

# Genetic predictions used to mitigate disease and increase profitability

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## Abstract

Veterinarians have much opportunity to add value to services by having a robust understanding of EPDs (Expected Progeny Differences) in beef cattle. As producers work to increase profitability, sustainability and transparency, veterinarians, as trusted members of the management team, are positioned to consult in the area of genetics. Management practices that decrease disease risk, increase growth, modify temperament, and increase the quality of the carcass at harvest are all influenced by the genetic makeup of each animal.

**Key words:** genetics, EPD, traits, genomics

## Résumé

Les vétérinaires ont vraiment l'occasion d'ajouter de la valeur à leurs services en ayant une compréhension solide des EPD (Écarts prévus dans la descendance) chez les bovins de boucherie. Alors que les producteurs tentent d'accroître le rendement, la pérennité et la transparence, les vétérinaires en tant que membres dignes de confiance dans l'équipe de gestion sont bien positionnés pour la consultation dans le domaine génétique. Les pratiques de régie qui diminuent le risque de maladie, améliorent la croissance, modifient le tempérament et accroissent la qualité de la carcasse à la récolte sont toutes influencées par la constitution génétique de chaque animal.

## Introduction

Traditionally, beef cow veterinarians are called to treat and prevent disease. Most often, this treatment and prevention centers around giving advice about a disease process. We are frequently asked to recommend a new vaccine or drug. These questions prompt beef cattle veterinarians to explore options of vaccines, antibiotics, immunostimulants, vitamins or mineral combinations that will eliminate disease, increase animal welfare, and enhance profit.

Millions, if not billions of dollars have been spent on research and development of animal health and pharmaceutical products to prove safety and efficacy. Food animal production relies on these tools to mitigate the risk of disease, to develop profitable herds, and produce cattle that will provide global consumers a safe, nutritious, and tastefully satisfying protein option. Consumers are becoming further disconnected from

the realities of food production, yet concerned about animal welfare and sustainability. Veterinarians are positioned to expand the available tool set in assisting cow-calf clients to be economically relevant in their production systems and create transparency with the watchful consumer.

More than 3 decades ago, the movement to document genetic performance in an effort to quantify outcomes in beef cattle resulted in Expected Progeny Differences (EPDs). Today progressive producers depend on these genetic predictions to make progress in creating livestock with predictable performance traits. Each major breed association includes EPDs on every registered animal included in the herd registry.

With most breed associations having real time EPDs available, there is tremendous opportunity for beef cow veterinarians to be knowledgeable about EPDs and genomic predictions, the modern genetic tool chest for cow-calf producers. Veterinarians spend hours examining vaccine trials to determine if the information is accurate, relevant, and statistically significant. Now, in the trusted role as an advisor, veterinarians are uniquely positioned to make recommendations that will enhance productivity and increase profitability through the use of these predictable tools.

In the most recent US Department of Agriculture's National Animal Health Monitoring System (NAHMS) report, a majority of producers consider veterinarians to be a valuable resource for breeding and genetic information. NAHMS data document that veterinarians are sought by more than 54% of producers for genetic information. As size of operations increased, the percentage of respondents relying on their veterinarians for general breeding and genetics increased to more than 63%.<sup>1</sup>

Traditionally, cow-calf veterinarians have influenced morbidity and mortality in our roles as advisors in the areas of pharmaceutical products. We are challenged to recommend the most efficacious, least-cost product to a producer. Producers are encouraged to embrace protocols requiring many pharmaceutical products, often at great expense. Now, with no cost to the producer, beef cattle veterinarians, understanding the importance of genetic selection tools and technology, can guide decisions to mitigate disease caused by dystocia by selecting bulls with documented calving ease EPDs. As dystocia is decreased, the risk of disease is lessened by increasing calf vigor, increasing colostrum intake, and calving less in confinement. Using these tools, producers can also make improvements in early growth and end product merit.

A starting point is the breed average EPDs and the percentile ranking table for each trait published by the breed associations throughout the year. By using these tables, a producer can make informed genetic decisions to make directional change in many production areas. Three examples of highly heritable EPD traits are Calving Ease Direct (CED), yearling weight (YW), and Marbling. These traits are considered moderate to highly heritable in beef cattle. Improving these traits alone can assure health and increase productivity.

Calving Ease Direct (CED) is an example of an EPD that is important to all producers, regardless of the geographic area or the resources available. CED predicts sire differences for calving difficulty in first-calf heifers. For example, if sire A has a CED of 5 and sire B has a CED of 15, we would expect sire A to have 10 more assisted calves than sire B. Measured in first-calf heifers, calving ease is a major predictor of a live, healthy calf ready to flourish. Unassisted calving increases colostral intake, decreases time to stand, increases overall survivability, and decreases the percentage of calves treated in the first 45 days.<sup>3</sup>

Often, the real or perceived need of calving assistance requires calving in confinement. This confinement increases labor and disease transmission due to concentration of the disease organisms. Young calves have a far less chance to withstand these disease challenges. In fact, dystocia-related disease factors account for > 10% in morbidity.<sup>2</sup> As high-accuracy CED bulls are used with confidence in beef production systems, each calf will have a greater opportunity for a vigorous start to achieve all of its genetic potential.

Yearling Weight EPD (YW) is used to describe the weight difference potential for each animal. As an example, compare sire A with a yearling weight of 135, compared to sire B with a yearling weight of 70. Sire A's offspring will average 70 lb more than sire B's offspring. Using YW EPD, the producer can reliably purchase bulls that will transmit more or less growth.

Marbling EPD describes the amount of intramuscular fat, on average, that will be transmitted genetically. This EPD is of particular importance in all sectors of production. Marbling is an end product trait that enhances the tenderness and taste of the beef. Marbling is not antagonistic to other areas of production, and there is no added cost to production when intramuscular fat (marbling) is expressed in animals at harvest. In fact, intramuscular fat or marbling is an end product trait that is currently driving beef demand. Marbling increases the value of the carcass at harvest. Even though some producers sell at weaning or yearling, it is important to understand increased marbling in a carcass will allow the feeder animal to carry more value at the time of harvest.

Approximately 75% of all beef cattle harvested in the US are sold on a value-based grid formula that rewards quality and yield. As a result, marbling in a carcass greatly increases the value at harvest. As the availability of USDA Choice beef has increased, the discounted value of USDA Select, when compared with Choice and upper 2/3 Choice,

has been a key pricing differential impacting fed cattle sold on carcass-merit grids. There is no indication that the phasing out of USDA Select beef will slow or reverse in the years ahead. In fact, market signals indicate the trend will continue until the Select grade represents 5% or less of graded beef tonnage.<sup>2</sup> Today there is unprecedented acceptance of beef in diets around the world. Much of the increased demand is due to the improved quality grade that greatly increases the predictable flavor and tenderness of beef.

Another tool of genetic documentation and predicting future performance is the use of genomic testing in beef cattle. Genomic testing quantifies the complete DNA that influences growth and production. Genomic testing is the most recent addition to a cow-calf producer's opportunities to add and capture value. Genomic testing has been used successfully in the dairy industry to decrease disease, increase efficiency and production. Genetic testing in beef cattle has been slower to evolve due to breed differences and the diversity of geographic and environmental conditions.

Decreasing research funds throughout land-grant university systems have given rise to the private sector to develop accurate and affordable genetic testing, serving both registered and commercial sectors. Progressive commercial operations are rapidly recognizing the value of genetic testing. Producers are implementing genetic testing to determine replacement heifer selection, documenting genetic merit of feeder cattle, quantifying the genetics of commercial cows and bulls for sale. Producers are embracing the combination of phenotypic and genomic data to make directional change in their management and marketing strategies.

By assisting our cow-calf clients with knowledge and application of genetic selection tools, producers can accurately and reliably benchmark their cowherds relative to heifer replacements. Producers can exponentially expand their marketing opportunities by embracing low-cost and no-cost genetic selection tools and technology. Beef cattle veterinarians can be front and center in the discussions toward herd improvement, better outcomes, and marketing opportunities. There are many risks today in cattle ownership and marketing. However, when genetic merit is measured, quantified and communicated, a producer will make more informed decisions and mitigate risk.

## References

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