

**SUPPLEMENT USE AND PERCEPTIONS: A SURVEY OF U.S.  
HORSE OWNERS**

by

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To Mom and Dad:  
For always believing I could.

## ABSTRACT

The pet supplement industry, including equine supplements, contributes over \$1 billion annually to the U.S. economy. Little research has examined horse owner use of supplements or opinions regarding safety and efficacy. The hypothesis was that perceptions of use, safety, and efficacy of supplements would differ by rider discipline and competitive versus recreational riders. An online survey including demographics, rider discipline, and 6-pt Likert scale questions examined beliefs regarding supplements. 2,087 responses were collected over 30 days. Perceived horse health issues were positively correlated ( $P < 0.05$ ;  $R^2 > 0.10$ ) with use of supplements to treat or prevent those issues. There was no difference by discipline or competitive status concerning perceptions on using supplements to treat or prevent issues, or the safety or efficacy of supplements. Most horse owners, regardless of discipline or competitive status, report giving supplements and indicate belief in their safety and efficacy.

# TABLE OF CONTENTS

	<b>Page</b>
LIST OF TABLES .....	vi
LIST OF FIGURES .....	vii
CHAPTER I: LITERATURE REVIEW.....	1
Introduction.....	1
Characterization of Supplements .....	3
Equine Supplements.....	6
How Do People Choose Supplements?.....	7
Where Do People Get Supplement Information? .....	9
Beliefs on Safety and Efficacy of Supplements.....	11
CHAPTER II: SUPPLEMENT USE AND PERCEPTIONS: A SURVEY OF	
U.S. HORSE OWNERS .....	14
Materials and Methods.....	16
Results.....	18
Discussion.....	42
Conclusion .....	46
LITERATURE CITED .....	47
APPENDICES .....	50

APPENDIX A: IRB Approval .....	51
APPENDIX B: Survey.....	52

## LIST OF TABLES

Table 1. Correlations between Perceived Horse Health Issues and Likelihood to Treat those Issues with Supplements <sup>a</sup> .....	30
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## LIST OF FIGURES

Figure 1. Percentage of Male vs. Female Respondents .....	19
Figure 2. Respondent Ages by Percent of Included Responses .....	20
Figure 3. Education Level of Respondents to Survey on “What is the highest level of education you have received?” .....	21
Figure 4. Horses Owned/ Under Care of Respondents to Survey on “How many horses are under your care?” .....	22
Figure 5. Length of Horse Ownership of Respondents to Survey on “How long have you owned horses?” .....	23
Figure 6. Where Horse Owners Keep Their Horses by Respondents to Survey on “Do you keep your horse(s) on your property, or are they boarded at a separate facility?” .....	24
Figure 7. Riding Discipline of Respondents to Survey on “Which discipline of riding/showing do you participate in most?” .....	25
Figure 8. Rider Identification of Competitive Status of Respondents to Survey on “How would you identify yourself?” Further divided into COM vs. REC. ....	27
Figure 9. Horses Supplements Given To by Respondents to Survey on “How many horses under your care do you give supplements to?” .....	28
Figure 10. Amount Spent per Horse per Month by Respondents to Survey on “How much, on average, do you spend on supplements, per horse, in one month?” .....	29
Figure 11. Perceived Issues and Supplement Use in Horses by Respondents to Survey on Evaluation of Statements About Issues They Perceive Their Horses to Have and Use of Supplements to Treat or Prevent Those Issues .....	31
Figure 12. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe it is Safe to Give Supplements to My Horse.” .....	33

Figure 13. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplement Safety is Well-Researched.” .....	34
Figure 14. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplements are Useful to Prevent Problems.” .....	35
Figure 15. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplements are Useful to Treat Problems.” .....	36
Figure 16. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplement Effectiveness is Well-Researched.” .....	37
Figure 17. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Prevent Problems in My Horse.” .....	38
Figure 18. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Treat Problems in My Horse.” .....	39
Figure 19. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Promote My Horse’s Overall Health.” .....	40
Figure 20. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Provide Nutrients Not Provided by Other Feedstuffs.” ...	41

## CHAPTER I: LITERATURE REVIEW

### Introduction:

The United States human health market is overflowing with supplements purported to do everything from balancing diet, to improving athletic performance, or mitigating health problems; and the equine supplement market is very much the same. As horse owners have become more concerned with the health, performance, and longevity of their horses, the demand for supplements for horses appears to grow larger every year.

The supplement industry has a significant impact on the U.S. economy. Reports on the human supplement industry suggest grosses over \$11.5 billion in 2012 (Schultz, 2012) with expected growth of 6% annually in upcoming years (Packaged Facts, 2014). The companion animal supplement industry reported over \$1.3 billion in sales in 2012 (Packaged Facts, 2013). The equine supplement industry's direct impact on the U.S. economy is difficult to determine, since many reports currently appear to include equine supplement sales in their calculations for all companion animal supplements. However, there are several companies, such as SmartPak Equine™ (Natick, MA), which post considerable profits based solely on the sale of their equine supplements.

The human supplement industry was reported to have a \$32.5 billion economic impact in 2012 (Moloughney, 2014). People cited maintaining or improving their overall health as their main reason for taking supplements, with bone, organ, and digestive health often given as common reasons as well (Bailey et al., 2010; Bailey et al., 2013). People have also reported taking supplements that are purported to provide more energy, improve mental health, or help with weight loss (Bailey et al., 2013).

Compared to human supplements, there are a number of commonly reported reasons pet owners give when explaining their decision to provide supplements for their pets; though no studies have been conducted to determine the prevalence of these common owner rationales. Some of those reasons include preference for “natural” treatments, treating or preventing health issues, preventing side effects that may come from giving their pets veterinarian-prescribed medication, or lack of balance in their pet’s diet (Schmalberg, 2014).

As with companion animals, there is limited information on why owners give their horses supplements. Common reasons cited by owners for giving their horses supplements include helping with a medical condition, modifying behavior, preventing problems in their horse, providing extra energy or nutrients for training or competition, or balancing their horse’s overall diet (Hoffman et al., 2009; Burk and Williams, 2008). Oke and McIlwraith (2010) identified joint, digestive, hoof, vitamins and minerals, skin or coat, relaxation, and cough or allergies as the top categories of supplements given to horses based on sales reports.

There has been a limited amount of research regarding how horse owners get information about nutrition for their horses, though not specifically supplements. According to the 2012 American Horse Publications (AHP) Equine Industry Survey, horse owners reported obtaining nutrition information from their veterinarians, websites, and friends or other horse owners (Stowe, 2012). Hoffman et. al. (2009), reported that horse owners claimed their veterinarian was a primary source of information for nutrition information, but also cited their farrier, feed store, and horse magazines as additional sources. While Hoffman et al. (2009) obtained some information about supplement use in

the equine industry, the study focused only on a small subset of horse owners in New England who brought their horses to the Tufts Cummings School of Veterinary Medicine, which makes it difficult to determine if similar thoughts and opinions are shared throughout the U.S.

When it comes to the safety and efficacy of human supplements, more than 84% of adults in the U.S. reported that they feel confident that the supplements they take are effective and safe (Dennis, 2010). Despite the fact that few regulations exist and that the majority of supplements are not tested for safety or efficacy, there is no published information about people's feelings towards the safety and efficacy of the supplements they give their pets or horses.

Another factor to consider when examining how horse owners feel about the safety and efficacy of supplements, as well as what supplements to give their horses, is the riding discipline. Within the horse industry, there are a wide variety of riding disciplines, each with their own culture, practices, and beliefs related to horses. The differences between each discipline may lead to each one having its own practices relative to the nutrition, training, and health of their horses. This may further extend to supplement use and beliefs about the safety and efficacy of supplements within that discipline.

### **Characterization of Supplements:**

Given the large economic impact of equine supplements, it is important to know what supplements are, what some of the common equine supplement categories are, and what regulations there are about supplements and their safety and efficacy.

The Food and Drug Administration (FDA) defines a supplement as “a product taken by mouth that contains a dietary ingredient intended to supplement the diet.” The FDA further explains that “dietary ingredients” include vitamins and minerals, extracts or concentrates, herbs, metabolites, as well as several other substances (FDA, 2014a). It is important to note that supplements are not drugs, and in order to be considered a supplement, it must be taken by mouth and not injected subcutaneously, intramuscularly, or intravenously. Supplements also may not contain anything that the FDA considers to be a drug or medication.

Supplements are typically split into different categories, depending on their intended use, and may be further categorized if they are designed for more specific function. Some common categories of equine supplements include joint, hoof, skin and coat, digestive care, immunity boosters, energy boosters, and calming (SmartPak™ Supplements, 2014; JeffersPet, 2014; Valley Vet Supply, 2014; State Line Tack, 2014). Horse owners choose from supplements within those categories that fit their horse’s specific needs. Horse owners may also choose total health supplements that may claim to include the same ingredients as supplements for specific problems, but at radically different price points. Some companies that sell equine supplements list hundreds of supplements that can be purchased either online or through local retail suppliers (SmartPak™ Supplements, 2014; JeffersPet, 2014; Valley Vet Supply, 2014; State Line Tack, 2014).

Though the FDA readily defines what supplements are, it is important to note that many supplements that people give to their companion animals or horses are not regulated by the FDA. The Association of American Feed Control Officials (AAFCO) does work with local, state, and federal agencies to develop laws, standards, regulations,

definitions, and enforcement policies regarding the manufacturing, distribution and sale of animal feeds. However, AAFCO does not have regulatory authority over feed and supplement manufacturers, which may limit their influence over supplements and feed companies (AAFCO, 2015). Similarly, dietary supplements for humans are not approved by the FDA based on their safety or effectiveness. The FDA does require a notification 75 days prior to marketing on any dietary supplements that contain dietary ingredients that were not sold in the U.S. before October 15, 1994 (FDA, 2009). Otherwise, products can be marketed since the FDA considers them to be generally regarded as safe (GRAS) (FDA, 2014b). While the FDA is responsible for approving all food additives and drugs that are given to pets, poultry, swine, and cattle, the same is not true for dietary supplements, given to horses (FDA, 2009). Individual states may require safety studies for certain supplements before the product can be marketed (FDA, 2009); however, those regulations are difficult to enforce, and the increasing availability of online retailers makes it even more difficult for states to regulate product sales within their state.

While the FDA is strict in its regulations of drugs and certain foods, it will generally not investigate the safety or efficacy of supplements for people, pets, or horses unless evidence is brought forward that suggests that the supplement may not be safe for use as it is currently being marketed (FDA, 2014a). The FDA does regulate dietary supplement labels and other labeling, such as packaging inserts, and the Federal Trade Commission (FTC) regulates supplement marketing. It is the duty of the supplement manufacturer to make sure that their claims and information on the product label are correct. However, this may not happen regularly within the equine supplement industry. Ramey et al. (2002) analyzed levels of glucosamine and chondroitin sulfate in different equine supplements,

and found that actual levels of the ingredients varied from 22.5% to 155.7% of label claims.

The FDA does have the responsibility for taking action against any misbranded or adulterated dietary supplements after they reach the market (FDA, 2014c). However, the FDA will only conduct an investigation with regard to a dietary supplement if a consumer or medical professional files a complaint about the supplement with the FDA (FDA, 2014a).

### **Equine Supplements:**

According to the 2012 AHP Equine Industry Survey, horse owners reported high use of joint supplements, trace mineral supplementation, digestive support, hoof health, and coat condition supplements (Stowe, 2012). While the results from the AHP are of value to people researching supplement use in the equine industry, the study did not report results for the use of any supplement that was reported by less than 30% of all respondents. Because of this, there is no information available on supplements that do not fit into those groups, which means that there are hundreds of supplements that were not included in the reported results of the AHP survey.

Oke and McIlwraith (2010) reported that oral joint-health supplements account for 34% of all horse supplement sales, with supplements for digestion representing 15% of sales, and hoof and general vitamin/mineral supplements each representing another 10%. Some studies discuss the potential benefits of supplement use including increased lean body mass, increased energy density of a feed, reduction of bodyweight, and improved energy metabolism (Geor, 2006; Harris and Harris, 2005). It is important to note, that

while studies may provide insight into the potential benefits of supplement use, they also mention that there may be little or no scientific evidence to back claims of efficacy (Geor, 2006; Harris and Harris, 2006).

### **How Do People Choose Supplements?:**

Understanding why people choose supplements for themselves may help shed some light on how they choose supplements for their horses. According to Bailey et al. (2013), only 23% of the adults who responded to their survey chose supplements based on suggestions from their health care advisors. Other results pertaining to how people choose which supplements to take were not reported, yet these results suggest that over three-fourths of the U.S. population does not consult a physician before choosing to take supplements (Bailey et al., 2013). Other studies from the United Kingdom may provide some insight (Connor et al., 2001, 2003; Harrison et al., 2004). Conner et al. (2001) indicated that women who identified themselves as supplement users indicated a likelihood to choose supplements based on information from books or magazines, health advisors or physicians, or from people within their social circle. CConner et al. (2003) reported similar findings when focusing specifically women over the age of 40. According to Harrison et al. (2004), the use of certain supplements, like vitamins and minerals, was positively associated with people who reported eating a diet that had the recommended daily requirements for the major food groups. The results of the Harrison et al. (2004) study indicate a higher use of dietary supplements with people living healthier lifestyles.

Although the pet supplement industry has a substantial economic impact, there are currently no studies available that provide insight as to how people choose supplements for their pets (Schmalberg, 2014). The 2012 AHP Equine Industry Survey does provide some insight into how horse owners choose supplements for their horses. The survey results stated the most common reason people chose supplements for their horses is they felt their horse needed the product, although their respondents also indicated they took veterinary advice and trust of the supplement supplier into account when considering which supplements to give their horses (Stowe, 2012). As with the AHP survey's results on the most common supplements used, there are no other indicators of what other influencing factors might have been considered by the responding population.

One study, conducted in the United Kingdom, examined the use of nutritional supplements in eventing and dressage horses. The survey asked horse owners about the problems perceived in their horses and the type of supplements they actually gave their horses (Agar et al., 2014). The article reported a disconnect between the problems horse owners perceived in their horses [energy and behavior, lameness, back and muscle problems (for dressage horses), and stamina (for eventing horses)] and the types of supplements they actually gave their horses. Agar et al. (2014) did not speculate as to why there was a disconnect, but the results of the study provide motivation to determine if a similar disconnect might be seen in the perceived issues of horses in the U.S., and the type of supplements horse owners are actually giving their horses.

### **Where Do People Get Supplement Information?:**

Since there is very little information on how people choose supplements, it is not surprising there are also limited data regarding where people get their supplement information. Only 23% of people chose supplements based on advice from their health providers, but the study did not offer information regarding additional sources where people choosing to take supplements might get information about those supplements (Bailey et al., 2013).

Similarly to how people choose supplements for themselves, there are very little data available identifying where pet owners get information about supplements. Some articles report commonly referenced sources of information including family and acquaintances, breeders, veterinarians, and pet food retailers (Michel, 2006).

Research that examines where horse owners get their information from is generally gathered from small subsets of the horse owning population. Burk and Williams (2008) surveyed feeding practices and supplement use in top eventing horses and reported riders first sought information from their trainers and feed dealers, followed by articles and magazines. The respondents were given the opportunity to indicate all of the sources they would go to for information, and respondents did indicate they obtained information from the internet, university faculty members, nutritionists, and barn managers (Burk and Williams, 2008). The data were collected from a very small portion of horse owners and riders (40 in 2006 and 33 in 2007) who reached the top levels of eventing competitions. This information does present an interesting option to further investigate if there is a correlation between riding discipline and riding level with where people get supplement

information; though the limited responses of this study makes it difficult to relate this information to other horse owners across the country.

Hoffman et al. (2009) reported owners were most likely to consult their trainer or veterinarian for supplement information, but also reported owners were likely to consult the internet. Further, horse owners were also looking to farriers, horse magazines, or the people who work at feed stores for supplement information (Hoffman et al., 2009). This study was conducted in a small subpopulation of horse owners in New England (owners who brought horses to the Large Animal Hospital at the Tufts Cummings School of Veterinary Medicine over a two-month period, Hoffman et al., 2009), which could limit how much the information may pertain to other horse owners around the U.S.

Hoffman et al. (2009) did not differentiate all of the sources people might consult for supplement information versus which source horse owners would trust most or go to first for information.

The 2012 AHP survey also provided some data on where horse owners get nutrition and supplement information from. According to the survey, almost 67% of their respondents got nutrition and supplement information from their veterinarian; the survey also reported that people used websites and their friends or other horse owners for supplement information (Stowe, 2012). The survey provided limited potential information choices for owners, though most of their respondents reported asking a veterinarian for nutrition and supplement information. The survey did not evaluate which of the possible sources of information horse owners get their information from first.

Additional studies have shown that many horse owners consider veterinarians to be good sources for supplement information, though these studies did not report what

percentage of respondents chose veterinarians as their primary source for information, or if veterinarians were their top choice for information (Roberts and Murray, 2014; Roberts and Murray, 2013; Honore and Uhlinger, 1994). Another study from the United Kingdom was conducted to evaluate sources of information that horse owners and riders used when choosing supplements for their horses, owner and rider opinions of those information sources, and what factors played affected the decisions they made with regard to supplements (Gemmill et al., 2014). The article reported that veterinarians were considered to be the most reliable source of information, followed by nutritionists, research studies, coaches and trainers, and other horse owners. In spite of veterinarians being perceived as the most reliable source for information, 18% of the respondents indicated that they had recently chosen a supplement based solely on the recommendation of another horse owner (Gemmill et al., 2014). The results of the survey also indicated a correlation between education and information sources (particularly research papers) as well as age and information sources. Based on these results, it could be of interest to determine if similar correlations could be found among horse owners in the U.S.

### **Beliefs on Safety and Efficacy of Supplements:**

Considering the fact that the FDA does not regulate the safety or efficacy of supplements, for human, companion animals, or horses, it is interesting to note people seem to have a high level of confidence in the safety and efficacy of supplements based simply on sales of such products. In fact, according to a 2009 survey, 84% of adult Americans reported to the Council for Responsible Nutrition (CRN) they were confident in the quality, safety, and effectiveness of the dietary supplements they were taking

(Dennis, 2010). The article did not explain how the CRN conducted their survey, which makes it difficult to determine if the sample they collected was representative of the nation as a whole, or if there was potentially a bias due to the method of data collection. The recent surge in consumers demand for more information may have changed the general opinion about the safety, quality, and effectiveness of supplements since the CRN conducted the survey in 2009.

There is very little published information about pet owners' beliefs on the efficacy and safety of the supplements they give their pets. Before companies began to produce and sell supplements just for companion animals, pet owners were known to give their pets human supplements (Grebow, 2012). Additionally, many companies that produce pet supplements will look to available research in humans to determine which ingredients or supplements might be safe to market to pet owners (Grebow, 2012). However, there have been no studies published that specifically examine how pet owners feel about the safety and efficacy of supplements.

As with many of the other previously discussed sections about supplement use in the equine industry, there is very little research available that concerns horse owners' opinions on the safety and effectiveness of supplements for their horses. When the 2012 AHP survey asked horse owners what they believed were the top issues facing the horse industry, respondents did not express concern regarding the lack of information about the safety or efficacy of supplements (Stowe, 2012). Yet many researchers cite the lack of evidence about the safety and efficacy of the supplements available for horses (Geor, 2006; Harris and Harris, 2005; Roberts and Murray, 2014; Roberts and Murray, 2013). It is difficult to determine how people might decide if supplements are safe or effective;

though if people believe it is safe for them to take supplements they may feel supplements are safe to give their horses.

## **CHAPTER II: SUPPLEMENT USE AND PERCEPTIONS: A SURVEY OF U.S. HORSE OWNERS**

There is limited information available about how horse owners in the U.S. choose supplements for their horses. The Agar et al. (2014) and Gemmill et al. (2014) studies served as much of the inspiration for this project. While their results provide some insight into a portion of the supplement industry in the United Kingdom, it is not correct for us to assume the results of their studies are valid representations of the supplement industry in the U.S. It is important to note these surveys examined supplement use among the owners of dressage and eventing horses, rather than all aspects of the equine industry in the United Kingdom.

While some studies report veterinarians are considered to be a main source of information about nutrition and supplements, the surveys were conducted in small portions of the industry (Burk and Williams, 2008; Hoffman et al., 2009; Roberts and Murray, 2013), though those results may still be applicable to the equine industry in the U.S. as a whole. Those studies did not report how often horse owners went to their veterinarian for advice or if their veterinarian was the last person they consulted before making decisions about supplements (Hoffman et al., 2009; Roberts and Murray, 2013). While these studies may give insight into potential sources of information, they do not indicate which source of information is considered most reliable when it comes to supplement information. However, a survey conducted by the University of Minnesota reported that horse owners identified equine magazines, other horse owners,

veterinarians, trainers, and farriers as their top sources of information about horses in general (Martinson et al., 2006).

The primary motivation behind this project comes from the need for better education about supplement use. The 2012 AHP survey indicated that horse owners considered a lack of educational materials one of the top issues facing the equine industry in the U.S. (Stowe, 2012). By identifying the sources of supplement information horse owners chose first, better education programs could be developed concerning supplement use. The most trusted source may vary depending on how the rider identifies themselves (professional, non-professional competing, non-competing), their discipline (dressage, polo, trail, etc...), or other factors. By improving understanding of how different portions of the U.S. equine industry respond, and then working to educate the right groups of people (farriers, veterinarians, trainers, barn owners, etc...) horse owners will have improved opportunities to gain accurate information about giving supplements to their horses.

## **Materials and Methods**

For this study, an online survey was developed and hosted on a third-party data collection website ([www.surveymonkey.com](http://www.surveymonkey.com)). The survey and all methods were approved by the Institutional Review Board at Middle Tennessee State University (Protocol #15-091, Appendix A). In order to publicize the survey, information about the survey and an internet link or QRS code was posted on social media websites (Facebook), distributed by several discipline or breed-specific organizations through email or social media, and distributed to students and faculty at several universities around the U.S. beginning in November 2014 and ending December 2014.

In this survey, general demographic information was collected, though no identity-specific questions were asked (Appendix B). Respondents were asked to identify their gender, select their age (given in ranges), and to indicate their level of education. Respondents were then asked a series of questions regarding their horse ownership status, rider identification as competing or non-competing, further broken down into competitive (COM) and recreational (REC), riding discipline, and whether or not they provide supplements to horses. In addition, respondents were asked to answer a series of 6-pt Likert scale questions about perceived issues in their horses, their views on the use of supplements to treat or prevent those issues, and their beliefs on the safety and efficacy of supplements.

Responses were collected for a period of 30 days, at which point data collection was halted and the survey webpage was closed. Prior to survey evaluation, inclusion criteria was developed which included completion of more than 9 survey questions.

Summary statistics and frequency counts of the data were completed using SAS Ver. 9.2 (SAS Inc., Cary, NC). Additionally, an analysis of variance using a general linear model was used to examine the effects of discipline and COM versus REC on use of supplements. Pearson's correlation coefficients were used to examine relationships between owner's perceived issues in their horses and their likelihood of using supplements to treat or prevent those issues. Statistical significance was set as  $P < 0.05$ , while trends were considered as  $0.05 < P < 0.10$ .

## Results

In total, 2,219 respondents completed the survey of which, 2,087 responses met the criteria for inclusion, i.e., the respondent answered more than 9 of the 41 survey questions). Of the respondents, 93% were female and 7% were male (Figure 1). Survey respondents represented a diverse set of age groups with 6% of respondents under 20 years old (but at least 18), 35% were 20 to 34 years old, 24% were 35 to 49 years old, and 35% were 50 years or older (Figure 2). Level of education among survey respondents was also spread across different levels with 1% of respondents without a High School diploma, 7% with a High School diploma, 27% some college, 43% a college degree, and 22% a post-grad degree (Figure 3).

When asked how many horses they own or were under their care, 2% of respondents reported that they currently do not own horses, 25% reported owning 1 horse, 43% reported owning 2 to 4 horses, 16% reported owning 5 to 9 horses, and 14% reported owning 10 or more horses (Figure 4). Of the respondents, 75% reported having owned horses for more than 10 years, 12% owned horses for 5 to 9 years, 11% owned horses for 1 to 5 years, and 2% owned horses for less than 1 year (Figure 5). There were 51% of respondents that reported keeping horses on their property, 37% boarded at a separate facility, and 11% had horses on their property and at a separate facility (Figure 6).

Survey respondents represented a wide variety of disciplines including dressage, driving, endurance, eventing, halter, hunter or jumper, polo, racing, speed events, vaulting, western all around events, and western performance events (Figure 7).

## Percentage of Male and Female Respondents

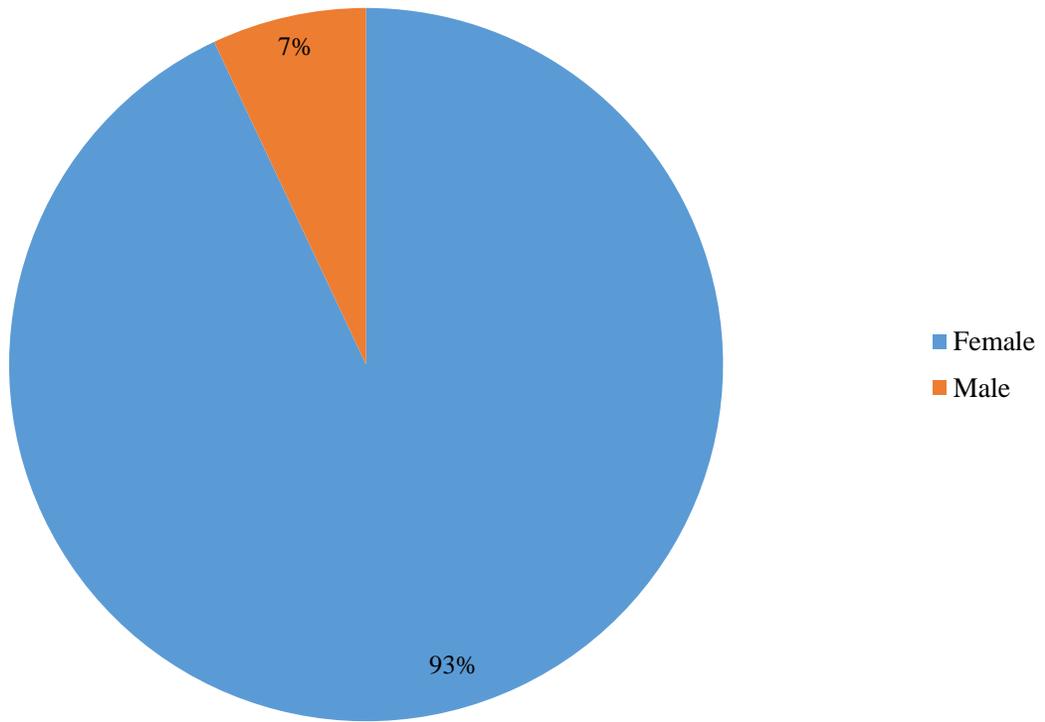


Figure 1. Percentage of Male vs. Female Respondents

## Respondent Ages by Percent of Included Responses

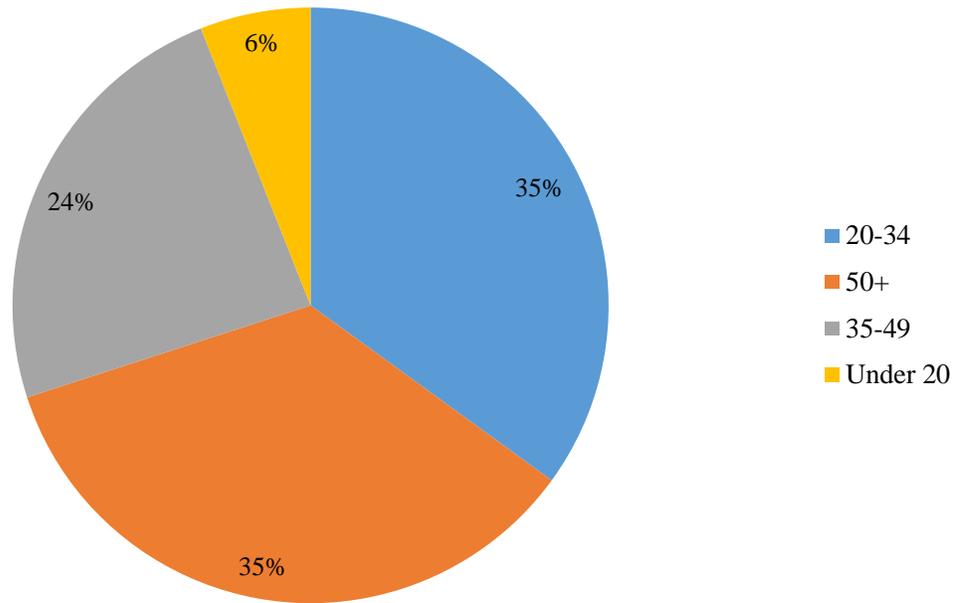


Figure 2. Respondent Ages by Percent of Included Responses

## Respondent Education

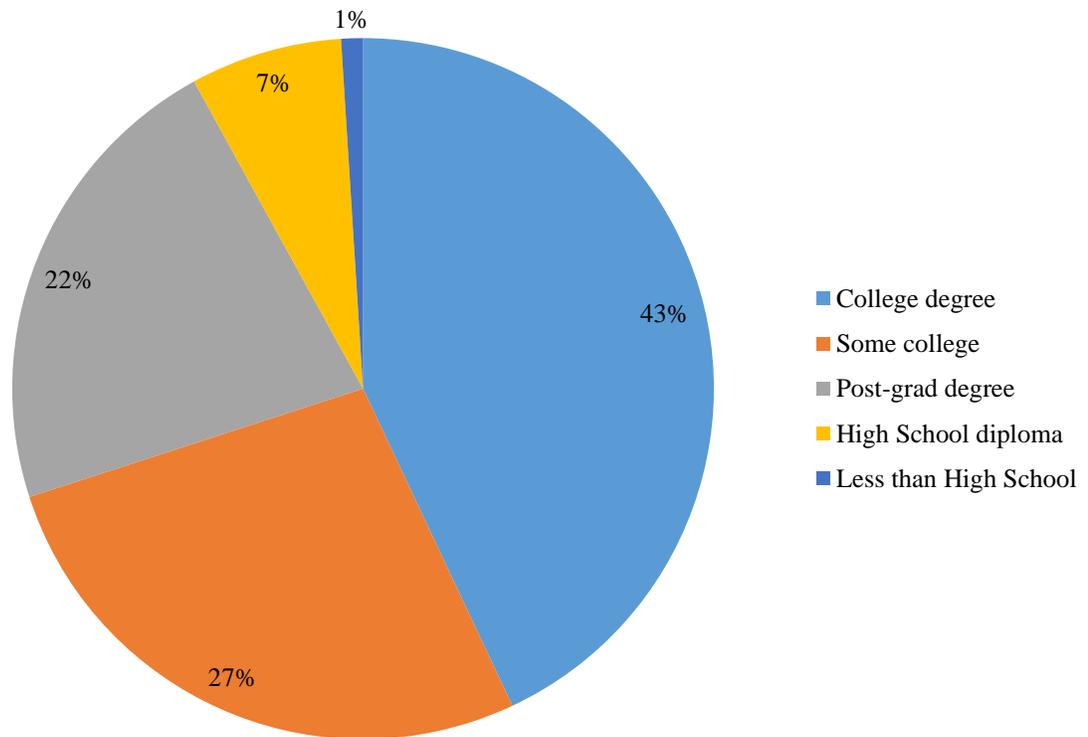


Figure 3. Education Level of Respondents to Survey on “What is the highest level of education you have received?”

## Number of Horses Owned/ Under Care

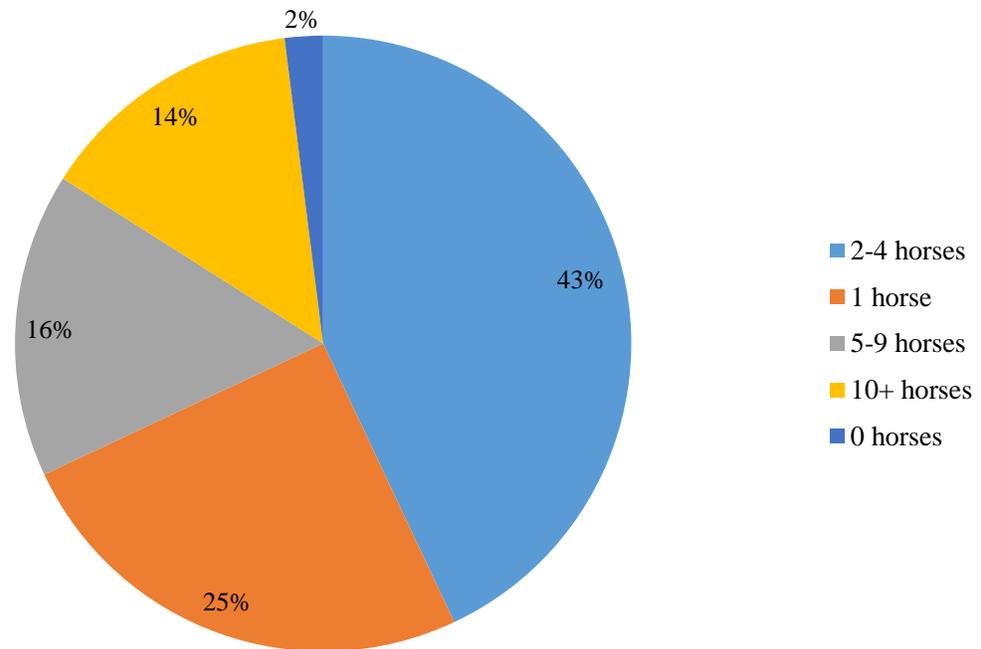


Figure 4. Horses Owned/ Under Care of Respondents to Survey on “How many horses are under your care?”

## Length of Ownership

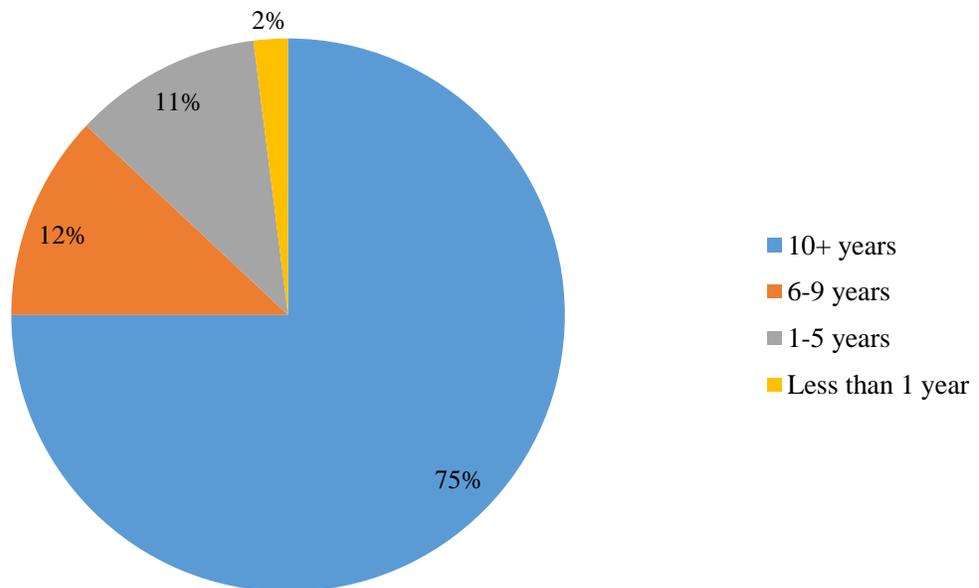


Figure 5. Length of Horse Ownership of Respondents to Survey on “How long have you owned horses?”

## Where Owners Board Their Horses

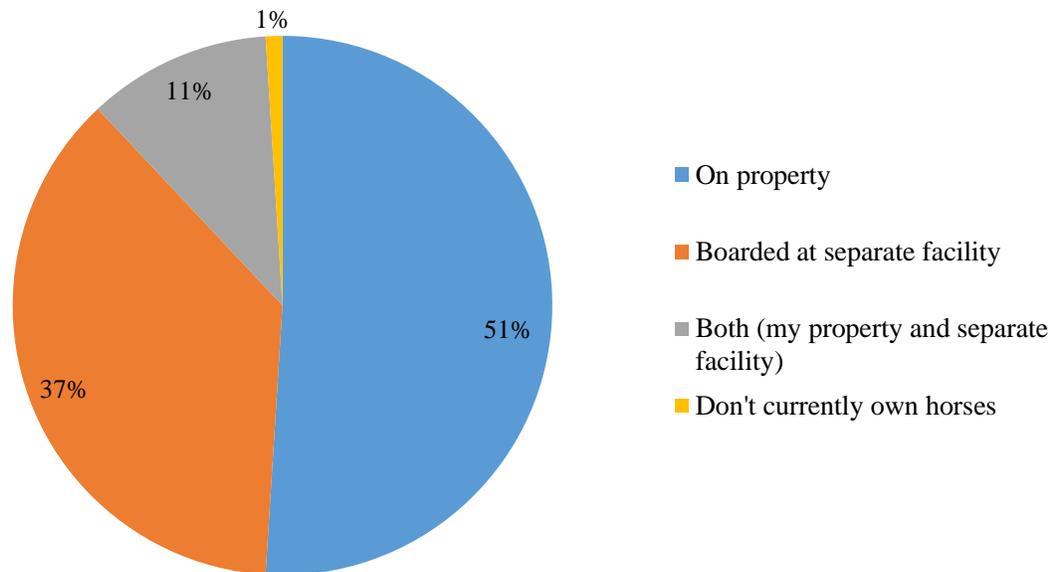


Figure 6. Where Horse Owners Keep Their Horses by Respondents to Survey on “Do you keep your horse(s) on your property, or are they boarded at a separate facility?”

## Rider Discipline

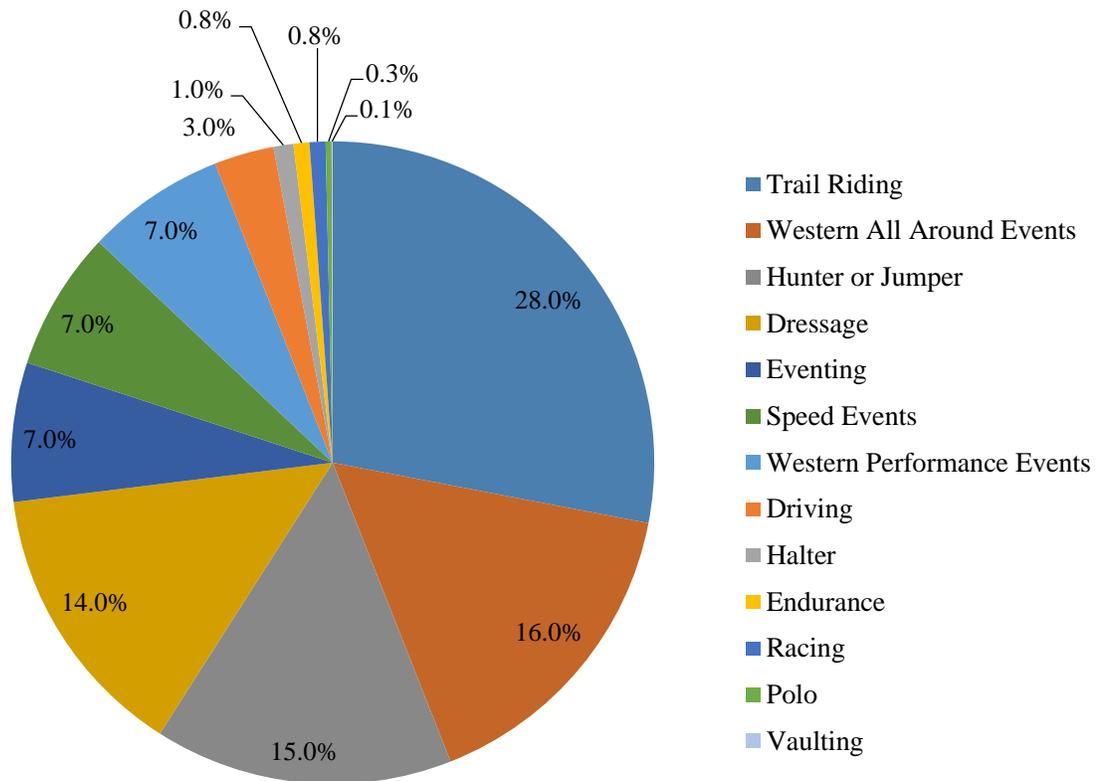


Figure 7. Riding Discipline of Respondents to Survey on “Which discipline of riding/showing do you participate in most?”

Respondents were asked to identify their competitive status as professional, amateur or non-professional, recreational, or not currently riding or competing. Professional and amateur or non-professional riders were represented by COM and recreational or non-riding or competing riders were represented by REC (Figure 8).

Of respondents, 84% reported giving supplements to at least one horse, with no difference between COM and REC or by discipline (Figure 9). There were 58% that reported spending \$30 or more per month per horse on supplements, with no difference between COM and REC or by discipline (Figure 10).

Across all disciplines, 21% of owners believed their horse has a behavior issue, 57% a joint issue, 43% a hoof issue, 18% a skin/coat issue, 9% a colic issue, 20% a digestive issue other than colic, 15% a performance/energy issue, and 12% believed their horse lacks a balanced diet. Perceived issues were positively correlated ( $P < 0.05$ ;  $R^2 > 0.10$ ) with use of supplements to treat or prevent those issues (Table 1). Across all disciplines, 31% of owners reported they would likely use supplements to treat or prevent behavior issues, 90% joint issues, 83% hoof issues, 49% skin or coat issues, 60% colic issues, 68% digestive issues other than colic, 50% performance or energy issues, and 80% would use supplements to provide nutrients not provided in other feedstuffs (Figure 11).

Respondents identified veterinarians, farriers, other horse owners, and nutritionists or consultants as the top four choices for supplement information, with 43% identifying veterinarians as their first choice for supplement information.

### Rider Identification

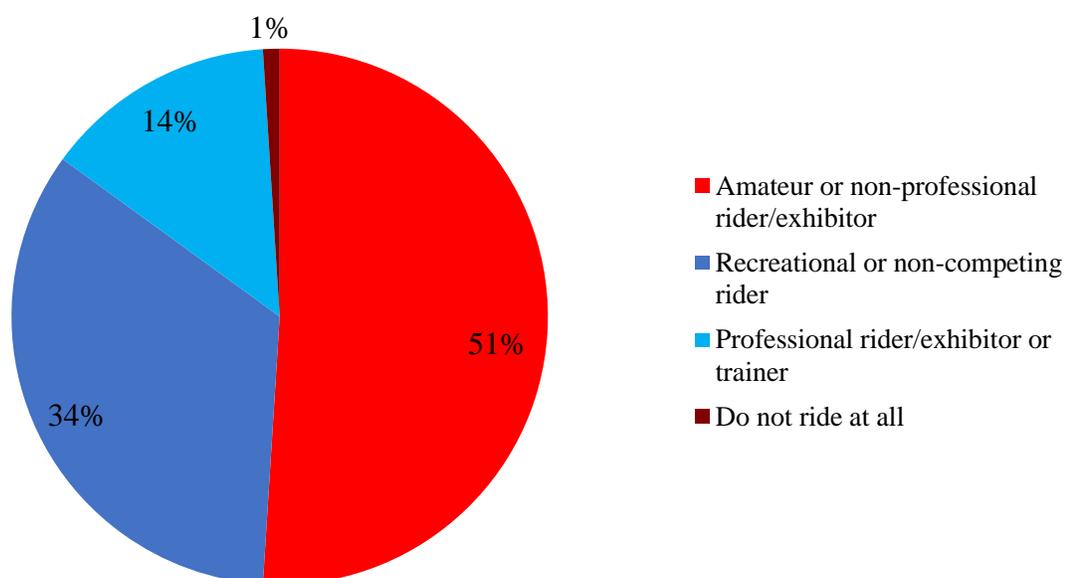


Figure 8. Rider Identification of Competitive Status of Respondents to Survey on “How would you identify yourself?” Further divided into COM vs. REC.

## Number of Horses Given Supplements

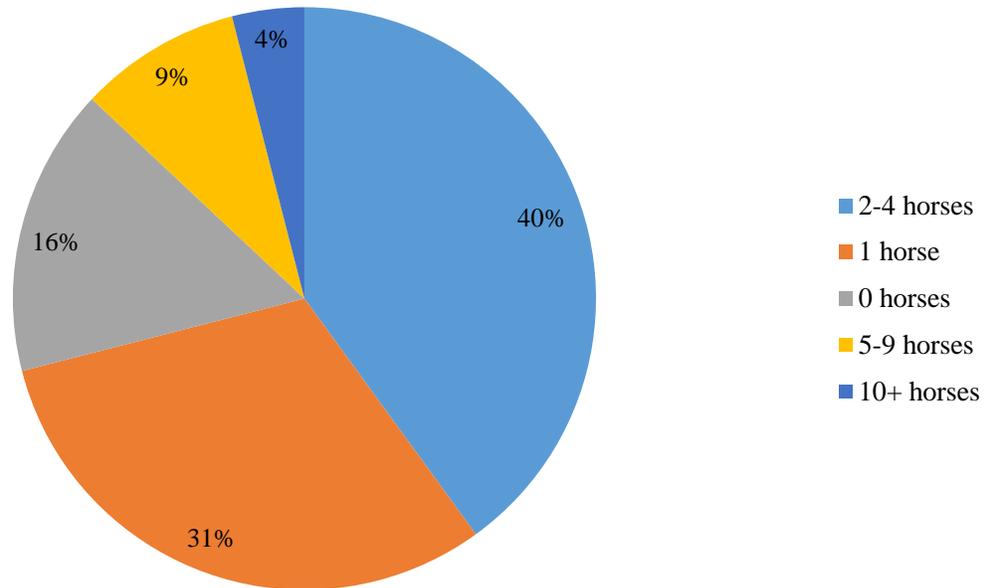


Figure 9. Horses Supplements Given To by Respondents to Survey on “How many horses under your care do you give supplements to?”

## Amount Spent: Per Horse Per Month

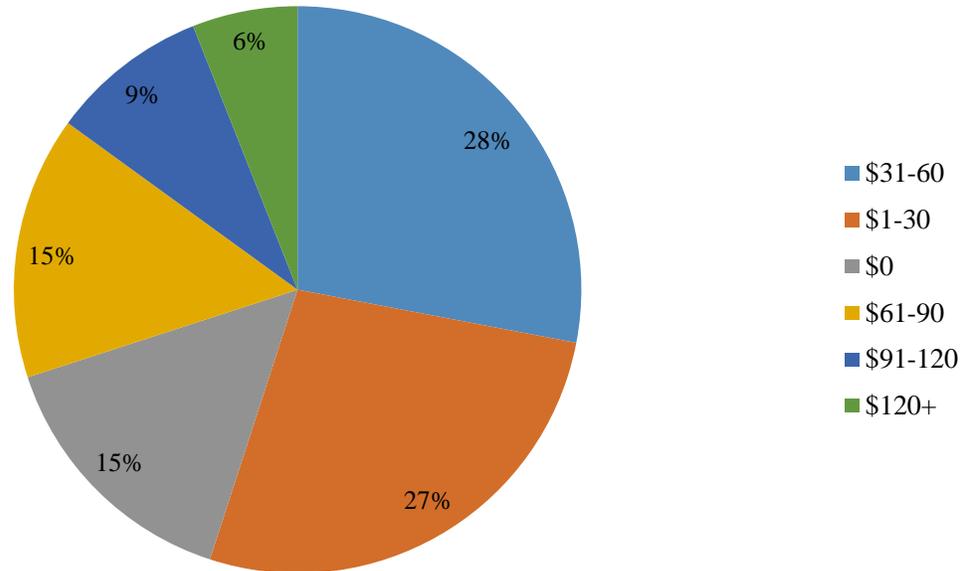


Figure 10. Amount Spent per Horse per Month by Respondents to Survey on “How much, on average, do you spend on supplements, per horse, in one month?”

Table 1. Correlations between Perceived Horse Health Issues and Likelihood to Treat those Issues with Supplements<sup>a</sup>

<b>Perceived Issue x Likelihood to Treat with Supplements</b>	<b>R</b>
Behavior	0.38
Joint	0.43
Hoof	0.37
Skin or Coat	0.30
Colic	0.29
Digestive Issues Other than Colic	0.37
Performance and Energy	0.30
Lacks a Balanced Diet	0.11

<sup>a</sup>Data are reported as Pearson's Correlation Coefficients (R). In all correlations,  $P < 0.001$ .

## Perceived Issues and Use of Supplements to Treat or Prevent Those Issues

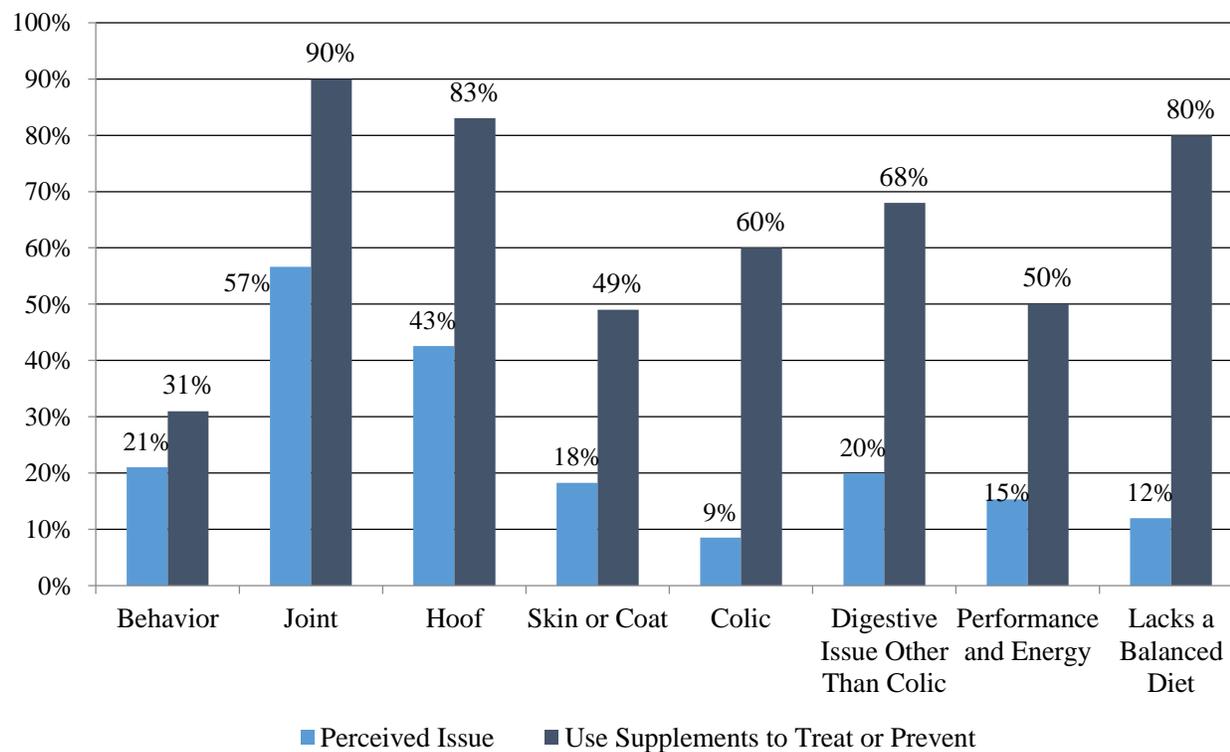


Figure 11. Perceived Issues and Supplement Use in Horses by Respondents to Survey on Evaluation of Statements About Issues They Perceive Their Horses to Have and Use of Supplements to Treat or Prevent Those Issues

When collectively examining “somewhat agree, agree, or strongly agree” responses to the Likert scale questions about beliefs on the safety, efficacy, and research on supplements, 50% of horse owners reported that supplements are safe to give (Figure 12), 47% that supplement safety is well researched (Figure 13), 47% that supplements are useful to prevent problems (Figure 14), 47% that supplements are useful to treat problems (Figure 15), and 48% that supplement effectiveness is well-researched (Figure 16). There were 51% of respondents that reported using supplements to prevent problems in their horse(s) (Figure 17), 51% to treat problems (Figure 18), 50% to promote overall health (Figure 19), and 47% to provide nutrients not provided in feedstuffs (Figure 20).

## “I Believe it is Safe to Give Supplements to My Horse”

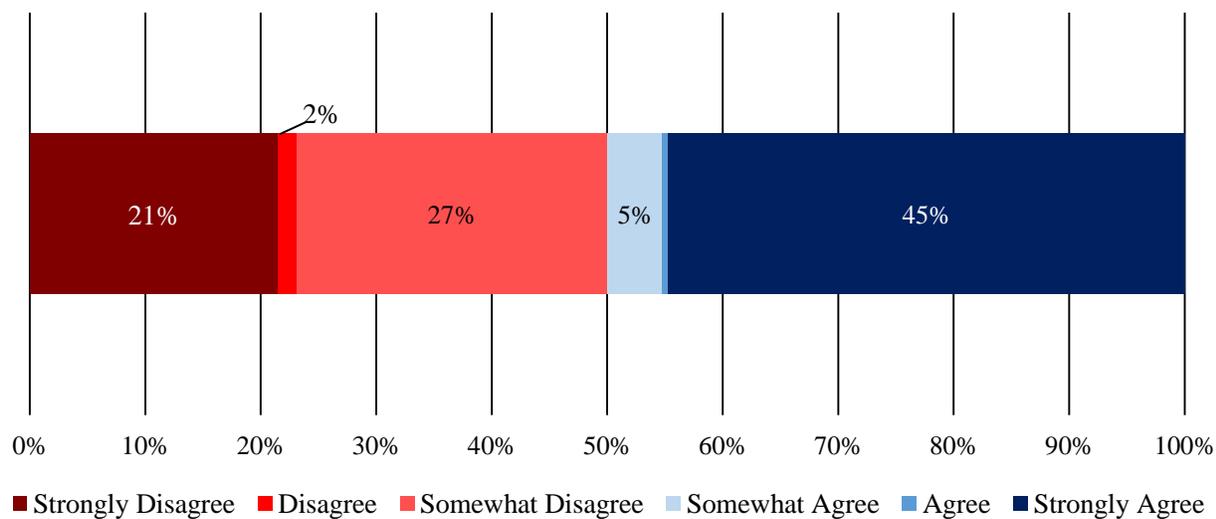


Figure 12. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe it is Safe to Give Supplements to My Horse.”

## “I Believe the Safety of Supplements is Well Researched”

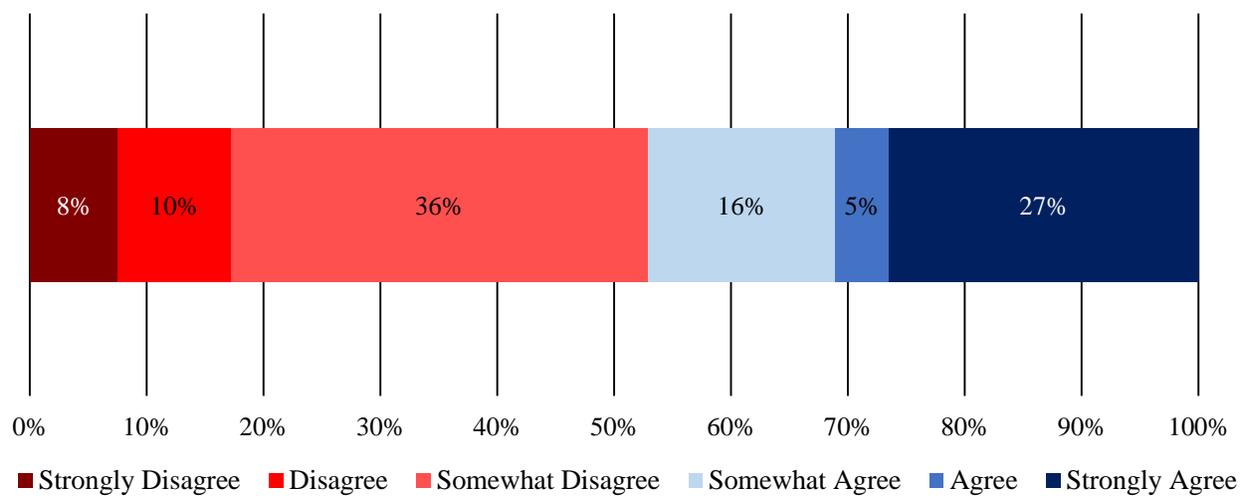


Figure 13. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplement Safety is Well-Researched.”

## “I Believe Supplements Are Useful to Prevent Problems”

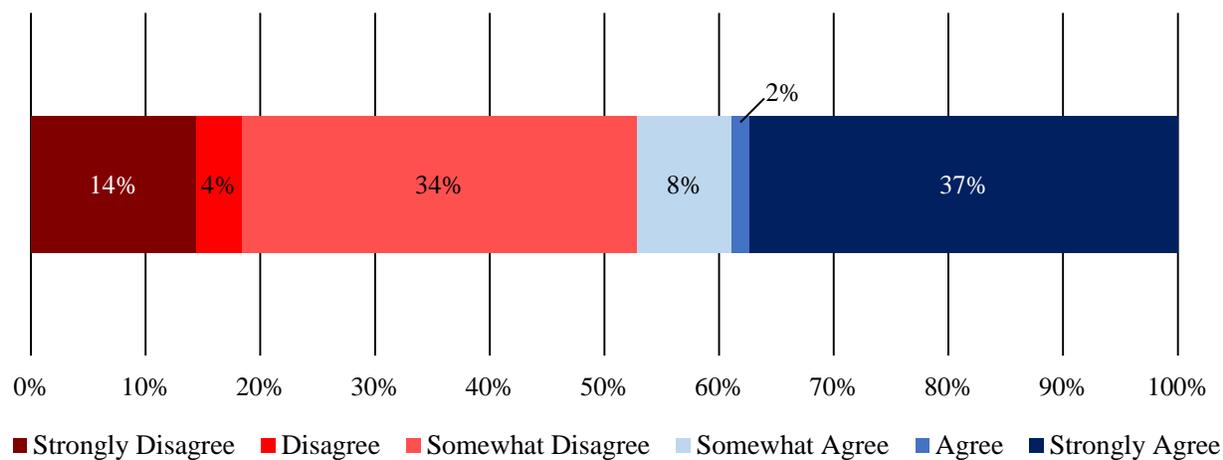


Figure 14. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplements are Useful to Prevent Problems.”

## “I Believe Supplements Are Useful to Treat Problems”

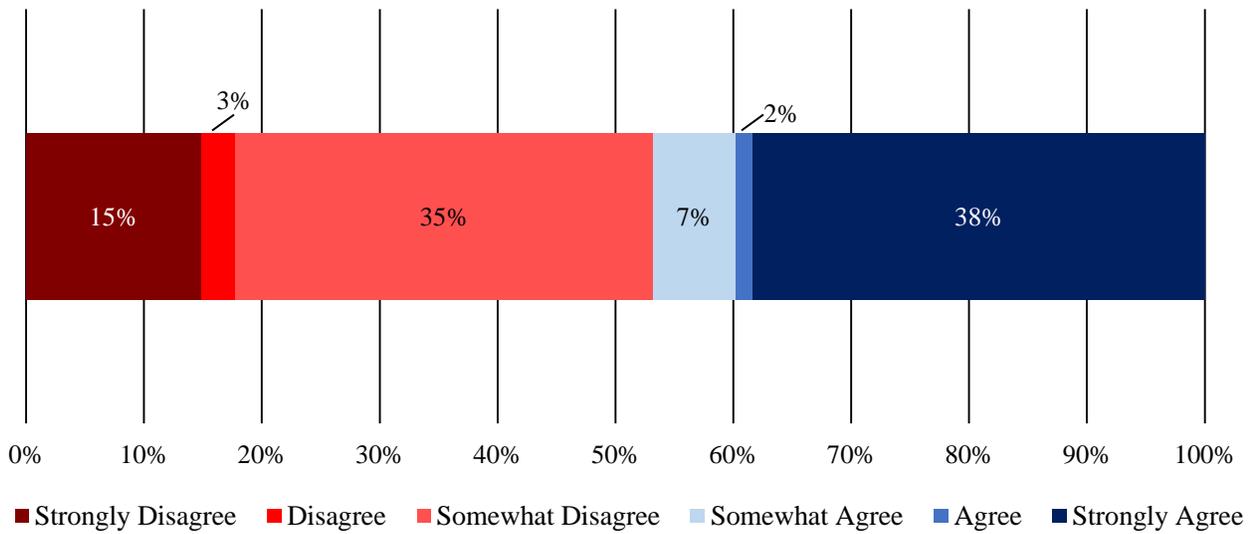


Figure 15. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplements are Useful to Treat Problems.”

## “I Believe the Effectiveness of Supplements is Well Researched”

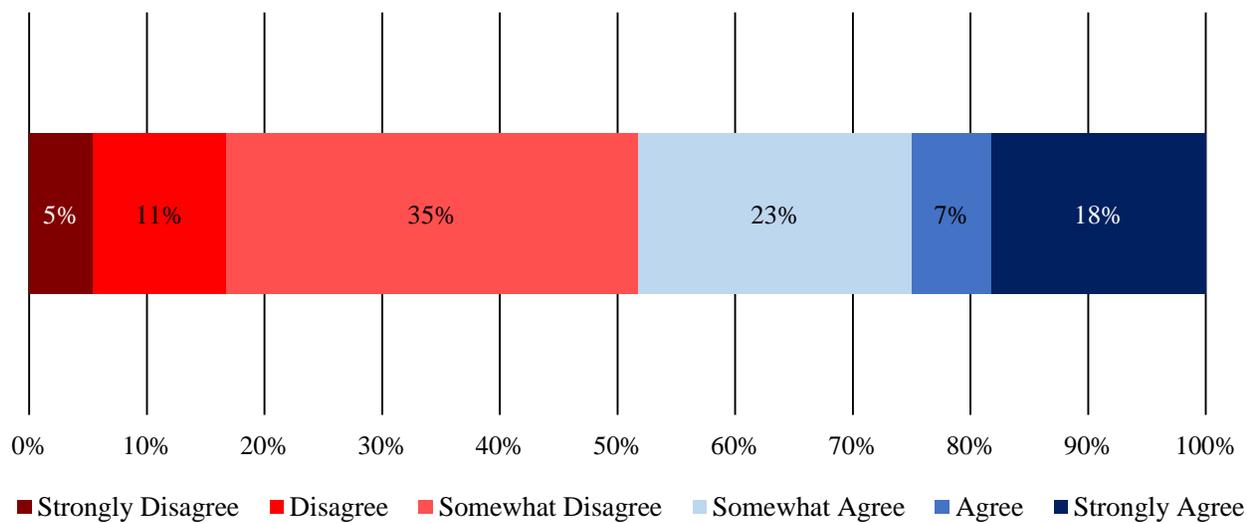


Figure 16. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Believe that Supplement Effectiveness is Well-Researched.”

## “I Use Supplements to Prevent Problems in My Horse”

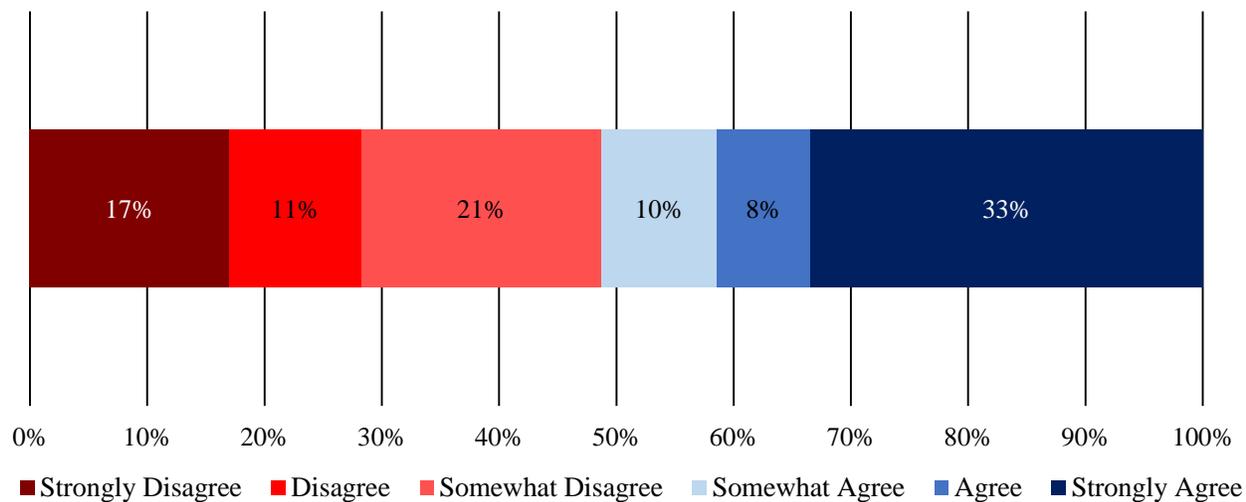


Figure 17. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Prevent Problems in My Horse.”

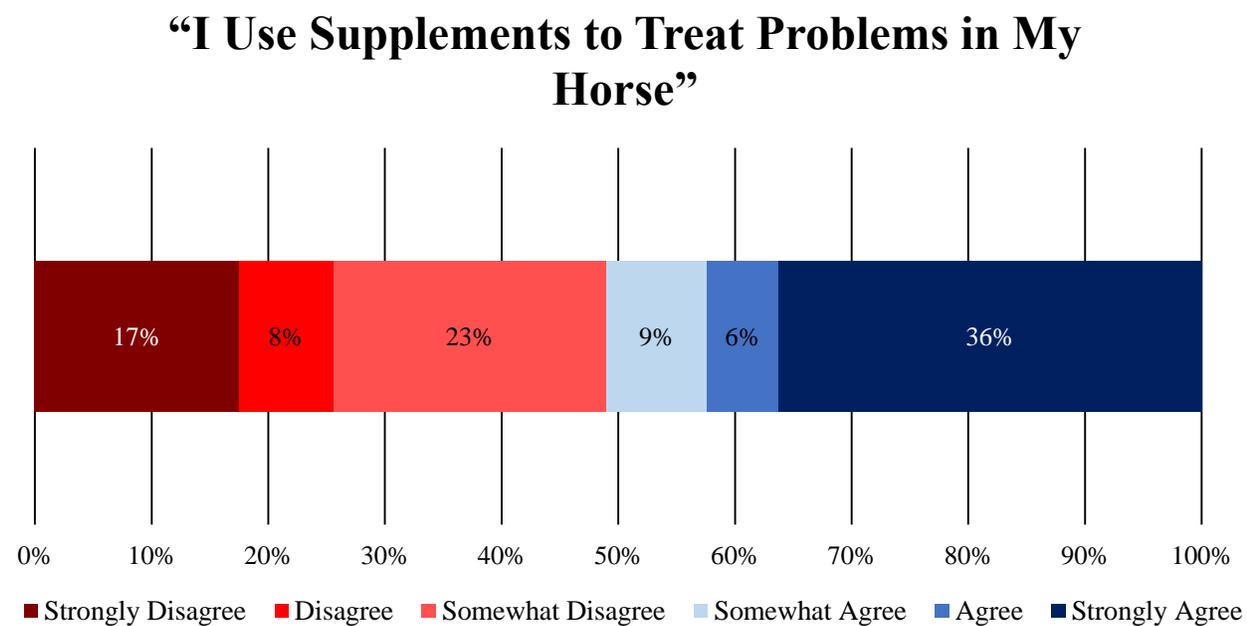


Figure 18. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Treat Problems in My Horse.”

## “I Use Supplements to Promote My Horse’s Overall Health”

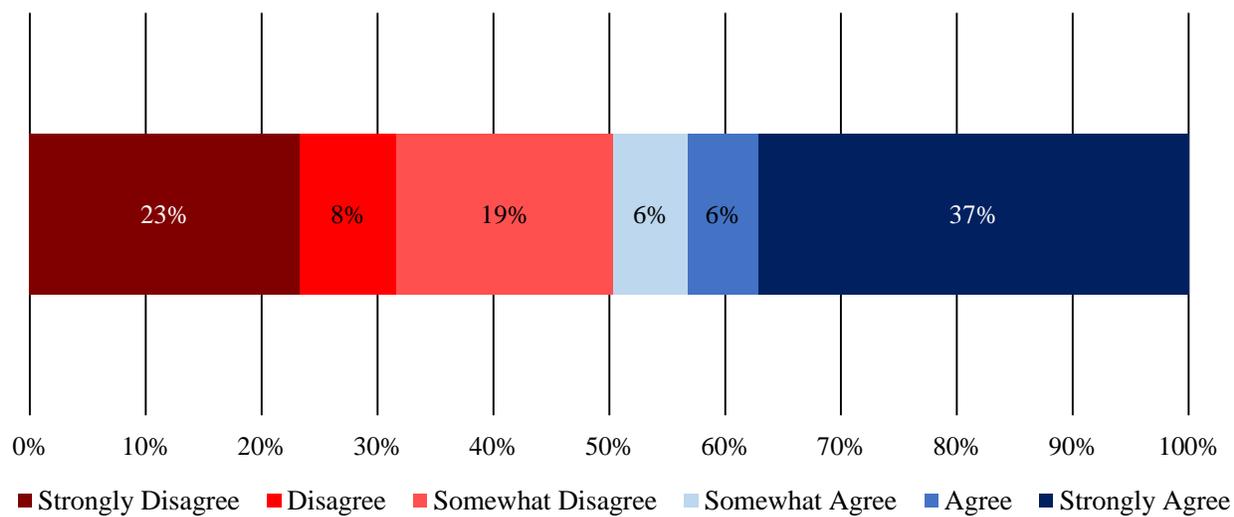


Figure 19. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Promote My Horse’s Overall Health.”

## “I Use Supplements to Provide Nutrients Not Provided in Other Feedstuffs”

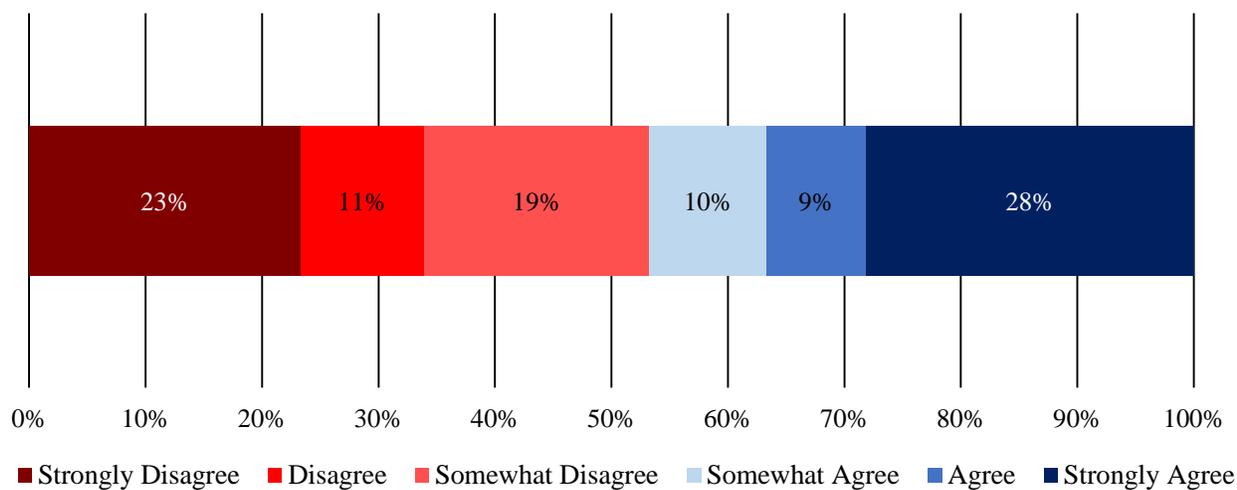


Figure 20. Belief Percentages of Respondents to Survey on Evaluation of Statement “I Use Supplements to Provide Nutrients Not Provided by Other Feedstuffs.”

## **Discussion**

In total, 2,219 respondents included in this survey appear to be a good representation of the U.S. horse industry, with breeds, disciplines, and rider identification reflecting expected levels as compared to demographics compiled by the American Horse Council (American Horse Council, 2005). With over 84% of respondents indicating they give supplements to at least one horse, it is interesting to note that only 50% of respondents “strongly agree, agree, or slightly agree” with the statement that supplements are safe. This is substantially less than the 84% of adult Americans that reported feeling confident about the safety of the human supplements they were taking (Dennis, 2010). In this study, 48% agreed to some extent that they felt supplements were well researched.

There was no difference by discipline or competitive status concerning horse owners’ perceptions and views on using supplements to treat or prevent issues, or on the safety or efficacy of supplements. Compared to REC riders, much of COM riders’ income may depend on the competitive ability of their horse(s), it was expected that these riders would be more likely to use supplements to treat or prevent issues, but the results did not support this hypothesis. In contrast, previous studies have shown up to 89% of college athletes report using some kind of dietary supplement while almost all professional athletes admit to taking one or more legal dietary supplements to boost their performance (Froiland et al., 2004; Jessop, 2014).

The reported amount spent on supplements per month in this study suggests horse owners and trainers are willing to spend a fair amount of money on supplements, even though this is an additional expense added to the cost of feeding a horse month to month.

When examining perceived issues across all competitive statuses and disciplines and their correlation with use of supplements to treat or prevent those issues. The results of this study are different from Agar et al. (2014), who identified a discrepancy between perceived issues among dressage and eventing horses in the United Kingdom and the supplements owners and trainers were using. Agar et al. (2014) did not report the percentage of perceived issues among their respondents, though they did report that energy and performance issues and lameness were considered to be the most important issues perceived among dressage and eventing horses.

When comparing the results of this study's respondents perceived issues in their horses to Burk and Williams (2008), similar percentages of owners reported use of treatment with supplements for joint issues and digestive issues other than colic. Differences between the results of this study and Burk and Williams (2008) may be due to the fact the previous study was conducted on a very small subset of the horse industry, having only surveyed top-level event horses rather than the horse industry as a whole. While Burk and Williams (2008) reported trainers, feed dealers, articles, and magazines as the top sources for supplement information; the current study found that owners chose veterinarians, farriers, other horse owners, and nutritionists or consultants as their top choices for supplement information.

Another interesting note is that 80% of horse owners reported they were likely to use supplements to provide nutrients not provided by other feedstuffs, which indicates that there may be a general misunderstanding among horse owners about the difference between a nutrient and a supplement. This study did not preclude the survey with specific information regarding the definition of nutrients and supplements, nor did it limit the

definition of supplements to nutraceuticals, herbs, phytonutrients or functional foods, or broaden that definition to include amino acids, fat supplements, vitamins or minerals. Not providing these definitions may have confounded the outcome of this questionnaire but also avoided any bias to the results of the survey. If indeed there is a misunderstanding among horse owners regarding the difference between a nutrient and a supplement, then this is one potential place to address with educational programs. Additional steps could be taken to further educate horse owners on how to properly determine and assess their horse's nutritional needs, as well as the assessing the nutritional value of the feedstuffs they are currently providing their horse(s).

Since 43% of respondents reported using veterinarians as their first source of supplement information, it would be of value to do an additional study to determine if veterinarians are, in fact, being asked about supplements by horse owners, in addition to determining what information veterinarians are giving horse owners about supplement use, safety, and efficacy. Oke and McIlwraith (2010) recommended a seven step system that could be used to identify and recommend quality supplements. The process recommends that veterinarians assess how recognizable a manufacturer is, the results of clinical trials, the contents of a supplement, the label claims of a supplement, administration recommendations, ingredient lists, and manufacturer information. It was suggested that, by using this process, veterinarians may be more able to identify useful supplements and then recommend them to their clients (Oke and McIlwraith, 2010). When examining what nutritional information veterinarians are giving their clients, Roberts and Murray (2010) found that only three-quarters of respondents gave their clients nutritional information, and a large portion of respondents only gave nutritional

information with regards to specific diagnoses or when specifically requested by clients. Based on the results of Roberts and Murray (2010), it could be surmised that veterinarians may act similarly with regards to providing supplement information to their clients.

Additionally, steps could be taken to develop other educational programs for horse owners that point them in the direction of the best sources for information regarding nutrition, including supplement usage. It should be stressed to horse owners that their local, county, or state extension agents are the best source for information on who to contact with questions about supplements. This means working with extension programs to make sure that they have accurate contact information for reputable nutritionists or consultants in the area.

In addition to taking steps to educate horse owners about supplements vs. nutrients and sources of supplement information, horse owners should also be educated regarding safety and efficacy of supplements. Though some individual states do require safety studies before a product can be marketed in their state, those rules are difficult to enforce (FDA, 2009), and the increasing availability of internet markets makes it even harder to prevent supplements from being sold in states where they may not have met safety requirements. Thus, horse owners should be educated to understand that some supplements may be either unsafe or unproven in their efficacy.

## **Conclusion**

The majority of horse owners surveyed in this study, regardless of riding discipline or competitive status, report giving supplements to their horses and indicate belief in supplement safety and efficacy. Although it was hypothesized that there would be a difference between disciplines with regards to beliefs on safety and efficacy of supplements, this study found no significant differences between disciplines or competitive status. Positive correlations indicated that horse owners were using supplements to treat or prevent the issues they perceive their horses have.

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## **APPENDICES**

## APPENDIX A: IRB APPROVAL

10/8/2014

Investigator(s): Dr. Holly Spooner, Nicole Swirsley, and Dr. Rhonda Hoffman

Department: ABAS

Investigator(s) Email Address: holly.spooner@mtsu.edu

Protocol Title: Use of supplements in the horse industry and attitudes and beliefs surrounding their

Use

Protocol Number: #15-091

Dear Investigator(s),

Your study has been designated to be exempt. The exemption is pursuant to 45 CFR 46.101(b)(2) Educational Tests, Surveys, Interviews, or Observations.

We will contact you annually on the status of your project. If it is completed, we will close it out of our system. You do not need to complete a progress report and you will not need to complete a final report. It is important to note that your study is approved for the life of the project and does not have an expiration date.

The following changes must be reported to the Office of Compliance before they are initiated:

- Adding new subject population
- Adding a new investigator
- Adding new procedures (e.g., new survey; new questions to your survey)
- A change in funding source
- Any change that makes the study no longer eligible for exemption.

The following changes do not need to be reported to the Office of Compliance:

- Editorial or administrative revisions to the consent or other study documents
- Increasing or decreasing the number of subjects from your proposed population

If you encounter any serious unanticipated problems to participants, or if you have any questions as you conduct your research, please do not hesitate to contact us.

Sincerely,

Lauren K. Qualls, Graduate Assistant

Office of Compliance

615-494-8918

## APPENDIX B: SURVEY

1. What is your gender?
  - Male
  - Female
2. How old are you?
  - Under 20
  - 20-34
  - 35-49
  - 50 +
3. What is the highest level of education you have received?
  - Less than High School
  - High School diploma
  - Some college
  - College degree
  - Post-grad degree
4. How long have you owned horses?
  - Less than 1 year
  - 1-5 years
  - 6-9 years
  - 10 + years
5. How many horses are under your care?
  - 0
  - 1
  - 2-4
  - 5-9
  - 10 +
6. Do you keep your horse(s) on your property, or are they boarded at a separate facility?
  - On property
  - Boarded at separate facility
  - Both (On my property and at a separate facility)
  - I do not currently own horses
7. Breed of horse
  - American Paint Horse
  - American Quarter Horse
  - Appaloosa

- Arabian
  - Draft breed
  - Miniature Horse
  - Mixed-breed or Grade
  - Pony breed
  - Tennessee Walking Horse or Spotted Saddle Horse
  - Thoroughbred
  - Warmblood breed
  - Other
8. How would you identify yourself?
- Professional rider/exhibitor or trainer
  - Amateur or non-professional rider/exhibitor
  - Recreational or non-competing rider
  - Do not ride at all
9. Which discipline of riding do you participate in most?
- Dressage
  - Driving
  - Endurance
  - Eventing
  - Halter
  - Hunter or Jumper
  - Polo
  - Racing
  - Speed Events (Barrel Racing, Gymkhana, Pole Bending, Mounted Shooting)
  - Trail Riding (Competitive or Recreational)
  - Vaulting
  - Western All Around Events (Trail, Pleasure)
  - Western Performance Events (Reining, Cutting, Roping)
10. How often do you compete (on average) with your horse or pony?
- I do not compete with my horse or pony
  - 1 day per month or less
  - 2-3 days per month
  - 4-5 days per month
  - 6 + days per month

**Evaluate the following statements - (Strongly Disagree, Disagree, Somewhat Disagree, Somewhat Agree, Agree, Strongly Agree)**

I feel that my horse has a behavior issue.

I feel that my horse has joint issues.

I feel that my horse has hoof issues.

- I feel that my horse has skin or coat issues.
- I feel that my horse has a colic issue.
- I feel that my horse has digestive issues other than colic.
- I feel that my horse has performance and energy issues.
- I feel that my horse lacks a balanced diet.
- I feel that my horse has no health issues.

11. Do you give supplements to the horses under your care?

- Yes
- No

12. How many of the horses under your care do you give supplements to?

- 0
- 1
- 2-4
- 5-9
- 10 +

13. How much, on average, do you spend on supplements, per horse, in one month?

- \$0
- \$1-30
- \$31-60
- \$61-90
- \$91-120
- \$120 +

14. Which of the following would you consult for supplement information? (Please check all that apply)

- Veterinarian
- Trainer
- Farrier
- Barn or farm owner
- Horse magazines
- Internet sites (not selling products)
- Peer-reviewed scientific journals
- Supplement companies
- Feed or supply store
- Nutritionist or consultant
- Other horse owners

15. Which of the following would you consult for supplement information first?

- Veterinarian
- Trainer

- Farrier
- Barn or farm owner
- Horse magazines
- Internet site (not selling products)
- Peer-reviewed scientific journals
- Supplement companies
- Feed or supply store
- Nutritionist or consultant
- Other horse owners

**Likelihood that you would use certain types of supplements - (Extremely Unlikely, Unlikely, Somewhat Unlikely, Somewhat Likely, Likely, Extremely Likely)**

How likely are you to use supplements to treat or prevent behavior issues?

How likely are you to use supplements to treat or prevent joint issues?

How likely are you to use supplements to treat or prevent hoof issues?

How likely are you to use supplements to treat or prevent skin or coat issues?

How likely are you to use supplements to treat or prevent colic?

How likely are you to use supplements to treat or prevent digestive issues other than colic?

How likely are you to use supplements to treat or prevent performance and energy issues?

How likely are you to use supplements to provide nutrients not provided by feedstuffs?

**Beliefs on Supplements - (Strongly Disagree, Disagree, Somewhat Disagree, Somewhat Agree, Agree, Strongly Agree)**

I believe that it is safe to give supplements to my horse.

I believe that the safety of supplements is well researched and studied.

I believe that supplements are useful to help prevent problems in my horse.

I believe that supplements are useful to help treat problems in my horse.

I believe that the effectiveness of supplements is well researched and studied.

I use supplements to prevent issues in my horse.

I use supplements to treat issues in my horse.

I use supplements to promote my horse's overall health.

I use supplements to provide nutrients that are not provided by other feedstuffs.