

# Symposium Report

## Prevention of Thoroughbred Racehorse Fatalities and Injuries *An assessment of the size of the problem, efforts to identify causes and methods to minimise the number of horses injured during racing*

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*The growth in the number of epidemiological studies that have been conducted in recent years demonstrates their potential value. They produce results that are readily understandable to the lay audience. However, that lay audience, whether racing officials, trainers, breeders or owners, may not have as much access to the results as they would wish. A recent symposium on racing injuries and fatalities, sponsored by Racing Victoria Ltd, the Racing Community Development Fund and the Rural Industries Research and Development Corporation was hosted by The Faculty of Veterinary Science at The University of Melbourne, Australia. The meeting brought researchers and representatives from many spheres of the international racing community together to highlight the advances that have been made and future directions that research into the welfare of the racehorse should take.*

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### Introduction

A significant amount of time and money has been applied to identifying the potential causes of Thoroughbred injury and death. Many studies have identified risk factors associated with deleterious outcomes. However, there are few examples of changes to racing that have come about as a direct result of these studies. This may be due, in part, to inconsistent findings or because identified risk factors are not modifiable. Most racing incidents occur as a consequence of a number of events that may or may not be related. Our current inability to completely understand the problem we are faced with may be due to the fact that we are not measuring the correct variables. It may also be the case that we are at present simply unable to measure, with enough accuracy, the factors of interest. An obvious example of this is our inability to record exact speeds and distances covered by a large number of racehorses in training. Several studies have demonstrated associations between exercise and musculoskeletal injury; however, there is a lack of consistency in the strength or even direction of the associations. New technologies such as the global positioning system (GPS) will no doubt enable us to overcome many difficulties we currently face, hopefully resulting in a greater degree of consistency between studies. It is only when armed with consistent, modifiable risk factors that we are likely to be able to have a significant impact on the risk of injury or fatality in racehorses. We cannot hope to eliminate risk altogether. However, there is still plenty of scope to minimise the likelihood of unwelcome events.

### Getting the message across

The multifactorial nature of many of the problems that epidemiologists must address necessitates sophisticated analytical

techniques. The majority of vets and racing officials have no need to understand, or indeed have an interest in, the nuances of these analyses. It is, however, beholden upon research workers to convey the potential impact of their findings to the appropriate individuals in a manner that enables decision-makers to act with conviction, in the knowledge that any interventions are likely to minimise the risk to both jockey and horse. The report below provides an example of researchers attempting to do exactly that to a mixed group of racing industry participants in Victoria, Australia.

### International Symposium on the Prevention of Injuries and Fatalities in the Thoroughbred Racehorse

The Faculty of Veterinary Science at The University of Melbourne was the host of a recent international symposium on the prevention of injuries and fatalities in the Thoroughbred racehorse. The first international symposium of its kind brought together speakers reporting research findings from the USA, UK, Australia, Hong Kong and New Zealand. Eighteen papers, largely focusing on the epidemiology and prevention of racing fatalities, were presented over two days. A total of 84 delegates from a variety of backgrounds attended the symposium. There were 24 representatives from different racing jurisdictions (including veterinary surgeons employed in racing), 24 academics and post graduate students, 16 practicing veterinary surgeons, 9 industry participants such as racehorse owners, trainers and breeders, 8 allied industry professionals and 3 representatives from government.

The conference was opened by the Victorian Minister for Racing, John Pandazopoulos, who welcomed all participants and commended Professor Andrew Clarke and his staff at The University of Melbourne Equine Centre for their vision and hard

work in organising the conference. He highlighted the importance of racehorse injuries and fatalities to racing jurisdictions worldwide and embraced the opportunity for experts from around the world to exchange knowledge, foster collaboration and identify future directions for research.

Professor Kenton Morgan gave a keynote address placing the subject of epidemiology firmly in the context of racetrack fatalities. None of the delegates will readily forget the slide showing a horse embedded in the windscreen of a car and the phrase 'horse, time, place' which he used to sum up the way epidemiologists address the subject of racecourse injury. Why did that horse die or sustain an injury at that particular time and in that place? Using the often-quoted example of John Snow removing the handle from the water pump in Broad Street, London to reduce the impact of a cholera epidemic in the 1850s, Professor Morgan emphasised the fact that it is not always necessary to know the exact cause of disease before one can prevent it. The exact cause of cholera in the 1850s was unknown, but removal of the risk factor (contaminated water) helped to assuage the epidemic. In the context of racehorse fatalities, the goal of epidemiologists is to identify risk factors that are associated with the outcome and which, when modified, will reduce the likelihood of death.

The five clearly defined sessions of the symposium followed the logical steps that epidemiologists take when addressing problems in this field:

1. Identify the problem.
2. Quantify the problem.
3. Identify risk factors for a broad case definition.
4. Focus on a specific refined case definition with potential to have 'high impact'.
5. Investigate potential interventions to modify the likelihood of the undesirable outcome.

Each of the sessions included three or four examples of work from around the world, enabling comparisons to be drawn not only with respect to outcomes, but also in terms of the methods used to investigate similar problems.

#### Session 1

Session 1 included details of the degree of wastage amongst New Zealand Thoroughbreds (Dr Nigel Perkins), the risk of racehorse fatality in Victoria, Australia (Dr Lisa Boden), and the incidence of fatal distal limb fractures in the UK (Dr Tim Parkin). All three speakers highlighted the overwhelming importance of musculoskeletal injuries as causes of fatality. In addition, there was a clear demonstration of the difficulties which arise in comparing studies in different populations when different methods have, by necessity, been used to quantify risk. Dr Perkins, studying horses in training, reported the number of events per 1000 horse training days, whereas Drs Boden and Parkin, both studying racing fatalities, reported the number of events per 1000 race starts. For individuals unfamiliar with this type of work, the important aspect to identify is the correct use of an appropriate measure of the amount of time at risk. Without this, such descriptive studies are rendered meaningless.

#### Session 2

Session 2 focused further on describing the problem facing three different racing populations. Dr Chris Riggs presented the reasons

for early equine retirement from the Hong Kong Jockey Club. This work has enabled the identification of a clear list of priorities for further research, currently being conducted by Dr Ken Lam in collaboration with the University of Liverpool, UK, which aims to reduce the number of horses being retired from racing in Hong Kong. Professor Ian Gardner described the California Horse Racing Board Post-mortem Programme, which has been running since 1990. This presentation demonstrated the immense value of a complete post mortem programme by summarising the vast number of projects that have been initiated as a direct result of the ongoing programme. Dr Boden presented the results of the first three years of a similar programme in place in Victoria. Already, this study has demonstrated that significant differences in the causes of fatality occur between countries, with sudden deaths referable to acute cardiovascular collapse or respiratory failure being more common in Victoria than elsewhere.

#### Session 3

Session 3 moved onto the identification of risk factors associated with various broad case definitions. Before this, however, Dr Parkin highlighted some of the sources of information available to researchers in this field and described some of the problems and potential benefits of the use of race videos in the identification of within-race risk factors. Dr Perkins described risk factors for racehorse wastage in New Zealand, Dr Boden identified risk factors for fatalities in flat racing in Victoria, Australia, Professor Gardner reported risk factors for catastrophic limb fractures in California, USA, and Dr Parkin presented results of analyses to identify risk factors for fatal distal limb fracture in flat and hurdle racing in the UK. Each of the four speakers identified both common and unique risk factors related to their particular outcome of interest. A common thread was the association of injury with exercise. It was clear that different research groups are using different methods to assess the impact of exercise on injury or fatality, making comparisons between studies difficult. Standardisation of definitions and measuring techniques was identified as a priority for workers in this field and formed one of the major discussion points at the post conference meeting.

#### Session 4

Session 4 focused on one of the most common forms of fatal distal limb fracture; fracture of the lateral condyle of the third metacarpus/metatarsus (Mc/tIII). Dr Riggs outlined a series of studies which enabled him to formulate a hypothesis on the aetiopathogenesis of lateral condylar fractures. He contended that adaptive sclerosis, in response to exercise, creates density gradients across condyles. These gradients cause stress-concentration and an increased rate of fatigue damage at the site of the vast majority of condylar fractures. In turn, increased fatigue induces remodelling, which involves an initial increase in bone porosity. This promotes further local stress-concentration and increases the likelihood of crack initiation and subsequent propagation into complete fracture. Professor Morgan provided details of the results of a MPhil research project being conducted by Jennifer Swindlehurst at the University of Liverpool, UK, investigating associations between osteochondral changes of the distal McIII and condylar fracture. In the population studied, fissures and linear defects in the parasagittal grooves of contralateral limbs were more common in horses that had sustained fractures than in control animals.

Cartilage ulceration and discolouration were common findings, but were not associated with fracture. Osteonecrotic lesions palmar to the transverse ridge were actually more common in horses that had sustained vertebral fracture or cardiovascular failure than in those that had sustained a fatal lateral condylar fracture. Further work is aimed at identifying by computed tomography subchondral bone changes in both fractured and nonfractured limbs that may be associated with fracture. Dr Parkin reported risk factors specific to lateral condylar fractures. He indicated that the previously reported increase in risk of fatal distal limb fracture in racehorses that did no gallop work in training was even greater for lateral condylar fractures, suggesting that this region of bone may be particularly sensitive to exercise-induced changes. Finally, Professor Gardner presented the results of studies which have highlighted a number of risk factors for both condylar fracture and suspensory apparatus failure. These studies have demonstrated associations between previous suspensory apparatus injury and condylar fracture, suggesting that the potential exists to identify predictors of future injury and that these predictors may not be directly associated with the tissue that subsequently fails. Professor Gardner concluded by saying that future work must include prospective studies to enable greater evidence of a causal relationship for risk factors and that practical and accurate diagnostic methods are required before prerace examinations become widely accepted.

#### Session 5

Session 5 had a prospective focus. Dr Paul O'Callaghan from Racing Victoria Ltd detailed current strategies for monitoring racetrack incidents in Victoria, Australia. He also gave a demonstration of a new reporting system (Australian Racing Incident Database) that is being introduced by a number of Australian racing authorities. This system will enable greater scrutiny of data in real time and also facilitate future retrospective research by standardising reporting protocols. Professor Morgan then facilitated a round-table discussion with a great deal of delegate participation. Topics of discussion included whip use, increasing speed of jump races in Victoria, the effect of different shoe types (notably the difference between rim shoes and toe-grabs), the prevalence of pathology in the 'normal' racehorse population and the relationship of these lesions with subsequent fracture.

#### Post conference meeting

All speakers and other invited participants took part in a post conference meeting to identify key areas for future research and potential collaboration. Discussion broadly highlighted two areas requiring further investigation:

##### 1. Comparative measures

- a) Standardisation of case definitions are required to enable direct comparison between studies conducted in different racing jurisdictions. Dr Parkin and Dr Kristien Verheyen are conducting a study to directly compare rates of fatality in several racing jurisdictions. A number of other racing authorities have been added to the group of participants following the symposium. Results from this study will be submitted for publication within the next 12 months.

- b) An indication of the current global situation is needed. Identification of similarities between racing authorities that may enable a greater degree of cooperation with respect to funding and the investigation of particular common problems. In addition, particular 'local' issues that require greater investigation within the bounds of individual racing populations must be identified.

##### 2. Training/exercise intensity

- a) Identification of better methods for measuring different training regimens is required. This should include a greater understanding of the different training patterns that are employed in normal healthy horses to enable comparison with training patterns in horses that subsequently become injured.
- b) Standardisation of definitions of different training speeds is needed. Some work on this was presented by Dr Perkins, showing that there were clear differences in the actual speed of horses when galloping compared with slower gaits, but that instructions from trainers to travel at canter, quarter-pace or half-pace all resulted in true speeds that were not significantly different from each other. The potential use of GPS for monitoring actual horse speed on a much larger scale is becoming more realistic, and it was felt that this would significantly aid the interpretation of the impact of different gaits on injury risk.

It is hoped that the majority of speakers and other interested individuals who were unable to attend this meeting will be able to reconvene around the time of the 11th International Symposium on Veterinary Epidemiology and Economics (ISVEE XI) in August 2006. It was also suggested that the Melbourne symposium be the first of a series and that the next full meeting also be planned at ISVEE XI.

#### Summary and conclusions

It is unlikely that the actual cause, if one exists, of the majority of incidents will be identified in the near future. The search for the holy grail of racing without equine injury or death is currently unattainable. Racehorses, like their human counterparts, are highly tuned athletes, racing on a knife-edge between injury and maximal fitness. This is the way it has to be, as no one involved in racing would want 'unfit' horses being sent to the starting gate. Nevertheless, it is essential that vets and others in the racing industry ensure that everything is done to enable the maximum number of horses to continue to race until 'voluntary' retirement. Naturally, there may be financial benefits to be gained from a safer racing environment and economics may be the motivation behind some of the work currently being undertaken. Even if this is not the case, interventions that are positive in terms of both welfare and finance obviously have a much greater chance of success. Nevertheless, regardless of the financial cost or benefit, we should remain focused in our aim to maximise the welfare of the animals that race for our pleasure. To this end, it is incumbent upon researchers to become more proactive in relaying information to stakeholders in a manner that enables interventions to be readily formulated and implemented.