



2016 AVMA Report on

THE MARKET FOR VETERINARIANS



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*Veterinary
Economics*



2016 AVMA Report on **THE MARKET FOR VETERINARIANS**

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SUMMARY

The market for veterinarians is the market of convergence between the market for veterinary education and the market for veterinary services. In this market, the equilibrium price and quantity in the market for veterinary services collides with the price and quantity equilibrium from the market for veterinary education. The number of veterinarians produced by veterinary colleges at a specific cost per veterinarian confront an income offer derived by the willingness of animal owners to purchase veterinary services from veterinary hospitals. While all three of these markets will rarely, if ever, have equilibriums that are in alignment, the markets should tend to induce resources to move in the direction of the equilibrium prices and quantities. That is, in each of the markets, there should be a movement of resources to produce a quantity of output that just meets demand at a price that is acceptable to both consumers and producers.

We estimate that in 2015 there were a total of roughly 105,000 veterinarians that were actively engaged in the profession in public or private practice, and roughly 15,000 veterinary students training to become veterinarians. The largest segment of the profession is engaged to provide medical services to animals in private and corporate practices. Of these practices, companion animal practices employed the largest number of veterinarians, followed by food animal, equine and mixed animal practices. In public practice, colleges and universities employ the most veterinarians, followed by industry and state and local governments.

The national market for veterinarians remains robust for the second straight year. The single largest source of this improvement has been the growth in the U.S. economy. The market for veterinarians has witnessed the second straight year of low unemployment, negative underemployment, applicant-to-jobs ratios of one or less, and increasing mean salaries. But the market may not be robust in every locality or in every practice type. To the extent that veterinarians are mobile both in location and practice type, the differences in the market that occur as a

result of maldistribution should be self-correcting: lower-income, unemployed or underemployed veterinarians should seek higher-paying employment opportunities. To the extent that mobility is constrained as a result of licenses, experience, technical skills, living costs and/or family situations, the variation in incomes will persist.

In 2015, unemployment remained below the national average and was not significantly different from 2014. Several factors were found to be statistically significantly correlated with a higher probability of being employed, including being a graduate from three U.S. colleges of veterinary medicine (University of California-Davis, Colorado State University and University of Georgia). Being board certified or in regions 1, 2, 3 and 5 also are highly correlated with a higher probability of being employed. The only statistically significant factor that was correlated with higher unemployment in 2015 was having additional degrees.

Underemployment was again negative in 2015, with more veterinarians indicating they wish to work fewer hours for less compensation than those that wish to work additional hours for more compensation. The total number of veterinarians that would be required to eliminate the negative underemployment was 1,833 if each were to work 40 hours per week. Of course the indivisibility of labor makes eliminating the negative underemployment difficult, as few veterinarians will wish to work the 5-10 hours per week in several practices that would be required because underemployment, both positive and negative, occurs in small numbers of hours distributed throughout the nation and practice types.

The ability of markets to adjust depends on information. Veterinarians will not relocate or change career paths without knowledge of the benefits that may be accrued as a result of the move. For this reason, the AVMA's Veterinary Economics Division is providing "salary calculators," tools that provide the

relative importance of various demographic factors in determining veterinary incomes. Of course these are mean incomes and there is still a great deal of variation in income not accounted for by the factors in the model. Some of these factors are unique to the individual, such as personality, lifestyle and energy level. To the extent that the constraints to mobility allow, the availability of this information to the profession should reduce the income difference between veterinarians over time and also reduce the time required for those changes to occur.

The Debt-to-Income Ratio (DIR) reported in the 2016 AVMA Report on the Market for Veterinary Education provides a Key Performance Indicator for the efficiency with which the markets for veterinary education and veterinarians interact to guide resources to their best use. A high DIR would suggest that the market for education is out of alignment with the market for veterinarians. The demand for veterinarians is insufficient to provide a price (income) that enables veterinary graduates to easily service the debt (cost of education). The high DIR is sending a signal to the veterinary education market that colleges should reduce the cost of education, and that veterinary applicants should reduce the demand for veterinary education. The signal to the market for veterinary services to practice owners is to lower the cost of veterinary services and to users of veterinary services to pay more practices to increase the demand for services.

The Net Present Value (NPV) presented in this report is a Key Performance Indicator for the efficiency with which the markets for veterinarians and veterinary services interact to guide resources to their best use. A low NPV would suggest that the market for veterinarians is out of alignment with the market for veterinary services. The demand for veterinary services is insufficient to provide income to veterinarians at a level that would provide a normal economic return (cover variable and fixed costs and produce a return on investment equivalent to those found in

similar markets). The low NPV is sending a signal to the market for veterinarians: for veterinarians to move to higher-valued employment opportunities and for veterinary employers to expand markets or lower costs to increase veterinary compensation.

The NPV reported on here is computed with a specific formulation and set of assumptions. Changes to the formulation or set of assumptions will change the NPV. Thus, the actual value is less important than the year-to-year change in the value and the relative importance of the factors that cause this change. One of the most important assumptions of NPV is the opportunity cost: the income earning potential that was given up to become a veterinarian. This opportunity cost is the earning path that would have occurred had the individual not become a veterinarian, and we have used the earning path of the average bachelor's of science recipient as a proxy for this opportunity cost. Because men and women veterinarians have demonstrated different earnings paths over their careers, and those same differences do not occur between men and women with bachelor's degrees, the opportunity cost for men to become veterinarians is higher than for women and this lowers the NPV for men relative to women. As the NPV formulation is based on historic data, its value as a predictive tool is only useful if the future resembles the past with respect to earnings paths.

Finally, the report illustrates a new research thrust of AVMA's Veterinary Economics Division to begin to look more closely at the potential differences in local compared to national market conditions. This report provides results of an analysis of veterinarians in Indiana, and next year we will provide the results for Arizona, Colorado, Texas, bovine practices, equine practices and a segment of specialists, the lab animal practitioners. Workforce characteristics in Indiana and the U.S. are compared, and the value of the veterinary services sector to the Indiana economy is computed.

INTRODUCTION

The market for veterinarians may be thought of as the market for veterinarian labor. As such, this market is linked to other labor markets as veterinarians compete with many other professionals for employment opportunities not directly involved in the care of animals. The largest markets for veterinarians are those of private practice (e.g., companion animal, food animal, equine and mixed animal), comprising roughly three-quarters of all active veterinarians. Other markets, such as education, research, industry, government, non-profits, banking and consulting, employ the remaining quarter of all active veterinarians.

Markets that employ veterinarians are “linked” through the prices paid for veterinary labor. Theoretically, over time, as the price of labor in one market rises compared to another, more labor will be drawn to the higher-priced market. This movement in labor from the lower-priced to higher-priced market continues until the supply-demand ratio in both markets is no longer differentiable and thus the price in both markets eventually becomes similar.

This process of labor resource allocation and reallocation, in reality, is constrained by the process of selecting applicants for veterinary education, the training received by the veterinary student, and the specialized experiences gained in practice.

In addition, not every potential applicant will be willing to use their veterinary skills to maximize their earning potential in the highest-paying employment opportunity. Every individual will weigh the tangible benefits of employment (compensation and benefits) with the intangibles (e.g., location, type of practice and duties). Some differences in compensation found between practice types and location may be due to the weighting of intangibles versus tangibles by veterinarians and thus reallocation of labor may not occur based only on differences in compensation (controlling for living costs).

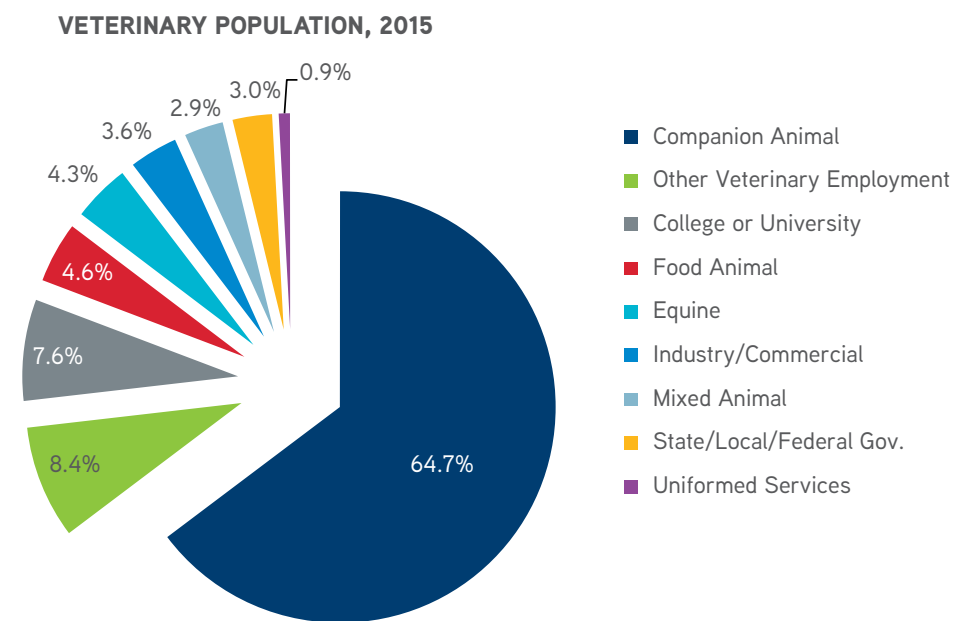
Some students have focused on obtaining the education for a specific type of veterinary practice that makes mobility between types of practice difficult, and active veterinarians that have been in practice have acquired specific skills that may not be needed in alternative markets and thus not compensated. Specialized skills, degrees and certifications required for employment act as barriers to entry, reducing the supply of labor and increasing the price of that labor.

All of these factors affect the incomes of new graduates and experienced veterinarians. We have provided the analysis of these factors to demonstrate the relative impacts of each on the variation in incomes between veterinarians.

One of the major factors that affects the demand for veterinarians is the demand for veterinary services. A greater demand for veterinary services will create a greater demand for veterinarians. And, with a greater demand for veterinarians relative to the supply of veterinarians, income levels will be higher. Because the demand for veterinary services depends on the number of animal owners, the incomes of those owners and the effect of the economy on those incomes, the demand for veterinarians, as well as the level of veterinarian incomes, will grow as the economy grows.

The market for veterinarian labor is connected through price to all other labor markets. Increases in the demand for veterinarians, in theory, should move in the same direction as the national level of demand for labor. As the demand for goods and services throughout the economy increases, firms will hire new labor to produce the new output needed to meet this demand. The number of jobs (people employed) will rise, and unemployment will fall. Thus, national employment estimates from the Bureau of Labor Statistics provide a good indicator for what may be happening in the market for veterinarians.

The Conference Board provides an indicator of the job market through their Help Wanted Online (HWOL) Data Series. The Conference Board is a global independent business membership and research association working in the public interest. “The Conference Board HWOL was first published in July 2005 and provides data on online advertised job demand. HWOL fills a critical gap in the current U.S. economic indicators by providing timely monthly measures of labor demand (advertised vacancies) at the national, regional, state, and metropolitan area levels. These monthly measures are comparable in timing and geographic detail to the Bureau of Labor Statistics’ (BLS) monthly measures of labor supply (unemployment) and employment. The Conference Board HWOL program is one of the earliest published monthly indicators of economic activity in the previous month with data publication centered around the first of each month. The program provides measures of levels and rates for both Total Online Ads and New Online Ads. The online vacancy program is one of the few indicators to provide extensive occupational detail with national estimates published at the major occupational group level and state and MSA estimates at higher-level aggregates” Conference Board (2016).



Estimated number of veterinarians as of December 31, 2015: 105,358

Figure 1

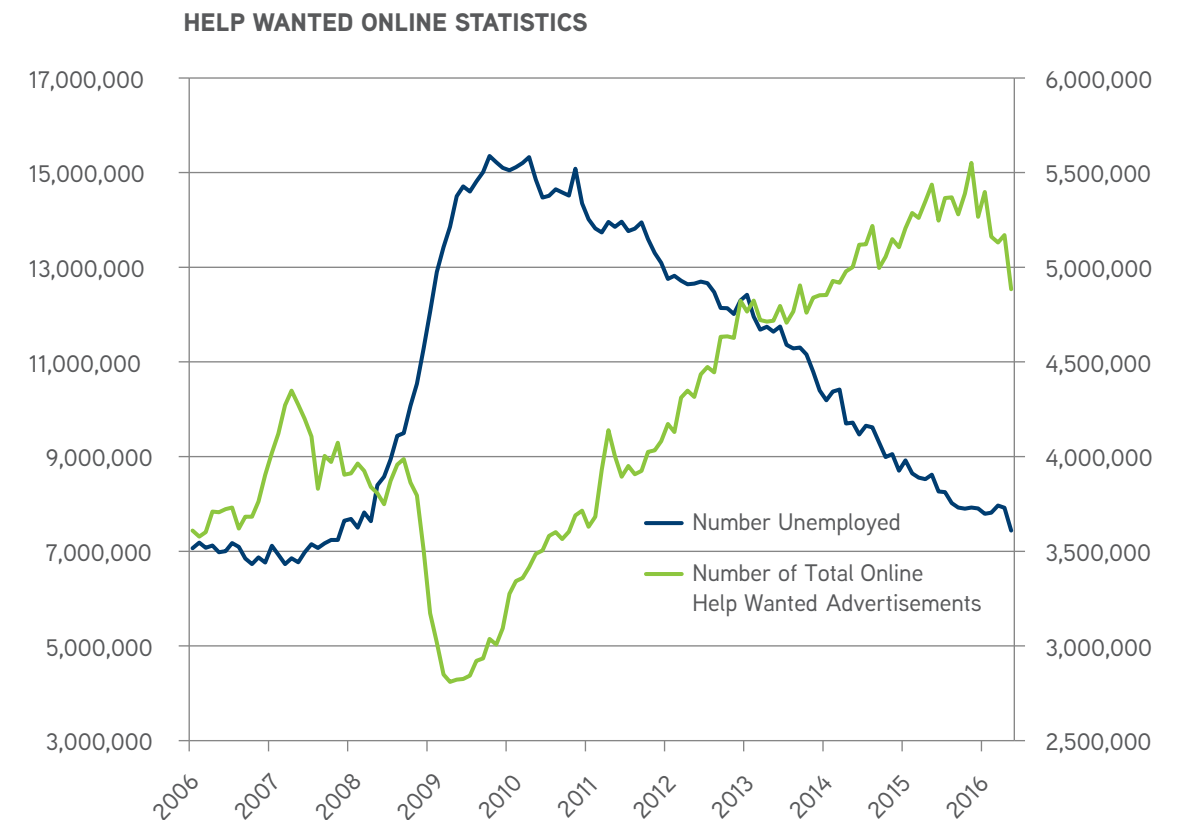


Figure 2

The HWOL series (labor demand), in combination with the BLS measure of unemployment (labor supply), provides an overall picture of the U.S. labor market. The HWOL job listings began to decline in 2007 and reached a bottom in early 2009. They had shown continued growth until the fall of 2015. The number of jobs posted nationally peaked in November of 2015 at just over 5.5 million and has declined since reaching a low of just under 4.9 million jobs posted in May of 2016. Unemployment mirrored the trend in the HWOL data. The low point for unemployment occurred at the same time that the posted jobs in HWOL hit a high. Unemployment then began to climb and reached a peak at the same time that the number of jobs posted online hit the low point. Unemployment has declined continually since 2009, hitting a low of just under 7.8 million in January of 2016. As noted in the 2016 AVMA Report on Veterinary Markets, these are important indications that the economy may have reached its zenith in the business cycle.

A simplified measure of the national labor markets is the supply/demand (S/D) ratio. The S/D ratio is the number of unemployed persons divided by the number of jobs posted online. The S/D ratio provides an indication of the general tightness of the national labor market and indicates the extent to which the national labor supply and demand is out of balance. At the height of the recession, there were more than five unemployed persons seeking each available employment opportunity. Relative scarcity of labor was very low, and wage growth suffered. The S/D ratio has fallen continuously since that high mark in 2009 and is now roughly 1.6:1. This suggests that there are three unemployed

persons for every two employment opportunities and thus the relative scarcity of labor is quite high compared to what it was in 2009. The declining S/D ratio, or increasing labor scarcity, should create increasing pressure on wage growth.

While providing an overall indicator of the national aggregate labor market, the S/D ratio may vary considerably by occupation and geographic location. Over time, the S/D ratios across regions and occupations would begin to equilibrate (become similar) if individuals were equally mobile, had information on all employment opportunities and there were no barriers to entry into the various occupations. In practice, none of these conditions hold and thus the S/D ratio maintains differences between occupations and locations even though all may change over time. The table below provides the S/D ratio for the 10 top occupations by posted jobs and the associated mean hourly wage rate for two different periods. In June of 2013, the national S/D ratio was 2.45:1, and, as noted earlier, the national S/D ratio is now approximately 1.6:1. For some of the occupations listed below, such as "Food preparation and related," the S/D ratio declined between the two periods but remained above the national average. For "Computer and Mathematical Science" and "Management," the S/D ratio increased between the two periods but remained far below the national average.

The relationship between the wage rate and the S/D ratio and can be easily illustrated by plotting the wage rate of the various occupations against the S/D ratio of each occupation. As relative scarcity of labor in a specific market increases (S/D declines), the wage rate increases.

S/D RATIO AND WAGE RATES FOR HELP WANTED ONLINE, 2013 AND 2016

Occupation	June 2013 HWOL		May 2016 HWOL	
	Ratio	Mean Wage	Ratio	Mean Wage
Sales and Related	1.54	\$18.37	1.29	\$18.59
Computer and Mathematical Science	0.17	\$39.43	0.21	\$40.37
Office and Administrative Support	1.75	\$16.78	1.72	\$17.08
Healthcare Practitioners and Technical	0.44	\$35.93	0.26	\$36.54
Management	0.77	\$53.15	0.83	\$54.08
Transportation and Material Moving	1.72	\$16.28	1.44	\$16.57
Business and Financial Operations	0.87	\$34.14	0.79	\$34.81
Food Preparation and Serving Related	3.45	\$10.38	2.58	\$10.57
Installation, Maintenance, and Repair	0.94	\$21.35	1.30	\$21.74
Architecture and Engineering	0.57	\$38.51	0.64	\$39.19

Table 1

The veterinary profession or the veterinary occupation is one of the labor markets that comprise this national market. Within that veterinary occupation are various specializations (practice types) that have unique S/D ratios and thus create variations in mean incomes by practice type. The characteristics of the unique labor markets within the veterinary profession, as well as the aggregate labor market for the veterinary profession, are the focus of this report.

This report provides a measure of income and the information about the factors that may affect income. As noted in the

discussion above, the S/D ratio, or relative scarcity of labor, affects the wage rate (income) and thus we examine the factors that may affect the supply and demand for veterinary labor. Those factors include; work hours, unemployment and underemployment, desire to increase or decrease working hours, job satisfaction, burn-out scores, general health and the analysis of expenditures. The report also provides forecasts of the most likely future paths of variables and key information surrounding the key performance indicator (KPI) for the market for veterinarians: Net Present Value of the DVM degree.

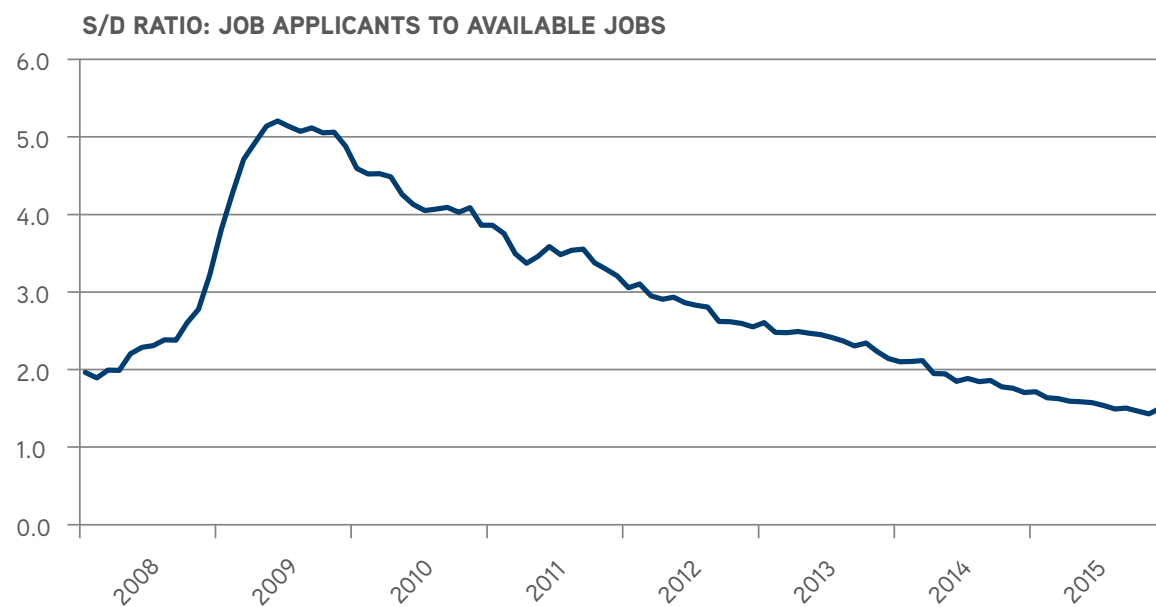


Figure 3

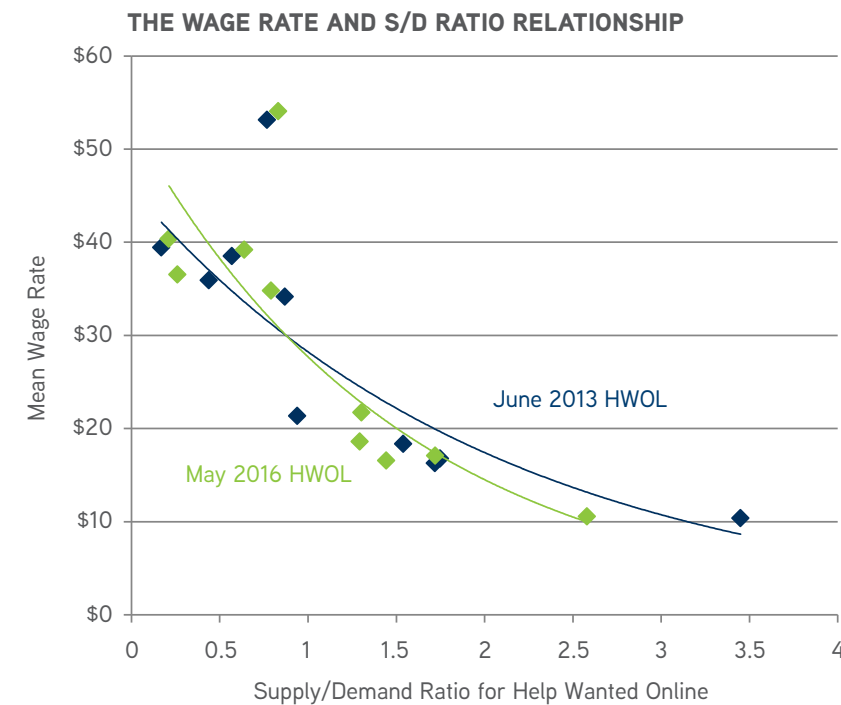


Figure 4



EMPLOYMENT

Because of the differences in distribution by practice type, region and gender, and between surveys, descriptive statistics for each survey must be weighted to reflect the change in the distribution of veterinarians across these factors to provide an accurate measure for each variable over time.

THE EMPLOYMENT AND COMPENSATION SURVEYS

In 2015 two AVMA surveys collected data on employment and income of U.S. veterinarians. The first survey, the Employment Survey, was initiated in 2014 with the purpose of quantifying unemployment and underemployment. The sample frame for the Employment Survey was drawn from the AVMA database of veterinarians that includes all graduates from U.S. veterinary schools; U.S. graduates from AVMA accredited foreign colleges; and any other veterinarian that has sought AVMA membership at any time in the past. The sample frame included AVMA members and non-members who graduated 1, 5, 10, 15 (only in the 2015 survey), and 25 years prior.

The second survey, the Veterinary Compensation Survey, formerly known as the Biennial Economic Survey, is conducted to gauge compensation trends within the veterinary profession. The sample frame is randomly drawn from all veterinarians for whom the AVMA has contact information.

The respondents to both surveys represented the distribution of veterinarians across the profession by practice type and region² generally, but there were not sufficient responses to provide detailed information for each practice type in each region.

The distribution of gender varies by survey and, again, generally represents a larger share of females in the profession compared to males.

² Region is identified by the first digit of the zip code. A map of the regions can be found on page 13 of the 2016 AVMA Report on the Veterinary Markets.

Because of the differences in distribution by practice type, region and gender, and between surveys, descriptive statistics for each survey must be weighted to reflect the change in the distribution of

veterinarians across these factors to provide an accurate measure for each variable over time.

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY PRACTICE TYPE

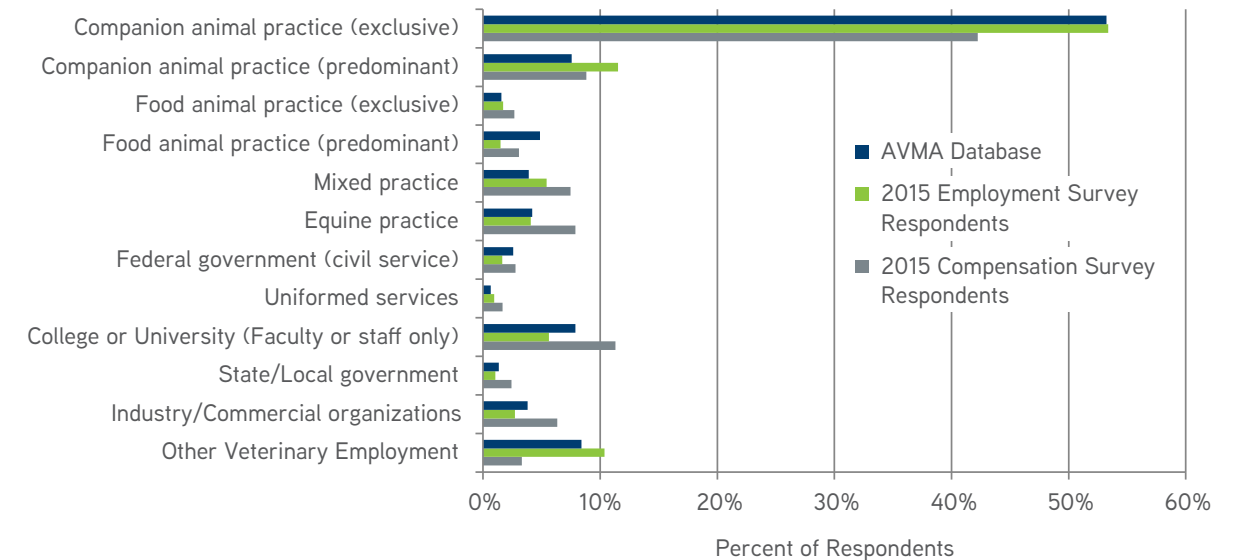


Figure 5

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY REGION

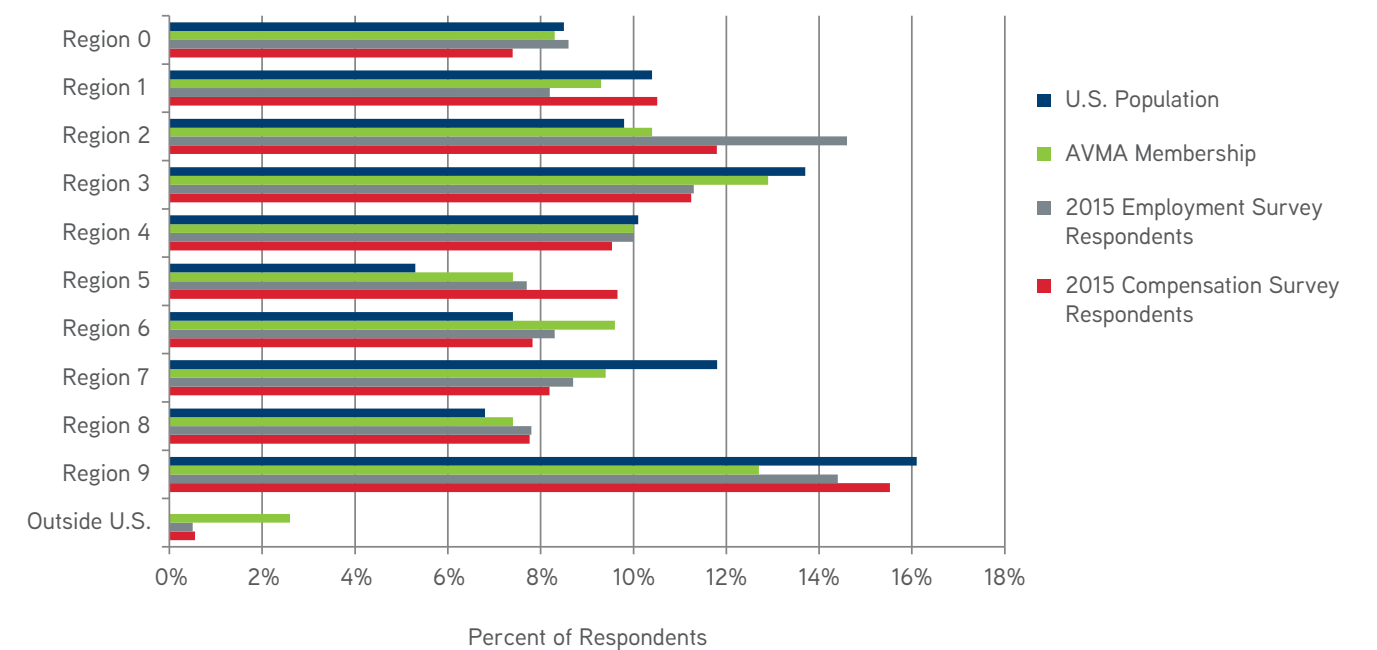


Figure 6

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY GENDER

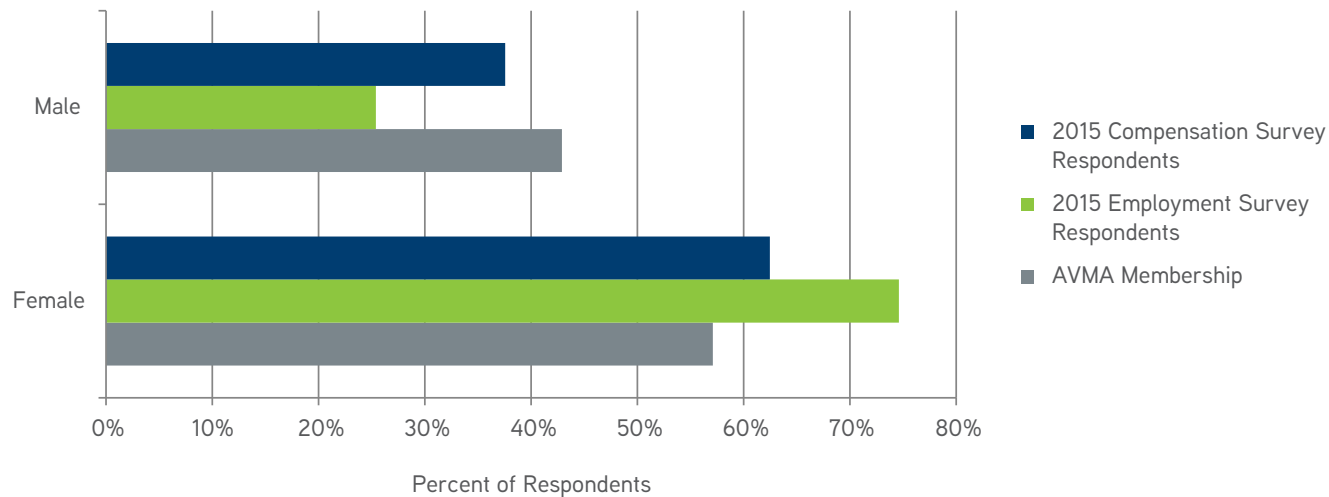


Figure 7

SAMPLE RESPONDENTS BY GRADUATION YEAR, EMPLOYMENT SURVEY

Graduation Year	Sample		AVMA Database	
	N	Percent	N	Percent
1989	299	13.4%	2507	16.6%
1999	300	13.5%	2680	17.8%
2004	375	16.8%	2954	19.6%
2009	566	25.4%	3248	21.6%
2013	684	30.7%	3671	24.4%
Total	2224	99.9%	15060	
Missing	2	0.1%		
Total	2226	100.0%	15060	

Table 2

UNEMPLOYMENT

In 2014 the AVMA undertook the task of simultaneously estimating the unemployment rate, the underemployment rate and veterinary education outcomes assessments for the veterinary profession. To this end, the Economics Division

Summary Statistics

For the 2014 Employment Survey, the unweighted unemployment rate was 3.3 percent, with 1.7 percent of respondents not responding to the question. For the 2015 Employment Survey, the unweighted unemployment rate was 4.4 percent, with 1.2 percent of respondents not responding to the question. The confidence interval around the 2014 and 2015 surveys was 0.81 percentage points and 0.85 percentage points, respectively, and thus the two rates are not statistically different.

Of those reporting unemployment in 2015, the mean number of weeks they have been unemployed was 47.9 weeks over a mean

of 2.1 separate periods, less than 2014's sample of an average of 55.7 weeks over 1.7 periods.

Women were more likely than men to be unemployed, with an unemployment rate of 4.9 percent, compared to an unemployment rate of 3.4 percent for men.

The highest rate of unemployment came from people currently living in Regions 3, 8 and 9, with 5.0, 4.8 and 4.9 percent, respectively, of respondents from these regions indicating they were unemployed.

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CURRENTLY EMPLOYED

Are you Currently Employed?	2014 Employment Survey	2015 Employment Survey
Yes	95.0%	94.4%
No	3.3%	4.4%
Missing	1.7%	1.2%

Table 3

LENGTH AND DURATION OF UNEMPLOYMENT

		Mean	N	Std. Dev.	Minimum	Maximum
2014 Employment Survey	How many weeks have you been unemployed in veterinary medicine?	55.7	60	49.7	1	156
	How many isolated periods of unemployment have you had?	1.7	57	1.3	1	10
	For approximately how many days, in total have you been unemployed during your veterinary career?	371.2	56	307.5	0	1000
2015 Employment Survey	How many weeks have you been unemployed in veterinary medicine?	47.9	65	48.5	0	156
	How many isolated periods of unemployment have you had?	2.1	63	1.7	1	10
	For approximately how many days in total have you been unemployed during your veterinary career?	325.8	62	323.2	0	1000

Table 4

UNEMPLOYMENT BY GENDER

Gender	AVMA Membership	Are you currently employed?		Total
		No	Yes	
Female	57.1%	4.9%	95.1%	100.0%
Male	42.9%	3.4%	96.6%	100.0%
Total	100.0%	4.5%	95.5%	100.0%

Table 5

OF THOSE REPORTING UNEMPLOYMENT IN 2015, THE MEAN NUMBER OF WEEKS THEY HAVE BEEN UNEMPLOYED WAS 47.9 WEEKS OVER A MEAN OF 2.1 SEPARATE PERIODS, LESS THAN 2014'S SAMPLE OF AN AVERAGE OF 55.7 WEEKS OVER 1.7 PERIODS.

UNEMPLOYMENT BY REGION

Region of Residence	AVMA Membership	Are you currently employed?		Total
		No	Yes	
Region 0	8.3%	3.8%	96.2%	100.0%
Region 1	9.3%	2.3%	97.7%	100.0%
Region 2	10.4%	3.5%	96.5%	100.0%
Region 3	12.9%	5.0%	95.0%	100.0%
Region 4	10.0%	3.3%	96.7%	100.0%
Region 5	7.4%	2.4%	97.6%	100.0%
Region 6	9.6%	1.7%	98.3%	100.0%
Region 7	9.4%	3.2%	96.8%	100.0%
Region 8	7.4%	4.8%	95.2%	100.0%
Region 9	12.7%	4.9%	95.1%	100.0%
Outside US	2.6%	0.0%	0.0%	0.0%
Total	100.0%	3.6%	96.4%	100.0%

Table 6

Of the veterinarians who reported being currently unemployed, those who had selected companion animal practitioner as their first position in veterinary medicine had the highest unemployment rate among private practitioners, with an unemployment rate of 4.0 percent in 2015. However, the survey results show that within the public practice areas the unemployment rate is alarmingly high at 23.1 percent for those who were employed in state or local government as their first professional position, and at 8.3 percent in both federal government as first position and for those whose first employment type is not listed.

Differences in the unweighted employment rates did vary by year of graduation and gender, with the 1989 graduates having the highest unemployment rate (6.5 percent) and the 2009 graduates having the lowest unemployment rate (3.4 percent). Females who graduated in 1999 had the highest unemployment rate (7.5 percent), while males who graduated in 2004 had the lowest unemployment rate (1.1 percent). However, after conducting an analysis of the variance to determine whether there is a significant difference in employment rates between graduation years, we concluded that there is no significant difference in the unemployment rate between the five graduation years.

UNEMPLOYMENT BASED ON FIRST VETERINARY POSITION

Sector of First Veterinary Position	AVMA Membership	Are you currently employed?		Total
		No	Yes	
Food animal practice (exclusive)	6.1%	7.0%	93.0%	100.0%
Food animal practice (predominant)	0.0%	2.4%	97.6%	100.0%
Mixed practice	3.9%	2.8%	97.2%	100.0%
Companion animal practice (predominant)	66.5%	4.0%	96.0%	100.0%
Companion animal practice (exclusive)	0.0%	4.8%	95.2%	100.0%
Equine practice	4.4%	2.6%	97.4%	100.0%
Federal Government (civil service)	1.3%	8.3%	91.7%	100.0%
Uniformed services	0.6%	0.0%	100.0%	100.0%
College or University (Faculty or staff only)	6.3%	2.6%	97.4%	100.0%
State/Local government	0.9%	23.1%	76.9%	100.0%
Industry/commercial organizations	3.1%	3.7%	96.3%	100.0%
Not-for-profit organizations	6.9%	3.1%	96.9%	100.0%
Other	0.0%	8.3%	91.7%	100.0%
Currently a resident/ post-doc/ in grad school	0.0%	4.5%	95.5%	100.0%

Table 7

UNEMPLOYMENT BY GENDER AND GRADUATION YEAR

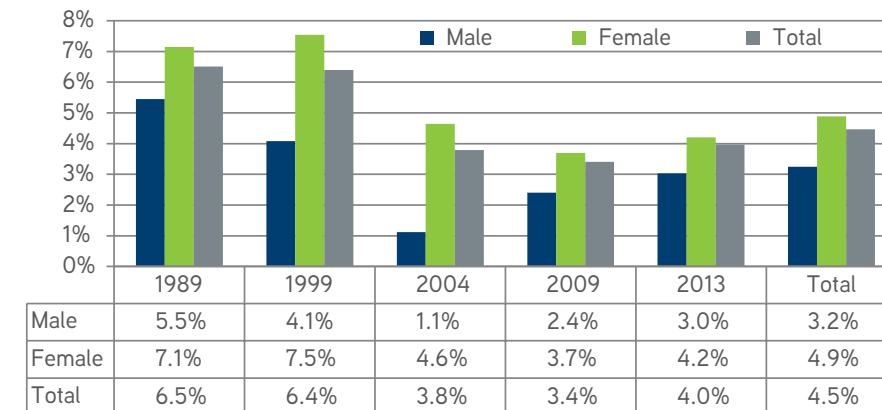
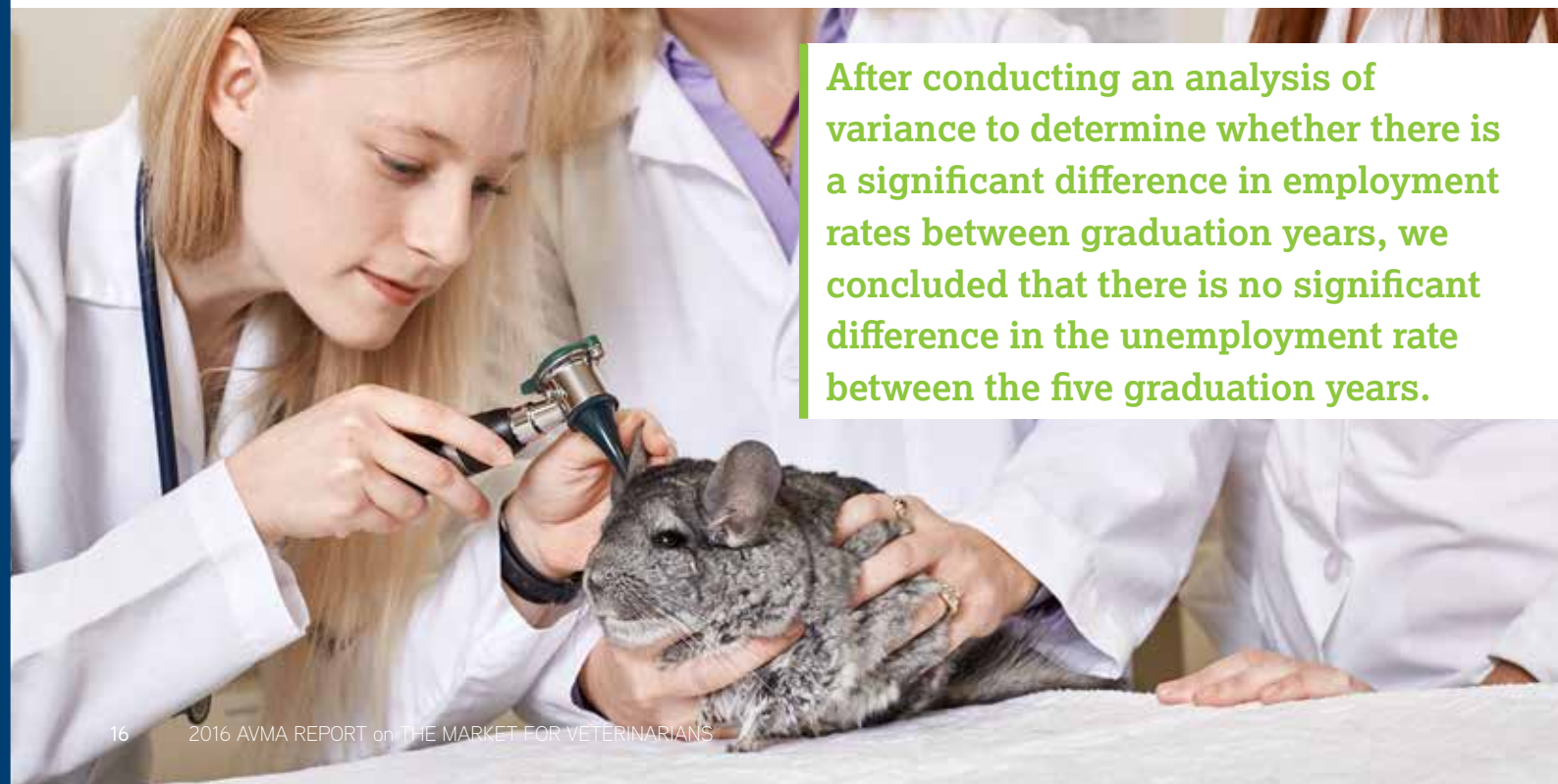


Figure 8

Unemployment rates also varied across colleges and practice types. The largest number of veterinarians who reported being unemployed at the time of the survey were graduates of Ross University, accounting for 7.1 percent of unemployed veterinarians in the sample. The University of Florida and Michigan State University followed closely, with each contributing 6.1 percent of the sample's unemployment.

The highest rate of unemployment among veterinarians under age 60 came from persons ages 31-40, 3.7 percent of whom reported being unemployed, whereas 20.7 percent of those over the age of 60 reported being unemployed.



After conducting an analysis of variance to determine whether there is a significant difference in employment rates between graduation years, we concluded that there is no significant difference in the unemployment rate between the five graduation years.

UNEMPLOYMENT BY VETERINARY COLLEGE

	Percent
Ross University	7.1%
University of Florida	6.1%
Michigan State University	6.1%
Virginia-Maryland Regional	5.1%
Colorado State University	4.1%
Kansas State University	4.1%
Tufts University	4.1%
Auburn University	3.1%
Cornell University	3.1%
Texas A&M University	3.1%
The Ohio State University	3.1%
Oregon State University	3.1%
North Carolina State University	3.1%
University of Minnesota	2.0%
University of Pennsylvania	2.0%
University of Tennessee	2.0%
University of California-Davis	1.0%
University of Georgia	1.0%
University of Illinois	1.0%
Iowa State University	1.0%
Louisiana State University	1.0%
Purdue University	1.0%
Oklahoma State University	1.0%
University of Missouri-Columbia	1.0%
University of Wisconsin	1.0%
Western University-California	1.0%
St. George's University	1.0%
St. Matthew's University	1.0%
Other	26.5%
Total	100.0%

Total unemployed: 98 veterinarians

Table 8

EMPLOYMENT STATUS BY AGE GROUP

Age	N	Percent	Employed	Unemployed	Total
18-30	581	26.1%	95.9%	4.1%	100.0%
31-40	939	42.2%	96.3%	3.7%	100.0%
41-50	376	16.9%	94.9%	5.1%	100.0%
51-60	276	12.4%	94.6%	5.4%	100.0%
61+	29	1.3%	79.3%	20.7%	100.0%
Missing	25	1.1%	100.0%	0.0%	100.0%
Total	2226	100.0%	95.5%	4.5%	100.0%

Table 9

As noted earlier, the national mean unemployment rate for veterinarians must be weighted to reflect the actual distribution of veterinarians by practice type, region and gender to determine the unemployment rate for the profession. Using the unemployment rate for gender, region and type of practice and applying these rates to the distribution of veterinarians across these demographic variables produces a national mean unemployment rate for the profession. The adjustments for gender, region and practice type are provided below. Adjusting for gender produces an unemployment rate of 4.3 percent, adjusting for the region produces an unemployment rate of 3.7 percent and adjusting for the type of practice in first employment yields an unemployment rate of 4.4 percent. The combined weighting of these three demographic characteristics yields a

weighted mean rate of 3.2 percent in 2014 and 4.1 percent in 2015 for the entire profession.

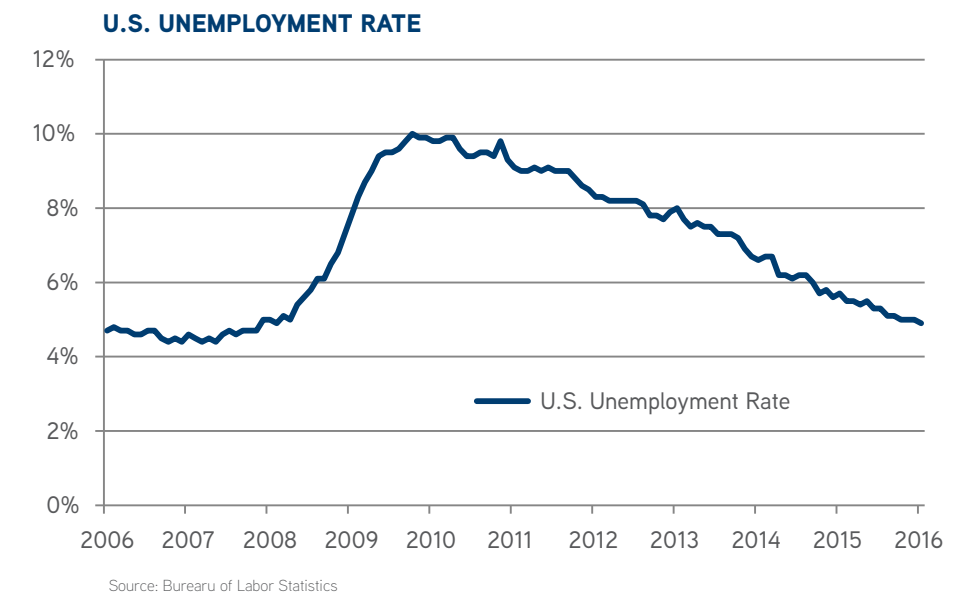
These two weighted mean unemployment rates are not statistically different and both remain below the U.S. national average unemployment rate. However, like the U.S. unemployment rate, the percent of veterinarians that may be employed in positions where they are not fully employed (underemployed), such as those that may be working part time or as relief because they cannot find full-time employment, is not captured in this unemployment rate.

The U.S. unemployment rate has been declining since 2009, and, as of May 2016, stands at 4.7 percent, far below its peak of 10.0 percent in October 2009 (BLS, 2016).

WEIGHTED UNEMPLOYMENT RATE

	2014	2015
Unemployment Rate by Gender	3.2%	4.3%
Unemployment Rate by Region	3.1%	3.7%
Unemployment Rate by First Veterinary Employment	3.3%	4.4%
Weighted Unemployment Rate	3.2%	4.1%

Table 10



Source: Bureau of Labor Statistics

Figure 9

LIKE THE U.S. UNEMPLOYMENT RATE, THE PERCENT OF VETERINARIANS THAT MAY BE EMPLOYED IN POSITIONS WHERE THEY ARE NOT FULLY EMPLOYED (UNDEREMPLOYED), SUCH AS THOSE THAT MAY BE WORKING PART TIME OR AS RELIEF BECAUSE THEY CANNOT FIND FULL-TIME EMPLOYMENT, IS NOT CAPTURED IN THIS UNEMPLOYMENT RATE.

Factors Correlated With Unemployment

The primary objective of this study was twofold: first to determine the level of unemployment/underemployment in the profession, and second to determine the factors affecting unemployment/underemployment within the veterinary profession.

To determine factors affecting unemployment within the profession, we calculated several binary logistic regressions with a series of combinations of independent variables. The binary logistic regression is similar to the simple linear regression where the relationships between the variable of interest (dependent variable) and the factors (independent variables) hypothesized to affect the variable of interest are mathematically computed. However, in the binary logistic regression the dependent variable has only two values (1=yes, 0=no) and the relationship measured is the probability of the dependent variable occurring when the factor occurs.

With each of the different regressions, we eliminated the characteristics that were not statistically significant in improving the probability that the dependent variable (employment) was likely to occur, while adding new variables to determine their impact on the likelihood of being employed. The dependent variable was “are you currently employed,” of which the responses were 1:Yes or 0:No.

The factors (independent variables) that were used to attempt to explain the probability of being unemployed included: age, gender, marital status, educational level, student debt, veterinary college, regional mobility, health, location, internship participation, board certification and practice type.

In this table, the “B values” are used to calculate the probability of an individual respondent falling into a specific category (employed or unemployed). The main criterion is to observe whether the B values are positive or negative. This will indicate the direction of the relationship, i.e., negative is more likely to lead to unemployment and positive more likely to lead to employment.

The “Exp (B)” column is the odds ratios (OR) for each of the independent variables. As noted in Tabachnick and Fidell (2013; pg.8), the OR represents “the change in odds of being in one of the categories of outcome (employed or unemployed) when the value of one of the independent variables (predictors) increases by one point.” To determine the likelihood of these outcomes, we use a Wald Test in which the variables that significantly contribute to predictive ability of the model would have a p-value of .05 or less in the column labeled “Sig.”

Being a graduate of UC Davis, Colorado State University or University of Georgia improved the probability of being employed, as did being male, board certified and located in regions 1, 2 and 5. The only factor that increased the probability of unemployment was for those who noted they had acquired “other” degrees.



FACTORS CORRELATED WITH UNEMPLOYMENT

Binary Logistic Regression : Dependent Variable: 1 - Employed / 0 - Unemployed						
	B	S.E.	Wald	df	Sig.	Exp(B)
Other degrees	-1.563	.509	9.437	1	.002	.210
University of California-Davis	3.334	1.144	8.489	1	.004	28.054
Gender	1.282	.453	8.007	1	.005	3.605
Colorado State University	3.078	1.132	7.391	1	.007	21.710
Board Certified	2.229	.864	6.660	1	.010	9.295
Region 5	1.601	.673	5.661	1	.017	4.958
Region 1	1.655	.696	5.655	1	.017	5.235
Region 2	1.642	.761	4.661	1	.031	5.167
University of Georgia	2.372	1.149	4.257	1	.039	10.715
Region 3	1.107	.580	3.643	1	.056	3.026
Texas A & M University	1.635	.921	3.152	1	.076	5.132
University of Wisconsin	2.186	1.234	3.138	1	.076	8.903
Region 7	1.441	.831	3.012	1	.083	4.227
University of Illinois	1.915	1.152	2.762	1	.097	6.785
Region 4	.985	.596	2.736	1	.098	2.679
Oregon State University	1.534	.937	2.680	1	.102	4.636
University of Pennsylvania	1.876	1.158	2.625	1	.105	6.525
Doctorate degree (Ph.D., Ed.D., etc.)	-1.219	.813	2.247	1	.134	.295
Health: 5 = Excellent / 1 = Poor	.257	.173	2.221	1	.136	1.293
Oklahoma State University	1.722	1.175	2.146	1	.143	5.595
Ohio State University	1.141	.789	2.089	1	.148	3.129
Kansas State University	1.292	.918	1.979	1	.159	3.639
DVM Debt	.000	.000	1.928	1	.165	1.000
Louisiana State University	1.639	1.183	1.922	1	.166	5.152
North Carolina State University	1.231	.927	1.764	1	.184	3.425
First Veterinary Employment: Equine	1.831	1.384	1.749	1	.186	6.238
Do not hold any other degrees	.995	.755	1.738	1	.187	2.704
Own / Don't own home	.478	.363	1.736	1	.188	1.613
First Veterinary Employment: State and Local Government	-1.778	1.366	1.695	1	.193	.169
First Veterinary Employment: Mixed Practice	1.433	1.106	1.681	1	.195	4.193
Cornell University	1.101	.883	1.557	1	.212	3.009
University Missouri-Columbia	1.429	1.188	1.446	1	.229	4.175
Virginia Maryland Regional	.974	.829	1.379	1	.240	2.649
Region 9	.764	.663	1.331	1	.249	2.148
Region 8	.748	.653	1.312	1	.252	2.112
University of Minnesota	1.236	1.081	1.309	1	.253	3.442
Age	-.021	.019	1.179	1	.278	.979
St Georges University	1.125	1.151	.955	1	.328	3.079
Auburn University	.893	.915	.952	1	.329	2.442
Tennessee State University	.850	.920	.852	1	.356	2.339

Table 11

FACTORS CORRELATED WITH UNEMPLOYMENT CONT'D.

Binary Logistic Regression : Dependent Variable: 1 - Employed / 0 - Unemployed						
	B	S.E.	Wald	df	Sig.	Exp(B)
Michigan State University	.645	.703	.842	1	.359	1.906
Single	.629	.714	.776	1	.378	1.876
Bachelor's degree	.439	.547	.645	1	.422	1.551
Seperated	-1.072	1.342	.639	1	.424	.342
Tufts University	.639	.832	.589	1	.443	1.894
First Veterinary Employment: Industry	-1.041	1.420	.537	1	.464	.353
Region 6	.558	.847	.433	1	.510	1.747
Ross University	.406	.713	.324	1	.569	1.500
Divorced	.473	.962	.241	1	.623	1.605
Master's in Business Administration	.475	1.176	.163	1	.686	1.608
University Of Florida	-.309	.778	.158	1	.691	.734
First Veterinary Employment: Companion Animal Practice	.357	.945	.143	1	.706	1.429
Married	-.221	.657	.113	1	.737	.802
Master's in Arts	-.364	1.237	.087	1	.768	.695
First Veterinary Employment: Food Animal Exclusive	-.392	1.368	.082	1	.775	.676
First Veterinary Employment: College / University	-.199	1.193	.028	1	.868	.820
First Veterinary Employment: Other	-.152	1.065	.020	1	.887	.859
First Veterinary Employment: Companion Animal Exclusive	-.067	.831	.007	1	.936	.935
Master's in Science (M.S.)	.023	.501	.002	1	.964	1.023
Iowa State University	19.161	3602.928	.000	1	.996	209557448.751
St Matthew's University	.007	1.377	.000	1	.996	1.007
Master's in Public Health (M.P.H.)	18.198	4486.359	.000	1	.997	80043416.972
Washington State University	19.464	5014.057	.000	1	.997	283829788.073
Purdue University	19.142	5304.326	.000	1	.997	205698020.134
First Veterinary Employment: Food Animal Predominant	17.221	6024.691	.000	1	.998	30118434.726
Western University-California	19.640	7119.050	.000	1	.998	338455261.681
Mississippi State University	18.670	7111.397	.000	1	.998	128265329.342
Tuskegee University	19.432	7633.913	.000	1	.998	275035692.221
Other Master's degree	18.370	7238.856	.000	1	.998	95015648.460
First Veterinary Employment: Not For Profit	17.560	7198.330	.000	1	.998	42306269.121
First Veterinary Employment: Uniformed Services	17.234	7255.835	.000	1	.998	30514230.522
First Veterinary Employment: Federal Government	17.296	7927.406	.000	1	.998	32475823.000
Specialized professional degrees (J.D., M.D., etc.)	18.160	19457.489	.000	1	.999	77045490.007
Widowed	16.496	25599.249	.000	1	.999	14592250.689
Constant	-.425	1.544	.076	1	.783	.653

Table 11 Cont'd.

AVMA Veterinary Career Center Data

An additional piece of evidence of the health of the market for veterinarians comes from data collected by the AVMA Veterinary Career Center (VCC). The VCC serves as a frequently updated and highly useful source of data on trends in the market for veterinarians. The VCC is one of the leading marketplaces for veterinary practices to post help-wanted ads and for veterinary practice staff to find employment.

Since the beginning of the last recession, new job seekers have outnumbered the number of searchable jobs, until recently. Though both have been increasing over time, the number of jobs has increased sharply since the beginning of 2015 and the number of new job seekers has markedly declined.



THE MARKET FOR VETERINARIANS DIDN'T BEGIN TO IMPROVE UNTIL WELL AFTER THE RECESSION (4-5 YEARS). THIS OBSERVATION IS IN-LINE WITH OTHER DATA ON VETERINARY SALARIES THAT SHOWED SALARIES DID NOT BEGIN TO INCREASE AGAIN AFTER THE RECESSION UNTIL 2014.

MONTHLY NUMBER OF JOBS AND APPLICANTS BY MONTH

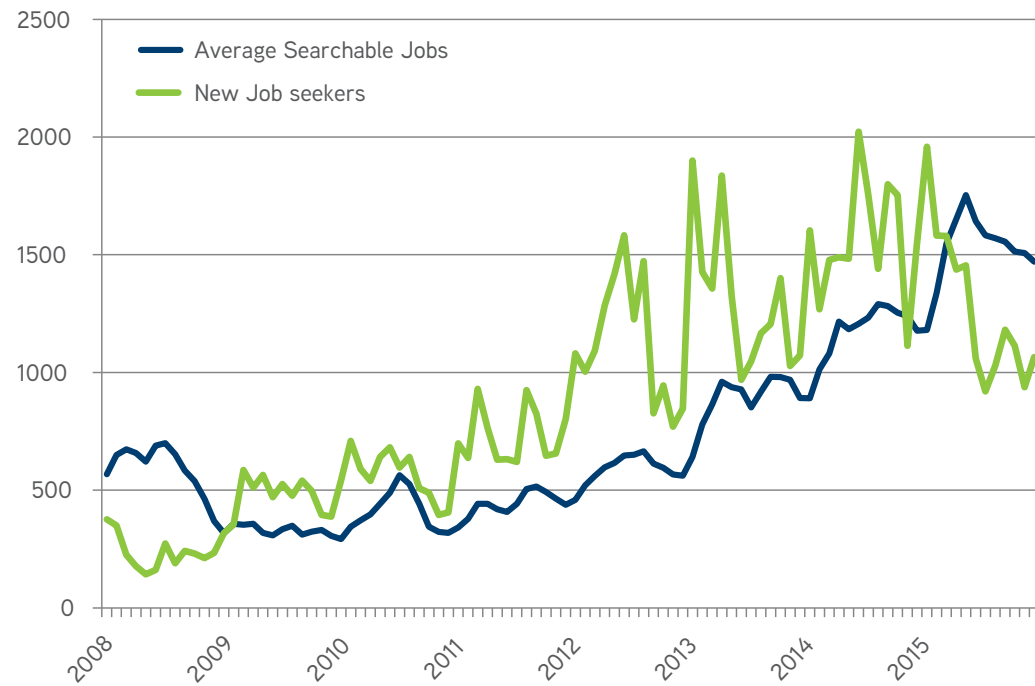


Figure 10

The VCC data series is quite volatile, so it helps to summarize the information as a ratio, as is shown in the following figure. This figure also shows a smoothed line representing a 12-month moving average of the ratio of applicants to available jobs. This chart illustrates that the ratio of applicants to available jobs increased from the last recession until reaching the peak of about 2:1 and has been decreasing since. This is an important illustration for two reasons. First, the market for veterinarians

didn't begin to improve until well after the recession (4-5 years). This observation is in-line with other data on veterinary salaries that showed salaries did not begin to increase again after the recession until 2014. The increasing salaries from 2013 to 2015 are consistent with the improving applicant-to-jobs ratio and thus this ratio provides a good indicator for future salary growth.

MONTHLY RATIO OF APPLICANTS TO AVAILABLE JOBS

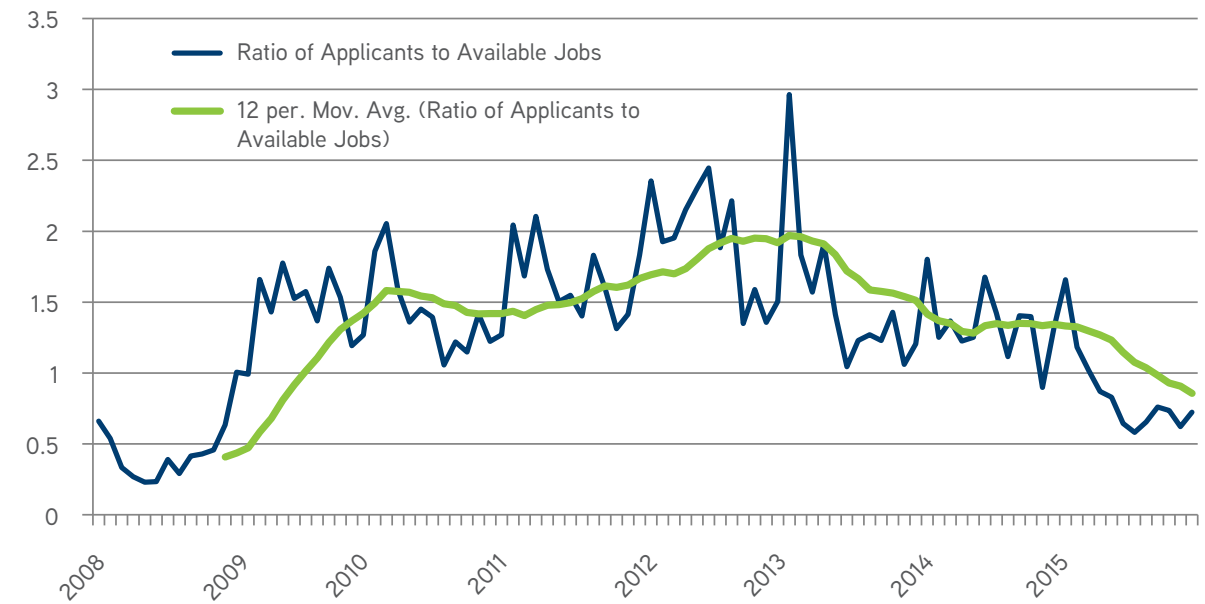


Figure 11



The total underemployment for the profession of an estimated 105,358 active veterinarians based on the survey responses was -60,520.3 hours. This negative number of hours implies that veterinarians wish to reduce their working hours below those that they are currently working rather than increase their working hours.



UNDEREMPLOYMENT

The argument always arises that the unemployment rate doesn't measure the true number of people who are looking for work, because it does not count those who have given up or those who are underemployed. Few would argue with this criticism. However, on the one hand, this doesn't particularly matter, because the point of the statistic is to act as an indicator for employment conditions. The point of an indicator is to measure the exact same thing consistently over time, not necessarily to put an exact measurement on a broad concept with multiple interpretations. Generally, these indicators are not meant to give accurate point estimates, but to provide an indication as to whether conditions are improving.

The AVMA Employment Survey was designed to measure underemployment. Underemployment is two-fold: it is first caused by a worker not being able to work as many hours as he

or she would like, or it can also be manifest in a person accepting employment below one's training and experience.

Underemployment has two definitions. The first definition of underemployment is when a veterinarian may be keeping busy all the time but would be able to see more clients and perform more productive work with additional veterinary technicians or physical space. The second definition of underemployment, as measured in total hours, represents the number of hours that veterinarians desire to work above what they are currently working. This was measured as the desire to increase/decrease hours worked for an equivalent increase/decrease in compensation. The most important aspect of the question pertaining to hours worked was the associated compensation. The survey question asked if veterinarians wish to work more for greater compensation or work less for less compensation.

Summary Statistics

The total underemployment for the profession of an estimated 105,358 active veterinarians based on the survey responses was -75,800 hours. This negative number of hours implies that veterinarians wish to reduce their working hours below those that they are currently working rather than increasing their working hours. Some 1,895 new veterinarians, each working 40-hour work weeks, would be required in order to offset the net total hours of those veterinarians who wish to work less and those who wish to work additional hours during their work week. In total, 19.2 percent of respondents indicated they wish to reduce the hours they work by a mean 13.1 hours, while only 15.0 percent of respondents wish to increase the hours they work by a mean 11.6 additional hours per week.

However, as with unemployment, these estimates do not reflect the true level of underemployment in the profession, since the sample of respondents does not reflect the demographics of the profession. The weighted values are provided below by gender, region and type of practice. Based on the reweighting of the sample to reflect the population of veterinarians, 24.7 percent of

veterinarians want to work less, while 22.6 percent wish to work more. The total hours of weighted underemployment are -73,320 hours, equivalent to a need for an additional 1,833 veterinarians.

As with unemployment, underemployment varies by gender, region and practice type. More females want to work fewer hours than want to work additional hours, while there is a slightly larger number of men who wish to work additional hours compared to those who want to work fewer hours.

Regionally, most of the regions followed the national trend with more veterinarians wanting to work fewer hours than the number of veterinarians wanting to work additional hours. However, in Region 1 there are more veterinarians that wish to work additional hours than those that wish to work fewer hours.

Underemployment by practice type also generally followed the national trend with most practice types having more veterinarians that wish to work fewer hours for less compensation than those who wish to work additional hours for more compensation.



AS WITH UNEMPLOYMENT, UNDEREMPLOYMENT VARIES BY GENDER, REGION AND PRACTICE TYPE. MORE FEMALES WANT TO WORK FEWER HOURS THAN WANT TO WORK ADDITIONAL HOURS, WHILE THERE IS A SLIGHTLY LARGER NUMBER OF MEN WHO WISH TO WORK ADDITIONAL HOURS COMPARED TO THOSE WHO WANT TO WORK FEWER HOURS.

WORK < HOURS



WORK > HOURS

UNDEREMPLOYMENT BY GENDER

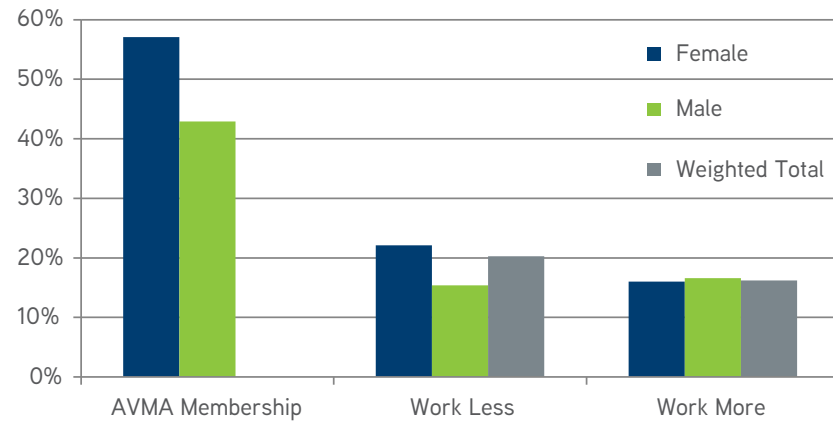


Figure 12

UNDEREMPLOYMENT BY REGION

Region of Residence	AVMA Membership	Work Less	Work More
Region 0	8.3%	19.4%	16.6%
Region 1	9.3%	12.2%	20.9%
Region 2	10.4%	22.7%	13.7%
Region 3	12.9%	21.3%	18.3%
Region 4	10.0%	20.9%	16.0%
Region 5	7.4%	23.4%	17.7%
Region 6	9.6%	22.1%	18.6%
Region 7	9.4%	16.6%	14.9%
Region 8	7.4%	22.0%	15.7%
Region 9	12.7%	21.1%	12.2%
Outside U.S.	2.6%	0.0%	0.0%
Weighted Total	100.0%	20.4%	16.1%

Table 12

UNDEREMPLOYMENT BY FIRST VETERINARY POSITION

First Veterinary Position	AVMA Membership	Work Less	Work More
Food animal practice (exclusive)	6.1%	12.5%	27.5%
Food animal practice (predominant)	6.1%	17.5%	10.0%
Mixed practice	3.9%	23.2%	14.2%
Companion animal practice (predominant)	66.5%	21.6%	13.7%
Companion animal practice (exclusive)	66.5%	20.7%	16.3%
Equine practice	4.4%	15.2%	22.3%
Federal Government (civil service)	1.3%	23.8%	14.3%
Uniformed services	0.6%	26.9%	3.8%
College or University (Faculty or staff only)	6.3%	24.0%	16.0%
State/Local government	0.9%	14.3%	28.6%
Industry/commercial organizations	3.1%	11.5%	3.8%
Not-for-profit organizations	6.9%	19.4%	29.0%
Other	0.0%	17.0%	13.2%
Currently a resident/post-doc/in grad school	0.0%	22.6%	21.0%
Total	0.0%	20.6%	16.1%

Table 13

The number of hours respondents indicated they currently work varied widely, ranging from 1 hour to 100 hours, but the majority of respondents (67.4 percent) indicated their current hourly work weeks were predominately in the five-hour increments between 30 and 60 hours per week.

Comparing the distribution of hours currently worked per week with the distribution that would exist if the respondents were able to work their desired number of hours per week shows little difference. However, the optimal distribution would include more veterinarians working 40-49 hours per week than is currently occurring.

CURRENT HOURS WORKED AND DESIRE TO CHANGE HOURS WORKED

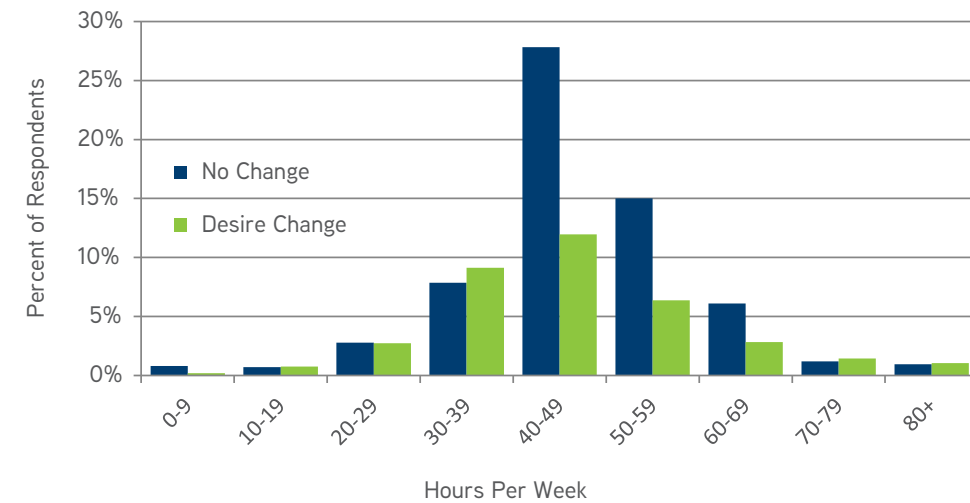


Figure 13

CHANGE IN HOURS DESIRED BY GENDER, 2015

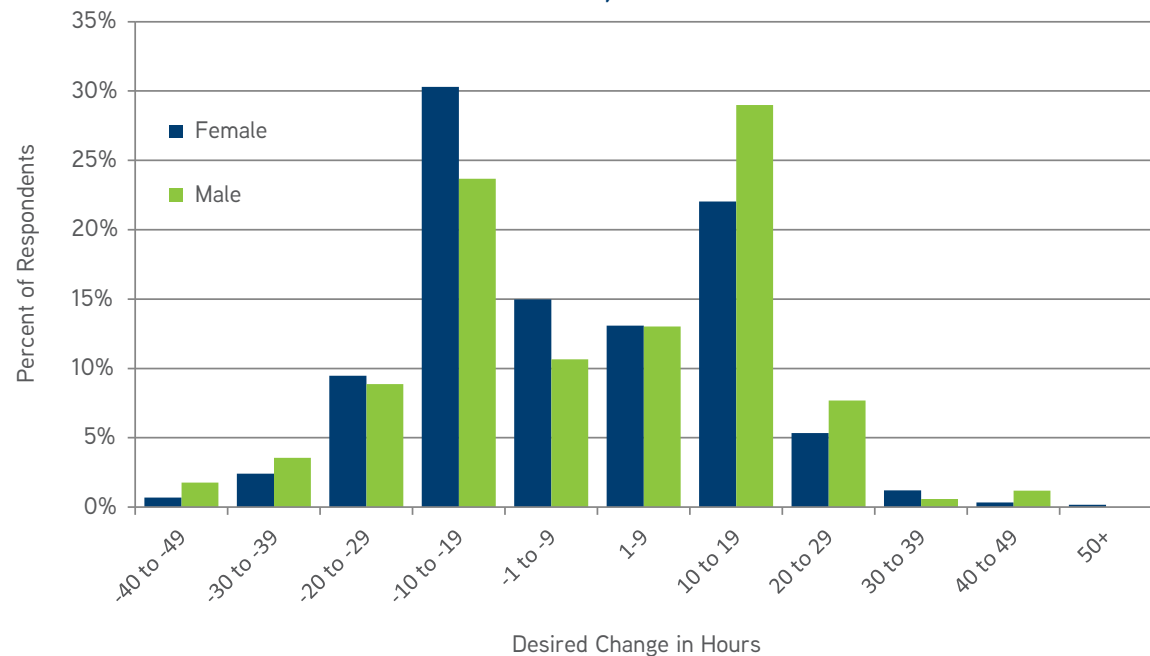


Figure 14

The distribution of the change in hours among those veterinarians who wish to change their hourly work week varies from a reduction of 40 hours per week to an increase of 50 hours per week from their current hourly work week. A majority of female respondents wish to reduce their work week by 10 hours. On the other hand, male respondents are roughly equal in their desires. Some wish to reduce their work week by 10 hours, while others desire a 10-hour increase.

Of the veterinarians who desire a reduction in the number of hours they work per week with a consequence of lower compensation, the mean number of hours that they would like to work weekly, as a group, is less than 40 hours per week. This is in contrast to the group that wants to increase the hours they work to over 50 hours a week accompanied by increased compensation.

The distribution of the desired hourly work per week reflects what each respondent claimed to be their ideal. For those that did not indicate a desire to either increase or decrease their current hours, the current hours worked was used as their desired level. For those that wished to increase or decrease their hours worked per week, the desired change was added to their current hours to obtain their desired hourly work week.

The difference between genders is observable in the distribution, with 20.9 percent of women having a strong preference for a 40-hour work week. But that preference is skewed strongly to the left, indicating 33.6 percent wishing to work less than 40 hours per week. For women, 30.1 percent desire to work 40 to 49 hours per week and 15.3 percent wish to work more than

50 hours per week. For men, the distribution is different. Most notably, only 18.8 percent of men expressed a desire to work less than 40 hours per week. Of the others, 21.1 percent want to work 40 hours per week, 32.6 percent want to work between 40 and 49 hours per week and 27.4 percent wish to work more than 50 hours per week.



FOR MEN, THE DISTRIBUTION IS DIFFERENT. MOST NOTABLY, ONLY 18.8 PERCENT OF MEN EXPRESSED A DESIRE TO WORK LESS THAN 40 HOURS PER WEEK.

NET HOURS DESIRED BY GENDER, 2015

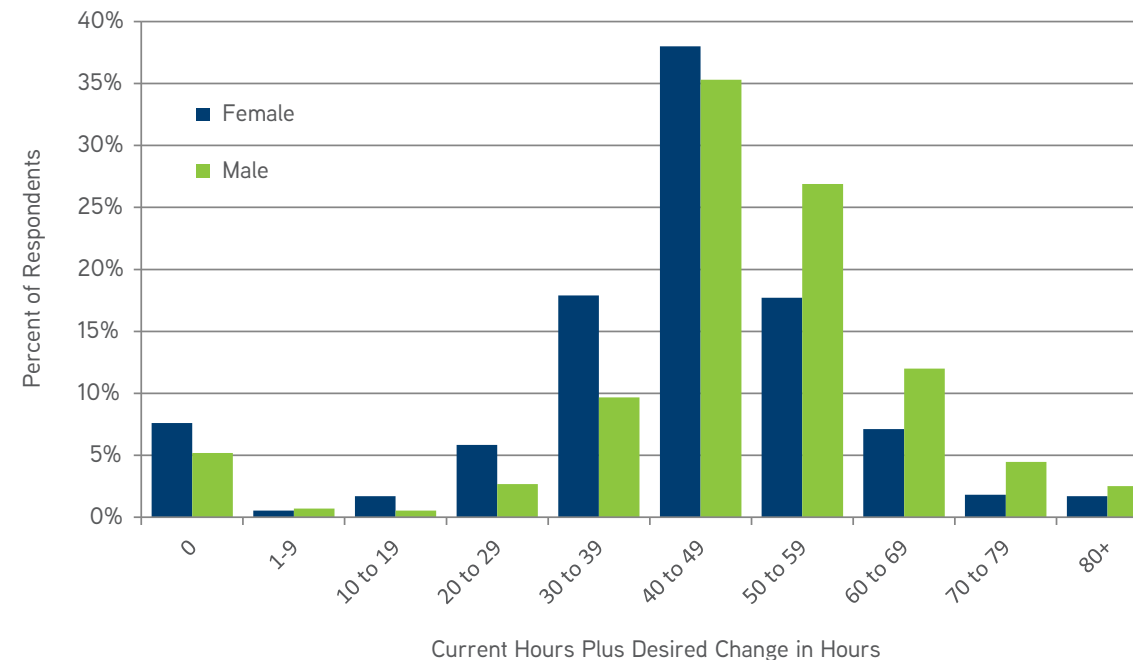


Figure 15

In summary, the veterinary profession does not have an aggregate problem with underemployment, but rather is experiencing negative underemployment, according to the results of the 2015 Employment Survey. There are more veterinarians that wish to work fewer hours than those who wish to work additional hours. If the hours of all veterinarians could be adjusted to align the hours that they wish to work with the hours they actually work, 1,833 additional veterinarians would be required to fill the void. Unfortunately, this presents an unattainable solution because it would require these additional

veterinarians to work in multiple practices and geographic areas simultaneously. That is, of course, unless a specific employer had numerous veterinary employees working more hours than they desired, and this is unlikely to be the case. More typically, the indivisibility of veterinary labor (or that of any professional) most typically comes in 40-50 hour blocks. A veterinary employer who may only have 20-30 hours of negative underemployment of veterinarians in their practice would probably opt for hiring a new veterinarian, thereby creating a condition of underemployment and excess capacity.

IF YOU COULD CHANGE THE NUMBER OF HOURS YOU WORK PER WEEK, AT YOUR CURRENT RATE

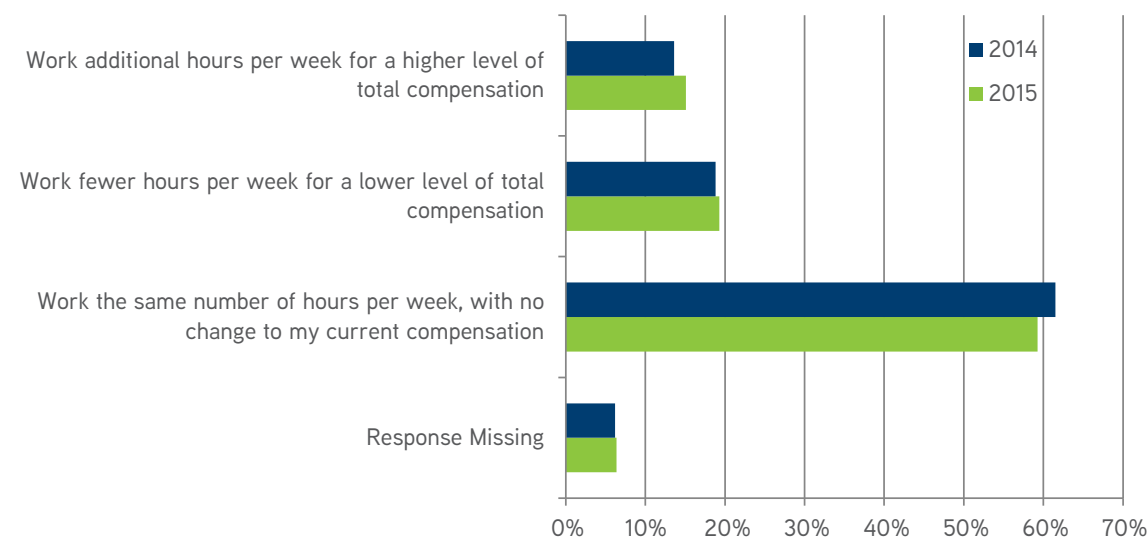


Figure 16

The different pattern in work hours, both current and desired, that exists between genders may partially explain the difference in the level of compensation between male and female veterinarians. Across all five graduating classes included in the survey, women generally want to work less. That is, in each of the graduating years, more women want to work fewer hours for less compensation than want to work more for more compensation.

For men, the pattern is different. Generally, newer graduates wanted to work more, but that proportion declines with age. For the three newest classes of graduates, the number of veterinarians who wish to work additional hours for more compensation exceeds the number that wish to work less for less compensation. At 15 and 25 years post-graduation, the

men who wish to work less hours for less compensation began to outnumber those who wish to work more hours for greater compensation.

The level of underemployment differed by practice type, with some practice types having positive net underemployment (e.g., equine, food animal exclusive, state and local government, and other veterinary sector) and other practice types having negative net underemployment.

Significant at the 10 percent level, there is no difference in underemployment among colleges. Tabulations show that graduates of St. Matthew's University desire the largest mean increase in hours of 3.4, whereas graduates of the University of Florida desire the largest mean decrease in hours of 3.1. The work preference of all other colleges fell within that range.

**FEMALE WORK PREFERENCE:
DESIRE TO WORK FEWER HOURS PER WEEK**

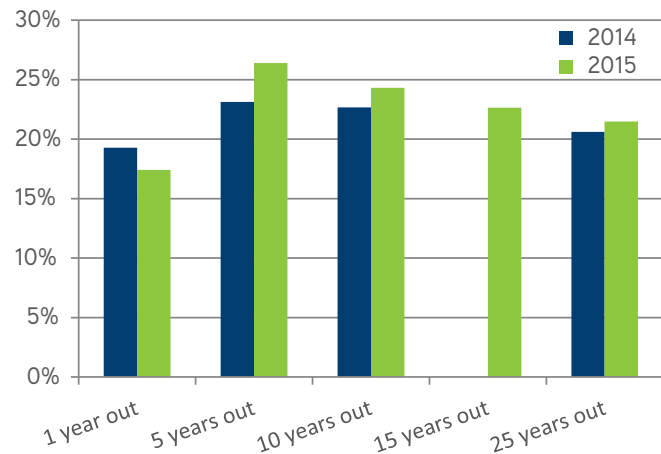
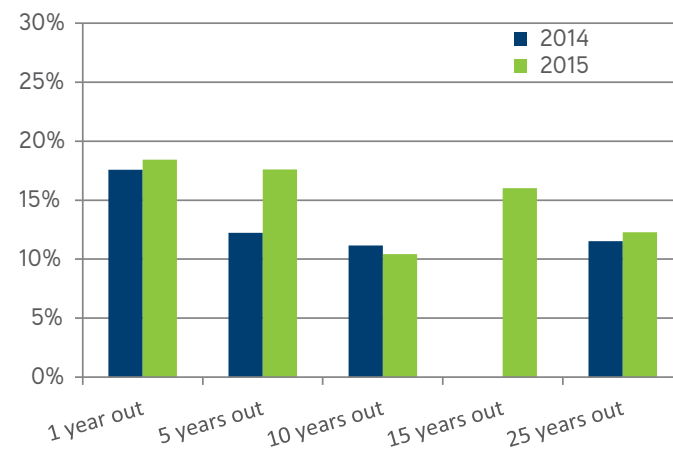


Figure 17

**FEMALE WORK PREFERENCE:
DESIRE TO WORK ADDITIONAL HOURS PER WEEK**



**MALE WORK PREFERENCE:
DESIRE TO WORK FEWER HOURS PER WEEK**

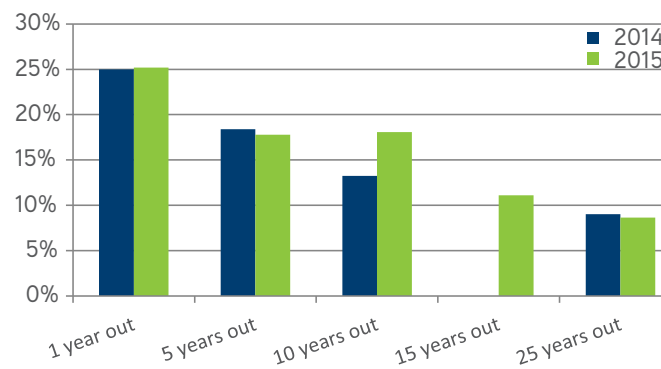
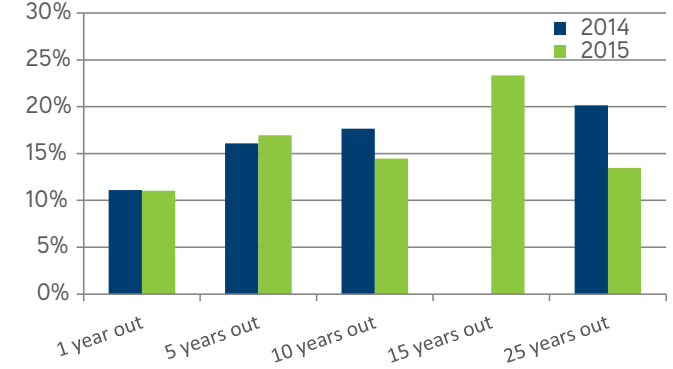


Figure 18

**MALE WORK PREFERENCE:
DESIRE TO WORK ADDITIONAL HOURS PER WEEK**



WORK PREFERENCE BY PRACTICE TYPE, 2015

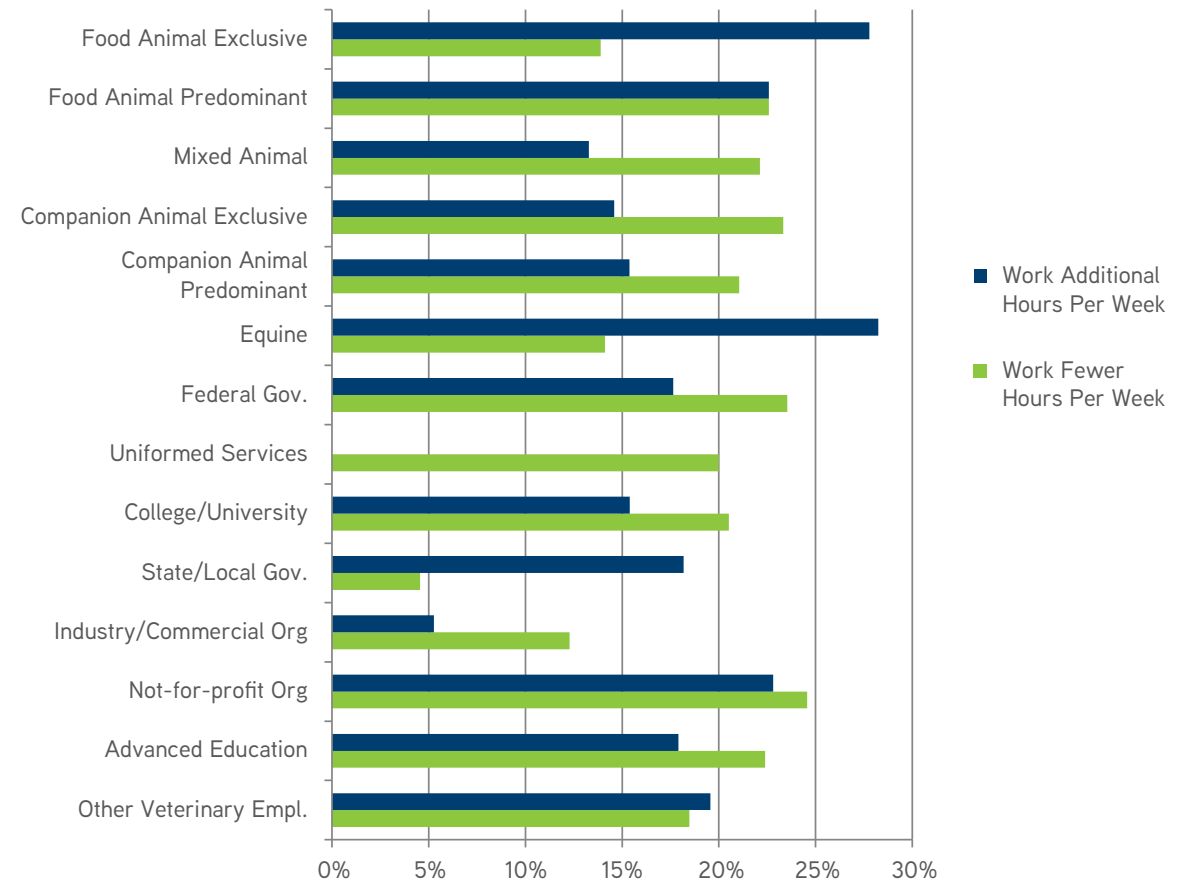
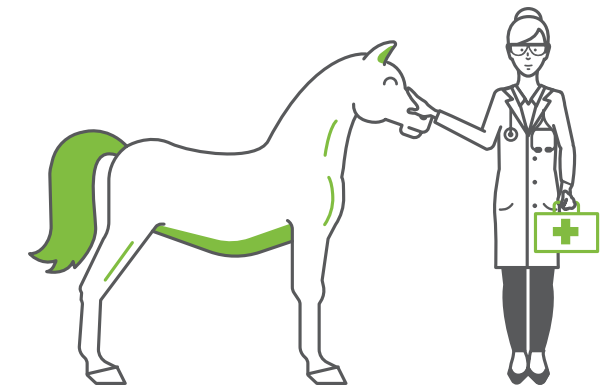


Figure 19

THE LEVEL OF UNDEREMPLOYMENT DIFFERED BY PRACTICE TYPE, WITH SOME PRACTICE TYPES HAVING POSITIVE NET UNDEREMPLOYMENT (E.G., EQUINE, FOOD ANIMAL EXCLUSIVE, STATE AND LOCAL GOVERNMENT, AND OTHER VETERINARY SECTOR) AND OTHER PRACTICE TYPES HAVING NEGATIVE NET UNDEREMPLOYMENT.



UNDEREMPLOYMENT BY VETERINARY COLLEGE, 2015

Graduate School	Mean change in hours desired	N	Std. Deviation
St. Matthew's University	3.36	11	15.699
Auburn University	1.52	54	6.345
Purdue University	0.85	52	8.544
St. George's University	0.63	30	10.928
University of Wisconsin	0.16	64	10.803
University of Tennessee	0.15	54	8.559
Michigan State University	0.12	89	8.351
Tuskegee University	0.08	26	8.231
The Ohio State University	-0.07	101	8.482
Ross University	-0.32	109	7.109
University of Pennsylvania	-0.57	75	8.383
Oklahoma State University	-0.62	45	8.853
Mississippi State University	-0.70	30	8.061
Colorado State University	-0.80	99	9.452
Cornell Veterinary College	-0.82	78	9.878
University of Minnesota	-0.83	69	9.041
Texas A&M University	-0.90	79	5.755
University of Georgia	-1.13	68	11.321
Iowa State University	-1.22	103	9.300
Louisiana State University	-1.35	47	7.678
Oregon State University	-1.39	33	8.685
Virginia-Maryland Regional	-1.54	80	7.637
North Carolina State University	-1.56	70	8.571
Western University-California	-1.59	29	8.846
University of MissouriColumbia	-1.61	66	9.413
University of California-Davis	-1.63	96	9.337
Washington State University	-1.64	66	7.002
Kansas State University	-2.21	68	8.391
Tufts University	-2.42	66	7.915
University of Illinois	-2.60	78	7.248
University of Florida	-3.05	40	8.202
Other	0.97	106	9.955
Total	-0.81	2081	8.724
Missing		145	
Total		2226	

Table 14

Veterinarians Who Wish to Work More (Underemployment)

Within the sample, 15.0 percent of veterinarians indicated wanting to work a mean of 11.6 additional hours per week. Of the veterinarians who indicated that they would like to work additional hours per week, those who graduated in 2012 currently work the most hours per week in veterinary medicine.

Of those wishing to work more, the average female currently works less than 40 hours per week and wishes to increase the hourly work week to 49 hours. On the other hand, men who wish to work more hours currently work roughly 45 hours and wish to increase that to over 55 hours.

UNDEREMPLOYMENT BY GENDER, 2015

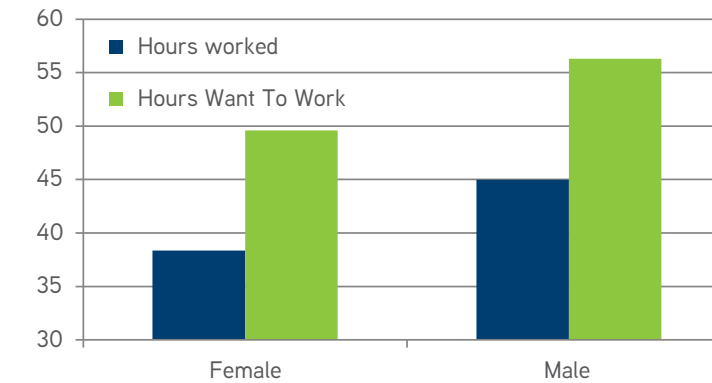


Figure 20

The level of underemployment for those that wish to work more hours for greater compensation also varies by practice type. Food animal practitioners (predominant), mixed animal and those veterinarians in advanced education that wish to work more hours reported already working more than 50 hours per week and on average were looking to increase that hourly work week to more than 60 hours per week. However, for the most part, those veterinarians that indicated they wish to work more hours were working less than 40 hours per week and wish to increase their hourly work week to more than 45 hours per week.

Of those veterinarians who desired to work additional hours, the group in "other employment" work the fewest hours per week currently and indicated a desire to move to a 40-hour work week. The low number of respondents in some of the categories and high standard deviations suggest caution in using the means to describe the situation of those considered underemployed. The values reflect the great diversity in and between the types of practices.

UNDEREMPLOYMENT BY FIRST VETERINARY POSITION PRACTICE TYPE, 2015

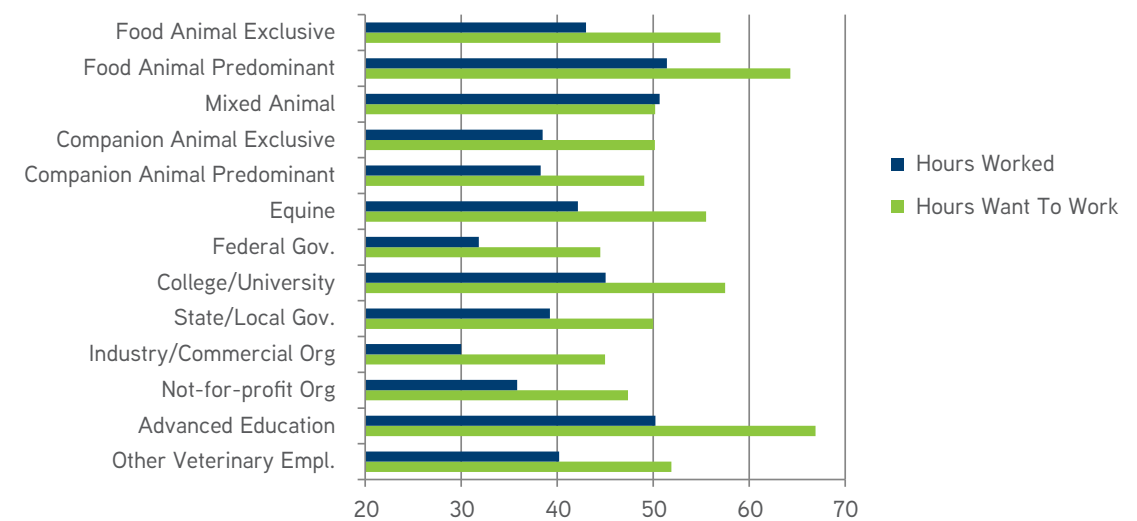


Figure 21

UNDEREMPLOYMENT BY REGION, 2015

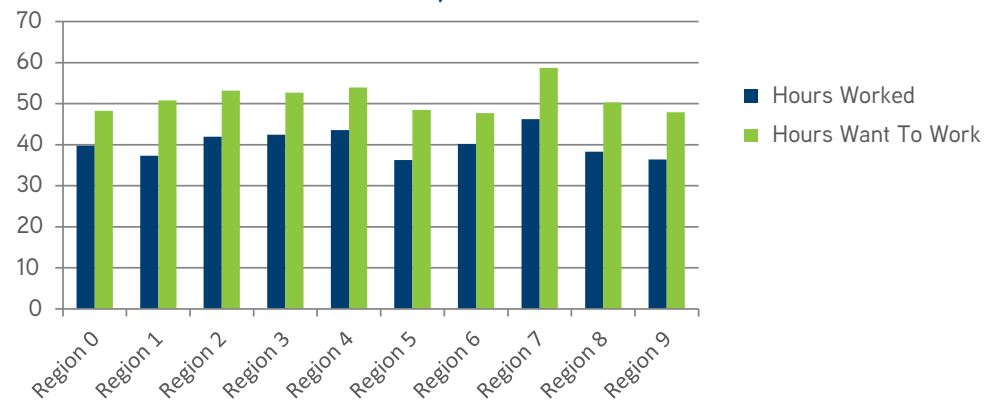
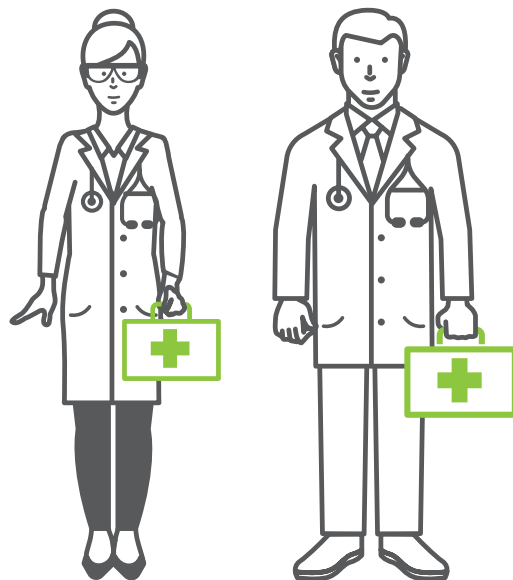


Figure 22

AGGREGATE UNDEREMPLOYMENT BY REGION

Region	Number of Additional Work Hours Desired	N	Mean Additional Work Hours Desired per Week
Region 0	230	27	8.5
Region 1	471	35	13.5
Region 2	451	40	11.3
Region 3	420	41	10.2
Region 4	366	31	11.8
Region 5	343	28	12.3
Region 6	313	31	10.1
Region 7	325	25	13.0
Region 8	301	25	12.0
Region 9	391	34	11.5
Total	3611	317	11.4

Table 15



OF THOSE WISHING TO WORK MORE, THE AVERAGE FEMALE CURRENTLY WORKS LESS THAN 40 HOURS PER WEEK AND WISHES TO INCREASE THE HOURLY WORK WEEK TO 49 HOURS. ON THE OTHER HAND, MEN WHO WISH TO WORK ADDITIONAL HOURS CURRENTLY WORK ROUGHLY 45 HOURS AND WISH TO INCREASE THAT TO OVER 55 HOURS.

Veterinarians Who Wish to Work Less (Negative Underemployment)

In contrast to those who indicated a desire to work additional hours for increased compensation, 18.7 percent of the respondents indicated wanting to work an average of nearly 13 hours less per week for less compensation. Among the veterinarians who indicated that they would like to work fewer hours per week, those who graduated in 2012 worked the most hours (mean = 53.5 hours), while those who graduated in 2003 had the lowest mean hourly work week. The 2012 graduates who indicated they would like to work fewer hours also indicated the lowest number of hours they would like to reduce, while the veterinarians who graduated in 1988 wanted to reduce their hours per week by a mean of 13.6 hours, from their current average work week of 44.1 hours per week.

The group that wishes to work less is working roughly 10 hours more per week than the group that wishes to work more. And both want to change their work hours per week by over 12 hours. However, because the number of veterinarians who desire to work less (351) exceeds the number who desire to work more (253), and those that want to work less desire to reduce their

work week by 12.86 hours while those that want to work more want to increase their work week by 12.51 hours, the total level of underemployment in the profession is negative. A negative underemployment indicates the need to add veterinarians to the workforce. However, because this negative underemployment occurs in different practice types and regions of the country and may not be sufficiently large enough to warrant adding an additional veterinarian in any specific practice or place of employment, the total number of veterinarians defined by the total hours of negative underemployment cannot be used to define a level of excess demand. Indeed this misdistribution of underemployment and negative underemployment describes the importance of labor indivisibility in the veterinary profession.

For the group of veterinarians that want to work fewer hours for less compensation, gender differences are less pronounced than for those who wish to work additional hours. For both males and females, the average number of hours currently working is near 50 while the hours they wish to work is less than 40.

NEGATIVE UNDEREMPLOYMENT BY GENDER

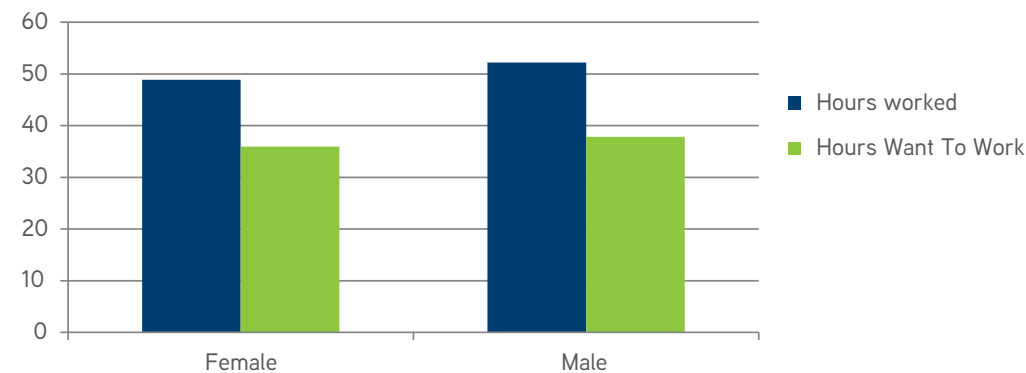


Figure 23

Differences in the current work week of veterinarians reporting they wish to work fewer hours for lower compensation are dramatic, with equine veterinarians and those in advanced education indicating a mean current hourly work week exceeding

60 hours and a desire to reduce this by a sufficient number of hours to move closer to the 40-45 hour work week. As a result, equine practitioners and those in advanced education had the largest level of negative underemployment.

THIS MALDISTRIBUTION OF UNDEREMPLOYMENT AND NEGATIVE UNDEREMPLOYMENT DESCRIBES THE IMPORTANCE OF LABOR INDIVISIBILITY IN THE VETERINARY PROFESSION.

NEGATIVE UNDEREMPLOYMENT BY PRACTICE TYPE

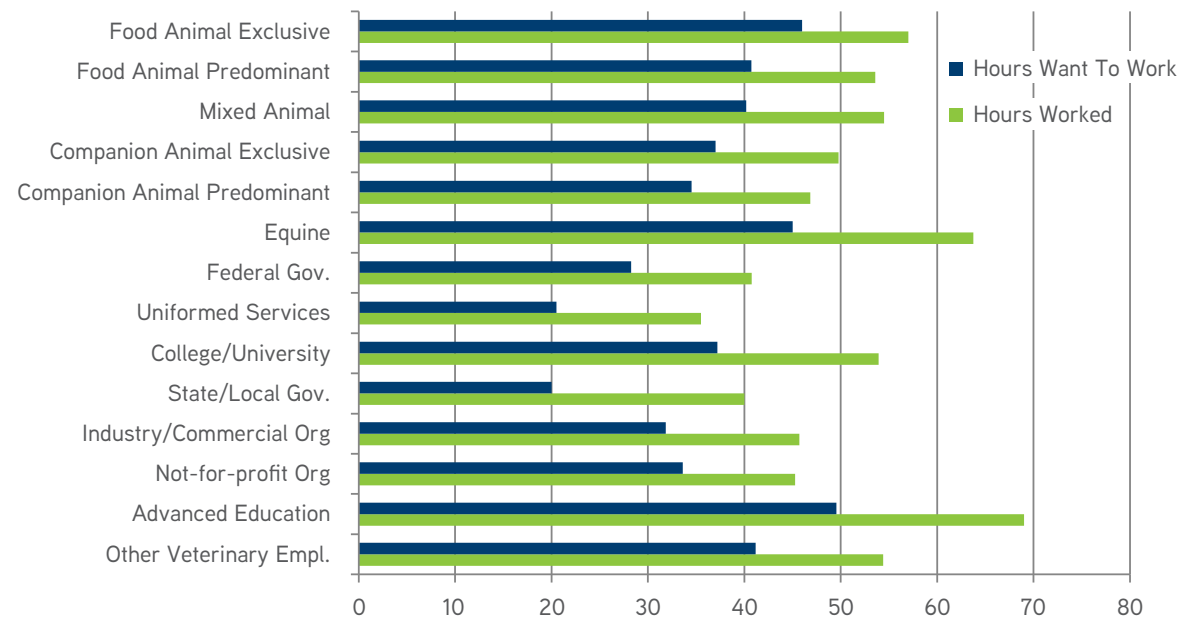


Figure 24

While there were considerable differences in underemployment by practice type, there was little difference across regions. In general, for veterinarians who indicated a desire to reduce their hourly work week for less compensation, the average current

hourly work week in each region was near the 50-hour mark. These veterinarians wished to reduce their hourly work week to get under the 40-hour work week. Region 3 had the lowest mean number of hours worked per week at 43.8.

NEGATIVE UNDEREMPLOYMENT BY REGION

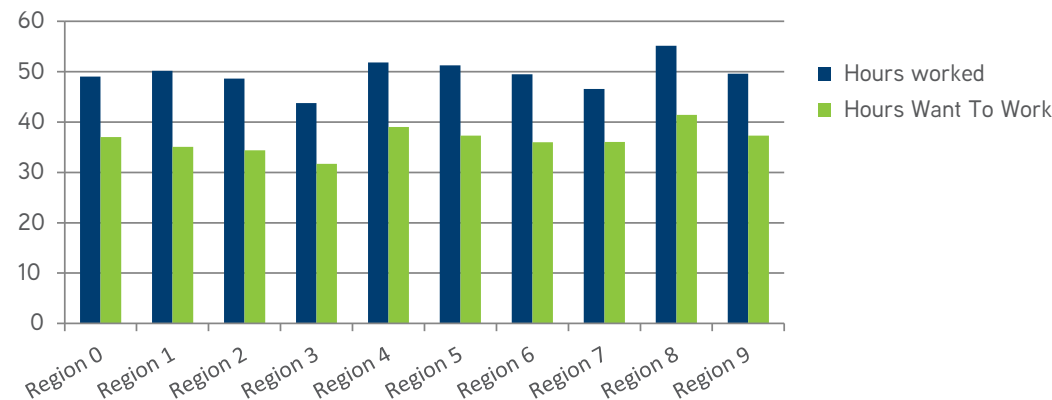


Figure 25

Within our sample of 2,226 respondents, there was reported underemployment of 3,895 hours per week and negative underemployment of 5,580 hours per week. The majority of those underemployed were in Region 9, with the total number of veterinarians reporting that they want to work a total of 510 hours more per week. The lowest underemployment reported occurred in Region 0, with veterinarians reporting that they want

to work 127 hours more per week (see Appendix for the number of responses in each region).

Only in Region 5 did the number of additional hours that veterinarians want to work exceed the decreased number of hours that veterinarians desired. Again, this indicates that underemployment on average is not a problem in the profession, but that there is a maldistribution.

AGGREGATE NEGATIVE UNDEREMPLOYMENT BY REGION

	Reduction in work-hours desired	N	Average reduction in work- hours desired
Region 0	372	31	12.0
Region 1	377	25	15.1
Region 2	904	67	13.5
Region 3	544	45	12.1
Region 4	550	43	12.8
Region 5	475	33	14.4
Region 6	512	38	13.5
Region 7	306	29	10.6
Region 8	467	34	13.7
Region 9	739	60	12.3
Total	5246	405	13.0

Table 16

Factors correlated with underemployment

Following the methods used to identify the factors that are correlated with employment, a similar method was used to determine the factors that are correlated with underemployment. In the following estimated equation, we identify factors that affect the number of hours veterinarians work. An ordinary least squares regression was estimated and included the following variables: veterinary practice type, graduating university, workplace location, gender, internship participation, debt, board certification, marital status, mobility and health. The following table yields the results.

An ordinary least squares regression is an equation in which unknown parameters are estimated such that the difference between observed and predicted variables is minimized.

The resulting model can be expressed in a formula such that controlled variations in the independent variables are used to predict the dependent variable (the variable being explained). The dependent variable is desired change in hours worked (underemployment) and the independent variables explaining this variation are health, gender, internships, practice type, board certification, veterinary college, additional degrees held, student debt and marital status.

In this regression, underemployment is hypothesized to be a function of veterinary practice type, graduating university, workplace location, gender, internship participation, debt, board certification, marital status, mobility and health.



FACTORS CORRELATED WITH UNDEREMPLOYMENT

	B	Std. Error	Beta	t	Sig.
(Constant)	-6.847	5.991		-1.143	.254
Income	-4.037E-05	.000	-.194	-4.326	.000
Other Master's Degree	14.481	5.728	.112	2.528	.012
Satisfaction with your current employment	1.315	.565	.100	2.328	.020
Please indicate your gender: 0=F, 1=M	3.231	1.393	.095	2.320	.021
State/Local government	16.283	7.279	.089	2.237	.026
Work Region 7	6.740	3.021	.127	2.231	.026
Mixed practice	-5.114	2.493	-.084	-2.051	.041
Companion animal practice (predominant)	-3.217	1.779	-.074	-1.809	.071
Uniformed services	-13.582	7.798	-.075	-1.742	.082
Food animal practice (exclusive)	7.209	4.329	.068	1.665	.096
Single	2.514	1.562	.080	1.609	.108
Work Region 1	4.412	2.833	.086	1.557	.120
Separated	14.762	10.120	.057	1.459	.145
Equine practice	4.008	2.776	.059	1.444	.149
University of Florida	-6.318	4.428	-.077	-1.427	.154
Divorced	-3.428	2.473	-.057	-1.386	.166
Other Degree	4.023	3.055	.055	1.317	.188
Work Region 3	3.718	2.847	.087	1.306	.192
Louisiana State University	-6.337	4.896	-.062	-1.294	.196
University of Illinois	-5.249	4.122	-.068	-1.273	.203
Board Certification Yes=1, No=0	-2.820	2.291	-.059	-1.231	.219
Kansas State University	-4.746	4.082	-.062	-1.163	.245
Own/Don't Own	-1.719	1.488	-.058	-1.155	.248
Auburn University	4.805	4.482	.057	1.072	.284
Texas A&M University	-4.865	4.607	-.053	-1.056	.291
Advanced Education (inclusive of internships and residencies)	-3.512	3.336	-.045	-1.053	.293
Master's of Arts MA	6.136	6.255	.041	.981	.327
Cornell Veterinary College	-3.772	3.994	-.053	-.944	.345
North Carolina State University	-3.893	4.312	-.047	-.903	.367
Ross University	-3.692	4.115	-.057	-.897	.370
Tufts University	-3.635	4.074	-.047	-.892	.373
Internship Participation Yes=1, No=0	-1.261	1.414	-.041	-.892	.373
Oklahoma State University	-4.151	4.813	-.044	-.862	.389
University of California-Davis	-3.516	4.140	-.048	-.849	.396
St. George's University	3.843	4.560	.042	.843	.400
Master's of Business MBA	-3.189	3.815	-.036	-.836	.404
DVM debt	7.629E-06	.000	.047	.826	.409
Purdue University	3.439	4.238	.041	.811	.418
University of Missouri-Columbia	-3.513	4.455	-.043	-.789	.431
University of Georgia	-3.230	4.343	-.038	-.744	.457
Mississippi State University	-3.949	5.438	-.034	-.726	.468

Table 17

FACTORS CORRELATED WITH UNDEREMPLOYMENT CONT'D.

	B	Std. Error	Beta	t	Sig.
Health 1: poor, 5= excellent	.518	.714	.031	.726	.468
Michigan State University	2.816	4.102	.037	.686	.493
Specialized Professional Degree	-7.011	10.334	-.027	-.678	.498
Work Region 0	1.911	2.866	.037	.667	.505
Work Region 6	1.917	2.960	.039	.648	.518
Do not hold any other degree	1.715	3.162	.035	.542	.588
University of Wisconsin	2.208	4.084	.033	.541	.589
Other Veterinary Employment	1.650	3.053	.022	.541	.589
Tuskegee University	2.799	5.471	.023	.512	.609
Colorado State University	1.809	3.781	.029	.478	.633
College or University (Faculty or staff only)	1.292	2.863	.020	.451	.652
Doctorate PhD	1.452	3.507	.019	.414	.679
Master's of Science MS	.796	2.022	.017	.394	.694
Oregon State University	2.297	5.930	.019	.387	.699
University of Tennessee	1.700	4.445	.020	.382	.702
The Ohio State University	-1.394	3.999	-.019	-.349	.728
Iowa State University	-1.372	3.969	-.020	-.346	.730
Bachelor's Degree	.877	2.604	.024	.337	.736
Work Region 8	.836	2.751	.016	.304	.761
Virginia-Maryland Regional College	-1.120	3.922	-.017	-.286	.775
St. Matthew's University	1.832	7.133	.011	.257	.797
Master's of Public Health MPH	-.993	3.875	-.010	-.256	.798
Partner	-.547	2.594	-.009	-.211	.833
Work Region 5	.634	3.125	.012	.203	.839
University of Minnesota	.859	4.507	.011	.191	.849
Have children- Yes=1, No= 2	-.231	1.405	-.008	-.165	.869
Federal Government (civil service)	-.618	4.209	-.006	-.147	.883
Industry/Commercial organizations	-.593	4.689	-.005	-.126	.899
Work Region 4	-.327	2.823	-.007	-.116	.908
Western University-California	-.668	5.776	-.006	-.116	.908
Graduation Year	-.010	.102	-.006	-.101	.920
Washington State University	-.336	4.501	-.004	-.075	.941
University of Pennsylvania	-.176	4.358	-.002	-.040	.968
Food animal practice (predominant)	-.159	4.319	-.002	-.037	.971
Not-for-profit organizations	-.083	2.941	-.001	-.028	.978
Work Region 2	-.005	2.593	.000	-.002	.998

a. Dependent Variable: Change in hours desired

Table 17 Cont'd.

FACTORS CORRELATED WITH UNDEREMPLOYMENT CONT'D.

	Sum of Squares	df	Mean Square	F	Sig.
Regression	22754.585	77	295.514	1.583	.002b
Residual	109054.458	584	186.737		
Total	131809.044	661			

R	R Square	Adjusted R Square	Std. Error of the Estimate
.415a	.173	.064	13.66518

Table 17 Cont'd.



According to our model, the factors found to be significant (sig. < .05) in explaining underemployment are: income, with persons making more money wanting to work less; master's degree; satisfaction with current employment; gender, with males wanting to work more; persons in mixed practice wanting to work less; state and local government employment; employment in region 7 and mixed animal practice type.

To determine the factors significant in explaining the variation in job satisfaction, mobility and wellness, the following nested equations were estimated:

- Regional mobility is a function of location preference, and marital status.
- Job Satisfaction is a function of $(\sum(\text{expectations-actual experience})_i)$, where i is the assessment outcomes of importance to the profession.
- Wellness is a function of hours worked per week, desired hours per week, size of practice, and work environment.

FACTORS IN EXPLAINING MOBILITY

	B	S.E.	Wald	df	Sig.	Exp(B)
Single	-1.536	.136	127.888	1	.000	.215
Divorced	-.609	.259	5.533	1	.019	.544
Widowed	20.389	21325.766	.000	1	.999	716181108.792
Seperated	.183	.825	.049	1	.825	1.200
Partner	-1.161	.249	21.691	1	.000	.313
Have children: Yes =1, No=2	-1.216	.149	66.825	1	.000	.296
Prefer smaller work place	.125	.241	.268	1	.605	1.133
Prefer larger work place	-.370	.139	7.098	1	.008	.691
Prefer smaller community	-.347	.192	3.260	1	.071	.706
Prefer larger community	.119	.170	.484	1	.487	1.126
Willing to relocate up to 25 miles	-.883	.184	22.939	1	.000	.414
Willing to relocate up to 50 miles	-1.034	.235	19.295	1	.000	.356
Willing to relocate up to 100 miles	-1.292	.255	25.772	1	.000	.275
Willing to relocate wherever the jobs are	-1.411	.143	97.945	1	.000	.244
Constant	4.255	.268	251.698	1	.000	70.491

Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.
Step	634.927	14	.000
Block	634.927	14	.000
Model	634.927	14	.000

Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1863.565a	.276	.384

Table 18

Regional mobility was determined by using home ownership as a proxy. Omitted variable categories, which serve as a base for interpretation, are married and no change in the size of work community desired. Results of this equation indicate that, in comparison to married persons, single persons are 88.2 percent

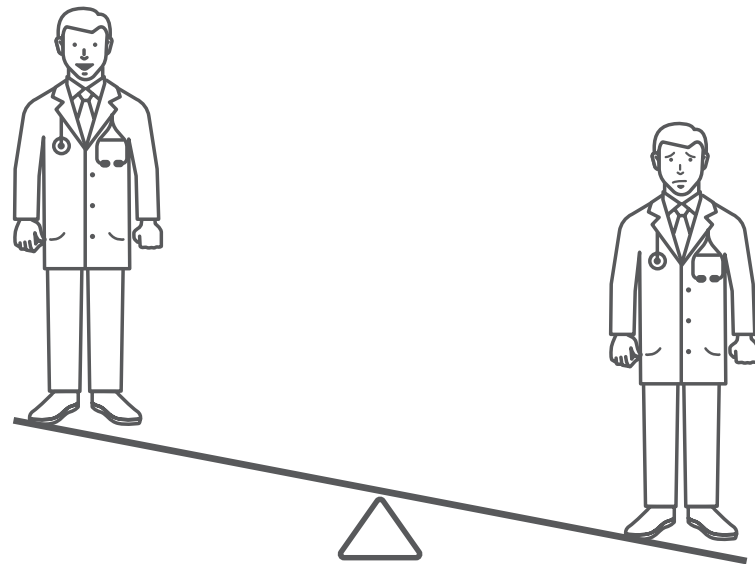
less likely to own a home (0.118-1), making them more mobile. When compared to persons wanting no change in the size of their work community, persons preferring a larger work community were 29.5 percent less likely to be homeowners (0.705-1), again making them more mobile.

WELL-BEING

In an effort to address the growing concern over the wellness of veterinarians, the AVMA has been collecting data through the Employment Survey on self-reported wellness of veterinarians. The point of this collection has been to attempt to find correlations of well-being with employment and demographic characteristics. To quantify the concerns about wellness in the veterinary profession, it is important to know the characteristics

of those who are at the highest risk of wellness issues.

The structure of this section follows from the data available on the possible causes of negative well-being: employment status (employed versus unemployed), the average number of hours worked, student debt load, job satisfaction, expenditure patterns, burn-out scores and self-reported health evaluations.



THE AVMA HAS BEEN COLLECTING DATA THROUGH THE EMPLOYMENT SURVEY ON SELF-REPORTED WELLNESS OF VETERINARIANS IN AN ATTEMPT TO FIND CORRELATIONS OF WELL-BEING WITH EMPLOYMENT AND DEMOGRAPHIC CHARACTERISTICS. IT IS IMPORTANT TO KNOW THE CHARACTERISTICS OF THOSE WHO ARE AT THE HIGHEST RISK OF WELLNESS ISSUES.

Debt

The debt of practicing veterinarians is a widely studied subject. However, literature tends to focus on debt at graduation, since this amount is fairly easy to measure and most graduates are at about the same place in their lives. Less studied is how that debt changes over time according to the experiences of practitioners who have been out of school. Admittedly, the problem of large student loan debts has accelerated in recent years, but there are few studies to show, beyond qualitative and personal stories, how well DVMs are managing their educational debt. The following figures describe the debt at the start of a veterinarians' career and currently for respondents according to when an individual graduated from veterinary school.

The first figure shows the average debt incurred by graduating class, with those graduating before 2004 grouped together. In-line with the general population, debt incurred generally has followed an upward trend, with exceptions most likely due to the sample nature of the data. Of those who incurred debt, the current amount owed is less than the original balance. Again, this balance generally rises for those who have graduated at a later date.

The second debt chart shows the dynamics of how that student loan debt has been paid off. Virtually no veterinarians who graduated before 1990 still owe money on their student loans,

but the proportion of borrowers who still owe on their loans increases proportionally according to their year of graduation, with less than 20 percent of year 2001+ graduates having paid off their loans.

It is interesting to note that, although student loan debt was significantly lower in previous decades, the years spent repaying were generally 4-10 years. With student loan balances much higher now, both in nominal dollars and as a percent of income,

one would expect that time to repay loans will be significantly higher in the future. Indeed, income-based student loan repayment programs allow a borrower to be in repayment for up to 25 years. Going forward, this will create a very different dynamic as older veterinarians would have already paid off their debt after an equal length of time. Going forward, student debt will noticeably affect the career satisfaction and well-being of veterinarians.

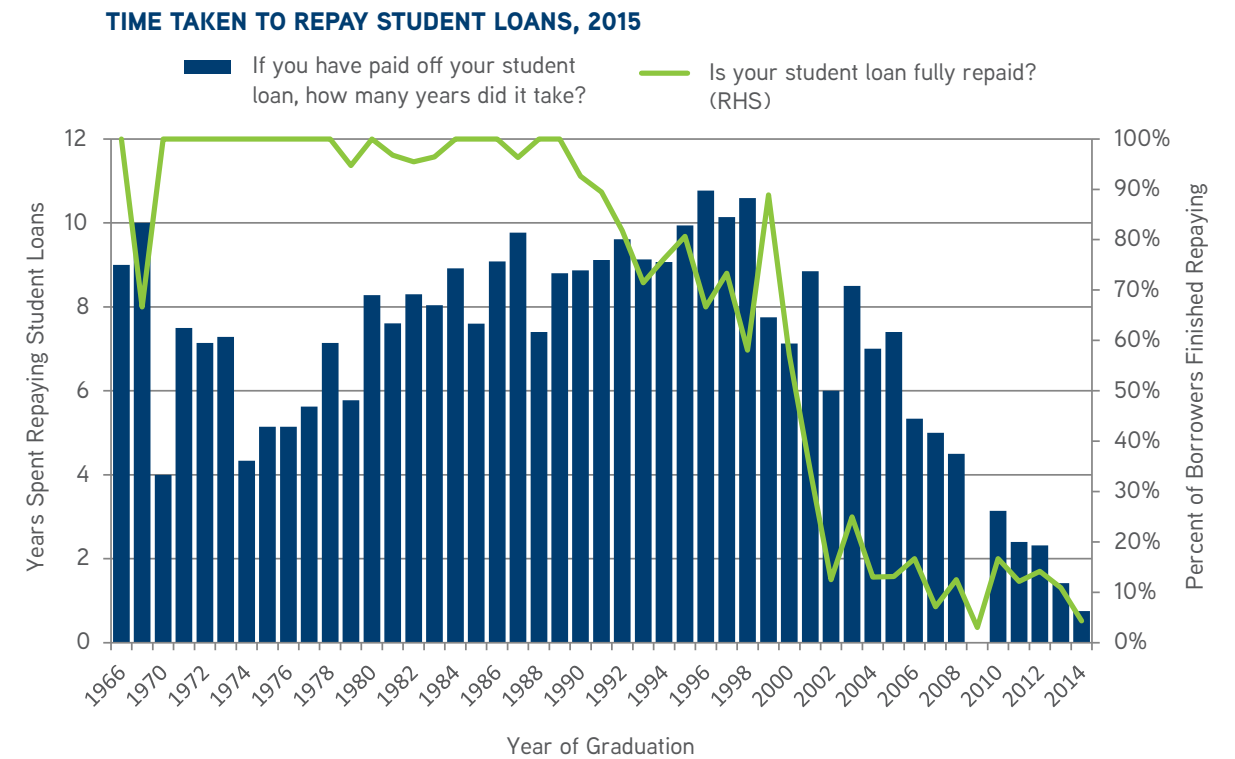


Figure 26

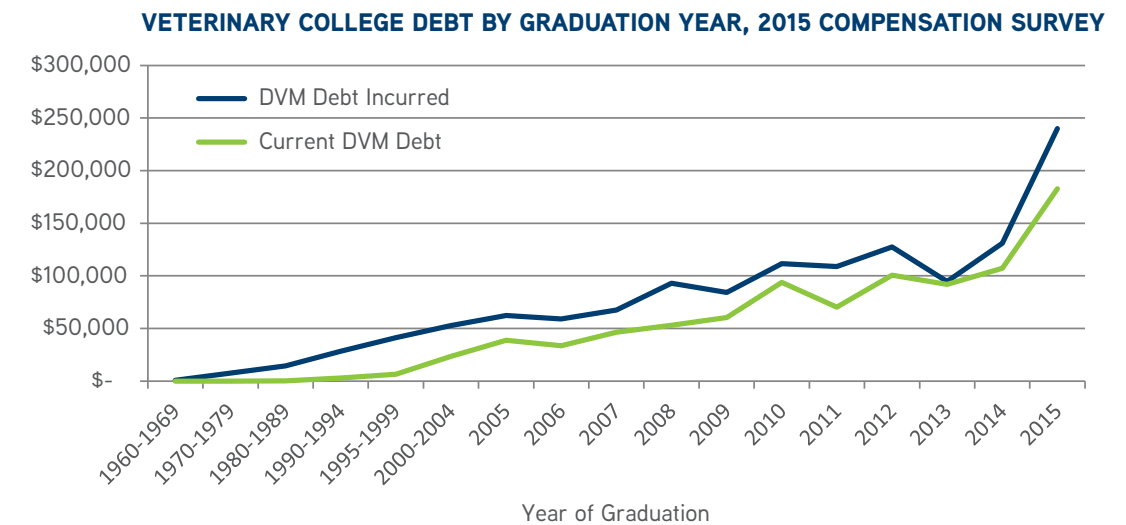


Figure 27

Job/Career Satisfaction and Income

The compensation that a veterinarian receives from an employer should represent the price at which the veterinarian is willing to sell her labor and the price at which the employer is willing to pay for that labor. In a perfectly competitive market for veterinarians, the level of compensation conceptually represents an equilibrium point: that level of compensation where the willingness of the veterinarian to sell her labor is equal to the willingness of the employer to purchase the same amount of labor. The level of compensation and hours of labor provided is a negotiated settlement between the labor provider and the employer. In this case, the hours of labor and total compensation pair represents a point on both the curve of the demand for veterinary labor (veterinarians) and the curve of the supply of veterinary labor. Veterinarians are not homogenous products and each veterinarian can be differentiated by differences in veterinary medical skills, business acumen, client services and individual characteristics, meaning, there will be considerable variation in compensation at any point in time.

In terms of supply, the relationship is between the number of hours veterinarians are willing to provide and the compensation required to provide them. The important question to answer pertains to veterinarians' willingness to provide hours of labor at specific levels of compensation. An argument can be made that because of veterinarians' limited ability to use their DVM for other employment opportunities with similar compensation, they are forced to accept employment out of the need to repay the high cost of their education. Thus, the level of compensation does not correctly reflect their willingness to sell their labor for their current level of compensation. That is, it may be that they are taking what they can get but are not satisfied with what they are earning.

To discover veterinarians' willingness to provide the quantity of labor at the level of compensation they currently earn, answers to questions about underemployment can reveal some insight. From the AVMA Employment Survey, it is clear that there were both veterinarians working more hours and less hours than they wished. More specifically, some veterinarians indicated they wished to work additional hours for more compensation

while others indicated they wished to work fewer hours for less compensation. However, this leaves open the question, "Would you like to work fewer hours at the same level of compensation?" and "Would you be willing to work more hours for the same level of compensation?"

The addition of these two questions would close the gap in the decision process but still would not adequately address the issue of willingness to sell. To address that question specifically requires an understanding of the schedule of number of hours that each veterinarian is willing to work and the compensation at each amount of hours worked.

Unfortunately, obtaining objective information on willingness of the individual veterinarian to sell their labor is difficult. Instead, another approach is to measure the level of satisfaction veterinarians report for their current employment and the relationship between that satisfaction and income. If income is an important factor in determining the level of satisfaction, then the relationship between satisfaction and income should be both economically and statistically significant. An analysis of the respondents to both the 2015 Employment Survey and the 2015 Compensation Survey found a large and statistically significant relationship between income and job satisfaction.

From the Employment Survey, the relationship between the expressed level of satisfaction on a 5-point scale where "1" was "not at all satisfied" and "5" was "very satisfied" is best defined by those whose level of compensation exceeds \$100,000. Very few of these higher-income earners indicated they were not satisfied (a 1 or 2 on the 5-point scale), while the majority of higher earners indicated they were at least somewhat satisfied (a 3 to 5 on the 5-point scale). However, there were low earners (below \$60,000) that indicated all levels of satisfaction.

Over 90 percent of respondents were at least somewhat satisfied (3) with their current employment, while the largest number of respondents indicated they were satisfied (4). The next largest group included those indicating they were very satisfied (5) with their current employment.



IN A PERFECTLY COMPETITIVE MARKET FOR VETERINARIANS, THE LEVEL OF COMPENSATION CONCEPTUALLY REPRESENTS AN EQUILIBRIUM POINT: THAT LEVEL OF COMPENSATION WHERE THE WILLINGNESS OF THE VETERINARIAN TO SELL HER LABOR IS EQUAL TO THE WILLINGNESS OF THE EMPLOYER TO PURCHASE THE SAME AMOUNT OF LABOR.

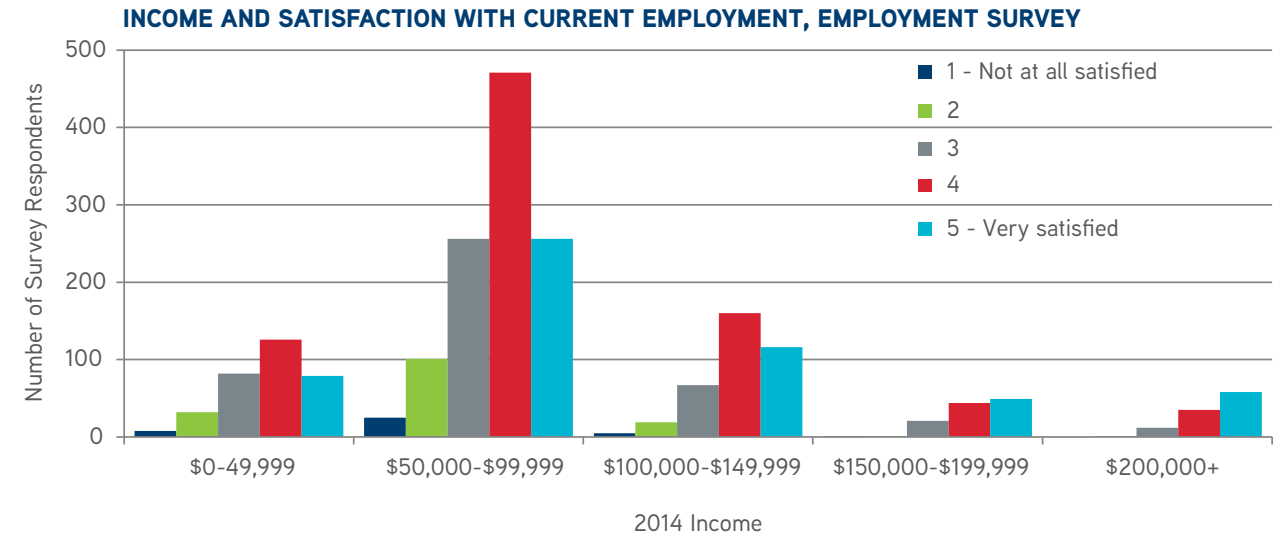


Figure 28

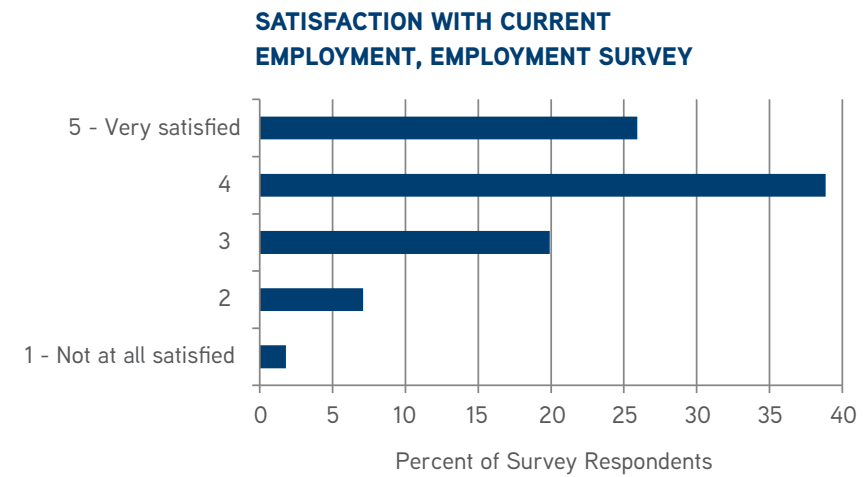


Figure 29

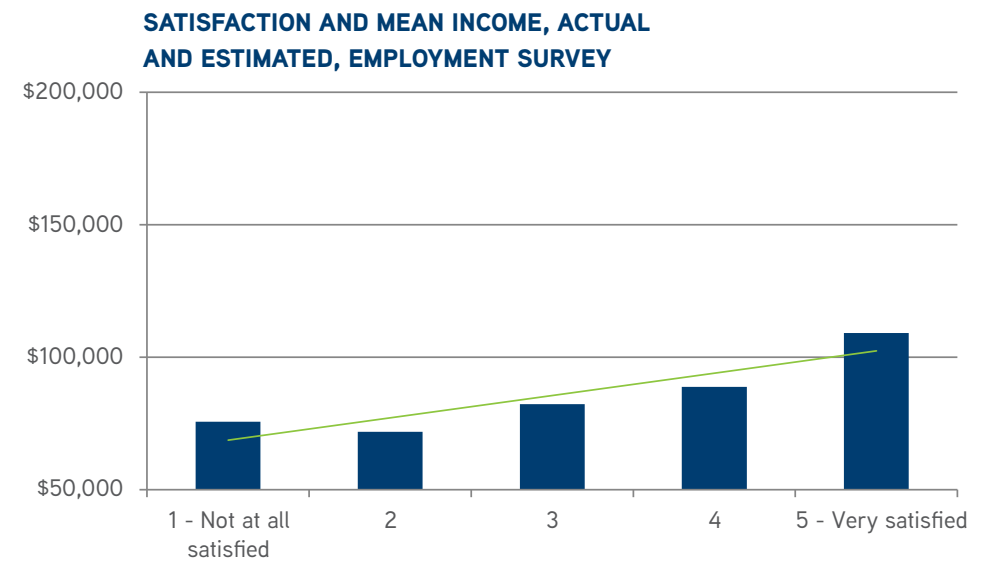


Figure 30

Statistically, the relationship between the level of income and satisfaction was found to be just over \$11,000 per degree of satisfaction. That is, to gain one additional level of satisfaction, for example moving from somewhat satisfied (3) to satisfied (4), would require an additional \$11,000 of annual compensation.

Of course, many factors contribute to satisfaction with employment, including actual hours worked compared to the amount and scheduling of hours worked, internal relationships, number of clients per day and level of debt. But there is a clear relationship between the level of income and satisfaction. This is important, especially to pre-veterinary and veterinary students and new veterinarians who may harbor the belief that

compensation is unimportant as long as they are “doing what they love to do.” While these data certainly suggest that this outlook may be true for some, generally this is not the case.

The results are similar in an analysis of the 2015 Compensation Survey data. The survey asked the question “How satisfied are you with your career?” Respondents could answer from 1 (not at all satisfied) to 7 (extremely satisfied). The proportion of respondents that indicate the higher levels of satisfaction (5-7) are noticeably larger in the higher-level income categories while the proportion of those respondents indicating the lower level of satisfaction (1-3) are larger in the lower-income categories.

SATISFACTION WITH CAREER, COMPENSATION SURVEY

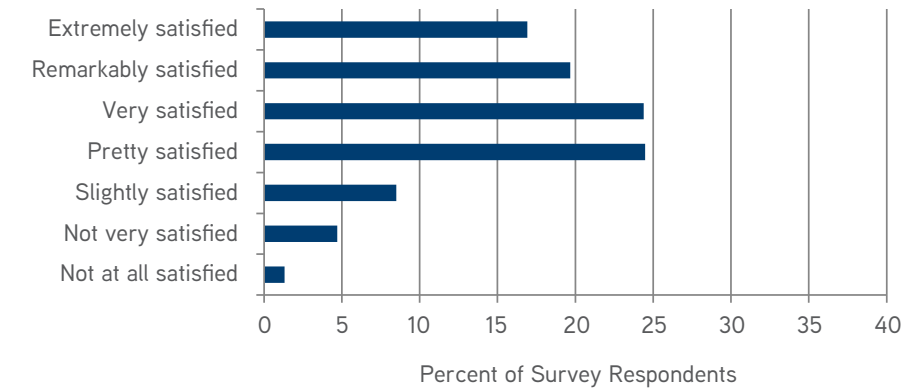


Figure 32

Eighty-five percent of respondents claimed to be at least a 4 (pretty satisfied) on the satisfaction scale.

The willingness of veterinarians to provide veterinary service labor, based on this simple analysis, increases as compensation increases. And this analysis suggests that a satisfaction level of 4 would generally require a level of compensation in the range of \$110,000 to \$120,000. In addition, based on previous

findings, this level of compensation should occur at the optimum level of hours worked: 42.4 hours for women and 48.8 hours for men. While the relationship between compensation and number of hours of labor available defines the supply relationship, understanding the factors that affect the willingness of veterinarians to supply labor is important to determining the number of veterinarians needed to meet the demands for veterinary services.

INCOME AND CAREER SATISFACTION, COMPENSATION SURVEY

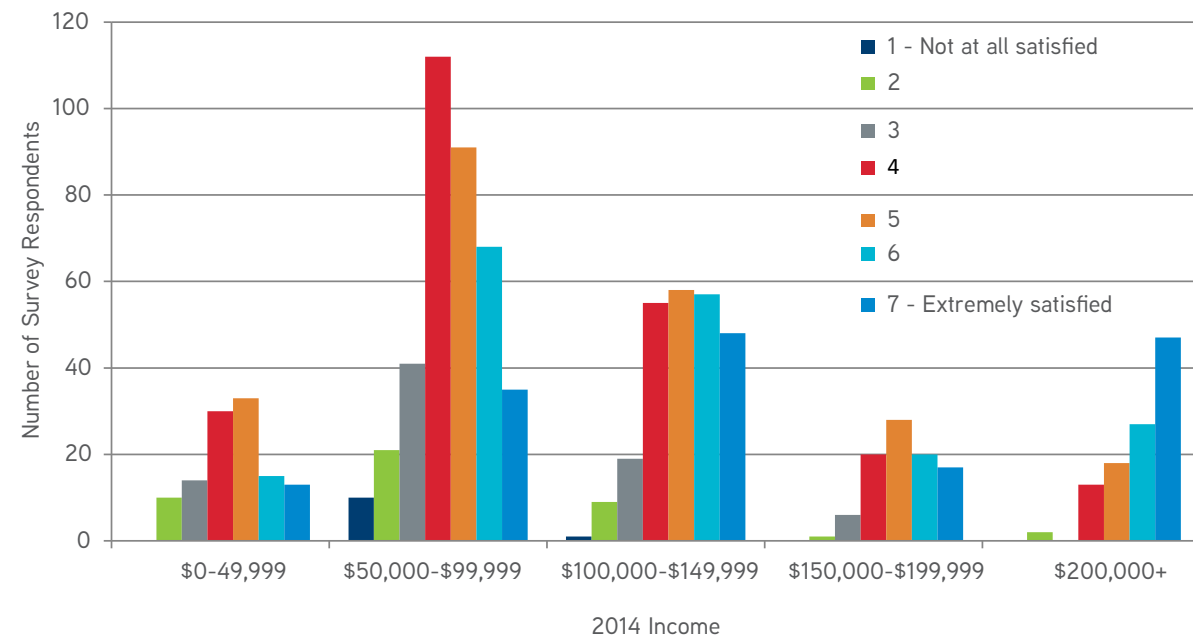


Figure 31

The seven levels of responses caused a larger range of mean incomes, from a low of \$78,773 from those who responded with a 1 (not at all satisfied), to a high of \$195,749 from those who responded with a 7 (extremely satisfied). The linear relationship predicts a \$14,617 difference between each level of satisfaction. The important point to take away from this is that the patterns of responses and levels of income are consistent across the two

datasets, indicating the existence of a very real, measurable pattern: that higher levels of compensation are correlated with higher levels of satisfaction.

Most important is that veterinarians generally seem to be satisfied with their career choice with more than 60% of respondents indicating that they are at least very satisfied.

SATISFACTION AND MEAN INCOME, ACTUAL AND ESTIMATED, COMPENSATION SURVEY

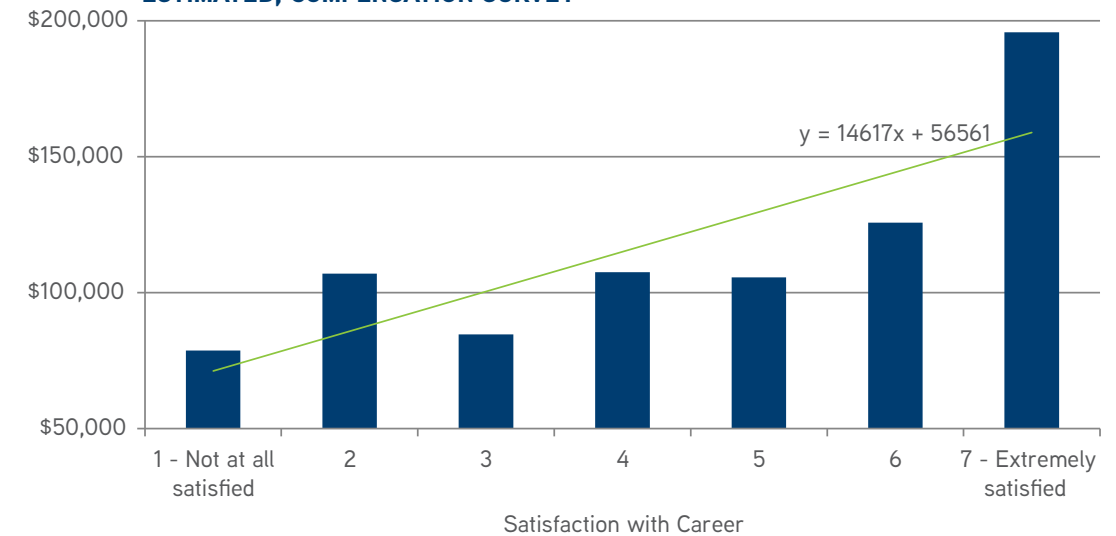


Figure 33

The challenges in estimating the demand for veterinarians are similar to those for estimating the supply. Demand is the relationship between the hours of veterinarian labor and the compensation the employer is willing to pay for those hours. The market demand is the summation of all of the individual employer relationships between hours and level of compensation. As with supply, developing this relationship would require obtaining the willingness-to-pay information from employers.

Our data contains points where the veterinarian and the employer have agreed to a level of compensation and number of hours of labor. For each of these transactions, the employer may have been willing to pay more, but was not forced to because the veterinarian accepted less. Or, the veterinarian received a greater level of compensation than she was willing to accept in return for the hours of labor required. Under normal market circumstances, the veterinarian would not provide labor for less than the compensation they were willing to accept, and

Expenditure Patterns

In the 2015 calendar year, a sample of 56 recent graduates completed the Personal Financial Planning Tool available on the AVMA website (<https://www.avma.org/PracticeManagement/BusinessIssues/Pages/personal-financial-planning-tool.aspx>). "Recent graduate" is defined as anyone who graduated between

the employer of veterinarian labor would not pay more for the labor needed than they were willing to pay. An abundance of labor and few opportunities for employment would cause the level of compensation to fall. A scarcity of labor in a market with many employment opportunities would cause the level of compensation to rise for the same amount of labor. Thus, over time, the changes in the level of compensation and the number of veterinarians employed would provide insight into the changing willingness of employers to pay for, and veterinarians to sell, veterinary labor.

In the market for new veterinarians, the compensation and number of veterinarians employed contains 14 aggregate annual observations (supply and demand equilibriums), while in the market for current veterinarians there are currently only eight such equilibrium points. This quantity of points is generally insufficient to estimate the demand relationship.

2011 and 2015, which are the five most recent graduation years. The expenditures of these early career veterinarians were aggregated by expense category and compared to a similar age-group national average for the U.S. See the appendix for detailed category definitions.

COMPARISON OF EXPENSES

	Veterinarian Household, Recent Graduate, 2015	General Population, 25-34 Years Old, 2014
Demographics		
Age	30	30
Household Size	1.5	2.8
Home Ownership Rate	20%	39%
College Education Rate	100%	71%
Gross Household Income	\$87,983	\$61,042
Expenses		
Federal and State Taxes	\$16,093	\$6,420
Student Loan Payments	\$9,360	N/A*
Credit Card Debt Payments	\$2,045	N/A*
Housing	\$13,806	\$17,404
Transportation	\$6,224	\$8,908
Food	\$5,852	\$6,632
Healthcare, Insurance and Medicare	\$5,826	\$4,560
Professional Development	\$1,035	\$1,087
Recreation and Leisure	\$4,110	\$4,055
Savings, Retirement and Social Security	\$12,247	\$6,407
Personal and Miscellaneous	\$3,464	\$3,609
Child Care**	\$258	N/A*
Pet Expenses	\$1,021	\$441
Annual Expenditures	\$81,340	\$59,523

*These categories are not separately recorded in the BLS CE survey.

**For those recent graduates with children, average expenses are \$2,403.

Sources: AVMA Estimates and the Bureau of Labor Statistics Consumer Expenditure Survey.

Table 19

A SCARCITY OF LABOR IN A MARKET WITH MANY EMPLOYMENT OPPORTUNITIES WOULD CAUSE THE LEVEL OF COMPENSATION TO RISE FOR THE SAME AMOUNT OF LABOR. THUS, OVER TIME, THE CHANGES IN THE LEVEL OF COMPENSATION AND THE NUMBER OF VETERINARIANS EMPLOYED WOULD PROVIDE INSIGHT INTO THE CHANGING WILLINGNESS OF EMPLOYERS TO PAY FOR, AND VETERINARIANS TO SELL, VETERINARY LABOR.



There are quite a few similarities between the veterinarian and similar-aged general population households. For one, recreation and leisure spending is almost identical, though the general population spends about a third more of their income on recreation and leisure. Personal and miscellaneous spending is similar, as is healthcare.

While the similarities are interesting, the differences are even more so. First, notice that the average household size of 1.5 for recent graduates versus 2.8 for the general population. This occurs because only 21 veterinarians in the sample are married and only six have children. Contrast this with the general population where the mean number of children in the sample is one per household. Furthermore, the home ownership rate in the general population is twice that of veterinarians, presumably because those in the general population have had additional years to work to save and are less burdened by student loan debt than recent veterinary graduates. Second, the amount of taxes paid by the general population is far less than those paid by veterinarians. While part of this may be an artifact of incomplete information – the taxes are estimated for veterinarians, but are actual taxes paid by the general population – the difference would still be large with any methodological adjustments. This indicates that the home ownership deduction, tax exemptions for spouses and dependents, and lower absolute and marginal tax rates do indeed have an effect on the effective tax rate of veterinarians.

The second difference to point out is how much more the general population spends on housing compared to recent veterinary

Burnout Scores

Another way to assess the well-being of veterinarians is through burnout scores. As the name suggests, a burnout score measures the cumulative effects of stress and compassion fatigue with respect to one's occupation. Burnout scores are easily obtained from survey data by asking a series of questions and using the responses to compute an index for each individual. The AVMA Student Leaders recommended using burnout scores as one measure of well-being for veterinarians.

Burnout scores have been used in the veterinary medical profession in several recent studies. Chigerwe, Boudreaux, Ilkiw (2014) used a type of burnout score, the Maslach Burnout Inventory-Educational Survey, to conclude that burnout scores are an acceptable instrument for assessing burnout in veterinary students, so application to the veterinary profession is not untoward. However, the results presented below contrast markedly with those obtained in Moore et al. (2014), who found that nearly a quarter of their sample scored high for both exhaustion and cynicism, while this current study has found very few veterinarians at high risk of burnout.

graduates. This may be a combination of things. Part of the difference may come about because recent veterinary graduates are very likely to live in a suburban setting while 25-34 year-olds are much more likely to live in an urban setting. Second, it could be an effect of wealth or income, whereby 25-34 year-olds have more disposable income, and so choose to spend more of that income on more upscale housing.

The third large difference is in the amount spent on transportation. 25-34 year-olds spend twice as much of a proportion of their salary on transportation compared to recent veterinary graduates. This is likely associated with the higher incidence of marriage amongst the general population, where there would be a need for two cars or could be as simple as the ownership of newer or more expensive vehicles.

The fourth difference is that the general population of this age group spends a third more money on food. This includes both food from restaurants (eating out and takeout) and groceries. Presumably this extra amount is used to pay for the additional household size. Indeed, veterinarians spend about \$3,900 per person in the household for food (4.4 percent) whereas the 25-34 year-olds pay about \$2,400 per person (3.9 percent).

The census data does not specifically itemize school loans or credit card debt and thus a comparison cannot be made, but recent graduates pay an average of \$9,360 in student loan payments and pay off an average of \$2,045 in credit card debt each year.

Using the Employment Survey data, burnout scores were calculated for the respondents who completed the necessary portion of the survey. According to http://www.proqol.org/uploads/ProQOL_Concise_2ndEd_12-2010.pdf, burnout scores have a distribution in the general population. A low score, indicating that someone is not imminently approaching burnout, is a score of 22 or less. An average score is a score of 23-41, and a score of 42 or higher is someone at the highest risk of burnout. The following tables display the burnout scores collected from the 2014 Employment Survey arranged according to graduation year, board certification, region, income, gender, practice type and according to DVM debt.

These burnout scores indicate burnout for the veterinary population is relatively low. Of course, burnout scores capture only one aspect of mental health: how one feels about their work and not the other myriad dimensions that comprise the full spectrum of mental health. But on the positive side, this shows that, on average, veterinarians may not be suffering from as much burnout as some recent anecdotal evidence has suggested.



THESE BURNOUT SCORES INDICATE BURNOUT FOR THE VETERINARY POPULATION IS RELATIVELY LOW. OF COURSE, BURNOUT SCORES CAPTURE ONLY ONE ASPECT OF MENTAL HEALTH: HOW ONE FEELS ABOUT THEIR WORK AND NOT THE OTHER MYRIAD DIMENSIONS THAT COMPRISE THE FULL SPECTRUM OF MENTAL HEALTH.

BURNOUT SCORE BY GRADUATION YEAR

Graduation Year	Mean	N	Std. Deviation
2013	23.8671	647	5.87836
2009	24.0726	537	6.09749
2004	23.4674	353	6.04948
1999	22.9110	281	6.28569
1989	21.4818	274	5.33164
Missing	16.0000	1	
Total	23.4080	2093	6.00635

Table 20

BURNOUT SCORE BY BOARD CERTIFICATION

Board Certified	Mean	N	Std. Deviation
No	23.4629	1873	5.99197
Yes	22.9409	220	6.12139
Total	23.4080	2093	6.00635

Table 21

BURNOUT SCORE BY REGION

Regions	Mean	N	Std. Deviation
Region 0	23.2184	174	5.73988
Region 1	24.1006	169	5.48444
Region 2	23.5932	295	6.27575
Region 3	22.9348	230	5.98762
Region 4	22.9660	206	6.12423
Region 5	24.0577	156	6.14160
Region 6	22.8503	167	6.42063
Region 7	21.5920	174	5.50041
Region 8	24.0000	159	5.53241
Region 9	23.8517	290	5.89781
Out of U.S.	23.5000	10	4.47834
Total	23.3365	2030	5.96553

Table 22

BURNOUT SCORE BY INCOME

Income Ranges	Mean	N	Std. Deviation
Less than \$10,000	24.9583	24	4.29842
\$10,000 to \$19,999	23.1250	24	8.05045
\$20,000 to \$29,999	23.5500	60	5.32479
\$30,000 to \$39,999	24.9767	86	6.79788
\$40,000 to \$49,999	23.8583	120	5.83426
\$50,000 to \$59,999	23.1111	144	5.76717
\$60,000 to \$69,999	23.1725	255	5.65839
\$70,000 to \$79,999	23.0597	268	5.69744
\$80,000 to \$89,999	24.1564	243	5.81536
\$90,000 to \$99,999	24.0123	163	6.11312
\$100,000 to \$124,999	23.5179	251	5.62589
\$125,000 to \$149,999	23.0510	98	5.55641
\$150,000 to \$174,999	21.6538	78	6.38551
\$175,000 to \$199,999	21.1351	37	6.15161
\$200,000 to \$249,999	22.4074	54	6.45892
\$250,000 and over	20.0980	51	5.51817
Total	23.3369	1956	5.90223

Table 23

BURNOUT SCORE BY GENDER

Please indicate your gender:	Mean	N	Std. Deviation
Male	22.6787	526	6.12080
Female	23.6540	1558	5.95080
Total	23.4079	2084	6.00765

Table 24

BURNOUT SCORE BY EMPLOYMENT SECTOR

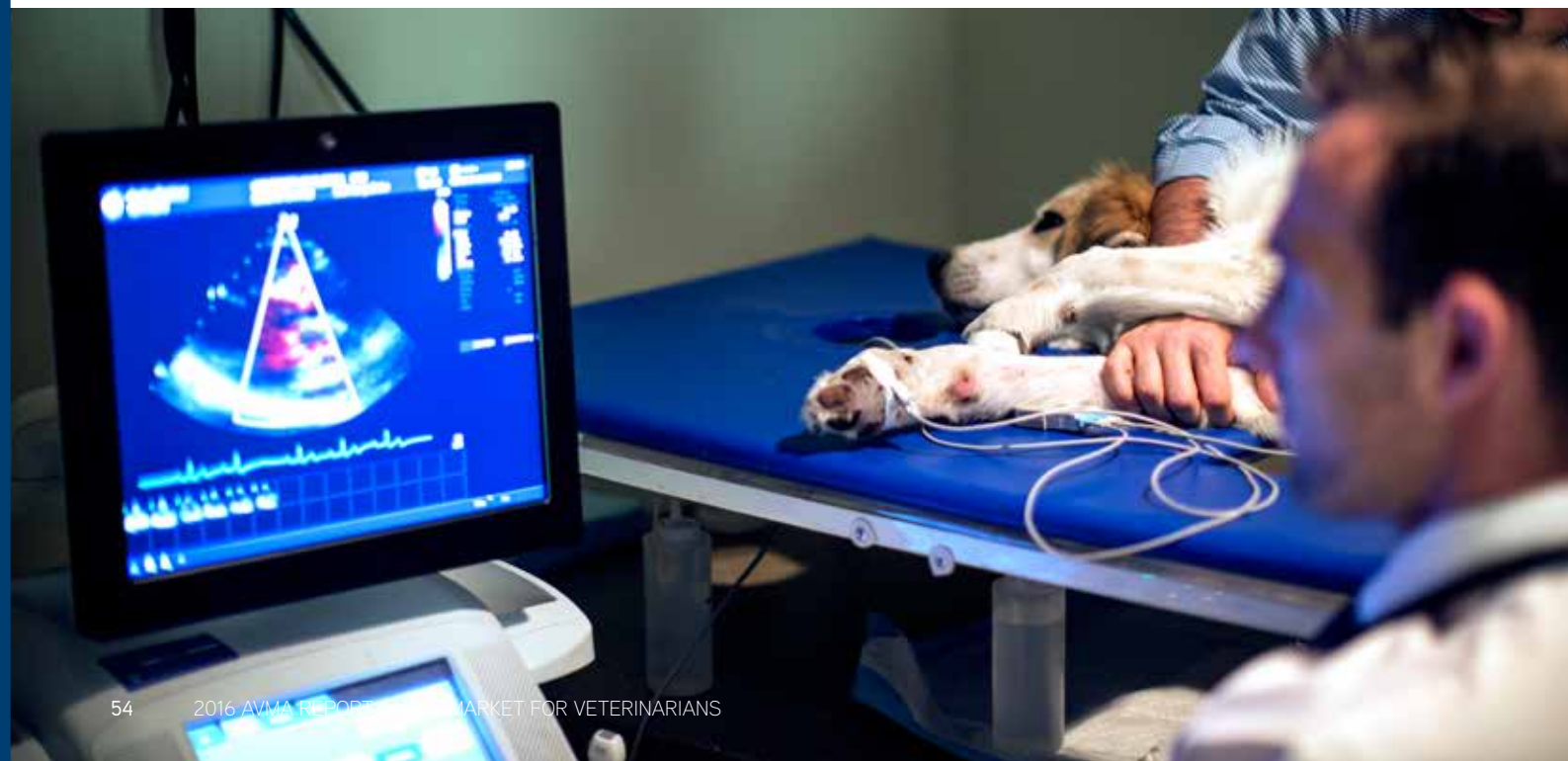
Please indicate your current employment position.	Mean	N	Std. Deviation
Food animal practice (exclusive)	20.3056	36	5.66604
Food animal practice (predominant)	21.1429	28	5.26142
Mixed practice (at least 25% companion and 25% food or equine)	23.0278	108	5.44550
Companion animal practice (predominant)	23.4397	232	5.89341
Companion animal practice (exclusive)	23.5671	1065	5.79291
Equine practice	23.0494	81	6.60284
Federal Government (civil service)	24.0000	33	7.31010
Uniformed services	22.9474	19	6.01363
College or University (Faculty or staff only)	22.5688	109	6.29722
State/Local government	21.2727	22	4.90075
Industry/Commercial organizations	21.6731	52	6.96130
Not-for-profit organizations	23.9273	55	5.68902
Advanced Education (inclusive of internships and residencies)	24.7031	64	6.68730
Other Veterinary Employment (specify):	22.6905	84	5.36381
Non-Veterinary Employment (specify):	25.1250	8	5.91457
Total	23.2971	1996	5.92919

Table 25

BURNOUT SCORE BY DVM DEBTLOAD

Ranges for DVM Debt	Mean	N	Std. Deviation
Less than \$10,000	22.68	393	5.98
\$10,000 to \$19,999	21.81	63	5.24
\$20,000 to \$29,999	21.76	87	4.94
\$30,000 to \$39,999	21.64	84	4.96
\$40,000 to \$49,999	23.64	89	6.41
\$50,000 to \$59,999	23.38	82	5.71
\$60,000 to \$69,999	22.92	112	5.77
\$70,000 to \$79,999	22.75	83	5.79
\$80,000 to \$89,999	23.96	99	5.68
\$90,000 to \$99,999	23.07	60	7.40
\$100,000 to \$124,999	23.73	214	6.17
\$125,000 to \$149,999	24.34	161	6.03
\$150,000 to \$174,999	24.06	157	6.16
\$175,000 to \$199,999	24.78	110	5.93
\$200,000 to \$249,999	25.21	111	5.83
\$250,000 and over	23.90	171	6.17
Total	23.42	2076	6.00

Table 26



Health

The 2015 Employment Survey asked respondents to broadly evaluate their own health. Of the Employment Survey's 2,080 respondents who report being currently employed, 36 percent report being in excellent health, 45 percent in very good health, 17 percent in good health, 2 percent in fair health and only 0.14 percent in poor health. This contrasts with the health of 98 currently unemployed veterinarians, 33 percent of whom report being in excellent health, 32 percent in very good health, 26 percent in good health, 6 percent in fair health and 4 percent in poor health. The overall health of unemployed veterinarians

is lower than for employed veterinarians; however it would be premature to say that one factor causes the other.

The self-reported health scores varied by practice type. Food animal veterinarians indicated the largest percentage of practitioners excellent health and uniformed services indicated the lowest level of excellent health. However, combining excellent and very good categories, the uniformed services veterinarians were near the top in percentage of respondents, while federal government veterinarians had the lowest percentage in the two categories.

SELF-REPORTED HEALTH BY EMPLOYMENT STATUS

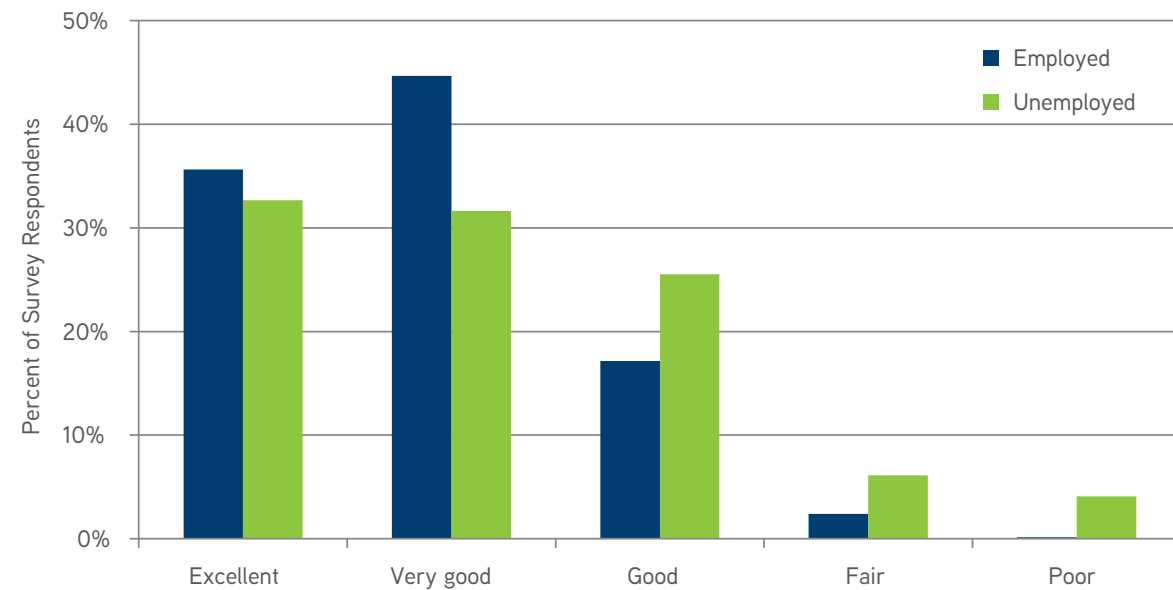


Figure 34

SELF-REPORTED HEALTH BY PRACTICE TYPE

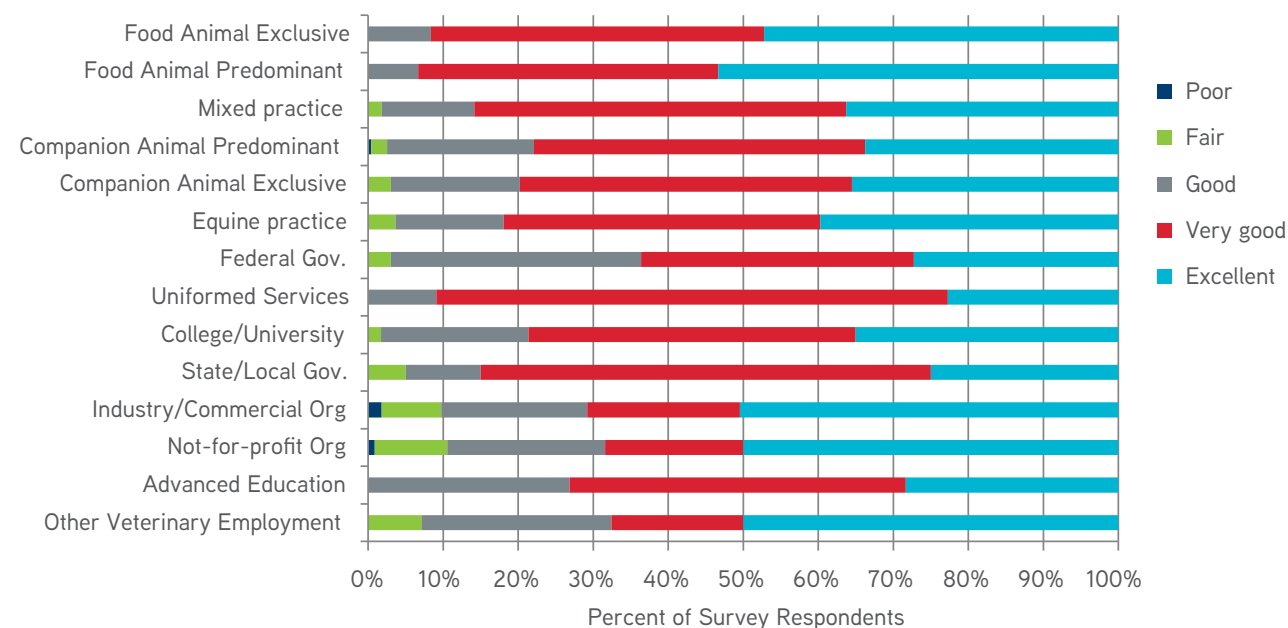


Figure 35

SELF-REPORTED HEALTH BY GENDER

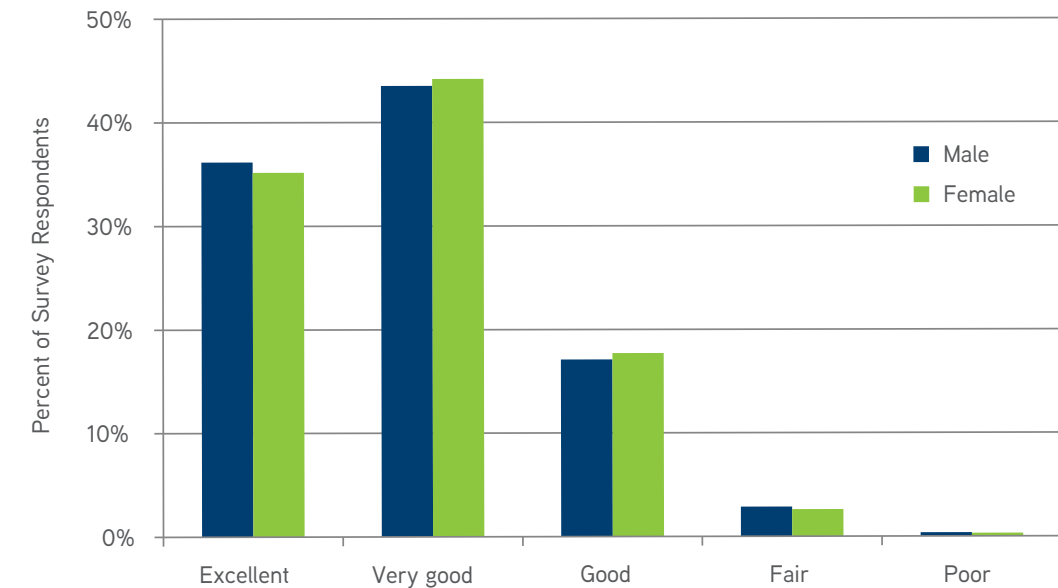


Figure 36

There was little difference in the self-reported health rating by gender with both the mean value and the distribution being very similar.

Also found in the data is the lack of difference in the self-reported health scores by year of graduation. Younger veterinarians have only a slight edge over older veterinarians in scoring themselves as in very good and excellent health.

SELF-REPORTED HEALTH BY GRADUATION YEAR

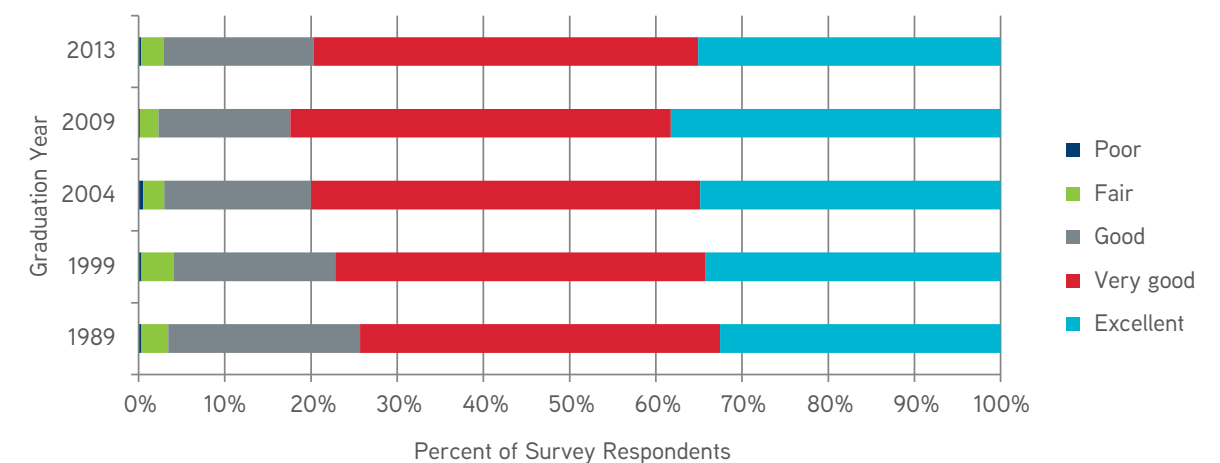


Figure 37



INCOME

After converting to real 2013 Dollars, the values comprising the estimates herein represent only those above \$20,000 and below \$500,000, those who worked an average between 30 hours and 120 hours per week, those who claim to earn less than \$1,000 per hour, and those who are between the ages of 22 and 94.

SUMMARY STATISTICS

Data in this section were collected once every two years from 2000-2014 from AVMA's Biennial Economic Survey, with each survey year representing data from the previous year. As a consequence, the data available for income actually ranged from 1999 to 2013. In 2015, the survey changed to collect annual data, so the latest available estimates on income are from 2014. All values have been converted into real 2013 U.S. Dollars.

The data have been cleaned of outlying observations. After converting to real 2013 Dollars, the values comprising the estimates herein represent only those above \$20,000 and below \$500,000, those who worked an average between 30 hours and 120 hours per week, those who claim to earn less than \$1,000 per hour, and those who are between the ages of 22 and 94. Observations outside these ranges likely represent either input errors or are so far removed from the mean that they are not representative of the population at large. While values outside of these ranges may be of interest to some studies, they are not representative of the realities of a typical, full-time veterinarian and may cause undue upward or downward bias on the estimates. For example, a veterinarian working full time but making less than \$20,000 is most likely doing so as a personal choice. He or she may easily enter the mainstream veterinary labor market and earn a significantly higher salary.

The two following charts show the difference in real mean income by employment sector. Perhaps the most interesting characteristic is the change in 2014 of large animal veterinarians, both exclusive and predominant, in increasing income compared

to the previous year. This could have been caused by a number of factors, but perhaps the most relevant is that the price of livestock increased sharply in 2014 due to strong demand for and a weaker supply of animal protein.

REAL MEAN INCOME BY PRACTICE TYPE, PRIVATE PRACTICE

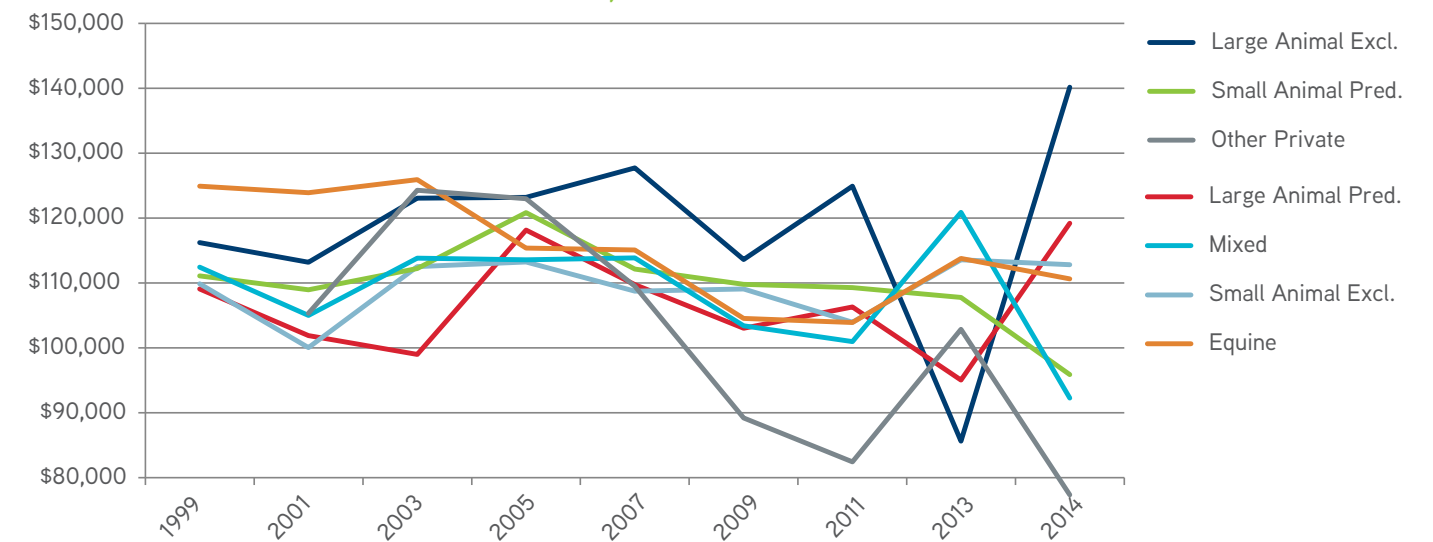


Figure 38

Generally, the trend over this period for private practice veterinarians is flat to declining for each of the practice types with a slight decline in total. Only the small animal exclusive showed a slight increase in salaries over the period.

In the public sector, the prevailing patterns appear to have held steady or slightly climbed, with the relative salaries of each public practice type remaining generally unchanged over the period. Industry veterinarians, however, have received much higher levels of compensation over the period and that compensation has been rising fairly steadily.

REAL MEAN INCOME BY EMPLOYMENT SECTOR, PUBLIC PRACTICE

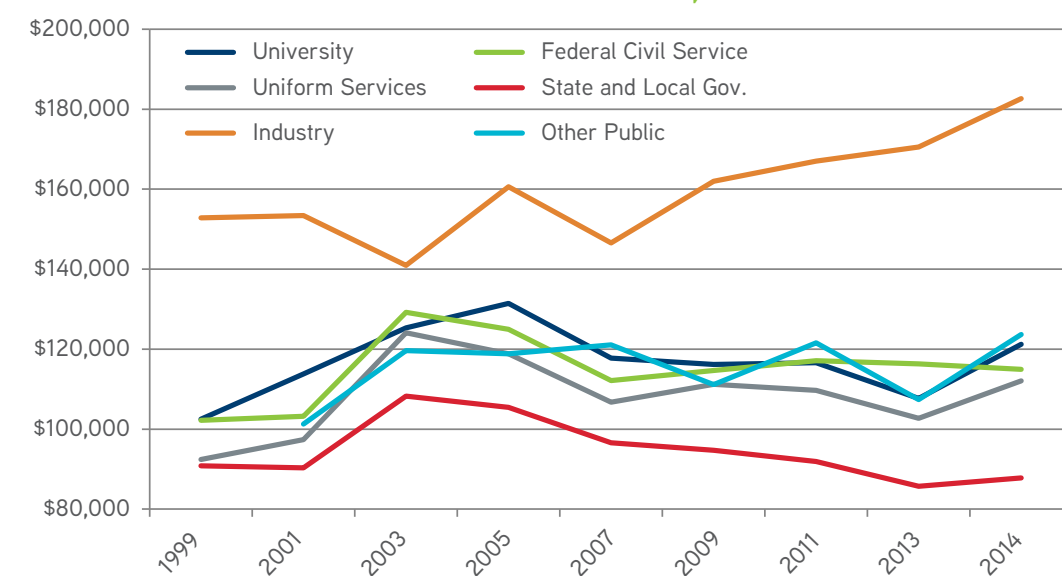


Figure 39

Separating income into segments by years of experience is another way to examine income. In all professions, earnings generally rise with experience. However, after a few decades in the workforce, it is common to see the average income reach a peak and then decline. The first part of this pattern, the increase in income, comes about because as someone performs their job, they become better at it, and are rewarded for their performance and often increase their efficiency. However, after a point, increases in efficiency and competency reach a plateau because a person has reached his or her capacity. After that point, income tends to stay at the same level or even decrease. This effect is

compounded by the fact that as people age, they tend to want to focus less on work, and often attempt semi-retirement while still staying active in the labor force.

The region of employment also has a pronounced impact on income. Regions in the following figure are based on the first digit of their zip code, with similar zip codes generally being located near to one another. Region 10 consists of those survey respondents from outside the United States. Research at the AVMA has shown regions to be one of the consistent factors in explaining variation in income. In 2015, regions 1 and 6 are the highest earning regions.

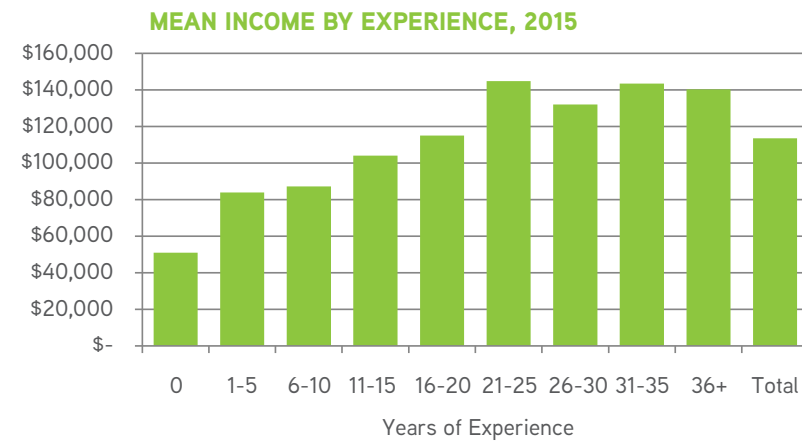


Figure 40

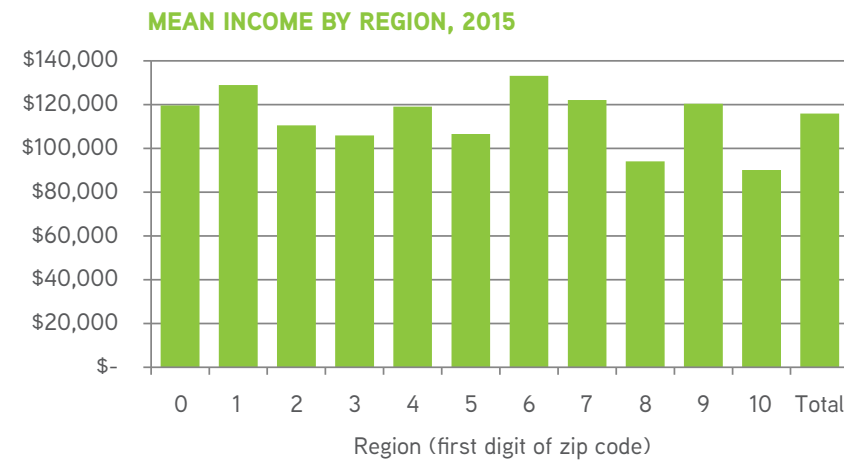


Figure 41

In the private sector, it is common to see veterinarians acting as managers and practice owners, typically with differences in income based on those responsibilities. The following figure shows that the same is true in the public sector, where veterinarians holding executive positions earn a substantial premium, and managers are also highly compensated.

Education level also frequently affects the level of income. Data on MBAs was collected for the first time in the most recent Compensation Survey. Prior to 2013, MBAs were grouped with the other master's degrees. Interestingly, veterinarians with MBA degrees earned virtually the same as every other group, in contradiction to last year's results that showed MBAs to be the highest compensated group.

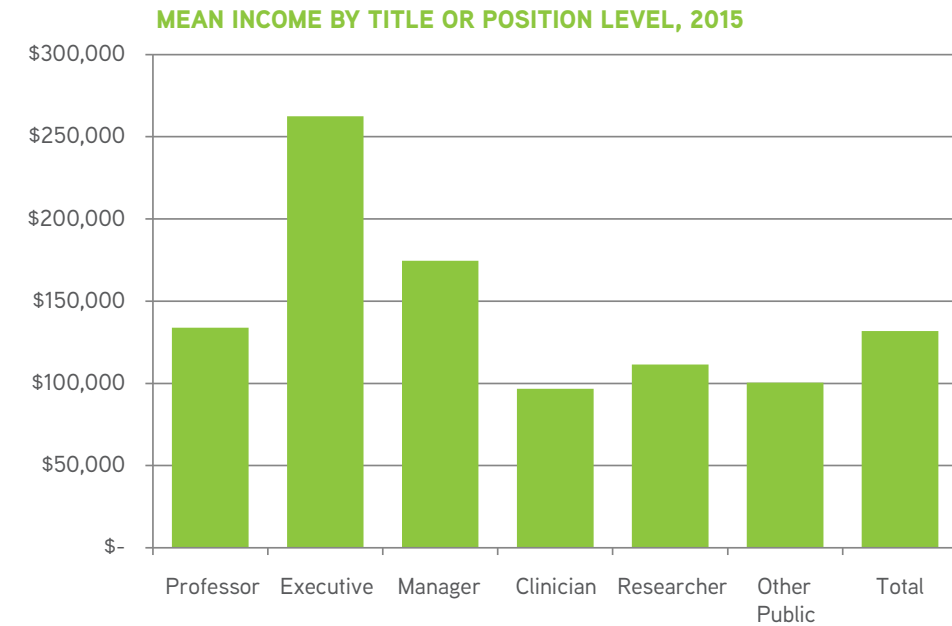


Figure 42

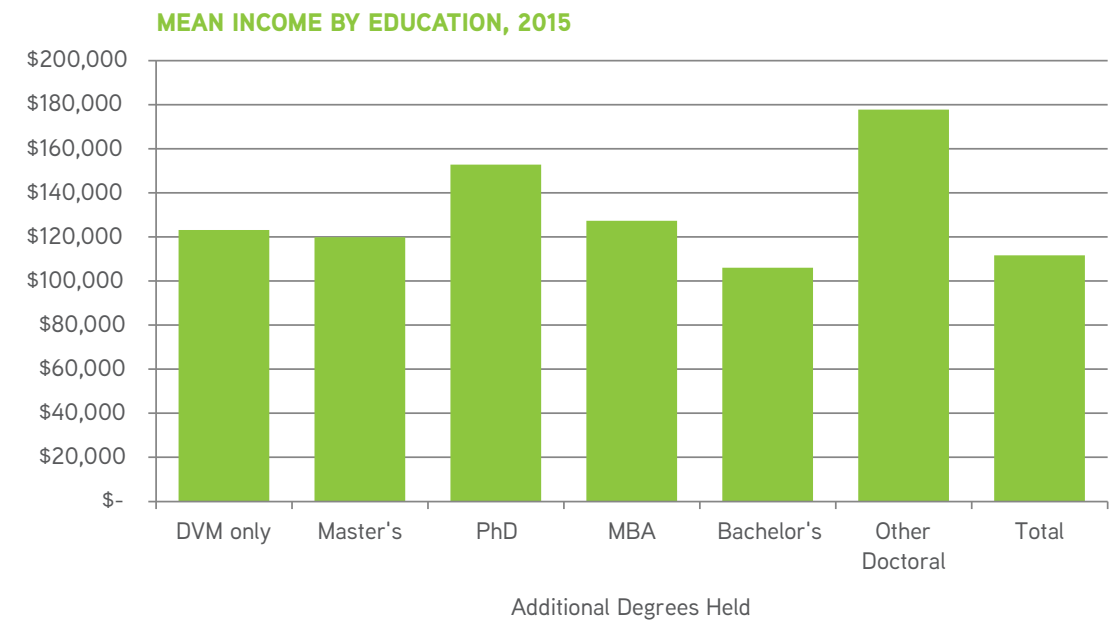


Figure 43

INCOME CALCULATORS

The above cross-tabulations are useful to gain an overall picture of trends across large portions of the population of veterinarians. However, because of the changing demographics of the profession and changing macroeconomic conditions, these averages fail to fully capture the long-run trends in compensation; specifically, what factors are associated with higher or lower compensation and by how much? These questions can be answered with a multiple regression analysis with the available data.

In previous years, the AVMA has biennially published the AVMA Report on Veterinary Compensation, the last of which was published in 2015 containing 2013 compensation data. This publication was over 100 pages of cross-tabulations that displayed the mean and median incomes of veterinarians in a variety of ways: across practice types, ages, experience levels,

advanced education levels and other variables of interest. The AVMA Economics team has developed a single table to replace this publication. This table contains the coefficient estimates of a linear regression with the annual income as the dependent variable. The independent, or explanatory variables, are the same as in the previous publication.

We encourage you to download and fill-out one of the AVMA's salary calculators, either for new graduates or for experienced veterinarians. These calculators predict what the mean wage is for your employment situation. While everyone's situation is unique, these calculators estimate the mean income in a particular situation. They do not take all factors into consideration and they do not necessarily reveal the amount that someone should be paid, but do estimate the mean compensation for the given input.



EXPERIENCED VETERINARIAN SALARY CALCULATOR

Category	Description	My Input	Male	Female	Product
Step 1	For ALL of the following items, enter a value in the "My Input" column:				
Basic Information	Constant	1	\$19,518	\$17,227	
	Last Two Digits of the Current Year	16	\$3,143	\$1,373	
	Mean Work Hours Per Week		\$580	\$428	
	Practice Owner (1=yes, 0=no)		\$9,738	\$3,065	
Step 2	For ONE of the following experience categories, enter a "1" in the "My Input" column:				
Years of Experience¹	1		\$3,310	\$6,208	
	2-3		\$8,039	\$13,824	
	4-6		\$15,325	\$23,019	
	7-9		\$23,119	\$29,841	
	10-14		\$31,770	\$34,309	
	15-19		\$40,011	\$37,387	
	20-29		\$46,435	\$44,302	
	30+		\$44,623	\$57,907	
Step 3	For ONE of the following U.S. regions, enter a "1" in the "My Input" column:				
Employment Region (first digit of zip code)	Region 0 (ME, NH, VT, MA, CT, RI, NJ, PR)		\$8,567	\$13,589	
	Region 1 (DE, PA, NY)		\$0	\$7,194	
	Region 2 (DC, MA, NC, SC, VA, WV)		\$3,064	\$4,624	
	Region 3 (AL, FL, GA, MS, TN)		\$0	\$0	
	Region 4 (IN, KY, MI, OH)		\$0	\$0	
	Region 5 (IA, MN, MT, ND, SD, WI)		-\$9,862	-\$4,820	
	Region 6 (IL, KS, MO, NE)		-\$10,020	\$0	
	Region 7 (AR, LA, OK, TX)		\$0	\$0	
	Region 8 (AZ, CO, ID, NM, UT, WY)		-\$7,127	\$0	
	Region 9 (AK, CA, HI, NV, OR, WA)		\$8,277	\$7,026	
Step 4	For ONE of the following practice types, enter a "1" in the "My Input" column:				
Private Practice	Food Animal (exclusive)		\$0	-\$6,074	
	Food Animal (predominant)		-\$12,516	-\$12,109	
	Mixed Practice		-\$4,837	-\$5,048	
	Companion Animal (exclusive)		\$0	\$0	
	Companion Animal (predominant)		\$0	\$0	
	Equine		\$0	-\$6,007	
Public Practice	Federal Government		-\$9,169	\$4,244	
	Uniformed Services		-\$15,163	-\$5,107	
	College or University		-\$5,733	-\$7,580	
	State or Local Government		-\$28,733	-\$12,579	
	Industry		\$25,202	\$31,696	
	Other Public		\$0	\$0	
Step 5	For ANY of the following Additional Qualifications, enter a "1" in the "My Input" column:				
Additional Qualifications	Master's Degree (MS, MBA, MA, etc)		\$1,889	\$4,463	
	Doctorate Degree (besides DVM)		\$9,976	\$9,484	
	Residency Completed		\$3,732	\$2,527	
	Board Certified		\$14,599	\$16,388	
Step 6	For EVERY entry in the "My Input" column, multiply by the number in either the "Male" or "Female" column and enter the result in the "Product" column.				
Step 7	Add ALL of the entries in the "Product" column. This is the mean salary for your situation:				

¹For "Years of Experience", take the current year and subtract your year of graduation from veterinary college, as well as any time spent out of the workforce or as a full-time student.

Table 27

INTERNSHIPS

The question of internships remains a debatable issue in the profession. On the one hand, internships provide a year of valuable post-graduate training. On the other hand, interns take a major salary cut in exchange for the training, and it's unknown whether or not they would receive equivalent training in the regular course of practicing medicine.

The following table tabulates internship participation rates according to the graduates responding to the Senior Survey. A few entries in 2006 and 2007 were omitted due to an insufficient number of observations.

A simple analysis that compares the mean (or conditional mean in a regression analysis) of a group that completed internships to a group that did not complete internships is one possible way to analyze the data. However, the difficulty in measurement comes about because of selection bias. If students are entering internships because they feel unprepared for their profession, then the extra time spent training in this learning environment could be yielding benefits that they might otherwise not be able to obtain. The difficulty comes about because we don't know the counterfactual: we don't know how the veterinarian would fare

in their career had they not pursued an internship. In fact, their income could have been less over their lifetime had they forgone the internship (if they were never able to achieve a higher level of confidence), or it could have been more (if they had not needed to make that initial \$40,000 sacrifice). Because no individual can take two career paths simultaneously (internship and no internship), directly measuring the impact of an internship on the lifelong earnings of a veterinarian is not possible.

To counter this selection bias and provide an estimate for the impact of an internship on the lifelong earnings of veterinarians who pursue an internship, an instrumental variables (IV) approach is very appealing (see Angrist and Pischke (2009)). The IV approach is used to estimate causal relationships when controlled experiments are not feasible. In a simple linear regression model, the effect a specific factor (independent variable) on the variable of interest (dependent variable) is determined. In the case of IV the impact of the instrument is measured on the independent variable. Since we know the relationship between the independent and dependent variable,

we can deduce the impact of the instrumental variable on the dependent variable.

We can leverage tens of thousands of observations from the previous decade across the Biennial Economic (BES) and Employment surveys. The proposed instrument variable is the veterinary school attended. Some schools, such as the University of Pennsylvania, Cornell University and Western University all have consistently high rates of internships over the years. Other schools have consistently low rates of internships. This is useful because we know that school attended does not have a statistically significant correlation with income (the IV exclusion restriction) but the school attended does have an effect on whether someone pursues an internship (instrument is correlated with the variable of interest).

The estimation uses a bootstrapped standard error, with clusters based on the year of graduation. The null hypothesis being tested is that internships do not have a statistically significant effect on income.

INTERNSHIP PARTICIPATION RATES BY SCHOOL, 2006-2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Auburn University	13%	18%	21%	13%	22%	22%	17%	11%	20%	22%
Tuskegee University	19%	12%	20%	22%	16%	14%	20%	20%	38%	29%
University of California-Davis		31%	40%	29%	31%	31%	43%	33%	39%	62%
Colorado State University	29%	37%	25%	28%	37%	41%	19%	26%	31%	34%
University of Florida	43%	31%	24%	31%	38%	31%	26%	23%	36%	34%
University of Georgia	25%	35%	28%	25%	32%	23%	26%	25%	21%	21%
University of Illinois	20%	20%	25%	20%	26%	20%	19%	22%	26%	22%
Iowa State University	12%	20%	20%	21%	21%	11%	12%	19%	15%	19%
Kansas State University	20%		23%	23%	20%	26%	26%	32%	26%	20%
Louisiana State University	23%	17%	19%	25%	28%	17%	23%	24%	23%	12%
Tufts University	49%	45%	57%	36%	53%	58%	50%	40%	41%	30%
Michigan State University	20%	26%	25%	28%	33%	37%	31%	28%	30%	22%
University of Minnesota	15%	26%	21%	31%	25%	25%	21%	19%	26%	28%
Mississippi State University	19%	19%	27%	14%	27%	19%	22%	14%	21%	18%
Purdue University	25%	9%	14%	16%	18%	28%	22%	20%	13%	19%
Cornell Veterinary College	45%	46%	35%	35%	34%	38%	48%	43%	52%	52%
Oklahoma State University	25%	15%	12%	26%	20%	27%	19%	22%	15%	24%
University of Pennsylvania	33%		44%	38%	41%	51%	37%	60%	47%	59%
Texas A&M University	22%	20%	17%	18%	18%	14%	21%	24%	14%	28%
Washington State University	16%	28%	23%	22%	21%	31%	19%	16%	17%	14%
University of Missouri	39%	28%	14%	19%	24%	17%	18%	20%	12%	21%
The Ohio State University	13%	18%	30%	24%	27%	31%	18%	19%	25%	28%
Oregon State University	6%	24%	19%	13%	14%	30%	34%	30%	21%	30%
University of Tennessee	20%	21%	20%	24%	22%	21%	20%	24%	28%	33%
Virginia-Maryland Regional	19%	22%	18%	24%	21%	19%	22%	22%	18%	23%
North Carolina State University	31%	28%	31%	28%	26%	27%	32%	26%	32%	33%
University of Wisconsin	20%	31%	41%	29%	40%	37%	29%	29%	25%	19%
Western University		25%	35%	37%	31%	41%	42%	39%	48%	42%
Total	23%	26%	26%	25%	28%	28%	26%	26%	27%	29%

Table 28



INTERNSHIP INSTRUMENTAL VARIABLES REGRESSION, 2014

Log (Income, 2014)	Coef.	Std. Err.	z	p-value
Completed Internship	0.256	0.167	1.54	0.125
Completed Residency	0.080	0.055	1.46	0.145
Board Certified	0.064	0.037	1.72	0.086
Female (1=yes, 0=no)	-0.268	0.096	-2.78	0.005
Male Experience	0.034	0.006	5.47	0.000
(Male Experience)^2	-0.001	0.000	-4.57	0.000
Female Experience	0.114	0.036	3.16	0.002
(Female Experience)^2	-0.009	0.004	-2.47	0.014
(Female Experience)^3	0.000	0.000	2.09	0.037
(Female Experience)^4	0.000	0.000	-1.74	0.082
Owner	0.235	0.047	5.01	0.000
Female Owner	-0.389	0.064	-6.04	0.000
Married	0.150	0.028	5.37	0.000
Log (Year Hours)	0.223	0.040	5.54	0.000
Hispanic	0.320	0.180	1.78	0.076
Executive	0.305	0.048	6.35	0.000
Manager	0.113	0.030	3.72	0.000
MBA	0.269	0.084	3.19	0.001
Doctorate	0.169	0.038	4.49	0.000
Region 0	0.110	0.082	1.34	0.180
Region 1	0.093	0.066	1.41	0.159
Region 2	0.055	0.050	1.1	0.274
Region 4	0.054	0.042	1.28	0.199
Region 5	-0.013	0.042	-0.31	0.756
Region 6	-0.036	0.068	-0.53	0.595
Region 7	0.008	0.047	0.17	0.869
Region 8	-0.039	0.070	-0.56	0.575
Region 9	0.126	0.056	2.23	0.026
Food Animal Exclusive	-0.007	0.099	-0.07	0.946
Food Animal Predominant	-0.207	0.092	-2.24	0.025
Companion Animal Predominant	-0.065	0.049	-1.33	0.182
Mixed Animal	-0.237	0.052	-4.56	0.000
Equine	-0.247	0.083	-2.98	0.003
Other Private Practice	-0.042	0.134	-0.31	0.753
College/University	-0.192	0.046	-4.21	0.000
Federal Gov.	-0.006	0.044	-0.13	0.894
Uniformed Services	-0.156	0.053	-2.96	0.003
State/Local Gov.	-0.313	0.051	-6.19	0.000
Industry/Commercial Org	0.219	0.055	3.97	0.000
Other Veterinary Empl.	-0.179	0.113	-1.58	0.115
Constant	9.321	0.335	27.8	0.000

Table 29

INTERNSHIP INSTRUMENTAL VARIABLES REGRESSION, 2014 CONT'D.

Log (Income, 2014)	Coef.	Std. Err.	z	p-value
Number of Observations	1782			
Wald Chi-Square (40)	3097.050			
Prob > Chi-Square	0.000			
R-Squared	0.285			
Adjusted R-Squared	0.268			
Root MSE	0.543			
Number of Clusters (Grad Years)	49			

Table 29 Cont'd.

We fail to reject the null hypothesis and cannot conclude that internships have an effect on income. Using the methods described herein, there is no evidence to suggest internships have an effect. This is not to say that they don't but with the

methods and data as stated, there is no evidence of an effect. Future methodologies will involve leveraging more data, using a time-varying instrumental variable and using propensity score matching.

KEY PERFORMANCE INDICATOR: NET PRESENT VALUE

Just as the debt-to-income ratio is the key performance indicator (KPI) for the efficiency of the price linkage between the market for veterinary education and the market for veterinarians (how efficiently resources are being used to produce veterinarians at a cost that is justified by the income they receive), the Net Present Value (NPV) of the DVM degree is the KPI for the efficiency of the price linkage between the market for veterinarians and the market for veterinary services (does society's willingness to pay for veterinary services provide a normal economic return on the investment required to produce a veterinarian). There are many possible formulations that could be used to compute the NPV. As with all indicators, the value of the indicator is less important than understanding the factors that contribute to the direction of change in the value of the indicator. This section provides the estimates of the NPV for newly graduated veterinarians and also explores the implications of the changes to the formulation and factors used in its estimation.

Net Present Value (NPV) provides a measure of the relative, current value of a stream of benefits and costs over a specified period. That is, the value to an individual to receive the net

income today of a lifetime of earnings. The net income is the value of the DVM degree less the value of what could have been earned in the next best opportunity (BS degree) and the cost of obtaining the DVM degree (tuition and fees, living expenses and interest on funds borrowed to pay for these expenses). Unlike the debt-to-income ratio that provides a measure of the current-year value of the DVM degree versus the costs of obtaining the degree that indicates the relative difficulty of maintaining a standard of living as a veterinary professional at a specific point in time, the NPV provides an indication of the value added to tangible benefits (lifelong earnings) as a result of becoming a Doctor of Veterinary Medicine.

A positive NPV indicates that the tangible benefits of obtaining the degree are greater than not obtaining the degree. A negative NPV indicates that the tangible benefits of not earning the degree exceed those of earning the degree. We acknowledge that, like all other professions, veterinarians obtain intangible benefits (non-monetary or non-measurable benefits) from practicing veterinary medicine. No attempt is made here to compute these intangible benefits.

UNLIKE THE DEBT-TO-INCOME RATIO THAT PROVIDES A MEASURE OF THE CURRENT-YEAR VALUE OF THE DVM DEGREE VERSUS THE COSTS OF OBTAINING THE DEGREE THAT INDICATES THE RELATIVE DIFFICULTY OF MAINTAINING A STANDARD OF LIVING AS A VETERINARY PROFESSIONAL AT A SPECIFIC POINT IN TIME, THE NPV PROVIDES AN INDICATION OF THE VALUE ADDED TO TANGIBLE BENEFITS (LIFELONG EARNINGS) AS A RESULT OF BECOMING A DOCTOR OF VETERINARY MEDICINE.

Age-Earnings Profiles

A major component of the Net Present Value is an individual's lifetime earning potential with and without the DVM degree. As a result, a change in the assumptions related to an individual's lifetime earnings will affect the NPV estimate. A person's future earnings are, of course, unknowable. An individual may decide to work harder or make a career-changing decision to increase or decrease lifetime income. However, basing the predicted future earnings path on the mean earnings path of older veterinarians provides the best estimate of the likely earnings path of future veterinarians. It is also important to acknowledge that this assumes that the work and lifestyle characteristics of the past veterinarians will be duplicated by the new veterinarians.

To capture how an individual's actions will affect the mean earnings path, the mean effect of certain decisions that are known to impact compensation are estimated. For this purpose, age-earnings profiles are used to estimate the average salary of the average person over a length of time. For a veterinarian, that length of time is measured from the date of graduation from veterinary college to retirement. The new veterinarian's earning path can be estimated by using the incomes of those who are already in the labor force at different points in their career. While the individual pattern may vary due to personal choices and the pattern of a cohort of graduates from year to year may change as a result of shifting demographics, the overall mean pattern for the profession is unlikely to have any significant change in the short term.

The same methods of estimation will apply to determining the opportunity costs associated with the DVM degree. The opportunity costs are what the average person would have earned had he or she decided to forego the path of becoming a veterinarian. How much would that person earn each year in the labor force? As with the discussion pertaining to estimating the impact of internships on incomes, computing how much a person would make both as a DVM and with only a BS is not possible individually. We cannot say that this is the "effect" of the DVM degree because, again, it is unknowable how this person would have fared in the other career path. Instead, this is simply the estimate of other similar post-baccalaureate individual earning paths. The collection of these various earning paths into an average provides a measure of the amount of income over time that veterinarians give up both while they were in school and after they become veterinarians. This forgone income is the opportunity cost of the veterinary medical degree.

First consider the age-earnings profile of a veterinarian. This is the expected labor income at any given age. The shape of lifetime earnings is similar to an inverted-U shape: earnings increase quickly at the beginning of one's career as each person quickly accumulates human capital (experience), reaches a peak around age 55, and then decreases as people tend to want to work fewer hours since they've accumulated all of the human capital necessary to fulfill their job.

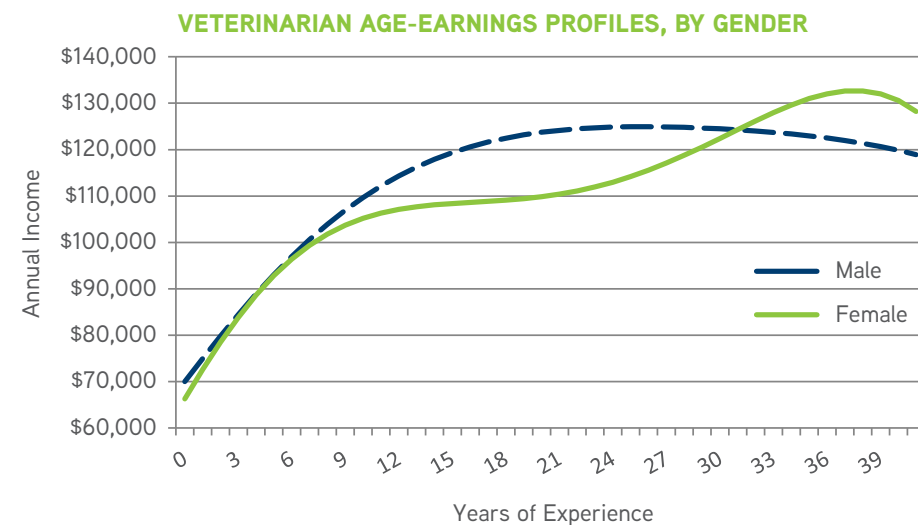


Figure 44

In economics literature, these are always called "age-earnings profiles," but what does that really mean? Age is typically used in because it is a proxy for one's years of experience. An older person is clearly more likely to have more years of experience. But the better measure is to actually use experience, which the surveys contain. The surveys ask the year of graduation and how many years someone was inactive as a veterinarian. So simply take the year of the survey, subtract one because it measures the previous year's salary, and subtract the year of graduation. This gives an estimated number of years of active work experience as a veterinarian. Since we have a very good estimate of work experience, and because not everyone follows a traditional path to veterinary school, work experience is the logical choice to use for the age-earnings profiles.

The next issue to tackle in estimating the age-earnings profiles is to adjust for possible biases in the data. For example, during a recession, consumer spending may slump and cause a decrease in the compensation of companion animal veterinarians. Or an increase in beef prices could increase the demand for food animal veterinarians. For this reason, the best approach to estimate the differences between various practice types, education levels and ownership status is to pool together veterinary income observations from multiple periods of time. Digital records for the AVMA's Biennial Economic Survey (BES) are available every two years from 2000 to 2014 (data covers the previous year, so the periods under consideration are actually from 1999 to 2013). This period covers various macroeconomic conditions and should be sufficient to estimate the parameters needed for the model. In order to make the years comparable to one another, salaries were converted to 2013 dollars using the Consumer Price Index.

The shape of the age-earnings profiles was estimated with a regression equation. In previous versions of the table, a single equation was used to estimate both men's and women's age-earnings profiles. It turns out that the age-earnings profile of women in the veterinary profession differs from those of men. For this reason, the appropriate estimation technique is to use two separate regression equations.

When using two separate regression equations, the shape of the age-earnings profiles differs substantially. Instead of an inverted U-shaped curve, female veterinarians' salaries increase more quickly than that of men early on in their careers, but levels off more quickly at about 10 years of work experience. It then accelerates again after about 25 years of experience, and levels off once more, 10 years later, at a level above that for males. To estimate these equations we used the BES data and included experience variables from the first to the second power for males and from the first to the fourth power for females.

Finally, consider alternative career paths or the opportunity costs associated with becoming a veterinarian. The opportunity costs are the earnings that a veterinarian will forego as a result of pursuing the DVM degree. Had the veterinarian stopped the educational experience at the bachelor degree, the earnings path that would have been followed represents a lost opportunity. The previously published NPV figures that estimate the ratio of the growth rate between professional and doctoral degree holders to bachelor's degree holders was extracted from Gohmann, McCrickard, and Slesnick (1998). This uses an old data series and is indirect. A more direct way to estimate what a person would be earning without the DVM degree is to estimate the age-earnings profiles from a relevant data set. To estimate these age-earnings profiles, the 2013 American Community Survey data from the U.S. Census Bureau was used. Two regression equations were then estimated; one for males and one for females. The male regression model best fit the data by using age up to the second power and the female regression model best fit the data by using age up to the fourth power, the same as was estimated for veterinarians. The regressions considered only those who reported 16 years of education, worked at least 35 hours per week for 48 or more weeks in the past year, and earned an income of more than \$0 but less than \$300,000. This exercise yielded a useable age-earnings profile for the opportunity cost.



SINCE WE HAVE A VERY GOOD ESTIMATE OF WORK EXPERIENCE, AND BECAUSE NOT EVERYONE FOLLOWS A TRADITIONAL PATH TO VETERINARY SCHOOL, WORK EXPERIENCE IS THE LOGICAL CHOICE TO USE FOR THE AGE-EARNINGS PROFILES.

COMPARISON OF AGE-EARNINGS PROFILES

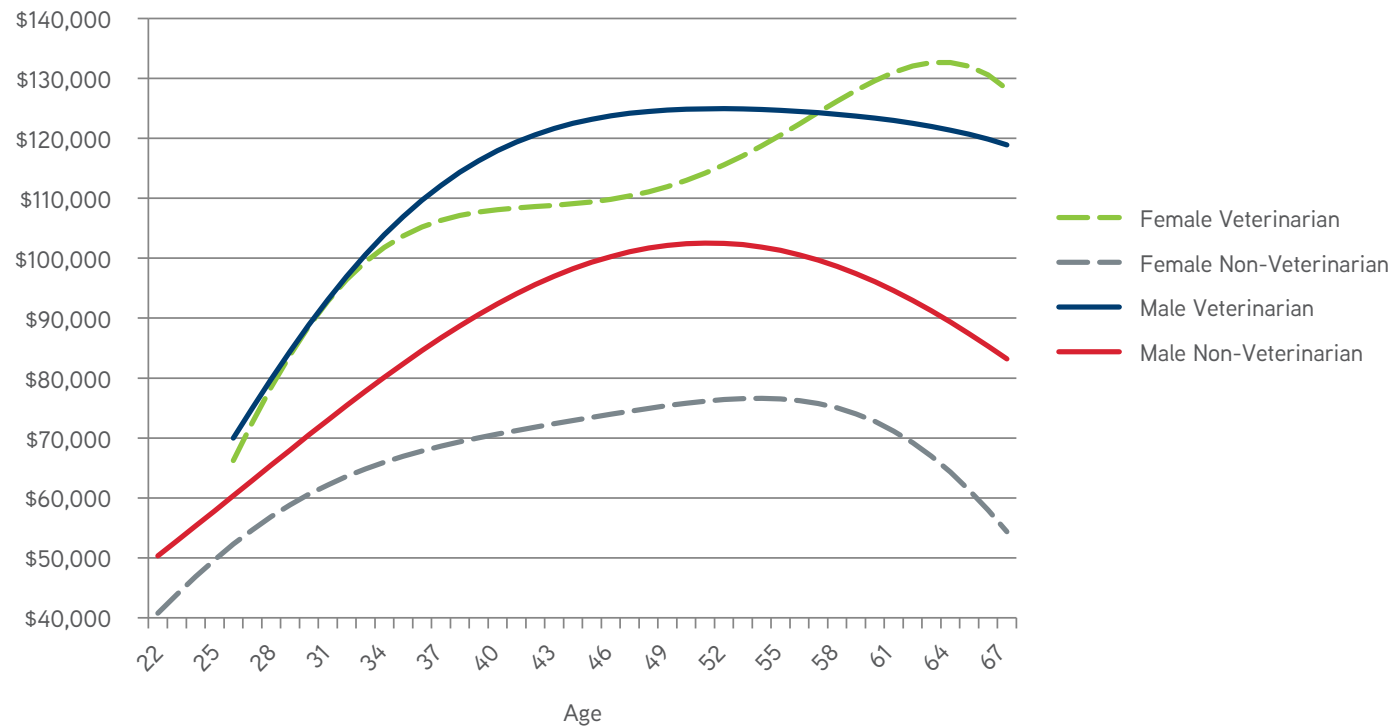


Figure 45

Baseline NPV

Net Present Value has been declining since the earliest data were available in 2010. The primary reason for this decline in NPV is the increasing opportunity costs: starting salaries for bachelor's degree holders grew 19 percent over this period, whereas starting salaries for DVM degree holders grew about 5.5 percent. The increase in opportunity cost contributed to 128 percent of the decline in NPV for men and 134 percent for women, whereas debt contributed to 14 percent of the decline for men and 19 percent for women, while starting salaries reduced the difference in NPV by 42 percent for men and 54 percent for women (percentages may not sum to 100 due to rounding). In other words, almost the entire decline in NPV over this period has been caused by the faster rate of increase in the starting salaries for bachelor's degree holders compared to veterinary graduates.

That bachelor's degree holders have been doing quite well is certainly a good thing, but their fortune has increased the angst that veterinarians feel about the added value of their education. If the earnings gap between DVM and bachelor's degree holders continues to narrow, veterinary students will continue to view the DVM degree as less valuable and less likely to be worth the price of admission to the veterinary profession. Because the decline in the NPV for men has been steeper than for women, this may be the reason for the changing gender distribution in the profession. Males have a much larger opportunity cost to become a DVM than do women.

ALMOST THE ENTIRE DECLINE IN NPV OVER THIS PERIOD HAS BEEN CAUSED BY THE FASTER RATE OF INCREASE IN THE STARTING SALARIES FOR BACHELOR'S DEGREE HOLDERS COMPARED TO VETERINARY GRADUATES.

NET PRESENT VALUE BY GENDER, 2010-2015

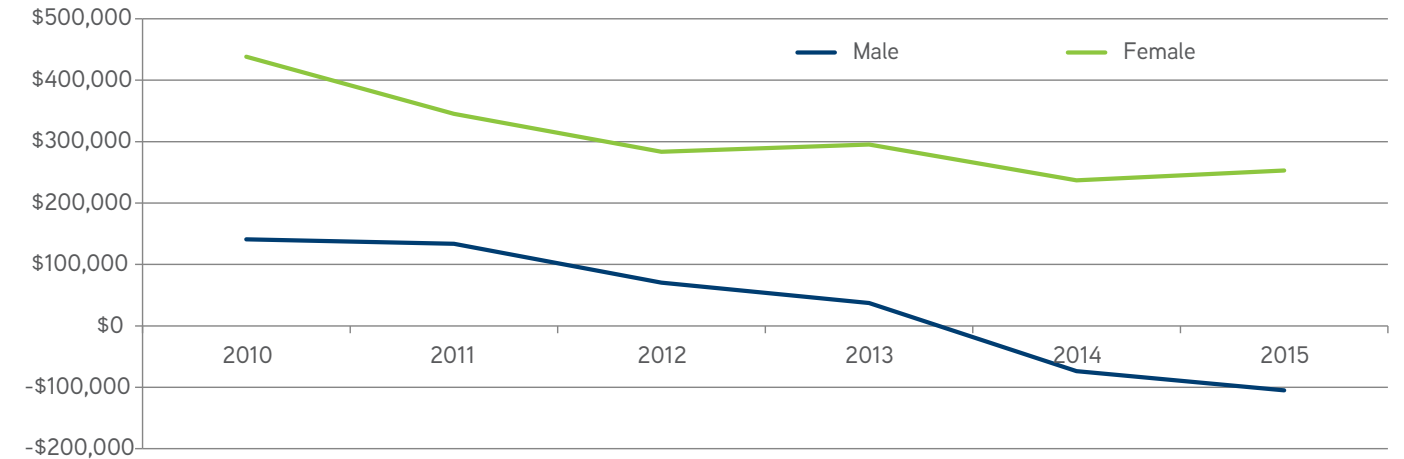


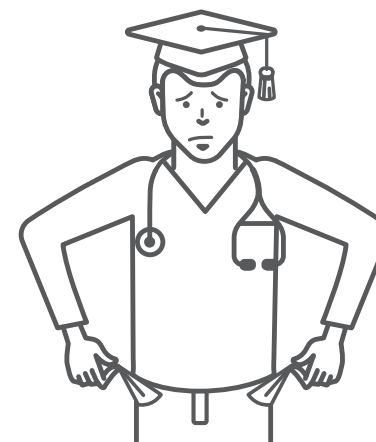
Figure 46

Changing Assumptions

Differences in Net Present Value Based on Practice Type

Net Present Value clearly differs by practice type. From the regression with the BES data, we were able to estimate the differences between salaries for each practice type. Those differences are summarized in the following table. For clarity, we elected to keep all of the different employment sectors, regardless of whether or not the differences were statistically significant. In many cases, the effect of various sectors has an

opposite effect. For example, male equine veterinarians make a higher salary compared to their peers in companion animal exclusive practice. On the other hand, females specializing in equine practice make less money than their peers in companion animal medicine. The opposite is true for those with employment in state and local government.



IF THE EARNINGS GAP BETWEEN DVM AND BACHELOR'S DEGREE HOLDERS CONTINUES TO NARROW, VETERINARY STUDENTS WILL CONTINUE TO VIEW THE DVM DEGREE AS LESS VALUABLE AND LESS LIKELY TO BE WORTH THE PRICE OF ADMISSION TO THE VETERINARY PROFESSION.

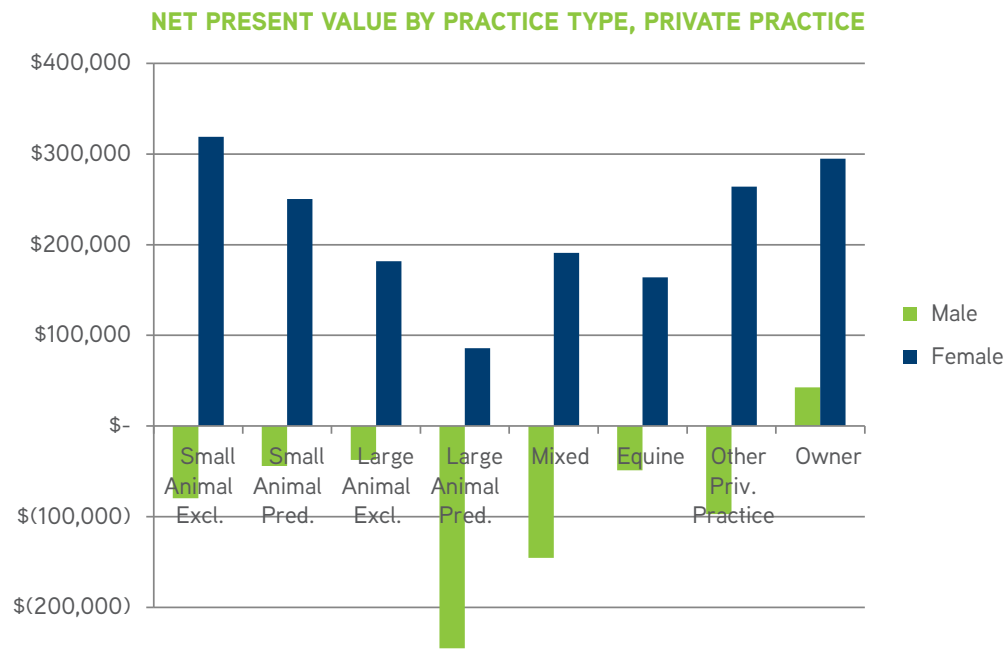


Figure 47

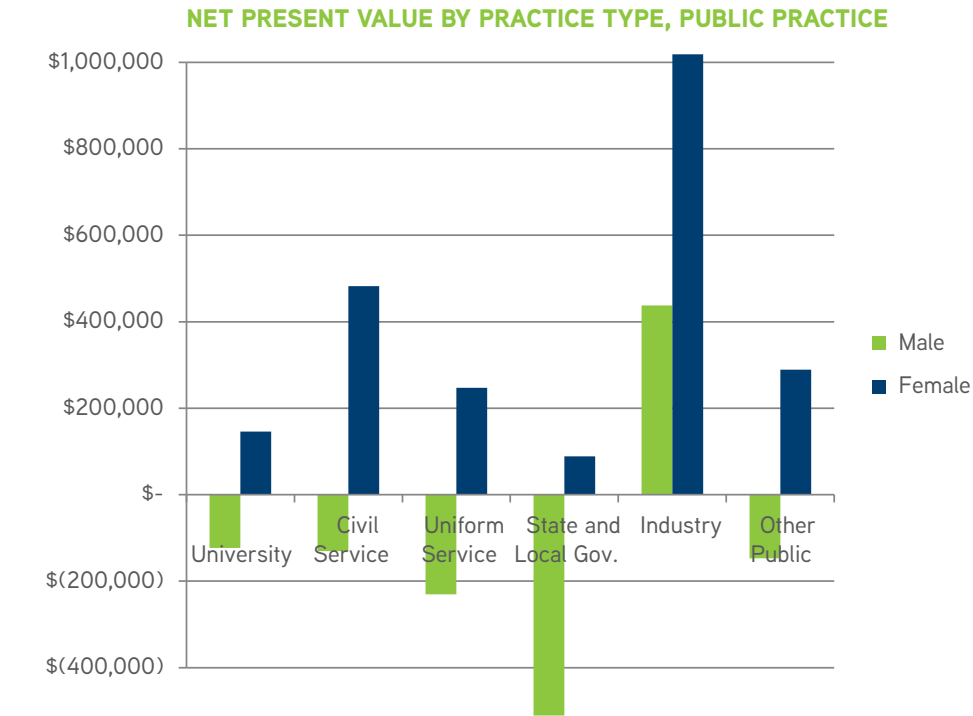


Figure 48

Another interest is to establish if there exists a difference in the effect of additional education on Net Present Value. There are four scenarios to consider. First, the effect of a master's degree: Master's degrees are sought by veterinarians either as advanced preparation for the DVM degree or afterward to complement the skills learned, most often with a Master's of Public Health (MPH) degree. Assuming that the master's degree is earned in two years and costs an additional \$20,000 per year in educational expenses with no additional income, a lower NPV will result for both men and women.

Second, the effect of a PhD on the earnings path was estimated. A large number of PhD holders are employed either as professors in universities or in research positions in industry and both of these practice types earn a higher than average income. However, the PhD typically has a much lower direct cost, since many are paid teaching or research assistantships. For this analysis, those with both a DVM and PhD are assumed to first obtain their DVM degree and then spend an additional three years in graduate school to obtain the PhD degree. During this time in school, the debt is assumed not to increase and a stipend of \$20,000 is received per year. After the three additional years of school, the individual earns their regular DVM salary, starting at zero years of experience, plus a premium in salary of 8.7 percent for males and 10.7 percent for females.

Third, the effect of the MBA on the earnings path was estimated. Data for veterinarians holding a Master's of Business Administration (MBA) degree is only available for the two most recent years, 2013 and 2014. Regressions with this data show that female MBA holders earn a 30.5 percent premium on their salary, all else equal, and males earn a 34.9 percent premium on their salary.

In addition, when the MBA variable is included in the regression, the coefficient on master's degrees is no longer statistically significant. For MBA holders, we assume an additional two years of education at a cost of \$40,000 per year. The opportunity cost remains the same, and we assume that the individual makes no additional income during this time. Interestingly, when MBAs are included in the regression as a variable separate from other master's degrees, the coefficient on other master's degrees decreases and becomes statistically insignificant, suggesting that the majority of the wage premium attributable to a master's degree is disproportionately earned by MBA holders.

And fourth and finally, the effect of board certification on the earnings path was estimated. Assuming that board certification requires a one-year internship followed by a three-year residency, each of which pay \$30,000 per year, followed by board-certification that pays a premium of 17.2 percent for men and 19.9 percent for women.

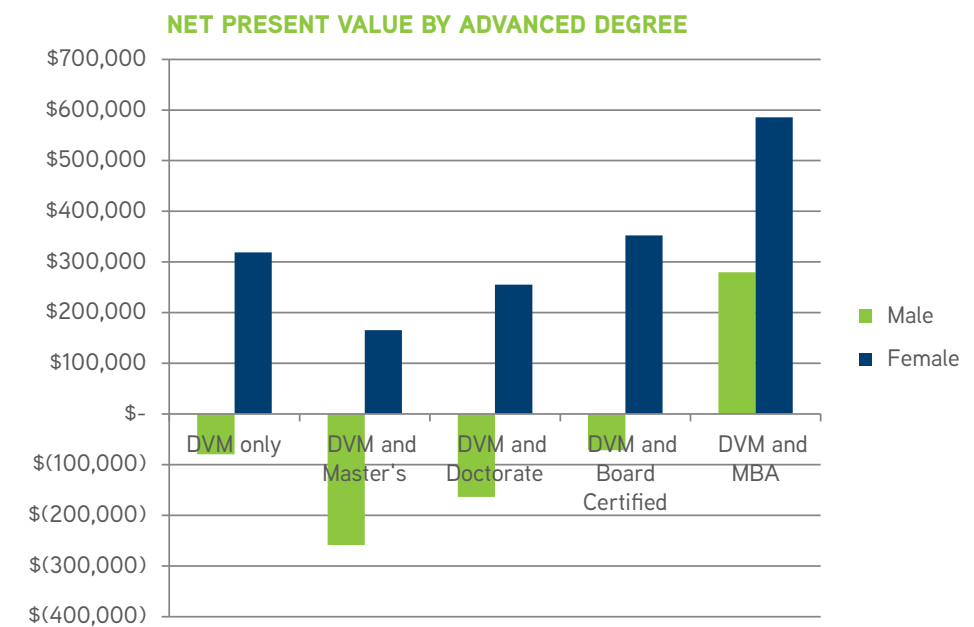


Figure 49

The discount rate provides the value that an individual places on the value of a dollar at some point in the future compared to today. An individual's exact discount rate is unknown and may differ between any two individuals. The discount rate is a measure of an individual's time preference and this is different than the expected return on investment or the interest rate of an investment. A person who is indifferent to being paid \$100 today or \$105 in a year has a discount rate of 5 percent. Whether that person chooses to invest or spend that money will depend on whether the interest rate is above or below his 5 percent discount rate.

Discount rates are unique to individuals, so despite the estimates aforementioned, there is much value to having multiple estimates. The table below illustrates the effect of changing the discount rate on the NPV assuming discount rates in the range of 1 to 10 percent for both men and women. The preferences of an extremely patient person would be represented by 1 percent, while 10 represents the preferences of a very impatient person. The true value for the population is likely somewhere in the middle. The estimates provided for NPV in the all other tables in this publication use a discount rate of 4 percent.

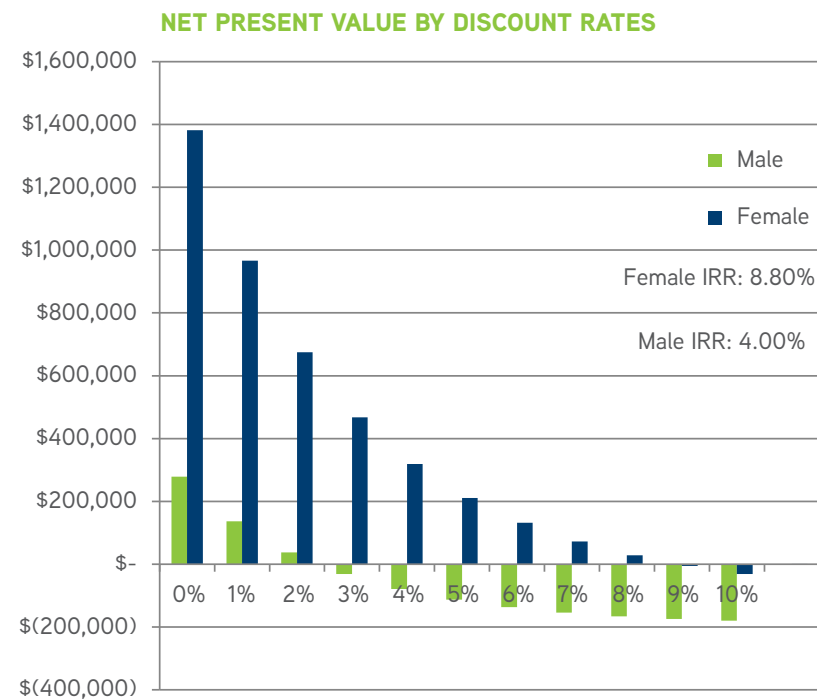


Figure 50

The effect of a change in the interest rate on NPV is illustrated below. The effect is relatively small: for both men and women a 5 percentage point increase in the interest rate decreases NPV by less than \$70,000. The real interest rate is very commonly confused with an individual's discount rate. This is because they are theoretically equal. In a perfect, closed market economy, where costs equal benefits and consumers are motivated by consumption smoothing across all time periods, the social cost of saving is equal to the social benefit of saving. So if the social cost of saving is determined by the average of every person's discount rate, then the benefit of saving is given by the real interest rate. Again, in a perfect, closed market economy these two values are equal, but in reality the actual economy does not follow these strict assumptions, so there will be some differences between

discount rates and interest rates. Because of these confounding factors, no one actually knows the true discount rate, despite over one hundred experiments to estimate it (Frederick, Loewenstein, and O'Donoghue, 2002). However, estimates for discount rates in the range of 2 to 5 percent are typical in the literature, based on the long-term, real interest rate.

Retiring later leads to the accumulation of more years of earnings and thus higher financial lifetime earnings. However, the value to NPV or the addition of income in later years is increasingly diminished as a result of the discount rate. Using a discount rate of 4 percent the value of adding \$100,000 30 years in the future only adds \$30,832 to the NPV and only adds \$20,829 if the \$100,000 is gained 40 years in the future.

NET PRESENT VALUE BY STUDENT LOAN INTEREST RATES

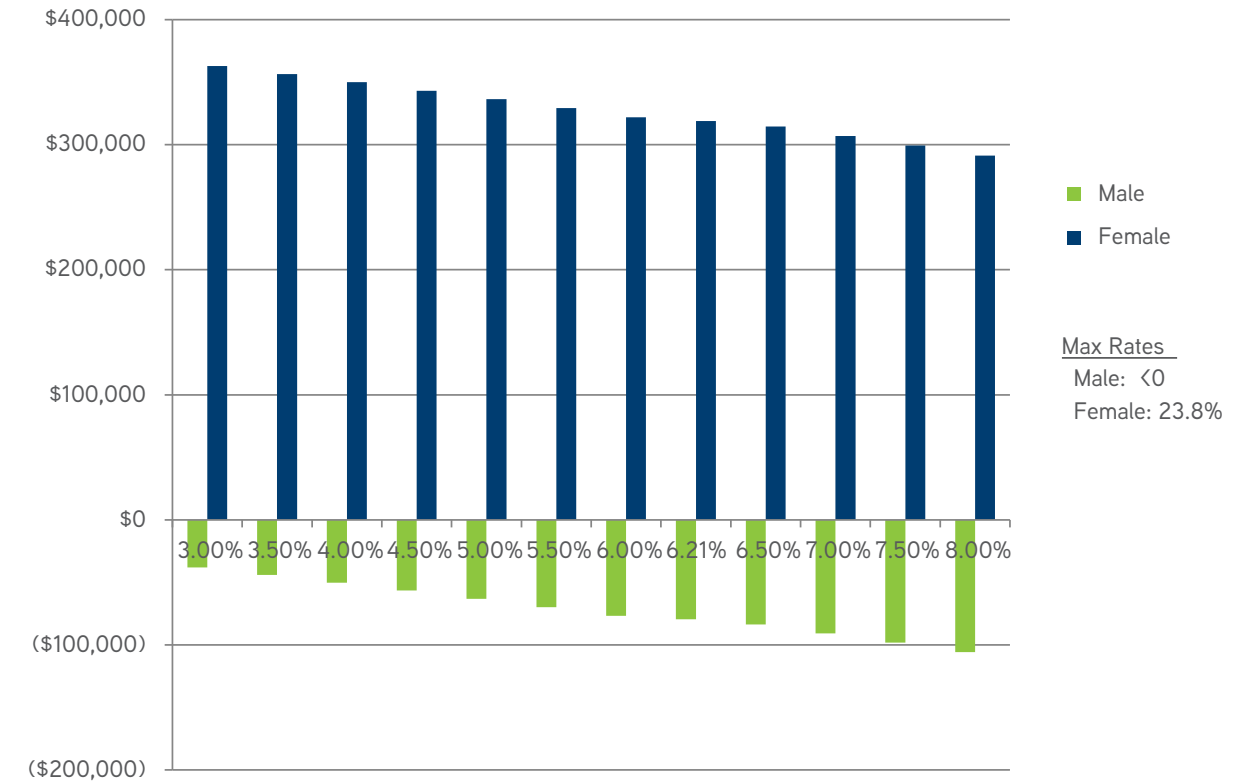


Figure 51

NET PRESENT VALUE BY RETIREMENT AGE

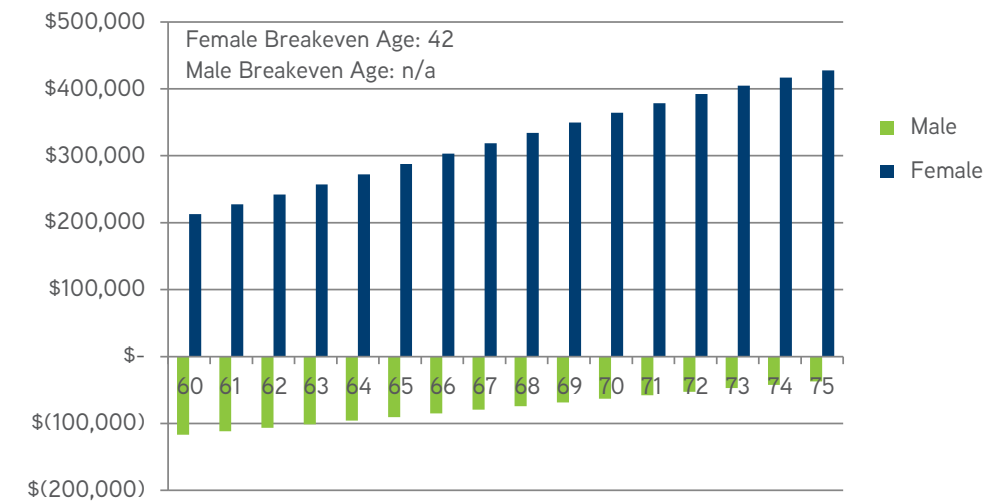


Figure 52

Finally, what is the impact on the NPV of a change in debt, starting salaries or the debt-to-income ratio? The following sets of tables provide the means for determining how various levels of debt and income affect the debt-to-income ratio and then how this same combination of debt and income affects the

NPV. Because of the difference between the earning paths of men and women these tables are provided by gender. These tables will allow a veterinary student to identify the earnings path (NPV) that represents the mean for the profession based on their starting debt and income level.

DEBT-TO-INCOME AND NET PRESENT VALUE, MALES

Debt	Income						
	\$30,000	\$40,000	\$50,000	\$60,000	\$65,000	\$70,000	\$75,000
\$ -	(1,120,876)	(840,868)	(560,860)	(280,853)	(140,849)	(845)	139,159
\$50,000	(1,175,639)	(895,631)	(615,623)	(335,615)	(195,612)	(55,608)	84,396
\$100,000	(1,230,402)	(950,394)	(670,386)	(390,378)	(250,375)	(110,371)	29,633
\$150,000	(1,285,165)	(1,005,157)	(725,149)	(445,141)	(305,138)	(165,134)	(25,130)
\$200,000	(1,339,928)	(1,059,920)	(779,912)	(499,904)	(359,901)	(219,897)	(79,893)
\$250,000	(1,394,691)	(1,114,683)	(834,675)	(554,667)	(414,663)	(274,660)	(134,656)
\$300,000	(1,449,454)	(1,169,446)	(889,438)	(609,430)	(469,426)	(329,423)	(189,419)
\$400,000	(1,558,980)	(1,278,972)	(998,964)	(718,956)	(578,952)	(438,949)	(298,945)
Break-even debt:	n/a	n/a	n/a	n/a	n/a	n/a	\$127,056

Table 30

DEBT-TO-INCOME AND NET PRESENT VALUE, MALES CONT'D.

	Income			Break-even income:
	\$80,000	\$90,000	\$100,000	
	279,163	559,171	839,179	\$70,030
	224,400	504,408	784,416	\$71,986
	169,637	449,645	729,653	\$73,942
	114,874	394,882	674,890	\$75,898
	60,111	340,119	620,127	\$77,854
	5,348	285,356	565,364	\$79,809
	(49,415)	230,593	510,601	\$81,765
	(158,941)	121,067	401,075	\$85,677
	\$254,883	\$510,537	\$766,192	

Table 30 cont'd.

DEBT-TO-INCOME AND ANNUAL AVERAGE RETURN ON INVESTMENT, MALES

Debt	Income									
	\$30,000	\$40,000	\$50,000	\$60,000	\$65,000	\$70,000	\$75,000	\$80,000	\$90,000	\$100,000
\$ -	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
\$50,000	<0	<0	<0	<0	<0	<0	3.9%	10.3%	23.2%	36.1%
\$100,000	<0	<0	<0	<0	<0	<0	0.7%	3.9%	10.4%	16.8%
\$150,000	<0	<0	<0	<0	<0	<0	<0	1.8%	6.1%	10.4%
\$200,000	<0	<0	<0	<0	<0	<0	<0	0.7%	3.9%	7.1%
\$250,000	<0	<0	<0	<0	<0	<0	<0	0.0%	2.6%	5.2%
\$300,000	<0	<0	<0	<0	<0	<0	<0	<0	1.8%	3.9%
\$400,000	<0	<0	<0	<0	<0	<0	<0	<0	0.7%	2.3%

Table 31

DEBT-TO-INCOME AND NET PRESENT VALUE, FEMALES

Debt	Income						
	\$30,000	\$40,000	\$50,000	\$60,000	\$65,000	\$70,000	\$75,000
\$ -	(680,031)	(390,014)	(99,998)	190,019	335,028	480,036	625,045
\$50,000	(734,794)	(444,777)	(154,760)	135,256	280,265	425,273	570,282
\$100,000	(789,557)	(499,540)	(209,523)	80,493	225,502	370,510	515,519
\$150,000	(844,320)	(554,303)	(264,286)	25,731	170,739	315,747	460,756
\$200,000	(899,083)	(609,066)	(319,049)	(29,032)	115,976	260,984	405,993
\$250,000	(953,846)	(663,829)	(373,812)	(83,795)	61,213	206,222	351,230
\$300,000	(1,008,609)	(718,592)	(428,575)	(138,558)	6,450	151,459	296,467
\$400,000	(1,118,135)	(828,118)	(538,101)	(248,084)	(103,076)	41,933	186,941
Break-even debt:	n/a	n/a	n/a	\$173,500	\$409,737	\$438,290	\$570,680

Table 32

DEBT-TO-INCOME AND NET PRESENT VALUE, FEMALES CONT'D.

	Income			Break-even income:
	\$80,000	\$90,000	\$100,000	
	770,053	1,060,070	1,350,087	\$53,448
	715,290	1,005,307	1,295,324	\$55,337
	660,527	950,544	1,240,561	\$57,225
	605,764	895,781	1,185,798	\$59,113
	551,001	841,018	1,131,035	\$61,001
	496,238	786,255	1,076,272	\$62,890
	441,475	731,492	1,021,509	\$64,778
	331,950	621,966	911,983	\$68,554
	\$703,078	\$967,870	\$1,232,666	

Table 32 cont'd.

DEBT-TO-INCOME AND ANNUAL AVERAGE RETURN ON INVESTMENT, FEMALES

Debt	Income							Income		
	\$30,000	\$40,000	\$50,000	\$60,000	\$65,000	\$70,000	\$75,000	\$80,000	\$90,000	\$100,000
\$-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
\$50,000	<0	<0	<0	6.2%	12.9%	19.6%	26.3%	33.0%	46.3%	59.7%
\$100,000	<0	<0	<0	1.9%	5.2%	8.5%	11.9%	15.2%	21.9%	28.6%
\$150,000	<0	<0	<0	0.4%	2.6%	4.8%	7.1%	9.3%	13.8%	18.2%
\$200,000	<0	<0	<0	<0	1.3%	3.0%	4.7%	6.3%	9.7%	13.0%
\$250,000	<0	<0	<0	<0	0.6%	1.9%	3.2%	4.6%	7.2%	9.9%
\$300,000	<0	<0	<0	<0	0.0%	1.2%	2.3%	3.4%	5.6%	7.8%
\$400,000	<0	<0	<0	<0	<0	0.2%	1.1%	1.9%	3.6%	5.3%

Table 33

The last two charts in this section summarize the relationship between educational debt, starting salaries, and NPV. The points plotted on each chart are the break-even points given in the NPV tables above. These points represent, for a given level of income, the amount of educational debt that will result in a net present value of zero and, equivalently, for a given level of debt, the starting salary that will result in a net present value of zero. An individual plotted above this line is most likely to benefit from a positive net present value of their DVM degree. Any individual

below this line is likely to have a negative net present value. For a new DVM graduate to calculate his or her minimum required starting salary, one that may mean the difference between a positive or negative Net Present Value, multiply student debt by 0.04 and add \$70,030 if male or \$53,199 if female. For example, a female graduate with \$100,000 of debt will need a starting salary of $\$100,000 \times 0.04 + \$53,199 = \$57,199$ to break even in her educational investment. A male with an equivalent debt would need \$74,030 to break even.

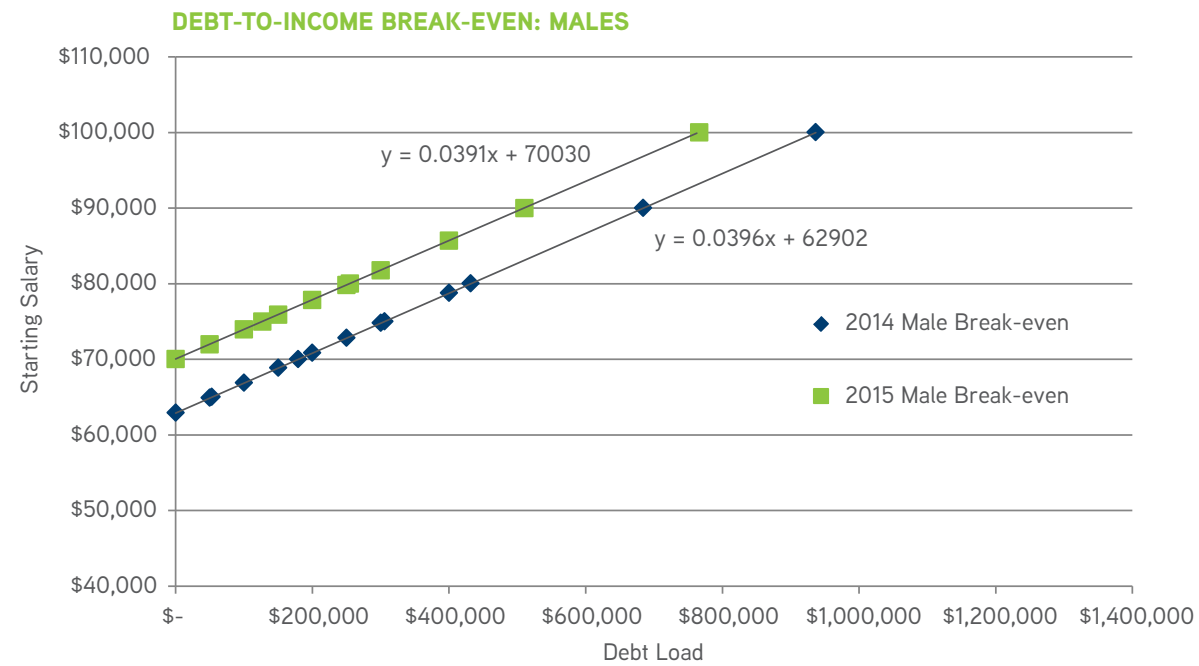


Figure 53

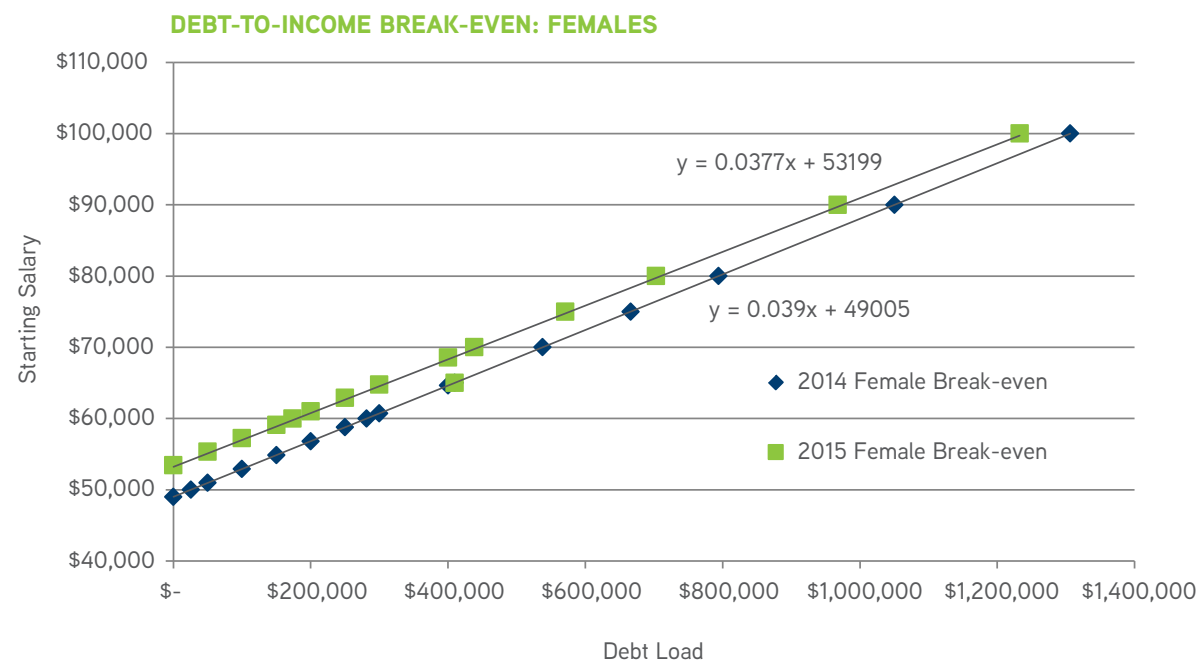


Figure 54

Overall, the financial condition of new veterinarians is declining as debt has increased faster than incomes. However, what is interesting is that, conceptually, starting salaries have kept pace with rising debt. Debt has risen from a weighted value of around \$75,000 in 2001 to \$135,000 in 2014. According to break-even graphs, the mean wage must have risen by about \$2,400 to keep the NPV at the same level. Over this time period the average real, weighted starting salary has, in fact, risen by about \$5,000. Even with a change in assumptions, this most probably indicates that starting salaries are in fact keeping pace with debt, at least at the mean.

This is not to say that the financial condition of new veterinarians is rosy. Having a debt the size of a mortgage can lead to considerable stress and can severely restrict available financial choices, as a large amount of an individual's income must be budgeted for debt service. Furthermore, these values are means, and approximately half of all new graduates are faring worse. In addition, federal student loan repayment plans are complicated, with income-based repayment plans and loan forgiveness possibly distorting financial incentives.

Taken together, all of the evidence in this section on NPV presents one possible explanation for why the sex ratio of the profession has become skewed towards a female majority in recent years. Even though females typically receive lower salaries than males, they have a higher NPV.

Why are there more males practice owners and in board certified specializations? Two possible reasons. First, these areas increase

the return on the DVM degree. As a result, those with a low financial return are seeking to increase that return. Second, because the mean return is relatively low, the only males who are entering veterinary medicine are those who see it as having especially low costs or especially high returns. Theoretically, those who spend the least amount of effort to obtain the degree have a lower cost in human capital.

Chiappori, Iyigun and Weiss (2009) created an economic model to explain the reason for an increasing proportion of females earning advanced degrees: specifically, why females outnumber males in earning doctoral-level degrees. They concluded that although there exists a wage gap at every level of education, that wage gap declines as the minimum education level increases. So at every level of education, females have a greater financial incentive compared to men to obtain higher education levels. Their model is consistent with the findings of this NPV study: females have a higher incentive to earn advanced degrees, which may explain, at least partially, is why the gender ratio in the veterinary medical profession has changed so dramatically over the last two decades.

Consider the issue in terms of starting salaries. The difference in starting salaries between males and females for college graduates is about a 20 percent gap, or \$10,000. The difference in starting salaries for male and female veterinarians in 2015 is only about \$3,000. Therefore, females are giving up less and gaining relatively more from the DVM degree, which in turn equates to a higher Net Present Value.



DISCUSSION

Of interest to economists is whether there are geographic differences in markets. As noted throughout the text, we have indicated regional differences but are unable to report on geographical differences of smaller political boundaries as the national surveys do not have enough responses to determine statistically significant differences. As a result, in 2015 we began to partner with state and other veterinary medical associations to begin to evaluate the uniformity and differences between state and national veterinary markets.

The AVMA Veterinary Economics Division (VED) also has the modeling capability to measure the value of the veterinary profession to the local economy (county, multicounty, and/or state) and has provided this capability to the states that elect to conduct the AVMA national surveys at the state level.

ECONOMIC IMPACT STUDIES

To pilot this effort, the AVMA VED chose one state association (Indiana Veterinary Medical Association (IVMA)), one practice type association (American Association of Bovine Practitioners (AABP)), and one specialty group association (American Society of Laboratory Animal Practitioners (ASLAP) and the American College of Laboratory Animal Medicine (ACLAM)) as pilot groups. Reports for each of these will be available in 2016. In addition, in 2016 the states of Arizona, Colorado and Texas were added and the reports on these efforts will be available in 2017.

The Veterinary Profession in Indiana

This study contains two parts: an analysis of the veterinary workforce in Indiana and an analysis of the state's veterinary practices on Indiana's economy (the economy-wide impacts). For the workforce study, the two AVMA national surveys discussed above, the employment and the compensation surveys, were used. The two surveys yielded response rates of 27.5 percent and 16.0 percent, respectively, for the employment and the compensation survey. The economic impact analysis used additional secondary data from the AVMA 2015 Report on Veterinary Compensation and the AVMA 2013 Report on Veterinary Practice Business Measures. The IMPLAN software was used to determine the economic contributions of the veterinary services sector in Indiana.

Unemployment in the Veterinary Industry

The unemployment rate in a given state provides insights on the overall health of the economy, but could also signal inefficiencies in a given sector of the economy. A person is considered unemployed when she is actively looking for employment with appropriate qualifications but is unable to find work. Information collected from the employment survey was used to assess the level of unemployment in the veterinary industry in Indiana. The level of unemployment of the AVMA membership survey was then used as a benchmark to compare that of the state of Indiana.

In Indiana, the percentage of people facing unemployment is higher (11.9 percent) than the AVMA sample respondents (3.3 percent). The z-score for independent group proportions indicates that the two rates are statistically different at the 5 percent significance level, with a z-value of 5.7023. The length and duration of unemployment were determined using the average number of weeks of unemployment, the average isolated number of periods of unemployment and the average total number of days of unemployment. Table 1 presents the summary statistics of the two groups. The results show that, on average, the length of unemployment is longer in Indiana than it is for the AVMA members.

Unemployment of Indiana veterinarians by gender and by first veterinary position is presented in Tables 2 and 3 and is compared with the AVMA national sample respondents. The unemployment rate is higher among males in Indiana (15.8 percent). Uniformed service is affected by unemployment more than all other sectors. About 46 percent of veterinarians in this sector are actively looking for a job - unsuccessfully.

Income and Debt

Unlike unemployment, there are few statistically significant differences in the mean work patterns, income, debt and age characteristics of the national and Indiana veterinarians. Mean practice owner incomes and variation in incomes among practitioners is similar between the U.S. and Indiana respondent populations.

LENGTH AND DURATION OF UNEMPLOYMENT IN INDIANA

	AVMA	INDIANA
How many weeks have you been unemployed in veterinary medicine?	55.72 (49.7)	68.25 (72.74)
How many isolated periods of unemployment have you had?	1.74 (1.30)	1 (0)
For approximately how many days, in total have you been unemployed during your veterinary career?	371.23 (307.5)	308.3 (409.40)

Table 34

UNEMPLOYMENT BY GENDER IN INDIANA

	Are you currently employed?			
	AVMA		INDIANA	
	YES	NO	YES	NO
FEMALE	96.20%	3.80%	92.90%	7.10%
MALE	97.60%	2.40%	84.20%	15.80%
TOTAL	96.60%	3.40%	88.10%	11.90%

Table 35

UNEMPLOYMENT OF VETERINARIANS BASED ON FIRST VETERINARY EMPLOYMENT IN INDIANA

	Are you currently employed?			
	AVMA		INDIANA	
	NO	YES	NO	YES
Food animal practice (excl.)	0.00%	100.00%	0.00%	100.00%
Food animal practice (pred.)	0.00%	100.00%	11.50%	88.50%
Mixed practice	1.60%	98.40%	8.80%	91.20%
Companion animal practice (pred.)	2.80%	97.20%	9.50%	90.50%
Companion animal practice (excl.)	3.20%	96.80%	10.30%	89.70%
Equine practice	6.30%	93.80%	16.70%	83.30%
Federal Government	0.00%	100.00%	0.00%	100.00%
Uniformed services	0.00%	100.00%	46.20%	53.80%
College or University	2.10%	97.90%	16.70%	83.30%
State/Local government	0.00%	100.00%	0.00%	100.00%
Industry/Commercial organizations	0.00%	100.00%	0.00%	100.00%
Not-for-profit organizations	10.70%	89.30%	0.00%	100.00%
Other	14.70%	85.30%	33.00%	67.00%
Currently a resident/Post-doc	3.60%	96.40%	50.00%	50.00%

Table 36

SUMMARY STATISTICS FOR PRIVATE PRACTICE OWNERS IN INDIANA

Variable	Owner			
	AVMA		IVMA	
	Mean	Std Dev	Mean	Std Dev
How many years have you been with current employer?	19.12	11.92	21.09	13.34
How many weeks did you work during 2014?	48.94	4.26	49.67	1.93
How many regular hours did you work during a typical week in 2014?	46.91	11.87	47.24	11.59
How many emergency or afterhours did you work during a typical week in 2014?	5.60	8.28	1.71	2.61
In 2014, what was your total personal income, before taxes, from all veterinary medical related activities?	\$184,434	\$161,964	\$190,197	\$177,652
Please estimate the total amount of educational debt you borrowed for your time as a veterinary medical student	\$48,080	\$57,891	\$42,861	\$100,215
How many years have you been actively repaying your educational debt?	10.55	5.56	11.33	5.51
How many years did it take you to repay your educational debt?	8.14	3.89	10.83	13.83
What is your age?	51.76	10.62	51.58	13.74

Table 37

Practice owners in Indiana are similar to those in the U.S. and appear to be on average 10 years older than non-owners. In addition, non-owners have been with their current employer roughly one-third of the time that owners have been with the

same practice. And as with the owners, the salaries of non-owners appear to be similar for both Indiana and the U.S. respondents.

SUMMARY STATISTICS FOR PRIVATE AND PUBLIC PRACTICE EMPLOYEES IN INDIANA

Variable	Non-Owner			
	AVMA		IVMA	
	Mean	Std Dev	Mean	Std Dev
How many years have you been with current employer?	6.36	7.06	7.90	9.33
How many weeks did you work during 2014?	48.19	5.06	48.01	5.87
How many regular hours did you work during a typical week in 2014?	45.89	9.46	41.32	15.71
How many emergency or afterhours did you work during a typical week in 2014?	6.32	8.94	6.62	9.81
In 2014, what was your total personal income, before taxes, from all veterinary medical related activities?	\$105,449	\$55,589	\$99,227	\$58,898
Please estimate the total amount of educational debt you borrowed for your time as a veterinary medical student	\$90,368	\$87,371	\$71,741	\$67,007
How many years have you been actively repaying your educational debt?	6.93	17.94	4.80	5.02
How many years did it take you to repay your educational debt?	8.07	4.77	7.87	4.92
What is your age?	40.26	10.93	39.34	11.75

Table 38

SUMMARY STATISTICS FOR PUBLIC SECTOR EMPLOYEES IN INDIANA

Variable	Non-Owner Public Sector			
	AVMA		IVMA	
	Mean	Std Dev	Mean	Std Dev
How many years have you been with current employer?	9.86	8.36	12.92	10.98
How many weeks did you work during 2014?	47.89	4.45	48.92	1.74
How many regular hours did you work during a typical week in 2014?	47.00	9.15	39.67	18.20
How many emergency or afterhours did you work during a typical week in 2014?	6.34	9.28	6.12	7.99
In 2014, what was your total personal income, before taxes, from all veterinary medical related activities?	\$129,302	\$70,863	\$120,223	\$47,291
Please estimate the total amount of educational debt you borrowed for your time as a veterinary medical student	\$51,925	\$67,207	\$46,333	\$50,087
How many years have you been actively repaying your educational debt?	8.29	5.88	9.14	8.40
How many years did it take you to repay your educational debt?	8.70	4.60	9.40	5.89
What is your age?	47.04	11.29	47.67	10.49

Table 39

Non-practice owner veterinarians who are working in the public sector earn more on average and have a lower debt level than non-owner private practitioners. The mean annual personal income from veterinary related activities for a veterinarian in the public sector is around \$120,223 and that for a veterinarian in the private sector is about \$88,943. But the public sector

veterinarian has a mean age significantly different from the non-owner private practitioner, with more than a 10 year mean difference in age that may contribute to the difference in mean incomes. And again, there was no statistical difference between the U.S. and Indiana veterinarians.

SUMMARY STATISTICS FOR PRIVATE PRACTICE ASSOCIATES IN INDIANA

Variable	Non-Owner Private Sector			
	AVMA		IVMA	
	Mean	Std Dev	Mean	Std Dev
How many years have you been with current employer?	4.51	5.50	5.45	7.35
How many weeks did you work during 2014?	48.36	5.21	47.57	7.04
How many regular hours did you work during a typical week in 2014?	44.80	9.77	42.83	13.28
How many emergency or afterhours did you work during a typical week in 2014?	6.50	9.18	7.00	11.19
In 2014, what was your total personal income, before taxes, from all veterinary medical related activities?	\$94,132	\$40,584	\$88,943	\$61,672
Please estimate the total amount of educational debt you borrowed for your time as a veterinary medical student	\$111,243	\$92,103	\$84,715	\$71,199
How many years have you been actively repaying your educational debt?	5.61	4.50	3.82	3.40
How many years did it take you to repay your educational debt?	8.62	7.59	6.17	3.02
What is your age?	35.96	9.12	35.27	10.13

Table 40

Economic Impact of Veterinary Services in Indiana

IMPLAN modeling software was used to determine the economic contributions of the veterinary industry to the Indiana economy, and the results are summarized in terms of direct, indirect and induced impacts.

- Direct impacts: GDP and jobs generated directly by the veterinary businesses.
- Indirect impacts: GDP and jobs generated by businesses from where veterinarians purchase their inputs (products, equipment, materials, etc.).
- Induced impacts: GDP and jobs generated by the spending patterns of those employed directly or indirectly by the veterinary businesses.

The report provides an estimate of the measurable impacts of the veterinary services sector within Indiana on the state's economy. It does not provide an estimate of the non-measurable benefits associated with the provision of veterinary services in the state. These non-measurable veterinary services include services such as reduced health care costs associated with lower incidence of zoonotic diseases, the positive impacts on human health from an improved human-animal experience, or lower prices of protein resulting from lower incidence of morbidity or mortality in food animals. The non-measurable impacts may exceed the value of the measurable impacts provided here.

Effects on Employment

We distinguished between jobs directly linked to veterinary services and indirectly related jobs. Direct jobs are employed veterinarians and all persons employed in the veterinary practices. Our estimate indicates that the veterinary services sector generates a total of 12,745 jobs in the state of Indiana, with 9,901 being directly related to veterinary services, about 983 indirect jobs and approximately 1,860 induced jobs.

Effects on Labor Income

The direct effect on labor income is the total amount of money injected into the economy as payroll by the veterinary services sector. This amount of money is estimated at \$254,238,000. Because some sectors outside of the veterinary service sector provide intermediate inputs to the veterinary service sector, indirect effects on employee compensation exist that must be accounted for in the total compensation effect. These indirect effects and the induced effects at the state level are \$50,459,840 and \$75,804,088, respectively. That is, some \$50 million is paid to employees that provide goods and service to veterinary practices (e.g., pharmaceutical sales reps, builders that construct veterinary practices or repairmen that fix problems at the practices) and another \$75 million is paid to the labor that provides general goods and services to those who are directly or

indirectly involved with the sector (e.g., fast-food workers, gas station attendants, retail outlet laborers).

Effects on Total Value Added

The total value added as a result of the existence of the veterinary services sector in the state of Indiana is estimated at \$652,874,177, with the direct effects corresponding to approximately \$439,024,550, the indirect effects at \$76,730,550 and the induced effects at about \$137,119,050. The direct effects represent the total value of goods and services sold by veterinary practices less the cost of those goods and services.

Effects on Output

The total industry output is the dollar value of all services produced by the veterinary services sector. The overall effect to the state of Indiana is worth \$1,076,603,121. The value of total value added as a percent of total industry output is roughly 43 percent and represents the return to capital, management and land for all veterinary practices before amortization, depreciation, interest and taxes.

Effects on State and Local Taxes

Part of the employee compensation is paid to the state government in the form of taxes. In total, the state receives \$281,221 from employees whose income is paid by the veterinary services sector. Products produced by the veterinary services and related industries are also taxed in the form of tax on production or tax on imports. From these types of taxes, the state of Indiana receives \$19,697,453 annually. Households and corporations also pay taxes for their links to the veterinary sectors or because they are using veterinary services. Examples of such taxes can be pet taxes, pet food taxes or veterinary service taxes paid by households. This analysis shows that in Indiana, households are paying (each year) an equivalent of an estimated \$10,429,509 in taxes due to the existence of the veterinary services sector. Corporations are paying \$1,999,835 per year.

Effects on Federal Taxes

Workers in Indiana also pay federal income taxes, both in the form of taxes on employee compensation and in an additional category of "Proprietor income tax." This tax is paid, for instance, by the veterinary hospital owners. In total, Indiana received an estimated \$6,658,829 of proprietor income taxes for the year 2014. The total employee compensation taxes paid to the federal government are estimated at \$26,491,729. The taxes on production and imports are approximately \$2.5 million. Households and corporations pay to the federal government \$23,918,613 and \$17,824,206, respectively.

CONCLUSION

Data shows a tightening in the market for veterinarians. While the 2015 unemployment rate increased from 2014, the difference is not statistically significant. Men continue to want to work additional hours per week while women continue to want to work fewer, with the overall weighted average desired change in hours would require an additional 1,833 veterinarians working 40-hour work weeks, up from 1,655 in 2014. Also on the positive side, well-being is a major issue in the market for veterinarians, and, while there is a lack of data to create a time trend, burn-out does not seem to be a major factor for the vast majority of veterinarians. Despite recent graduates devoting an average of 10.6 percent of their gross income to servicing their student loan debts, their other expenditure patterns appear normal and health-related issues are not a problem for most veterinarians.

Veterinarians' incomes and the value of the DVM degree continue to be important issues for the profession. Through an econometric study outlined above, there is still no evidence

that internships affect income later in a veterinarian's career. Despite the improving market for veterinarians, the Net Present Value of the DVM degree has been declining since tracking started in 2010, mainly due to the relative success of bachelor's degree holders. Lastly, veterinary services play a large part in the economy and the AVMA is conducting an impact analysis studies around the country. The initial finding out of the state of Indiana is that the effect of veterinary practices on the economy of Indiana is large, contributing to three-tenths of a percent of the state's total output.

Overall the market for veterinarians is improving, with incomes increasing and underemployment declining. However, pressures on the market for veterinarians include the rising level of educational debt, rising outside opportunities, and well-being metrics that must be carefully collected and tracked in the future.

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APPENDIX

RECENT GRADUATE EXPENDITURE CATEGORIES

Income	Vehicle Insurance Premium	Job Search Expenses
Personal Income	Vehicle Repairs Maintenance	Recreation and Leisure
Spouse/Partner Income	Fuel	Periodicals and Personal Reading
Supplemental Income	Driver License Fees	Vacation Expenses
Federal and State Taxes	Vehicle Registration Fees	Entertainment
Federal Taxes (Calculated)	Parking Fees, Tolls, Etc	Gym Membership
State Taxes (Calculated)	Public Transit Costs	Sports Clubs
Student Loan Payments	Food	Civic Organizations
Student Loan Payments	Groceries	Cable or Satellite TV
Credit Card Debt Payments	Dining Out	Internet
Credit Card Payments	Healthcare, Insurance and Medicare	Cell Phone
Housing	General Health Care	Savings, Retirement and Social Security
Mortgage	Dental Care	Personal Savings
Property Taxes	Vision Care	Other Investments
Homeowners Insurance	Prescriptions and OTC Medications	Other Retirement Contributions
Homeowners Association Fees	HAS and FSA Contributions	Social Security (Calculated)
Home Repairs and Maintenance	Life Insurance	Personal and Miscellaneous
Rent	LongTerm Disability Insurance	Gifts, Flowers, and Cards
Renters Insurance	Other HealthCare Expenses	Charitable Gifts
Moving and Storage Expenses	Medicare (Calculated)	Health and Beauty Expenses
Home Furnishings	Professional Development	Clothing and Accessories for Self
Other Insurance	Tuition and Fees	Clothing and Accessories for Significant
Landline Phone	Textbooks	Other
Heating Gas	CE Fees	Misc Financial Fees
Heating Oil	CE Travel Expenses	Other Debt Payments
Electricity	Local Regional VMA Memberships	Pet Expenses
Water	State VMA Memberships	Pet Medical Care
Sewer	AVMA or SAVMA Membership	Pet Expenses non-Medical
Garbage Removal	Specialty Organization Memberships	Child Care
Transportation	State Veterinary License Fees	Daycare and Nanny
Vehicle Loan Payment	DEA License Fee	Children's Education
Vehicle Purchase Down Payment	CSR License Fees	Diapers
Vehicle Lease	Professional Liability Insurance	Clothing and Accessories for Children

A1

SELF-SCORED COMPETENCIES, BY COLLEGE

	National		Auburn University		Tuskegee University		UC-Davis		Colorado State University		University of Florida	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Physical examination	4.20	1187	4.18	39	4.00	16	4.42	45	3.70	63	4.18	22
History taking	4.35	1186	4.08	39	4.06	16	4.27	45	4.30	63	4.59	22
Diagnosis of lameness	3.49	1177	3.54	39	3.20	15	3.53	45	3.69	62	3.64	22
Diagnosis/Treatment of parasitic diseases	3.85	1183	4.18	38	4.13	16	3.67	45	3.31	62	4.09	22
Anesthesia	3.88	1181	3.54	39	3.56	16	3.71	45	4.10	62	4.32	22
Fluid therapy	3.80	1182	3.67	39	3.50	16	4.04	45	3.95	62	3.77	22
Intravenous injection	4.03	1180	3.61	38	4.00	16	4.36	45	3.90	63	4.45	22
Development/Adaptation of vaccination protocols	3.64	1182	3.92	39	3.88	16	3.78	45	3.65	62	4.05	22
Advising clients on nutrition	2.99	1185	2.87	39	3.13	16	3.13	45	2.94	62	3.36	22
Developing diagnostic plans for difficult cases	3.65	1187	3.44	39	3.38	16	3.69	45	3.61	62	3.68	22
Investigation of potential toxin exposure	3.16	1183	3.15	39	3.31	16	3.41	44	3.29	63	2.91	22
Prescribing medications	3.66	1185	3.51	39	3.88	16	3.67	45	3.79	62	3.71	21
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Physical examination	4.35	1156	4.44	39	4.13	15	4.26	43	4.16	62	4.40	20
History taking	4.42	1160	4.23	39	4.25	16	4.23	44	4.44	63	4.65	20
Diagnosis of lameness	3.66	1138	3.87	39	3.40	15	3.42	43	3.90	62	3.55	20
Diagnosis/Treatment of parasitic diseases	4.00	1147	4.36	39	4.31	16	3.75	44	3.62	60	4.25	20
Anesthesia	3.95	1143	3.89	38	3.94	16	3.84	43	4.30	61	4.26	19
Fluid therapy	3.96	1138	4.05	39	4.06	16	3.93	42	4.13	61	3.74	19
Intravenous injection	4.37	1147	4.26	38	4.31	16	4.40	43	4.40	63	4.74	19
Development/Adaptation of vaccination protocols	4.00	1127	4.36	39	4.13	15	4.00	42	3.92	59	4.05	20
Advising clients on nutrition	3.32	1143	3.47	38	3.63	16	3.30	43	3.31	61	3.47	19
Developing diagnostic plans for difficult cases	3.88	1159	4.08	39	4.25	16	3.84	44	3.89	62	3.90	20
Investigation of potential toxin exposure	3.41	1137	3.55	38	3.88	16	3.60	43	3.52	61	3.30	20
Prescribing medications	4.07	1153	4.28	39	4.31	16	3.84	43	4.16	61	4.06	17

	National		Auburn University		Tuskegee University		UC-Davis		Colorado State University		University of Florida	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Interpretation of cytologic specimens	3.30	1176	3.28	39	3.38	16	3.50	44	3.27	63	3.86	22
Interpretation of post-mortem specimens	3.49	1168	3.21	39	3.69	16	3.74	43	3.54	63	3.50	22
Interpretation of ultrasound examinations	2.63	1164	3.38	39	2.63	16	3.69	45	2.66	62	3.33	21
Interpretation of radiographs	3.61	1178	3.54	39	4.13	16	3.82	45	3.37	63	3.77	22
Interpretation of hematologic values	3.92	1176	3.85	39	3.94	16	3.82	45	3.87	63	4.14	22
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Interpretation of cytologic specimens	3.30	1139	3.36	39	3.06	16	3.23	44	3.32	63	3.50	20
Interpretation of post-mortem specimens	3.32	1017	3.33	36	3.00	14	3.48	40	3.42	57	3.55	20
Interpretation of ultrasound examinations	2.90	1052	3.50	32	2.47	15	3.43	42	3.08	59	3.50	16
Interpretation of radiographs	3.60	1129	3.66	38	3.94	16	3.56	43	3.68	63	3.63	19
Interpretation of hematologic values	3.97	1147	3.85	39	3.88	16	3.91	44	4.13	62	3.95	20
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Diagnosis/Therapy of gastrointestinal disease	3.76	1165	3.72	39	3.88	16	3.93	43	3.61	62	4.18	22
Diagnosis/Therapy of dermatological disease	3.46	1163	3.85	39	3.69	16	3.44	43	3.31	62	3.95	22
Diagnosis/Therapy of endocrine disease	3.55	1164	3.67	39	3.81	16	3.65	43	3.40	62	3.55	22
Diagnosis/Therapy of cardiac disease	3.27	1164	3.08	39	3.63	16	3.23	43	3.24	62	3.36	22
Diagnosis/Therapy of respiratory disease	3.37	1165	3.38	39	3.69	16	3.53	43	3.27	62	3.50	22
Diagnosis/Therapy of renal disease	3.76	1162	3.77	39	3.88	16	3.88	43	3.62	61	3.91	22
Diagnosis/Therapy of neurological disease	3.36	1166	3.44	39	2.94	16	3.77	43	3.21	62	3.05	22
Diagnosis/Therapy of ocular disorders	3.19	1164	2.69	39	3.00	16	3.79	43	3.08	62	3.55	22

	National		Auburn University		Tuskegee University		UC-Davis		Colorado State University		University of Florida	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Diagnosis/Therapy of gastrointestinal disease	4.00	1136	4.08	39	4.13	16	3.95	42	3.97	62	4.20	20
Diagnosis/Therapy of dermatological disease	3.67	1126	4.03	39	4.06	16	3.55	42	3.57	60	4.16	19
Diagnosis/Therapy of endocrine disease	3.71	1122	4.03	39	4.13	16	3.62	42	3.74	61	3.74	19
Diagnosis/Therapy of cardiac disease	3.42	1121	3.54	39	3.88	16	3.24	42	3.40	62	3.20	20
Diagnosis/Therapy of respiratory disease	3.56	1132	3.79	38	3.94	16	3.55	42	3.52	62	3.55	20
Diagnosis/Therapy of renal disease	3.98	1119	4.05	39	4.19	16	3.95	42	3.95	61	4.10	20
Diagnosis/Therapy of neurological disease	3.43	1131	3.56	39	3.06	16	3.64	42	3.50	62	3.10	20
Diagnosis/Therapy of ocular disorders	3.30	1127	3.23	39	3.31	16	3.64	42	3.25	61	3.45	20
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Orthopedic surgery	2.02	1136	2.51	39	2.69	16	1.76	38	1.87	61	2.59	22
Soft tissue surgery	3.01	1165	3.28	39	3.88	16	2.91	43	2.53	62	3.59	22
Spay/Neuter	3.65	1161	3.54	39	4.00	16	3.69	42	3.05	62	4.18	22
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Orthopedic surgery	2.25	881	2.55	33	2.67	12	1.89	28	2.38	50	2.61	18
Soft tissue surgery	3.52	1094	4.03	39	4.00	15	3.36	39	3.34	59	4.00	19
Spay/Neuter	4.02	1075	4.36	39	4.20	15	4.03	37	3.63	59	4.58	19
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Management of reproductive programs	2.70	1121	3.21	38	2.87	15	2.58	38	2.51	59	3.05	21
Evaluation of disease outbreaks	2.95	1129	2.97	38	2.87	15	2.78	40	3.00	60	3.24	21
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Management of reproductive programs	2.77	858	3.03	31	2.62	13	2.69	29	2.40	47	2.94	16
Evaluation of disease outbreaks	3.00	894	3.13	31	2.92	13	3.10	30	2.78	51	3.72	18

	National		Auburn University		Tuskegee University		UC-Davis		Colorado State University		University of Florida	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Evaluation of new drugs/products	3.18	1158	3.31	39	3.19	16	3.18	44	3.03	62	3.27	22
Interpretation of medical literature	3.69	1167	3.79	39	3.25	16	3.57	44	3.57	63	4.18	22
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Evaluation of new drugs/products	3.58	1110	3.74	39	3.75	16	3.46	41	3.38	61	3.50	20
Interpretation of medical literature	3.80	1142	3.97	39	3.56	16	3.64	42	3.79	63	4.15	20
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Dealing with people	3.49	1171	3.05	39	3.63	16	3.59	44	3.97	63	3.55	22
Veterinary Medicine as a business	2.53	1166	2.08	39	2.06	16	2.58	43	2.90	62	3.18	22
Giving educational presentations to the community	2.93	1116	3.08	38	2.87	15	2.92	39	2.92	61	2.71	21
Client Communications	3.74	1171	3.77	39	3.87	15	3.73	44	4.14	63	3.95	22
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Dealing with people	4.07	1158	4.05	38	3.56	16	4.14	44	4.30	63	4.00	20
Veterinary Medicine as a business	2.98	1089	2.97	39	2.57	14	3.00	41	3.23	60	3.35	20
Giving educational presentations to the community	3.51	971	3.81	32	2.92	13	3.59	34	3.42	57	3.28	18
Client Communications	4.18	1152	4.36	39	3.88	16	4.23	43	4.40	62	3.95	20

	National		University of Georgia		University of Illinois		Iowa State University		Kansas State University		Louisiana State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Physical examination	4.20	1187	4.40	40	4.05	44	4.28	53	3.92	38	3.96	26
History taking	4.35	1186	4.36	39	4.18	44	4.38	52	4.18	38	4.04	25
Diagnosis of lameness	3.49	1177	3.58	40	3.45	44	3.25	51	3.43	37	3.58	24
Diagnosis/Treatment of parasitic diseases	3.85	1183	4.35	40	3.61	44	3.69	52	4.21	38	4.00	26
Anesthesia	3.88	1181	3.90	39	3.72	43	3.62	53	3.78	36	3.92	26
Fluid therapy	3.80	1182	4.03	39	3.61	44	3.62	53	3.54	37	3.72	25
Intravenous injection	4.03	1180	4.25	40	3.89	44	4.02	53	4.00	36	4.00	26
Development/Adaptation of vaccination protocols	3.64	1182	4.20	40	2.75	44	3.51	51	3.47	38	3.44	25
Advising clients on nutrition	2.99	1185	3.67	39	2.55	44	2.49	53	2.46	37	2.73	26
Developing diagnostic plans for difficult cases	3.65	1187	3.78	40	3.57	44	3.53	53	3.13	38	3.65	26
Investigation of potential toxin exposure	3.16	1183	3.35	40	3.23	44	3.08	51	2.71	38	3.31	26
Prescribing medications	3.66	1185	3.75	40	3.39	44	3.49	53	3.55	38	3.73	26
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Physical examination	4.35	1156	4.56	39	4.36	42	4.35	51	4.11	38	4.50	24
History taking	4.42	1160	4.58	40	4.42	43	4.31	51	4.22	37	4.38	24
Diagnosis of lameness	3.66	1138	3.76	38	3.51	41	3.42	48	3.42	38	4.00	23
Diagnosis/Treatment of parasitic diseases	4.00	1147	4.45	38	3.81	43	3.70	50	4.05	38	4.33	24
Anesthesia	3.95	1143	4.13	38	3.74	42	3.61	51	3.78	37	4.13	24
Fluid therapy	3.96	1138	4.21	38	3.83	42	3.82	49	3.76	37	4.09	23
Intravenous injection	4.37	1147	4.49	39	4.40	42	4.18	50	4.30	37	4.63	24
Development/Adaptation of vaccination protocols	4.00	1127	4.41	37	3.78	41	3.94	49	3.63	38	4.13	23
Advising clients on nutrition	3.32	1143	3.71	38	3.27	41	2.88	49	3.00	37	3.08	24
Developing diagnostic plans for difficult cases	3.88	1159	3.85	39	3.84	43	3.78	51	3.66	38	3.92	24
Investigation of potential toxin exposure	3.41	1137	3.45	40	3.54	41	3.31	48	2.95	38	3.79	24
Prescribing medications	4.07	1153	4.08	40	4.05	42	3.82	51	3.95	38	4.29	24

	National		University of Georgia		University of Illinois		Iowa State University		Kansas State University		Louisiana State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Interpretation of cytologic specimens	3.30	1176	3.21	39	3.47	43	3.13	52	2.89	37	3.12	25
Interpretation of post-mortem specimens	3.49	1168	3.53	40	3.30	43	3.57	51	3.43	37	3.40	25
Interpretation of ultrasound examinations	2.63	1164	2.54	37	2.47	43	1.98	50	2.42	36	2.48	25
Interpretation of radiographs	3.61	1178	3.72	39	3.56	43	3.33	52	3.41	37	3.68	25
Interpretation of hematologic values	3.92	1176	3.80	40	3.81	43	3.75	52	3.67	36	3.72	25
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Interpretation of cytologic specimens	3.30	1139	3.33	40	3.44	41	3.22	50	3.05	37	3.30	23
Interpretation of post-mortem specimens	3.32	1017	3.22	37	2.92	37	3.60	43	3.36	33	3.36	22
Interpretation of ultrasound examinations	2.90	1052	2.79	33	2.50	36	2.69	45	2.44	34	2.65	23
Interpretation of radiographs	3.60	1129	3.56	39	3.43	40	3.48	50	3.30	37	3.91	23
Interpretation of hematologic values	3.97	1147	3.72	39	4.10	42	3.86	51	3.56	36	3.78	23
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Diagnosis/Therapy of gastrointestinal disease	3.76	1165	4.05	40	3.53	43	3.54	52	3.55	38	3.76	25
Diagnosis/Therapy of dermatological disease	3.46	1163	3.73	40	3.33	43	3.75	52	3.14	37	4.00	25
Diagnosis/Therapy of endocrine disease	3.55	1164	3.75	40	3.63	43	3.33	52	3.35	37	3.48	25
Diagnosis/Therapy of cardiac disease	3.27	1164	3.31	39	2.12	43	3.19	52	2.73	37	3.32	25
Diagnosis/Therapy of respiratory disease	3.37	1165	3.35	40	2.84	43	3.33	52	3.21	38	3.52	25
Diagnosis/Therapy of renal disease	3.76	1162	3.70	40	3.58	43	3.45	51	3.54	37	3.80	25
Diagnosis/Therapy of neurological disease	3.36	1166	3.80	40	2.40	43	3.17	52	2.89	38	3.04	25
Diagnosis/Therapy of ocular disorders	3.19	1164	3.48	40	3.88	43	2.86	51	3.24	37	3.52	25

	National		University of Georgia		University of Illinois		Iowa State University		Kansas State University		Louisiana State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Diagnosis/Therapy of gastrointestinal disease	4.00	1136	4.24	38	3.88	41	3.84	50	3.87	38	4.13	23
Diagnosis/Therapy of dermatological disease	3.67	1126	3.87	38	3.66	41	3.76	50	3.41	37	4.22	23
Diagnosis/Therapy of endocrine disease	3.71	1122	3.79	38	3.88	41	3.45	49	3.54	37	3.61	23
Diagnosis/Therapy of cardiac disease	3.42	1121	3.54	37	3.05	41	3.24	50	3.11	37	3.43	23
Diagnosis/Therapy of respiratory disease	3.56	1132	3.45	38	3.24	41	3.60	50	3.43	37	3.83	23
Diagnosis/Therapy of renal disease	3.98	1119	3.92	38	4.02	41	3.75	48	3.65	37	3.91	23
Diagnosis/Therapy of neurological disease	3.43	1131	3.82	38	2.93	41	3.34	50	3.18	38	3.52	23
Diagnosis/Therapy of ocular disorders	3.30	1127	3.45	38	3.79	42	3.27	49	3.24	37	3.74	23
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Orthopedic surgery	2.02	1136	1.97	34	1.61	41	1.96	51	1.65	37	1.88	25
Soft tissue surgery	3.01	1165	2.97	38	2.49	43	3.37	52	2.32	37	3.28	25
Spay/Neuter	3.65	1161	3.21	38	3.26	43	4.12	52	3.05	37	3.76	25
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Orthopedic surgery	2.25	881	2.30	27	1.84	32	2.16	37	2.19	32	2.19	21
Soft tissue surgery	3.52	1094	3.74	35	3.13	40	3.79	48	3.14	37	3.55	22
Spay/Neuter	4.02	1075	4.08	37	3.90	41	4.21	47	3.84	37	3.95	21
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Management of reproductive programs	2.70	1121	2.86	37	2.33	42	2.76	50	2.36	36	2.88	25
Evaluation of disease outbreaks	2.95	1129	3.00	37	2.76	41	3.08	50	2.71	38	2.96	25

	National		University of Georgia		University of Illinois		Iowa State University		Kansas State University		Louisiana State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Management of reproductive programs	2.77	858	3.00	27	2.33	30	2.98	43	2.69	26	3.10	20
Evaluation of disease outbreaks	3.00	894	3.23	30	2.55	31	3.13	45	2.77	31	3.20	20
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Evaluation of new drugs/products	3.18	1158	3.25	40	2.93	43	3.10	50	2.84	38	3.13	24
Interpretation of medical literature	3.69	1167	3.70	40	3.33	43	3.55	53	3.27	37	3.24	25
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Evaluation of new drugs/products	3.58	1110	3.68	38	3.37	41	3.64	47	3.31	36	3.77	22
Interpretation of medical literature	3.80	1142	3.77	39	3.43	42	3.61	51	3.61	36	3.78	23
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Dealing with people	3.49	1171	3.80	40	3.37	43	3.08	52	2.71	38	3.42	24
Veterinary Medicine as a business	2.53	1166	2.78	40	2.23	43	2.10	51	1.74	38	3.16	25
Giving educational presentations to the community	2.93	1116	2.86	37	2.53	43	2.76	51	2.26	35	3.17	24
Client Communications	3.74	1171	4.08	40	3.37	43	3.33	52	3.21	38	3.71	24
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Dealing with people	4.07	1158	4.35	40	3.88	42	3.60	52	3.55	38	4.08	24
Veterinary Medicine as a business	2.98	1089	3.35	40	2.63	41	2.73	45	2.37	38	3.36	22
Giving educational presentations to the community	3.51	971	3.57	35	3.17	35	3.46	46	2.97	31	3.76	21
Client Communications	4.18	1152	4.43	40	4.05	43	3.80	51	3.66	38	4.39	23

	National		Tufts University		Michigan State University		University of Minnesota		Mississippi State University		Purdue University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Physical examination	4.20	1187	4.28	43	4.17	46	4.03	34	4.45	20	4.43	23
History taking	4.35	1186	4.42	43	4.30	46	4.34	35	4.60	20	4.65	23
Diagnosis of lameness	3.49	1177	3.45	42	3.48	46	3.27	33	3.65	20	4.09	23
Diagnosis/Treatment of parasitic diseases	3.85	1183	3.51	43	3.54	46	3.47	34	4.35	20	3.78	23
Anesthesia	3.88	1181	4.21	43	3.80	46	3.29	34	4.45	20	4.13	23
Fluid therapy	3.80	1182	3.88	43	3.87	46	3.68	34	4.35	20	4.30	23
Intravenous injection	4.03	1180	3.84	43	3.76	46	4.00	33	4.45	20	4.43	23
Development/Adaptation of vaccination protocols	3.64	1182	2.86	43	3.11	46	3.76	34	4.15	20	3.91	23
Advising clients on nutrition	2.99	1185	3.84	43	2.78	46	2.74	35	3.25	20	2.83	23
Developing diagnostic plans for difficult cases	3.65	1187	3.86	43	3.44	45	3.41	34	3.90	20	4.04	23
Investigation of potential toxin exposure	3.16	1183	3.37	43	2.65	46	3.09	34	3.55	20	3.22	23
Prescribing medications	3.66	1185	4.02	43	3.48	46	3.18	34	3.95	20	3.96	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Physical examination	4.35	1156	4.33	43	4.18	45	4.29	34	4.40	20	4.41	22
History taking	4.42	1160	4.53	43	4.27	45	4.37	35	4.47	19	4.50	22
Diagnosis of lameness	3.66	1138	3.67	42	3.73	45	3.59	32	3.84	19	4.05	22
Diagnosis/Treatment of parasitic diseases	4.00	1147	3.79	43	3.66	44	3.94	34	4.39	18	3.95	21
Anesthesia	3.95	1143	4.00	43	3.84	45	3.76	33	4.30	20	4.05	21
Fluid therapy	3.96	1138	3.93	43	3.98	45	3.79	33	4.32	19	4.32	22
Intravenous injection	4.37	1147	4.26	43	4.16	45	4.32	34	4.25	20	4.62	21
Development/Adaptation of vaccination protocols	4.00	1127	3.56	43	3.41	44	4.25	32	4.30	20	4.40	20
Advising clients on nutrition	3.32	1143	3.95	43	3.00	45	3.09	35	3.50	20	3.30	20
Developing diagnostic plans for difficult cases	3.88	1159	3.98	43	3.60	45	3.68	34	4.11	19	4.05	22
Investigation of potential toxin exposure	3.41	1137	3.31	42	2.93	44	3.47	32	3.80	20	3.38	21
Prescribing medications	4.07	1153	4.12	43	3.98	44	4.03	34	4.45	20	4.18	22

	National		Tufts University		Michigan State University		University of Minnesota		Mississippi State University		Purdue University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Interpretation of cytologic specimens	3.30	1176	3.67	43	3.22	45	2.74	34	3.25	20	3.26	23
Interpretation of post-mortem specimens	3.49	1168	3.42	43	3.24	45	3.56	34	3.80	20	3.74	23
Interpretation of ultrasound examinations	2.63	1164	3.09	43	2.56	45	2.48	33	2.60	20	2.04	23
Interpretation of radiographs	3.61	1178	3.86	43	3.38	45	3.32	34	3.45	20	3.65	23
Interpretation of hematologic values	3.92	1176	4.19	43	3.89	45	3.94	34	3.70	20	4.41	22
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Interpretation of cytologic specimens	3.30	1139	3.53	43	3.35	43	2.97	31	3.60	20	2.91	22
Interpretation of post-mortem specimens	3.32	1017	3.15	33	3.14	37	3.45	31	3.67	18	3.32	19
Interpretation of ultrasound examinations	2.90	1052	2.95	41	2.87	39	2.60	30	2.88	16	2.75	20
Interpretation of radiographs	3.60	1129	3.56	43	3.47	43	3.28	32	3.90	20	3.39	23
Interpretation of hematologic values	3.97	1147	4.21	43	3.74	43	4.00	33	4.00	20	4.18	22
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Diagnosis/Therapy of gastrointestinal disease	3.76	1165	3.80	40	3.53	45	3.68	34	3.85	20	4.04	23
Diagnosis/Therapy of dermatological disease	3.46	1163	3.10	40	3.09	46	3.88	34	3.55	20	2.43	23
Diagnosis/Therapy of endocrine disease	3.55	1164	3.80	40	3.46	46	3.41	34	4.00	20	3.70	23
Diagnosis/Therapy of cardiac disease	3.27	1164	3.88	40	3.13	46	3.32	34	3.15	20	2.91	23
Diagnosis/Therapy of respiratory disease	3.37	1165	3.48	40	2.98	46	3.47	34	3.55	20	3.61	23
Diagnosis/Therapy of renal disease	3.76	1162	4.23	40	3.57	46	3.88	34	3.90	20	4.13	23
Diagnosis/Therapy of neurological disease	3.36	1166	4.00	40	2.78	46	3.00	34	3.60	20	3.83	23
Diagnosis/Therapy of ocular disorders	3.19	1164	3.40	40	2.93	46	2.94	34	2.75	20	3.70	23

	National		Tufts University		Michigan State University		University of Minnesota		Mississippi State University		Purdue University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Diagnosis/Therapy of gastrointestinal disease	4.00	1136	3.85	40	3.84	45	4.00	32	4.20	20	4.04	23
Diagnosis/Therapy of dermatological disease	3.67	1126	3.25	40	3.29	45	4.00	32	3.95	20	3.05	22
Diagnosis/Therapy of endocrine disease	3.71	1122	3.74	39	3.69	45	3.63	32	4.00	20	3.78	23
Diagnosis/Therapy of cardiac disease	3.42	1121	3.65	40	3.22	45	3.48	31	3.45	20	2.96	23
Diagnosis/Therapy of respiratory disease	3.56	1132	3.43	40	3.31	45	3.66	32	3.85	20	3.61	23
Diagnosis/Therapy of renal disease	3.98	1119	4.18	40	3.76	45	4.07	30	4.10	20	4.09	23
Diagnosis/Therapy of neurological disease	3.43	1131	3.58	40	3.00	45	3.22	32	3.60	20	3.74	23
Diagnosis/Therapy of ocular disorders	3.30	1127	3.08	40	3.13	45	3.25	32	3.25	20	3.45	22
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Orthopedic surgery	2.02	1136	2.15	41	1.93	46	1.82	33	2.89	19	2.41	22
Soft tissue surgery	3.01	1165	2.95	41	3.02	46	2.94	34	4.00	19	3.43	23
Spay/Neuter	3.65	1161	3.34	41	3.46	46	3.62	34	4.80	20	4.39	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Orthopedic surgery	2.25	881	2.26	27	2.29	38	2.09	23	2.75	16	2.50	18
Soft tissue surgery	3.52	1094	3.33	40	3.49	45	3.47	30	4.21	19	3.78	23
Spay/Neuter	4.02	1075	3.71	41	3.91	43	4.14	29	4.58	19	4.50	22
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Management of reproductive programs	2.70	1121	2.38	39	2.16	45	3.06	31	3.40	20	2.57	23
Evaluation of disease outbreaks	2.95	1129	2.70	40	2.53	45	3.03	32	3.40	20	3.26	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Management of reproductive programs	2.77	858	2.26	27	2.23	31	3.43	21	3.26	19	2.90	20
Evaluation of disease outbreaks	3.00	894	2.70	27	2.62	34	3.50	24	3.38	16	3.32	19

	National		Tufts University		Michigan State University		University of Minnesota		Mississippi State University		Purdue University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Evaluation of new drugs/products	3.18	1158	3.25	40	2.74	46	3.00	33	3.45	20	3.96	23
Interpretation of medical literature	3.69	1167	4.10	41	3.46	46	3.53	34	4.00	20	4.30	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Evaluation of new drugs/products	3.58	1110	3.63	40	3.30	43	3.63	32	3.75	20	4.09	22
Interpretation of medical literature	3.80	1142	3.93	41	3.64	45	3.67	33	4.00	20	4.09	22
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Dealing with people	3.49	1171	3.61	41	3.22	46	3.59	34	3.75	20	3.65	23
Veterinary Medicine as a business	2.53	1166	2.65	40	2.40	45	2.56	34	3.60	20	3.17	23
Giving educational presentations to the community	2.93	1116	2.92	36	3.04	45	2.97	34	3.39	18	3.68	22
Client Communications	3.74	1171	3.71	41	3.65	46	3.65	34	4.10	20	3.96	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Dealing with people	4.07	1158	4.29	41	4.00	44	4.09	33	3.85	20	4.09	23
Veterinary Medicine as a business	2.98	1089	2.92	37	2.85	41	2.97	32	3.45	20	3.30	23
Giving educational presentations to the community	3.51	971	3.27	33	3.59	37	3.44	27	3.43	14	3.80	20
Client Communications	4.18	1152	4.12	41	4.14	44	4.12	33	4.25	20	4.00	23

	National		Cornell Veterinary College		Oklahoma State University		University of Pennsylvania		Texas A&M University		Washington State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Physical examination	4.20	1187	4.48	48	4.05	20	4.27	33	4.46	37	4.14	37
History taking	4.35	1186	4.52	48	4.35	20	4.30	33	4.54	37	4.30	37
Diagnosis of lameness	3.49	1177	3.53	49	3.25	20	2.97	33	3.76	37	3.32	37
Diagnosis/Treatment of parasitic diseases	3.85	1183	3.69	48	4.25	20	3.55	33	4.05	37	3.92	37
Anesthesia	3.88	1181	3.67	48	3.75	20	3.42	33	4.05	37	3.78	37
Fluid therapy	3.80	1182	4.04	48	3.80	20	3.67	33	3.86	37	3.62	37
Intravenous injection	4.03	1180	3.92	48	3.65	20	3.73	33	4.30	37	3.76	37
Development/Adaptation of vaccination protocols	3.64	1182	3.79	48	3.65	20	3.48	33	3.95	37	3.89	36
Advising clients on nutrition	2.99	1185	2.98	48	2.70	20	2.72	32	3.24	37	2.81	36
Developing diagnostic plans for difficult cases	3.65	1187	4.02	48	3.55	20	3.42	33	3.97	37	3.73	37
Investigation of potential toxin exposure	3.16	1183	3.10	48	3.45	20	3.00	33	3.11	37	3.78	37
Prescribing medications	3.66	1185	3.88	48	3.35	20	3.45	33	3.65	37	3.75	36
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Physical examination	4.35	1156	4.52	48	4.16	19	4.50	32	4.51	37	4.26	35
History taking	4.42	1160	4.65	48	4.21	19	4.56	32	4.51	37	4.14	35
Diagnosis of lameness	3.66	1138	3.65	49	3.68	19	3.25	32	3.76	37	3.43	35
Diagnosis/Treatment of parasitic diseases	4.00	1147	3.69	48	4.42	19	3.69	32	4.22	37	3.80	35
Anesthesia	3.95	1143	3.67	48	4.00	19	3.63	30	4.11	37	3.91	34
Fluid therapy	3.96	1138	4.02	48	3.95	19	3.81	32	4.11	37	3.56	34
Intravenous injection	4.37	1147	4.29	48	4.42	19	4.22	32	4.46	37	3.97	34
Development/Adaptation of vaccination protocols	4.00	1127	4.08	48	3.84	19	3.74	31	4.28	36	3.91	35
Advising clients on nutrition	3.32	1143	3.29	48	3.37	19	2.97	32	3.73	37	3.03	35
Developing diagnostic plans for difficult cases	3.88	1159	4.02	48	3.89	19	3.56	32	4.03	37	3.89	35
Investigation of potential toxin exposure	3.41	1137	3.37	46	3.63	19	3.16	32	3.54	37	3.74	35
Prescribing medications	4.07	1153	4.19	48	3.74	19	3.81	32	4.30	37	3.83	35

	National		Cornell Veterinary College		Oklahoma State University		University of Pennsylvania		Texas A&M University		Washington State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Interpretation of cytologic specimens	3.30	1176	3.52	48	3.30	20	2.84	32	3.62	37	3.28	36
Interpretation of post-mortem specimens	3.49	1168	3.50	46	3.30	20	3.22	32	3.30	37	3.46	35
Interpretation of ultrasound examinations	2.63	1164	2.81	47	1.84	19	2.41	32	2.38	37	2.40	35
Interpretation of radiographs	3.61	1178	3.57	47	3.75	20	3.56	32	3.65	37	3.53	36
Interpretation of hematologic values	3.92	1176	4.26	47	3.65	20	3.81	32	4.00	37	3.92	36
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Interpretation of cytologic specimens	3.30	1139	3.39	46	3.58	19	2.88	32	3.46	35	3.26	34
Interpretation of post-mortem specimens	3.32	1017	3.67	42	3.11	18	3.23	26	2.97	35	3.26	34
Interpretation of ultrasound examinations	2.90	1052	3.19	43	2.00	17	2.71	31	2.76	34	2.68	34
Interpretation of radiographs	3.60	1129	3.42	45	3.58	19	3.78	32	3.69	35	3.65	34
Interpretation of hematologic values	3.97	1147	4.11	46	3.89	19	3.91	32	4.06	36	4.12	34
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Diagnosis/Therapy of gastrointestinal disease	3.76	1165	3.70	46	3.45	20	3.52	31	4.16	37	3.71	35
Diagnosis/Therapy of dermatological disease	3.46	1163	3.50	46	3.00	20	3.61	31	3.53	36	2.71	35
Diagnosis/Therapy of endocrine disease	3.55	1164	3.80	46	3.25	20	3.58	31	3.76	37	3.54	35
Diagnosis/Therapy of cardiac disease	3.27	1164	3.57	46	2.75	20	3.39	31	3.84	37	2.94	35
Diagnosis/Therapy of respiratory disease	3.37	1165	3.59	46	2.80	20	3.29	31	3.78	37	3.37	35
Diagnosis/Therapy of renal disease	3.76	1162	3.83	46	3.45	20	3.65	31	3.92	37	3.60	35
Diagnosis/Therapy of neurological disease	3.36	1166	3.41	46	3.25	20	3.10	31	3.78	37	3.29	35
Diagnosis/Therapy of ocular disorders	3.19	1164	3.37	46	3.15	20	2.81	31	2.24	37	2.63	35

	National		Cornell Veterinary College		Oklahoma State University		University of Pennsylvania		Texas A&M University		Washington State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Diagnosis/Therapy of gastrointestinal disease	4.00	1136	4.00	45	3.84	19	3.94	31	4.19	36	3.79	34
Diagnosis/Therapy of dermatological disease	3.67	1126	3.51	45	3.58	19	3.71	31	3.81	36	3.09	34
Diagnosis/Therapy of endocrine disease	3.71	1122	3.71	45	3.58	19	3.74	31	3.78	36	3.76	33
Diagnosis/Therapy of cardiac disease	3.42	1121	3.40	45	3.00	19	3.35	31	3.61	36	3.24	33
Diagnosis/Therapy of respiratory disease	3.56	1132	3.51	45	3.16	19	3.35	31	3.89	36	3.42	33
Diagnosis/Therapy of renal disease	3.98	1119	3.81	43	3.79	19	3.90	30	4.08	36	3.88	33
Diagnosis/Therapy of neurological disease	3.43	1131	3.46	46	3.21	19	3.29	31	3.58	36	3.36	33
Diagnosis/Therapy of ocular disorders	3.30	1127	3.47	45	3.42	19	2.81	31	2.60	35	2.88	33
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Orthopedic surgery	2.02	1136	1.91	45	1.74	19	1.94	31	2.22	37	1.85	34
Soft tissue surgery	3.01	1165	2.83	46	2.80	20	2.55	31	3.24	37	2.86	36
Spay/Neuter	3.65	1161	3.30	46	4.00	20	3.10	29	4.14	37	3.47	36
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Orthopedic surgery	2.25	881	2.32	34	1.82	17	2.04	23	2.50	30	2.30	27
Soft tissue surgery	3.52	1094	3.36	44	3.53	19	3.00	29	3.89	35	3.36	33
Spay/Neuter	4.02	1075	3.83	42	4.37	19	3.46	28	4.18	33	3.64	33
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Management of reproductive programs	2.70	1121	2.89	45	2.61	18	2.33	30	2.94	35	2.41	34
Evaluation of disease outbreaks	2.95	1129	3.22	45	2.88	17	2.57	30	3.14	36	2.83	35
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Management of reproductive programs	2.77	858	2.97	36	2.67	15	2.55	22	3.03	29	2.65	26
Evaluation of disease outbreaks	3.00	894	3.27	33	2.81	16	2.90	20	3.16	31	2.86	28

	National		Cornell Veterinary College		Oklahoma State University		University of Pennsylvania		Texas A&M University		Washington State University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Evaluation of new drugs/products	3.18	1158	3.32	47	2.65	20	2.87	30	3.61	36	3.03	36
Interpretation of medical literature	3.69	1167	3.94	47	3.45	20	3.61	31	4.08	36	3.47	36
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Evaluation of new drugs/products	3.58	1110	3.79	43	3.11	19	3.25	28	3.89	35	3.38	34
Interpretation of medical literature	3.80	1142	3.89	47	3.65	20	3.60	30	3.97	35	3.53	34
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Dealing with people	3.49	1171	3.83	47	3.05	20	2.71	31	3.24	37	3.53	36
Veterinary Medicine as a business	2.53	1166	2.49	47	2.00	19	2.68	31	2.54	37	2.61	36
Giving educational presentations to the community	2.93	1116	3.38	47	2.72	18	2.64	25	3.06	35	2.86	35
Client Communications	3.74	1171	3.96	47	3.80	20	3.10	31	3.68	37	3.86	36
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Dealing with people	4.07	1158	4.15	47	3.95	19	3.74	31	3.97	36	4.00	35
Veterinary Medicine as a business	2.98	1089	2.90	42	2.67	18	2.92	26	2.91	34	2.97	32
Giving educational presentations to the community	3.51	971	3.74	46	3.29	17	3.11	19	3.87	31	3.43	30
Client Communications	4.18	1152	4.26	47	4.32	19	3.87	31	4.20	35	3.97	35

	National		University of Missouri-Columbia		The Ohio State University		Oregon State University		University of Tennessee		Virginia-Maryland Regional	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Physical examination	4.20	1187	4.38	42	4.31	51	4.00	23	4.00	30	4.11	54
History taking	4.35	1186	4.40	42	4.55	51	4.13	23	4.50	30	4.24	55
Diagnosis of lameness	3.49	1177	3.64	42	3.46	50	3.30	23	3.23	30	3.51	55
Diagnosis/Treatment of parasitic diseases	3.85	1183	3.95	42	3.82	51	3.26	23	4.30	30	3.95	55
Anesthesia	3.88	1181	4.07	42	3.94	51	4.13	23	4.30	30	4.09	55
Fluid therapy	3.80	1182	3.80	41	3.63	51	3.30	23	4.17	30	3.75	55
Intravenous injection	4.03	1180	4.33	42	4.08	51	3.65	23	4.30	30	4.22	54
Development/Adaptation of vaccination protocols	3.64	1182	3.74	42	3.80	51	2.87	23	3.57	30	3.82	55
Advising clients on nutrition	2.99	1185	3.12	42	2.84	51	2.35	23	3.77	30	3.16	55
Developing diagnostic plans for difficult cases	3.65	1187	3.60	42	3.57	51	3.48	23	4.00	30	3.64	55
Investigation of potential toxin exposure	3.16	1183	3.38	42	2.86	50	2.43	23	3.23	30	3.25	55
Prescribing medications	3.66	1185	3.69	42	3.67	51	3.04	23	3.83	30	3.87	55
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Physical examination	4.35	1156	4.67	42	4.20	49	4.17	23	4.07	29	4.20	54
History taking	4.42	1160	4.63	41	4.44	50	4.30	23	4.48	29	4.42	52
Diagnosis of lameness	3.66	1138	3.69	42	3.57	47	3.35	23	3.78	27	3.64	53
Diagnosis/Treatment of parasitic diseases	4.00	1147	4.41	41	3.96	48	3.48	23	4.31	29	4.00	53
Anesthesia	3.95	1143	4.22	41	3.84	49	4.00	23	4.10	29	4.12	52
Fluid therapy	3.96	1138	4.10	41	3.63	48	3.74	23	4.17	29	3.92	52
Intravenous injection	4.37	1147	4.69	42	4.29	48	4.13	23	4.57	28	4.36	53
Development/Adaptation of vaccination protocols	4.00	1127	4.18	40	3.88	50	3.70	23	4.00	28	4.17	53
Advising clients on nutrition	3.32	1143	3.40	42	3.06	48	2.96	23	3.89	28	3.19	52
Developing diagnostic plans for difficult cases	3.88	1159	3.90	42	3.63	49	3.83	23	4.20	30	3.83	52
Investigation of potential toxin exposure	3.41	1137	3.52	42	3.09	46	3.13	23	3.60	30	3.42	50
Prescribing medications	4.07	1153	4.26	42	3.88	49	3.65	23	3.93	29	4.17	53

	National		University of Missouri-Columbia		The Ohio State University		Oregon State University		University of Tennessee		Virginia-Maryland Regional	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Interpretation of cytologic specimens	3.30	1176	3.76	41	3.34	50	3.30	23	3.37	30	2.84	55
Interpretation of post-mortem specimens	3.49	1168	3.71	42	3.24	49	3.43	23	3.76	29	3.42	55
Interpretation of ultrasound examinations	2.63	1164	2.56	41	2.39	51	2.13	23	2.50	30	2.51	53
Interpretation of radiographs	3.61	1178	3.51	41	3.55	51	3.22	23	4.23	30	3.67	55
Interpretation of hematologic values	3.92	1176	4.05	41	3.90	51	3.65	23	4.33	30	3.87	55
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Interpretation of cytologic specimens	3.30	1139	3.70	40	3.27	48	3.35	23	3.38	29	2.88	51
Interpretation of post-mortem specimens	3.32	1017	3.42	33	3.15	41	3.19	21	3.32	25	3.33	43
Interpretation of ultrasound examinations	2.90	1052	2.89	37	2.64	44	3.00	20	2.96	28	3.11	46
Interpretation of radiographs	3.60	1129	3.59	39	3.54	48	3.35	23	4.00	28	3.70	50
Interpretation of hematologic values	3.97	1147	4.23	40	3.90	48	3.78	23	4.23	30	4.00	54
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Diagnosis/Therapy of gastrointestinal disease	3.76	1165	3.76	42	3.70	50	3.39	23	3.93	29	3.89	53
Diagnosis/Therapy of dermatological disease	3.46	1163	3.37	41	3.74	50	2.39	23	4.24	29	3.15	53
Diagnosis/Therapy of endocrine disease	3.55	1164	3.27	41	3.32	50	2.96	23	4.03	29	3.53	53
Diagnosis/Therapy of cardiac disease	3.27	1164	3.27	41	3.48	50	3.83	23	3.24	29	3.41	54
Diagnosis/Therapy of respiratory disease	3.37	1165	3.50	42	3.38	50	2.91	23	3.34	29	3.43	53
Diagnosis/Therapy of renal disease	3.76	1162	3.83	41	3.76	50	3.17	23	4.14	29	3.85	53
Diagnosis/Therapy of neurological disease	3.36	1166	3.52	42	3.40	50	3.35	23	4.03	29	3.68	53
Diagnosis/Therapy of ocular disorders	3.19	1164	3.64	42	3.48	50	2.09	23	4.34	29	3.13	53

	National		University of Missouri-Columbia		The Ohio State University		Oregon State University		University of Tennessee		Virginia-Maryland Regional	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Diagnosis/Therapy of gastrointestinal disease	4.00	1136	4.10	41	3.94	47	3.70	23	4.18	28	4.00	52
Diagnosis/Therapy of dermatological disease	3.67	1126	3.53	40	3.72	47	3.17	23	4.18	28	3.51	49
Diagnosis/Therapy of endocrine disease	3.71	1122	3.44	39	3.48	46	3.48	23	4.21	28	3.67	48
Diagnosis/Therapy of cardiac disease	3.42	1121	3.67	39	3.64	47	3.68	22	3.48	27	3.59	49
Diagnosis/Therapy of respiratory disease	3.56	1132	3.61	41	3.62	47	3.43	23	3.50	28	3.69	51
Diagnosis/Therapy of renal disease	3.98	1119	4.00	40	3.94	47	3.68	22	4.32	28	4.06	48
Diagnosis/Therapy of neurological disease	3.43	1131	3.50	42	3.43	47	3.68	22	3.67	27	3.58	50
Diagnosis/Therapy of ocular disorders	3.30	1127	3.64	42	3.61	46	2.87	23	3.82	28	3.22	49
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Orthopedic surgery	2.02	1136	2.37	41	2.04	49	1.74	23	1.79	29	1.71	52
Soft tissue surgery	3.01	1165	3.19	42	3.22	50	3.22	23	3.03	29	2.55	53
Spay/Neuter	3.65	1161	3.78	41	4.10	50	4.09	23	3.83	29	3.28	53
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Orthopedic surgery	2.25	881	2.69	29	2.06	33	1.94	18	1.88	24	2.29	35
Soft tissue surgery	3.52	1094	3.62	39	3.45	44	3.39	23	3.44	27	3.19	48
Spay/Neuter	4.02	1075	4.13	38	4.14	43	4.33	21	4.11	27	3.81	48
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Management of reproductive programs	2.70	1121	2.86	42	2.88	49	2.23	22	2.89	28	2.55	49
Evaluation of disease outbreaks	2.95	1129	3.02	42	3.24	50	2.59	22	3.00	28	2.94	50
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Management of reproductive programs	2.77	858	2.87	30	3.17	36	2.13	15	3.00	20	2.54	35
Evaluation of disease outbreaks	3.00	894	3.13	30	3.19	42	2.47	15	3.23	22	3.00	38

	National		University of Missouri-Columbia		The Ohio State University		Oregon State University		University of Tennessee		Virginia-Maryland Regional	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Evaluation of new drugs/products	3.18	1158	3.31	42	3.43	49	2.74	23	3.39	28	3.09	53
Interpretation of medical literature	3.69	1167	3.86	42	3.66	50	3.65	23	3.97	29	3.51	53
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Evaluation of new drugs/products	3.58	1110	3.73	41	3.71	48	3.27	22	3.59	27	3.47	51
Interpretation of medical literature	3.80	1142	3.79	42	4.02	48	3.95	22	3.72	29	3.81	53
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Dealing with people	3.49	1171	3.36	42	3.84	49	2.96	23	4.17	29	3.51	53
Veterinary Medicine as a business	2.53	1166	2.12	42	2.82	49	2.30	23	2.69	29	2.56	52
Giving educational presentations to the community	2.93	1116	3.08	40	2.73	48	2.78	23	3.22	27	2.47	51
Client Communications	3.74	1171	3.67	42	4.10	49	3.09	23	4.24	29	3.66	53
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Dealing with people	4.07	1158	4.05	42	4.22	49	3.96	23	4.41	29	4.09	53
Veterinary Medicine as a business	2.98	1089	2.93	40	3.04	47	2.77	22	3.08	25	2.86	44
Giving educational presentations to the community	3.51	971	3.76	37	3.59	41	3.75	20	3.75	20	3.37	41
Client Communications	4.18	1152	4.24	42	4.16	49	3.91	23	4.50	28	4.19	52

	National		North Carolina State University		University of Wisconsin		Western University - California		Ross University		St. George's University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Physical examination	4.20	1187	4.21	34	4.00	33	4.27	30	4.31	81	4.61	23
History taking	4.35	1186	4.41	34	4.18	33	4.43	30	4.52	81	4.57	23
Diagnosis of lameness	3.49	1177	3.24	34	3.03	32	3.87	30	3.79	80	3.83	23
Diagnosis/Treatment of parasitic diseases	3.85	1183	4.06	32	3.48	33	3.77	30	4.22	81	4.22	23
Anesthesia	3.88	1181	3.76	33	3.70	33	3.41	29	4.41	81	4.30	23
Fluid therapy	3.80	1182	3.39	33	3.27	33	3.70	30	4.15	81	4.17	23
Intravenous injection	4.03	1180	4.15	33	3.27	33	3.97	29	4.30	81	4.43	23
Development/Adaptation of vaccination protocols	3.64	1182	3.50	34	3.38	32	4.20	30	3.86	81	3.87	23
Advising clients on nutrition	2.99	1185	3.06	34	2.09	33	3.27	30	3.30	81	3.30	23
Developing diagnostic plans for difficult cases	3.65	1187	3.76	34	3.45	33	3.73	30	3.81	81	4.00	23
Investigation of potential toxin exposure	3.16	1183	3.00	34	2.52	33	3.50	30	3.47	81	3.00	23
Prescribing medications	3.66	1185	3.74	34	3.24	33	3.63	30	4.00	81	3.74	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Physical examination	4.35	1156	4.36	33	4.52	33	4.52	29	4.42	81	4.68	22
History taking	4.42	1160	4.48	33	4.55	33	4.55	29	4.53	81	4.52	21
Diagnosis of lameness	3.66	1138	3.42	33	3.52	31	4.03	29	3.90	78	4.10	21
Diagnosis/Treatment of parasitic diseases	4.00	1147	4.19	32	4.21	33	4.14	29	4.23	81	4.30	20
Anesthesia	3.95	1143	3.75	32	3.61	33	3.66	29	4.31	80	4.48	21
Fluid therapy	3.96	1138	3.81	32	3.79	33	3.83	29	4.21	80	4.05	20
Intravenous injection	4.37	1147	4.50	32	4.12	33	4.41	29	4.50	80	4.41	22
Development/Adaptation of vaccination protocols	4.00	1127	4.00	32	4.14	29	4.33	27	3.99	79	4.15	20
Advising clients on nutrition	3.32	1143	3.27	33	2.94	33	3.55	29	3.55	80	3.50	20
Developing diagnostic plans for difficult cases	3.88	1159	3.97	33	3.88	33	4.10	30	3.94	80	4.14	21
Investigation of potential toxin exposure	3.41	1137	3.31	32	2.94	33	3.90	30	3.48	80	3.30	20
Prescribing medications	4.07	1153	4.18	33	4.12	33	4.21	29	4.17	81	4.19	21

	National		North Carolina State University		University of Wisconsin		Western University - California		Ross University		St. George's University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Interpretation of cytologic specimens	3.30	1176	3.18	33	3.06	33	3.50	30	3.49	81	3.61	23
Interpretation of post-mortem specimens	3.49	1168	3.32	34	3.25	32	3.70	30	3.66	79	3.68	22
Interpretation of ultrasound examinations	2.63	1164	2.39	33	2.18	33	3.53	30	2.80	81	2.82	22
Interpretation of radiographs	3.61	1178	3.33	33	3.58	33	3.63	30	3.85	81	3.87	23
Interpretation of hematologic values	3.92	1176	4.12	33	3.91	33	3.83	30	4.06	81	4.09	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Interpretation of cytologic specimens	3.30	1139	2.97	32	3.00	33	3.70	30	3.34	80	3.74	19
Interpretation of post-mortem specimens	3.32	1017	3.19	27	3.22	27	3.46	28	3.39	69	3.18	17
Interpretation of ultrasound examinations	2.90	1052	2.79	29	2.68	31	3.57	28	2.99	77	2.79	19
Interpretation of radiographs	3.60	1129	3.19	31	3.67	33	3.79	29	3.80	79	3.86	21
Interpretation of hematologic values	3.97	1147	4.09	32	4.18	33	4.10	30	3.91	80	3.90	21
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Diagnosis/Therapy of gastrointestinal disease	3.76	1165	3.97	34	3.70	33	3.57	30	3.95	79	4.13	23
Diagnosis/Therapy of dermatological disease	3.46	1163	3.71	34	3.52	33	3.20	30	3.72	79	3.74	23
Diagnosis/Therapy of endocrine disease	3.55	1164	3.71	34	3.36	33	3.40	30	3.65	79	3.91	23
Diagnosis/Therapy of cardiac disease	3.27	1164	3.56	34	3.24	33	3.13	30	3.37	79	3.52	23
Diagnosis/Therapy of respiratory disease	3.37	1165	3.65	34	3.15	33	3.33	30	3.52	79	3.50	22
Diagnosis/Therapy of renal disease	3.76	1162	3.82	34	3.61	33	3.87	30	3.97	79	4.09	23
Diagnosis/Therapy of neurological disease	3.36	1166	3.50	34	3.52	33	3.33	30	3.41	79	3.61	23
Diagnosis/Therapy of ocular disorders	3.19	1164	3.35	34	3.21	33	2.83	30	3.19	79	3.39	23

	National		North Carolina State University		University of Wisconsin		Western University - California		Ross University		St. George's University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Diagnosis/Therapy of gastrointestinal disease	4.00	1136	4.00	33	4.03	33	4.07	30	4.12	78	4.18	22
Diagnosis/Therapy of dermatological disease	3.67	1126	3.73	33	3.91	33	3.72	29	3.81	78	3.91	22
Diagnosis/Therapy of endocrine disease	3.71	1122	3.70	33	3.58	33	3.90	30	3.76	78	3.82	22
Diagnosis/Therapy of cardiac disease	3.42	1121	3.52	33	3.31	32	3.45	29	3.50	78	3.57	21
Diagnosis/Therapy of respiratory disease	3.56	1132	3.67	33	3.45	33	3.63	30	3.63	78	3.50	22
Diagnosis/Therapy of renal disease	3.98	1119	3.97	33	3.91	32	4.13	30	4.17	78	4.32	22
Diagnosis/Therapy of neurological disease	3.43	1131	3.61	33	3.42	33	3.63	30	3.39	76	3.41	22
Diagnosis/Therapy of ocular disorders	3.30	1127	3.42	33	3.03	33	3.23	30	3.24	78	3.57	21
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Orthopedic surgery	2.02	1136	1.88	32	1.79	28	2.20	30	2.28	79	2.61	23
Soft tissue surgery	3.01	1165	2.91	33	2.67	33	3.10	30	3.48	80	3.61	23
Spay/Neuter	3.65	1161	3.82	33	3.13	32	3.93	30	3.99	80	4.22	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Orthopedic surgery	2.25	881	1.82	28	1.88	24	2.52	27	2.32	59	2.50	16
Soft tissue surgery	3.52	1094	3.31	32	3.34	32	3.76	29	3.81	78	3.63	19
Spay/Neuter	4.02	1075	3.97	32	3.72	29	4.18	28	4.16	76	4.55	20
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Management of reproductive programs	2.70	1121	2.42	33	2.33	33	2.90	29	2.79	75	3.26	23
Evaluation of disease outbreaks	2.95	1129	2.82	33	2.53	34	3.40	30	3.00	74	3.09	22

	National		North Carolina State University		University of Wisconsin		Western University - California		Ross University		St. George's University	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Management of reproductive programs	2.77	858	2.29	28	2.52	25	3.13	23	2.63	62	3.19	16
Evaluation of disease outbreaks	3.00	894	2.70	27	2.81	27	3.12	25	2.90	62	2.69	16
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Evaluation of new drugs/products	3.18	1158	3.55	33	2.91	33	3.63	30	3.42	78	3.05	22
Interpretation of medical literature	3.69	1167	3.76	33	3.45	33	4.30	30	3.77	78	3.64	22
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Evaluation of new drugs/products	3.58	1110	3.61	33	3.41	32	4.00	29	3.63	78	3.80	20
Interpretation of medical literature	3.80	1142	3.71	34	3.59	32	4.30	30	3.84	79	3.95	21
On a scale of 1 through 5, please rate each category based on your college preparedness (how well you thought your college training had prepared you before you started working)												
Dealing with people	3.49	1171	3.62	34	3.03	34	4.13	30	3.74	80	3.65	23
Veterinary Medicine as a business	2.53	1166	2.76	34	1.88	34	2.80	30	2.74	80	2.00	23
Giving educational presentations to the community	2.93	1116	3.03	32	2.33	33	3.47	30	3.14	76	2.85	20
Client Communications	3.74	1171	3.88	34	3.44	34	4.37	30	3.84	80	4.00	23
On a scale of 1 through 5, please rate each category based on your satisfaction with your experience while on the job (what you have found since working)												
Dealing with people	4.07	1158	4.18	34	3.97	34	4.43	30	4.23	80	4.36	22
Veterinary Medicine as a business	2.98	1089	3.09	32	2.45	33	2.85	27	3.22	78	2.82	22
Giving educational presentations to the community	3.51	971	3.41	29	3.24	29	3.36	28	3.76	66	3.63	16
Client Communications	4.18	1152	4.30	33	4.09	34	4.60	30	4.31	80	4.64	22

THE AVMA 2016 ECONOMIC REPORTS INCLUDE:

The AVMA Report on Veterinary Markets:

This report summarizes the economics and finance research presented at the annual AVMA Economic Summit and provides information about general U.S. economic conditions and the markets for veterinary education, veterinarians and veterinary services, and the performance of veterinary practices.

The AVMA & AAVMC Report on the Market for Veterinary Education:

The market for veterinary education is the beginning of the pipeline to the market for veterinary services. This report examines the characteristics of veterinary college applicants, the supply of and demand for veterinary education, and the performance of the market in providing new veterinarians.

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This report explores the demographics and employment of the veterinary profession: where they are located, what type of work they do, how much they are compensated, and how they are managing their educational debt. The report also measures unemployment and underemployment and identifies the contributing factors, and explores the performance of the market based on the value of the DVM degree.

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