



# Genetic evaluation of UK sport horses for dressage competition

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# Dressage



# Introduction

Genetic Evaluations:

Practiced in Northern Europe, absent in UK

Adult or young horse trait data

Within studbooks

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Aim: Estimate genetic parameters for performance in UK dressage and estimate breeding values

Account for range of breeds

# Data

British Dressage competition results

National Equine Database pedigree data

Overall selection:

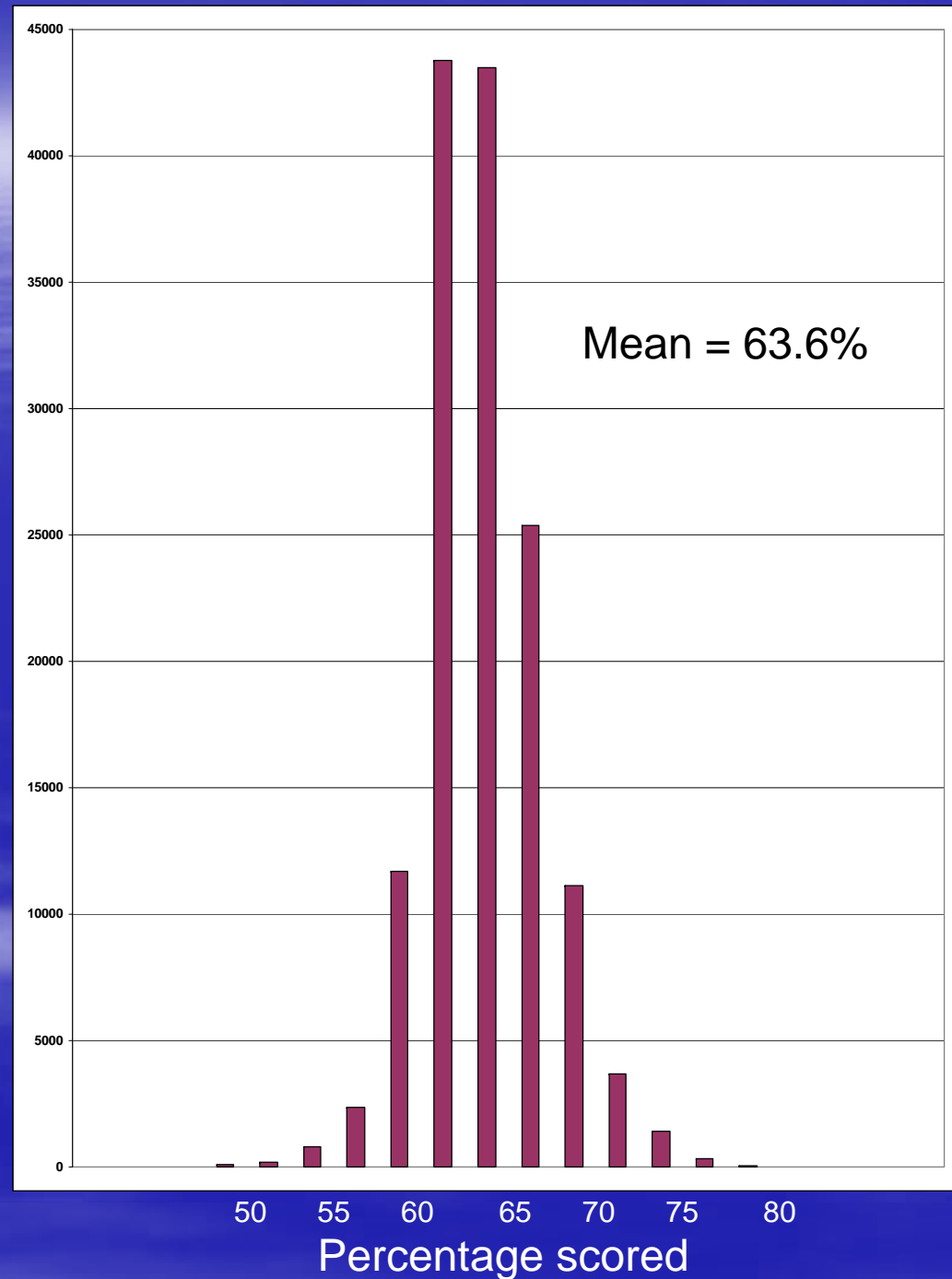
Horse with passport and pedigree in NED

Scored >60% in test

# Trait analysed:

percentage scored  
in test

Number  
of records



# Analysis

Issues:

Pedigree recording

Mare ratio

Competition standards

# Breed classes

- i) British native / indigenous
- ii) Irish
- iii) Non-British native / indigenous
- iv) Thoroughbred (worldwide)
- v) Warmblood/ sport horse
- vi) Arab

# Statistical Analysis

- Animal model
- BLUP to estimate breeding values (EBVs)

# Statistical Analysis

Mixed effects models, including

- Fixed effects:      Horse sex  
                            Age  
                            Height  
                            Competition standard  
                            (Breed)

# Statistical Analysis

Mixed effects models, including

- Fixed effects: Horse sex  
Age  
Height  
Competition standard  
(Breed)
- Random effects: Additive genetic  
Horse permanent environment  
Class  
Show (temporary environment)  
Class-show interaction (judging)

# Record numbers

Without breed:

6622 competing horses

144509 competition records

With breed:

2183 competing horses

51391 competition records

# Results: random effects

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Variance Source	Without Breed % of $V_p$
Heritability (horse genetic)	15.2
Permanent environment	11.5
Class	2.5
Show	5.5
Class.show interaction	10.0
Residual	55.3

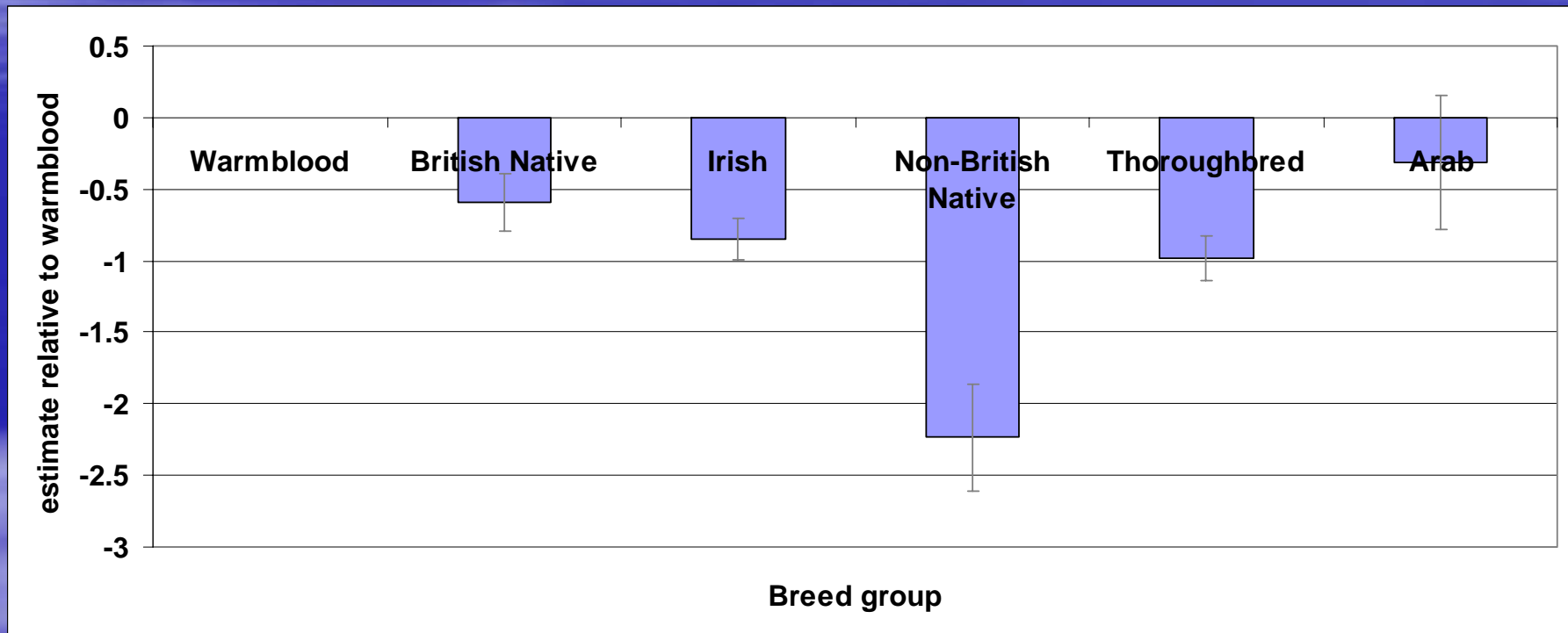
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# Results: random effects

Variance Source	Without Breed % of $V_p$	Breed Model % of $V_p$
Heritability (horse genetic)	15.2	11.0
Permanent environment	11.5	17.2
Class	2.5	2.7
Show	5.5	6.6
Class.show interaction	10.0	7.6
Residual	55.3	54.8

# Breeds

## Breed effect on performance, relative to Warmbloods

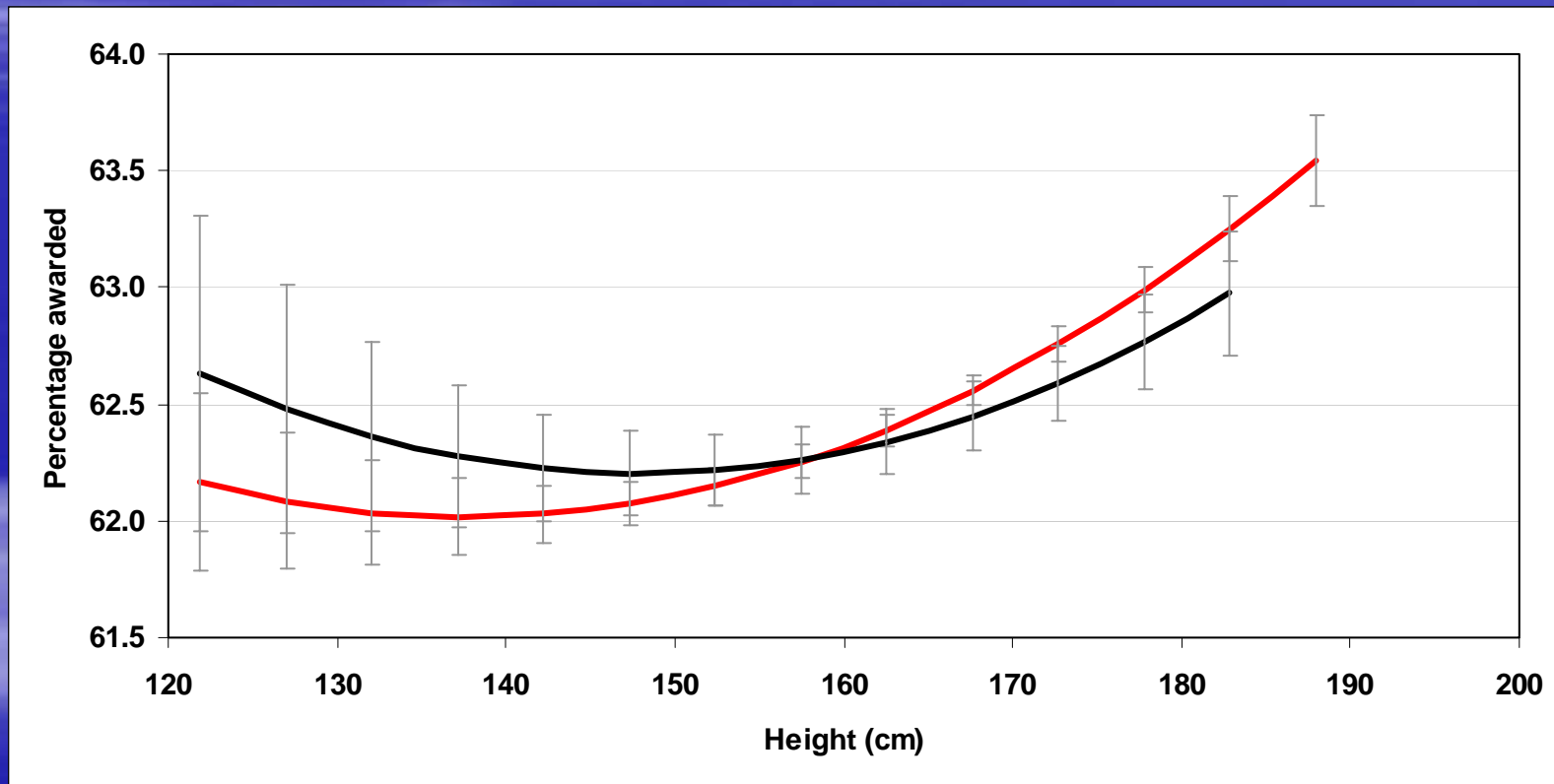


# Gender & standard

- Gender – stallions performed better than geldings
- Competition standard –  
Novice > E > M > AM > Advanced

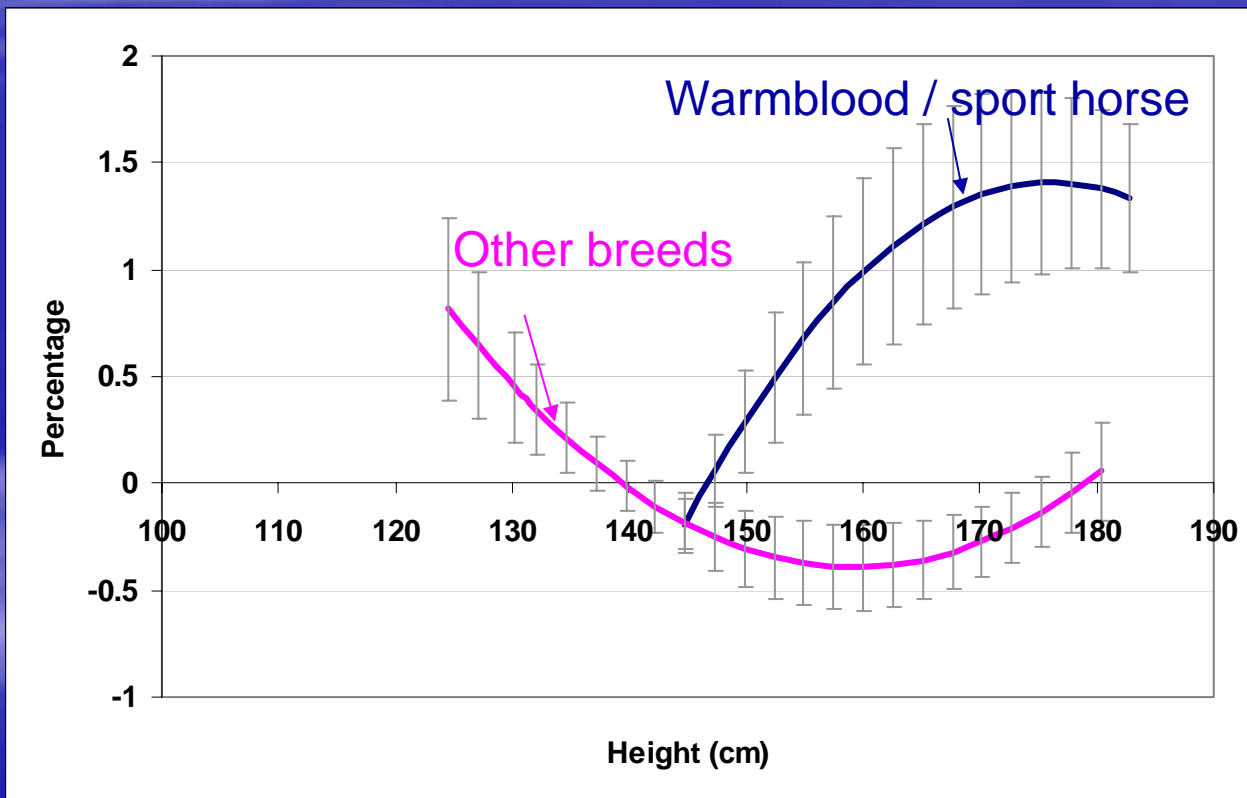
# Height of horse

Predicted percentage by height from model excluding breed (black) and model including breed (red)



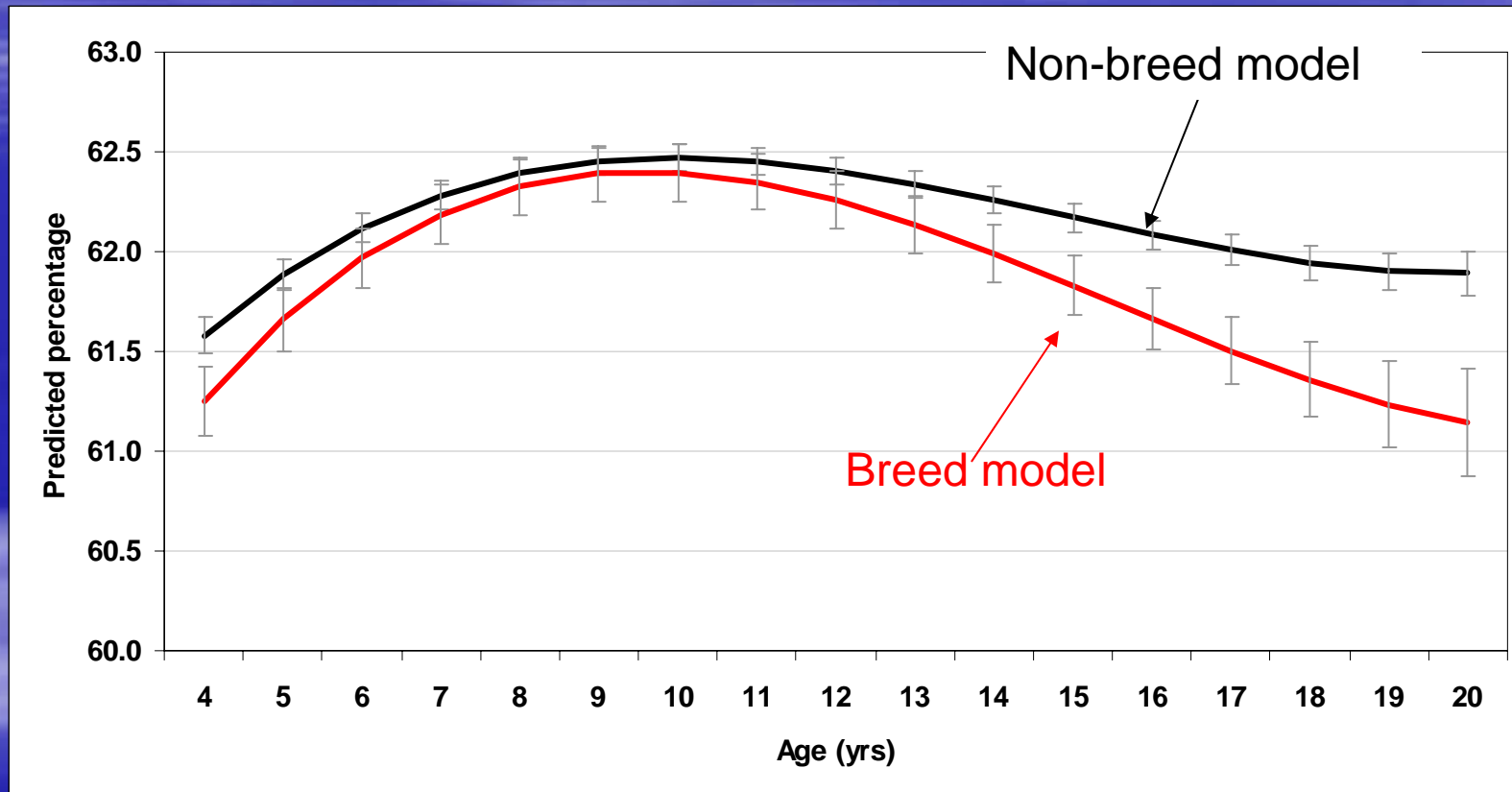
# Height by breed

Effect of height on percentage for warmbloods and all other breeds, over 90% height range



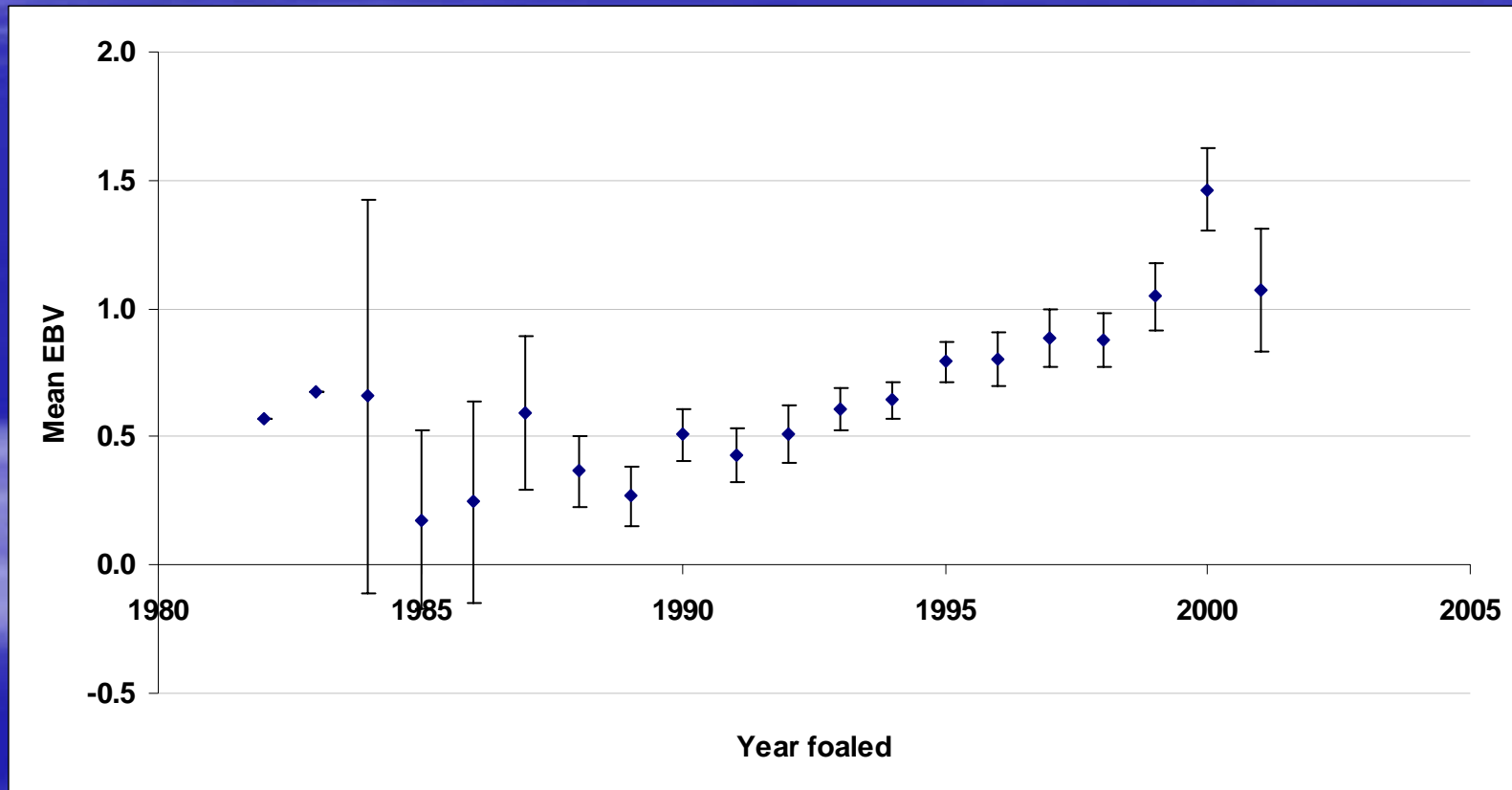
# Age

Predicted percentage at different ages



# EBVs over time

Trend in estimated breeding values over time for all competing horses from model excluding breed



# Further Work

- Incorporate young horse evaluation data
- Combine with eventing dressage

# Conclusions

- Evidence of genetic variance suggests selection can take place
- Provide EBVs for NED

- Acknowledgements

