



University
of Glasgow

Risk Factors in FEI Endurance Rides 2010-2015

Dr Euan D. Bennet

Dr Tim D. H. Parkin

University of Glasgow

Euan.Bennet@glasgow.ac.uk



- Direct collaboration (FEI-funded) between the University of Glasgow and the FEI
- Complete Endurance database from 2010-2015 available for study
- Data set: 82,917 horse starts in 4,963 events across all nine Region Groups

Project goals

Horse welfare goals

Quantifying risk factors at horse-, rider-, and ride-level.

Through regulation and education, reduce the risks of serious injury.

Allow for extra veterinary attention for horses in high-risk categories, based on past and real-time data during rides.

Academic goals

Large-scale epidemiological study of Endurance riding on an unprecedented scale

Completeness of data set allows detailed investigation of both known and new risk factors.

Predictive models built using many more risk factors than ever previously available.

Project goals

Horse welfare goals

Quantifying risk factors at horse-, rider-, and ride-level.

Through regulation and education, reduce the risks of serious injury.

Allow for extra veterinary attention for horses in high-risk categories, based on past and real-time data during rides.

Academic goals

Large-scale epidemiological study of Endurance riding on an unprecedented scale

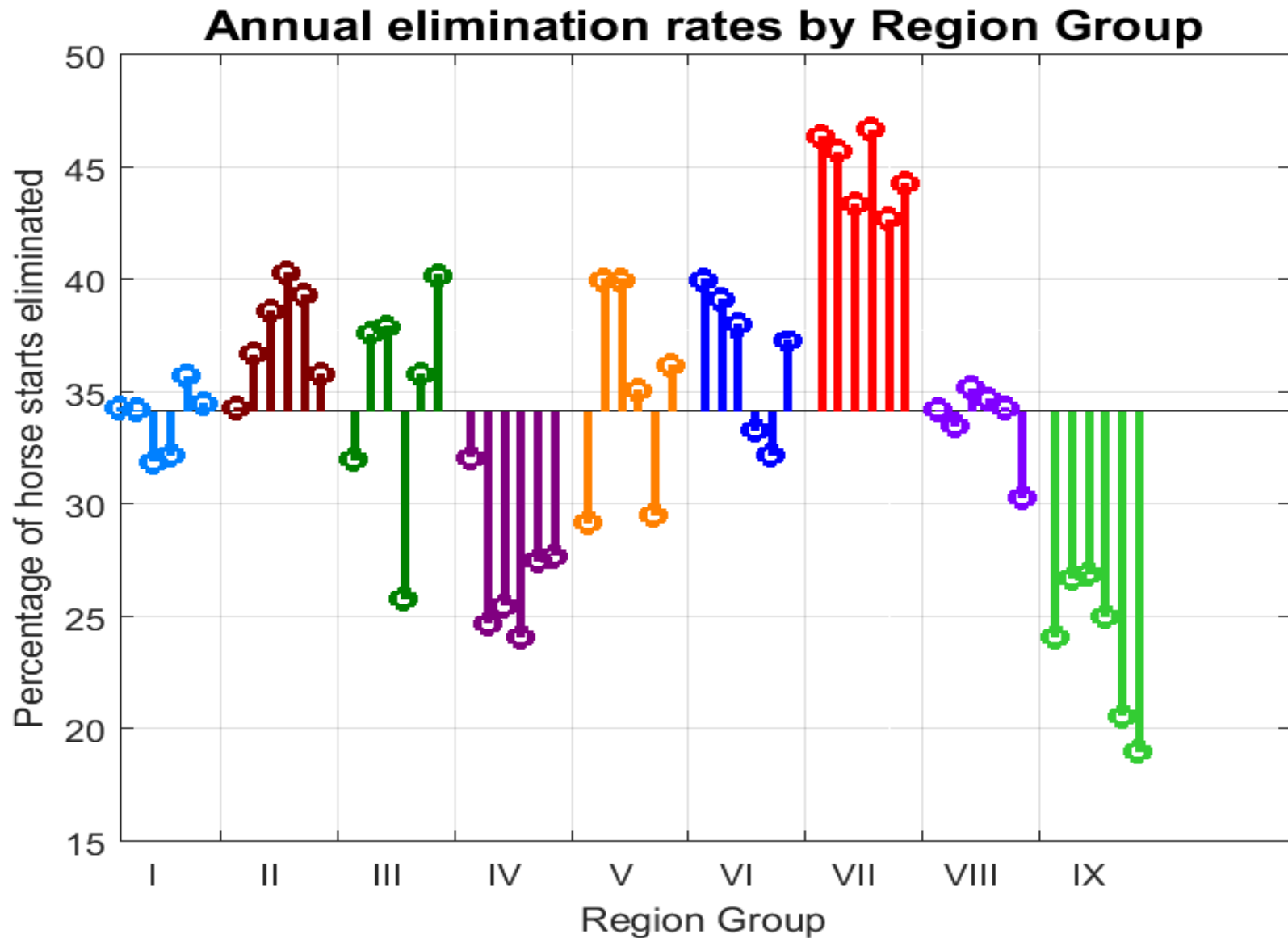
Completeness of data set allows detailed investigation of both known and new risk factors.

Predictive models built using many more risk factors than ever previously available.

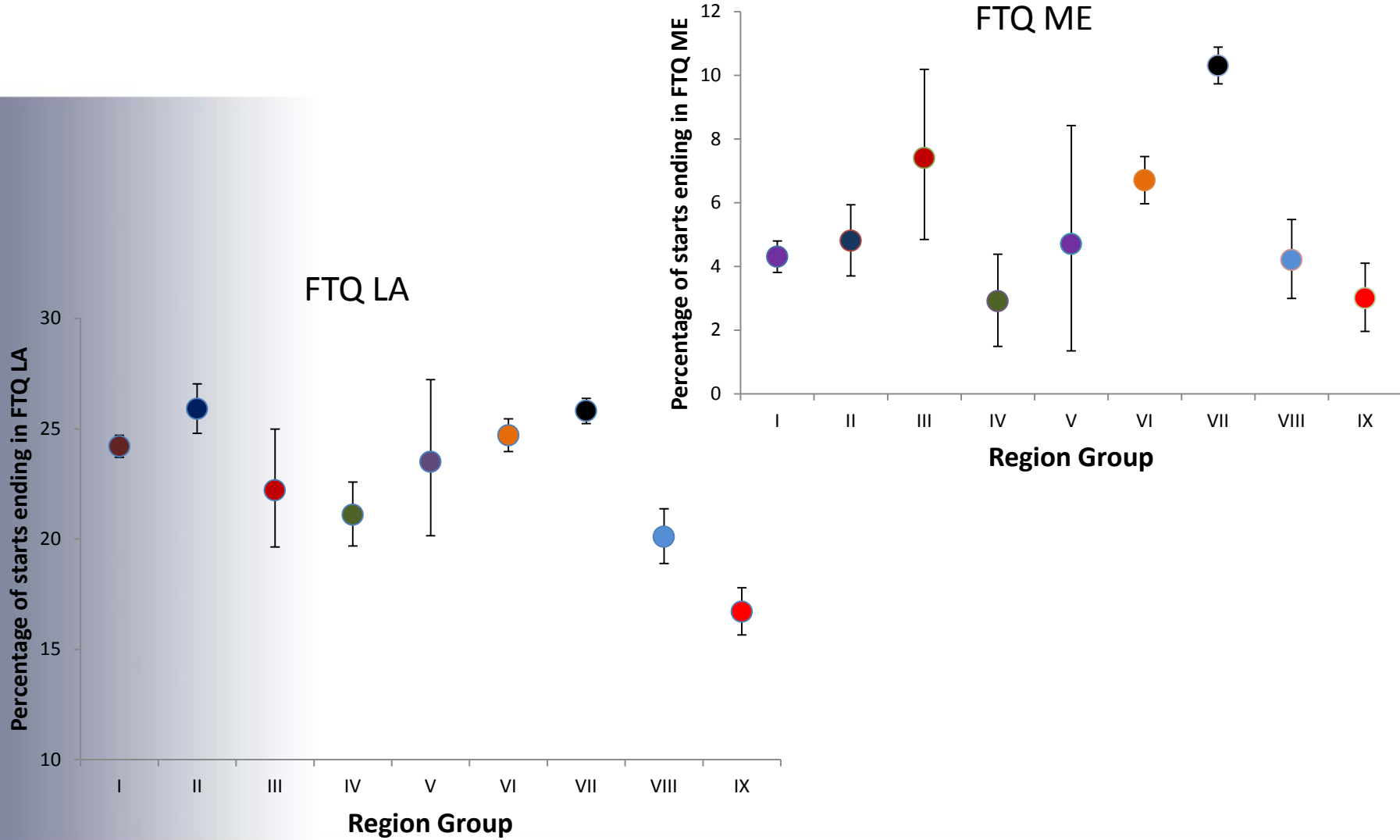
Descriptive statistics

- Of 82,917 horse starts during the time period covered:
 - 47,897 (57.8%) successfully completed the ride
 - 30,455 (36.7%) were eliminated at a vet gate
 - mostly due to a “Failure to Qualify” [FTQ]
 - 4,565 (5.5%) retired voluntarily
- Two sub-categories of FTQ outcome:
 - FTQ due to Lameness (FTQ LA)
 - FTQ due to Metabolic problems (FTQ ME)

Annual elimination rates



FTQ LA and FTQ ME by Region Group



- Three outcomes modelled:
 - Failure to Qualify (any reason): FTQ
 - FTQ due to Lameness: FTQ LA
 - FTQ due to Metabolic problems: FTQ ME
- 21 potential risk factors
- Plus many more created from the original 21
 - Days since previous ride

Outline of results

1. Horse-, Rider-, and Ride-level risk factors
2. Mandatory rest periods
3. Average riding speeds

Risk factors

- Identified risk factors at Rider-level:
 - Male rider (25% increased risk)
 - Rider has one or more previous FTQ MEs (10%)
- Identified risk factors at Ride-level:
 - Region Group (various differences)
 - Ride distance – 120km (20-30%)
 - Year (various different years)
 - Field size – 30+ or 60+ (20%)

Risk factors

- Identified risk factors at Horse level:
 - Entire males (12%)
 - Age – over 12 yr. old (13%)
 - Average riding speed in different loops
- For returning horses:
 - Rest time relative to Mandatory Rest Period
 - Result in previous ride
 - Recent intensity of ride schedule

Mandatory Rest Periods

Mandatory rest periods

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

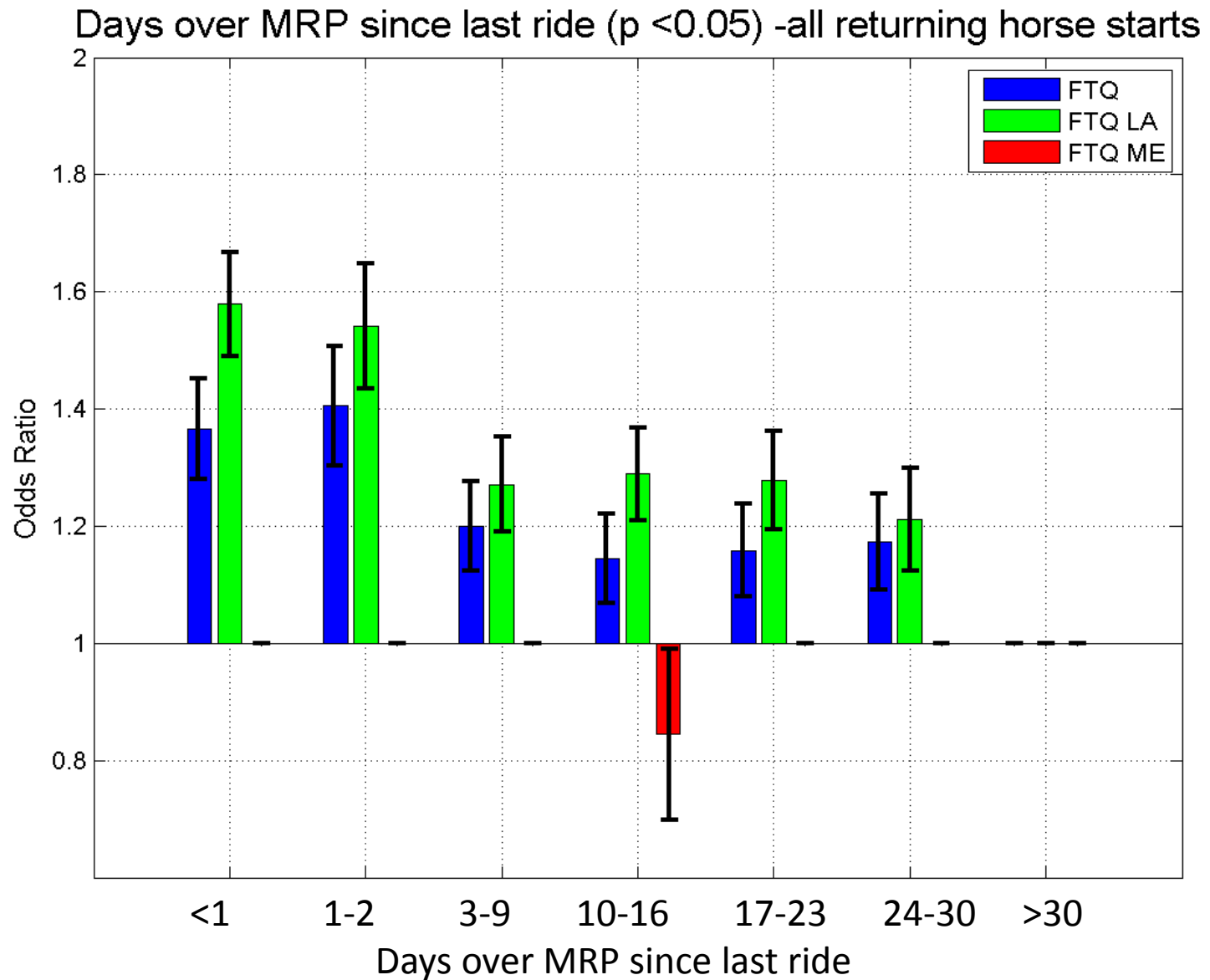
Distance completed in last ride	MRP (days)	MRP if “irregular gait”	MRP if “invasive treatment”
Start – 40km	5	19	65
40 – 80km	12	26	72
80 – 120km	19	33	79
120 – 140km	26	40	86
140km	33	47	93

- 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 category is “greater than 30 days over MRP since previous ride”
- Category “less than 1 day over MRP since previous ride” covers pre-2014 when current MRPs enforced.

Horse-level: Rest time



FTQs prevented by MRPs

- Current mandatory rest periods have been in place since 2014
- Possible to estimate
 - how many horses “saved” from FTQ
 - impact of extending MRPs

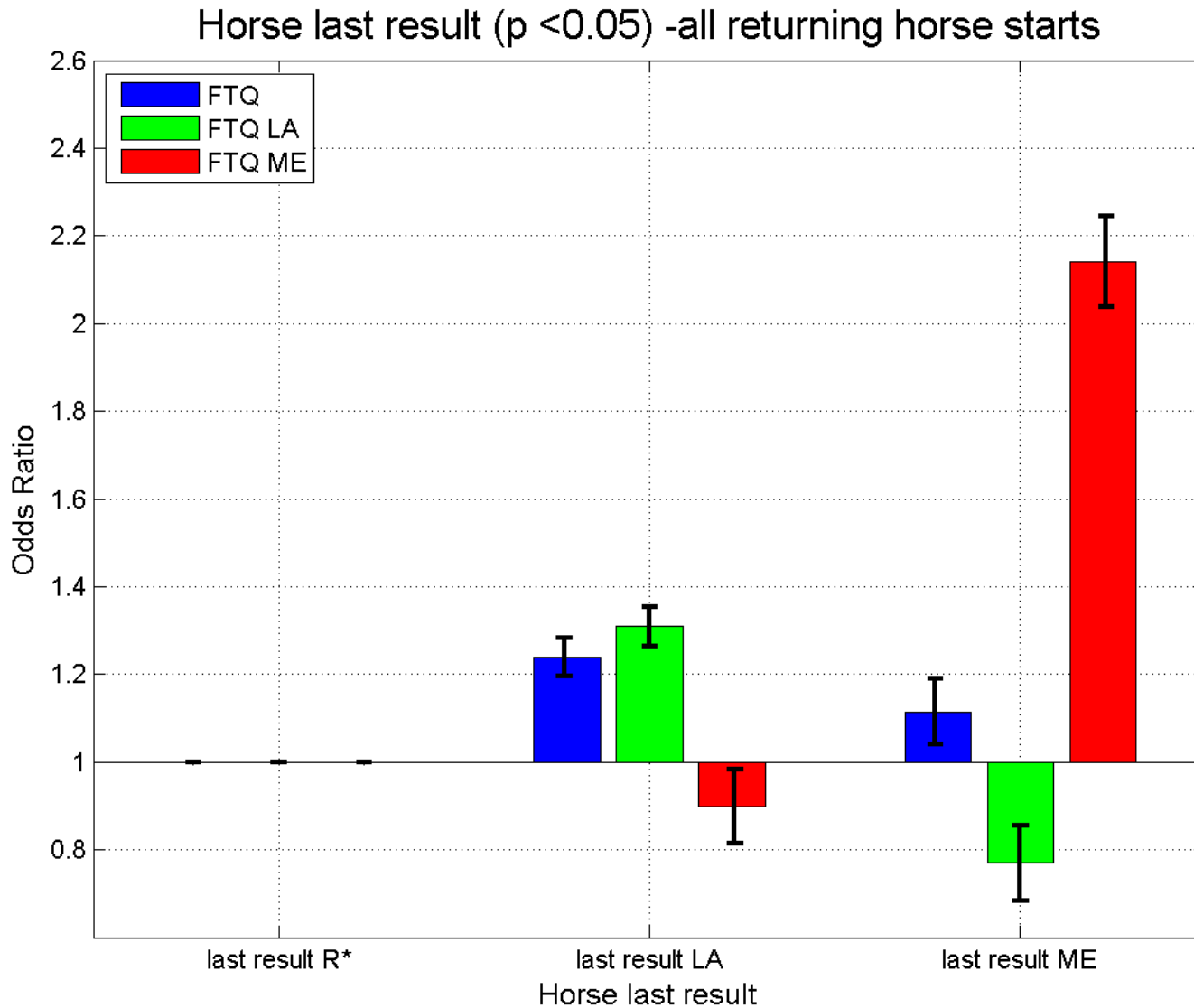
Among all horse starts:

MRP	FTQ LAs prevented
Current	76 (4.6%)
+7 days	266 (10.2%)

Among horses returning after FTQ LA:

MRP	FTQ LAs prevented
Current	34 (3.8%)
+7 days	150 (13.6%)

Result in previous ride



Conclusions – rest periods

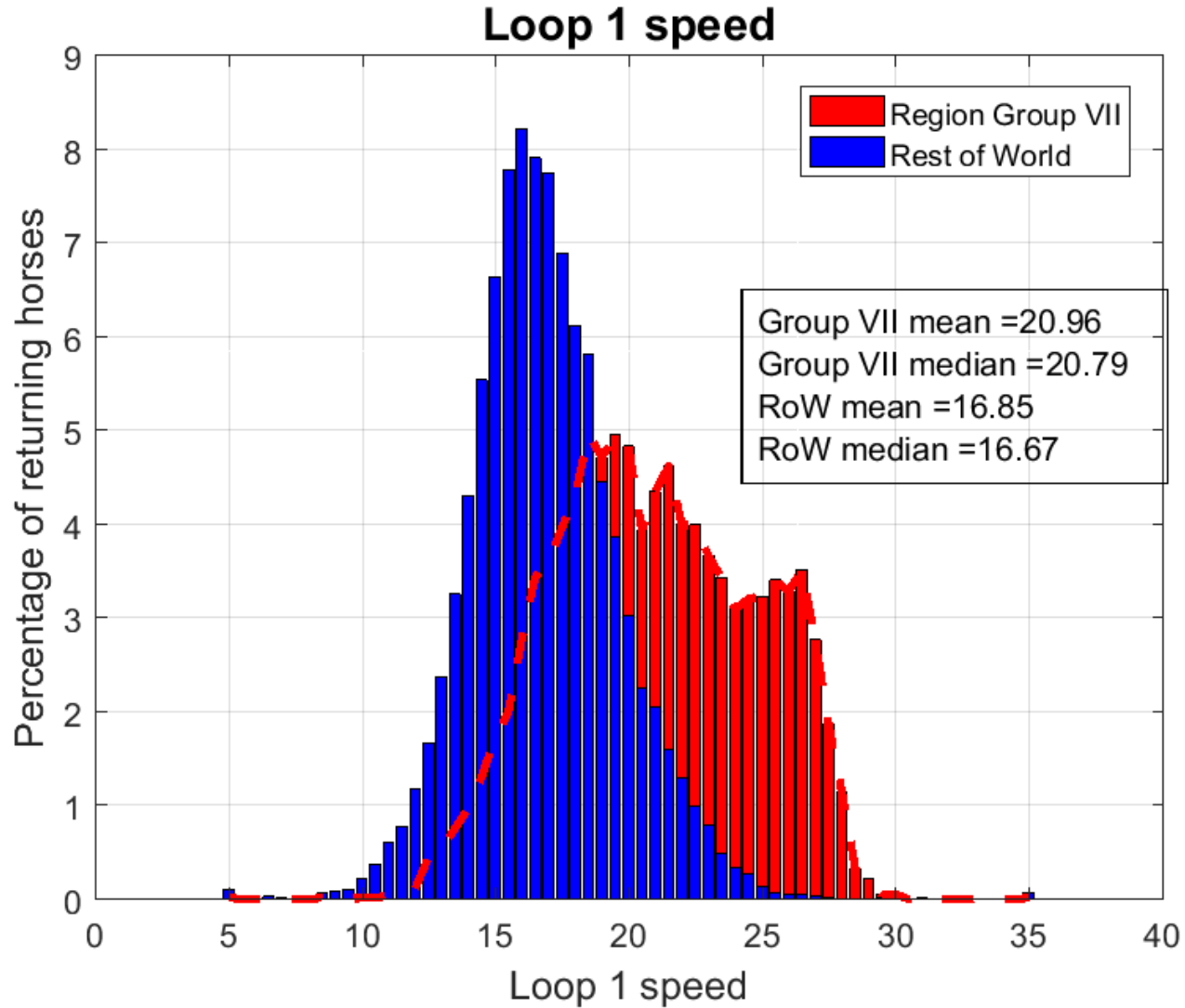
- Horses with longer rest periods between rides are less likely to be injured
- Horses returning after FTQ outcomes are more likely to experience the same outcome again
- Worth further investigation of optimal MRPs following different ride length/result combinations

Average Riding Speeds

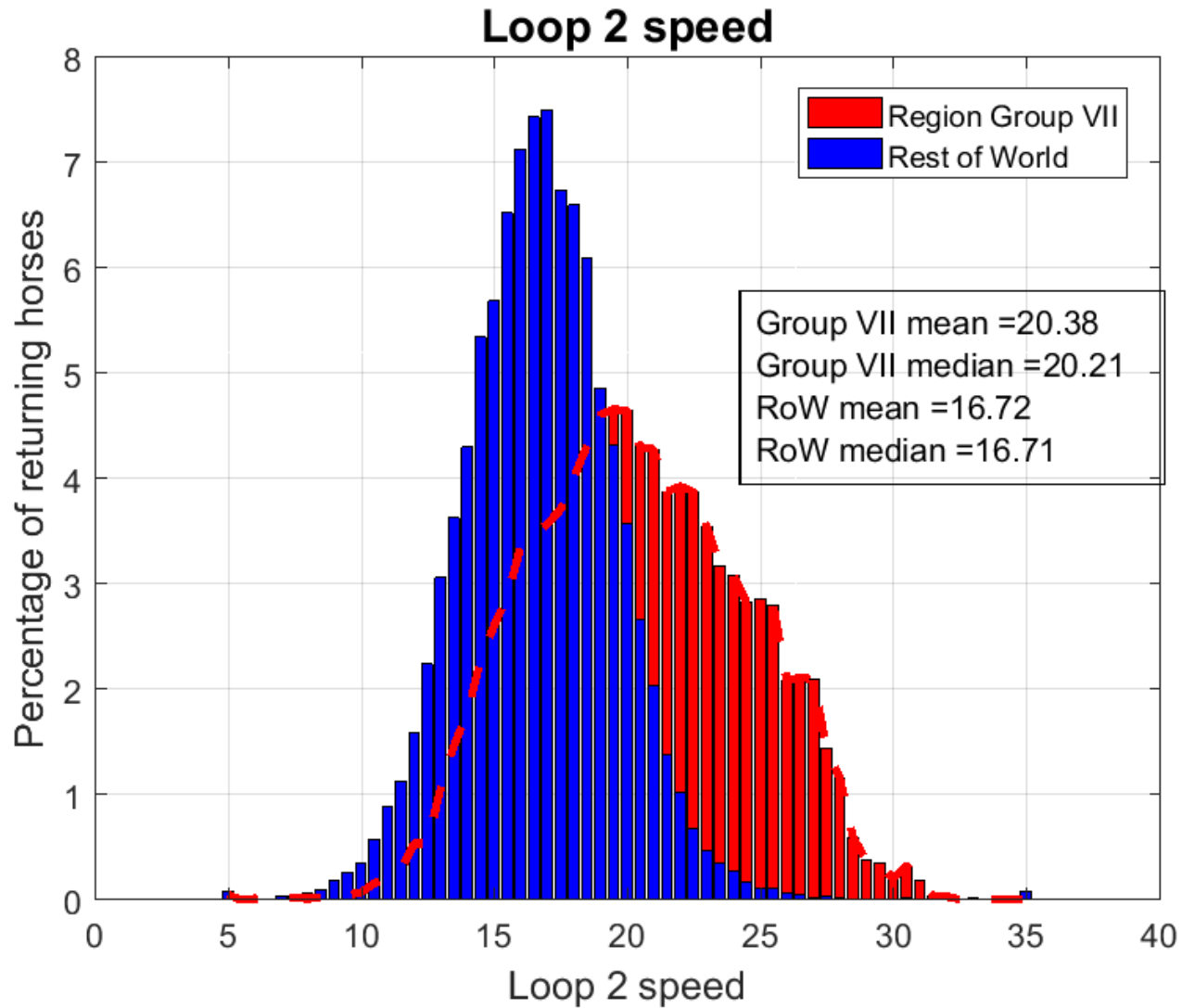
Average riding speeds

- Risk factors: average riding speeds in each individual loop, and for the entire ride
- High riding speeds are continually discussed in relation to high elimination rates in Endurance
- Differences between Region Group VII and the rest of the World

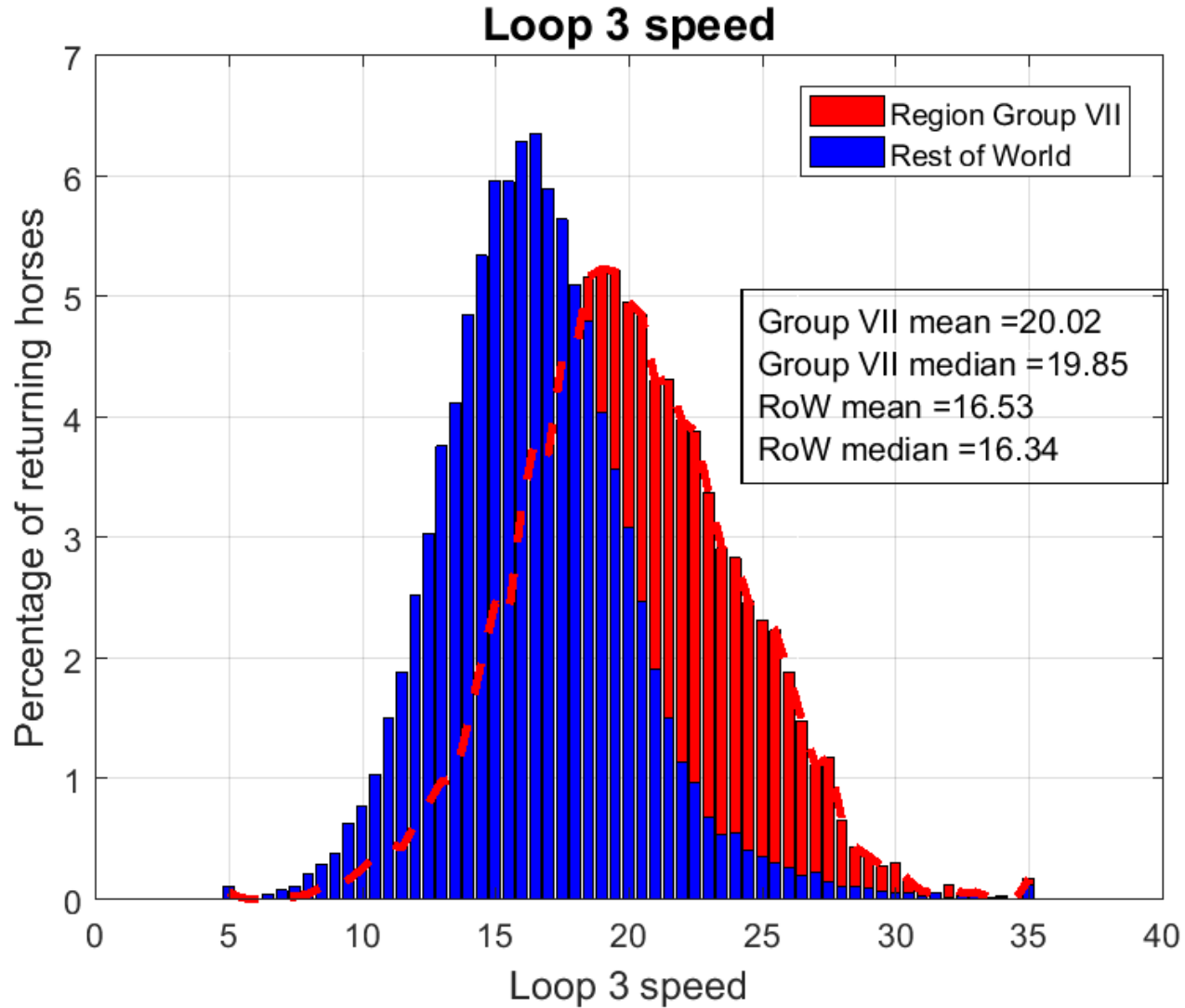
Loop 1 speed



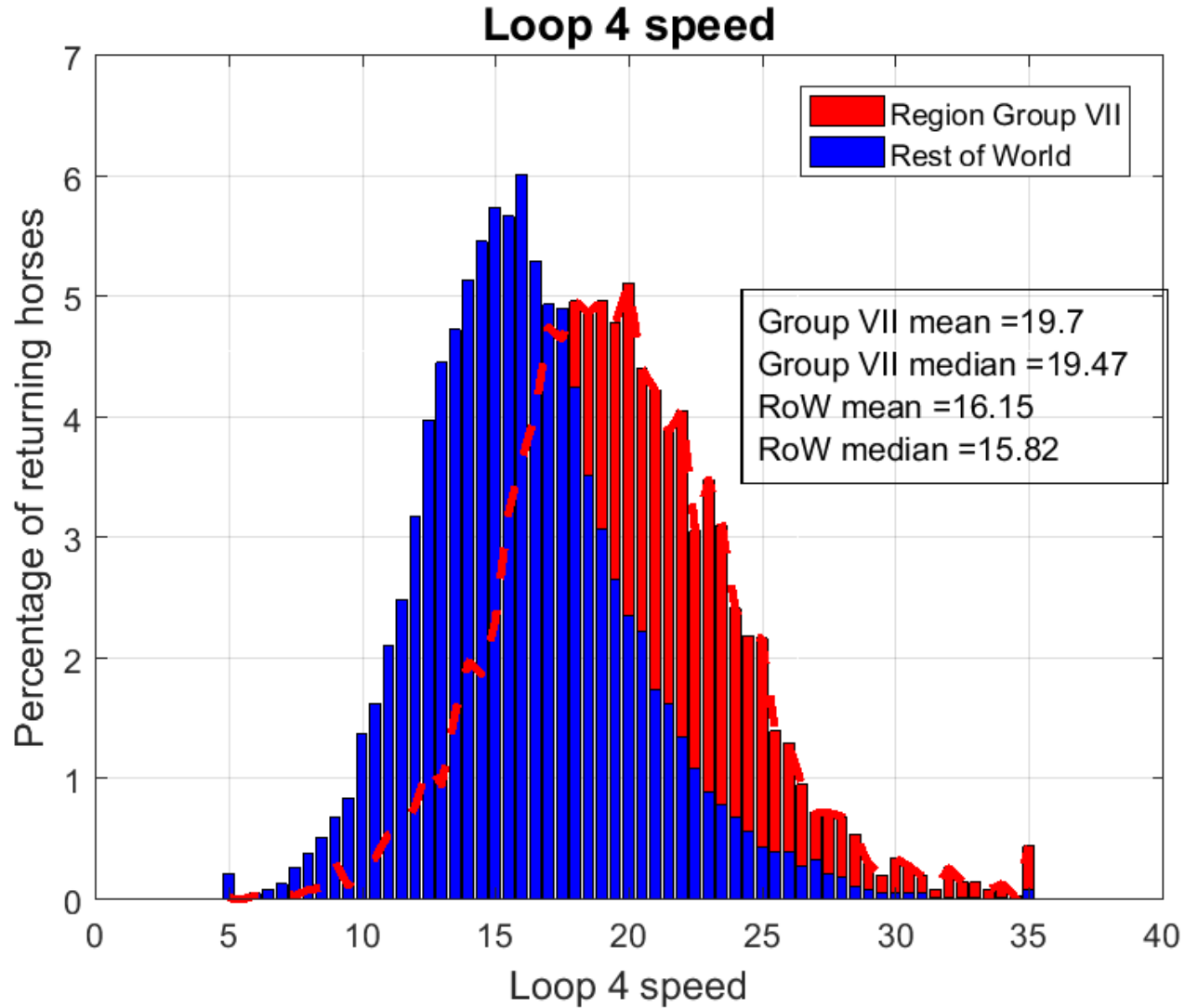
Loop 2 speed



Loop 3 speed



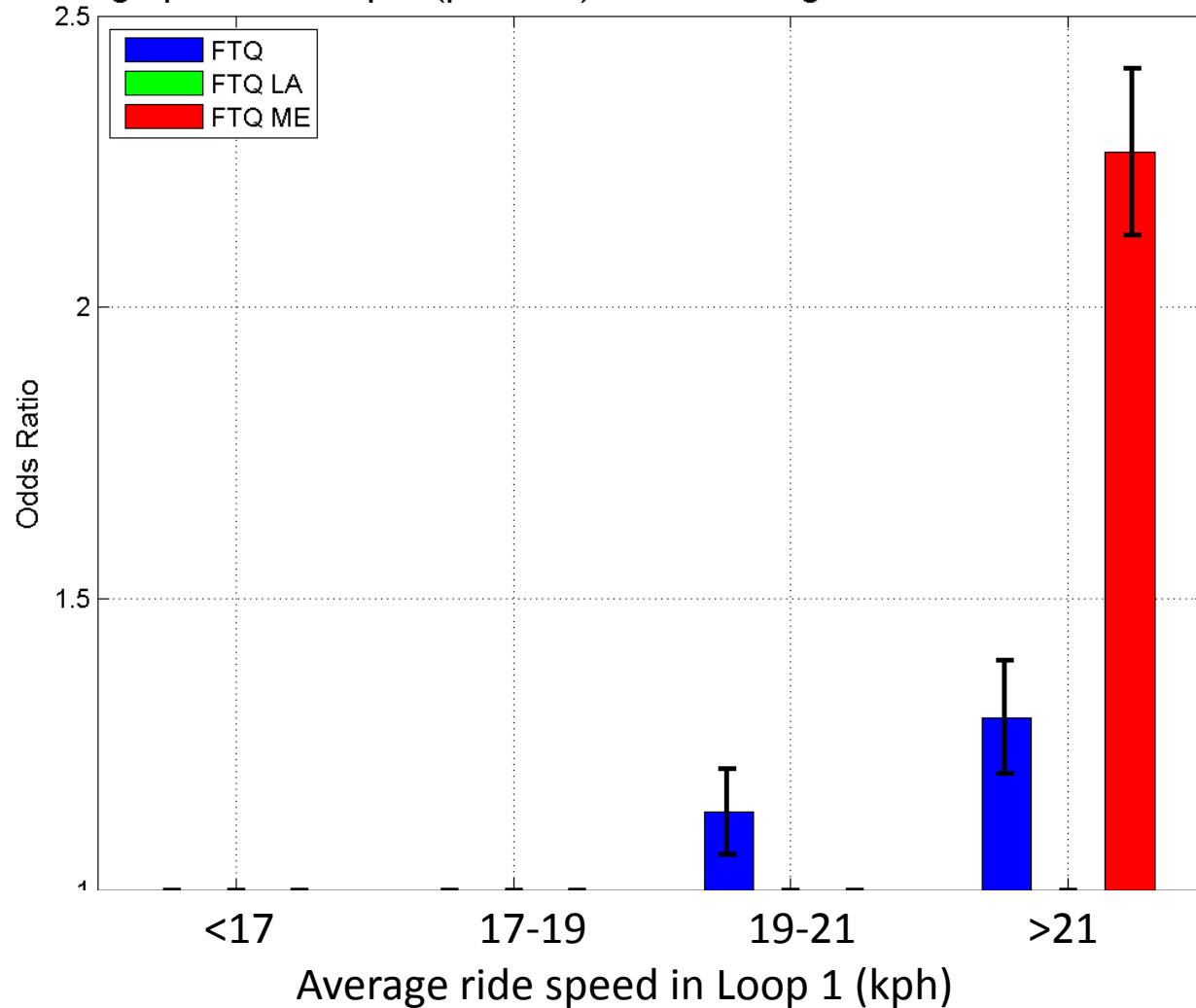
Loop 4 speed



FTQ at any point in ride

Average riding speed in Loop 1

verage riding speed in Loop 1 ($p < 0.05$) -all returning horse starts with L1 and L2 s|



Elimination by Loop

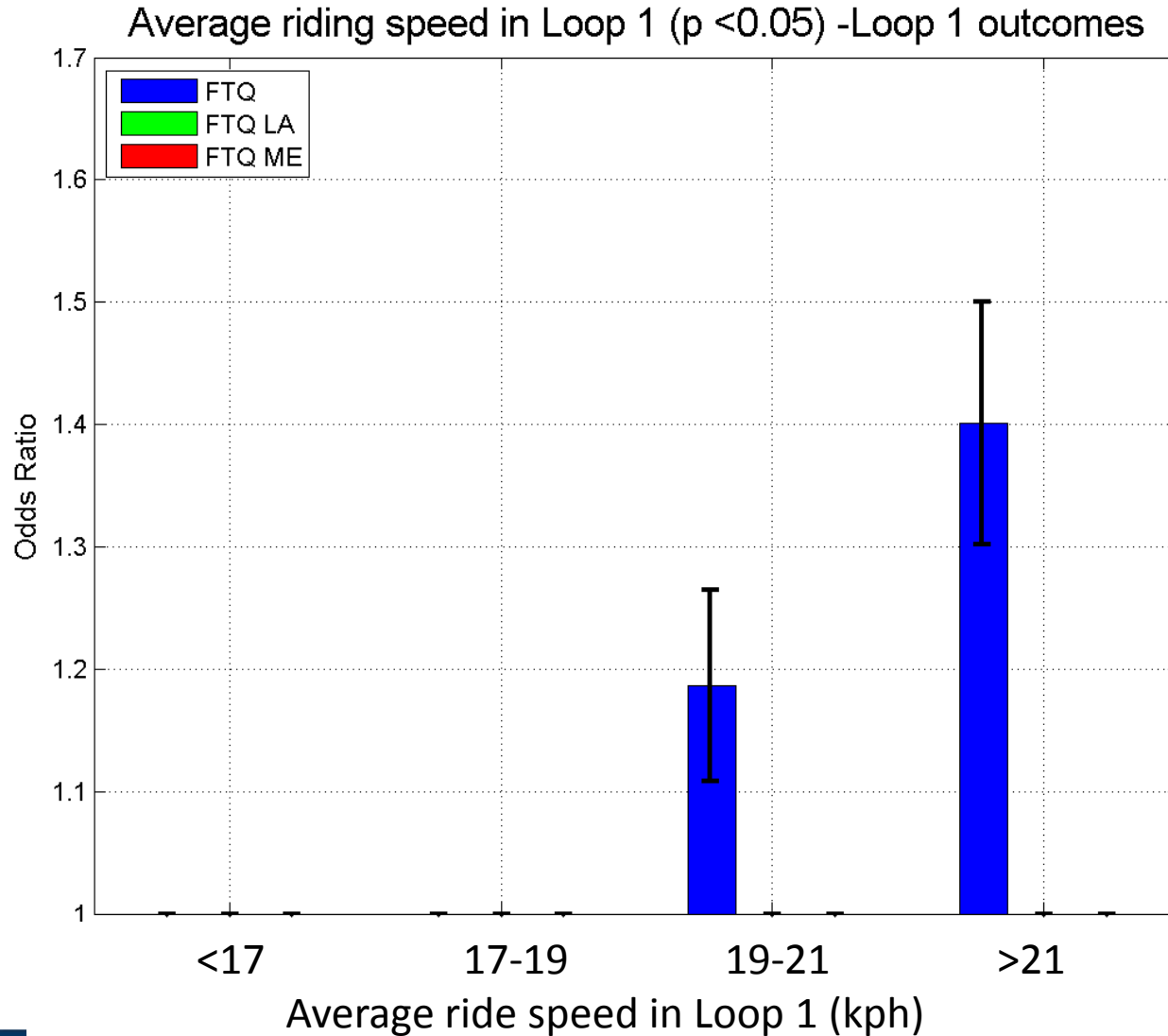
- Up until now we've only seen results based on the overall outcome of the ride.
- Are high average riding speeds in early Loops associated with eliminations in later Loops?

Elimination by Loop

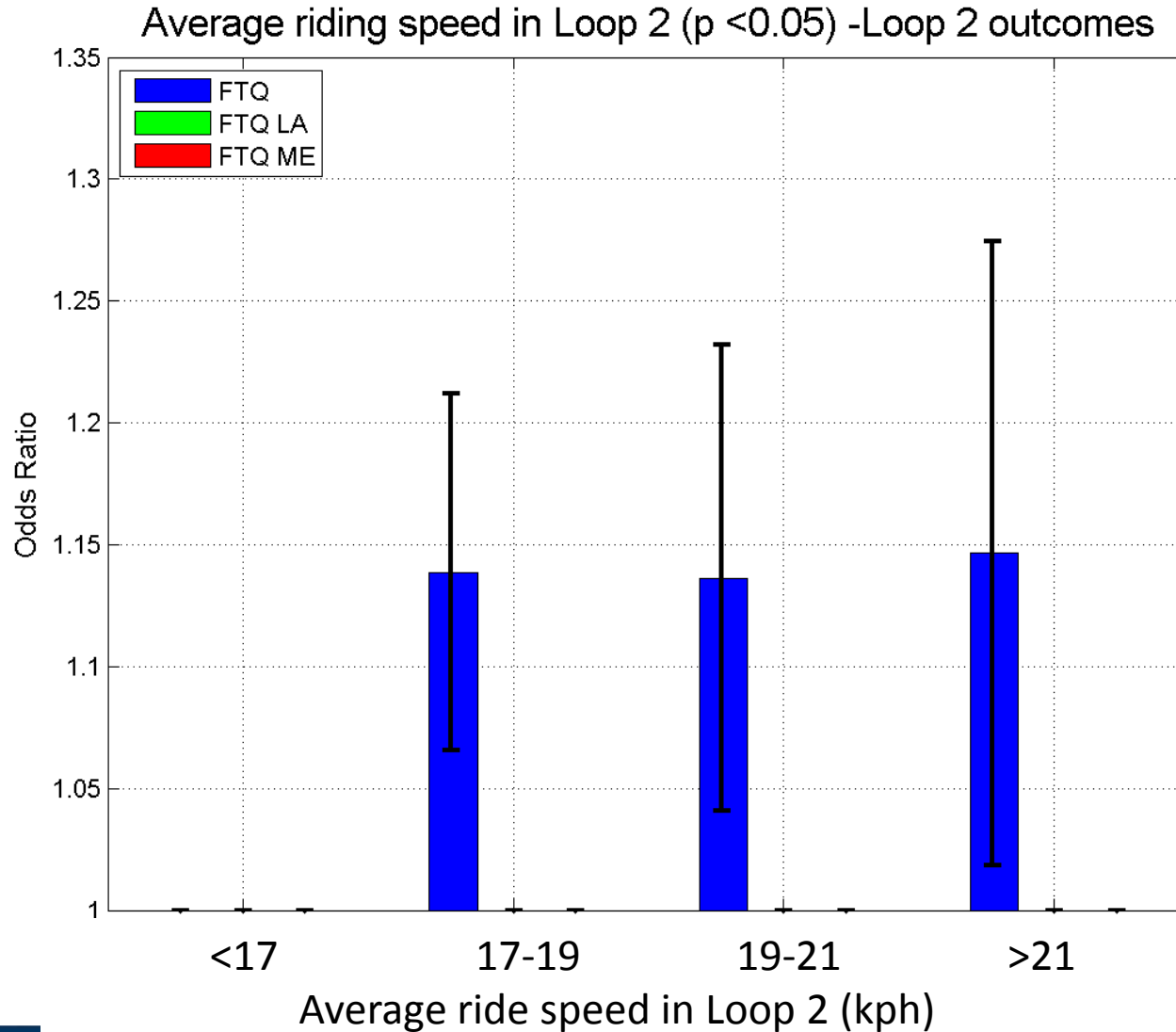
- Up until now we've only seen results based on the overall outcome of the ride.
- Are high average riding speeds in early Loops associated with eliminations in later Loops?

SHORT ANSWER: YES

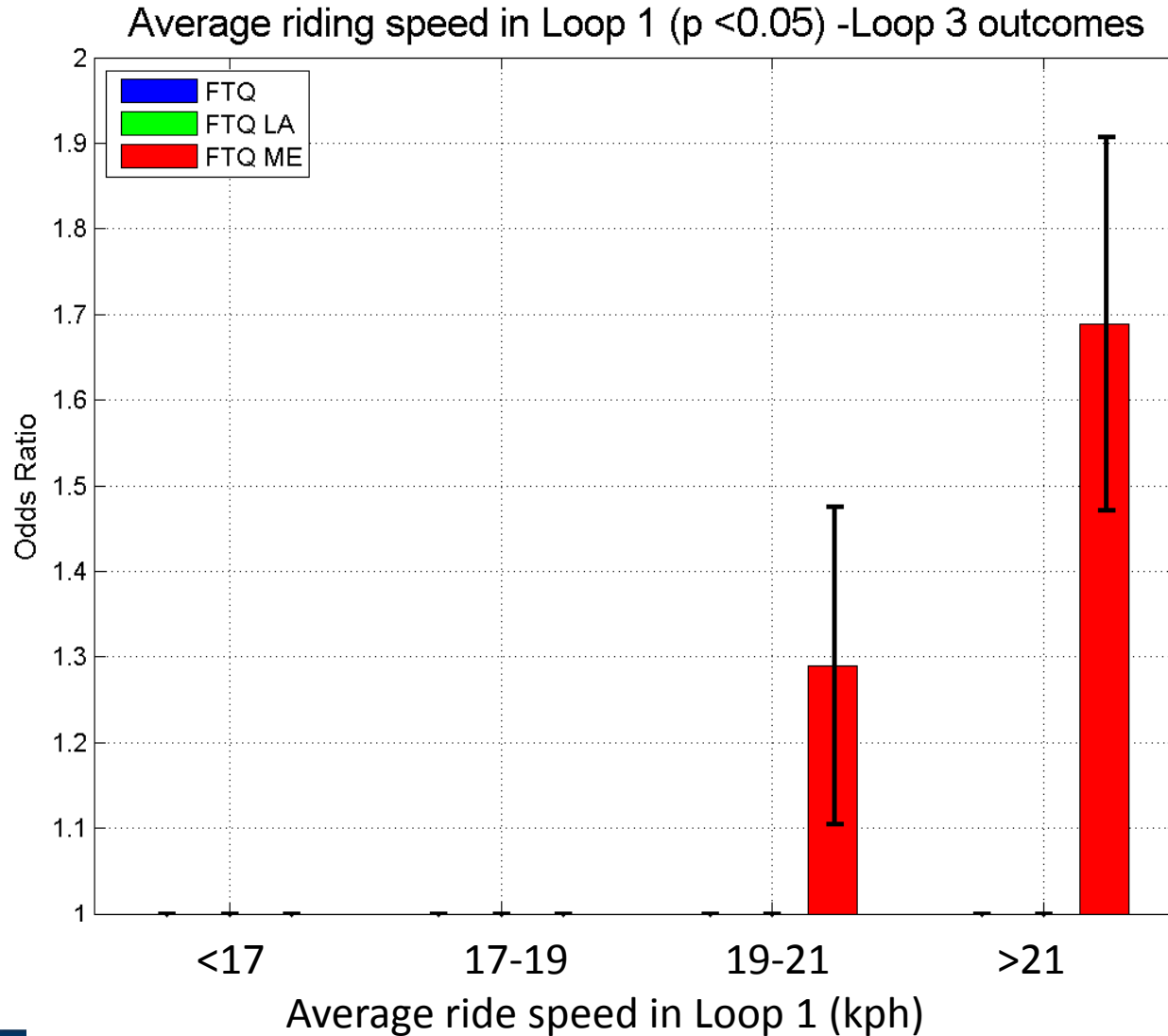
Elimination in Loop 1



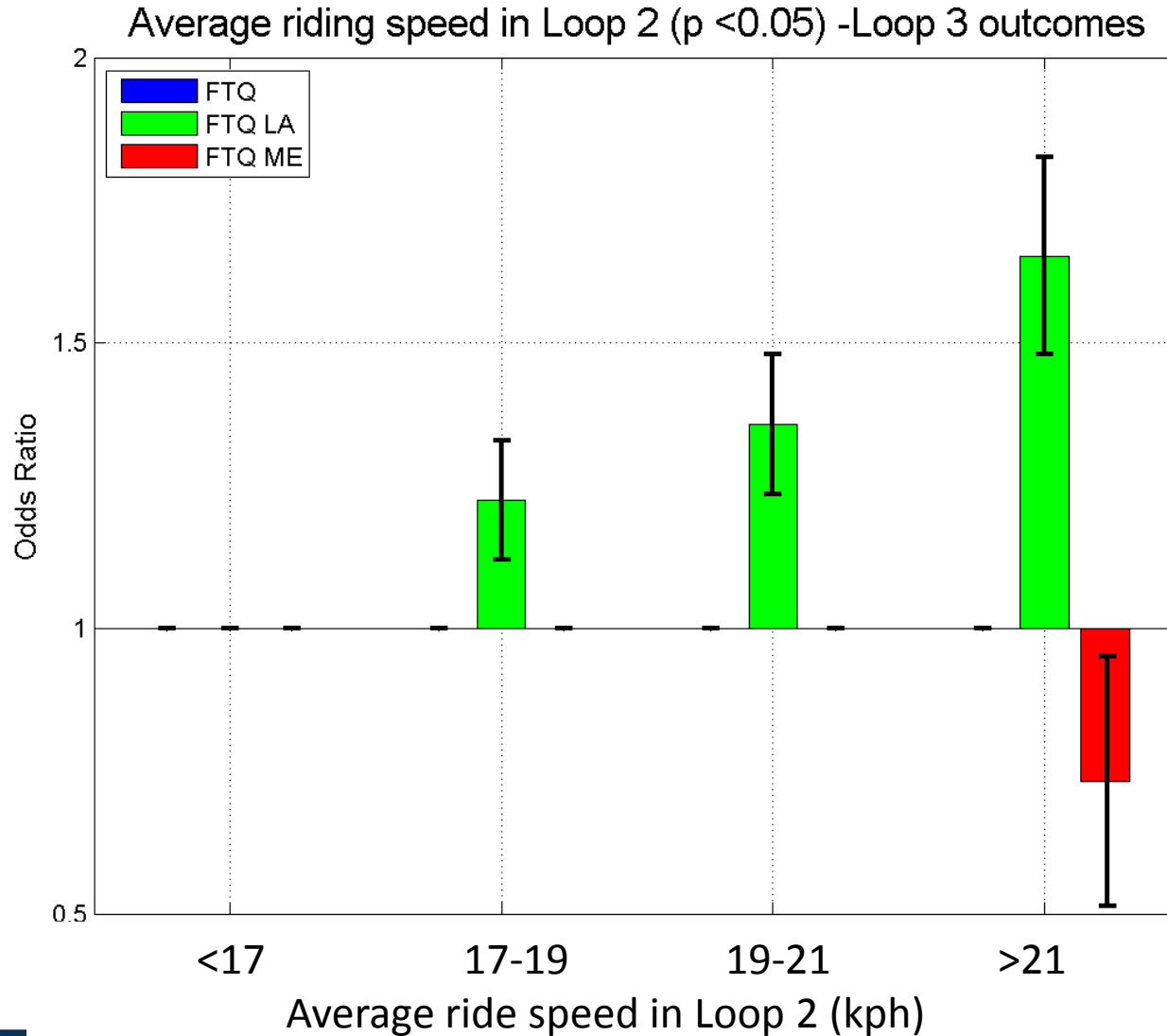
Elimination in Loop 2



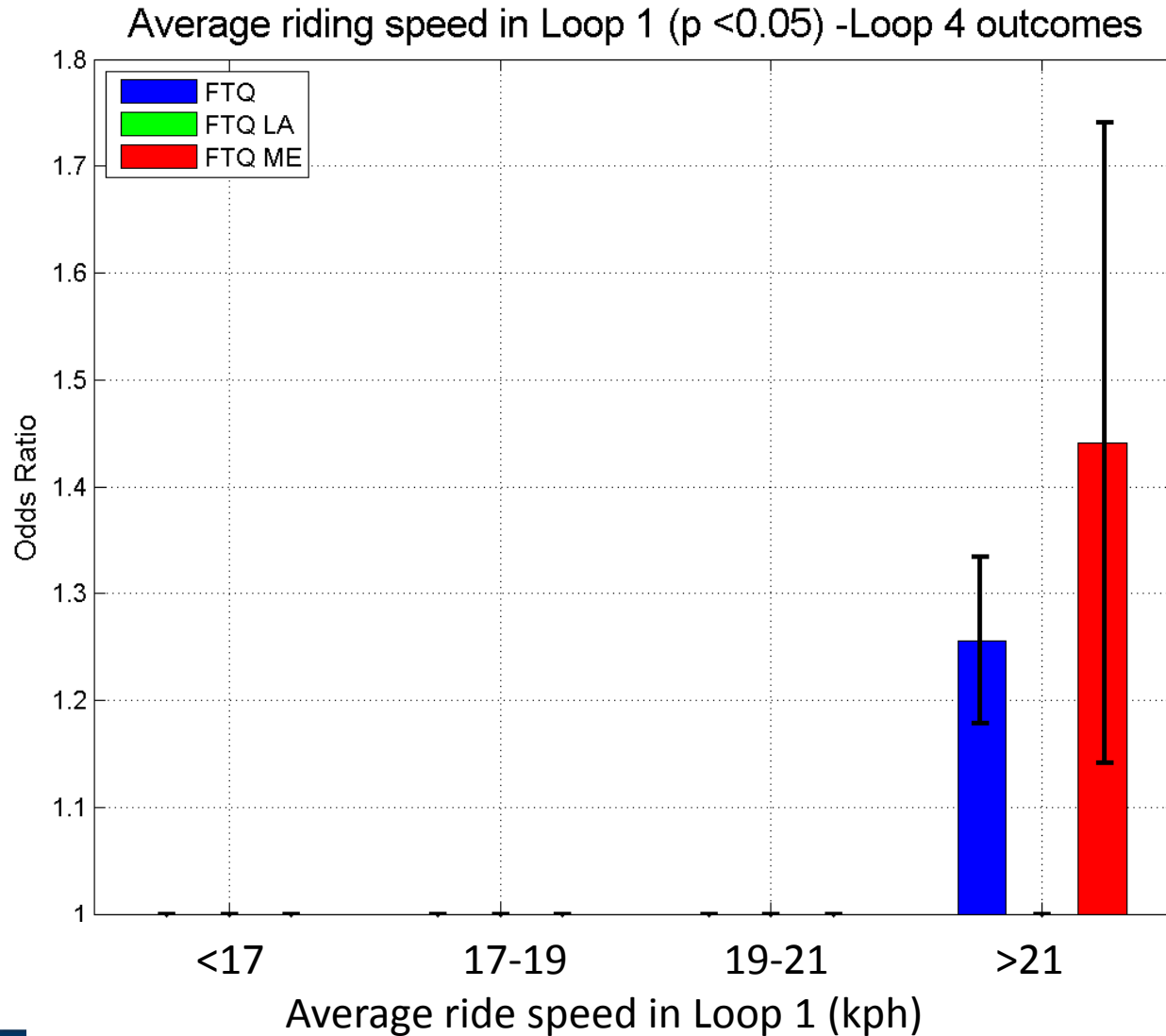
Elimination in Loop 3



Elimination in Loop 3

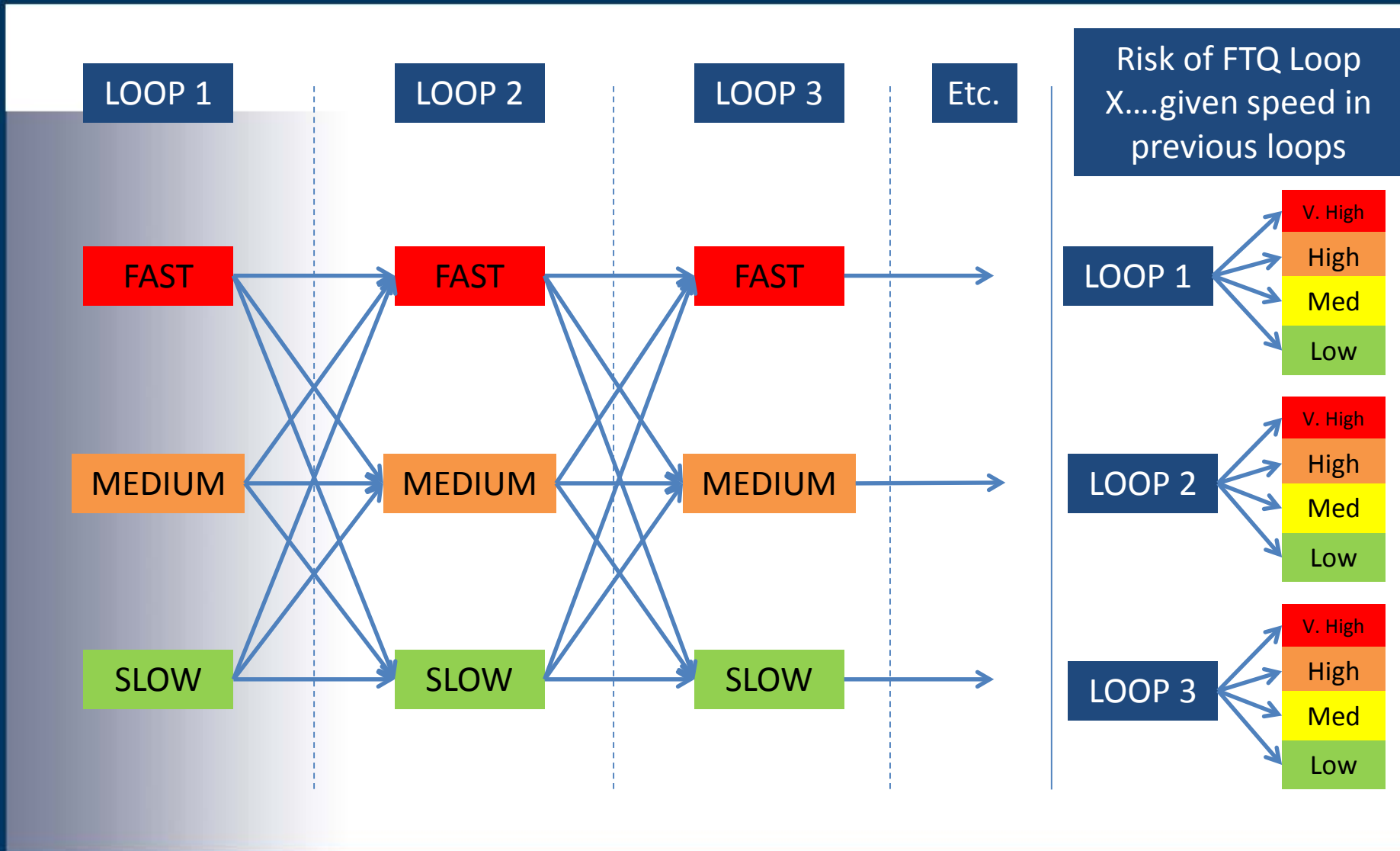


Elimination in Loop 4



- Average riding speed
 - Association between high average riding speeds in Loop 1 and overall Failure to Qualify.
 - Furthermore, associations between high average riding speeds in Loop 1 and 2, and FTQ during Loops 2, 3, and 4 specifically.

Loop speed combinations



Acknowledgements

- **Euan Bennet**
- **FEI funding**
- **FEI Vet Committee**
 - **Göran Åkerström**
 - **John McEwen**

Thank you for listening