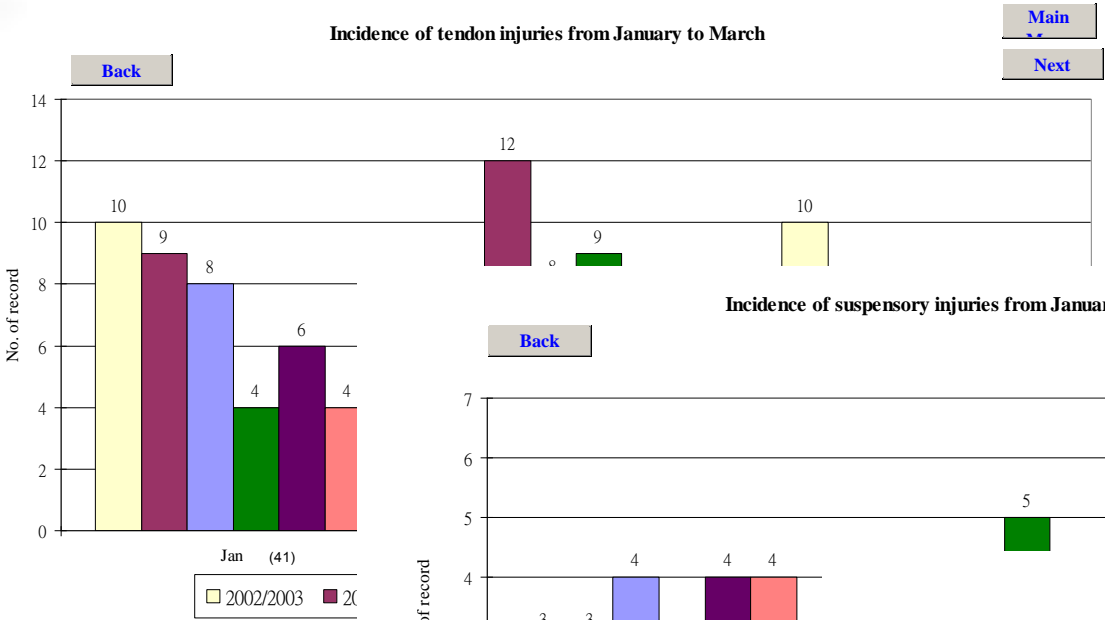
## Veterinary Management

### Clinical records

- Timely, detailed honest, open



# Data Analysis



# Outline

- The Hong Kong Jockey Club
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# Bleeding and racing performance

- Horses often bleed into their lungs following high speed exercise (including racing)
  - Estimate range from 40-90%
- Number of theory as to why
  - Pressure in capillaries them to rupture
  - Concussive forces causes capillaries to rupture
- Blood in the nostrils results in horses being suspended from racing



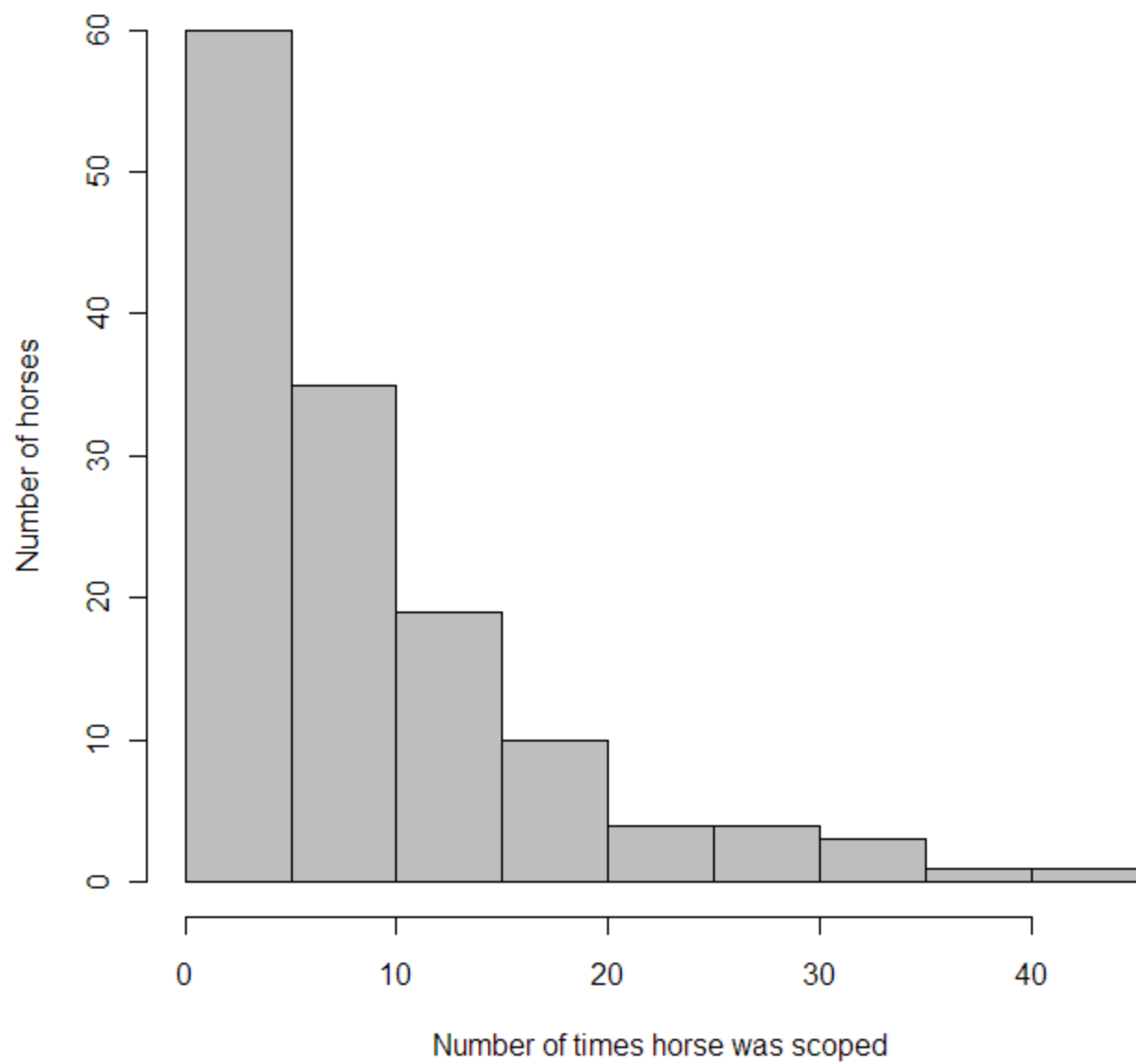
# Bleeding and racing performance

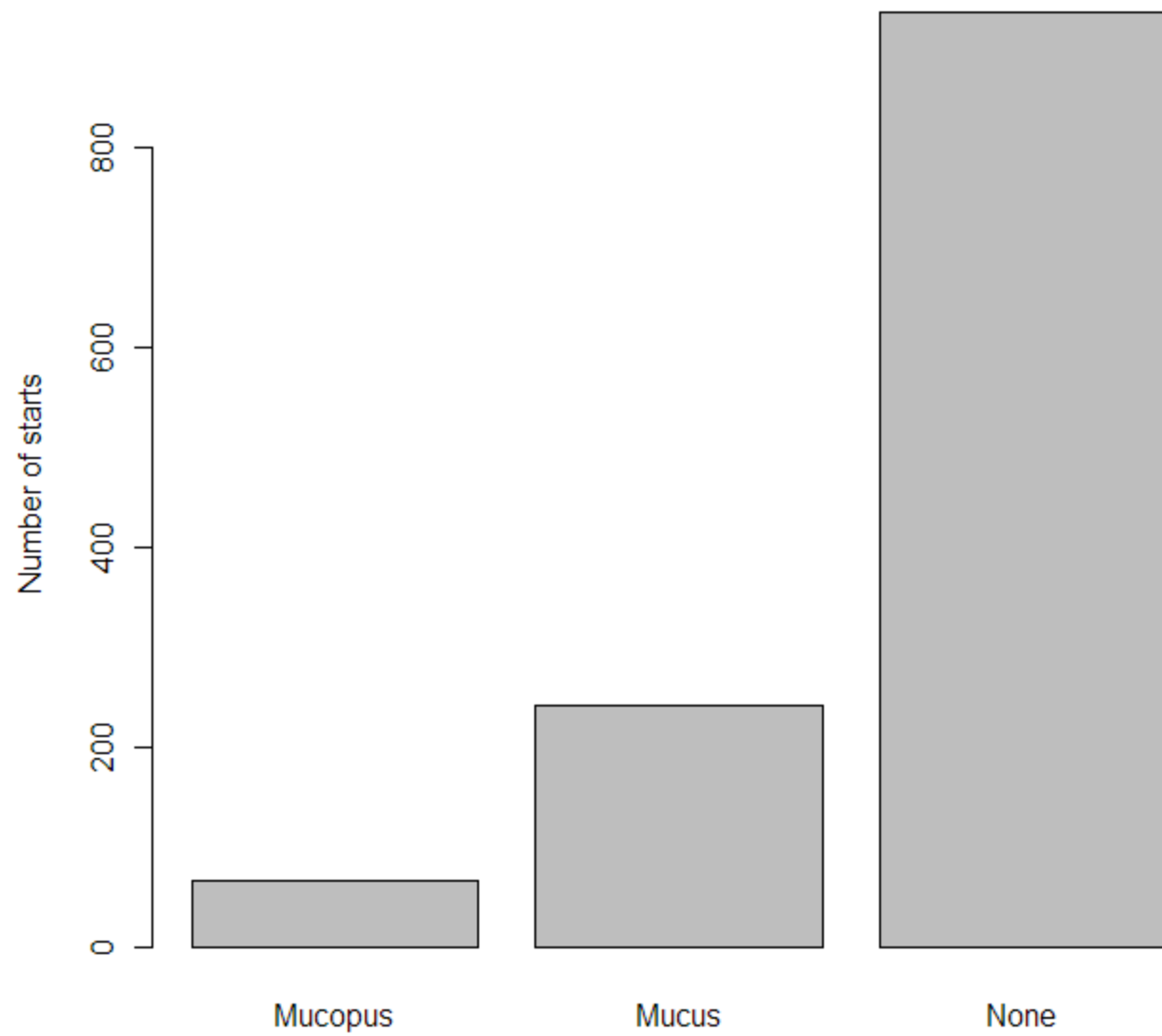
- Link between bleeding and performance is unclear some believe
  - Poor performers are more likely to bleed
  - Well performing horses are more likely to be bleed
  - Horses with airway inflammation are more likely to bleed
- Retrospective analysis of scoping following 1,541 racing starts from a single trainer were to examined to determine
  - Bleeding is associated performance
  - Evidence of airway inflammation is associated with performance
- All horses under the care of the trainer were scoped

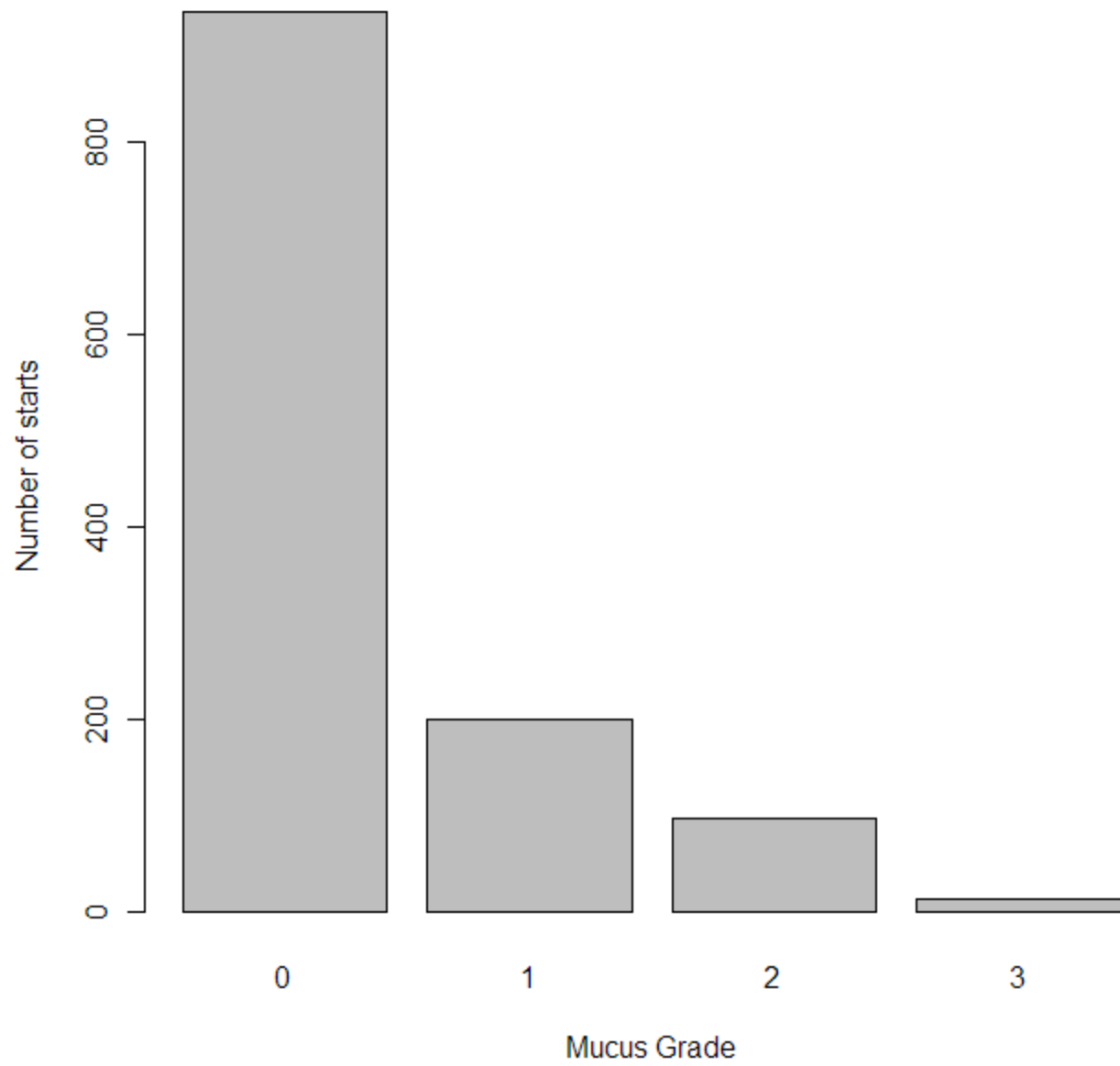


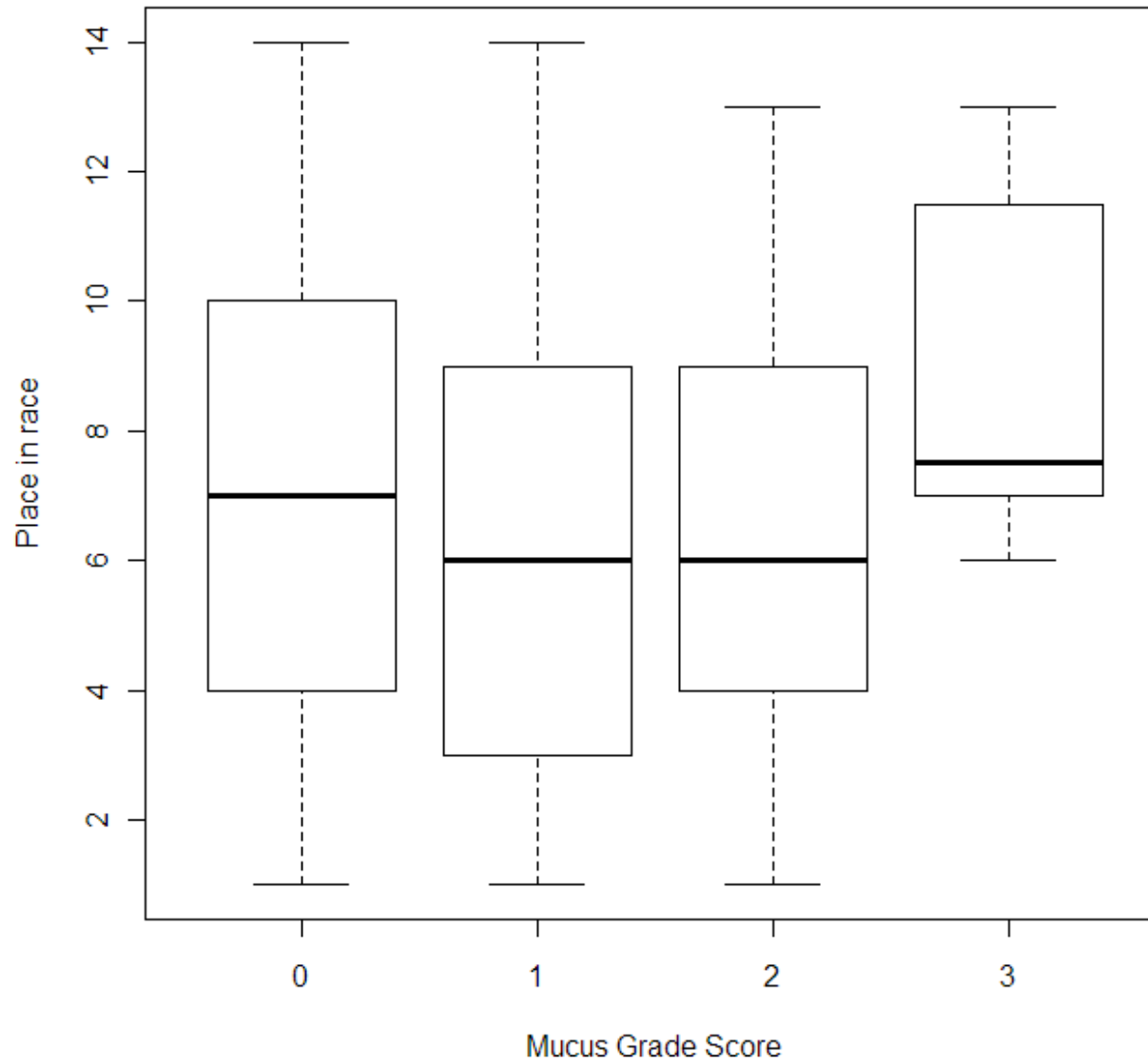
## Endoscopic scoring system used to assess tracheal mucus and tracheal blood

Tracheal mucus		EIPH	
Grade	Description	Grade	Description
0	Clean	0	Clean
1	Small, singular threads or droplets of mucus	1	Flecks of blood in trachea
2	Larger droplets or thin continuous stream of mucus < ½ trachea length	2	Long stream of blood or two short streams occupying 1/3 tracheal circumference
3	Multiple streams of mucus	3	Multiple streams of blood covering more than 1/3 tracheal circumference
4	Elongated thick swirls or pools of mucus which covered 25% of tracheal circumference	4	Blood pools at thoracic inlet, extending up to 90% of tracheal surface



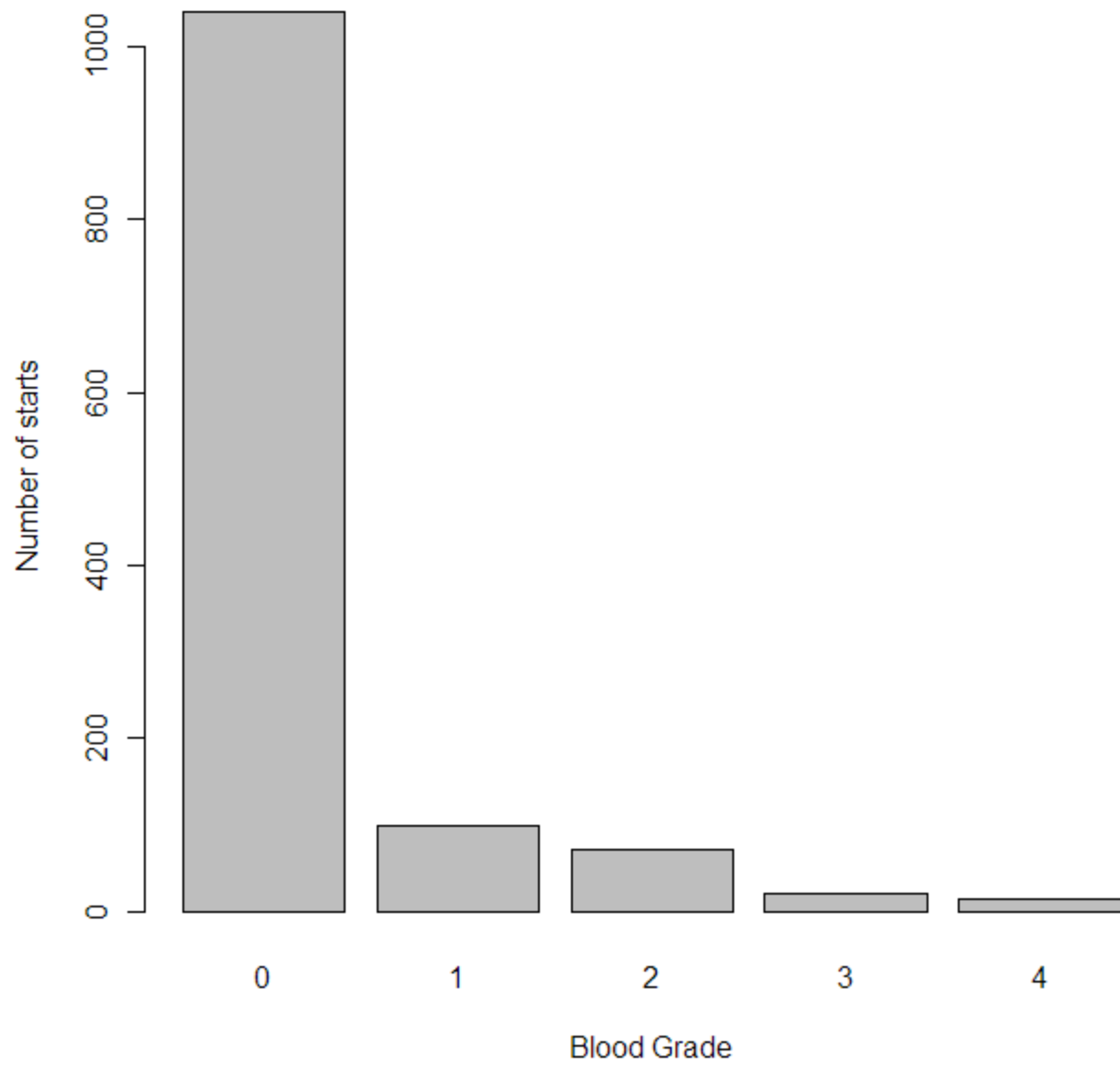


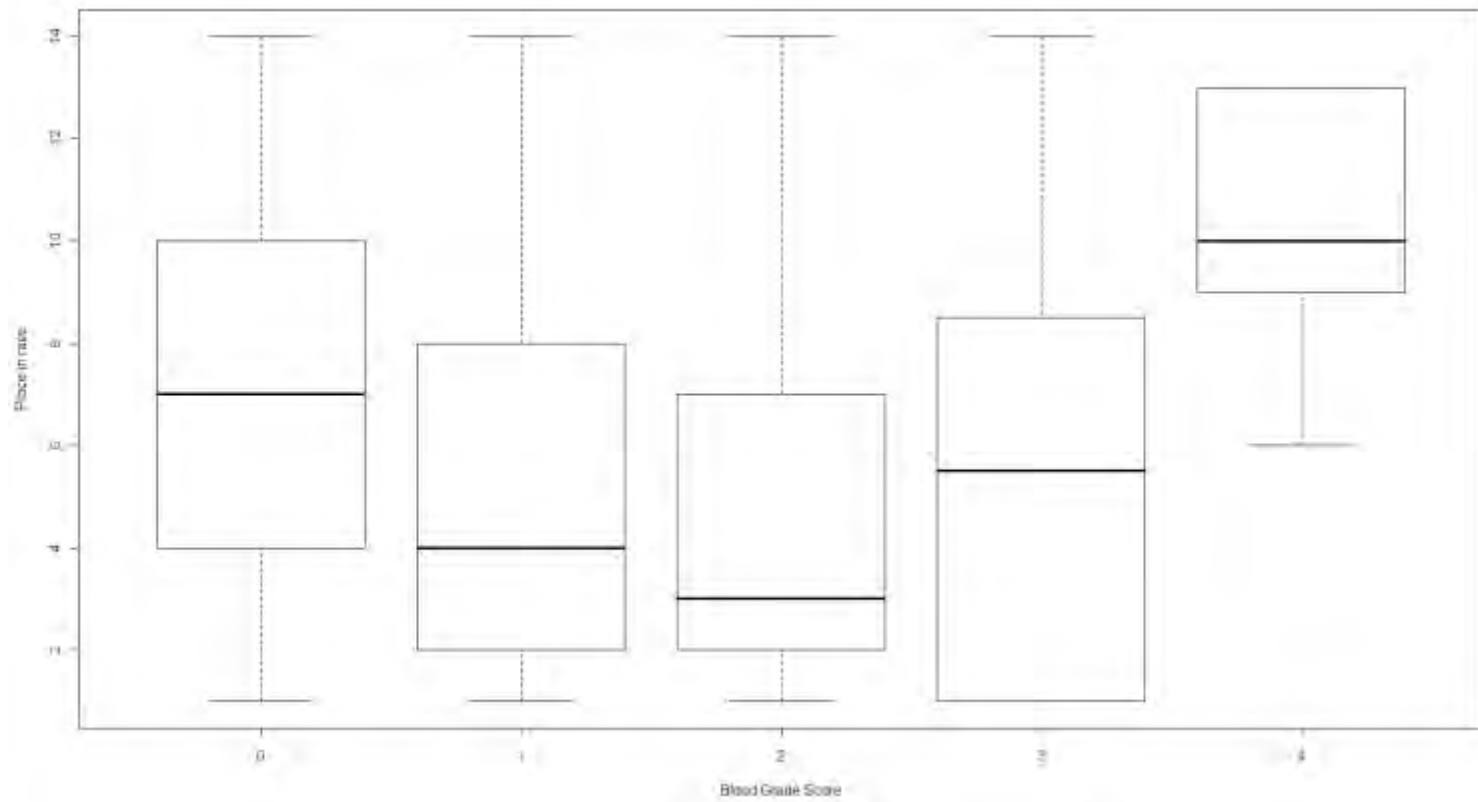




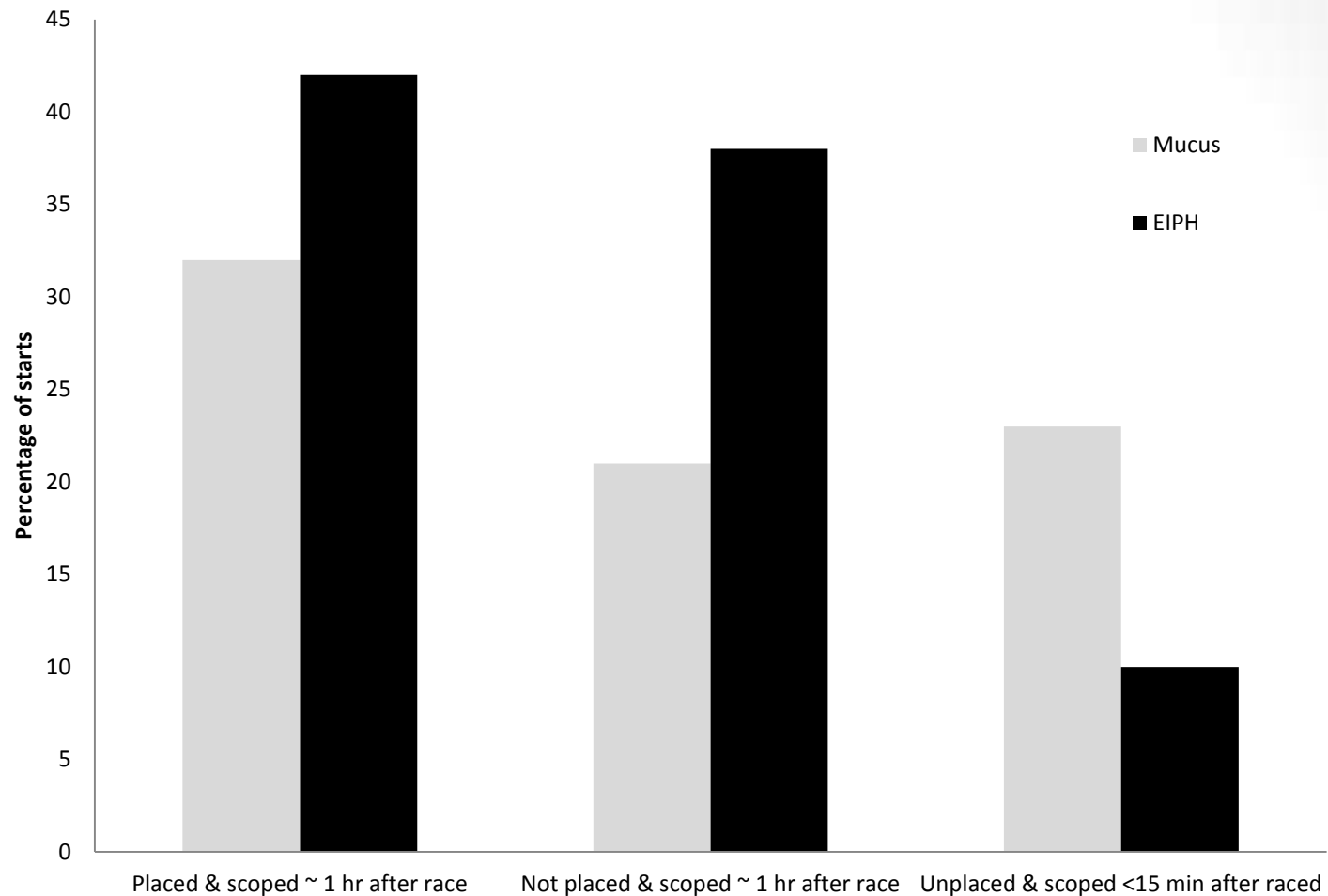
Median place varied with mucus grades ( $P < 0.003$ ).



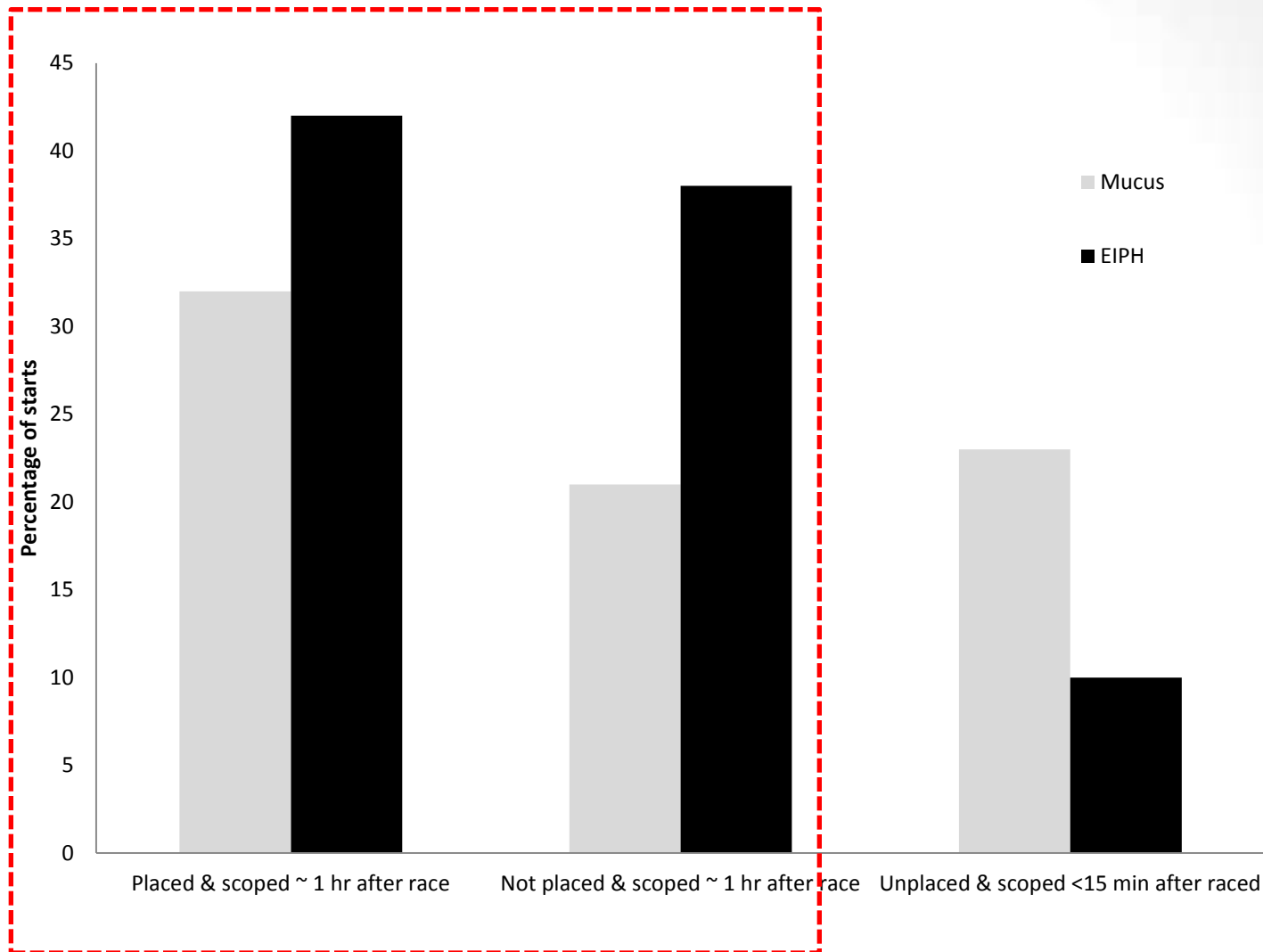




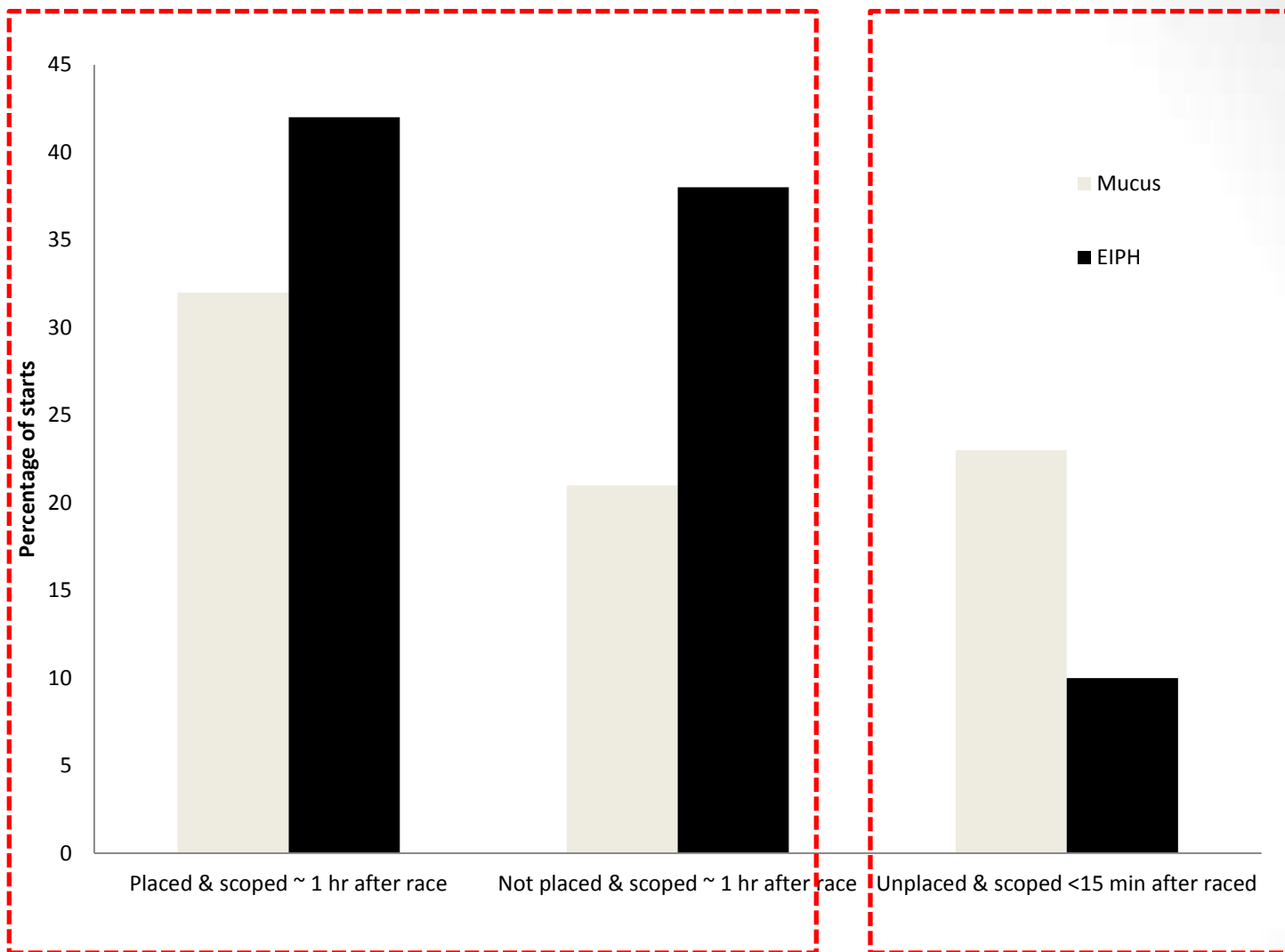
EIPH grades statistically significant  $P < 0.0001$



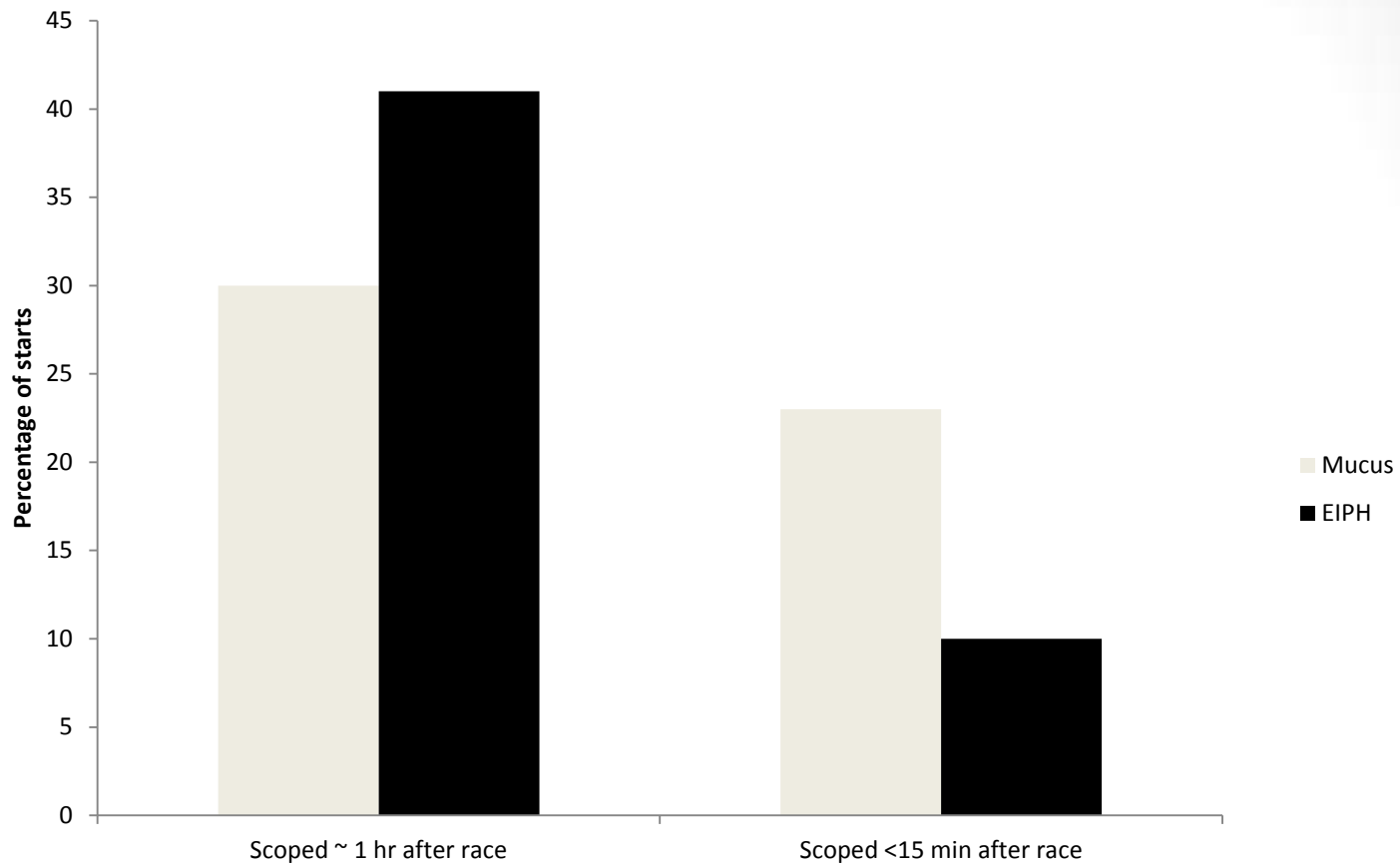
The percentage of starts with EIPH and mucus varied significantly between the three groups



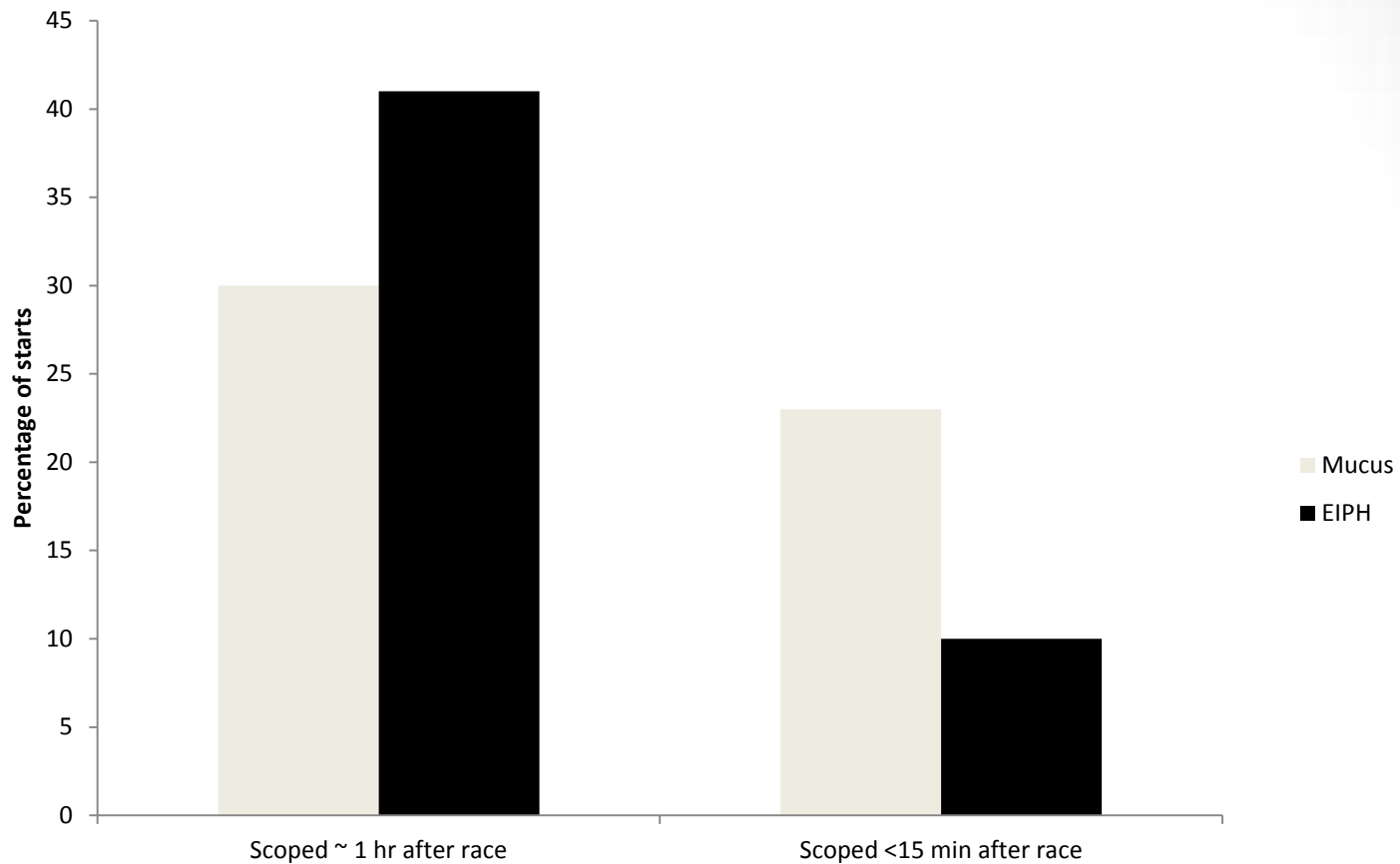
Within the group of horses scoped ~ 1 hour after a race there was no significant difference in the presence of mucus ( $p=0.20$ ) and blood ( $p=0.75$ )







Horses scoped ~ 1 hour after racing were 1.3 times more likely to have excess mucus in the trachea than horses scoped immediately after the race ( $p < 0.001$ )



Horses scoped ~ 1 hour after racing were 4 times more likely to have blood in the trachea than horses scoped immediately after the race ( $p < 0.001$ )

# Bleeding and performance

- Clinical relevance
  - Time since high speed work should be considered when interpreting endoscopic findings
    - HKJC now records this in their database
- Future work
  - Repeat scoping of horses following race, or high speed exercise, to determine the optimal time to scope horses

# Outline

- The Hong Kong Jockey Club
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  - Impact of tie back surgery
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# Impact of tie back surgery

- Left-sided laryngeal hemiplegia (LLH) causes upper airway obstruction & can be corrected surgically using 'tie back' surgery
- Surgery is thought to increase risk of Exercise Induced Pulmonary Hemorrhage (EIPH).
- This has not been investigated formally because of difficult in following horses after surgery.
- HKJC provides a unique opportunity to examine post-surgery outcomes.

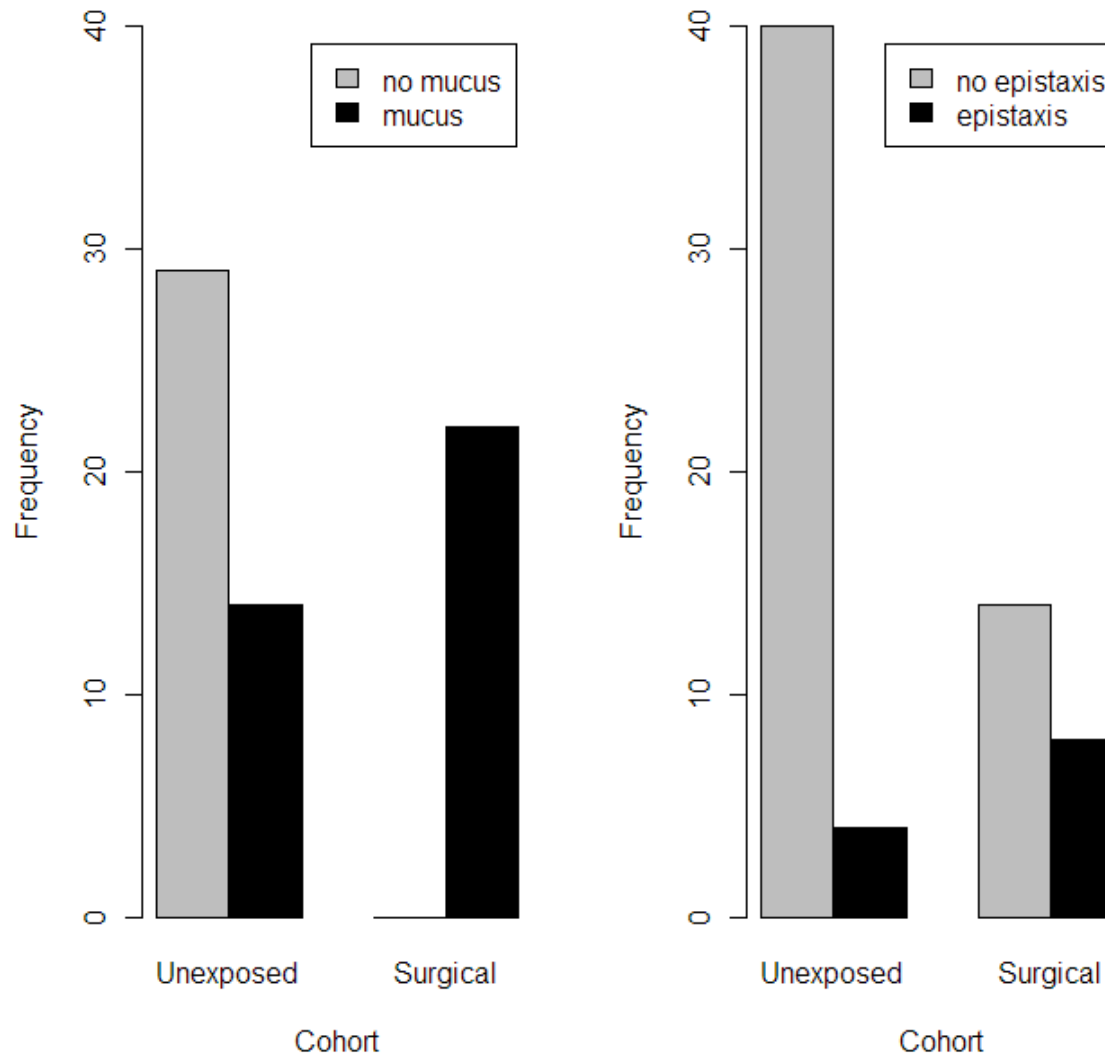


Mason et al. (In press) Cohort study examining the impact of left sided prosthetic laryngoplasty and bilateral ventriculocordectomy on respiratory health, career duration and racing performance. *Equine Veterinary Journal*

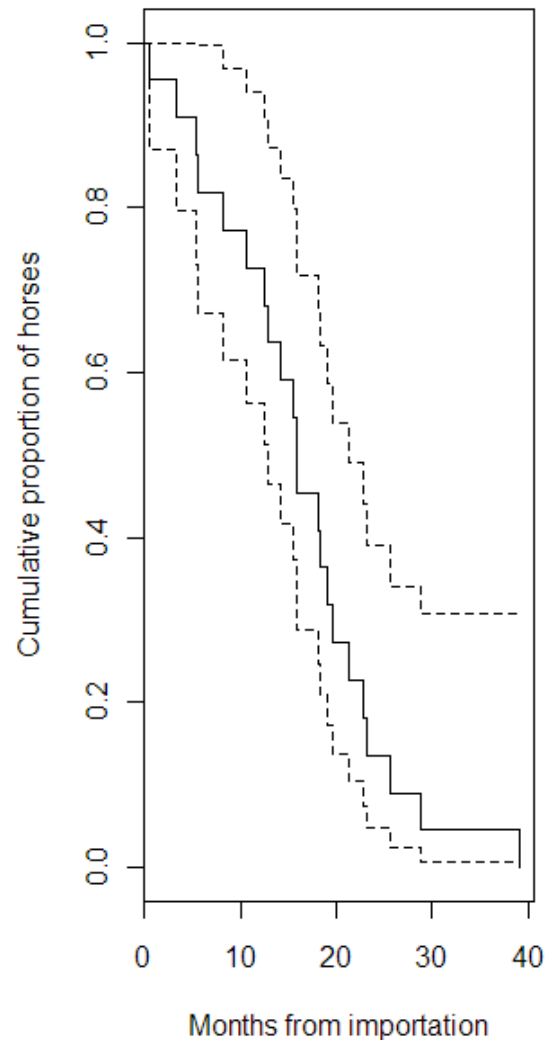


# Impact of tie back surgery

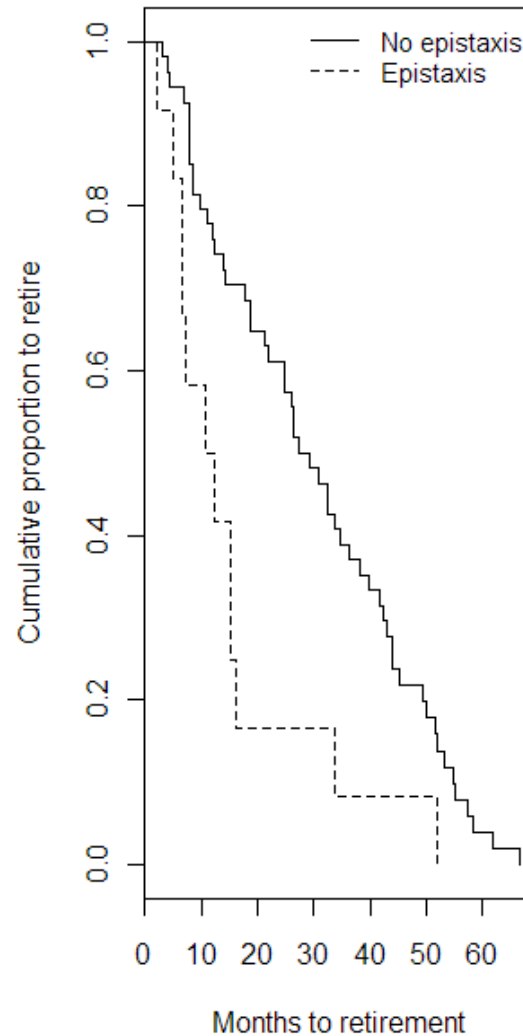
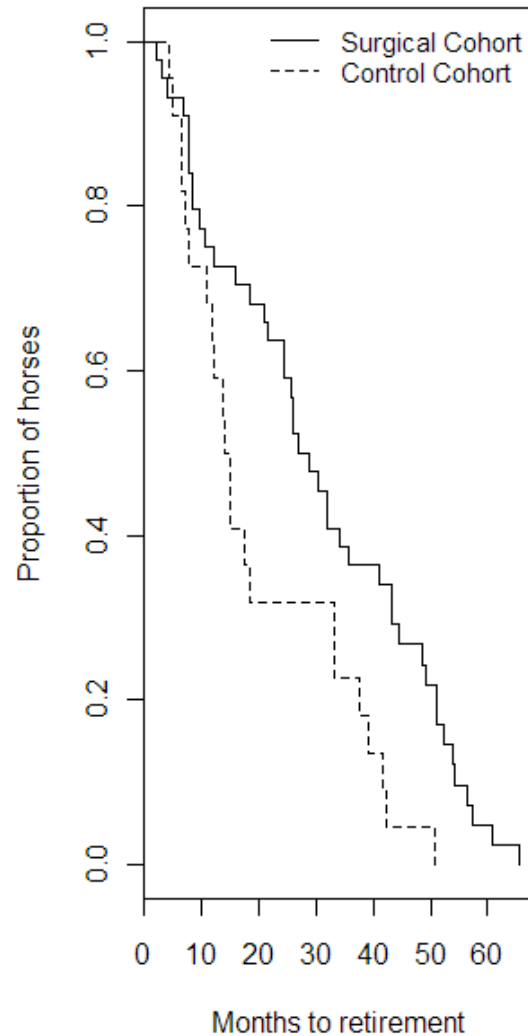
- A retrospective cohort study design was used.
  - Exposed cohort = all horses that had undergone surgery (n = 22)
  - Unexposed cohort = Matched on trainer, year of importation and pre-importation handicap rating (n = 44)
- Data from importation until retirement was extracted from the database
- Study period divided into:
  - Before surgery/matching
  - After surgery/matching
- Analysis examined differences respiratory health, career duration and racing performance



Number of horses in the exposed and surgical cohort that with excessive mucus (left; p-value <0.0001) and epistaxis (right; p-value = 0.004) after surgery/matching.



Kaplan-Meier estimate of the number of months from importation until the 22 horses in the surgical cohort underwent prosthetic laryngoplasty and bilateral ventriculectomy for left-sided laryngeal hemiplegia.



Kaplan-Meier estimate of the time to retirement after surgery/matching of the surgery and control cohorts (left) and of horses that suffered one or more episode of epistaxis.

Factors conditionally associated with retirement. Data from retrospective cohort study involving 22 horses that underwent surgery to correct left-sided laryngeal hemiplegia (LLH) and 44 matched unexposed horses.

Variable	Beta	SE (Beta)	Hazard Ratio	95% CI	P
Cohort					
Unexposed	-		REF		
Surgery	0.06	0.04	0.94	0.45-1.95	0.86
Epistaxis after surgery/matching					
No	-				
Yes	6.01	0.86	410.98 <sup>a</sup>	76.4-22,210.6	<0.001
Epistaxis × Ln (Time) <sup>b</sup>	-0.02	0.002	0.98	0.98-0.99	<0.001



## Factors conditionally associated with retirement.

Variable	Beta	SE (Beta)	Hazard Ratio	95% CI	P
Cohort					
Unexposed	-		REF		
Surgery	0.06	0.04	0.94	0.45-1.95	0.86
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Yes	6.01	0.86	410.98	76.4-22,210.6	<0.001
Epistaxis × Ln (Time) <sup>b</sup>	-0.02	0.002	0.98	0.98-0.99	<0.001

After accounting for the other factors in the model, the career of horses that developed LLH and subsequently underwent prosthetic laryngoplasty and bilateral ventriculectomy were 411 times more likely to retire than those in the unexposed cohort

Association between a number of independent variables and the number of times a horse won stakes money in the three years post surgery/matching, accounting for the number of starts.

Variable	Level	Beta	SE	p-value
Cohort	Unexposed	0.11	-0.02	0.07
	Surgery	0		
Excessive mucus prior to surgery/matching	No	0.18	0.09	0.04
	Yes	0		
Excessive mucus after surgery/matching	No	0.07	0.09	0.38
	Yes	0		
EIPH prior to surgery/matching	No	0.1	0.12	0.43
	Yes	0		
EIPH after surgery/matching	No	0.08	0.09	0.34
	Yes	0		
Epistaxis after surgery/matching	No	0.06	0.17	0.71
	Yes			
Percentage of starts after surgery/matching that $\leq 1400$ m	0-20%	0.05	0.11	0.56
	21-99%	0.1	0.13	
	1	0		
Number of times placed prior to surgery/matching	None	-0.02	0.09	0.86
	1 or more	0		
Number of start prior to surgery/matching	1 to 5	0.08	0.1	0.5
	6 to 10	-0.08	0.11	
	>10	0		

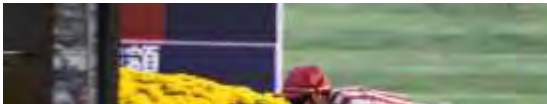
# Impact of tie back surgery

- Clinical relevance
  - Owners and trainers should be advised that horses with LLH that undergo surgery are at increased risk of respiratory conditions, which is likely to shorten their racing career, compared to horses without this condition.
- Further work
  - Compare outcomes for horses with LLH that do not undergo surgery to those that do

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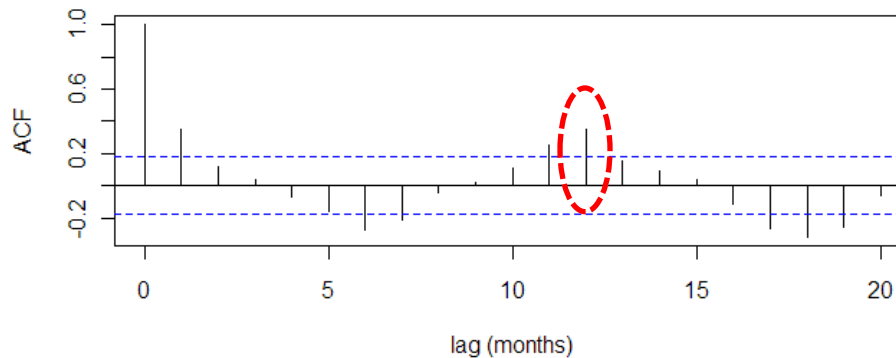
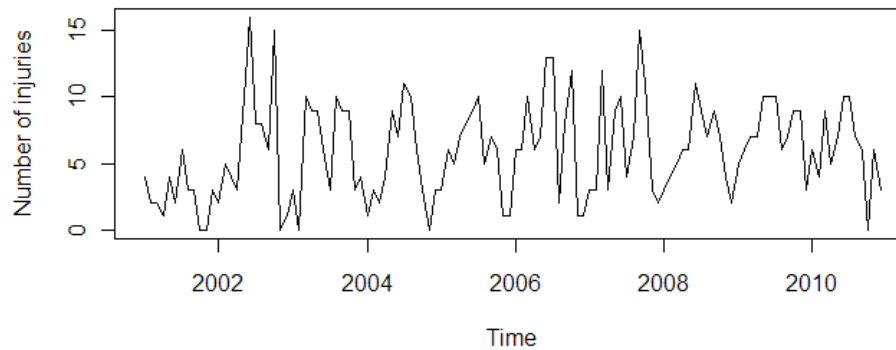
# Work in progress

- Can pre-race 'bloods' predict racing performance?
    - Preliminary results found some blood parameters are significantly associated with some blood parameters BUT
      - Some were did not make sense biologically
        - e.g.  $\uparrow$  in fibrin improved performance
      - The effect was not biologically meaningful
        - e.g.  $\uparrow$  % Neutrophils 20% meant a horse finished 0.5 places worse than expected
    - To put in perspective predicted place for a horse drawing:
      - Inside barrier = 5
      - Outside barrier = 8
- 



# Work in progress

- Is there a seasonal trend in the HKJC injury fracture data?



Time series for fractures (top) and auto-correlation (bottom)



# Work in progress

- What is the day-to-day, month-to-month and year-to-year variability in training track?
  - And is the variability linked to fracture, tendon injury or suspensory ligament injury



# Work in progress

- Case-cross over study to determine if horses are at greater risk of fracture after a 'lay-off'
  - i.e. period of time with no training at the track



Not a Hong Kong Race



# Work in progress

- What health problems do horses get after air travel?
  - And can we find ways reduce the occurrence of these problems?



# Work in progress

- How can we manage pre-existing injuries when a horse moves from racing to equestrian events?

## LIFE AFTER RACING CAPE OF GOOD HOPE

### Before . . .

Cape Of Good Hope (Bolskoy, Mick Kinane) gets the better of Shabasta in the Group 1 Golden Jubilee Stakes at Royal Ascot at York in June 2005, the final victory in a globetrotting career that brought him seven wins and more than £1.8m in win and place prize-money. His series of one-sided duels at Shu Te with outstanding Hong Kong sprinter Silent Witness (duels in which he never finished on the winning side) brought tens of thousands to the racetrack to see the great steely rivalry time and again.



### . . . after

The 'super-cool' Cape Of Good Hope goes clear over a set of multi-coloured poles on his first acrobatic over obstacles. Rider Christelle Daverat is preparing him for a possible career as an eventer, and the ten-year-old gelding has surprised both his new rider and owner Guy Carvillat with his amenability and aptitude for the discipline.



# Work in progress

- Cohort study to better understand the aetiology and possible management for anhidrosis in horses



Thanks to the clinical services  
and regulatory veterinarians  
from the HKJC



Questions?