



CARDIOVASCULAR COMPETENCE
A LOOK AT EQUINE ECHOCARDIOGRAPHY



What is Echocardiography?

Echocardiography is the use of ultrasound to obtain an image of the heart. Multiple dimensions of this image are then studied to derive measurements that correlate with racing and breeding performance.

Equine Analysis Systems has been performing Echocardiography procedures on horses since 1984, and have completed over 35,000 examinations on horses in Europe, North America, South America and Australia. This unique tool provides data for horsemen so they might better understand their horses' racing physiology. This improved understanding leads to better management decision-making in multiple scenarios.

Applying the Cardiovascular Competence Examination.

Homebred Management

Our program is very effective in a homebred management scenario. When analyzing homebreds, we take three measurements for each generation. By taking three measurements we can compare the horse's cardiovascular growth with predicted models based on our 35,000-horse database. We can also compare a yearling's heart with his or her siblings, dam, sire, and horses that had identical measurements at the same age. This allows us to forecast growth with a high degree of accuracy, and rapidly detect any growth irregularities.

Overall, our program provides the horseman with accurate information about their horse's cardiovascular potential well before a decision needs to be made for sale entry. This allows the horseman to make more informed and accurate decisions, and only put horses into training that have the potential to be top tier performers.

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Selection

Additionally, our program can also help clients purchase more capable horses at the sales. Utilizing the Cardiovascular Competence Exam in a Sales Environment can dramatically increase efficiency and minimize the likelihood of purchasing horses that are unlikely to achieve the organization's racing and breeding goals.

Figures 1, Figure 2 and Figure 3 are charts comparing the same client's performance when they implemented Cardiovascular Competence into their sales selection program versus not using the system.

Figure 1: Percentage of Graded and Gr1 Winners with and without Cardiovascular Competence

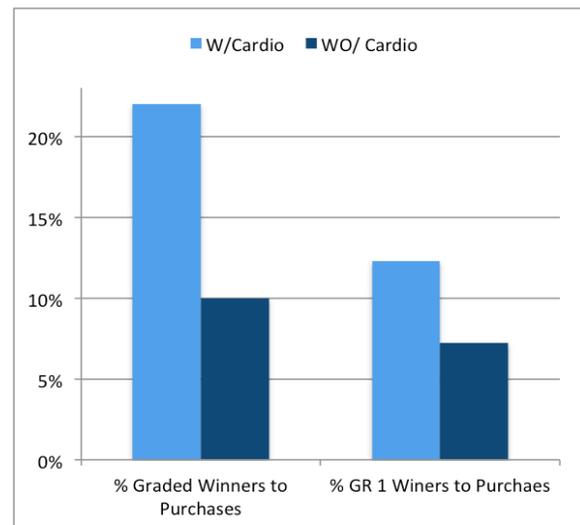


Figure 2: Cost of Graded and Gr 1 winners with and without Cardiovascular Competence

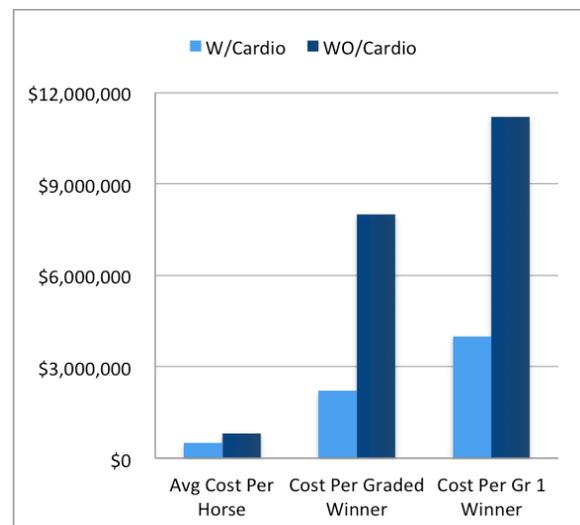
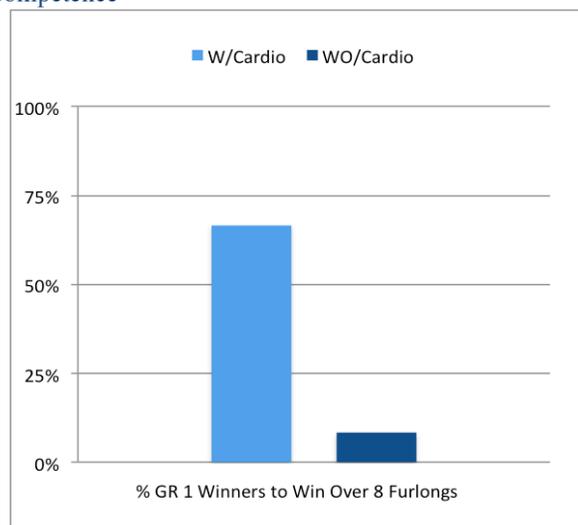




Figure 3: Incidence of Gr1 purchases that performed at distances >8 furlongs with and without Cardiovascular Competence



These figures were collected over 5 years of data and over \$130,000,000 in purchases. Utilizing Cardiovascular Competence analysis allowed this client to improve their ratio of Grade 1 winners to purchases by 58.5% while their average cost per Grade 1 winner fell over \$7,200,000. Additionally, as noted in Figure 3, most of the Grade 1 winners purchased using Cardiovascular Competence were able to win at distances greater than a mile. In the current marketplace, these horses are considerably more valuable as they earn more on the racetrack and are valued more highly as future stallion prospects. Cardiovascular Competence is an accurate discriminator for these horses, and can thus make even a successful selection team more efficient and profitable.

Utilizing Cardiovascular Competence allowed our clients to improve their selection rate and purchase more valuable horses, all while spending \$400,000 less per horse over 69 purchases

Training and Racing

Not only can our Cardiovascular Competence analysis aid in making correct purchasing and homebred management decisions but also can make training and racing operations more efficient. Indeed, different cardiovascular systems are suited to different types of racing and different types of racing strategy. For instance, larger hearts can be more adept at racing over distance than those that are smaller. As a result, having a thorough understanding of a horse's cardiovascular system can help trainers prepare for the right races, and then implement correct strategies to optimize their horse's potential.

Breeding

Cardiovascular Competence analysis can also have implications for breeders. Our research has demonstrated that cardiovascular system traits are highly heritable. The Cardiovascular Competence exam can be applied to both mares and stallions. In fact, the system maintains its accuracy even if the mare is in foal. The Cardiovascular Competence analysis can even provide our clients with initial information about a horse's breeding potential when the horse is only a yearling.

Additionally, we can analyze a potential mating between mare and stallion and advise our clients on the likelihood the mating will produce progeny with the desired cardiovascular traits.

Being able to forecast a mating's potential to produce capable progeny gives our clients a competitive advantage over breeders without cardiovascular information.



The Classic Heart Index™

The Classic Heart Index (CHI) is a quantitative way of understanding a horse's cardiovascular potential. Using our internal growth calculations, the index grows all parameters out to 36 months and then compares against other horses in the database. This allows the Classic Heart Index to be relevant at any age of a horse's growth.

The system gives each horse a score from 0-140. The score is designed to assess a horse's cardiovascular ability to perform from 8-10 furlongs on dirt and synthetic surfaces. Figure 4 illustrates the incidence of Grade 1 performance in a population of horses with various CHI's.

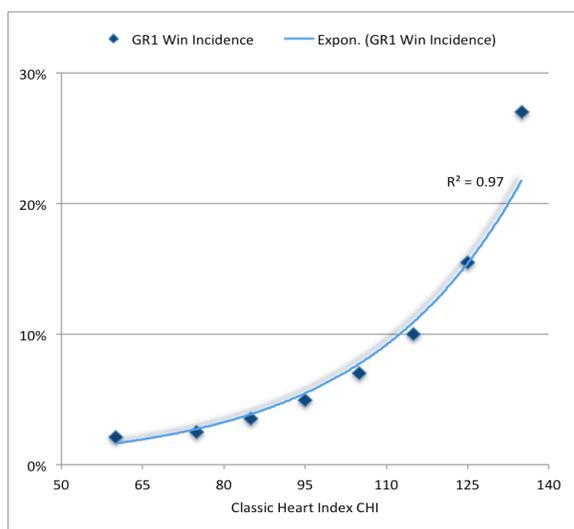


Figure 4: The Relationship between CHI and Grade 1 Win Incidence.

In addition to being an accurate discriminator of cardiovascular potential, having a quantitative measure of cardiac capacity gives our clients the flexibility to enact other strategies. For instance, establishing CHI cutoffs for sales placement gives our clients an easy to integrate and replicable metric to ensure they are only keeping horses with the highest chances of success. Our clients are also able to run analytics on herd development in order to develop breeding targets, and review at the end of the breeding cycle to check the accuracy of their forecasts.

Integration

Like all of our services, Cardiovascular Competence analysis provides the horseman considerable information simply as a stand-alone product. However when Cardiovascular Competence is integrated with other services by Equine Analysis Systems, our veterinarians can get an increasingly precise understanding of the physiological aptitudes of the horse.

As always, our services are at their absolute most effective when our veterinarians get to work intimately with our clients and their horses. We look forward to creating a relationship with your team, and becoming a valued member of your organization.