

## Identification of three distinct sub-populations of 2 year old racehorses in training

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**Aim:** To describe sub-populations of 2-year-old Thoroughbred racehorses in training, and to quantify their activity during training for 2-year-old racing.

**Methods:** The 2-year-old cohort of Thoroughbred racehorses, part of a larger prospective study of training in New Zealand from 1997-2000 (Perkins et al., 2005), was selected. The training activity for each 2-year-old horse was scored 1 – 5 as a training activity score (TAS): spell (TAS 1), walk or trot (2), canter (3), fast work (4) and starting in a trial/race (5) (Perkins et al., 2005). Horses were classified on progression to first trial/race as: having no setback (interruption) to training (non-setback (N\_S) horses), a >7day voluntary setback (VS) (horse spelled but no known condition/disease interfering with training), or involuntary setback (IS) (confirmed condition/disease that forced spelling of the horse from training). Time to event data (to starting in a trial/race) were examined using Kaplan-Meier survival analysis and log rank test, with a significance level of  $P < 0.05$ .

**Results:** Of the 555 2-year-olds, 279 (50%) were N\_S, 144 (26%) were VS and 132 (24%) were IS horses; 46% of VS horses and 68% of IS horses had no start in a trial/race as a 2-year-old. The time to first trial/race differed significantly ( $p < 0.0001$ ) between N\_S, VS and IS horses. Compared to N\_S horses, IS horses were 0.16 (Confidence Interval (CI) 0.11-0.22,  $p < 0.0001$ ) and VS horses were at 0.17 (CI 0.12-0.22,  $P < 0.0001$ ) times the daily hazard of starting in a trial/race. Horses in the setback groups that did not start in a trial/race spent more time training at lower TAS compared to horses that did start. Setbacks occurred significantly earlier in the training programme in the VS group compared to the IS group (median 48 days (CI 43-53) vs 67 days (CI 60-74), respectively,  $P < 0.01$ ), with horses in the latter group often having more than one setback.

**Conclusion:** Thoroughbreds in 2-year-old training emerged as part of 3 distinct sub-populations, regarding level of work while in training, time to first competitive event (trial/race), or their succeeding to compete at all. The findings have economic implications for the industry since only 50% of 2-year-olds produced a betting opportunity or a potential return on investment. Future studies investigating wastage during training might consider these sub-populations separately, to allow identification of modifiable risk factors which could increase the proportion of 2-year-old horses that progress to racing without interruptions to training.