THOROUGHBRED HEALTH NETWORK IMPACT ASSESSMENT

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THOROUGHBRED HEALTH NETWORK

- The Thoroughbred Health Network (THN) is a knowledge exchange initiative for the racing industry
- The THN's main output is via their website, www.thoroughbredhealthnetwork.co.uk, where colour-coded critical reviews of the literature covering relevant topics, including topics such as EIPH and tendon injuries can be accessed free of charge
- The colour-coded critical reviews provide a clear overview of the confidence and content of the literature on each topic covered
- The THN is now a nation-wide project, following a successful northern pilot which began in June 2015
- The main aim of the initiative is to translate the abundance of racehorse-related research into a format that enables industry uptake

THN: WHY BOTHER?

- Despite large amounts of racehorse specific research, anecdotally many racing professionals do not have access to this research, and uptake is poor.
- Improved understanding could help reduce injury rates and improve racehorse welfare. In turn this could save trainers money and improve results.
- Other similar initiatives such as www.thehorse.com are aimed more generally at the horse community than specifically for the racing industry and do not attempt to categorise according to confidence in the evidence for a topic.

AIMS

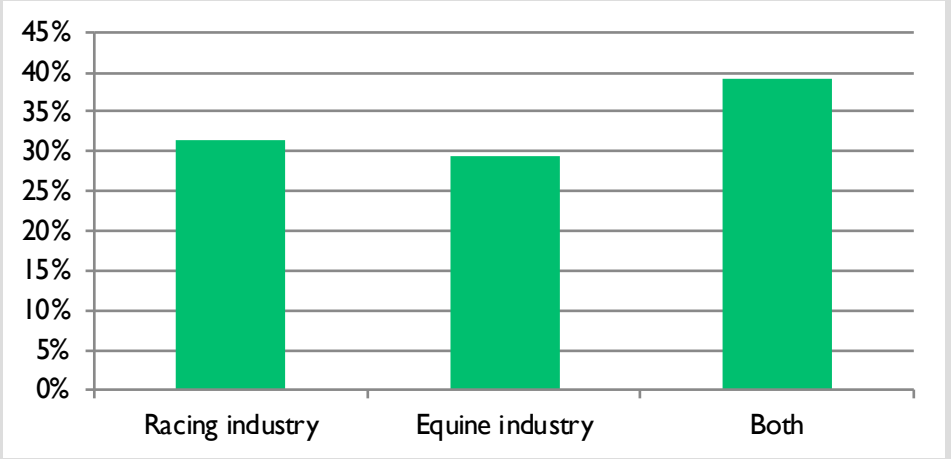
- The current study investigated the subscriber population of the THN:
  - Demographics: job roles, industry sector involvement
  - Motives: reasons for visiting the THN, specific areas of interest
  - Suitability: appropriateness of information presented, usefulness of information
  - Uptake: changes in practices, use of other similar initiatives, interest in future THN outputs
- The survey aims to give a broad understanding of the subscriber base, their interests, needs and interest in future engagement, as well as assessing the impact the THN has had.
- To demonstrate to future potential funding bodies the impacts and merits of the initiative
- To guide future output of the THN, in order to better serve the interests and needs of the subscribers

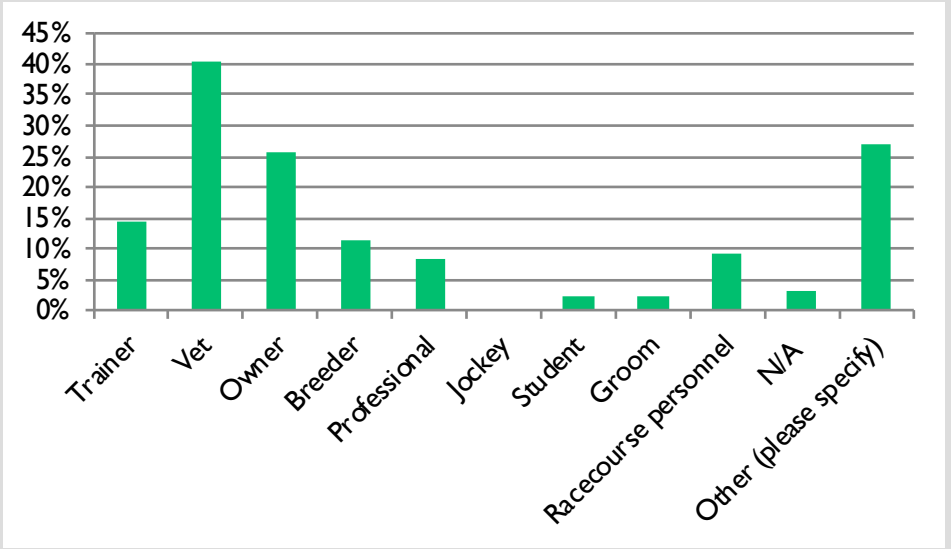
METHODOLOGY

- An email (right) containing a link to the online survey (www.surveymonkey.com) was sent to all subscribers of the THN (self-subscribed by submitting email address on THN website) on the 29/6/18, amounting to approximately 1000 email invitations sent.
- A reminder email was sent on the 22/7/18
- The survey contained 10 questions, and was estimated to take 2 minutes to complete
- Questions were asked in a variety of formats, including single- and multiple- selection multiple choice, sliding scales from 1-10, comment boxes and ranking options from 1 to 4.

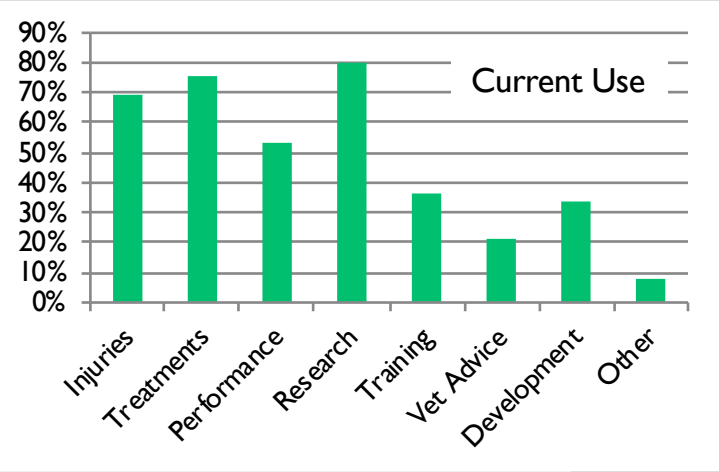
DEMOGRAPHICS

- 133 subscribers responded.
- Approximately two thirds of responders are in the racing industry.
- A little under one third of responders are not in the racing industry at all!
- The majority (40%) of responders are vets - and only 2 grooms and no jockeys responded.
- Vets combined with 12% who are academics or lecturers means over 50% of responders already had access to the research papers.
- This highlights the value of the critical reviews and clear summaries available on the THN.



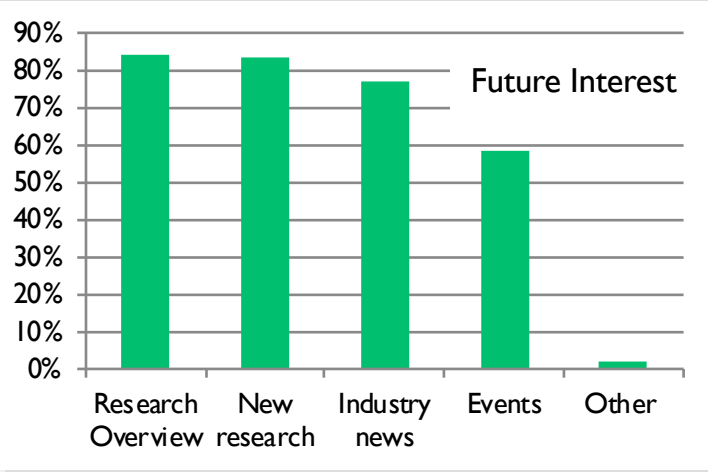


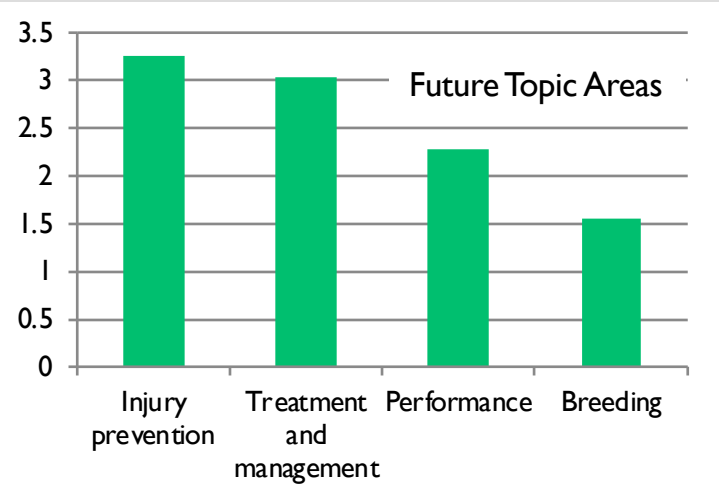
MOTIVES



- Most are using it for evidence - injuries, treatment, performance
- Nearly 80% of people are using it to keep up to date with research
- Grooms are using it to understand vets
- Vets are using it for product development and marketing
- Trainers are using it to help inform training decisions

- Future interest is mainly in research overviews and new research but also in industry news and events – overall a high amount of future interest

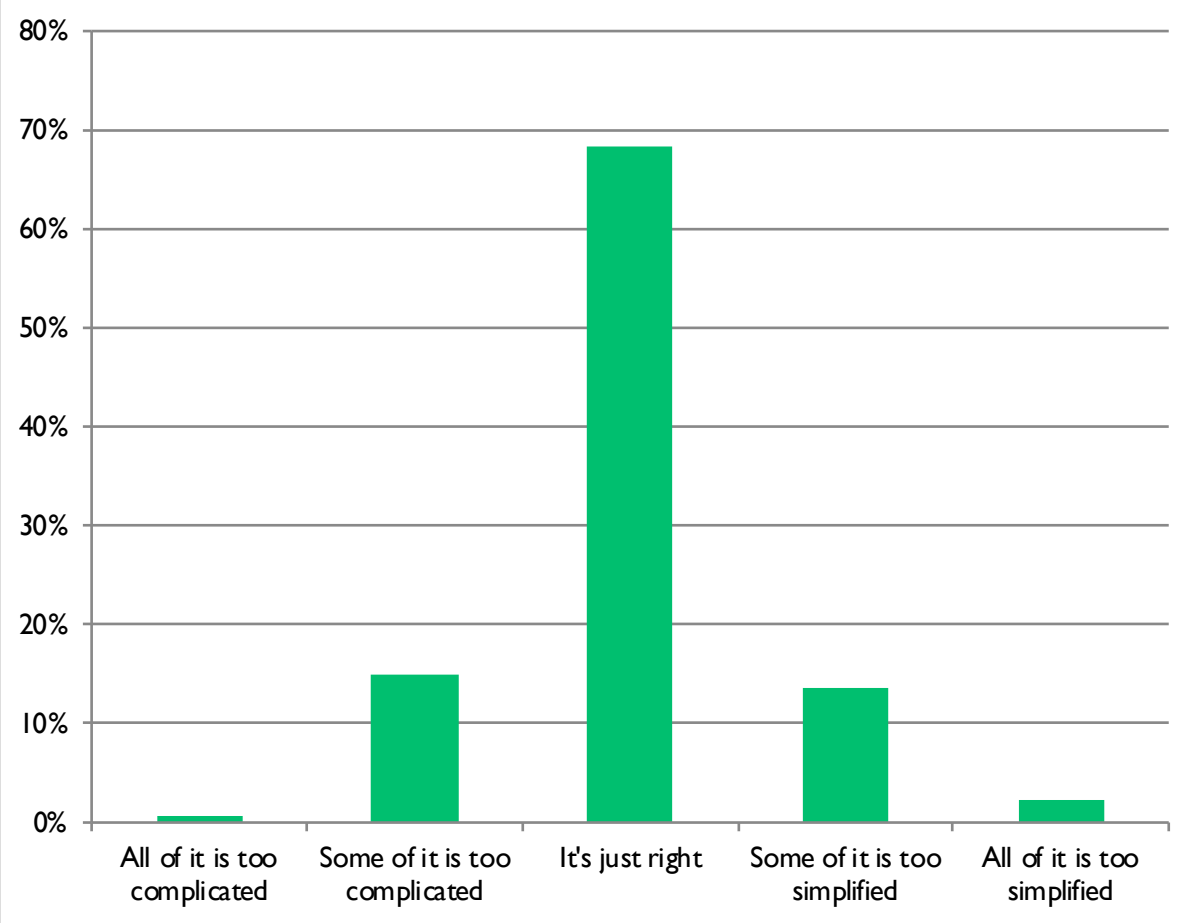




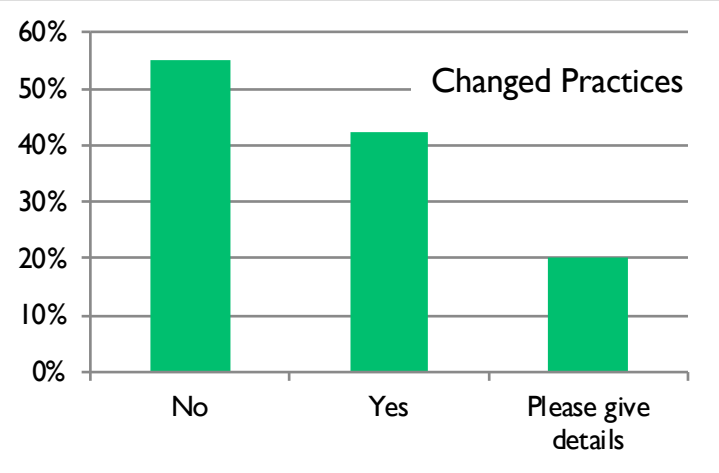
- Future topics of interest mainly reflect the current use
- Breeding is of least interest to the current subscribers – but currently there is no breeding information available which may be reflected in the subscriber population

SUITABILITY

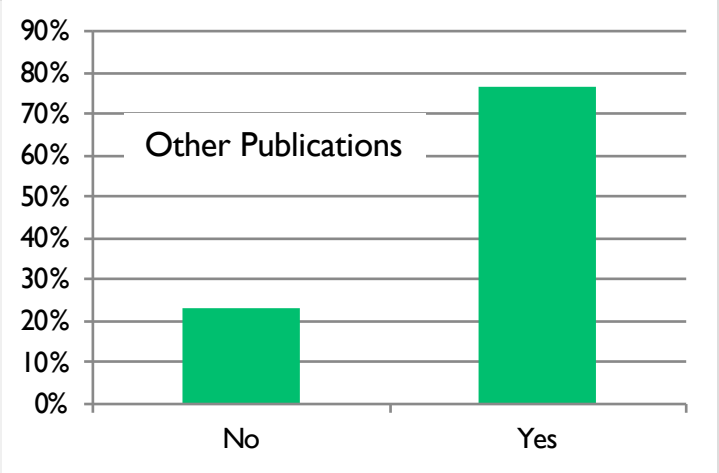
- A very positive picture! Nearly 70% of responders feel the information provided is at just the right level.
- Results are very similar across all jobs – which was interesting given the range of education levels expected with the broad range of jobs reported by responders
- Vets were slightly more likely to report some of it too simplified.
- Subscribers gave a 68% usefulness score to the THN.



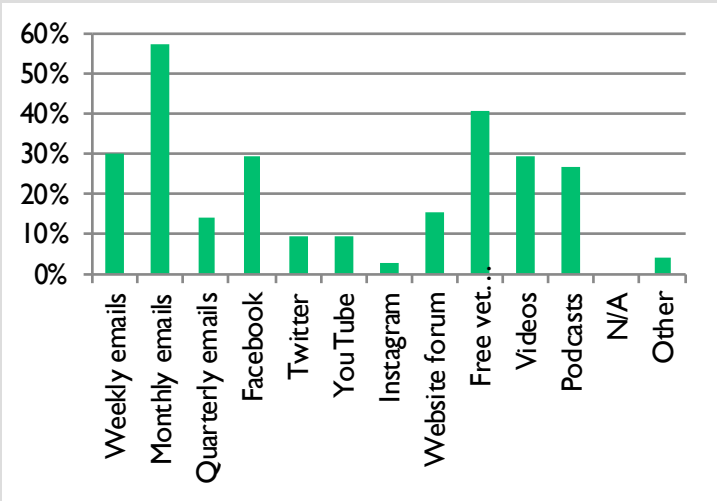
UPTAKE



- Most responders are using other sites
- Vets are using journals and BEVA
- Non-vets are using TheHorse.com, training magazines and websites
- Trainers most likely to not be using other source.



- Over 40% of responders had changed their practices
- Many of the 'please give details' were either 'new to the site' or were a specific practice they had changed
- Really fantastic response which supports continued advancement of the THN.



- Most responders would like a monthly email (which they do not currently receive)
- Vets would like free vet workshops
- No responses for N/A – all respondents to the survey would like to hear more from the THN.

SUMMARY

- Majority of readership are vets
- Evidence-based critical reviews are well-received and in appropriate detail
- Over 40% of responders had changed their practices based on the most recent scientific evidence based upon their use of the THN website
- Subscribers would like a monthly email

VARIATION IN GOING AS INJURY RISK FACTORS IN UK THOROUGHBRED RACEHORSES

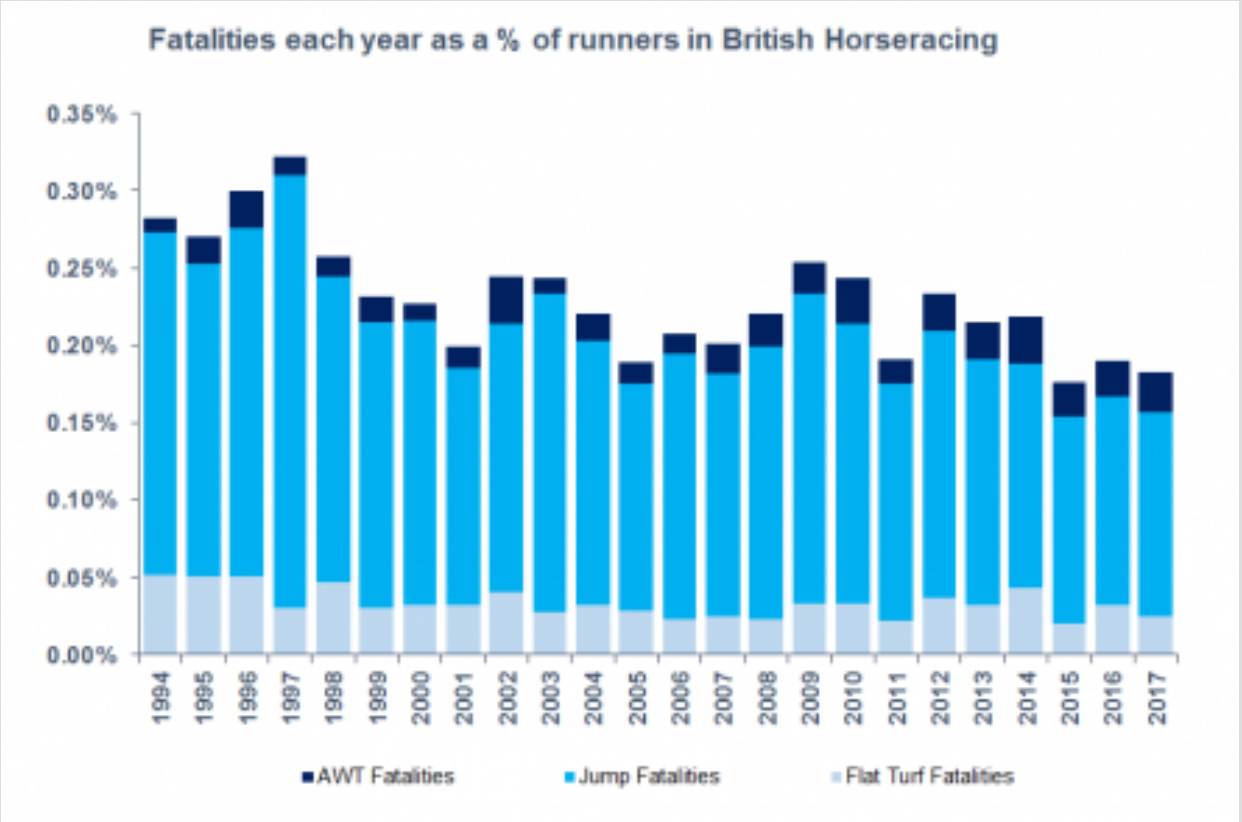
Hannah Birch

Supervisors: Prof Tim Parkin & Dr Richard Reardon

Kindly sponsored by The Beaufort Cottage Educational Trust

INJURY AND FATALITY IN RACING

- UK jump racing fatality rate has fallen 21% in past 20 years (BHA, 2018).
- Overall track surface firmness is a recognised risk factor for both tendinopathy (Reardon et. al., 2012) and distal limb fractures (Parkin et. al., 2004) in UK jump racing.
- Injuries and fatalities have a big impact on horse and jockey welfare and safety, on economic losses for the industry and on public perception of the sport (Evans, 2007).



https://www.britishhorseracing.com/regulation/making-horseracing-safer/

GOINGSTICK MEASUREMENTS

- Going is measured at multiple individual points ('waypoints') on each track prior to racing (BHA, 2018).
- The importance of variation in these measurements in relation to injury has not been investigated.

https://www.pitchcare.com/news-media/the-going-stick.html

AIMS

- To evaluate whether variation in going is associated with an increased likelihood of epistaxis, superficial digital flexor (SDF) tendinopathy or distal limb fracture (DLF).

METHODS

GOINGSTICK DATA

- GoingStick provides 2 measurements: penetration and shear.
  - Penetration – the force required to push the GoingStick into the surface – a proxy for the firmness of the going (TurfTrax, 2018; Hobbs et. al., 2014).
  - Shear – the force required to withdraw the GoingStick at 45° angle from the surface – a proxy for traction/slip properties of the going (TurfTrax, 2018; Hobbs et. al., 2014).
- 30 Waypoints around the track at fixed points. 3 readings at each waypoint, amounting to 9 values – so each track has 270 readings per meet (Godfrey, 2017).
- An overall score (going index) is calculated per meet from a combination of the penetration and shear.
- Data was available for December 2002 to December 2009, amounting to 1114 meets.

BHA INJURY DATA

- The British Horseracing Authority records all injuries and fatalities that occur while racing (BHA, 2018).
- The BHA publishes fatality record reports online each year

DATA MATCHING

Waypoint	Penetrate	Shear	Index	Going
1	6	11.5	7.8	Good
2	7	12	8.7	Good
3	5.4	11.3	6.9	Good to Soft
4	7.2	11.7	8.7	Good
5	0	0	8.7	Good
6	0	0	8.7	Good
7	6.8	11.7	8.4	Good
8	0	0	8.4	Good
9	6.7	11.6	8.3	Good
10	0	0	8.3	Good
11	5.2	11.7	6.8	Good to Soft
12	7.5	11.7	8.9	Good
13	7	12.1	8.7	Good
14	0	0	8.7	Good
15	0	0	8.7	Good
16	5.7	12	7.3	Good
17	0	0	7.3	Good
18	0	0	7.3	Good

- Some of the GoingStick data was incomplete
- Meets with less than 80% of waypoint readings recorded were excluded.
- The GoingStick data (per meet) was matched with the BHA injury data (per start)
- This yielded a total of 38,106 combined records

GOINGSTICK VARIATION ASSESSMENT

- GoingStick variable variation assessment was carried out for shear, penetration and the going index.
- Variation was calculated as coefficient of variation, maximum and median differences for each of the 3 GoingStick variables
- These were calculated both on a whole-track basis and between each waypoint
- This resulted in each meet having 18 measures of variation calculated

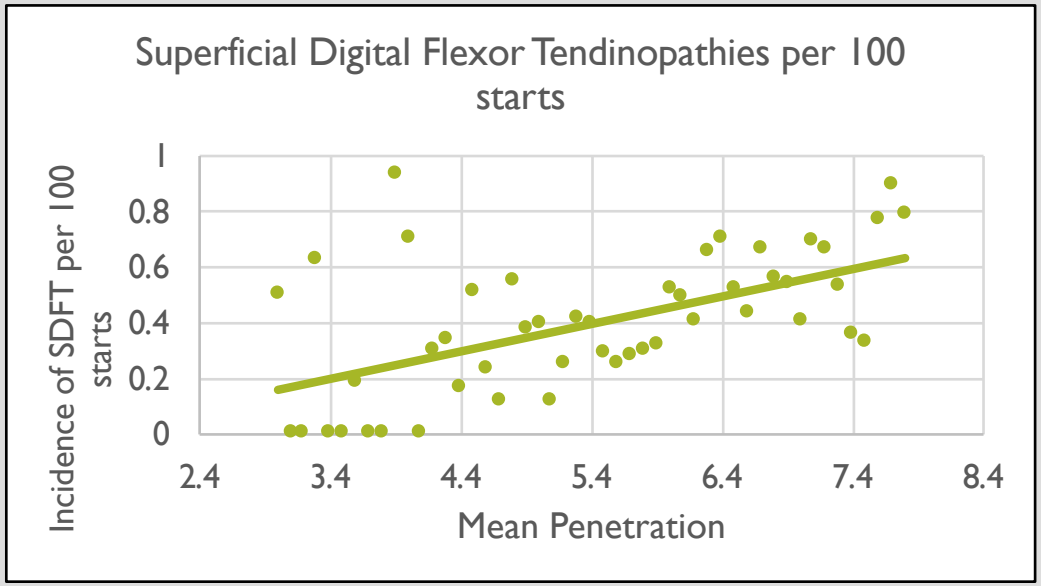
VARIABLE – OUTCOME ASSOCIATIONS

- Univariable logistic regression was used to investigate:
  - Associations between GoingStick variables (mean and median penetration, shear and index score) and the incidence of the outcomes (epistaxis, superficial digital flexor tendinopathy and distal limb fractures) at the level of the start
  - Associations between calculated variability scores (coefficient of variation, maximum and median differences, between waypoints and the whole track) and the outcome incidence at the level of the start
- Statistics were performed in Stata with significance set at $P<0.05$

RESULTS

GOING FIRMNESS

- Measures of going firmness (median penetration, median index) were associated with increased likelihood of SDF tendinopathy and distal limb fractures.
- This is in agreement with a number of other studies that found increased going firmness is associated with increased risk of tendinopathies and fractures (Parkin et. al., 2004; Oikawa and Kusunose, 2005; Henley et. al., 2006; Clegg, 2011).
- No association was found with epistaxis. Previous studies have found mixed evidence for this, with some studies finding an association with firm going (Newton et. al., 2005) and others finding no association (Hinchcliff et. al., 2010).
- The lack of association found in this study may support the cardiovascular theory behind EIPH, as opposed to the locomotor-respiratory theory. However the sample size may have limited the results.



TRACTION

- Increased median shear was associated with increased likelihood of SDF tendinopathy and epistaxis
- This has not been investigated previously as a track factor, but partially agrees with previous work that investigating shoes and toe grabs as SDFT risk factors (Hernandez et. al., 2005)
- However these studies found rimmed shoes (increases traction) decreased injury risk (Kane et. al., 1996). There may be an optimal amount of shear for minimal injuries (Thomason and Peterson, 2008)
- Traction as a risk factor for epistaxis has not been investigated previously.
- Costa and Thomassian (2006) suggested going that requires more effort to cover could increase EIPH. This may explain the link found between increased traction and epistaxis.
- This would support the cardiovascular theory of epistaxis (Young, 2003) over the locomotor-respiratory impact theory (Newton et. al., 2005)

GOING VARIATION

- Increased variation (coefficient of variation index, maximum index and coefficient of penetration) was associated with a decreased likelihood of SDF tendinopathy
- This is against the anecdotal and industry held belief that increased going variation is a risk factor for injury (Thoroughbred Health Network, 2016)
- This study only investigated the data using univariable analysis. It is possible that going variation is affected by other factors that also influence injury risk.
- It could also be possible that variation is injury protective – for example, it could be possible that the jockeys ride the course more carefully if they know the going is variable

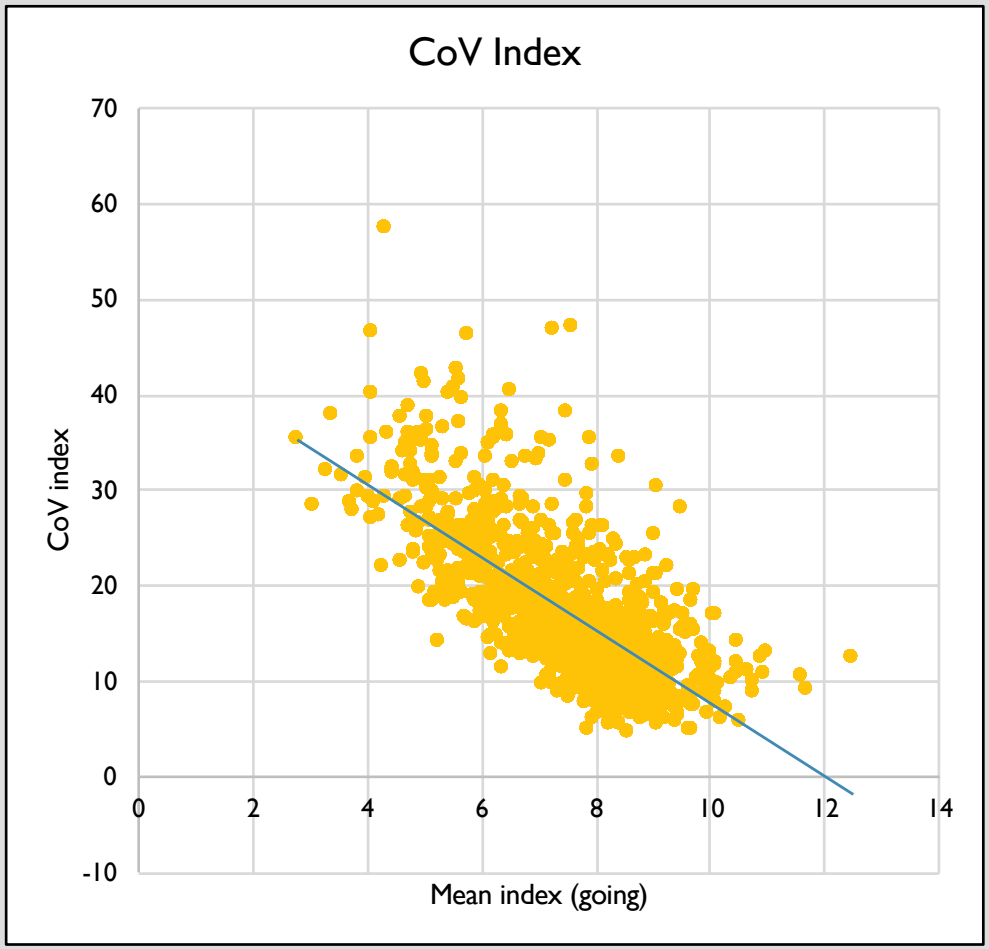
CONCLUSIONS & LIMITATIONS

CONCLUSION

- Variation in going is associated with decreased injury risk
- Increased going firmness is associated with increased injury risk

FUTURE STUDIES

- Further investigation using multivariable models would be sensible
- Possible explanation for unexpected results finding variation in going to be injury-protective – harder going appears to be more likely to have increased variation
- Many of the GoingStick records had to be discarded due to incompleteness. More complete data would allow further analysis
- Other variables of interest that were not included in this study: the relation of the Goingstick readings to the fence position, race speed and weight carried



REFERENCES

British Horse Racing, 2018. Making horseracing safer. Available at: https://www.britishhorseracing.com/regulation/making-horseracing-safer/

Clegg, P.D., 2011. Musculoskeletal disease and injury, now and in the future. Part 1: fractures and fatalities. Equine veterinary journal, 43(6), pp.643-649.

Costa, M.F.M. and THOMASSIAN, A., 2006. Evaluation of race distance, track surface and season of the year on exercise-induced pulmonary haemorrhage in flat racing Thoroughbreds in Brazil. Equine Veterinary Journal, 38(S36), pp.487-489.

Evans, D.L., 2007. Welfare of the racehorse during exercise training and racing. In The welfare of horses (pp. 181-201). Springer, Dordrecht.

Godfrey, N., 2017. Everything you ever wanted to know about the GoingStick. Racing Post. Available at: https://www.racingpost.com/news/everything-you-ever-wanted-to-know-about-the-goingstick/260234

Henley, W.E., Rogers, K., Harkins, L. and Wood, J.L.N., 2006. A comparison of survival models for assessing risk of racehorse fatality. Preventive veterinary medicine, 74(1), pp.3-20.

Hernandez, J.A., Scollay, M.C., Hawkins, D.L., Corda, J.A. and Krueger, T.M., 2005. Evaluation of horseshoe characteristics and high-speed exercise history as possible risk factors for catastrophic musculoskeletal injury in Thoroughbred racehorses. American journal of veterinary research, 66(8), pp.1314-1320.

Hinchcliff, K.W., Morley, P.S., Jackson, M.A., Brown, J.A., Dredge, A.F., O'callaghan, P.A., McCaffrey, J.P., Slocombe, R.F. and Clarke, A.F., 2010. Risk factors for exercise-induced pulmonary haemorrhage in Thoroughbred racehorses. Equine Veterinary Journal, 42(s38), pp.228-234.

Hobbs, S.J., Northrop, A., Mahaffey, C., Martin, J., Clayton, H., Murray, R., Roepstorff, L. and Peterson, M., 2014. Equine surfaces white paper. FEI Books.

Kane, A.J., Stover, S.M., Gardner, I.A., Case, J.T., Johnson, B.J., Read, D.H. and Ardans, A.A., 1996. Horseshoe characteristics as possible risk factors for fatal musculoskeletal injury of Thoroughbred racehorses. American journal of veterinary research, 57, pp.1147-1152.

Newton, J.R., Rogers, K., Marlin, D.J., Wood, J.L.N. and Williams, R.B., 2005. Risk factors for epistaxis on British racecourses: evidence for locomotory impact-induced trauma contributing to the aetiology of exercise-induced pulmonary haemorrhage. Equine veterinary journal, 37(5), pp.402-411.

Oikawa, M. and Kusunose, R., 2005. Fractures sustained by racehorses in Japan during flat racing with special reference to track condition and racing time. The Veterinary Journal, 170(3), pp.369-374.

Pinchbeck, G.L., Clegg, P.D., Proudman, C.J., Morgan, K.L. and French, N.P., 2004. A prospective cohort study to investigate risk factors for horse falls in UK hurdle and steeplechase racing. Equine veterinary journal, 36(7), pp.595-601.

Reardon, R.J.M., Boden, L.A., Mellor, D.J., Love, S., Newton, J.R., Stirk, A.J. and Parkin, T.D.H., 2012. Risk factors for superficial digital flexor tendinopathy in Thoroughbred racehorses in hurdle starts in the UK (2001–2009). Equine veterinary journal, 44(5), pp.564-569.

Thomason, J.J. and Peterson, M.L., 2008. Biomechanical and mechanical investigations of the hoof-track interface in racing horses. Veterinary Clinics of North America: Equine Practice, 24(1), pp.53-77.

Thoroughbred Health Network, 2016. Research review: injury risks associated with surface type & going. Available at: http://www.thoroughbredhealthnetwork.co.uk/impact-on-health-performance-2/

TurfTrax, 2017. TurfTrax GoingStick. Available at: https://www.turftrax.co.uk/goingstick.html

Young, L.E., 2003. Equine athletes, the equine athlete's heart and racing success. Experimental physiology, 88(5), pp.659-663

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