University of Central Lancashire | Myerscough Associate School

Risk factors for horse falls in the cross-country phase of British Eventing competitions: A comprehensive data analysis

Cameron – Whytock.H.A., Parkin.T.D., Georgopolous.S., Brigden.C., Taylor.P.J., Sinclair.J.K., Hobbs,S.J.

Introduction

- Myerscough College - National Diploma
- Myerscough/UCLan – BSc(Hons) Equine Science (Physiology)
- UCLan (Myerscough funded) – PhD by Research

- Worked, groomed and ridden in eventing in UK

- Research published in ‘Eventing Magazine’, ‘Horse Magazine’, ‘Horse and Hound’
- Research presented at a variety of equine and sports conferences in the UK, Ireland, Denmark, Madrid…. and now Switzerland!

- Attended National Safety Officers Seminar in Madrid, Spain 2016.

Previous Research

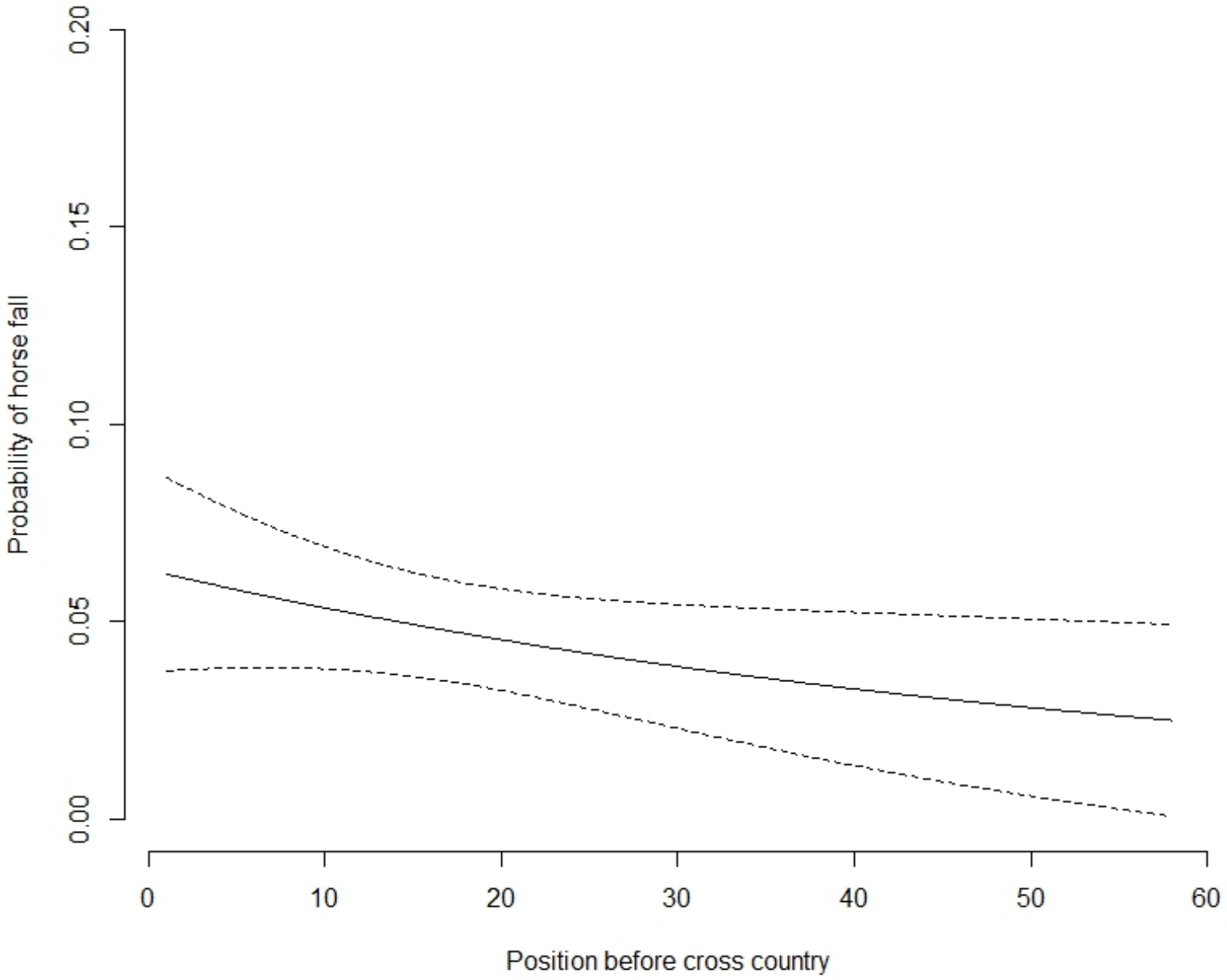
- Level of Event
- Horse Age
- Horse Sex
- Rider Sex
- Position Before Cross-Country
- Month of Event
- Year of Event
- Event

- Novice
- Intermediate
- Advanced

- N = 2002

National level one-day events only. Format:

Dressage – Show-jumping – Cross-country



Although effect is small, strong support, large data set, 95 % confidence intervals (dashed lines) are narrow

Physiology or Psychology?

PhD Research

Why are riders in leading positions at an increased risk of a horse fall?

Mass data analysis to confirm/deny preliminary results

- Last 10 years of data
- N=850,000

How do the variables interact with each other?

What are the key risk factors for horse falls?

Methods from racing risk analysis (30, 60, 90 days)

PhD Research

Mass Data Processing

Data processing

- Data is live on competition results but not on fall results, marriage changes name
- Some people use ‘0’ some people use blanks (which is missing data, and which is ‘0 faults’?)
- How to get the system to recognise which horse fell if the rider is on several horses during that day (horse name not included on fall report data)
- Human error on fall report forms, misspelt names etc
- Huge data set some computers/software programs not able to process it

Creating new variables

- How many times has the horse/rider competed in last 30,60,90 days?
- How many times has the horse/rider had a HF in career, 6 months, 1 year?
- How many times has the horse/rider had a UR in career, 6 months, 1 year?

Using a variety of statistical software packages, mainly ‘R’ and Microsoft Access for data processing, and STATA for analysis

PhD Research

Mass Data Analysis

- Univariate analysis was completed on each individual factor against horse fall
- Almost everything came up as ‘significant’ due to large data set
- Variables sorted in to numerical order using the highest odds ratio and lowest significance combined

- Variables are then input in to a multivariable model in this order
- When a variable comes up as insignificant in the MV model it is removed
- This process narrows the significant factors down greatly (from 34 to 13!)

VARIABLE	VARIABLE EXPLANATION	FINDING	RISK	RISK EXPLANATION
My_sum_horse_falls	How many horse falls has the horse had in its career	For every horse fall	increases	If horse has had several horse falls in career it is likely it will have more
My_horse_starts_30_60	How many times has the horse competed in the last 30-60 days	For every competition	increases	The more the horse has competed in 30-60 days the more it is at risk of a HF
Ridersex	Gender of rider	Male riders	Increases	Male riders are more likely to have HFs
My_horse_starts_60_90	How many times has the horse competed in last 60-90 days	For every competition	Increases	The more the horse has competed in last 60-90 days the more it is at risk
My_horse_starts_0_30	How many times has the horse competed in the last 30 days	For every competition	Increases	The more the horse has competed in last 30 days the more it is at risk
Horsegrade	Horses grade	Higher grade	Increases	Horses of a higher grade are at an increased risk
Riderage	Age of the rider	For every additional year of age	Decreases	Young riders are more at risk than older riders
Dressagepen	Dressage penalties	For every additional penalty	Increases	A poor dressage test score predicts higher risk of a horse fall
Horseage	Age of the horse	For every additional year of age	Increases	Older horses are at a higher risk of HFs
Sjpen	Show jumping penalties	For every additional penalty	Increases	A poor show jumping round presents increased risk of a HF
My_days_since_last_start_jockey	How many days has it been since the rider last competed	For every additional day of rest	Decreases	More days of rest for the rider reduce the risk of a horse fall
My_jockey_starts_30_60	How many times has the rider competed in the last 30-60 days	varied	varied	Decreased risk initially, but at 5 or more it changes to increased risk

PhD Research

Why are riders in leading positions at an increased risk of a horse fall?

In-field data collection

- Follow a group of riders and their horses through the eventing season
- Monitor heart rate and heart rate variability of the horse and rider during cross-country
- Psychoanalysis of rider before and after cross-country
- GPS mapping of course
- GPS tracking of horse and rider during cross-country rounds (location, speed, altitude)

Are there changes in the horse/rider physiological, psychological or GPS data depending on what position they are in (or any other factors!)?

PhD Research

Why are riders in leading positions at an increased risk of a horse fall?

Psychological profiling of riders

- Personality profiling
- Sensation seeking scale

How do riders score on the sensation seeking scale? Is there a trend?

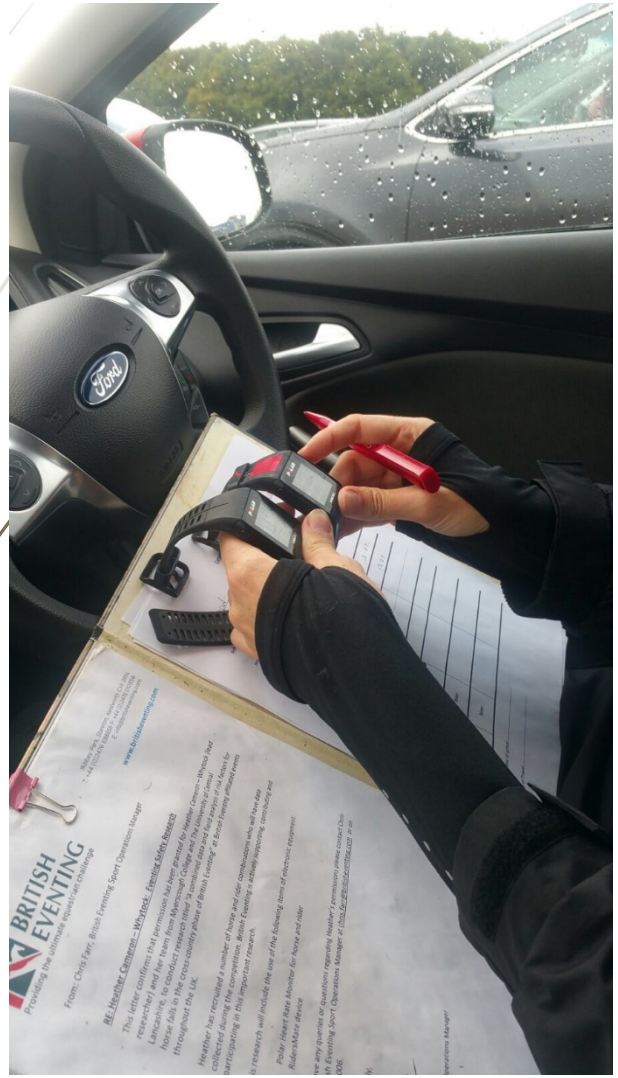
Is there a trend in personality profiles of riders as there is in participants of other high risk sports?

PhD Research

In-field data collection

PhD Research

In-field data collection



PhD Research

In-field data collection

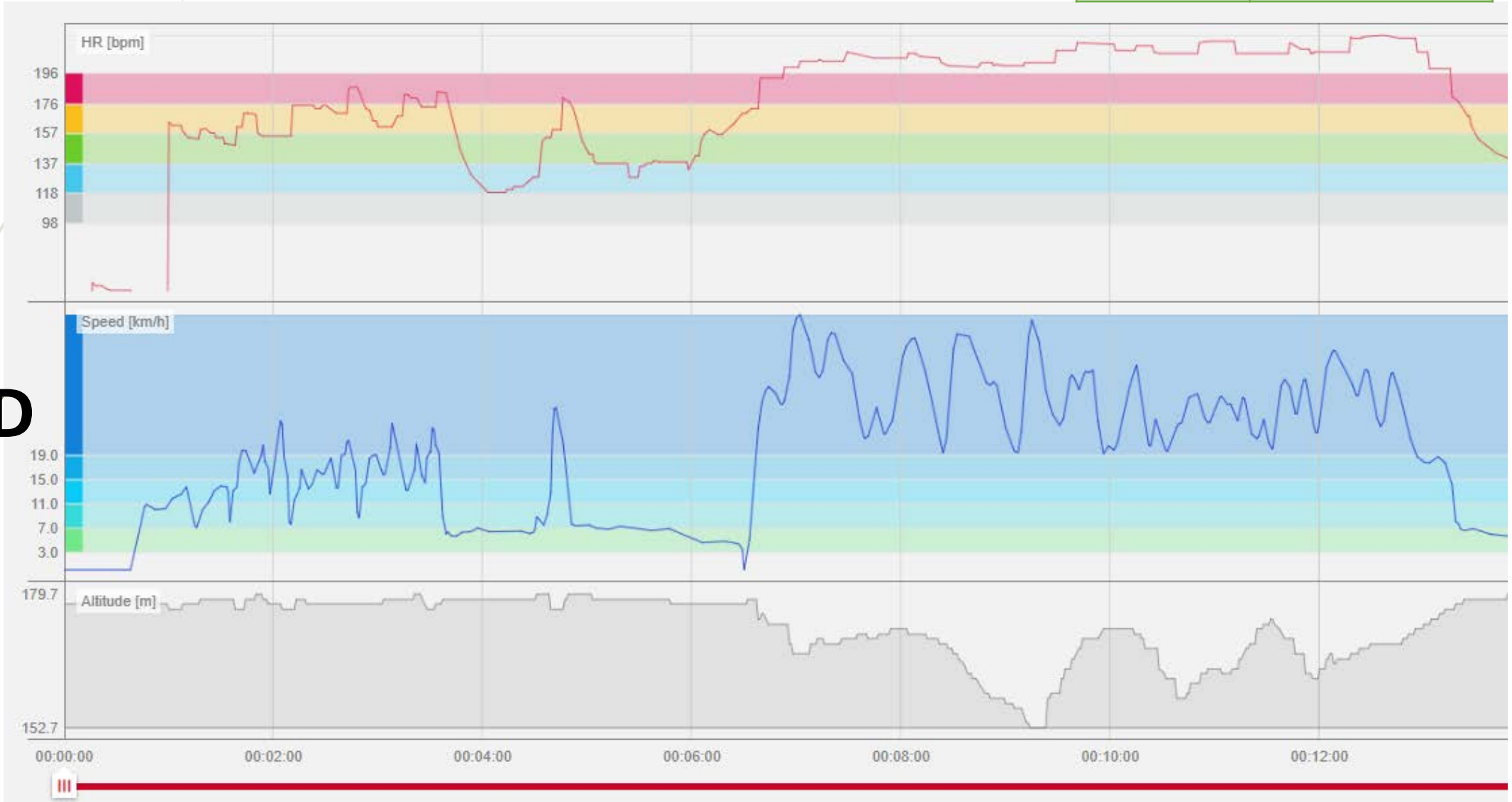
	Horse	Rider
Max HR	222 bpm	198 bpm
Min HR	42 bpm	64 bpm
Average HR	160 bpm	164 bpm
Max Speed	42.2 km/h (26.2mph)	
Average Speed	17.6 km/h (11 mph)	

HR

(HORSE)

SPEED

ALT



PhD Research
In-field data collection

Notable events whilst testing

- 3 rider falls
- 1 horse fall
- Several '1st attempt at level'
- Regional final competitions
- Male and female riders, variety of age and experience
- BE90 to Intermediate level

Observations

- Who is present/spectating? Parents, spouse etc.

PhD Research

Current phase of research

- Analysis of psychological data from competitions
- Analysis of HR/HRV data from competitions

- Psychoanalysis/personality profiling of riders

Multifactor analysis of quantitative data

PhD end date 31st December 2018