FEI Endurance Conference 2018

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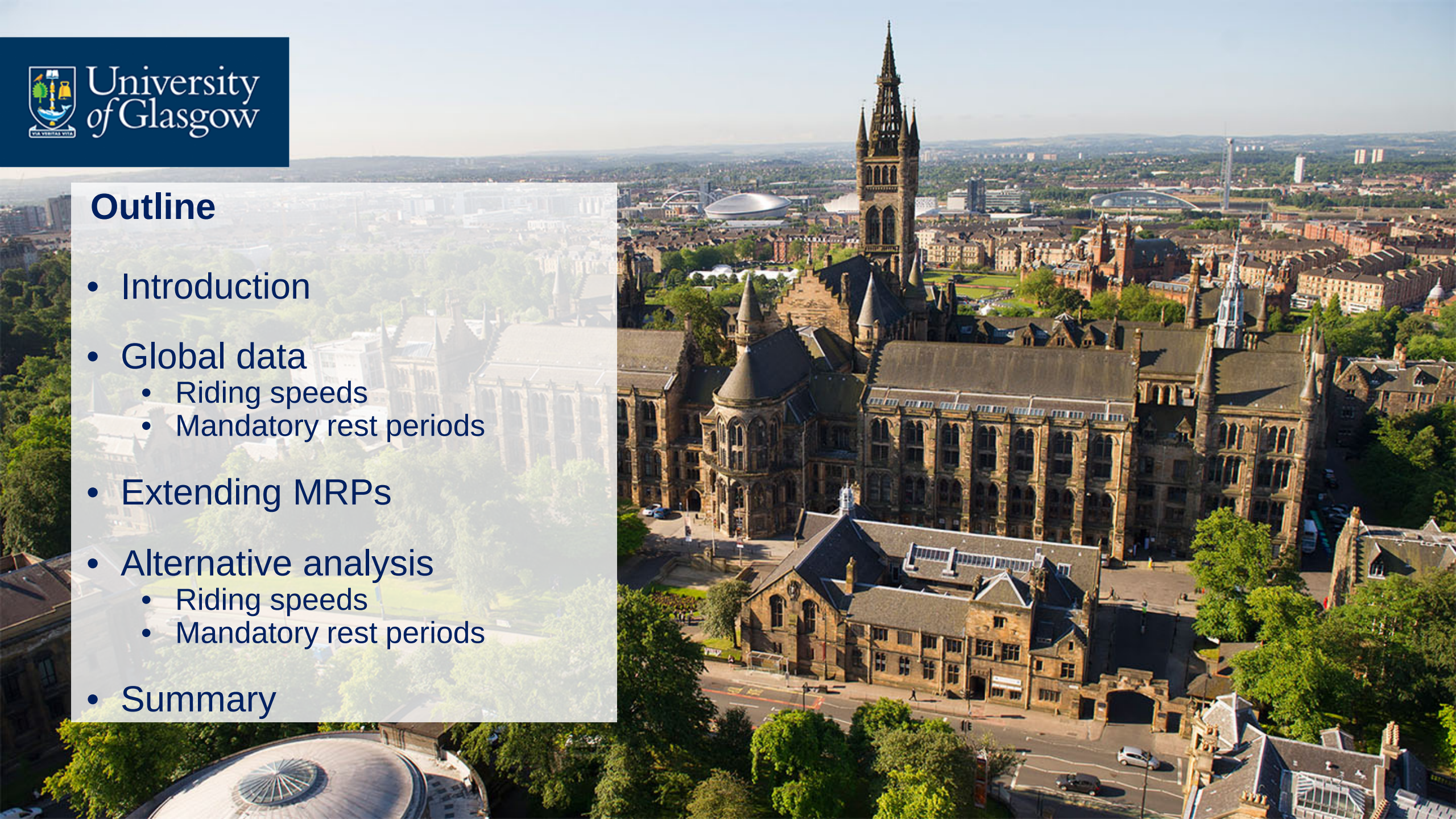
Dubai, April 2018



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Outline

- Introduction
- Global data
  - Riding speeds
  - Mandatory rest periods
- Extending MRPs
- Alternative analysis
  - Riding speeds
  - Mandatory rest periods
- Summary

Introduction

Project overview

- Direct collaboration (FEI-funded) between the University of Glasgow and the FEI since November 2015.
- Complete Endurance database of FEI-level rides from 2010-2017 available for study at present.
- 113,834 horse starts in 6,794 events across all nine Region Groups.
- Outcomes studied:
  - Failure to Qualify (FTQ)
  - FTQ due to lameness (FTQ LA)
  - FTQ due to metabolic problems (FTQ ME)

Descriptive statistics - global

- Of 113,834 horse starts during the time period covered:
  - 65,761 (57.8%) successfully completed their ride (Result outcome)
  - 36,389 (32%) received a Failure to Qualify (FTQ) outcome including
    - 23,645 (20.8%) due to lameness/irregular gait (FTQ LA outcome)
    - 6,726 (5.9%) due to metabolic problems (FTQ ME outcome)

Methodology – Multivariable models

Multivariable models

- The results that follow are from what we call a ***multivariable model.***

- These are a type of statistical model that take the data and assess the impact of ***many risk factors at once***.
  - In the case of these results, a total of 43 risk factors were assessed.

- When we report results for one risk factor, please bear in mind that this is taking into account the impact of ***every other risk factor*** that we assessed in the model.

Riding speeds

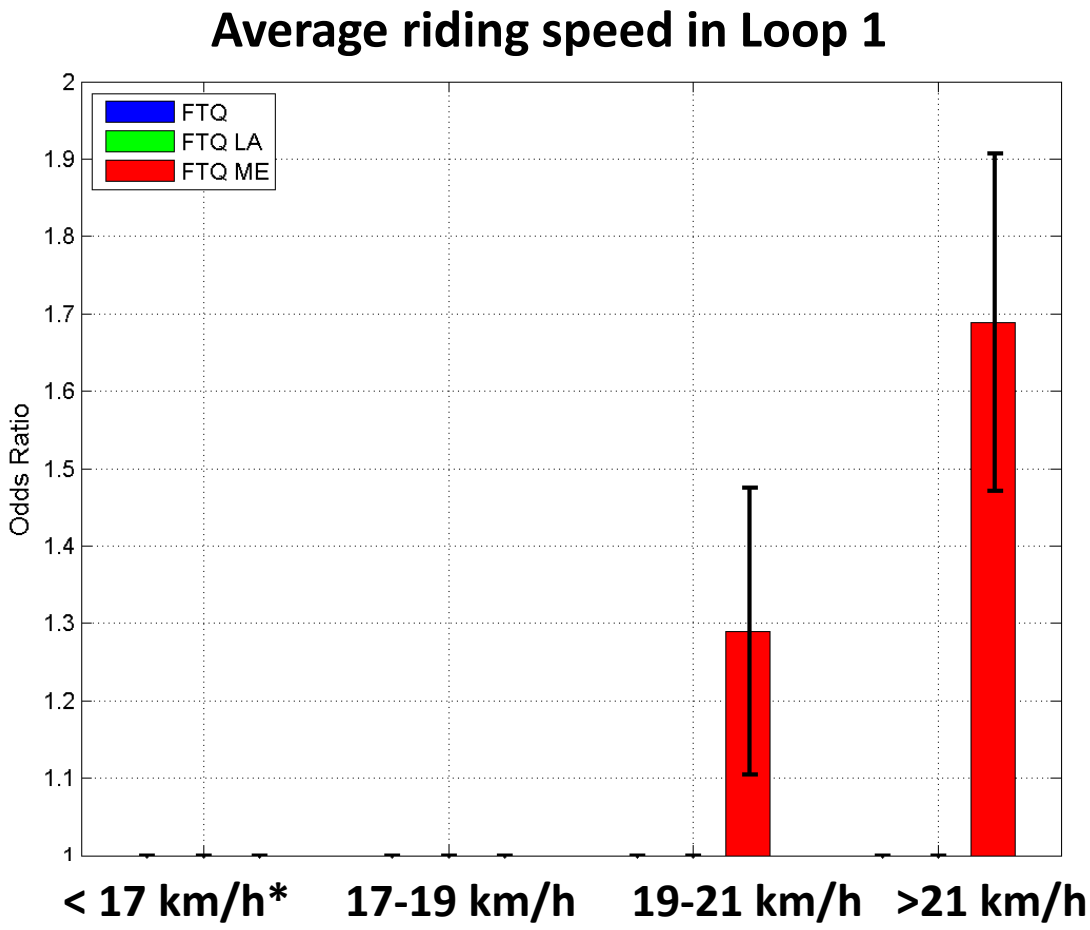
Average riding speeds

- High riding speeds have been a potential explanation for high elimination rates in the past, this is the first global study of them.

- *Risk factors:*
  - *Overall average riding speed for each horse.*
  - *Average riding speed in each loop for each horse.*

Average riding speeds

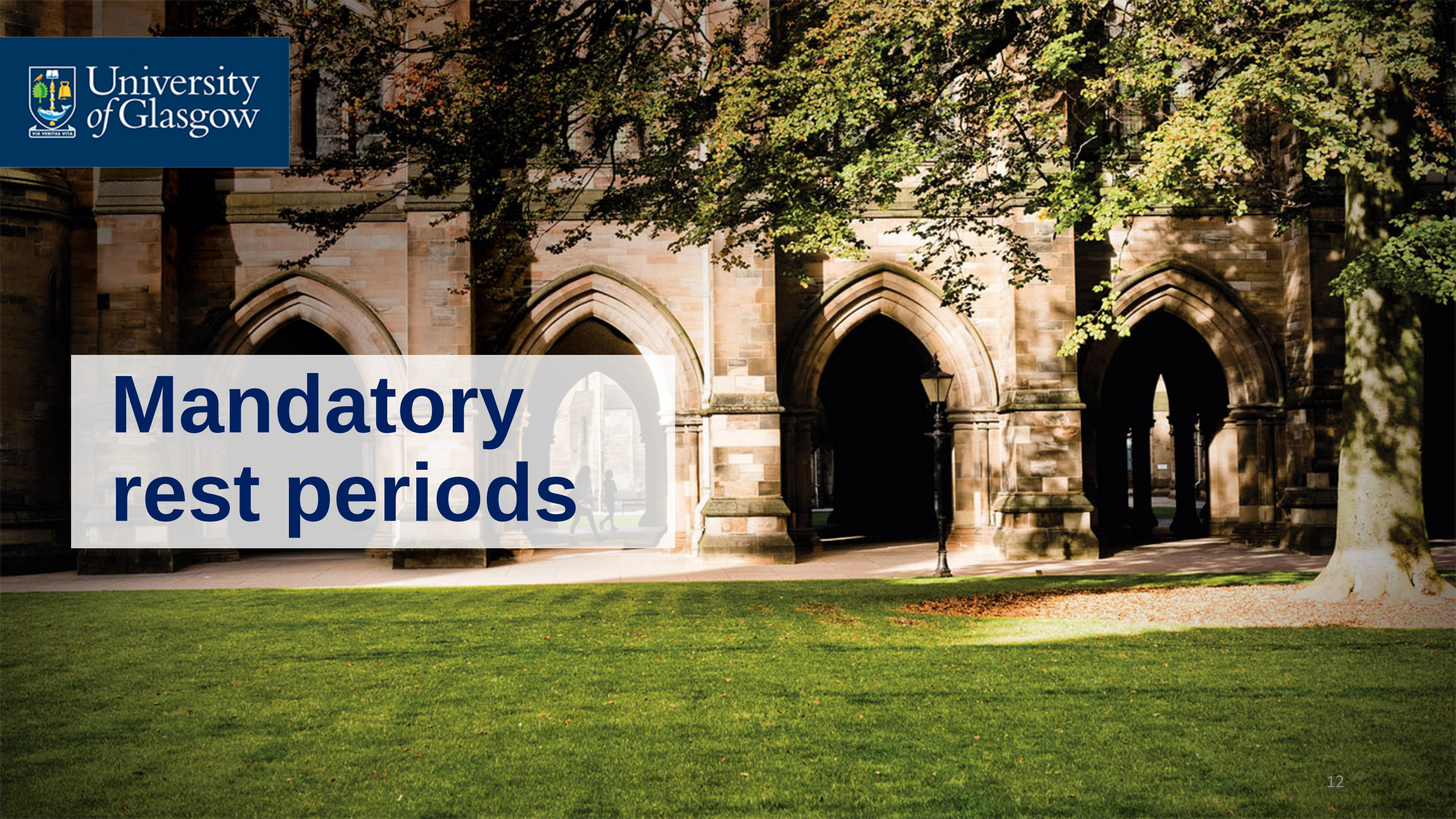
- Example: average riding speed during loop 1 associated with FTQ in loop 3.
- Horses ridden at >19 km/h in loop 1, at increased odds of FTQ ME compared to those ridden at <17km/h in loop 3.
- 30% increase in likelihood of FTQ ME for horses ridden at between 19 and 21 km/h.
- 68% increase for those ridden faster than 21 km/h.



Conclusions – riding speed

- Association between high average riding speeds (particularly during Loops 1 and 2) and FTQ outcomes.

- High riding speeds in Loops 1-2 are particularly associated with FTQ ME outcomes.



Mandatory rest periods

Mandatory rest periods

- Current mandatory rest periods (MRP)
  - Additional rest times if previous ride ended in FTQ.

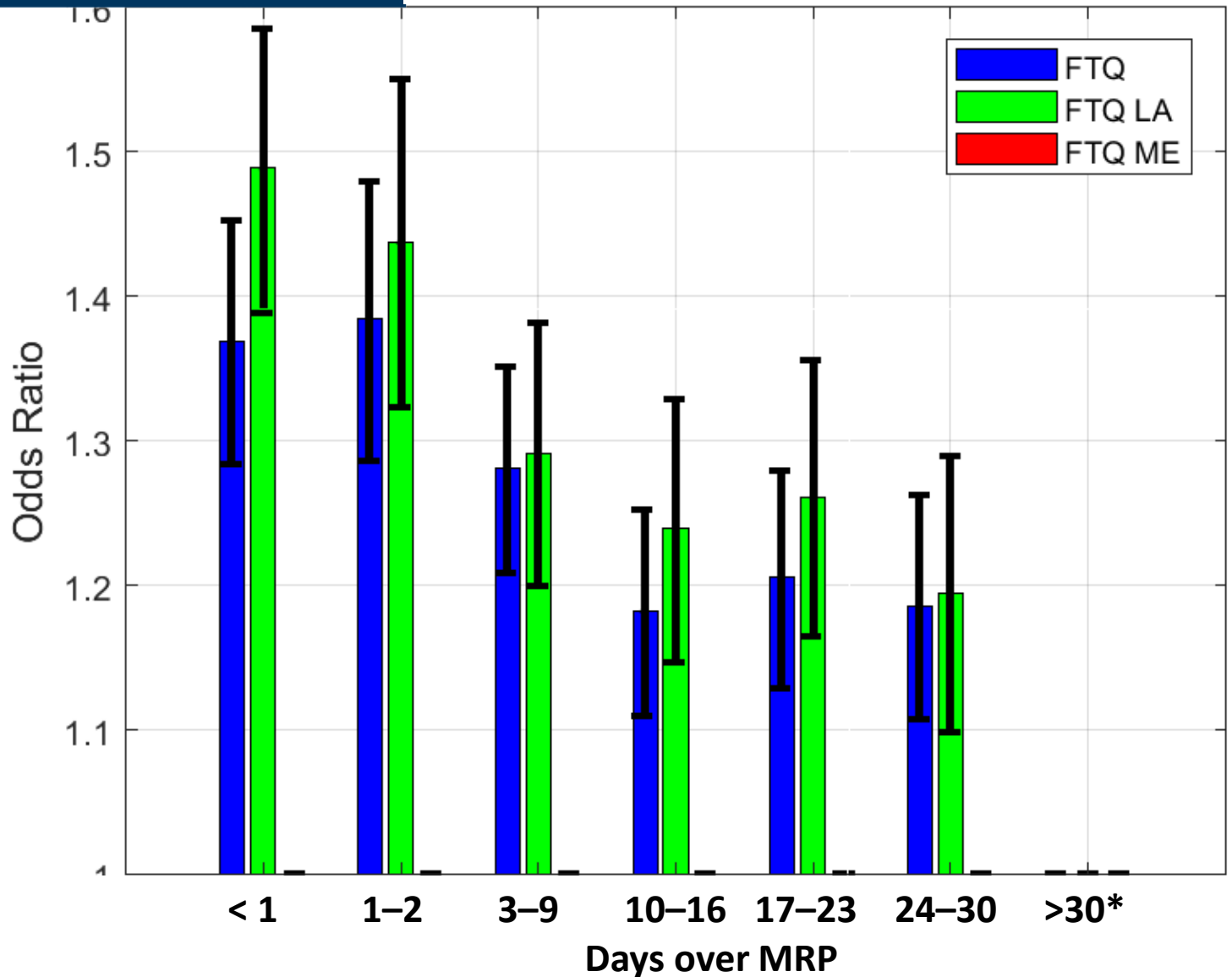
Distance Completed in last ride	MRP (days)	MRP if "irregular gait"	MRP if "invasive treatment"
Start – 40km	5	19	65
40 – 80km	12	26	72
80 – 120km	19	33	79
120 – 140km	26	40	86
> 140km	33	47	93

- New risk factor: days over MRP since last ride.

MRP as a risk factor

- Each returning horse has a “rest time over MRP” based on the applicable mandatory rest period.
- Reference: “greater than 30 days over MRP since previous ride”
- This study used 2014 MRPs – the category “less than 1 day over MRP since previous ride” mostly includes pre-2014 rides.

Days over MRP since last ride



Simple message:

- The longer you wait between rides* the lower the risk of FTQ in the next ride

*up to 30 days in this analysis

Conclusions – rest periods

- Horses with shorter rest periods between rides are more likely to FTQ.
- Horses returning after FTQ outcomes are more likely to experience the same outcome again.
- Mandatory rest periods could be increased as an effective preventative measure, benefitting ***all*** horses.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Extending MRPs

FTQs prevented by MRPs

- Current mandatory rest periods have been in place since 2014 – covering 3 out of 7 years studied.
- Possible to estimate how many horses “saved” from FTQ.
- Can also estimate the potential impact of extending MRPs.

Extending MRPs

- The mandatory rest period a horse must observe after a ride depends on the distance it covered during that ride.

- Given the risks associated with high riding speed, MRPs could also take into account the recorded speed of the horse during the ride.

- Nine scenarios used to calculate the number of FTQ outcomes that would have been prevented under increased MRPs.

Extending MRPs

- **Model type 1:** extend MRPs for everyone i.e. a flat increase to each existing MRP.

- **Model type 2:** extend MRPs **only** for horses recorded as riding “fast” (e.g. >20 km/h) during the completed stages of their previous ride.

- **Model type 3:** extend MRPs for everyone, with an additional MRP for those riding “fast” in the completed stages of their previous ride.


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Results

Potential impact – FTQ LA + FTQ ME outcomes

NUMBER OF FTQ OUTCOMES PREVENTED	No penalty for speed	+7 days for speeding	+14 days for speeding
Current MRPs	163 (7.2%)	275 (9.4%)	307 (8.8%)
+ 7 days for all	358 (9.4%)	441 (10.1%)	527 (10.9%)
+ 14 days for all	596 (11.3%)	738 (12.9%)	648 (10.6%)

Potential impact – FTQ LA + FTQ ME outcomes

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Current MRPs	163 (7.2%) →	275 (9.4%) →	307 (8.8%)
+ 7 days for all	358 (9.4%) →	441 (10.1%) →	527 (10.9%)
+ 14 days for all	596 (11.3%) →	738 (12.9%) →	648 (10.6%)

Clear benefit of a one-week speeding fine…

… is not doubled by a two-week fine

Potential impact – FTQ LA + FTQ ME outcomes

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+ 14 days for all	596 (11.3%)	738 (12.9%)	648 (10.6%)

Least impact

Potential impact – FTQ LA + FTQ ME outcomes

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+ 7 days for all	358 (9.4%)	441 (10.1%)	527 (10.9%)
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Highest impact but high ‘cost’

Potential impact – FTQ LA + FTQ ME outcomes

NUMBER OF FTQ OUTCOMES PREVENTED	No penalty for speed	+7 days for speeding	+14 days for speeding
Current MRPs	163 (7.2%)	275 (9.4%)	307 (8.8%)
Best-value impact			
+ 7 days for all	**358 (9.4%)**	**441 (10.1%)**	527 (10.9%)
+ 14 days for all	596 (11.3%)	738 (12.9%)	648 (10.6%)

Cost-benefit analysis

- “Best value” MRP extension for FTQ outcomes is +7 days for all, with additional +7 days for horses riding >20 km/h in completed loops.
- This would extend MRPs by 7 days for all horses, and an additional 7 days for around 32% of horses.
- However, +14 days for all +7 days for speeding could prevent significantly higher numbers of FTQ outcomes.

Proposed changes

- Recommend extending the present mandatory rest periods as follows:
  - +7 days for all horses (benefits all horses, 9% of horses would have had a longer mandatory wait before returning to competition)
  - +7 days for horses recorded as riding at >20 km/h during completed loops (benefits all horses ridden at >20km/h, 10.8% of horses would have had a longer mandatory wait before returning to competition).
- If acceptable to the community, further benefit could be gained by extending the present mandatory rest periods even further:
  - +14 days for all horses (benefits all horses, 15% would have had a longer mandatory rest period)

Handover to Tim

Areas to emphasise

- Speed and FTQs
  - in the same ride
  - and in the following ride
- MRPs and FTQs
  - ‘Days between competition’
- Cost-benefit analysis
  - Defining costs and benefits
  - Weighing the two against each other
- Produce strong evidence-based advice

Further analysis – riding speed

As EquiRatings presented – outcomes according to completion speed in previous ride

In previous ride	Outcome in next ride				
Speed	Starts	Results	FTQs	Completion rate	FTQ rate
>25	1021	493	372	48.3%	36.4%
22-24	2989	1561	1007	52.2%	33.7%
19-21	9331	5218	3103	55.9%	33.3%
16-18	19674	11161	6515	56.7%	33.1%
<16	19182	11288	6106	58.8%	31.8%
did not finish	32508	18950	9857	58.3%	30.3%

Further analysis – riding speed

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>25	2057	1021	674	49.6%	32.8%
22-24	5000	2989	1462	59.8%	29.2%
19-21	13422	9331	3300	69.5%	24.6%
16-18	27378	19674	6217	71.9%	22.7%
<16	26088	19182	5369	73.5%	20.6%
no speed recorded	10760	0	7238	0.0%	67.3%

What happened in the previous ride?

As EquiRatings presented – outcomes according to completion speed in previous ride

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But what happened in the previous ride?

Focusing only on these 493 "high-performance" Results…

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As Equi-Vision looked – outcomes according to completion speed in previous ride

Further analysis – riding speed

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But what happened in the previous ride?

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Means ignoring 28,921 unique FTQs

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As Equi-Visual did – outcomes according to completion speed in previous ride

Further analysis – UAE rides

As EquiRatings presented – outcomes according to completion speed in previous ride

In previous ride	Outcome in next ride				
Speed	Starts	Results	FTQs	Completion rate	FTQ rate
>25	640	291	239	45.5%	37.3%
22-24	1281	613	428	47.9%	33.4%
19-21	2329	1058	873	45.4%	37.5%
16-18	3103	1425	1163	45.9%	37.5%
<16	1368	675	499	49.3%	36.5%
did not finish	6951	4223	2052	60.8%	29.5%

Further analysis – UAE rides

In previous ride	Outcome in same ride				
Speed	starts	results	FTQs	Completion rate	FTQ rate
>25	1389	640	448	46.1%	32.3%
22-24	2157	1281	565	59.4%	26.2%
19-21	3332	2329	705	69.9%	21.2%
16-18	4212	3101	779	73.7%	18.5%
<16	1943	1368	415	70.4%	21.4%
no speed recorded	2639	0	1778	0.0%	67.4%

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did not finish	6951	4223	2052	60.8%	29.5%

As Equi-Virtual showed – outcomes according to completion speed in previous ride

Further analysis – UAE rides

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But what happened in the previous ride?

As Equipe divided – outcomes according to completion speed in previous ride

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22-24	1281	613	428	47.9%	33.4%
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16-18	3103	1425	1163	45.9%	37.5%
<16	1368	675	499	49.3%	36.5%
did not finish	6951	4223	2052	60.8%	29.5%

Focusing only on these 291 "high-performance" Results…

Means ignoring 5,620 unique FTQs

Further analysis - MRPs

Further analysis – rest periods

Days since last ride	starts	results	FTQs	Completion rate	FTQ rate
<21	4327	1907	1752	44.1%	40.5%
22-28	5190	2414	2114	46.5%	40.7%
29-35	4909	2397	1902	48.8%	38.7%
36-42	3938	1998	1508	50.7%	38.3%
43-49	3658	1976	1284	54.0%	35.1%
50-56	3958	2159	1410	54.5%	35.6%
57-63	3305	1801	1200	54.5%	36.3%
64-365	45604	26491	14473	58.1%	31.7%
>365	9816	5449	3278	55.5%	33.4%

As EquiRatings presented – outcomes according to days since last ride

Further analysis – rest periods

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22-28	5190	2414	2114	46.5%	40.7%
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43-49	3658	1976	1284	54.0%	35.1%
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64-365	45604	26491	14473	58.1%	31.7%
>365	9816	5449	3278	55.5%	33.4%

As EquiRatings presented – outcomes according to days since last ride

When presented as days over MRP since last ride the data is consistent with the above

Days over MRP since last ride	starts	results	FTQs	Completion rate	FTQ rate
<1	3704	1548	1596	41.8%	43.1%
1-2	2323	1016	983	43.7%	42.3%
3-9	4644	2211	1856	47.6%	40.0%
10-16	4682	2365	1769	50.5%	37.8%
17-23	4193	2141	1577	51.1%	37.6%
24-30	3782	1979	1409	52.3%	37.3%
31-365	61377	35332	19731	57.6%	32.1%
>365	8603	4825	2838	56.1%	33.0%

Further analysis – UAE rides

Days since last ride	starts	results	FTQs	Completion rate	FTQ rate
<21	1566	648	642	41.4%	41.0%
22-28	1776	714	743	40.2%	41.8%
29-35	1150	479	458	41.7%	39.8%
36-42	803	372	322	46.3%	40.1%
43-49	536	233	197	43.5%	36.8%
50-56	346	144	133	41.6%	38.4%
57-63	264	106	113	40.2%	42.8%
64-365	5826	2967	1878	50.9%	32.2%
>365	3405	1783	1134	52.4%	33.3%

As EquiRatings presented – outcomes according to days since last ride

Further analysis – UAE rides

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50-56	346	144	133	41.6%	38.4%
57-63	264	106	113	40.2%	42.8%
64-365	5826	2967	1878	50.9%	32.2%
>365	3405	1783	1134	52.4%	33.3%

As EquiRatings presented – outcomes according to days since last ride

When presented as days over MRP since last ride the data is consistent with the above

Days over MRP since last ride	starts	results	FTQs	Completion rate	FTQ rate
<1	1243	504	533	40.5%	42.9%
1-2	810	322	330	39.8%	40.7%
3-9	1556	659	642	42.4%	41.3%
10-16	1035	434	405	41.9%	39.1%
17-23	635	274	255	43.1%	40.2%
24-30	568	259	216	45.6%	38.0%
31-365	9825	4994	3239	50.8%	33.0%
>365	3025	1600	997	52.9%	33.0%

MRPs – Cost-benefit analysis

Recap – proposed changes

- Rules change as voted on at the FEI General Assembly, October 2017
  - +7 days for horses recorded as riding at >20 km/h during completed stages of their previous ride.

- Next few slides show the full cost-benefit analysis for all modelled scenarios of MRPs.

“Costs” and “Benefits”

- “Costs” – the number (or proportion) of horse starts that under the MRP scenario would have had *an extra 7-day period between competitions.*
  - *N.B.* Mandatory Rest Periods enforce only the time between competitions, they do not affect training.

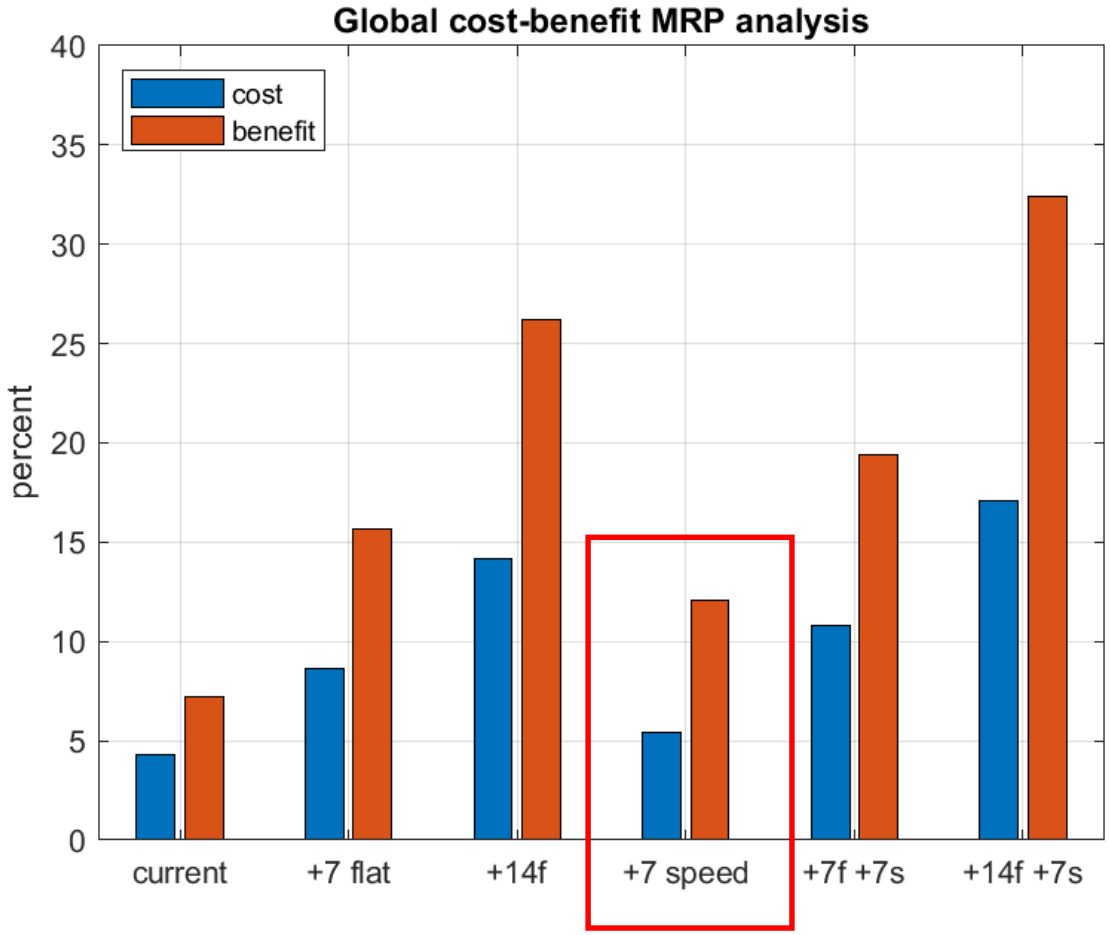
- *“*Benefits” – the number (or proportion) of horse starts resulting in a Failure to Qualify outcome that could have been prevented by having a longer period between competitions.

“Benefits” defined in more detail

- FTQ outcomes vary quite significantly:
  - FTQ due to lameness can be minor or very serious
  - FTQ due to metabolic problems can be simply because of a recorded heart rate slightly above the threshold for the ride, or can be because of serious dehydration or other conditions requiring invasive treatment.
- NB any previous FTQ increases the risk of future FTQ
- Measures that reduce the number of FTQ outcomes **will** reduce the number of **serious** FTQ outcomes
  - Therefore, have significant impact on equine welfare

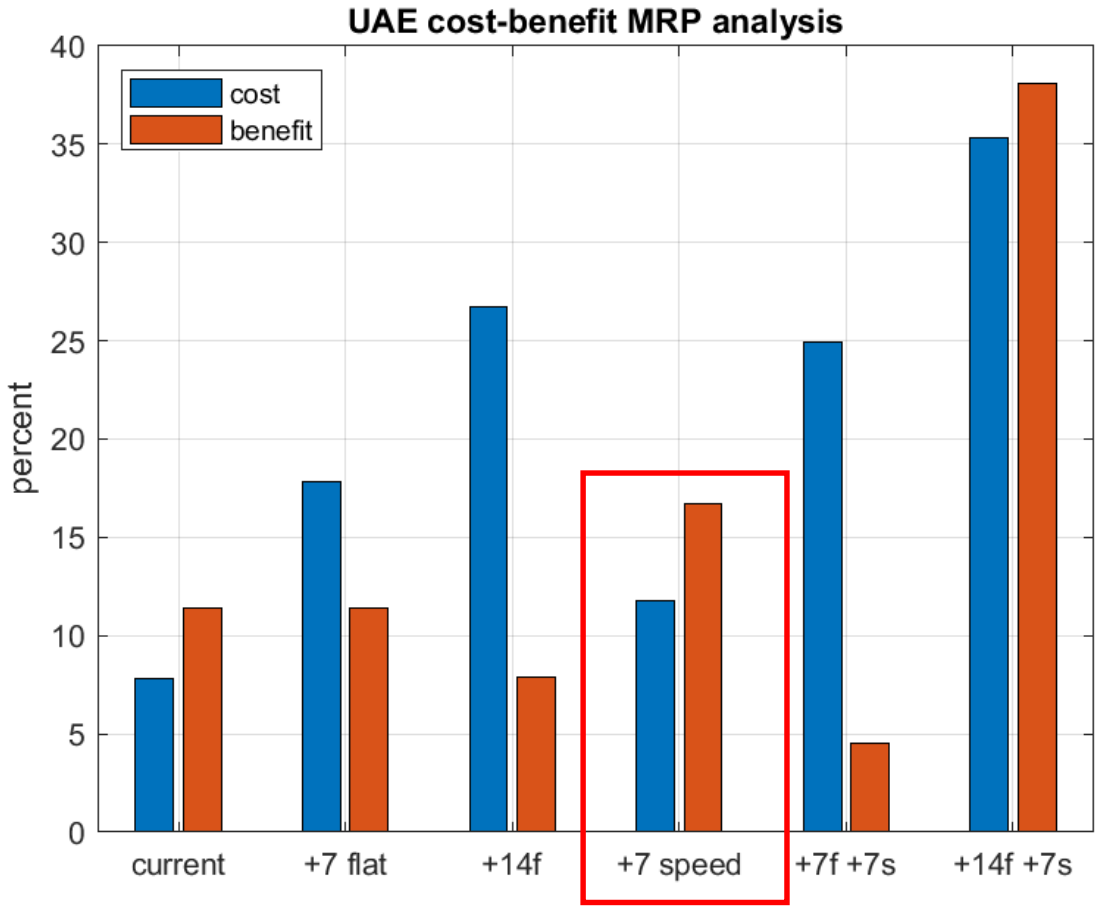
Cost-benefit analysis

- The figure shows the cost-benefit analysis for the Global dataset.



Cost-benefit analysis

- The figure shows the cost-benefit analysis for UAE rides.

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Summary

Summary

- On rest periods, our results are broadly consistent with those presented by EquiRatings – even slightly more time between competitions is associated with higher completion rates and lower FTQ rates.

- On riding speeds, the two presentations diverge because we were focussing on different outcomes.
  - EquiRatings presented results based on successful ride outcomes in a ride according to speed in the previous ride, whereas our study examined risk factors for FTQ outcomes in the current ride.

Summary

- We must allow elite horses to continue to perform at a high level without risking those horses that are unsuited and unprepared for elite competition.

- If the welfare of the horse is to be taken seriously, attention must not only focus on high performing horses at the expense of tens of thousands of horses experiencing FTQs.