



2018 AVMA Report on

THE MARKET FOR VETERINARIANS





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VETERINARIANS**

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SUMMARY

The market for veterinary labor continues to be increasingly robust as all indicators point toward favorable conditions for the veterinary industry on a national level, but there are still considerable maldistribution problems creating variations in unemployment, underemployment, incomes, wellbeing and other labor market indicators, such as the net present value of the degree. These variations occur regionally, by state and within states, by gender and by practice type, and the continued increasing scarcity of veterinary labor should help to ameliorate this maldistribution. A compilation of key indicators by region is provided at the end of this summary (Table 1 and Figure 1).

While the number of new veterinarians entering the workforce is nearly 4,062 per year, the number leaving is nearly 2,000, for a net gain of roughly 2,000. The current number of active veterinarians is estimated at approximately 110,500 and thus there are roughly 2,940 people per veterinarian in the United States. At the rate of current population growth and growth in the number of veterinarians, however, only 2,400 new people are being added for every new veterinarian. More importantly, while the cost of veterinarians continues to rise, the median household income of the increased population is not expanding.

The recent economic expansion has maintained a low unemployment rate in veterinary medicine and the changing structure of the veterinarian workforce has helped create an even larger negative underemployment rate. The large number of veterinarians nearing retirement coupled with the increased number of women in the profession is reducing the number of hours in a veterinary full-time equivalent (FTE) and this has led to an actual reduction in the total number of veterinary FTEs, even while the number of veterinarians entering the profession increases.

The number of jobs exceeded the number of applicants on the AVMA's Veterinary Career Center (VCC) in 2017 but there were still markets in which the number of applicants exceeded the number of jobs; in other markets employers went begging for applicants and found none. This disparity led to sharply rising veterinary incomes in some areas with no growth in incomes in other areas.

Veterinary wellbeing, talked about throughout the profession with major concern, does not appear different from other specialized professions, such as medical doctors, engineers and lawyers, when assessed through the ProQOL tool that measures compassion satisfaction, burnout and secondary traumatic stress.

Because the market for veterinarians sits at the crossroads for the market for veterinary services - which drives the demand for veterinarians - and the market for veterinary education - the source of the pipeline of veterinarians - the market is affected by, and is responsive to, changes in these two vertically related markets. Problems in either of these markets become problems in the market for veterinarians and this leads to inefficiency in the market until adjustments are made.

Market adjustments occur when the market players make informed decisions. The purpose of this report is to enhance the decision-making process by providing the best information available for veterinarians to tap for employment and career decisions. Toward this end, those who complete AVMA surveys enable the collection and analysis of data to report on the markets, providing invaluable information to assist veterinarians. These obliging professionals are the source of change in the profession.

2017 CENSUS OF VETERINARIANS KEY IINDICATORS BY REGION

Region of Workplace	Statistic	Change in Hours Desired	Total Personal Income	Burnout Score	Unemployed in Veterinary Medicine	S/D Ratio (Externally Sourced)	Years of Experience of Respondent	Percentage Female
0	Mean	-1.4510	\$120,596.60	25.3118	2.5%	0.183	15.3911	78.2%
	N	51	161	186	5		202	
	Std. Deviation	20.6807	\$90,306.30	6.2028			12.3285	
1	Mean	-3.6119	\$112,613.10	26.0657	1.9%	0.206	13.5775	72.0%
	N	67	174	198	4		213	
	Std. Deviation	14.3695	\$79,436.93	6.5089			12.2840	
2	Mean	-4.2250	\$109,395.40	25.1798	1.3%	0.231	15.2718	75.0%
	N	80	237	267	4		298	
	Std. Deviation	18.5650	\$67,327.33	6.5135			13.3907	
3	Mean	-6.5556	\$113,070.30	25.8037	0.3%	0.387	14.7951	68.3%
	N	99	228	270	1		288	
	Std. Deviation	19.4597	\$93,047.53	7.2565			13.5087	
4	Mean	-3.7042	\$119,112.80	25.575	0.8%	0.225	14.1805	72.6%
	N	71	218	252	2		266	
	Std. Deviation	16.7838	\$95,740.55	5.8349			12.7260	
5	Mean	-0.2881	\$108,704.90	24.7186	3.2%	0.376	13.7150	68.8%
	N	59	179	199	7		214	
	Std. Deviation	25.5526	\$71,305.79	6.3223			12.1101	
6	Mean	-6.5362	\$120,513.20	24.8599	0.9%	0.255	16.0591	62.0%
	N	69	179	207	2		220	
	Std. Deviation	19.1139	\$94,439.90	6.4217			14.4656	
7	Mean	-2.2344	\$134,267.30	25.1269	0.9%	0.226	16.4521	62.4%
	N	64	172	197	2		219	
	Std. Deviation	22.4787	\$96,381.82	6.6662			14.5470	
8	Mean	-6.8475	\$109,939.30	25.9261	1.4%	0.217	13.4292	69.5%
	N	59	181	203	3		219	
	Std. Deviation	18.0915	\$95,463.11	6.3402			14.1894	
9	Mean	-5.3556	\$117,324.80	26.4452	2.6%	0.176	14.5131	80.1%
	N	90	237	283	8		306	
	Std. Deviation	18.7349	\$80,931.21	6.6182			12.7421	
Total	Mean	-4.3202	\$116,232.50	25.5376	1.6%	0.176	14.7395	71.2%
	N	709	1966	2262	38		2445	
	Std. Deviation	19.4146	\$86,742.79	6.5057			13.2624	

Table 1

INTRODUCTION

REGIONS OF THE UNITED STATES

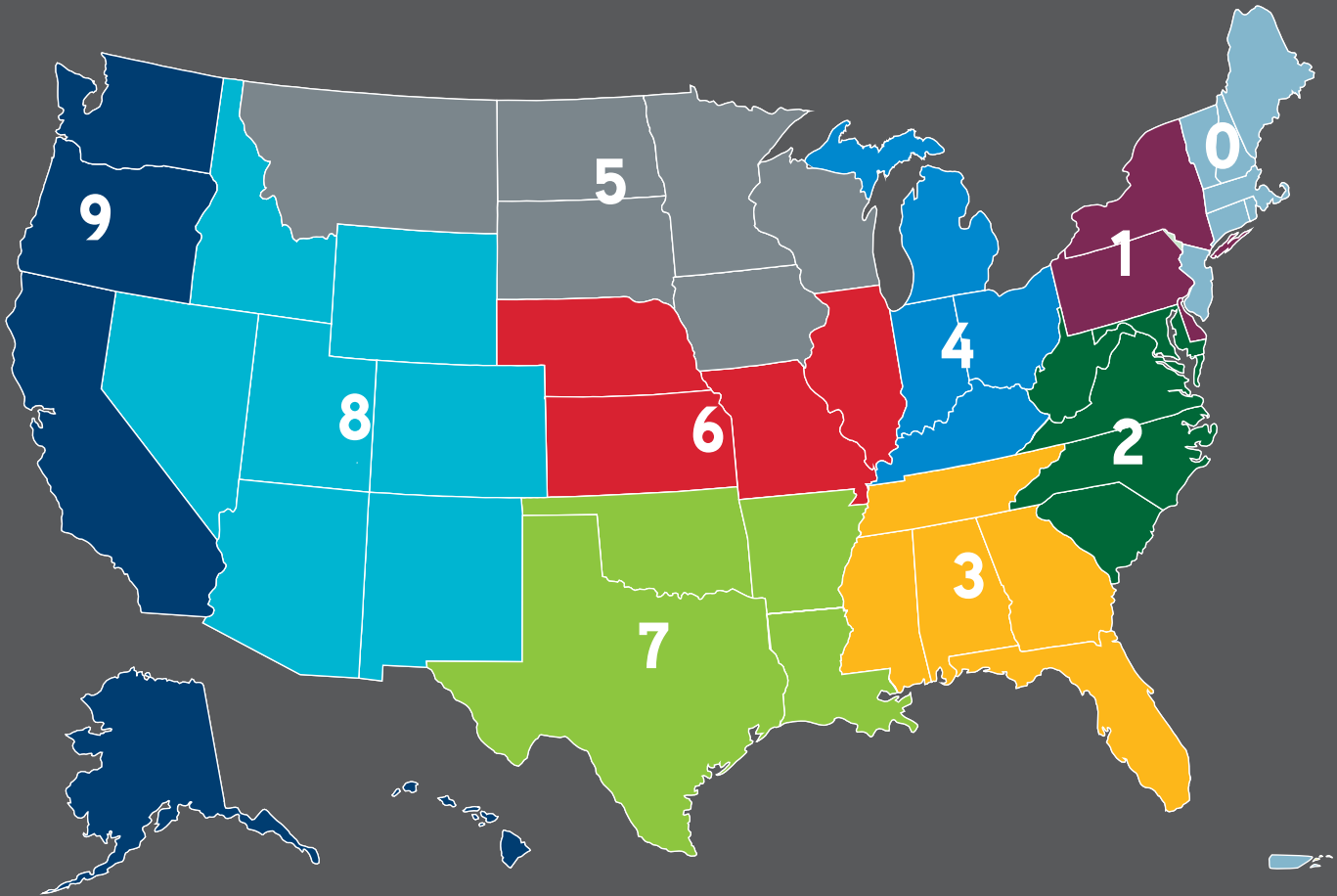


Figure 1

For the third year in a row, the market for veterinarians is increasingly robust with declining levels of unemployment, increasing levels of negative underemployment, larger year-to-year increases in mean starting salaries and the number of graduates who have obtained full-time employment prior to graduation, and an increasing number of employment postings on the AVMA Veterinary Career Center. The number of employment opportunities posted on the VCC continued to exceed the number of applicants, with many of these opportunities remaining unfilled through the end of 2017.

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 should confront an income offered by employers that is derived from the willingness of animal owners to purchase veterinary services from veterinary hospitals. This juxtaposition of the cost of veterinarians with the value of services perceived by animal owners, however, presumes that veterinary practices are able to translate the demand for veterinary services into the value accorded the veterinarian producing these services. Unfortunately, few veterinary practices use the value of output per veterinarian to establish veterinary incomes, and even fewer owners understand the relationship between price of services, quantity of services demanded, and veterinary incomes. While all three veterinary markets (education, veterinarian, and veterinary services) 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, movement of resources should occur to produce a quantity of output that just meets quantity demanded at a price that is acceptable to both consumers and producers.

In 2017 there were an estimated total of 110,531 veterinarians actively engaged in the profession in the United States, in public or private practice, and 16,246 veterinary students in the pipeline

to become veterinarians in 2017 (in the United States and internationally). 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 (59.7 percent), followed by food animal (5 percent), equine (4.5 percent) and mixed animal practices (4.7 percent). In public practice, colleges and universities employ the most veterinarians, followed by industry, and state and local governments (Figure 2).

The percent of veterinarians identifying their practice type as companion animal in 2017 increased by almost 1 percent from 2016, while those identifying food animal, mixed animal and equine as their practice type saw a slight decrease from the previous year, and those who selected "other" as their employment type remained about the same from 2016 to 2017.

The single largest source of the continued improvement in the market for veterinarians has been the growth in the U.S. economy, and because the growth in the U.S. economy has not occurred uniformly in all sectors of the economy, and those sectors are not uniformly distributed throughout the United States, economic improvement has not occurred uniformly throughout the country. As such, veterinary markets might not be robust in every locality or 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-corrective. Lower-income, unemployed or underemployed veterinarians would, in a competitive market, relocate to 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 variations in incomes will persist.

In 2015, the unemployment rate in veterinary medicine (3.4 percent) remained below the national average and was not significantly different from 2014. To better align the veterinary medicine employment rate with the national unemployment statistics, new questions were added to the veterinary census surveys. Eliminating veterinarians who either indicated they

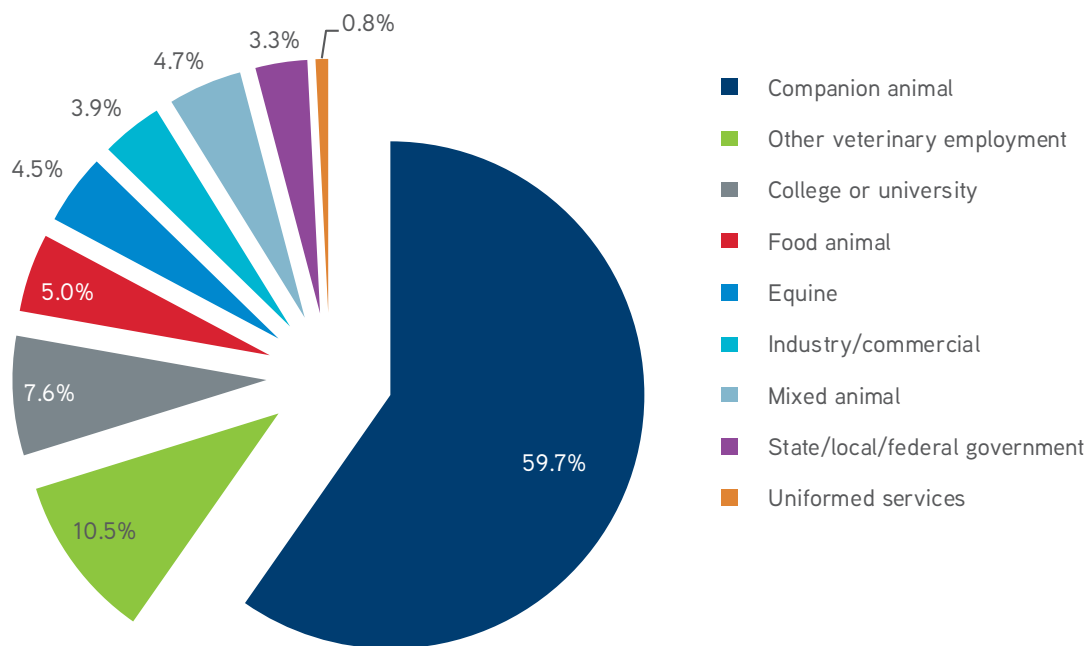
were retired, seeking enrollment in an internship, residency or advanced education, or not currently seeking employment, the 2017 unemployment rate in veterinary medicine comparable to the national unemployment rate was calculated to be 0.4 percent (1.4 percent in 2016).

Underemployment was again negative in 2017, with more veterinarians indicating they wish to work fewer hours for less compensation than those who wish to work more hours for more compensation. The total number of veterinarians that would be required to eliminate the negative underemployment was 3,330 (40 hours per week equals one FTE). Of course, the indivisibility of labor makes eliminating the negative underemployment difficult, as few veterinarians will wish to work the five to 10 hours per week in several practices that would be required;

underemployment – both positive and negative – occurs in small numbers of hours distributed throughout the nation and across practice types.

The ability of markets to adjust depends on information conveyed. Veterinarians will not relocate or change career paths without knowledge of the benefits that can 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 a great deal of variation in income remains unaccounted for by the factors in the model. Some of these factors, such as personality, lifestyle and energy level, are unique to the individual.

VETERINARY POPULATION, 2017



Estimated number of veterinarians as of December 31, 2017: 110,531

Figure 2



NATIONAL LABOR MARKETS



There are about 2.5 unemployed persons for every two employment opportunities and thus the relative scarcity of labor is high compared to what it was in 2009.

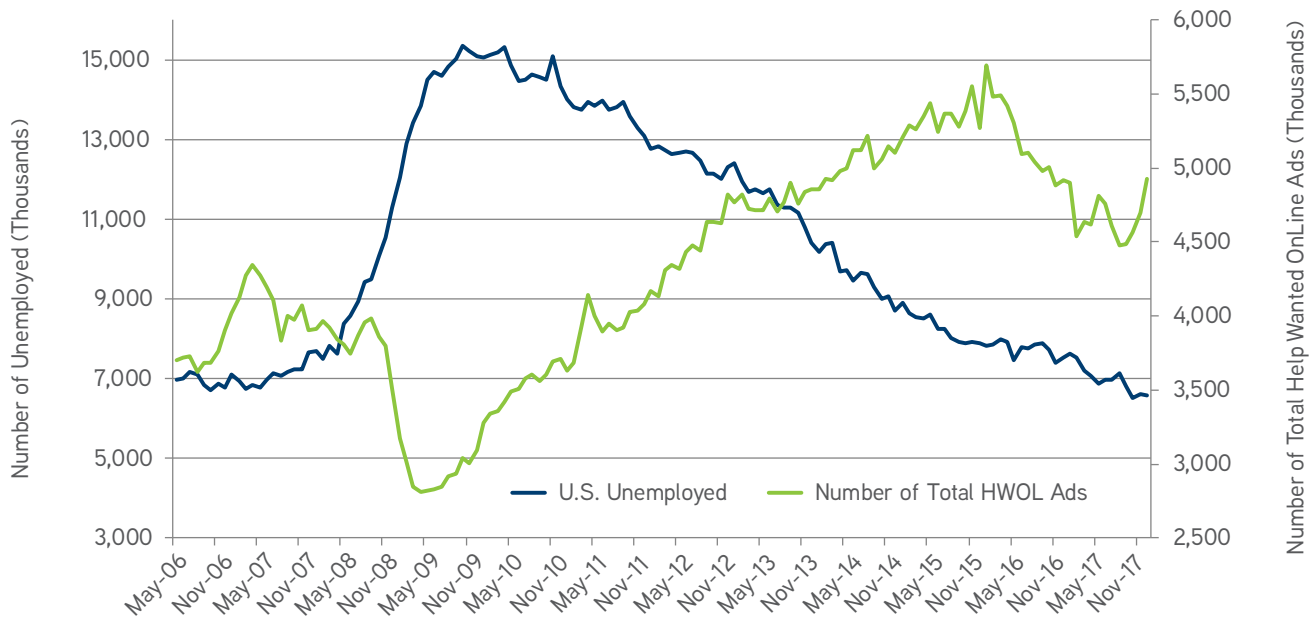
The market for veterinarian labor is connected through price to all other labor markets. Increases in the demand for veterinarians, in theory, should move in the same direction as the national level of demand for labor. As the demand for goods and services throughout the economy increases, businesses 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 (BLS) provide a good indicator for what might be happening in the market for veterinarians.

The Conference Board provides an indicator of the job market through its Help Wanted OnLine (HWOL) Data Series. Information about this series was provided in the *2016 AVMA Report on the Market for Veterinarians*.

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 and then showed continued growth until the Fall of 2015. The number of jobs posted nationally peaked in January of 2016 at almost 5.7 million and then dropped to under 4.5 million jobs posted in September of 2017; after September 2017 and through December 2017 there was an increase in jobs posted. 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 (Figure 3). Unemployment has declined continually since 2009, hitting a low of under 6.5 million in December of 2017. As noted in the 2017 AVMA Report on Veterinary Markets, these are important indications that the economy might have reached its zenith in the latest business cycle.

U.S. LABOR SUPPLY AND DEMAND, SEASONALLY ADJUSTED



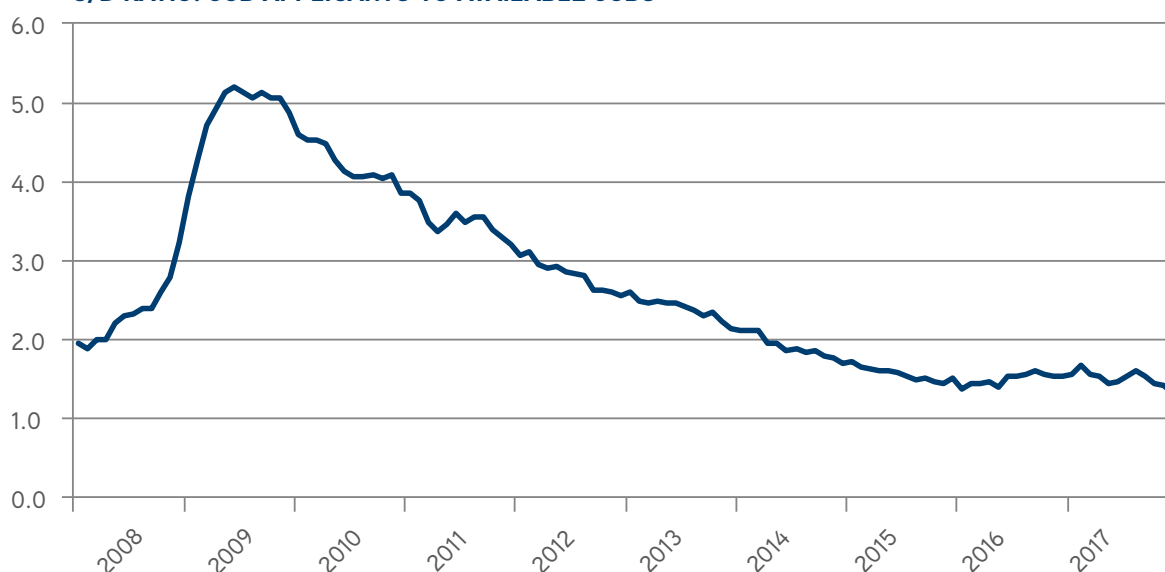
Source: The Conference Board Help Wanted OnLine® (HWOL); United States Bureau of Labor Statistics

Figure 3

A simplified measure of the national labor markets is the supply/demand (S/D) ratio. The S/D ratio is the number of unemployed 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 fell continuously during the last recession reaching a low of 1.38:1 in late 2015 but showed an increasing trend through 2016. Since 2016 it has reached a low of 1.33:1, at the end of 2017. This suggests that there are about 2.5 unemployed persons for every two employment opportunities and thus the relative scarcity of labor is high compared to what it was in 2009. The declining S/D ratio, or increasing labor scarcity, should create increasing pressure on wage growth (Figure 4).

S/D RATIO: JOB APPLICANTS TO AVAILABLE JOBS



Source: The Conference Board Help Wanted OnLine® (HWOL); United States Bureau of Labor Statistics

Figure 4

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. Table 2 provides the S/D ratio for the 10 top occupations by posted jobs and the associated mean hourly wage rate for three different periods. In June of 2013, the national S/D ratio was

2.45:1, and, as noted earlier, the national S/D ratio at the close of 2017 was approximately 1.33:1. For some of the occupations listed below, such as “Food Preparation and Serving Related,” the S/D ratio declined substantially between the three periods but remained above the national average. For “Computer and Mathematical Science” and “Management,” the S/D ratio increased between the two periods from 2013 to 2016 and decreased in 2017 but remained far below the national average, with the demand for employees exceeding the available pool of potential applicants. As a result of the differences in the changes in the S/D ratios, the wage rate changes between the three periods were considerably different, as well.

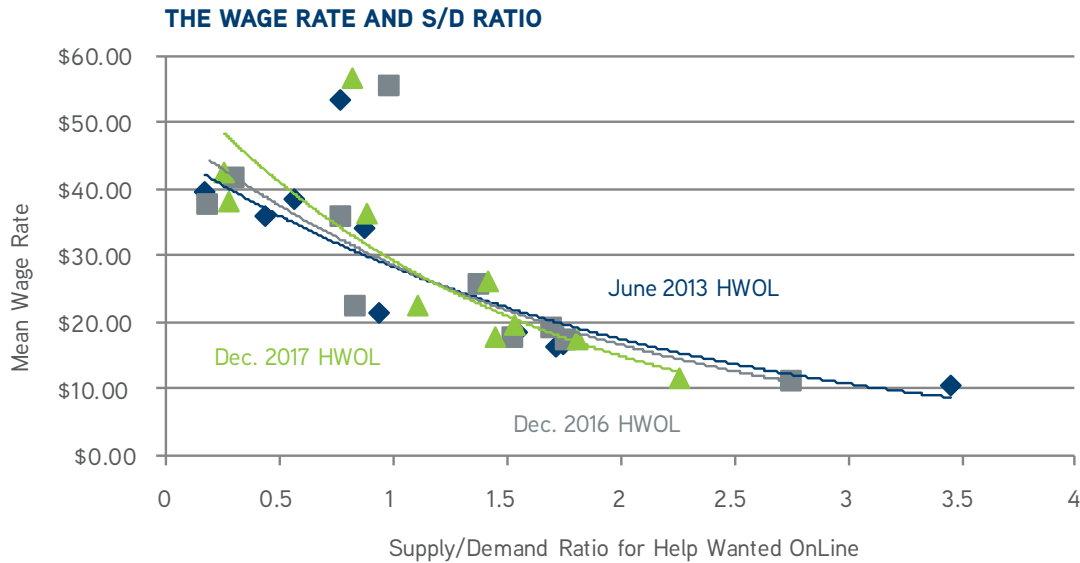
S/D RATIO AND WAGE RATES FOR HELP WANTED ONLINE, 2013, 2016 AND 2017

Occupation	June 2013 HWOL		Dec. 2016 HWOL		Dec. 2017 HWOL	
	Ratio	Mean Wage	Ratio	Mean Wage	Ratio	Mean Wage
Sales and Related	1.54	\$18.37	1.71	\$18.90	1.53	\$19.50
Computer and Mathematical Science	0.17	\$39.43	0.31	\$41.43	0.26	\$42.25
Office and Administrative Support	1.75	\$16.78	1.53	\$17.47	1.45	\$17.91
Healthcare Practitioners and Technical	0.44	\$35.93	0.19	\$37.40	0.28	\$38.06
Management	0.77	\$53.15	0.99	\$55.30	0.82	\$56.74
Transportation and Material Moving	1.72	\$16.28	1.77	\$16.90	1.81	\$17.34
Business and Financial Operations	0.87	\$34.14	0.78	\$35.48	0.88	\$36.09
Food Preparation and Serving Related	3.45	\$10.38	2.76	\$10.98	2.26	\$11.47
Installation, Maintenance and Repair	0.94	\$21.35	0.84	\$22.11	1.11	\$22.45
Education, Training and Library	0.57	\$38.51	1.39	\$25.48	1.42	\$26.21

Source: The Conference Board Help Wanted OnLine® (HWOL)

Table 2

The relationship between the S/D ratio and the wage rate can be illustrated by graphically comparing the points and finding the mathematical relationship (line). This relationship, represented by the blue (2013), gray (2016) and green (2017) lines in Figure 5, can be seen to have become steeper over the past three years. This implies that at higher wage rates, a small change in the S/D ratio results in a large increase in the wage rate.



Source: The Conference Board Help Wanted OnLine® (HWOL)

Figure 5

The market for veterinary labor can be compared to the national labor market through the use of the information collected on the AVMA's Veterinary Career Center with respect to posted employment opportunities and posted applications for employment.

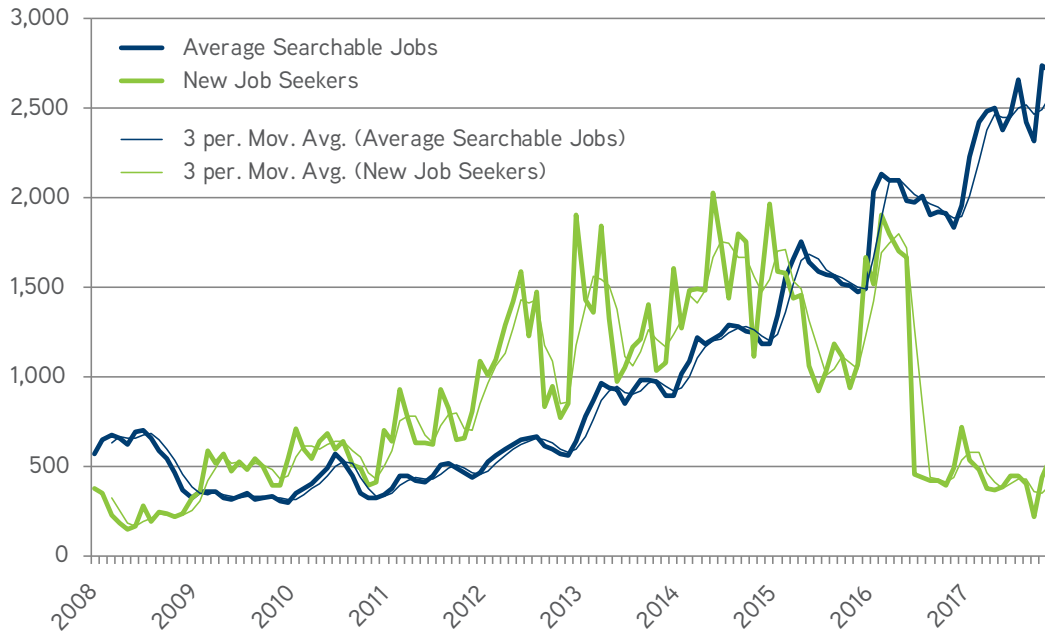
Prior to the recession in 2008 and 2009 the number of employment opportunities exceeded the number of applicants. However, after the recession when the S/D national ratio hit a high of more than five applicants looking for every employment opportunity, the number of applicants exceeded the number of employment opportunities for veterinarians nationally. While the national S/D ratio fell by half in 2012 (roughly 2.5 applicants for every job), in the veterinary profession the number of applicants per employment opportunity peaked, and starting salaries for new veterinarians bottomed along with the percentage of graduates who were able to obtain full-time employment opportunities prior to graduation.

While the national S/D ratio hit a low point in 2016 (less than 1.5:1), the number of applicants for the available veterinary employment opportunities fell below 1 for the first time since before the last recession and new graduate starting salaries hit

an all-time high real income level along with a record number of new graduates finding full-time employment prior to graduation. In 2017 there was a drop in the number of job applicants applying through the VCC website; this is because VCC jobs were no longer being posted on another search engine (which would direct the applicant to the VCC website), but the overall story remains that there are more employment opportunities than job applicants (Figure 6).

The relationship between the national S/D ratio and the VCC applicant-to-jobs ratio suggests a lag time between the national labor market and the veterinary labor market. This agrees with economic theory. As the economy reaches a peak, inventories begin to accumulate and companies lay off workers. The national S/D would show fewer Help Wanted OnLine employment opportunities and the rising unemployment would produce more applicants. Over time, unemployment benefits and savings would dry up and pet-owning households would reduce their demand for veterinary services. As this demand declined, the number of employment opportunities would decline but the number of potential new employees would not. This process appears, from these data, to take three-four years to occur, and this information should help veterinary practices prepare for the next recession.

VETERINARY CAREER CENTER JOBS AND APPLICANTS



Source: AVMA Veterinary Career Center (VCC)

Figure 6

Not all the employment opportunities on the VCC are for DVMs. Some of the opportunities are for the various staff positions in a veterinary hospital. More than 92 percent of the posted jobs do, however, require a DVM degree¹ (Table 3).

VCC DESCRIPTIVE STATISTICS OF JOBS, 2017

Occupation	< One	One to seven	Seven +	Any experience	Total
Veterinarian	4.0% (636)	47.8% (7,651)	0.4% (58)	47.9% (7,660)	100.0% (16,005)
Vet Tech/Assistant/Nurse	3.8% (27)	74.0% (529)	0.7% (5)	21.5% (154)	100.0% (715)
Practice Manager	0.5% (1)	91.8% (178)	1.5% (3)	6.2% (12)	100.0% (194)
Hospital Administrator	0.0% (0)	100.0% (2)	0.0% (0)	0.0% (0)	100.0% (2)
Medical Director	2.3% (1)	70.5% (31)	15.9% (7)	11.4% (5)	100.0% (44)
Regional Director	0.0% (0)	55.6% (5)	0.0% (0)	44.4% (4)	100.0% (9)
Other	6.4% (26)	69.2% (281)	5.2% (21)	19.2% (78)	100.0% (406)
Total	691	8,677	94	7,913	17,375 (17,375)

Source: AVMA Veterinary Career Center (VCC)

Table 3

While the DVM is the predominant requirement for employment opportunities listed on the VCC and represents the predominant registered applicant looking for employment, the veterinarian comprised 59 percent of the total number of registered active users of the VCC in 2017². Thus, there were roughly 16,005 DVM job postings that were seeking 2,570 applicants. In comparison

to the S/D ratios of other professionals, this 0.16 S/D would suggest that the mean salary would be in the ballpark of \$45-\$50 per hour. Assuming an average hourly work week of 45 hours, the average salary of a veterinarian would be \$105,000 to \$117,000 (Table 4).

¹The total column includes VCC-employment opportunities in which the job indicated the occupation and experience level in the VCC database, and excludes those opportunities that did not provide both types, or provided neither type, of information.

²The total column includes VCC-registered applicants who indicated their job level and experience level in the VCC database, and excludes those applicants who did not provide both types, or who provided neither type, of information.

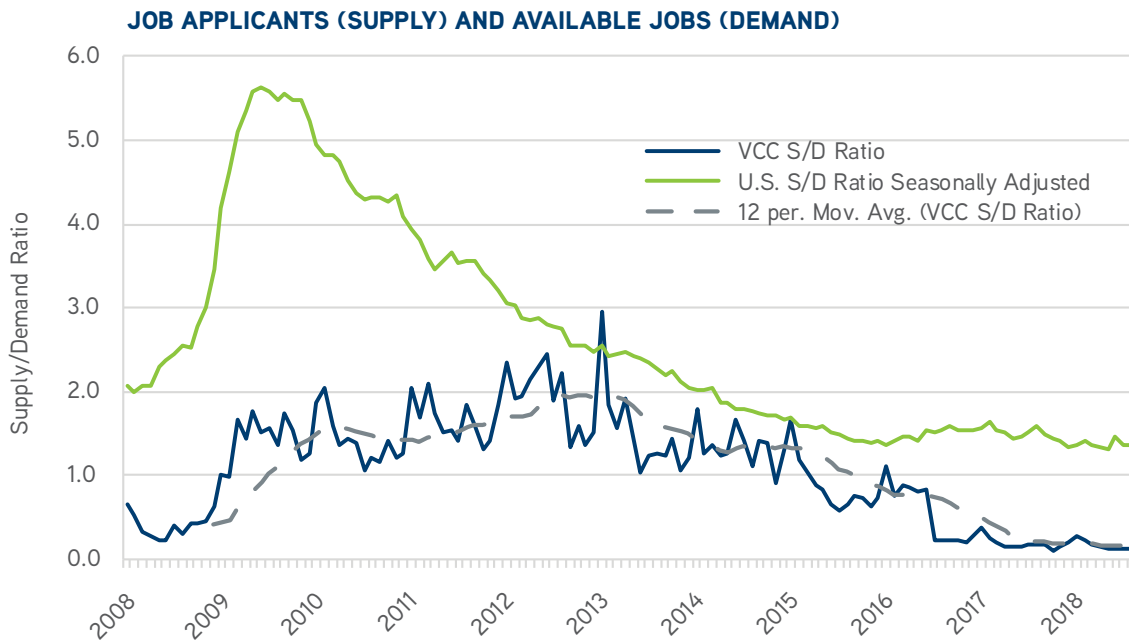
VCC DESCRIPTIVE STATISTICS OF USERS, 2017

Registered User	Experience Level of Registered User				Total
	< 1	1 to 7	7+	Any Level	
Veterinarian	28.2% (726)	45.6% (1,173)	22.4% (576)	3.7% (95)	100.0% (2,570)
Veterinary Student	80.4% (614)	8.8% (67)	1.7% (13)	9.2% (70)	100.0% (764)
Veterinary Technician	7.8% (46)	63.1% (373)	27.1% (160)	2.0% (12)	100.0% (591)
Not Listed	9.2% (38)	59.3% (246)	24.8% (103)	6.7% (28)	100.0% (415)
Total	32.8% (1,424)	42.8 (1,859)	19.6% (852)	4.7% (205)	100.0% (4,340)

Source: AVMA Veterinary Career Center (VCC)

Table 4

A comparison of the U.S. S/D ratio and the VCC ratio illustrates a pattern that may suggest a long lag time between changes in the United States S/D and changes in the veterinary labor market. This will be an important relationship to observe over time to determine the exact relationship between the two series and how that relationship can be used by veterinary practices to minimize the impacts of a recession (Figure 7).



Source: AVMA Veterinary Career Center (VCC); The Conference Board Help Wanted OnLine® (HWOL); United States Bureau of Labor Statistics

Figure 7



THE SURVEY INSTRUMENTS

The respondents to the 2017 Census of Veterinarians represented the distribution of veterinarians across the profession by practice type and region.

In 2014 and 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 veterinarians who have sought AVMA membership at any time in the past. The sample frame included AVMA members and non-members who graduated one, five, 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, was conducted to gauge compensation trends among the veterinary profession. The sample frame was randomly drawn from all veterinarians for whom the AVMA had contact information.

In 2016 the employment survey and the compensation survey were combined to reduce the number of national surveys and provide a more comprehensive set of information for each respondent. The new survey, referred to as the Census of Veterinarians is fielded in January and February, and questions cover events that occurred in or over the previous year (Table 5). The 2017 Census of Veterinarians was fielded to 15,904 recipients (21,638 in 2016), with 2,780 responding to the survey (2,545 in 2016), for a 17.5 response rate (11.8 percent in 2016).

AVMA SURVEYS RESPONSE RATES

	2014	2015	2016	2017
Employment Survey	22.7%	19.0%		
Compensation Survey	14.7%	11.8%		
Census of Veterinarians			11.8%	17.5%

Table 5

The respondents to the 2017 Census of Veterinarians represented the distribution of veterinarians across the profession by practice type (Figure 8) and region (Table 6), generally, but there were not sufficient responses to provide detailed information for each practice type in each region.

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY PRACTICE TYPE

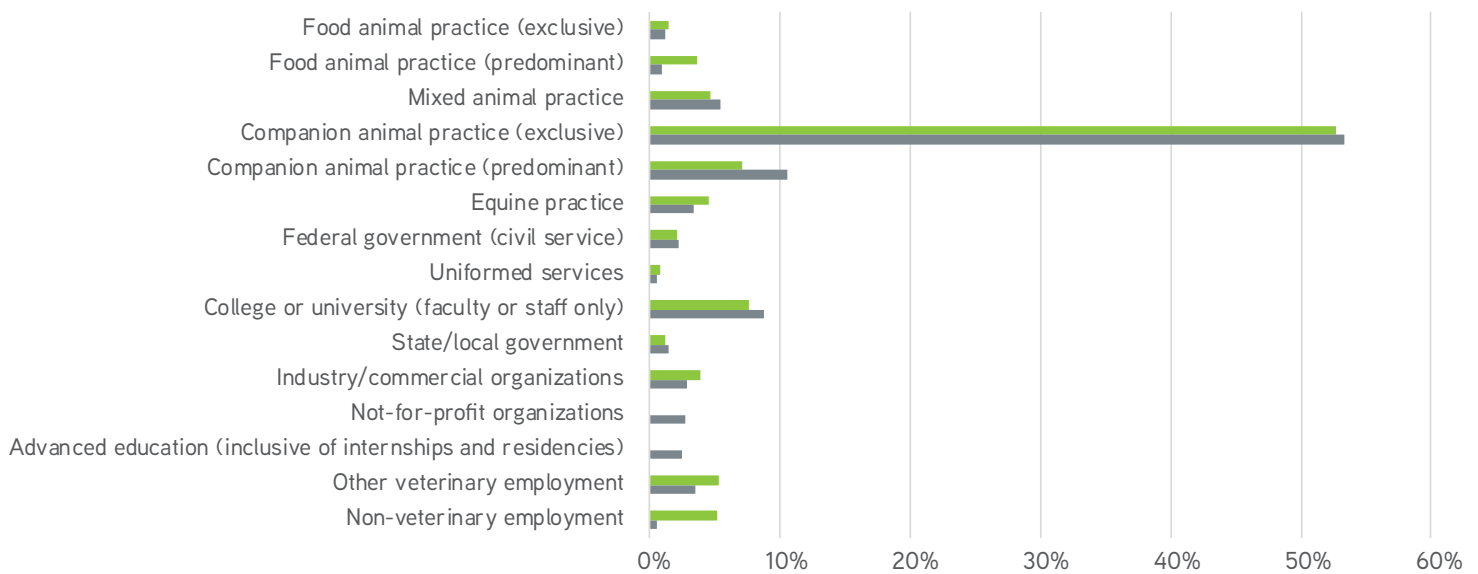


Figure 8

³ American Association of Bovine Practitioners

⁴ American Association of Equine Practitioners

SAMPLE RESPONDENTS, AVMA MEMBERSHIP AND U.S. POPULATION BY REGION

	2017 Census of Veterinarians	AVMA Membership	U.S. Population (est. 2017)
Region 0	8.2%	8.1%	7.3%
Region 1	8.9%	9.2%	10.3%
Region 2	11.8%	10.3%	9.7%
Region 3	11.9%	13.7%	14.1%
Region 4	11.1%	10.4%	10.1%
Region 5	8.8%	7.7%	5.3%
Region 6	9.1%	8.9%	7.3%
Region 7	8.8%	11.3%	12.3%
Region 8	8.9%	7.6%	7.1%
Region 9	12.5%	12.9%	16.4%

Table 6

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY GENDER

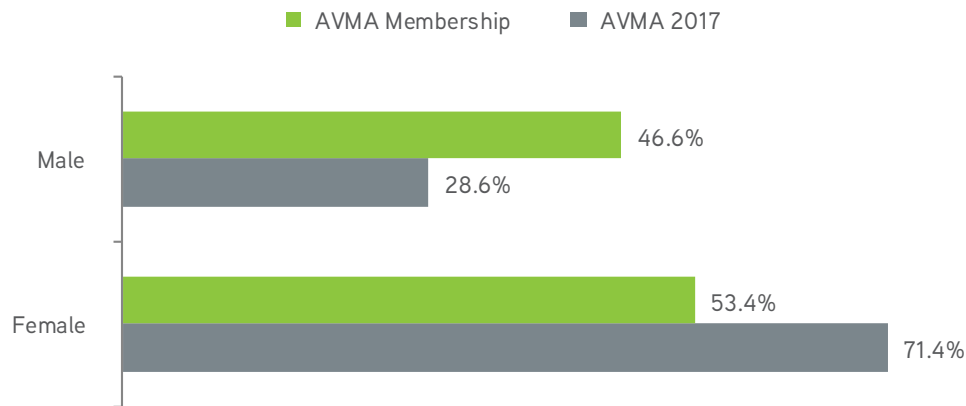


Figure 9

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

Because of the differences in distribution by practice type, region and gender, 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. A higher percentage of females than males responded to the survey compared to the gender distribution found in the profession (Figure 9).

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY GRADUATION YEAR

	2017 Census of Veterinarians		AVMA Membership	
	N	Percent	N	Percent
2007-2016	1,346	48.4%	28,704	29.8%
1997-2006	680	24.5%	20,220	21.0%
1987-1996	385	13.8%	17,480	18.2%
1977-1986	209	7.5%	14,300	14.9%
1967-1976	104	3.7%	7,654	8.0%
1957-1966	39	1.4%	4,858	5.0%
1947-1956	8	0.3%	3,023	3.1%
Missing	9	0.3%		
Total	2,780		96,239	

Table 7

The higher percentage of female respondents corresponds to the higher number of early career veterinarians who responded, as the majority of these early career veterinarians are female (Table 7).

There was, however, very little difference in the distribution of respondents by veterinary college attended, compared to the veterinary population (Figure 10).

More than half of the respondents were working in a suburban area (as with the respondents in the 2016 survey). Compared to 2016, there is a slight increase in respondents working in an urban area and a slight decrease in rural areas (Figure 11).

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY VETERINARY COLLEGE ATTENDED

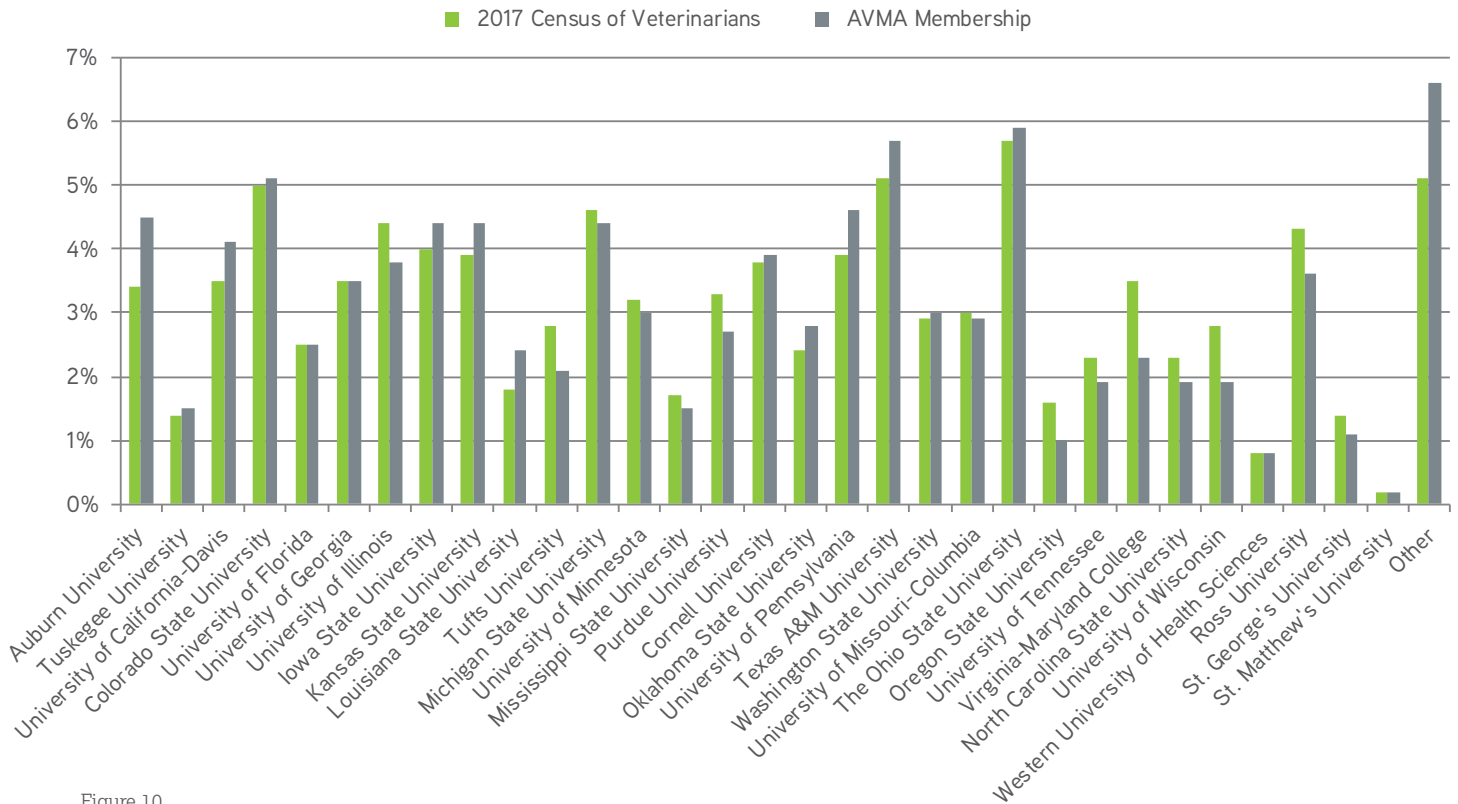


Figure 10

SAMPLE RESPONDENTS BY TYPE OF COMMUNITY

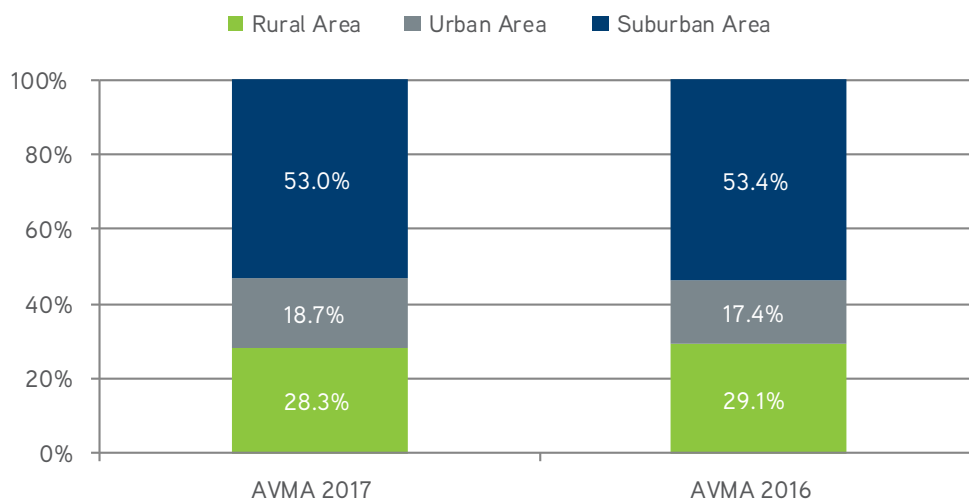


Figure 11



VETERINARIAN INCOMES

There is an increase in the 2017 reported incomes for veterinarians who earned more than \$80,000 compared to 2016, and a decrease in the number of veterinarians reporting less than \$80,000, with the exception of those reporting less than \$20,000 in 2017.

Incomes reported in this section are based on responses from veterinarians who earned more than \$30,000 and no more than a \$1,000,000 in 2016 and worked full time, between 30 and 90 hours per week. Veterinarians who fell outside of income and hours worked ranges were outliers for this analysis.

Around 65 percent of veterinarians' incomes were between \$60,000 and \$149,999. There is an increase in the 2017 reported incomes for veterinarians who earned more than \$80,000 compared to 2016, and a decrease in the number of veterinarians reporting less than \$80,000, with the exception of those reporting less than \$20,000 in 2017 (Figure 12).

SAMPLE RESPONDENTS BY INCOME RANGE

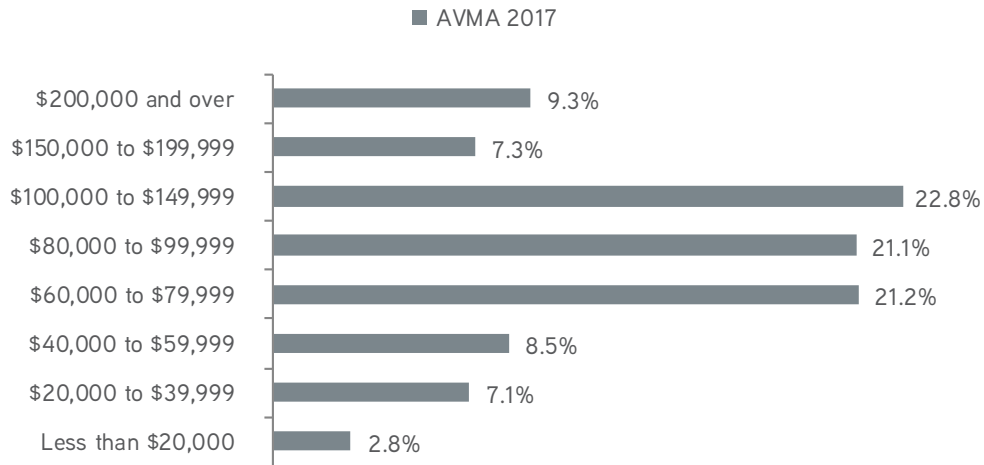


Figure 12

The income for the national sample varies by both graduation year and practice type. Figure 13 displays the mean income (points) by graduation year, as well as the range of incomes within one standard deviation of either side of the mean (line). Incomes increase with experience, and the range of incomes also

increases as experience increases for the first three decades post-graduation and then the mean income growth slows and declines along with the variation in income. An increase in average income is shown between 1960-1969, but note there were only eight observations.

INCOME BY GRADUATION YEAR, 2017

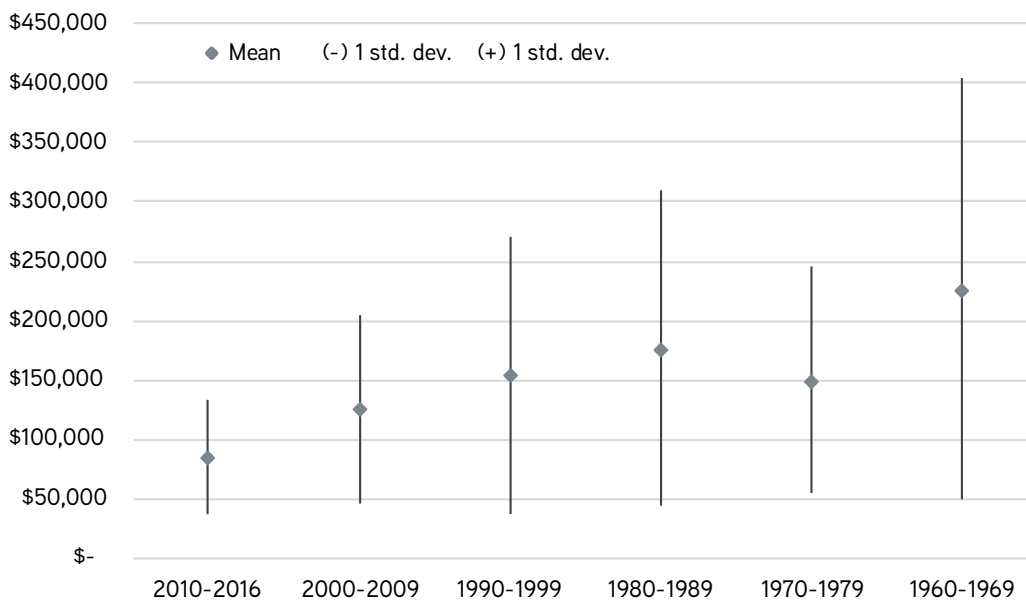


Figure 13

The difference in both mean incomes and the range of incomes within one standard deviation of the mean vary by practice type. This is the first year that additional practice type categories were added: consultant and research contractor. Incomes for industry veterinarians had the highest mean income in 2016 but in 2017

research contractors had the highest mean income followed by consultant, and then industry. Research contractor, equine and food animal practice types had the greatest range of reported incomes within one standard deviation of the mean (Figure 14).

MEAN PROFESSIONAL INCOME BY PRACTICE TYPE, 2017

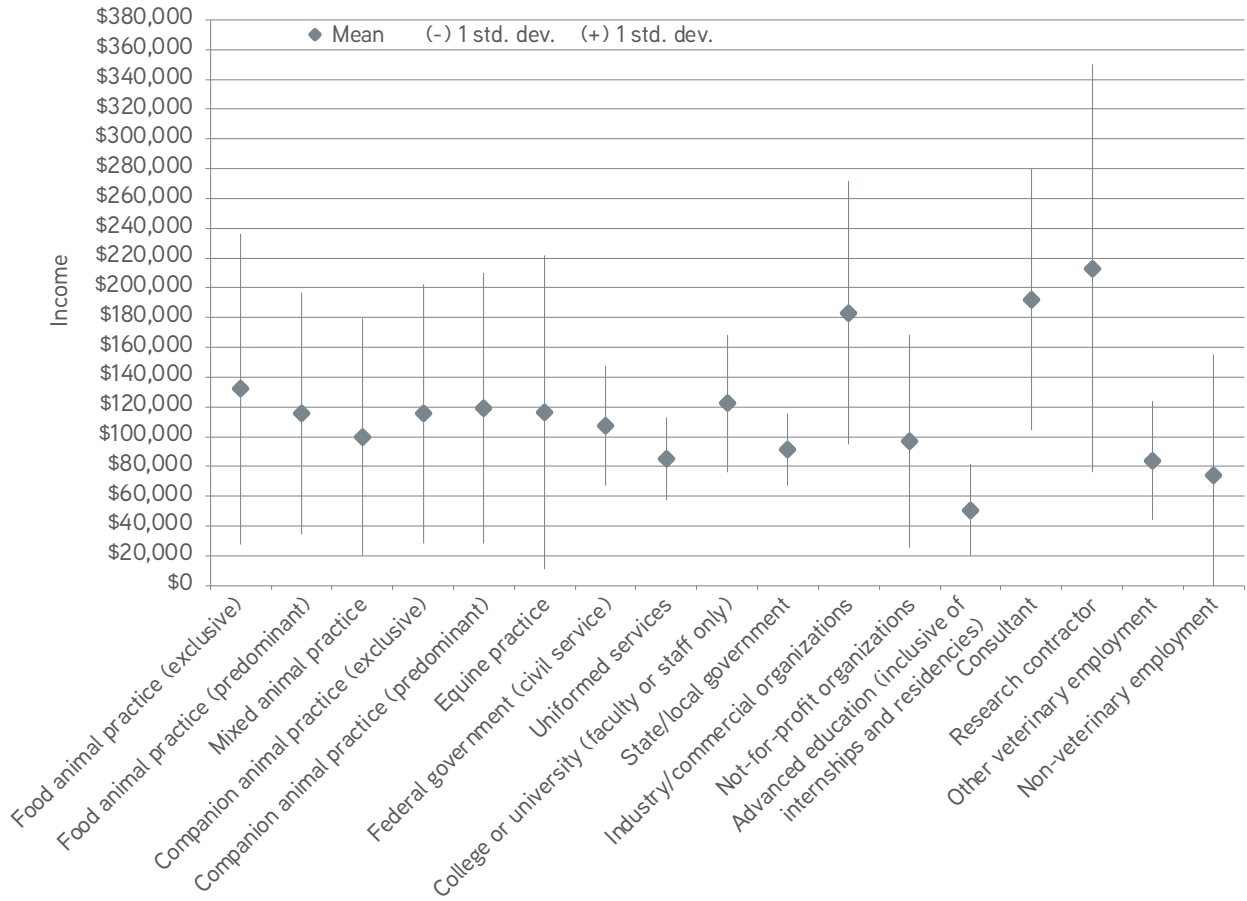


Figure 14

The distribution of incomes by practice type can also be illustrated by describing the mean income at percentiles. Mean income across all practice types for all levels of experience was just more than \$115,331 in 2017, placing the mean veterinarian income above the 90th percentile of all U.S. workers (Table 8).

INCOME PERCENTILES BY PRACTICE TYPE, 2017

Private Practice	10%	25%	Median	75%	90%	Mean	Std. Dev.	Obs.
Food Animal Exclusive	\$61,351	\$70,000	\$89,500	\$172,500	\$228,250	\$132,004	\$104,485	40
Food Animal Predominant	\$65,000	\$71,000	\$84,000	\$126,000	\$250,000	\$115,851	\$81,229	31
Mixed Animal	\$55,000	\$65,000	\$78,000	\$98,000	\$165,000	\$99,790	\$79,652	129
Companion Animal Predominant	\$60,000	\$70,000	\$90,000	\$130,000	\$200,000	\$115,325	\$86,827	281
Companion Animal Exclusive	\$65,000	\$77,500	\$95,000	\$120,000	\$190,000	\$118,848	\$90,874	1,174
Equine	\$45,000	\$60,000	\$80,000	\$120,000	\$296,000	\$116,278	\$105,400	69
Total Private Practice	\$61,800	\$74,000	\$92,000	\$120,000	\$195,000	\$116,997	\$90,273	1,724
Public Practice	10%	25%	Median	75%	90%	Mean	Std. Dev.	Obs.
Federal Government (Civil Service)	\$62,000	\$73,000	\$97,000	\$136,000	\$160,300	\$107,192	\$40,026	43
Uniformed Services	\$60,000	\$61,500	\$76,000	\$95,000	\$120,000	\$85,000	\$27,868	11
College/University	\$74,000	\$92,798	\$115,000	\$145,000	\$175,000	\$122,297	\$45,972	128
State/Local Government	\$65,570	\$75,000	\$84,000	\$98,000	\$140,000	\$91,298	\$24,428	18
Industry/Commercial Organization	\$95,000	\$118,000	\$173,000	\$224,000	\$300,000	\$183,259	\$88,590	63
Not-for-Profit Organization	\$51,385	\$62,400	\$80,000	\$102,000	\$150,000	\$96,776	\$71,514	61
Interns, Residents, & Adv. Education	\$31,500	\$35,500	\$45,000	\$55,000	\$70,000	\$50,592	\$30,712	64
Consultant	\$70,000	\$100,000	\$200,000	\$265,000	\$310,000	\$192,143	\$87,553	7
Research Contractor	\$60,000	\$73,500	\$206,000	\$335,000	\$441,968	\$212,924	\$137,015	7
Other Veterinary Employment	\$39,000	\$60,000	\$80,000	\$100,000	\$125,000	\$83,948	\$39,806	73
Non-Veterinary Employment	\$34,000	\$35,000	\$47,000	\$72,000	\$88,000	\$73,786	\$81,503	14
Total Public Practice	\$42,620	\$63,000	\$91,000	\$136,000	\$193,000	\$109,458	\$69,575	489
All Employment Types	\$57,000	\$72,000	\$92,000	\$125,000	\$193,905	\$115,331	\$86,170	2,213

Table 8

Using the percentile table to illustrate the influence of experience on income for all practice types indicates that within two decades in the workforce the median income of veterinarians exceeds the median income of the 90th percentile of all U.S. workers.

And, as noted earlier, median income begins to drop off after four decades of employment, as veterinarians move towards retirement (Table 9).

INCOME PERCENTILES BY EXPERIENCE LEVEL, 2017

Years of Experience	10%	25%	Median	75%	90%	Mean	Std. Dev.	Obs.
0-1	\$31,500	\$35,000	\$47,042	\$71,000	\$75,500	\$60,354	\$49,675	42
2-4	\$45,673	\$62,000	\$72,000	\$85,000	\$100,750	\$75,049	\$27,397	540
5-9	\$60,000	\$75,000	\$90,000	\$112,000	\$145,000	\$101,280	\$60,090	547
10-19	\$68,000	\$85,000	\$107,000	\$140,000	\$215,000	\$129,086	\$83,753	584
20-29	\$65,000	\$86,000	\$120,000	\$169,500	\$260,000	\$151,520	\$116,254	296
30-39	\$80,000	\$99,000	\$150,000	\$225,000	\$340,000	\$186,508	\$137,651	148
40+	\$56,000	\$88,000	\$113,000	\$192,000	\$300,000	\$157,664	\$112,649	57
All Levels	\$57,000	\$72,000	\$92,000	\$125,000	\$193,905	\$115,306	\$86,376	2,214

Table 9

The impact of additional education on income is illustrated in Table 10. Generally, though additional degrees have little impact on income, there is a statistically significant increase in income as a result of obtaining board certification (Table 10).

In some of the practice types, such as college and university, there are significant differences in incomes associated with different positions. Researchers make a significantly higher income followed by managers and executives than all other veterinary employees, while clinicians have the lowest average incomes (Table 11).

INCOME PERCENTILES BY ADDITIONAL EDUCATION, 2017

Education Level	10%	25%	Median	75%	90%	Mean	Std. Dev.	Obs.
DVM only	\$60,000	\$75,000	\$100,000	\$150,000	\$215,000	\$129,890	\$95,427	173
DVM and Specialized Degree (JD, MD, etc.) or Other	\$67,000	\$75,000	\$83,000	\$95,000	\$135,000	\$91,232	\$32,975	21
DVM & Bachelor's	\$55,000	\$70,000	\$90,000	\$118,707	\$173,000	\$109,102	\$81,174	1,596
DVM & Master's	\$62,000	\$76,000	\$100,000	\$140,000	\$224,000	\$123,465	\$79,709	318
DVM & PhD	\$77,000	\$100,000	\$140,000	\$180,000	\$300,000	\$167,025	\$120,198	87
Board Certification	10%	25%	Median	75%	90%	Mean	Std. Dev.	Obs.
Board Certified	\$85,000	\$113,000	\$145,000	\$206,000	\$300,000	\$175,249	\$110,860	285
Not Board Certified	\$55,000	\$70,000	\$88,000	\$115,000	\$165,000	\$106,553	\$78,463	1,934
All Levels	\$57,000	\$72,000	\$92,000	\$125,000	\$190,000	\$114,789	\$85,717	2,050

Table 10

SUMMARY STATISTICS FOR VETERINARIANS IN COLLEGE/UNIVERSITY POSITIONS

	Median*	Mean	Std. Dev.	Freq.
Professor: Assistant, Associate or Full	\$124,000	\$124,802	\$35,143	86
Executive: CEO/Vice President/ Chief Administrator/Dean	\$165,000	\$163,182	\$50,064	11
Manager: Division Director/Department Chair/Section Head	\$160,000	\$170,984	\$90,555	58
Clinician	\$80,000	\$89,314	\$38,833	79
Researcher	\$172,000	\$179,733	\$104,105	15
Other	\$88,500	\$96,027	\$36,991	86
Total	\$109,000	\$120,762	\$63,187	335

*Some values rounded to protect privacy.

Table 11

VETERINARY SALARY WORKSHEET

Questions pertaining to veterinarian incomes are among those most frequently received from veterinarians by the AVMA Veterinary Economics division. The following worksheet was developed using a multiple regression model with available factors found to significantly affect veterinary incomes. The regression model used observations of veterinary incomes from AVMA surveys between 2001 and 2017, including more than 50,000 observations. Thus, the worksheet provides the mean salary for specific demographic characteristics based on

historic observations (Table 12). This worksheet can be used to provide veterinarians with an understanding of how years of experience, practice ownership, location of employment, practice type, gender, and education or training beyond the doctor of veterinary medicine degree has affected incomes in the recent past. The worksheet was not intended, however, to be used by either employee or employer in setting or negotiating income. Veterinary incomes should reflect the value of veterinary services provided and the financial performance of the overall operation.

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	\$40,407	\$32,467	
	Last Two Digits of the Current Year	17	\$2,682	\$1,545	
	Mean Work Hours Per Week		\$349	\$131	
	Practice Owner (1=yes, 0=no)		\$4,738	\$3,146	
Step 2	For ONE of the following experience categories, enter a "1" in the "My Input" column:				
Years of Experience¹	1		\$0	\$19,867	
	2-3		\$25,244	\$47,017	
	4-6		\$41,200	\$57,966	
	7-9		\$55,786	\$65,863	
	10-14		\$71,343	\$68,822	
	15-19		\$79,695	\$76,099	
	20-29		\$90,835	\$82,402	
	30+		\$82,832	\$95,044	
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)		\$6,742	\$9,540	
	Region 1 (DE, PA, NY)		\$0	\$7,344	
	Region 2 (DC, MA, NC, SC, VA, WV)		\$0	\$3,578	
	Region 3 (AL, FL, GA, MS, TN)		\$0	\$0	
	Region 4 (IN, KY, MI, OH)		-\$7,055	-\$4,597	
	Region 5 (IA, MN, MT, ND, SD, WI)		-\$7,360	-\$2,303	
	Region 6 (IL, KS, MO, NE)		\$0	\$0	
	Region 7 (AR, LA, OK, TX)		-\$6,688	\$0	
	Region 8 (AZ, CO, ID, NM, UT, WY)		\$7,495	\$5,031	
	Region 9 (AK, CA, HI, NV, OR, WA)		\$0	-\$5,693	
Step 4	For ONE of the following practice types, enter a "1" in the "My Input" column:				
Private Practice	Food Animal (exclusive)		\$0	-\$5,693	
	Food Animal (predominant)		-\$8,918	-\$11,744	
	Mixed Animal		-\$6,331	-\$8,036	
	Companion Animal (exclusive)		\$0	\$0	
	Companion Animal (predominant)		\$0	-\$4,687	
	Equine		-\$3,470	-\$10,209	
Public Practice	Federal Government (civil service)		-\$5,471	\$4,782	
	Uniformed Services		-\$9,898	-\$6,103	
	College/University		-\$6,631	-\$6,364	
	State/Local Government		-\$23,929	-\$9,665	
	Industry/Commercial Organizations		\$23,095	\$28,157	
	Other Public		-\$7,829	-\$3,291	
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.)		\$0	\$4,022	
	Doctorate Degree (besides DVM)		\$9,245	\$9,613	
	Residency Completed		\$4,190	\$3,957	
	Board Certified		\$14,588	\$16,058	
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:				

¹ For "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 12

EARLY CAREER SALARIES OF BOARD-CERTIFIED VETERINARIANS

Among the many factors that might motivate veterinarians to become board certified is increased compensation. This type of specialization leads not only to an increase in the breadth of one's skillset, but also a refinement; focusing on one area of a skillset makes a veterinarian faster and more efficient, which leads to higher compensation.

In the previous section, it was shown that while accounting for all other factors including hours worked, region of the United States, other advanced degrees, practice type, practice ownership, and years of experience, a higher mean income is obtained by both board certification (\$14,588 for men and \$16,058 for women) and having served in a residency (\$4,190 for men and \$3,957 for women); both two variables add an additional amount just short of \$20,000 together. That is important to know, but a real question faced by veterinarians – particularly those who may have only worked in advanced education positions, such as internships and residencies – is how to determine just how much they should seek for a post-board certification starting salary. As he or she enters the workforce, a new board-certified veterinarian needs information to negotiate a starting salary and knowing the \$20,000 premium for all board-certified veterinarians won't help them. They can't simply ask for a \$20,000 premium, because they have been board certified. The answer is not straightforward because the interpretation of the survey questions appears to be inconsistent across

survey respondents. To counter this inconsistency, the table below provides income summary statistics for a small variety of experience levels. This information could influence the career decision of someone thinking of seeking board certification.

The data represented in Table 13 are drawn from the 2017 AVMA Census of Veterinarians. While a survey respondent's starting salary after the subject has become board certified isn't specifically asked, an educated guess can be made based on the number of years since the reported (DVM) graduation. Table 13 gives the summary statistics for those surveyed who were five, six and seven years post-graduate with their DVM degree, who are board certified, and whose income listed is for the prior year, 2016. For example, someone who graduated five years prior would be from the DVM class of 2011 reporting income for the 2016 year. For a traditional student, this would correspond to graduating in 2011, interning in 2012, serving in a residency from 2012-2015, and earning a full-time income from 2015-2016. This calculation gets complicated, however, because not everyone is a traditional student: Some will take a longer or shorter time to go through internships and residencies; some might take time off between DVM graduation and an internship/residency; some might study longer for exams; and some might face a variety of other complicating circumstances. There are few data points meeting these criteria, so it is not possible to look at each board-certified specialty.

EARLY CAREER SALARIES OF BOARD-CERTIFIED VETERINARIANS, 2017

DVM Graduation Year	Observations	Median	Mean	Std. Dev.
2011	32	\$106,850	\$115,737	\$65,273
2010	8	\$110,000	\$113,491	\$36,935
2009	8	\$136,000	\$143,128	\$46,666
2011***	27	\$113,000	\$129,026	\$62,288

*** Excludes observations below \$60,000, which are presumably residents' salaries.

Table 13

Both the mean and median salaries for those indicating they are board certified are above the mean and median salaries of those not board certified with an equivalent level of education, and represent a large increase, approaching \$50,000 over the starting salaries of veterinarians who are recent graduates.



VETERINARIAN EMPLOYMENT

The mean number of weeks unemployed in veterinary medicine has declined each of the last four years while the number of isolated periods of unemployment has not shown any significant change and remains near two periods.

UNEMPLOYMENT

Since 2014, the AVMA has been estimating the unemployment rate in the profession. As noted earlier, each survey is conducted at the beginning of the year and reports the unemployment rate for the previous year. Thus, the 2017 Survey provides the unemployment rate for 2016, and similarly, the underemployment rate and veterinary education outcomes assessments for the veterinary profession reflect those of the previous year.

SUMMARY STATISTICS

The 2014 Employment Survey indicated that the 2013 unweighted unemployment rate was 3.3 percent, with 1.7 percent of respondents not responding to the question. The 2015 Employment Survey indicated that the 2014 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 .81 percent and .85 percent, respectively, and thus the two rates are not statistically different. In 2016, the census survey was used to indicate the 2015 unweighted unemployment rate of 3.4 percent (updated from the *2017 AVMA Report on The Market for Veterinarians*), with 0.4 percent of the respondents not responding to this specific question, and in 2017, the unweighted unemployment rate was 1.5 percent, with 0.2 percent not responding to this specific question (Table 14).

To better align with the BLS estimates of unemployment, starting in 2016 a set of new questions were introduced in the Census of Veterinarians to

determine how many of those unemployed were actively seeking employment (the BLS definition). Eliminating respondents who indicated they were unemployed in 2016 because they were not actively seeking employment and those who were seeking

enrollment in an internship, residency or advanced education yielded an unemployment rate of 0.4 percent, which is well below the 4.9 percent national unemployment rate reported for 2016.

UNEMPLOYMENT RATE, 2017

Are you currently employed in veterinary medicine?	2014 Survey	2015 Survey	2016 Survey	2017 Survey
Yes	95.0%	94.4%	90.2%	94.9%
No	3.3%	4.4%	3.4%	1.5%
Retired			6.0%	3.5%
Missing	1.7%	1.2%	0.4%	0.2%
If unemployed, are you seeking employment in veterinary medicine?				
Seeking employment in veterinary medicine			38.8%	29.3%
Seeking enrollment in an internship, residency, or advanced education program			12.9%	4.9%
Not seeking employment (and not retired)			48.2%	65.9%
Unemployment Rate			1.4%	0.4%

Table 14

The surveys also sought the length and duration of unemployment in the veterinary profession by each of the respondents. The mean number of weeks unemployed in veterinary medicine has declined each of the last four years while the number of isolated periods of unemployment has not shown any significant change and remains near two periods (Table 15).

Unemployment by gender and year of graduation over the last three years has generally shown higher unemployment for females compared to males, and unemployment across all graduation years and gender have generally remained lower than the national average unemployment rate (Figure 15).

LENGTH AND DURATION OF UNEMPLOYMENT

		Mean	N	Std.Dev.	Minimum	Maximum
2014 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
2015 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
2016 Survey	How many weeks have you been unemployed in veterinary medicine?	36.5	93	20.3	0	52
	How many isolated periods of unemployment have you had?	1.6	66	1.1	0	5
2017 Survey	How many weeks have you been unemployed in veterinary medicine?	31.8	45	21.8	0	52
	How many isolated periods of unemployment have you had?	1.7	45	2.5	0	13

Table 15

UNEMPLOYMENT BY GENDER AND YEAR OF GRADUATION, 2013-2016

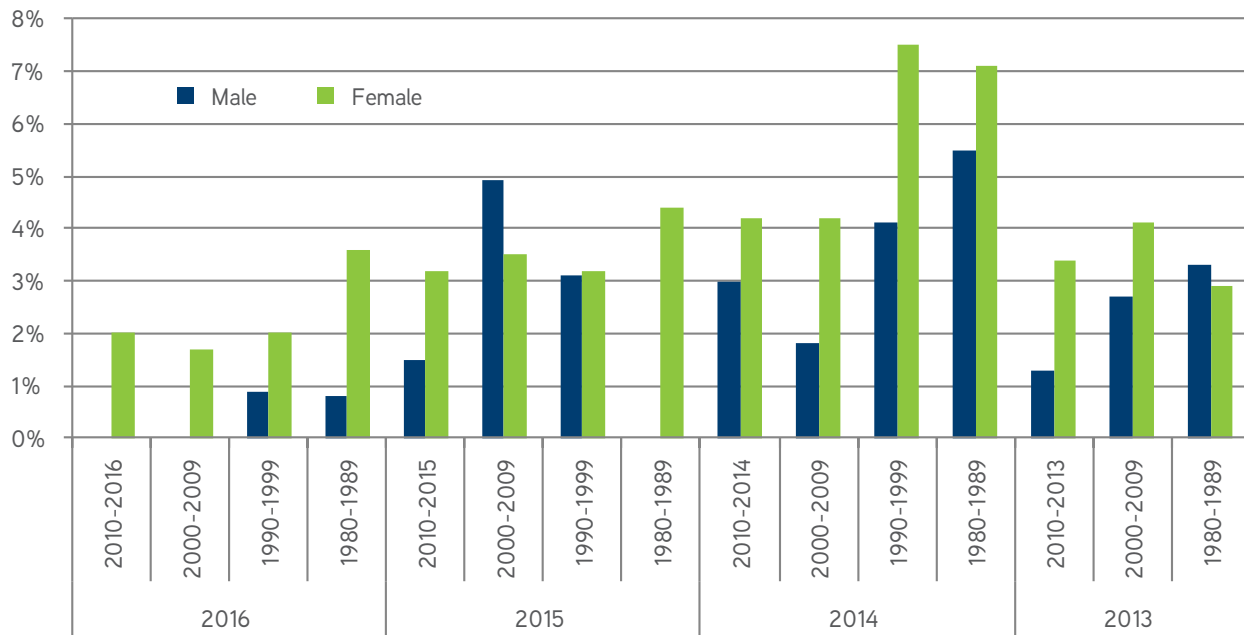


Figure 15

Unemployment also varied by region with the West North Central region (Region 5) having the highest percent of unemployed (3.2 percent) and the South Atlantic (Region 3), which comprises Tennessee, Mississippi, Alabama, Georgia and Florida, having the lowest unemployment (0.3 percent) (Table 16).

REGION AND EMPLOYMENT STATUS, 2017

	Working full time in veterinary medicine	Working part-time in veterinary medicine	Unemployed in veterinary medicine	Retired from veterinary medicine	Total
Region 0	80.7%	13.9%	2.5%	3.0%	100.0%
Region 1	81.7%	15.0%	1.9%	1.4%	100.0%
Region 2	81.2%	10.4%	1.3%	7.0%	100.0%
Region 3	86.8%	8.7%	0.3%	4.2%	100.0%
Region 4	84.2%	12.8%	0.8%	2.3%	100.0%
Region 5	82.9%	11.6%	3.2%	2.3%	100.0%
Region 6	85.1%	10.0%	0.9%	4.1%	100.0%
Region 7	82.6%	11.0%	0.9%	5.5%	100.0%
Region 8	82.7%	11.4%	1.4%	4.5%	100.0%
Region 9	78.2%	16.0%	2.6%	3.3%	100.0%
Total	82.6%	12.0%	1.6%	3.8%	100.0%

Table 16

Unemployment is also affected by the choice of first employment, with those first employed in uniformed services, food animal predominant, and faculty or staff at a college or university having the highest unemployment (Table 17).

Unemployment also varied by veterinary college attended, with those who attended Iowa State University and Oklahoma State University, followed by those who attended other (schools, not mentioned, outside of the 28 U.S.-accredited colleges of veterinary medicine) having the highest percent of unemployed veterinarians (Table 18).

FIRST VETERINARY EMPLOYMENT AND CURRENT EMPLOYMENT STATUS, 2017

	Working full time in veterinary medicine	Working part-time in veterinary medicine	Unemployed in veterinary medicine	Retired from veterinary medicine	Total
Food animal practice (exclusive)	94.0%	4.0%	2.0%	0.0%	100.0%
Food animal practice (predominant)	76.0%	10.0%	13.0%	1.0%	100.0%
Mixed animal practice	82.0%	12.0%	6.0%	1.0%	100.0%
Companion animal practice (predominant)	84.0%	13.0%	2.0%	1.0%	100.0%
Companion animal practice (exclusive)	82.0%	14.0%	2.0%	1.0%	100.0%
Equine practice	86.0%	10.0%	2.0%	2.0%	100.0%
Federal government (civil service)	90.0%	5.0%	0.0%	5.0%	100.0%
Uniformed services	65.0%	15.0%	19.0%	0.0%	100.0%
College or university (faculty or staff only)	80.0%	8.0%	10.0%	2.0%	100.0%
State/local government	89.0%	11.0%	0.0%	0.0%	100.0%
Industry/commercial organizations	94.0%	3.0%	3.0%	0.0%	100.0%
Not-for-profit organizations	80.0%	15.0%	3.0%	3.0%	100.0%
Currently participating in internship/residency	99.0%	1.0%	0.0%	0.0%	100.0%
Currently pursuing advance education	54.0%	15.0%	8.0%	23.0%	100.0%
Other	81.0%	11.0%	2.0%	6.0%	100.0%
Total	83.0%	12.0%	4.0%	2.0%	100.0%

Table 17

UNEMPLOYMENT BY VETERINARY COLLEGE

	2017	2016	2015
Iowa State University	4.5%	3.4%	2.4%
Oklahoma State University	4.5%	0.0%	0.0%
Michigan State University	3.1%	3.5%	2.2%
University of California-Davis	3.1%	2.8%	1.2%
Cornell University	2.8%	6.2%	1.3%
Ross University	2.5%	0.0%	0.0%
Washington State University	2.5%	0.0%	0.0%
Purdue University	2.2%	1.5%	0.0%
Virginia-Maryland College	2.1%	2.4%	0.0%
Louisiana State University	2.0%	2.6%	0.0%
North Carolina State University	1.6%	3.0%	1.6%
The Ohio State University	1.3%	4.0%	2.4%
Tufts University	1.3%	3.9%	1.4%
University of Wisconsin	1.3%	4.2%	3.0%
University of Pennsylvania	0.9%	0.9%	0.0%
Kansas State University	0.9%	1.6%	1.1%
University of Illinois	0.8%	0.9%	0.0%
Auburn University	0.0%	2.3%	0.0%
Tuskegee University	0.0%	0.0%	0.0%
Colorado State University	0.0%	1.0%	0.0%
University of Florida	0.0%	1.9%	0.0%
University of Georgia	0.0%	1.0%	0.0%
University of Minnesota	0.0%	5.7%	1.4%
Mississippi State University	0.0%	0.0%	0.0%
Texas A&M University	0.0%	0.6%	0.0%
University of Missouri-Columbia	0.0%	3.8%	2.9%
Oregon State University	0.0%	0.0%	0.0%
University of Tennessee	0.0%	1.6%	0.0%
Western University of Health Sciences	0.0%	3.1%	0.0%
St. George's University	0.0%	7.5%	5.1%
St. Matthew's University	0.0%	0.0%	0.0%
Other	3.5%	13.1%	7.3%
Total	2.0%	3.0%	1.4%

Table 18

FACTORS AFFECTING UNEMPLOYMENT

A logistic regression was employed to identify the relationship between unemployment and the various factors presented above. The logistic regression predicts the probability that an observation falls into one of two categories, in this case employed or unemployed. Unemployment regression identifies the respondents as having a higher likelihood of being unemployed in veterinary medicine if the coefficient is positive and significant. The increase in probability of being unemployed is defined by the Odds Ratio. For instance, having a first employment in a companion animal exclusive practice indicates a .07 times lower probability associated with unemployment, meaning that first employment in this sector decreases the odds of being unemployed by 93 percent. The factors that are significant are associated with unemployment, though are not necessarily a cause of unemployment. This regression, however,

applies to all respondents who were unemployed in veterinary medicine. This does not mean they are all seeking employment in veterinary medicine nor does it mean they are unemployed. It just means they are not currently employed in veterinary medicine.

Factors found to be associated with a lower probability of unemployment were male compared to female, board certified compared to non-board certified, home ownership and first employment in mixed animal practice and companion animal practice (exclusive). Factors found to be associated with higher probability of unemployment were M.P.H. degree, reside in Region 5 and attended Oklahoma State University. Even though DVM debt was found to be significant, there was no change in the probability of those with more DVM debt compared to those with less DVM debt (Table 19).

FACTORS AFFECTING UNEMPLOYMENT IN VETERINARY MEDICINE

	Coefficient	Standard Error	t-Statistic	p-value	Odds Ratio	Probability
Number of years post graduation (2016=1)	0.042	0.031	1.36	0.173	1.04	4%
Gender: Male=1, Female=0	-2.216	0.961	-2.30	0.021	0.11	-89%
Board Certified =1 else 0	-1.706	0.988	-1.73	0.084	0.18	-82%
Health, Poor=1, Excellent=5	-0.202	0.255	-0.79	0.429	0.82	-18%
Own	-1.949	1.154	-1.69	0.091	0.14	-86%
Rent	-1.030	1.216	-0.85	0.397	0.36	-64%
Married	-0.131	0.534	-0.25	0.806	0.88	-12%
DVM Debt	0.000	0.000	-1.86	0.062	1.00	0%
Doctorate Degree (Ph.D., Ed.D. etc.)	1.055	1.200	0.88	0.379	2.87	187%
Master's in Public Health (M.P.H., etc.)	1.979	1.153	1.72	0.086	7.24	624%
Master's in Science (M.S.)	0.044	0.914	0.05	0.961	1.05	5%
Other Master's Degree	0.679	1.539	0.44	0.659	1.97	97%
Bachelor's Degree (BSc., B.A., etc.)	-0.623	0.913	-0.68	0.495	0.54	-46%
Other Degree	0.461	1.231	0.37	0.708	1.59	59%
No Additional Degree	0.058	1.262	0.05	0.964	1.06	6%
First Veterinary Employment: Mixed Practice	-3.937	1.163	-3.38	0.001	0.02	-98%
First Veterinary Employment: Companion Animal Exclusive	-2.667	0.805	-3.31	0.001	0.07	-93%
First Veterinary Employment: Equine	-0.632	0.992	-0.64	0.524	0.53	-47%
First Veterinary Employment: College/University	-2.443	1.579	-1.55	0.122	0.09	-91%
First Veterinary Employment: Not-for-Profit	-1.647	1.544	-1.07	0.286	0.19	-81%
Live Region 0	0.769	1.085	0.71	0.478	2.16	116%
Live Region 1	0.175	1.12	0.16	0.876	1.19	19%
Live Region 2	0.153	1.033	0.15	0.883	1.17	17%
Live Region 3	0.396	1.281	0.31	0.757	1.49	49%

FACTORS AFFECTING UNEMPLOYMENT IN VETERINARY MEDICINE CONT'D.

	Coefficient	Standard Error	t-Statistic	p-value	Odds Ratio	Probability
Live Region 4	-0.278	1.140	-0.24	0.807	0.76	-24%
Live Region 5	1.998	1.162	1.72	0.085	7.38	638%
Live Region 6	0.576	1.155	0.5	0.618	1.78	78%
Live Region 7	-1.200	1.445	-0.83	0.406	0.30	-70%
Live Region 8	1.115	1.019	1.09	0.274	3.05	205%
University of California-Davis	0.111	1.448	0.08	0.939	1.12	12%
University of Illinois	-1.032	1.609	-0.64	0.521	0.36	-64%
Iowa State University	-1.336	1.592	-0.84	0.401	0.26	-74%
Tufts University	-1.454	1.793	-0.81	0.418	0.23	-77%
Michigan State University	0.354	1.382	0.26	0.798	1.43	43%
Purdue University	-0.460	1.533	-0.30	0.764	0.63	-37%
Cornell University	-0.769	1.732	-0.44	0.657	0.46	-54%
Oklahoma State University	2.421	1.411	1.72	0.086	11.26	1,026%
University of Pennsylvania	-0.866	1.612	-0.54	0.591	0.42	-58%
Washington State University	-0.346	1.501	-0.23	0.818	0.71	-29%
The Ohio State University	-1.242	1.581	-0.79	0.432	0.29	-71%
Virginia-Maryland College	-0.048	1.493	-0.03	0.975	0.95	-5%
Ross University	1.502	1.364	1.10	0.271	4.49	349%
Constant	2.416	2.428	0.99	0.320	11.20	1,020%
Observations	767					
Prob > chi2	0.0272					

Auburn, Tuskegee, Colorado, Florida, Georgia, Kansas, Louisiana, Minnesota, Mississippi, Texas, Missouri, Oregon, Tennessee, North Carolina State, Wisconsin, Western, St. George's, St. Matthew's, other college, first employment food animal (exclusive), food animal (predominant), companion animal (predominant), federal government, uniform services, state and local government industry and other first employment, M.B.A., Master's degree (M.A., M.S.), specialized degree, and live Region 9 were omitted because the number of unemployment observations did not permit estimation.

Table 19

Only 0.5 percent of the sample is unemployed in veterinary medicine and seeking employment or further continuing education in veterinary medicine. There is an additional set of respondents who are unemployed in veterinary medicine but not seeking employment in veterinary medicine or enrollment in advanced education (Table 20).

UNEMPLOYED SEEKING EMPLOYMENT OR OTHER CONTINUING EDUCATION IN VETERINARY MEDICINE

	Frequency	Percent	Valid Percent
Seeking employment in veterinary medicine	12	0.4	29.3
Seeking enrollment in an internship, residency, or other academic program	2	0.1	4.9
Not seeking employment or enrollment	27	1.0	65.8
Total	41	1.5	100
System	2,698	97.1	
Total	2,780	100	

Table 20

When those currently unemployed and seeking employment in veterinary medicine are considered, the only significant variable associated with a higher probability of being unemployed was graduation date. That is, recent graduates have a statistically higher probability of being unemployed and seeking employment in veterinary medicine (Table 21).

SEEKING EMPLOYMENT BY GRADUATION YEAR

Graduation Years	Seeking employment in veterinary medicine	Not seeking employment in veterinary medicine	Total
2007-2016	10	9	19
1997-2006	1	7	8
1987-1996	0	7	7
1977-1986	1	3	4
1967-1976	0	1	1
1957-1966	0	2	2
Total	12	29	41

Table 21





UNDEREMPLOYMENT

Underemployment was again negative in 2017 following the trend started in 2014, with more veterinarians indicating they wish to work fewer hours for less compensation than those who wish to work more hours for more compensation.

As noted earlier, the unemployment rate considers only those who are unemployed and seeking employment. Within veterinary medicine the unemployment rate for veterinarians would consider only those who are not employed but desire to be employed (are actively seeking employment) in the veterinary profession. But the unemployment rate doesn't measure the true number of people who are looking for work, because it does not count those who are underemployed. Because the unemployment rate is computed using the same method each year, it is an indicator of 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 or worsening.

The AVMA Census of Veterinarians Survey was designed to measure both unemployment and underemployment. Underemployment occurs when a worker is not working as many hours as he or she would like, or the worker is not working in a position that utilizes his or her training and experience.

Underemployment has two definitions. In the context of the veterinary field, the first definition of underemployment is when a veterinarian is 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 increase or decrease in compensation. The survey question asked if veterinarians wish to work more for greater compensation or work less for less compensation. Additional questions sought the actual number of hours per week worked currently and the number of hours that would be preferred.

SUMMARY STATISTICS

Underemployment was again negative in 2017 following the trend started in 2014, with more veterinarians indicating they wish to work fewer hours for less compensation than those who wish to work more hours for more compensation. In 2017, veterinarians wanted to reduce a net total 133,219 weekly hours of work, and this would require an additional 3,330 veterinary FTEs (40 hours per week equals one FTE) to eliminate the negative underemployment. This was slightly less than the number of veterinarians needed in 2016 (3,391), and still a substantial

increase from the 1,895 new veterinarians needed in 2015 and the 1,713 new veterinarians who would have been needed in 2014.

While the majority of veterinarians are content with their current number of work hours per week, 9.3 percent indicated a desire to increase the number of hours per week for increased compensation, while 20.2 percent indicated a desire to reduce the number of hours worked per week for reduced compensation (Figure 16).

PREFERENCE TO CHANGE WORK HOURS PER WEEK

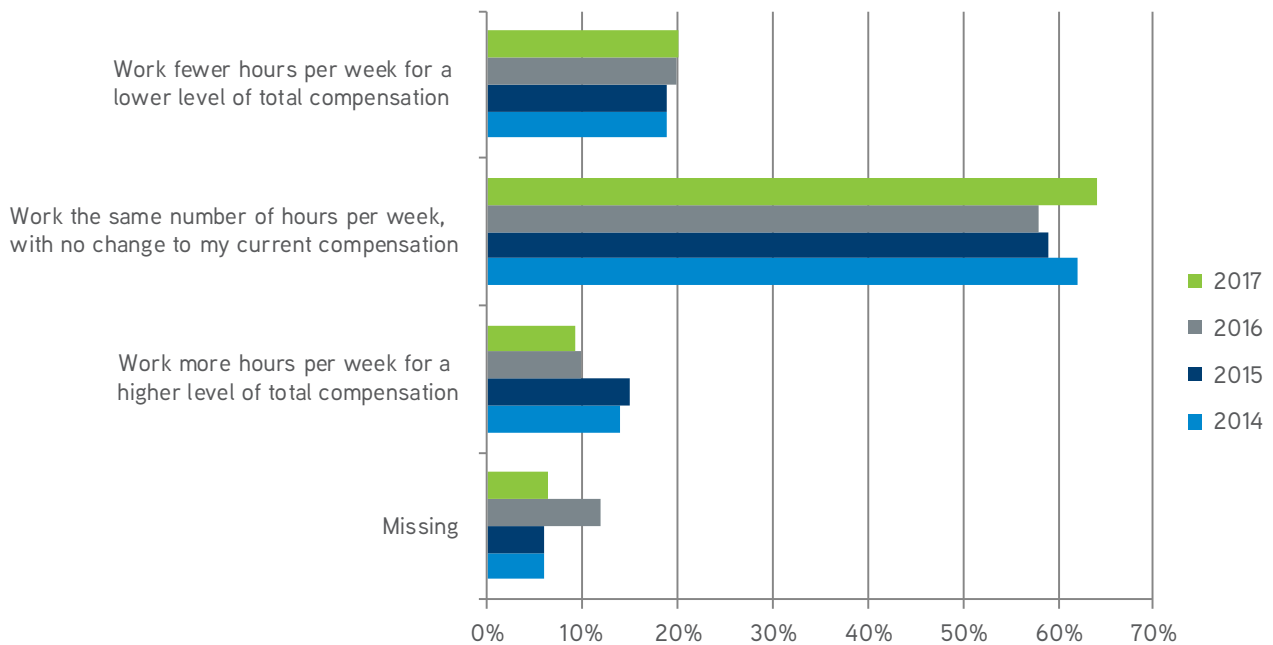


Figure 16

As with unemployment, underemployment varies by gender, region and practice type. More females want to work fewer hours than want to work additional hours, but for the second time since we have measured underemployment, the percent of men who wish to work less is also greater than the percent who wish to work more hours per week (Figure 17).

⁶ Number updated since the 2017 AVMA Economic Summit.

UNDEREMPLOYMENT BY GENDER

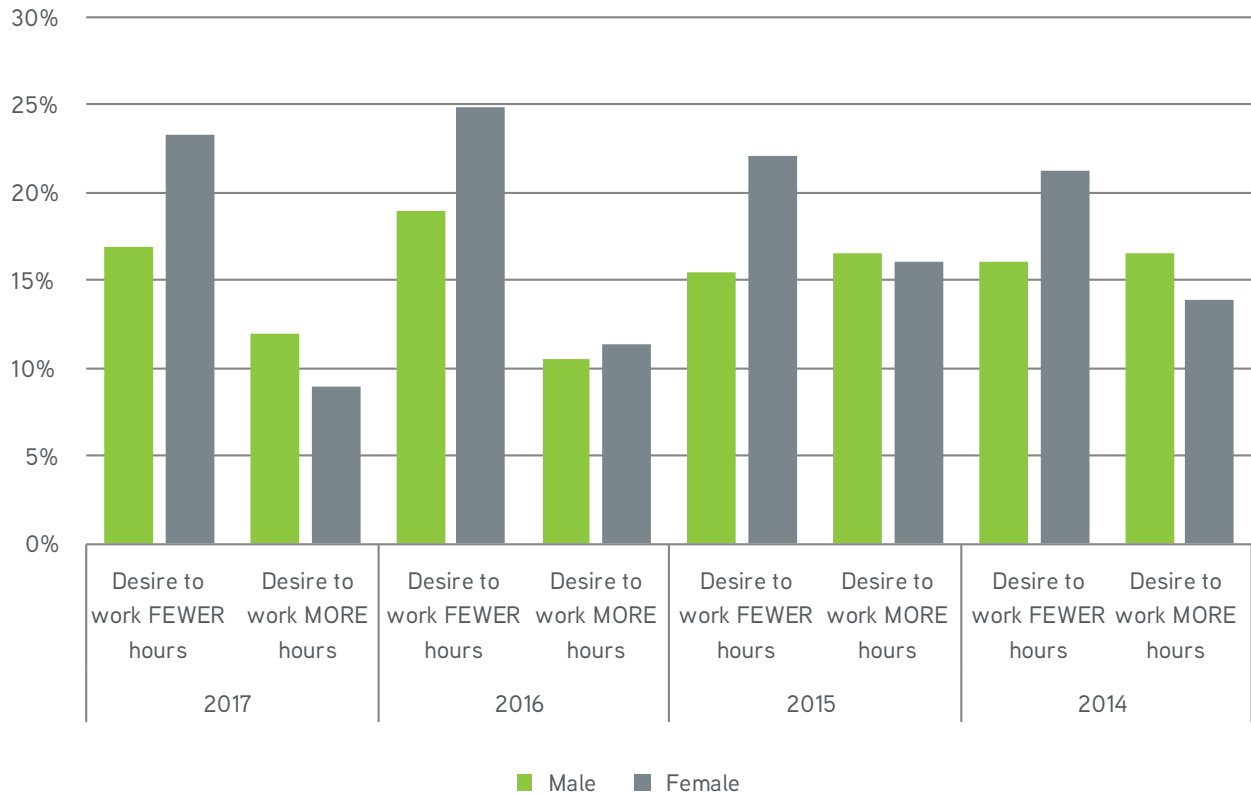


Figure 17

Geographically, less than half of the regions followed the national trend of more veterinarians wanting to work fewer hours than the number of veterinarians wanting to work additional hours. In the Northeast (Region 0), the Middle Atlantic (Region 1), East South Central (Region 4), West North Central (Region 5), West North Central (Region 6) and West South Central

(Region 7) there are more veterinarians who wish to work additional hours than those wishing to work fewer hours. This disparity in underemployment across regions illustrates the problem of geographical maldistribution and suggests a need for greater mobility within the profession (Table 22).

UNDEREMPLOYMENT BY REGION

	AVMA Database	Work fewer hours	Work more hours
Region 0	8.0%	7.4%	7.6%
Region 1	9.0%	8.2%	11.7%
Region 2	10.9%	11.4%	10.8%
Region 3	13.7%	15.9%	10.3%
Region 4	10.0%	9.0%	12.1%
Region 5	7.5%	7.8%	9.4%
Region 6	8.3%	9.4%	10.3%
Region 7	11.1%	8.8%	9.4%
Region 8	8.2%	8.8%	6.7%
Region 9	13.3%	13.1%	11.7%
Total	100.0%	100.0%	100.0%

Table 22

Underemployment by practice type also generally followed the national trend with most practice types having more veterinarians who wish to work fewer hours for less compensation than those who wish to work more hours for more compensation (Table 23).

UNDEREMPLOYMENT BY PRACTICE TYPE

	AVMA Database	Work fewer hours	Work more hours
Food animal practice (exclusive)	1.4%	4.3%	10.9%
Food animal practice (predominant)	3.6%	12.2%	12.2%
Mixed animal practice	4.7%	26.6%	9.5%
Companion animal practice (predominant)	7.1%	22.6%	11.5%
Companion animal practice (exclusive)	52.7%	21.8%	8.4%
Equine practice	4.5%	19.2%	10.8%
Federal government (civil service)	2.1%	5.3%	21.1%
Uniformed services	0.8%	31.0%	7.1%
College or university (faculty or staff only)	7.6%	21.8%	10.3%
State/local government	1.2%	22.2%	22.2%
Industry/commercial organizations	3.9%	9.7%	9.7%
Not-for-profit organizations		19.4%	8.3%
Currently participating in internship/residency		25.4%	14.1%
Currently pursuing advanced education		0.0%	25.0%
Other	10.4%	15.5%	20.7%
Total/ Average	100.0%	17.1%	13.5%

Table 23

The number of hours respondents indicated they currently work varied widely, ranging from one hour to more than 100 hours, but the majority of respondents (67.4 percent) indicated that their current hourly work weeks were predominately in the five-hour increments between 30 and 50 hours per week. And, as might be expected there was a higher percentage of respondents who currently work more than 40 hours per week who wish to reduce the number of hours worked per week for less compensation

than there are those who wish to increase the number of hours worked per week for more compensation. The reverse was also true. Among those working fewer than 40 hours per week, there was a higher percentage who wished to work more hours per week for greater compensation than those who wish to work less for less compensation (Figure 18). But this differed slightly by gender.

CHANGE IN HOURS DESIRED AND CURRENT HOURS WORKING

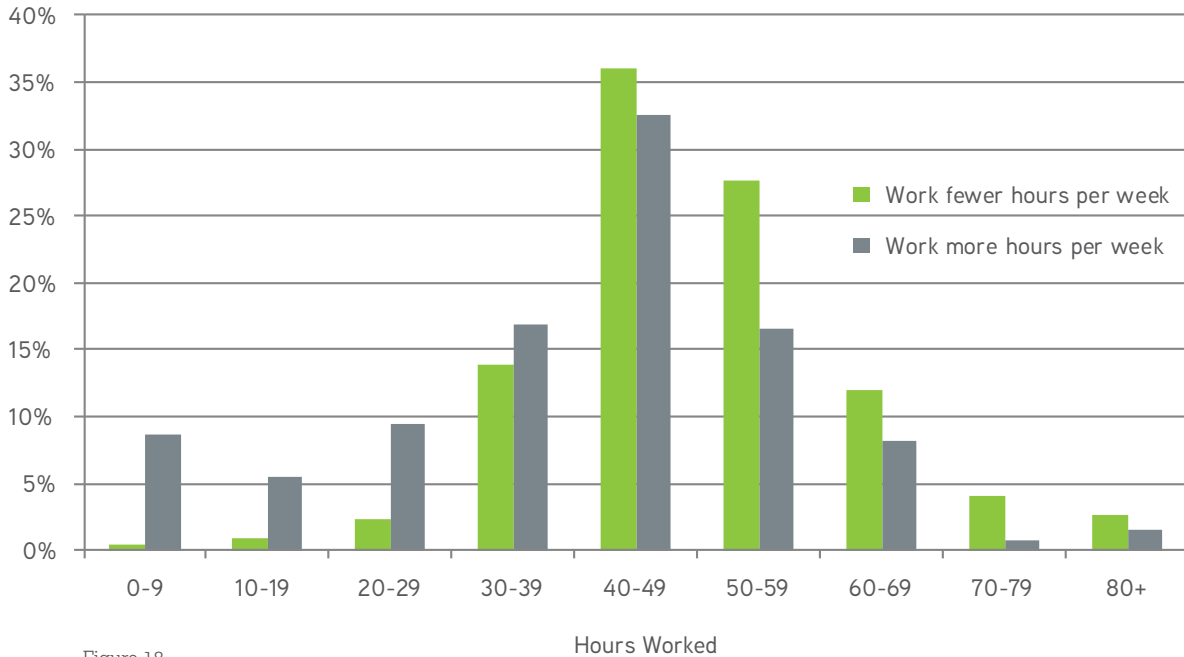


Figure 18

The difference in the preference of hours worked by gender over the last four years illustrates the constant growth in the percentage of female veterinarians who wish to work fewer hours for less compensation. And, for both men and women, the desire to work more hours continued to fall in 2017 compared to the previous years.

Among veterinarians working between 40 and 49 hours per week, approximately 33 percent of males and females want to work more hours while 37 percent of females and 33 percent of males want to work fewer hours. Almost 25 percent of males working between 50 and 59 hours per week want to work fewer hours while almost 30 percent of females in the same category want to work fewer hours (Figure 19 and Figure 20).

MALE WORK PREFERENCE

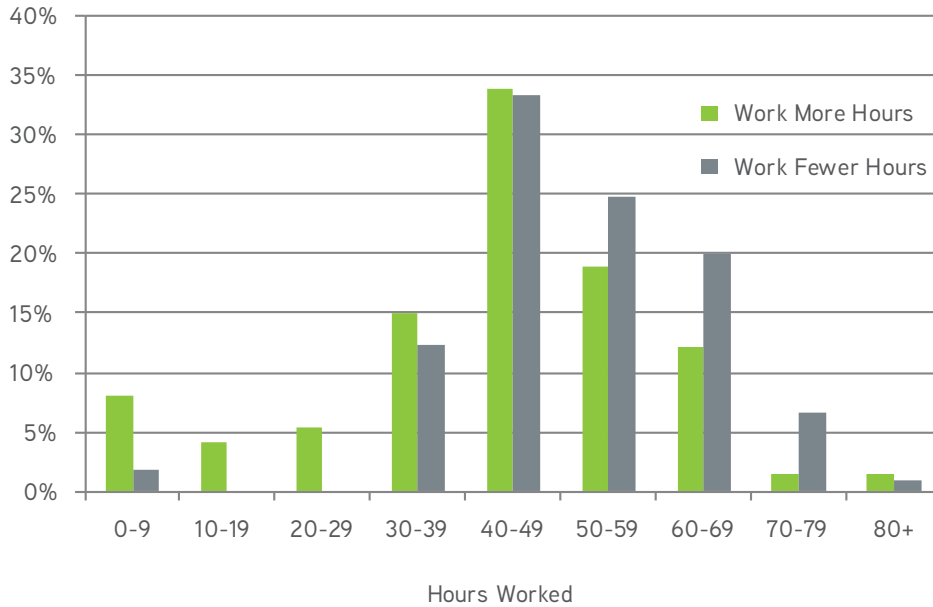


Figure 19

FEMALE WORK PREFERENCE

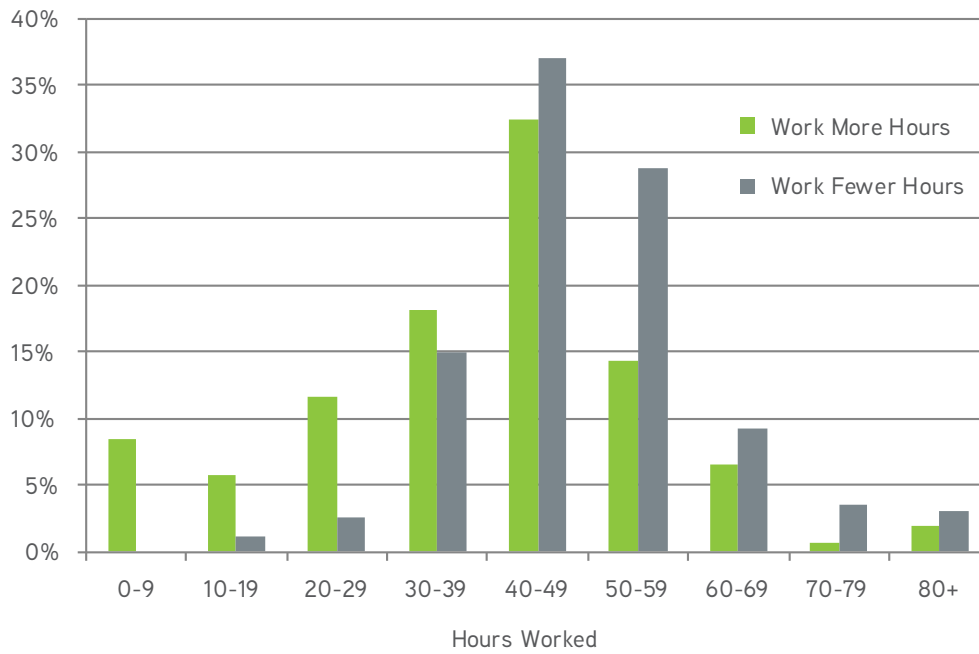


Figure 20

In 2017, the distribution of change in hours among those veterinarians who desired to change their hourly work week varied from a reduction of 49 hours per week to an increase of 50 hours per week from their current hourly work week, just as occurred in 2016. For both men and women in 2017, however,

more than 25 percent of males and 35 percent of females desired a reduction in hours per week of 10 to 19 hours while about 17 percent of males and 11 percent of females desired an increase of 10 to 19 hours, compared to the 5 percent that in 2016 desired an increase of this number of hours (Figure 21).

CHANGE IN HOURS DESIRED BY GENDER, 2017

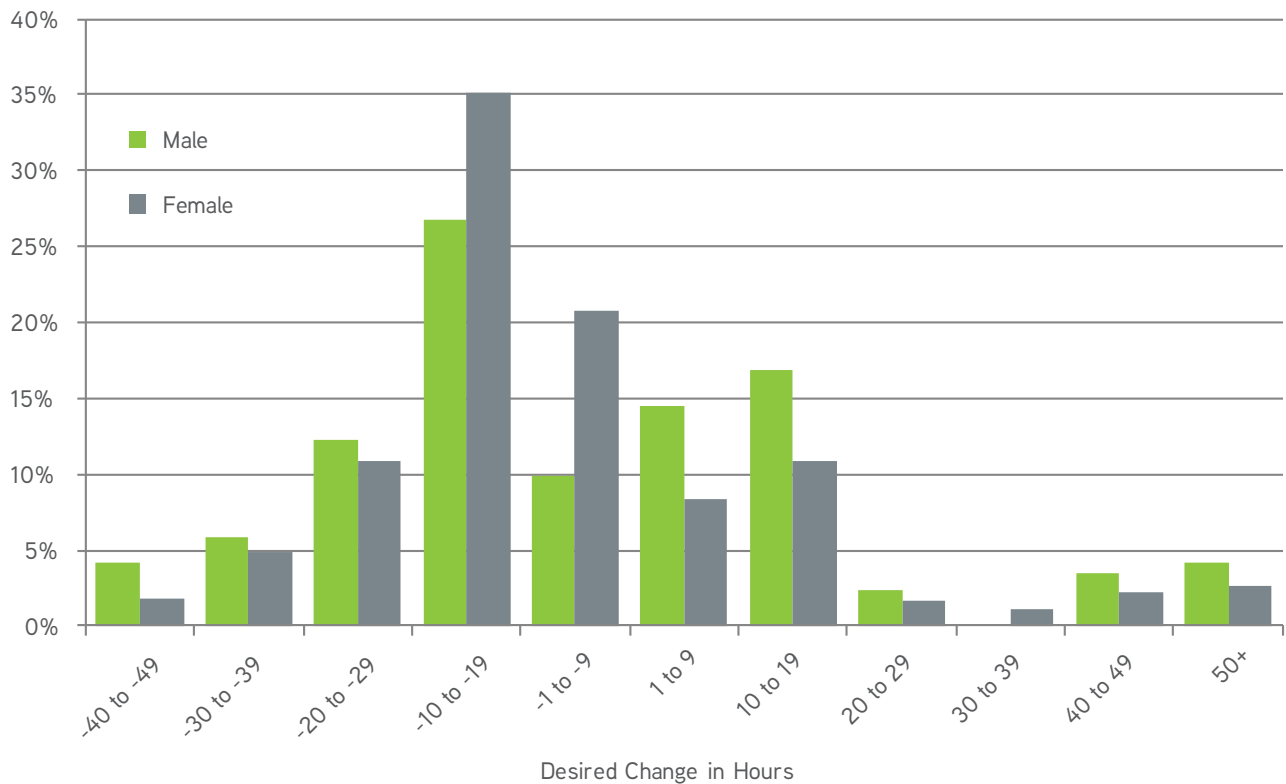


Figure 21

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 fewer than 40. This is in contrast to the group that wants to increase the hours they work to more than 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 who 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 who 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 for 2015, 2016 and 2017: The majority wished to work 40-49 hours per week (roughly 35 percent in 2015, 39 percent in 2016,

and 40 percent in 2017). In 2015 the desired number of hours per week was normally distributed for women with roughly 30 percent wanting to work fewer hours and 30 percent wanting to work more than 40 to 49 hours per week. This changed in 2016 with 36 percent wishing to work less and 25 percent wishing to work more than the 40 to 49 hours per week, and in 2017, 33 percent wishing to work less and 25 percent wishing to work more than 40 to 49 hours per week.

In 2015, 46 percent of men desired a work week in excess of 40 to 49 hours while only 19 percent wanted to work fewer hours. In 2016 this wide variation declined, however, as only 38 percent indicated that the optimum hours per week exceeded 40 to 49 hours while 24 percent wished to work less than 40 to 49 hours per week. In 2017 it is seen that 28 percent wished to work fewer than 40 to 49 hours per week and 38 percent wished to exceed a 40- to 49-hour work week (Figure 22).

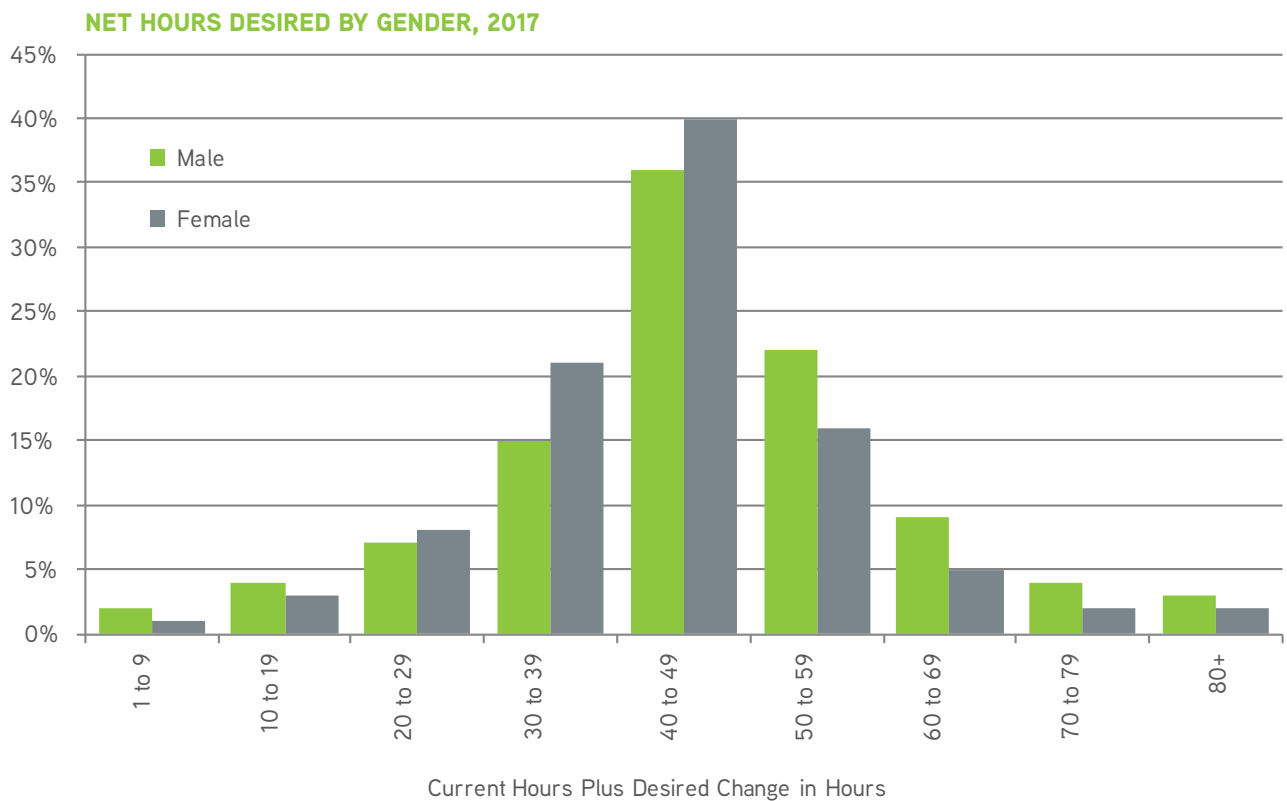


Figure 22

Taking apart the desired change in hours worked by gender and graduation period for those who wish to work more versus those who wish to work less provides greater detail for understanding the distribution of underemployment in the profession.

For nearly every age of female veterinarians, those who wish to reduce the hours per week worked for less compensation exceeded the number of those who wished to increase the number of hours worked per week for increased compensation. In 2017, there is an increase in the percent of female veterinarians who wish to reduce their hourly work week the farther away from their graduation year (Figure 23).

The percentage of female veterinarians that wish to work more hours per week for greater compensation declined across all graduation periods over the last four years. And, a smaller percentage of female veterinarians desired an increase in the hourly work week as they got further away from their graduation year (Figure 24).

For males, the number of those wishing to work fewer hours in 2017 increases for veterinarians the farther they are from the most recent graduation period, and the percentage of male veterinarians who wish to work more hours declined as the graduation period became older (Figure 25 and Figure 26).

FEMALE WORK PREFERENCE: DESIRE TO WORK FEWER HOURS PER WEEK

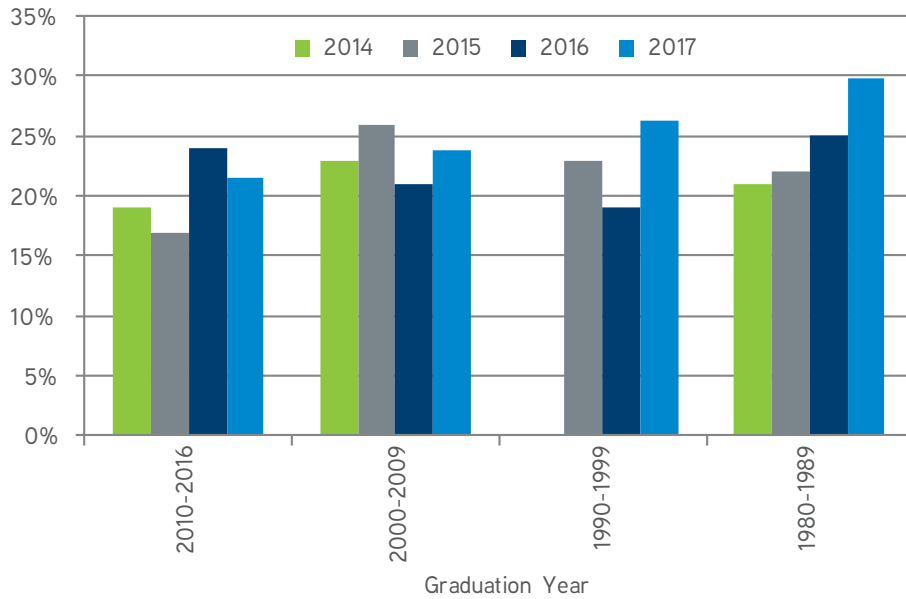


Figure 23

FEMALE WORK PREFERENCE: DESIRE TO WORK MORE HOURS PER WEEK

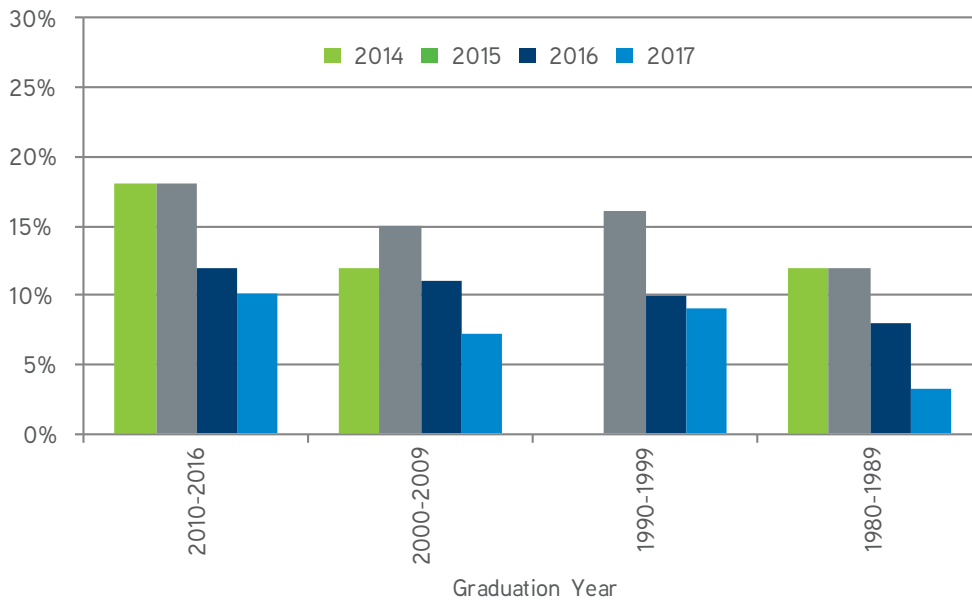


Figure 24

MALE WORK PREFERENCE: DESIRE TO WORK FEWER HOURS PER WEEK

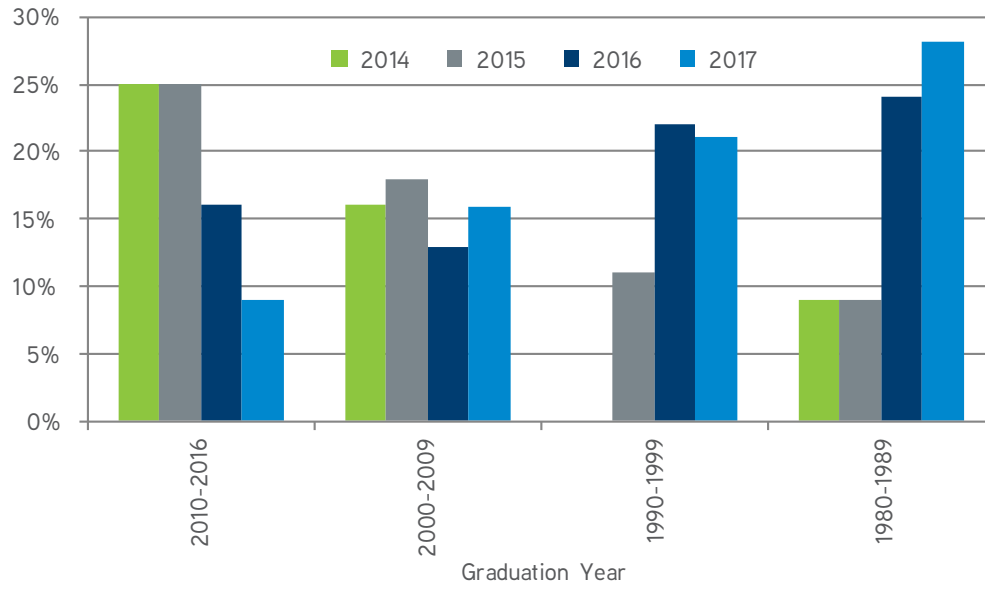


Figure 25

MALE WORK PREFERENCE: DESIRE TO WORK MORE HOURS PER WEEK

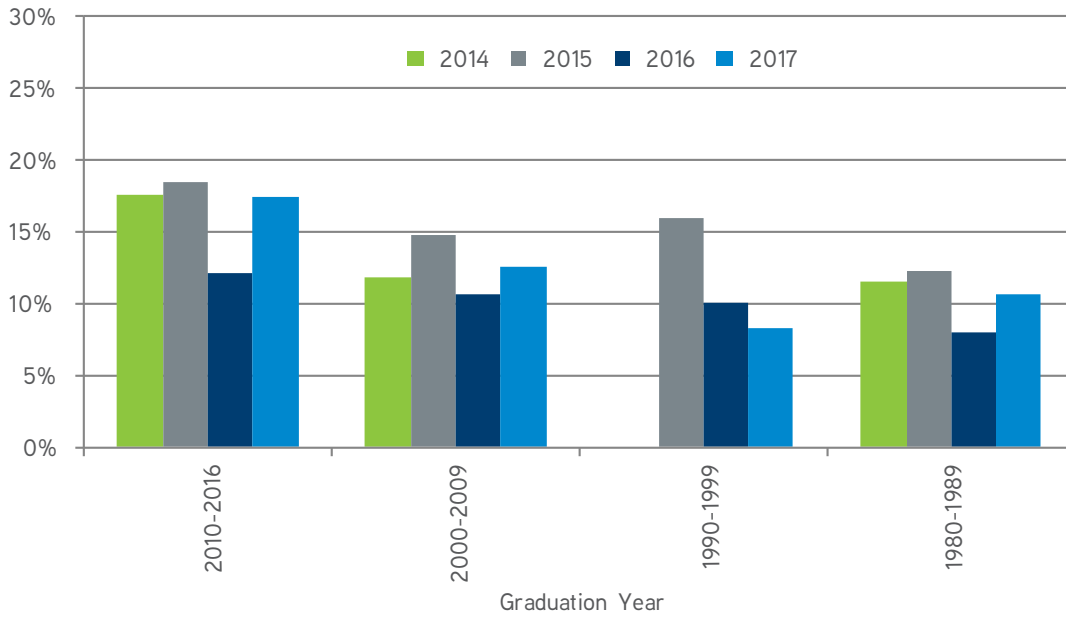


Figure 26

In summary, the veterinary profession does not have a problem with underemployment, according to the results of the 2017 Census Survey, but rather with negative underemployment. There are more veterinarians who 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, 3,330 additional veterinarians would be required to fill the void. Unfortunately, this situation has an unfeasible solution: Achieving it would require the additional veterinarians needed 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. Generally, the indivisibility of veterinary labor (or that of any professional) is characterized by blocks of 40-50 hours. A veterinary employer who might 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. When there are multiple practices in an area that have veterinarians who wish to work less for less compensation, however, a single veterinarian may work for different practices to reach a desired level of hours and compensation.

The level of underemployment differed by practice type. For the second time since the AVMA Economics Division began tracking underemployment, the percent of veterinarians who wish to work less exceeded the percent that wish to work more in private and public practice types (veterinarians in food exclusive and state/local government had an equal number desiring more and fewer hours), with the exception of industry/commercial and not-for-profit organizations, advanced education and non-veterinary employment (Figure 27).

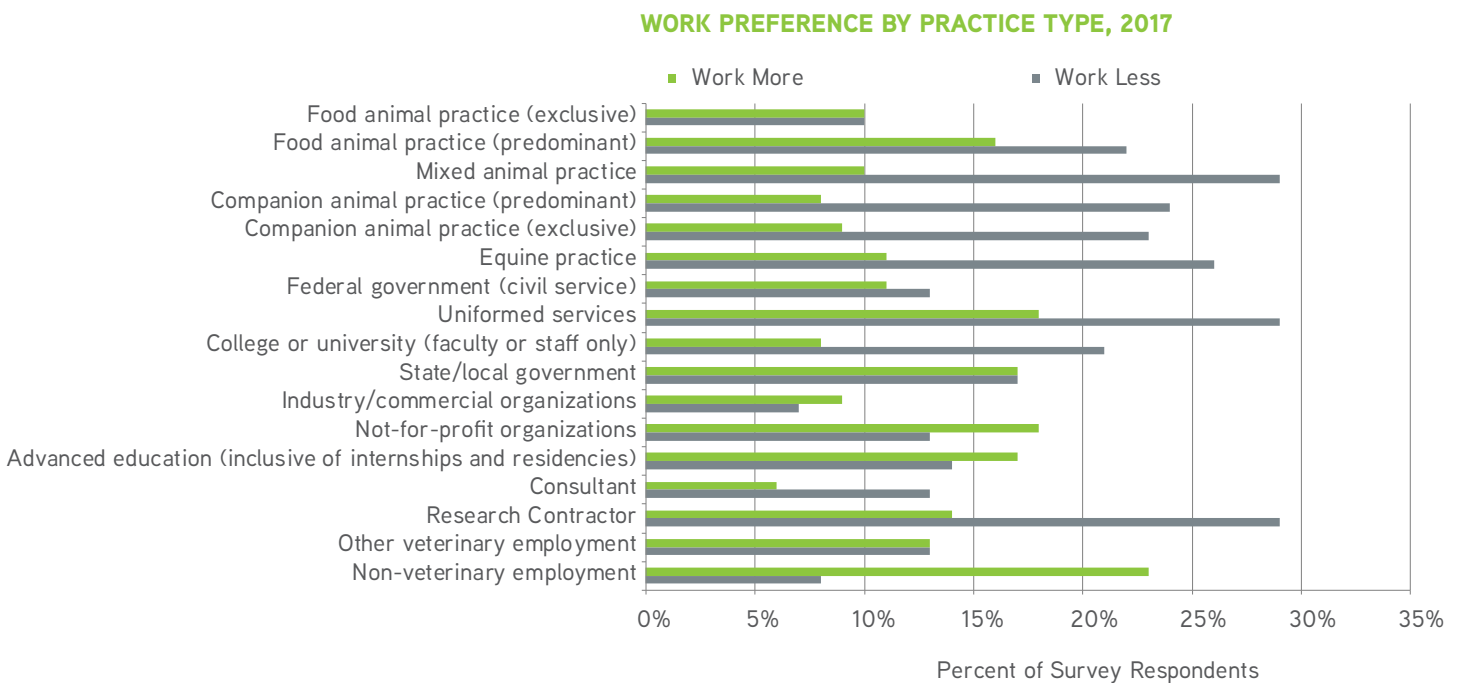


Figure 27

There is no significant difference in underemployment among colleges. Tabulations show that for the second year in a row graduates of Mississippi State University desired the largest mean increase in hours per week, 5.92, followed by graduates of University of Florida, desiring a mean increase of 2.39. Graduates of Oregon State University and St. Matthew's University desire the largest mean decrease in hours, 13.18 and 10, respectively (Table 24).

UNDEREMPLOYMENT BY VETERINARY COLLEGE

	2017			2016			2015		
	Mean change in hours desired	N	Std. Deviation	Mean change in hours desired	N	Std. Deviation	Mean change in hours desired	N	Std. Deviation
Auburn University	-3.53	30	20.16	1.57	23	21.94	1.52	54	6.35
Colorado State University	-8.24	41	15.97	-8.89	68	15.32	-0.8	99	9.45
Cornell University	-7.91	21	13.27	-5.44	25	15.59	-0.82	78	9.88
Iowa State University	-2.31	26	23.79	-4.45	30	16.39	-1.22	103	9.30
Kansas State University	-5.28	32	20.91	-1.30	30	21.25	-2.21	68	8.39
Louisiana State University	-8.84	19	12.41	-4.26	21	17.92	-1.35	47	7.68
Michigan State University	-8.00	36	9.92	-3.61	36	15.69	0.12	89	8.35
Mississippi State University	5.92	13	22.60	4.22	16	21.10	-0.7	30	8.06
North Carolina State University	-2.95	20	12.50	3.26	21	25.92	-1.56	70	8.57
Oklahoma State University	-6.80	20	11.75	-8.52	26	15.06	-0.62	45	8.85
Oregon State University	-13.18	11	15.65	-5.88	12	20.46	-1.39	33	8.69
Other	-6.63	56	18.93	0.54	74	28.65	0.97	106	9.96
Purdue University	-0.47	15	16.02	-10.93	28	14.80	0.85	52	8.54
Ross University	-0.28	36	21.44	-0.69	45	27.42	-0.32	109	7.11
St. George's University	1.60	10	21.57	-3.67	12	24.54	0.63	30	10.93
St. Matthew's University	-10.00	1	.	1.00	2	15.56	3.36	11	15.70
Texas A&M University	-7.90	29	15.28	-7.77	86	17.91	-0.9	79	5.76
The Ohio State University	-4.40	43	16.15	-8.03	45	14.04	-0.07	101	8.48
Tufts University	-4.75	20	12.85	-4.67	26	15.23	-2.42	66	7.92
Tuskegee University	-9.08	13	16.84	0.19	13	28.56	0.08	26	8.23
University of California-Davis	-1.71	31	25.21	-5.34	28	18.70	-1.63	96	9.34
University of Florida	2.39	26	22.47	-4.29	14	15.77	-3.05	40	8.20
University of Georgia	-2.32	28	24.51	-11.43	21	9.38	-1.13	68	11.32
University of Illinois	-3.22	37	24.13	-6.82	31	18.43	-2.6	78	7.25
University of Minnesota	-0.13	24	28.64	0.69	21	20.26	-0.83	69	9.04
University of Missouri-Columbia	-8.00	29	15.53	-9.91	23	19.40	-1.61	66	9.41
University of Pennsylvania	0.07	30	24.12	0.14	35	19.08	-0.57	75	8.38
University of Tennessee	-2.68	19	18.16	-4.04	24	19.39	0.15	54	8.56
University of Wisconsin	-1.50	28	22.01	-8.62	26	14.49	0.16	64	10.80
Virginia-Maryland College	-7.72	29	17.53	-6.17	21	15.81	-1.54	80	7.64
Washington State University	-6.14	22	12.90	-1.12	21	22.92	-1.64	66	7.00
Western University of Health Sciences	-5.00	6	28.28	3.25	12	30.37	-1.59	29	8.85
Total/Average	-4.34	801	18.76	-4.42	916	19.96	-0.81	2,081	8.72

Table 24

VETERINARIANS WHO WISH TO WORK MORE (UNDEREMPLOYMENT)

Within the 2017 sample, 10 percent (15 percent in 2015 and 10.4 percent in 2016) of veterinarians indicated wanting to work a mean of 17.4 (11.6 in 2015 and 18.9 in 2016) additional hours per week. The pattern of respondents who wish to work more hours decreasing with more years since graduation has been

continuous through the periods of data collection. There is a decreasing trend in the percent of respondents who indicated they wish to work more hours for more compensation across graduation periods and genders (Figure 28).

WORK PREFERENCE: DESIRE TO WORK MORE HOURS PER WEEK

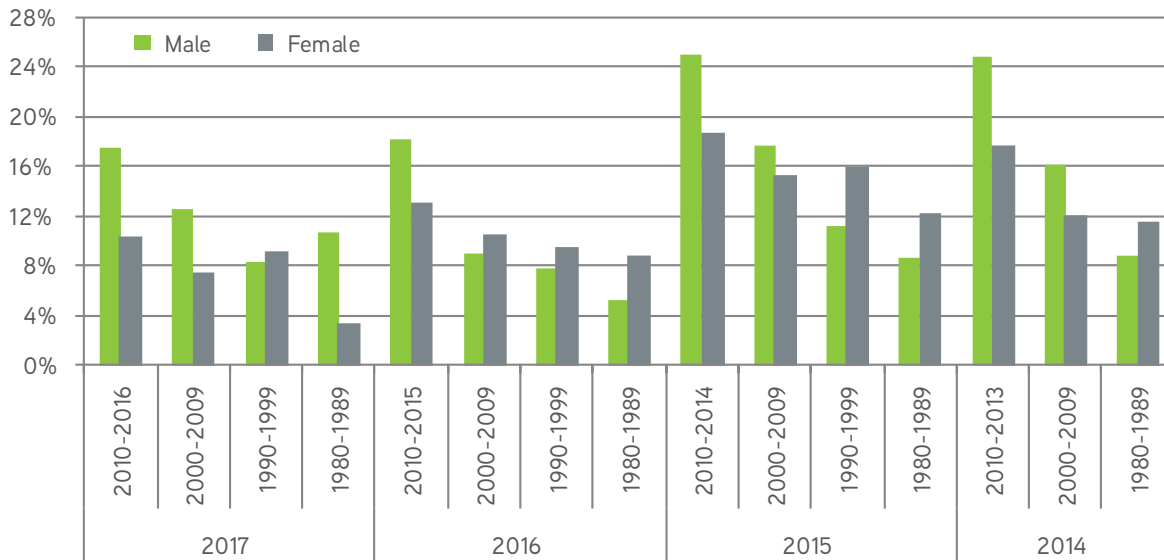


Figure 28

Females wishing to work more comprised 8.9 percent of the sample and the mean number of hours currently worked by this group was 37 in 2017 (38.4 in 2015 and 37.5 in 2016) and the mean number of hours per week the group wished to work increased to 54.6 hours (49.6 in 2015 and 53.8 in 2016). On the

other hand, men who wish to work additional hours comprised 12 percent of the sample. This group currently works 41.2 hours per week (45 hours in 2015 and 41.8 in 2016) and wishes to increase work to 58.3 hours per week (56.3 hours in 2015 and 66.7 in 2016) (Figure 29, Figure 30 and Figure 31).

UNDEREMPLOYMENT BY GENDER, 2015

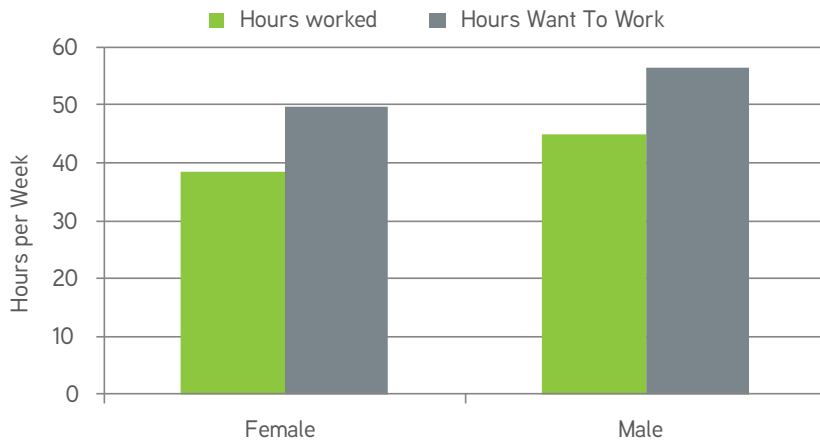


Figure 29

UNDEREMPLOYMENT BY GENDER, 2016

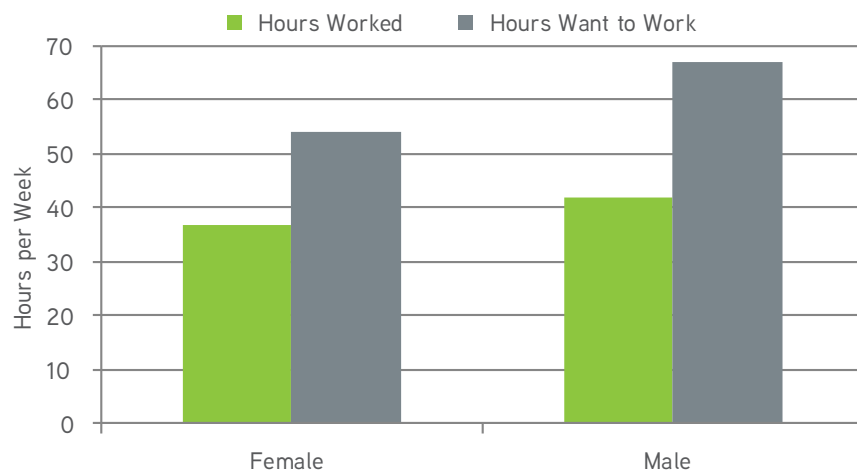


Figure 30

UNDEREMPLOYMENT BY GENDER, 2017

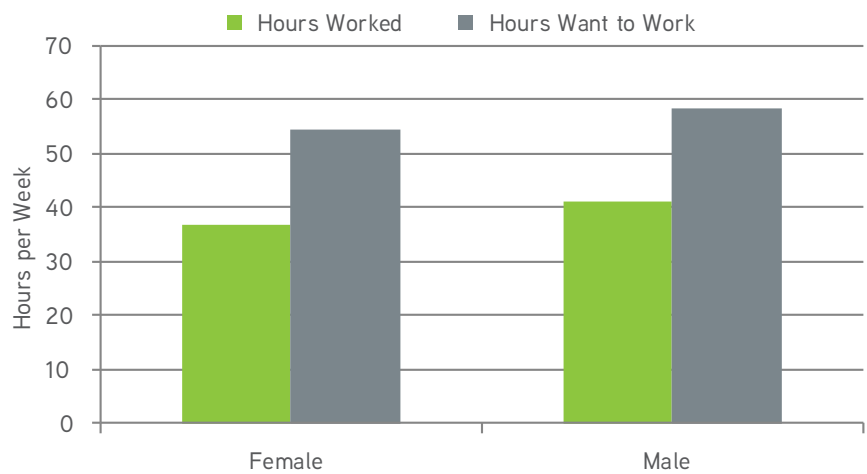


Figure 31

The level of underemployment of those who wish to work more hours for greater compensation also varies by practice type. In 2015, food animal practitioners (predominant), mixed animal and those veterinarians in advanced education who wish to work more hours reported a mean hourly work week of more than 50 hours per week and on average were looking to increase that hourly work week to more than 60 hours per week. In 2016, the veterinarians who wished to work more hours in all of the practice types had a mean hourly work of fewer than 50 hours. In 2017, food animal practitioners (exclusive) and college and

university staff/faculty who wish to work more hours reported the highest mean hourly work week of more than 50 hours per week.

Of those veterinarians who desired to work more hours, uniformed services work the fewest hours per week currently (13.3 hours per week) and indicated a desire to move to a 45-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 considerable diversity among the types of practices (Figure 32).

UNDEREMPLOYMENT BY PRACTICE TYPE, 2017

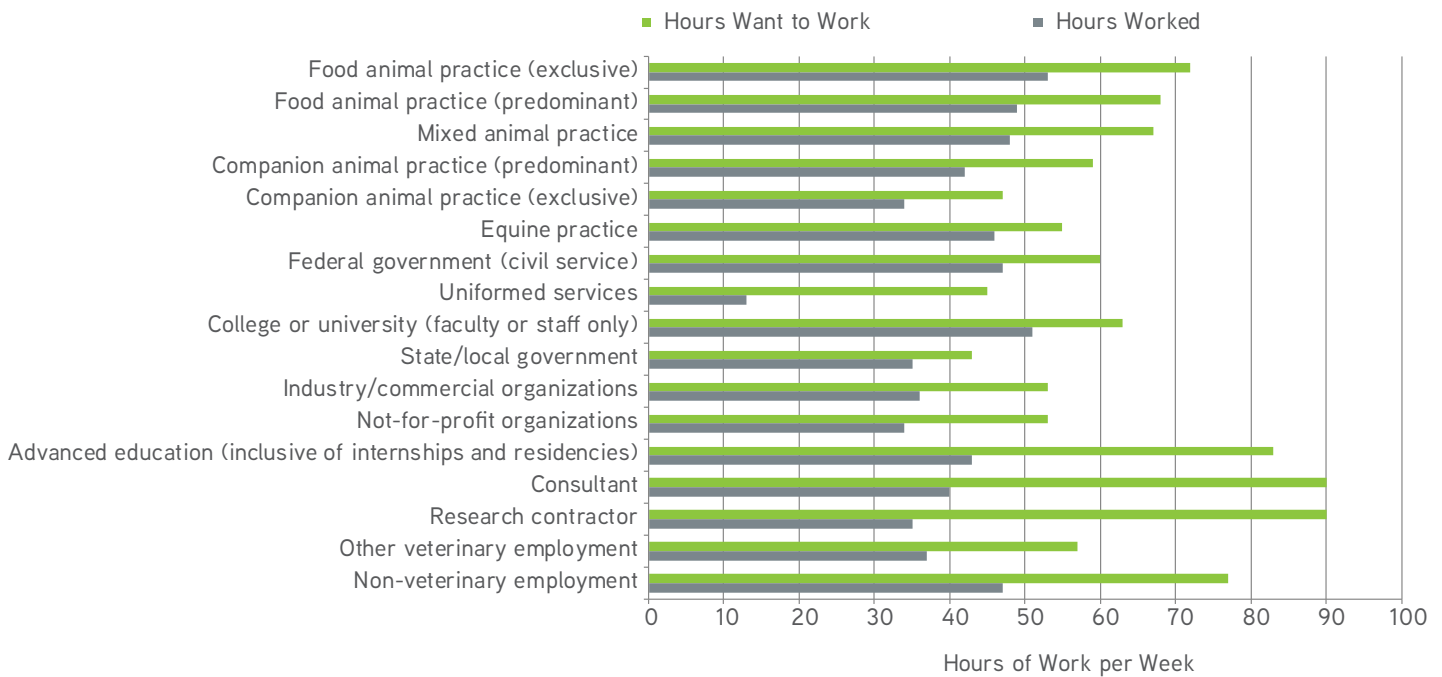


Figure 32

Across regions, veterinarians who wish to work additional hours for increased compensation are generally working a full-time, 35-40-hour work week, but wish to expand this to more than 50 hours per week. As with the underemployment data by practice

type, the standard deviations for both the current hours worked and the additional hours veterinarians would like to work are great and point to the large diversity in work hours within regions (Figure 33).

UNDEREMPLOYMENT BY REGION, 2017

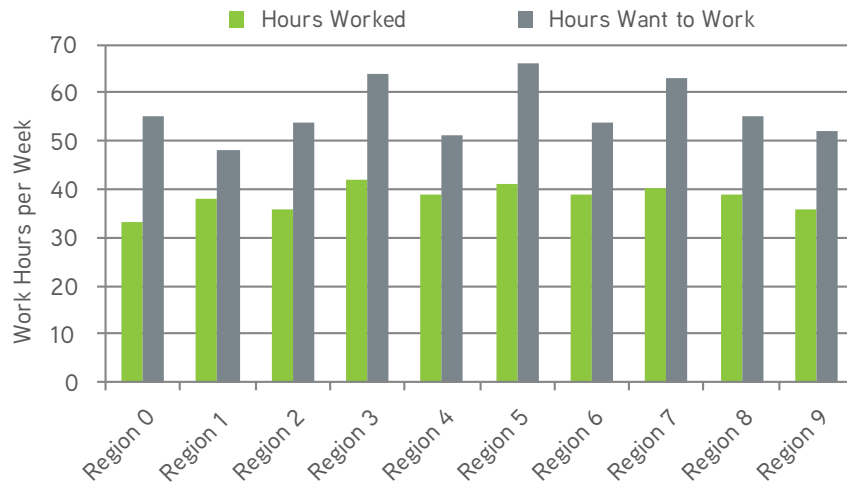


Figure 33

VETERINARIANS WHO WISH TO WORK LESS (NEGATIVE UNDEREMPLOYMENT)

In contrast to those who indicated a desire to work more hours for increased compensation, in 2017, 21.6 percent (18.7 percent in 2015 and 20.6 percent in 2016) of the respondents indicated wanting to work an average of 14.2 hours less per week for less compensation (12.7 hours in 2015 and 14.9 hours in 2016).

The percentage of respondents who wished to work fewer hours per week increased the further veterinarians were from graduation. And for the first time since underemployment was measured, both male and female respondents showed an increase in wishing to cut back on their hourly work week the farther away from their graduation period (Figure 34).

Females wishing to work fewer hours comprised 23.3 percent of the sample and the mean number of hours currently worked by this group was 47.7 in 2017 (48.9 in 2015 and 47.6 in 2016) and the mean number of hours per week the group wished to work decreased to 34 hours (35.9 in 2015 and 33.1 in 2016). Men who wish to work fewer hours comprised 16.9 percent of the sample. This group of males currently works 49.2 hours per week (52.2 in 2015 and 52 in 2016) and wish to decrease that to 32 hours per week (37.8 in 2015 and 35.7 in 2016) (Figure 35, Figure 36 and Figure 37).

WORK PREFERENCE: DESIRE TO WORK FEWER HOURS PER WEEK

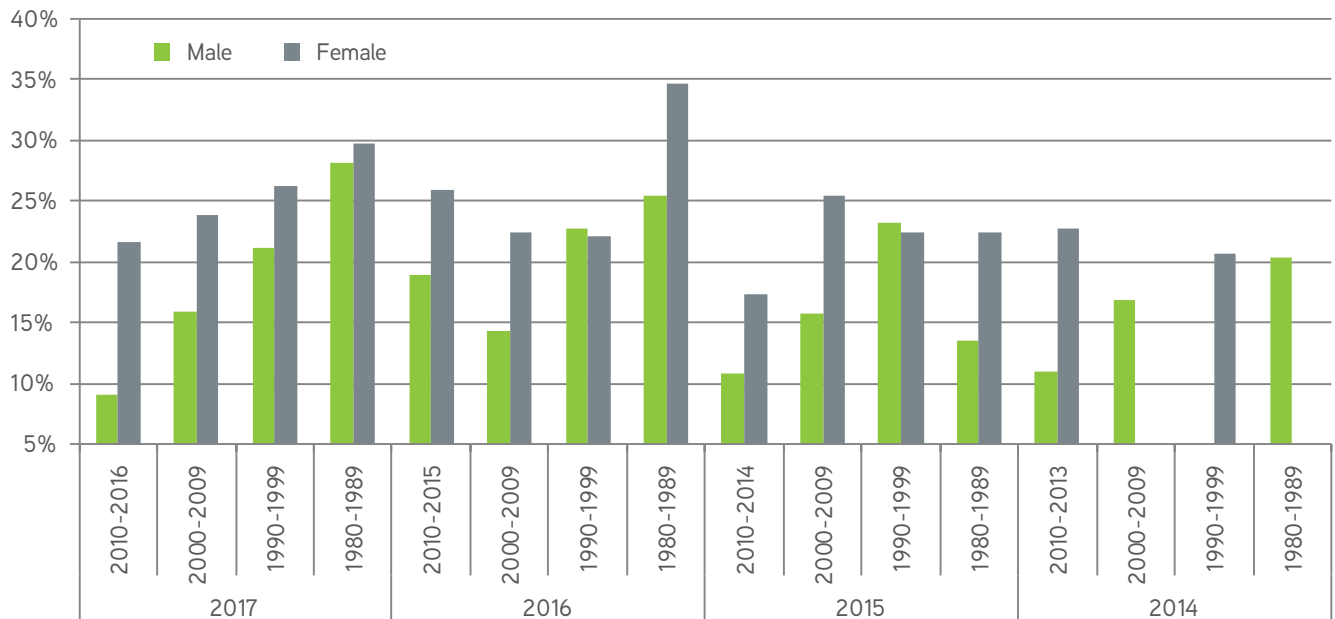


Figure 34

NEGATIVE UNDEREMPLOYMENT BY GENDER, 2015

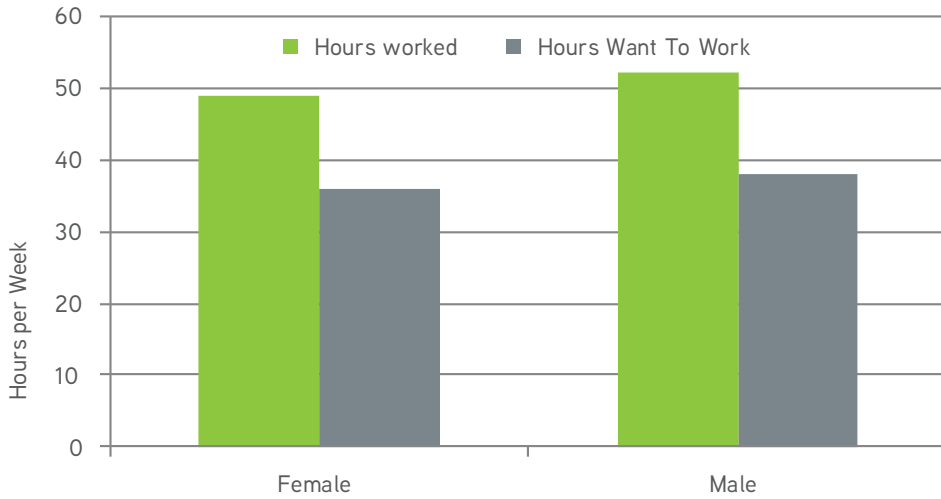


Figure 35

NEGATIVE UNDEREMPLOYMENT BY GENDER, 2016

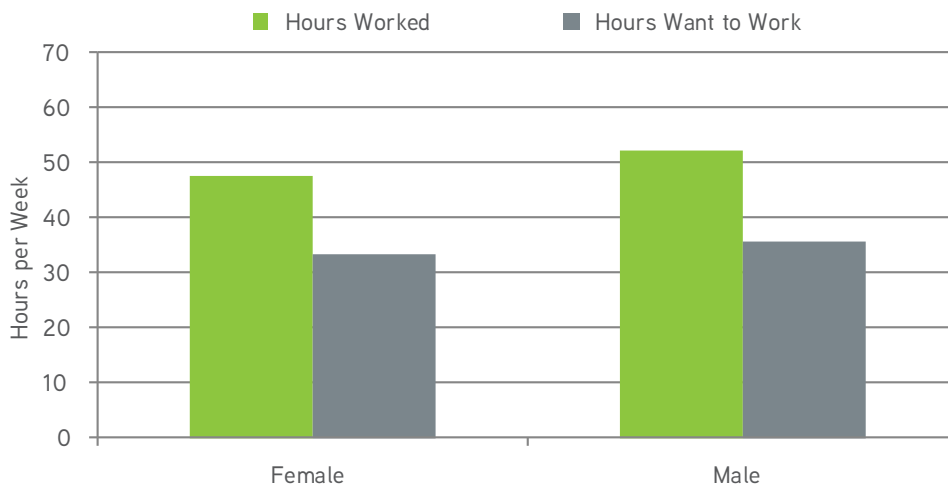


Figure 36

NEGATIVE UNDEREMPLOYMENT BY GENDER, 2017

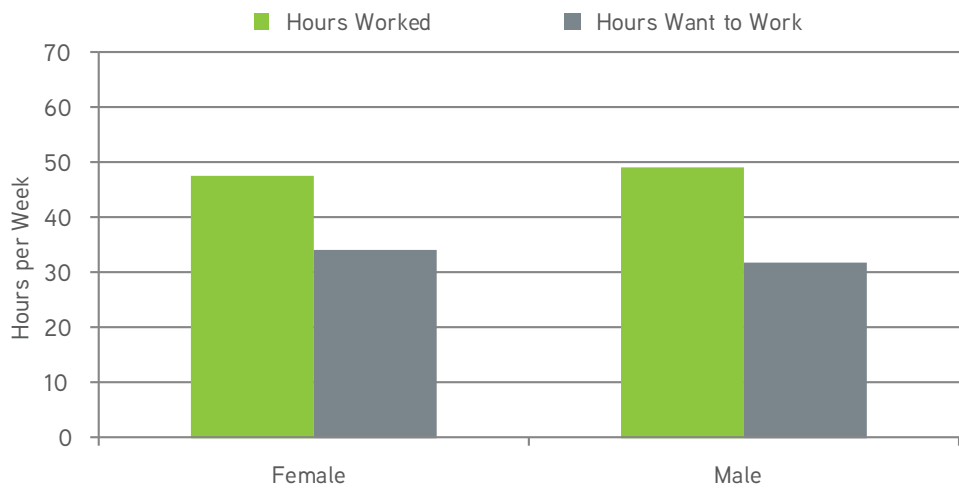


Figure 37

The group that wishes to work less is working roughly 10 hours more per week than the group that wishes to work more (48.1 and 38.3 hours, respectively), and both groups want to change their work hours per week by 14 hours or more. However, because 561 veterinarians in the sample (21.6 percent) desire to work less (351 in 2015 and 465 in 2016) and this exceeds the 257 veterinarians who desire to work more (253 in 2015 and 239 in 2016), and those who want to work less desire to reduce their work week by 14.2 hours (12.86 hours in 2015 and 14.9 hours in 2016) while those who want to work more want to increase their work week by 17.4 hours (12.51 hours in 2015 and 18.9 hours in 2016), the total level of underemployment in the profession is negative. A negative underemployment indicates the need to add veterinarians to the workforce. Because this negative underemployment occurs in different practice types and regions of the country and may not be sufficiently large enough in any specific local area and practice type, however, adding an additional veterinarian in any specific practice or place of employment may not be feasible and thus this measure of negative underemployment cannot be used to define a level of excess demand. Indeed, this misdistribution of underemployment

and negative underemployment illustrates the importance of labor indivisibility in the veterinary profession.

Differences in the current work week of veterinarians reporting they wish to work fewer hours for lower compensation are dramatic, with those in advanced education indicating a mean current hourly work week exceeding 60 hours. Representatives of more than half of practice types were exceeding a 50-hour work week and expressed a desire to reduce this by a sufficient number of hours to move closer to a 30-40 hour work week. In private practice, equine practitioners who wished to work fewer hours for less compensation wanted the greatest mean reduction in hours per week (20.5 hours), while companion animal practitioners (exclusive) who sought fewer hours per week with a reduction in compensation sought the lowest hourly work week reduction (13.3 hours). In public practice, practitioners in industry and commercial organizations who wished to work fewer hour for less compensation wanted the greatest mean reduction in hour per week (22), while uniformed service practitioners wanted the smallest mean reduction in hours per week (8.6) (Figure 38).

NEGATIVE UNDEREMPLOYMENT BY PRACTICE TYPE, 2017

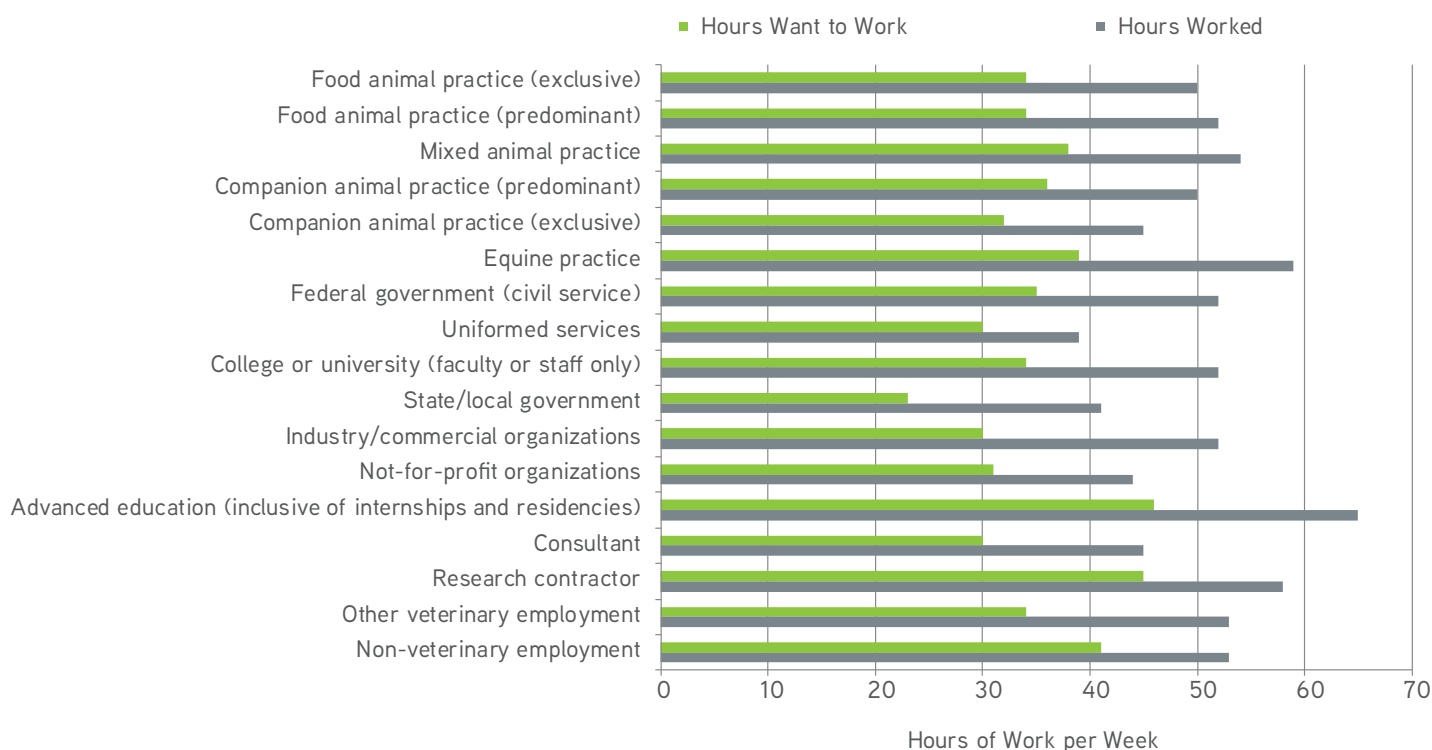


Figure 38

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 1 had the lowest mean number of hours worked per week at 44.9 hours and one of the smallest means desired in a reduction of hours worked 12.7 hours, along with Region 0 (12.6 hours). Conversely, Region 7 had the highest mean hourly work week (50.8 hours), and at 16.6 hours, Region 6 had the largest mean desired reduction in hours worked (Figure 39).

NEGATIVE UNDEREMPLOYMENT BY REGION, 2017

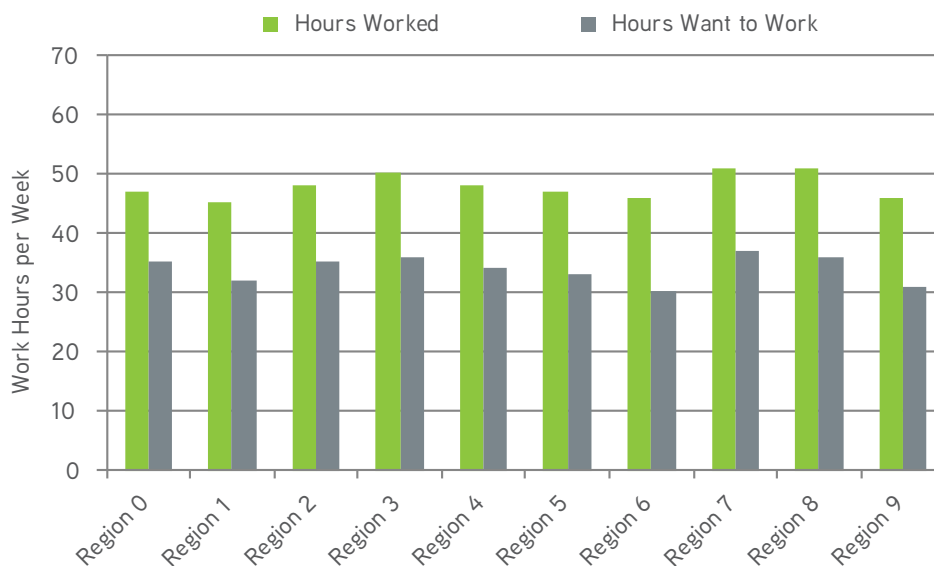


Figure 39

FACTORS CORRELATED WITH UNDEREMPLOYMENT

Following the methods used to identify the factors that are correlated with employment, a similar approach 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 performed and included the following variables: veterinary practice type, highest level of education, years of experience practicing veterinary medicine, workplace location, desire to change living location, gender, debt, income, part-time status, home ownership (mobility), marital status, number of children in household, and health. Respondents who reported desiring a decrease or an increase of more than 40 hours per week were excluded from the regression.

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 in the following regression is the number of hours the respondent wants to add or subtract from his or her current workload. He or she is willing to take a pay cut to reduce hours and, of course, receive an increase in compensation for working additional hours.

Variables significant in explaining underemployment or negative underemployment in veterinary medicine are veterinarians who obtained a DVM degree and a specialized degree who wanted to work on average 10 additional hours per week; health, with veterinarians reporting their health as fair wanting to work on average five hours less per week; gender, with males wanting to work on average six additional hours per week; debt, with veterinarians with remaining educational debt wanting to work an average of .2 hours (~12 minutes) more for every 10 percent increase of debt above the mean; part-time, with veterinarians who work part-time wanting to work almost 19 hours more per week; and veterinarians in food animal (exclusive), uniformed services, and non-veterinary employment, with respondents from the first two categories expressing a wish to work an average of an additional 11 hours more, and non-veterinary employment eight hours more per week (Table 25).

In the previous year's report, factors identified as significant in explaining the variation to work fewer or more hours were DVM degree and a Masters degree, DVM and a specialized degree, gender, years of experience, income, part-time, working in Region 1, Region 5, Region 6, Region 7, Region 8 and Region 9, and federal government. Males wanted to work approximately six hours more and veterinarians with a specialized degree wanted to work 21 hours less (see the *2017 Report on The Market for Veterinarians* for more details).

FACTORS CORRELATED WITH UNDEREMPLOYMENT

Dependent Variable: Desired Change in Work Hours per Week	Coef.	Std. Err.	t	P>t
DVM	-0.84	3.12	-0.30	0.790
DVM + Ph.D.	8.7	5.4	1.60	0.110
DVM + M.S.	1.1	2.2	0.50	0.620
DVM + Specialized degree (J.D., M.D., E.D.)	10	5.4	1.90	0.070
Home Owner	-1.7	1.7	-1.00	0.310
Male	6.1	2	3.10	0.000
Years of Experience	-0.2	0.2	-1.20	0.230
Married	0.7	1.8	0.40	0.720
Want to change living location	0.8	1.5	0.60	0.570
Children	-0.2	0.8	-0.30	0.770
Health 1 - Poor	-0.9	5.8	-0.20	0.880
Health 2 - Fair	-5.3	3	-1.80	0.070
Health 3 - Good	-1.9	2.1	-0.90	0.370
Health 4 - Very Good	-3.3	2.1	-1.50	0.120
Health 5 - Excellent (Omitted)				
Log of Remaining Educational Debt	1.9	0.9	2.10	0.040
Log of Annual Income	-1.1	1.2	-0.90	0.350
Part-time	18.8	2.5	7.40	0.000
Region 0	3.6	3.4	1.00	0.300
Region 1	1.4	2.8	0.50	0.600
Region 2	0.9	2.7	0.30	0.730
Region 4	3.5	2.8	1.30	0.210
Region 5	4.4	3.1	1.40	0.160
Region 6	2.4	3	0.80	0.420
Region 7	3.2	3.1	1.10	0.300
Region 8	0.3	3	0.10	0.930
Region 9	3.2	2.8	1.10	0.260
Food Animal Exclusive	11.3	6	1.90	0.060
Food Animal Predominant	5.5	5.7	1.00	0.340
Mixed Animal	-2.3	2.7	-0.80	0.400
Companion Animal Predominant	0.5	2.2	0.20	0.820
Equine	-3.3	4.1	-0.80	0.420
Federal Government	-0.1	6.9	0.00	0.980
Uniformed Services	10.9	5.8	1.90	0.060
College/University	2.2	4.2	0.50	0.610
State/Local Government	10.1	13.5	0.80	0.450
Industry/Commercial Organization	11	9.8	1.10	0.260
Not-for-profit Organization	-3.5	4.9	-0.70	0.470
Advanced Education	-2.3	4.2	-0.60	0.580
Other Veterinary Employment	1.8	8	0.20	0.830
Non-Veterinary Employment	8.1	4.5	1.80	0.070
Constant	-17.7	17.2	-1.00	0.310
Observations	693			
Prob > F	0.000			
Adjusted R-Square	0.223			

Consultant and research contractor were removed from the model because the number of observations did not permit estimation.

Table 25

To better understand the variation in underemployment, factors affecting mobility were examined. Mobility was determined by using home ownership as a proxy. If the workforce is highly mobile then differences in unemployment rates, underemployment and incomes across regions and within regions between business areas should begin to decline. Factors thought to contribute to reducing job mobility are marital status, number of children and preferences for type of community and

size of business. Factors omitted from the equation, to use as a base, are single and no change in community or practice size. Factors that were statistically significant with an increased probability of being less mobile (owning a home) were married, widowed, divorce, and children at home. Factors that were statistically significant with a decreased probability of being less mobile were preference for a smaller community and preference for a larger community (Table 26).

FACTORS CONSIDERED IN EXPLAINING MOBILITY

Logistic regression	Number of obs.	=	2,383		
	LR chi2(10)	=	497.63		
	Prob > chi2	=	0.000		
Log likelihood = -1178.8214	Pseudo R2	=	0.1743		
	Odds Ratio	Coefficient	t-statistic	p-value	Probability
Married	4.290	1.457	11.98	0.000	329%
Separated	1.870	0.626	1.28	0.200	87%
Widowed	7.210	1.976	2.53	0.010	621%
Divorced	3.350	1.209	5.04	0.000	235%
Children at Home	2.070	0.727	10.12	0.000	107%
Prefer Smaller Community	0.630	-0.466	-2.58	0.010	-37%
Prefer Larger Community	0.460	-0.782	-5.42	0.000	-54%
Prefer Smaller Practice	1.060	0.061	0.31	0.760	6%
Prefer Larger Practice	0.910	-0.09	-0.67	0.500	-9%
Constant	0.660	-0.417	-3.9	0.000	-34%
Omitted categories: single/never married, prefer same size community, prefer same size practice					

Table 26



MALDISTRIBUTION OF VETERINARIANS



Four states and Puerto Rico are shown to have less than the national average concentration of veterinarians while most states have between 0.8 and 1.25 of the concentration of veterinarians compared to the national average.

The variation in incomes, unemployment and underemployment by region and practice type are descriptive of symptoms of maldistribution. Maldistribution suggests that the spatial distribution by practice type of the supply of veterinarians does not align with the spatial distribution by practice type of demand for veterinarians.

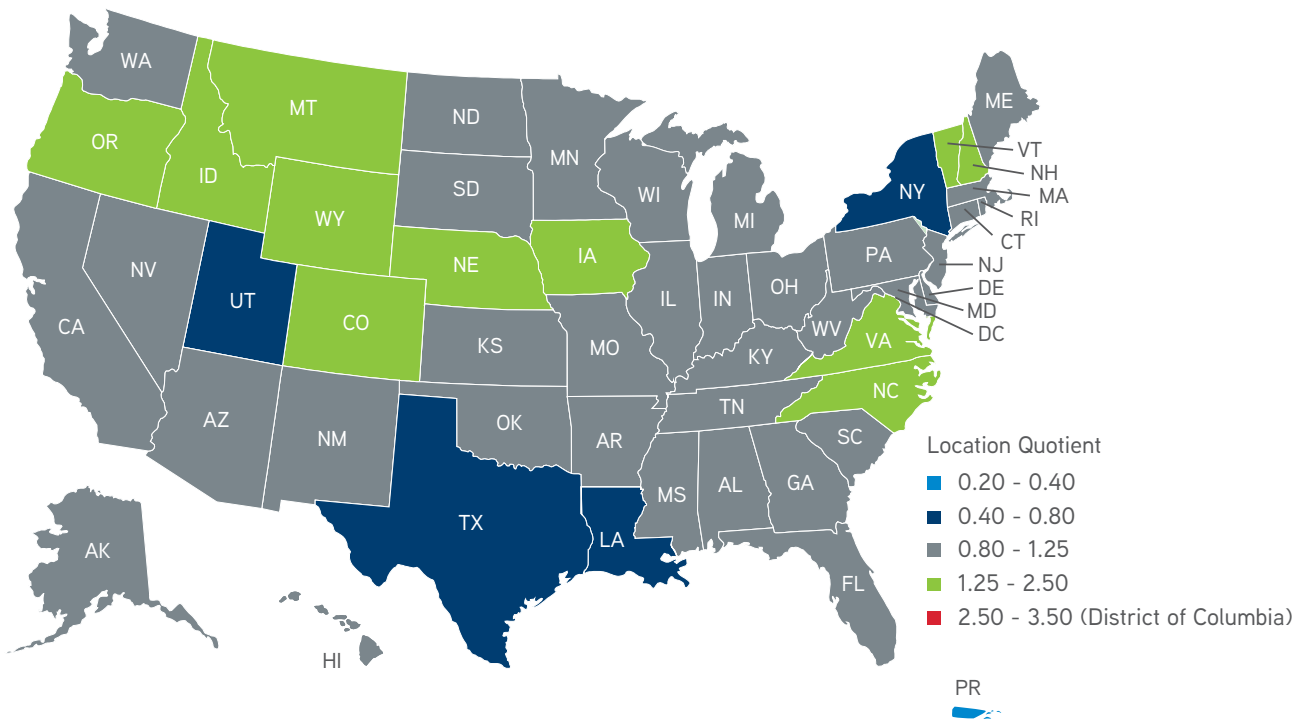
A location quotient can be used to evaluate maldistribution. The location quotient provides a way to quantify the regional concentration of a specific occupation in comparison to the national average. Specifically, a location quotient for veterinarians compares the number of veterinarians as a percent of all employees in a specific area to the number of veterinarians as a percent of all employees in the United States. Thus, a location quotient of "1" means that the concentration of veterinarians (percent of veterinarians in the workforce) in the local area is equal to the concentration of veterinarians nationally. A location quotient above "1" suggests the concentration of veterinarians is greater in the area than nationally, and below one suggests that the concentration of veterinarians is less in the area than nationally.

The Bureau of Labor statistics tracks veterinarian employees and has mapped by state the location quotient of these workers (veterinarian practice owners are omitted). Four states and Puerto Rico are shown to have less than the national average concentration of veterinarians while most states have between 0.8 and 1.25 of the concentration of veterinarians compared to the national average. Eleven states, however, have between 1.25 and 2.5 times as many veterinarian employees

per total employees in the state than occurs on the average nationally. This variation in concentration, all other factors being equal, should align with the income, unemployment and underemployment statistics. Of course, all other factors are not equal. Cost-of-living differences will interfere with income differences between the states and the median household income

variation between states will affect the demand for veterinarians as will the number of pets per household and the extent of the human-animal bond of pet-owning households. Finally, because practice owners are not included in this location quotient, the average number of veterinarians per practice will also affect the quotient (Figure 40).

LOCATION QUOTIENT OF VETERINARIANS BY STATE, 2016



Source: The Bureau of Labor Statistics
Figure 40

AVMA maintains a database of all U.S. veterinarians who have graduated from a U.S.-accredited college of veterinary medicine, and any veterinarian who graduated from a non-U.S.-accredited college and has become an AVMA member. Using this database of roughly 110,531 active veterinarians in the United States, a location quotient was computed for each state. Utah, Hawaii and California still have a concentration of veterinarians below the

national average but are joined in this condition by New Jersey. Despite Idaho, North Carolina, New Hampshire and Virginia no longer appearing in the higher concentration category, the number of states with a higher concentration of veterinarians than the national average has grown to 14, with the addition of Maine, Kentucky, Alabama, Wisconsin, South Dakota, Kansas and Oklahoma (Figure 41).

LOCATION QUOTIENT OF AVMA VETERINARIANS BY STATE, 2017

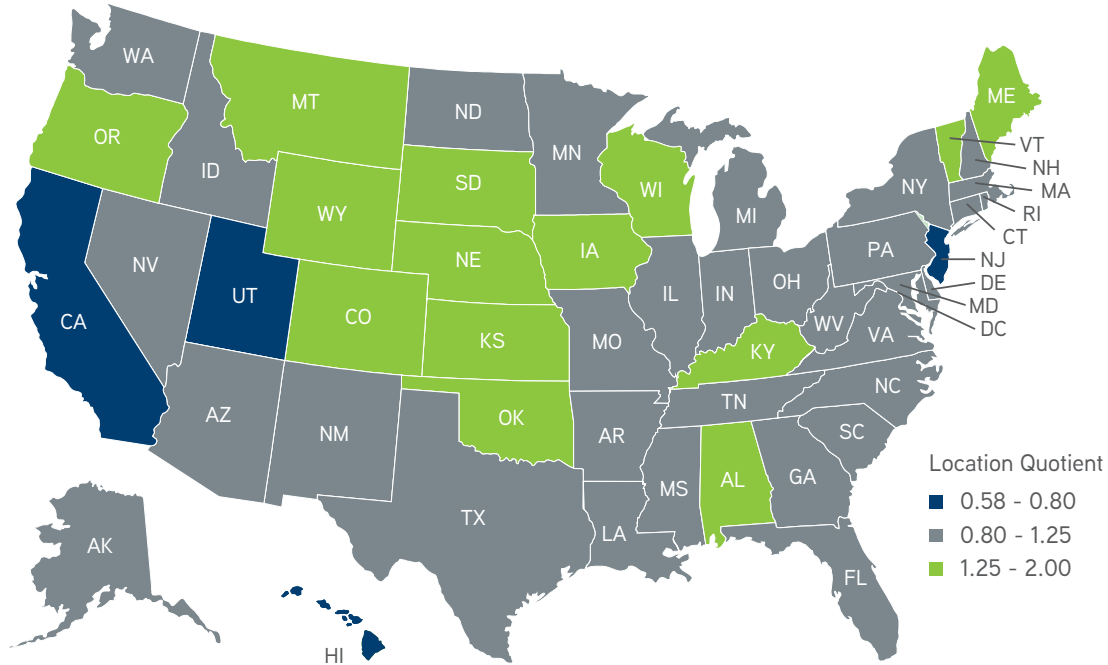


Figure 41

The location quotient was calculated for new AVMA veterinarians and mapped by state. The pattern is similar to the pattern found in the map of the location quotient for all veterinarians but there are more states with a location quotient below the national average. The concentration of new veterinarians to employed veterinarians in California, Utah and Hawaii, however, was below

the national concentration. That the location quotient for new graduates is also less than 1 in these states where the location quotient for the profession is less than 1, suggests an increasing scarcity of veterinarians. Hence, these three states should see lower unemployment and more negative underemployment; and higher incomes relative to the cost of living (Figure 42).

LOCATION QUOTIENT OF NEW VETERINARIANS BY STATE, 2017

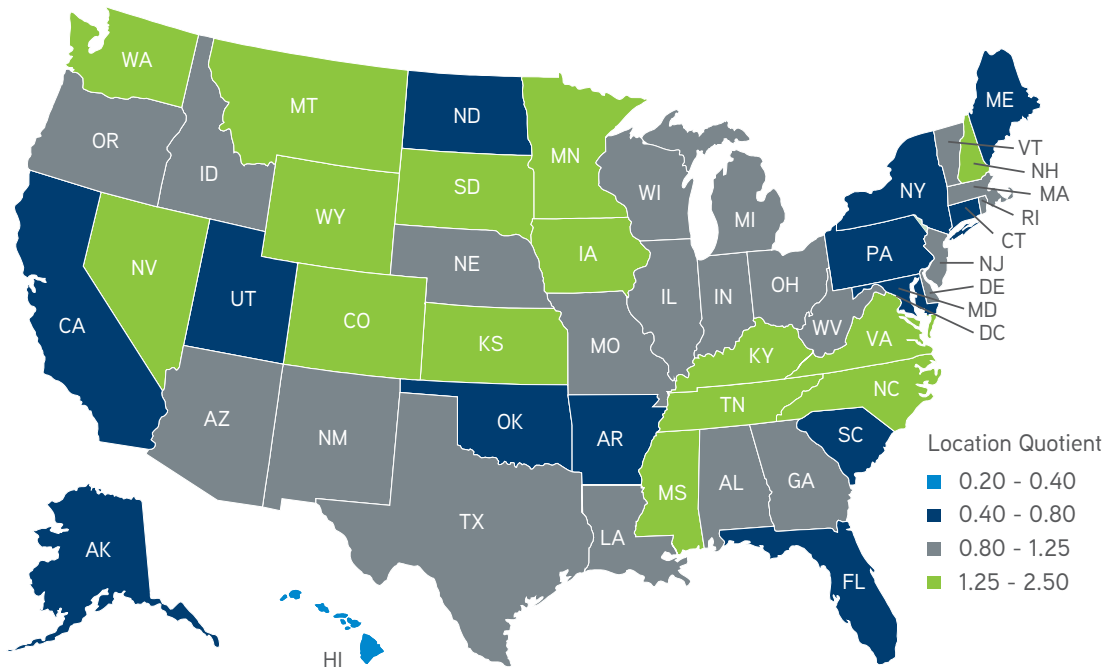


Figure 42

DISTRIBUTION OF VETERINARY JOBS AND APPLICANTS

Using the labor quotient provides an overview of the supply and demand for veterinarians at the state level, but veterinary hospitals comprise nearly 70 percent of employment opportunities and the markets (business areas) for most of these hospitals is less than 10 miles (area where 90 percent of clients reside). Thus, the state location quotient might not be adequate in identifying the problem of maldistribution that occurs within smaller areas of states.

Using the VCC data, the location of the applicants and the employment opportunity can be mapped to identify “hot” areas for employment (small numbers of applicants per employment opportunity) and “cold” areas (large number of applicants per employment opportunity). The map below plots the location (one dot for one applicant) for 4,138 active users (applicants) who provided their ZIP code information. The distribution is strongly concentrated in the eastern United States (Figure 43).

VCC REGISTERED USERS, 2017

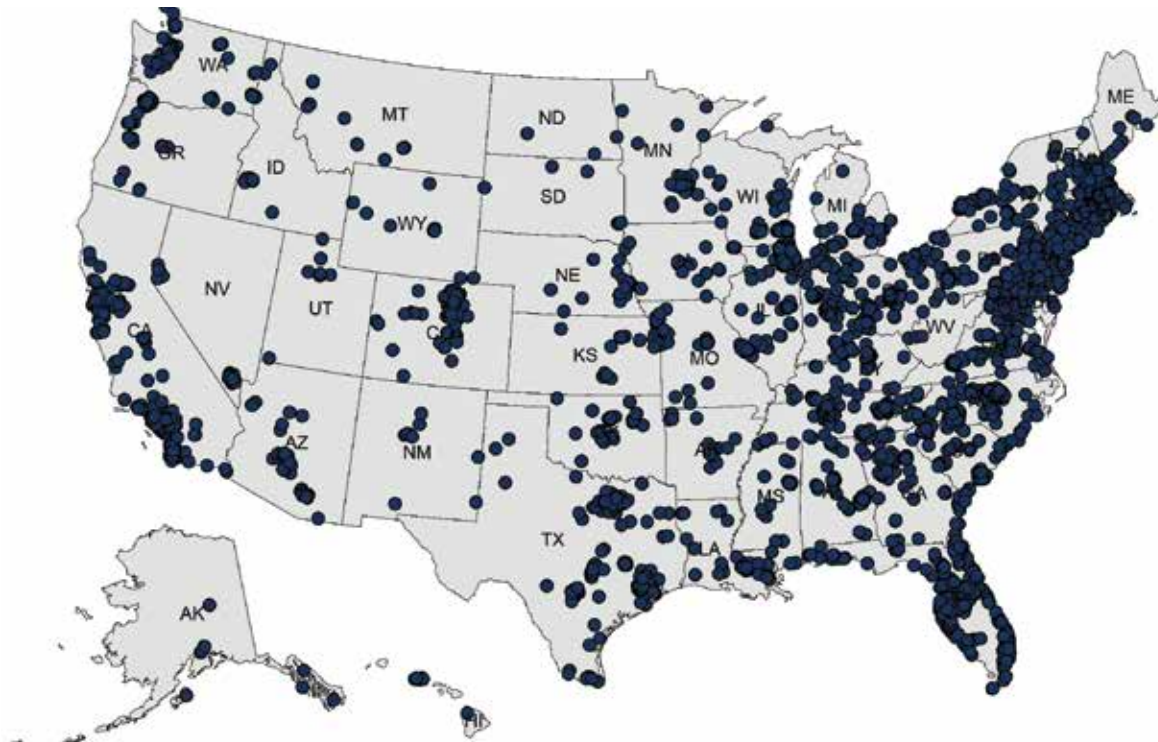


Figure 43

The distribution of VCC active job listings for 2017 appears to be similar to the distribution of active registered users, but their number is shown to be much more concentrated in the eastern third of the United States (Figure 44).

To focus attention on the areas that have “hot” and “cold” labor markets, a state-level supply/demand (S/D) map can be created using the VCC data. The green states are areas where the number of applicants to employment opportunities is high, with Alabama and Mississippi having 1.10-1.45 applicants per employment opportunity. Iowa’s S/D ratio is where the number of applicants to employment opportunities is around 1:1, while the remaining states have a low S/D ratio indicating more employment opportunities than applicants (Figure 45).

Using the dot map to plot the job applicants per DVM job listing provides a clearer illustration of the localized veterinary labor

markets. The larger the circle the more applicants that exist per job listing. These larger areas represent potential cold spots for veterinary labor. Competition for each available employment opportunity in these areas is stiff and this is likely to hold down income growth in these areas (Figure 46).

One contributing factor to the problem of maldistribution in the profession is community background of the veterinarians. New veterinarians seek employment in communities similar to those where they grew up. While the U.S. Census has no definition (nor statistics) for suburban communities, most people have an idea of the suburbs. However, the idea of what a suburb is varies considerably. Communities that surround urban centers is the most common perception of a suburb, but some who live in communities of more than 10,000 people within proximity of an urban center, but not attached to it, may consider themselves suburban or rural (Table 27).

VCC DVM JOB LISTINGS, 2017

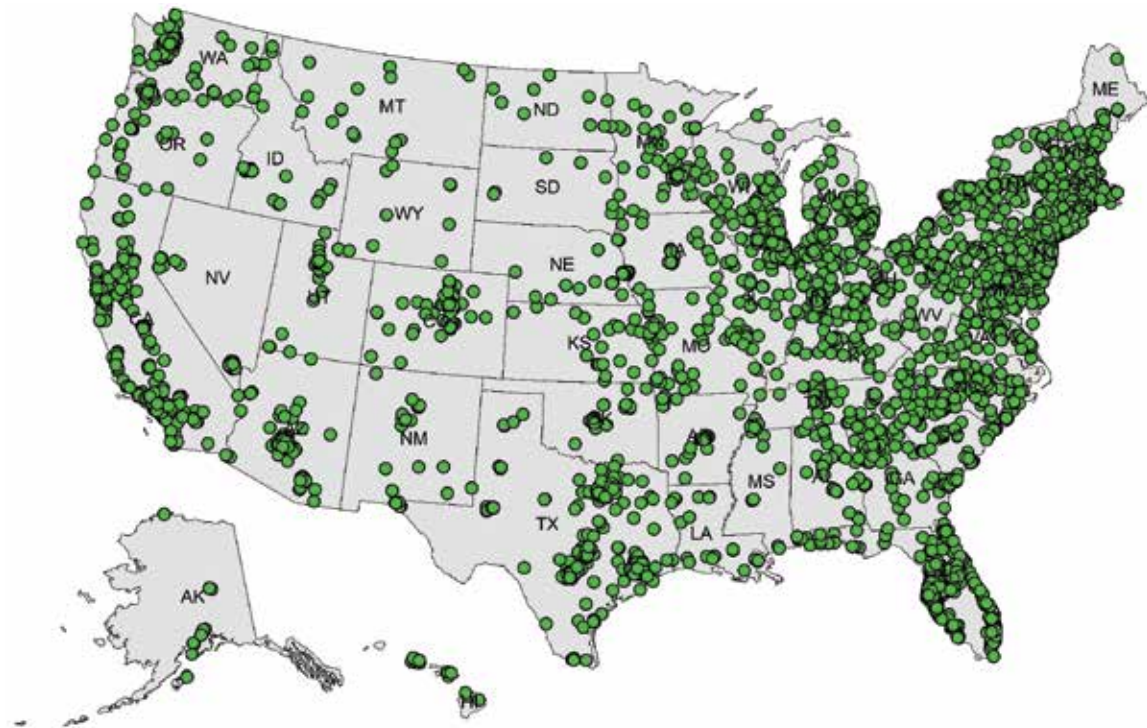


Figure 44

VCC APPLICANT-TO-AVAILABLE-JOBS RATIO, 2017

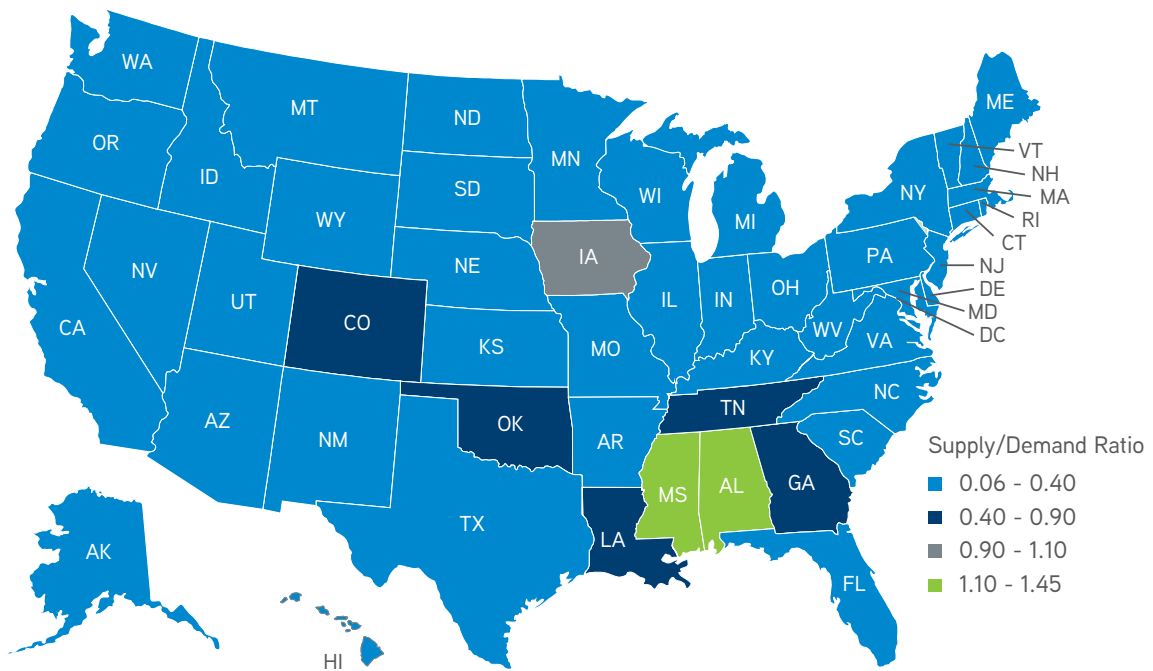


Figure 45

VCC JOB APPLICANT QUANTITY PER DVM JOB LISTING, 2017

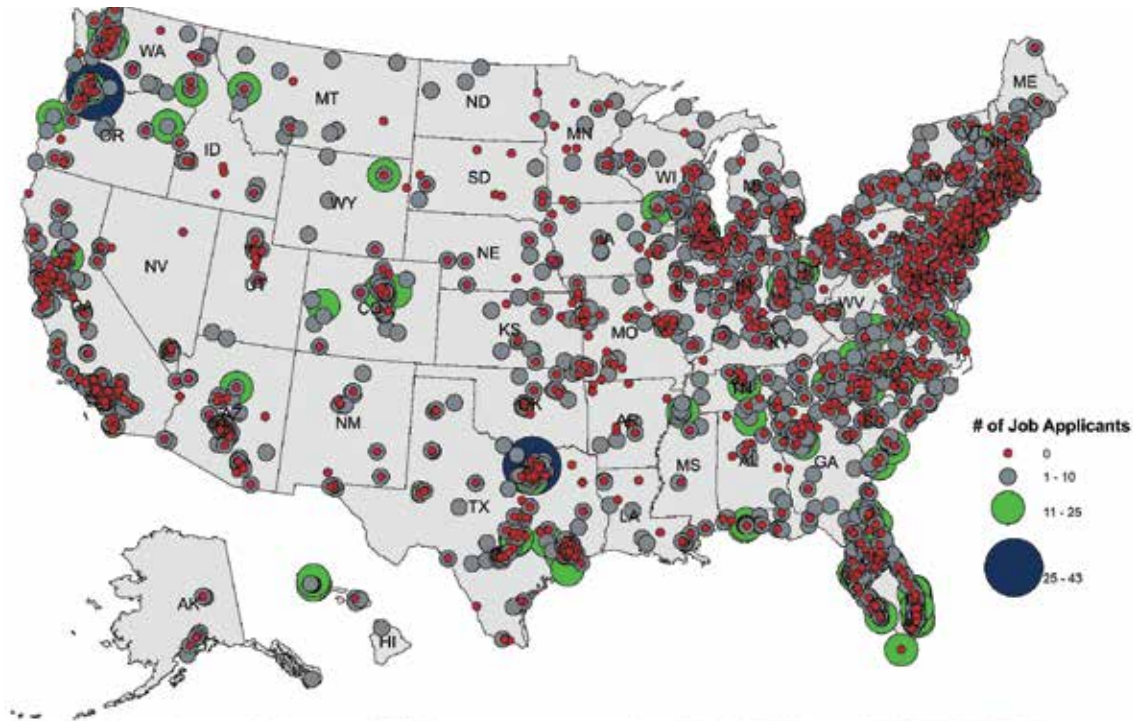


Figure 46

NEW VETERINARIAN COMMUNITY

2013-2016	Grew Up	Found Employment			
		Rural	Suburb	Urban	Total
	Rural	757	320	140	1,217
	Suburban	1,164	3,804	842	5,810
	Urban	480	994	1,674	3,148
Total	2,401	5,118	2,656	10,175	

2016	Grew Up	Found Employment			
		Rural	Suburb	Urban	Total
	Rural	204	71	38	313
	Suburban	316	982	210	1,508
	Urban	133	258	398	789
Total	653	1,311	646	2,610	

2017	Grew Up	Found Employment			
		Rural	Suburb	Urban	Total
	Rural	196	89	36	321
	Suburban	346	986	189	1,521
	Urban	127	252	363	742
Total	669	1,327	588	2,584	

Table 27



VETERINARIAN WELLBEING



Those who graduated prior to 1995 and paid off their student loans did so in less than 10 years, while for years later than 1995 fewer veterinarians have been able to pay off their loans in a 10-year period.

In an effort to address the growing concern over the wellbeing of veterinarians, the AVMA has been collecting data on self-reported wellbeing of veterinarians. The purpose of this collection has been to attempt to find correlations of wellbeing with employment and demographic characteristics. If, in fact, there is a problem with wellbeing in the veterinary profession, then it is important to know what factors are contributing to lower levels of wellbeing.

In addition to self-reported wellbeing measures, the Professional Quality of Life (ProQOL) subscale questions are included in surveys and compassion satisfaction, burnout and secondary traumatic stress scores are calculated for each respondent. In addition, these three scores can be used as dependent variables in measuring the impact of factors that, conceptually, are thought to contribute to compassion satisfaction, burnout or secondary traumatic stress.

The structure of this section follows from the data available on the possible causes of negative wellbeing: student debt load, job, career and lifestyle satisfaction, expenditure patterns, burnout scores and self-reported health evaluations.

STUDENT DEBT LOAD

The literature on debt of practicing veterinarians, while considerable, tends to focus on debt at graduation, since this amount is fairly easy to measure and most graduates are in a similar lifestage. Less studied is how that debt changes over time according to the experiences (both work experience and personal experience) of practitioners who have been out of school for some time. Admittedly, the problem of large student loan debts has accelerated in recent years, but there are few studies that show, beyond qualitative and personal stories, that DVMs are managing their educational debt rather well. 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.

Figure 47 shows the average debt incurred for each of the sampled graduating classes, with those graduating before 2004 grouped by spans of time. In line with the general population, the level of incurred debt has generally followed an upward trend, with variations most likely due to variation in the respondent sample size in each year. Of those who incurred debt and graduated before 2008, the current amount owed is less than the original balance, but the current debt reported exceeds the incurred debt of most of the respondents who reported graduating after 2008.

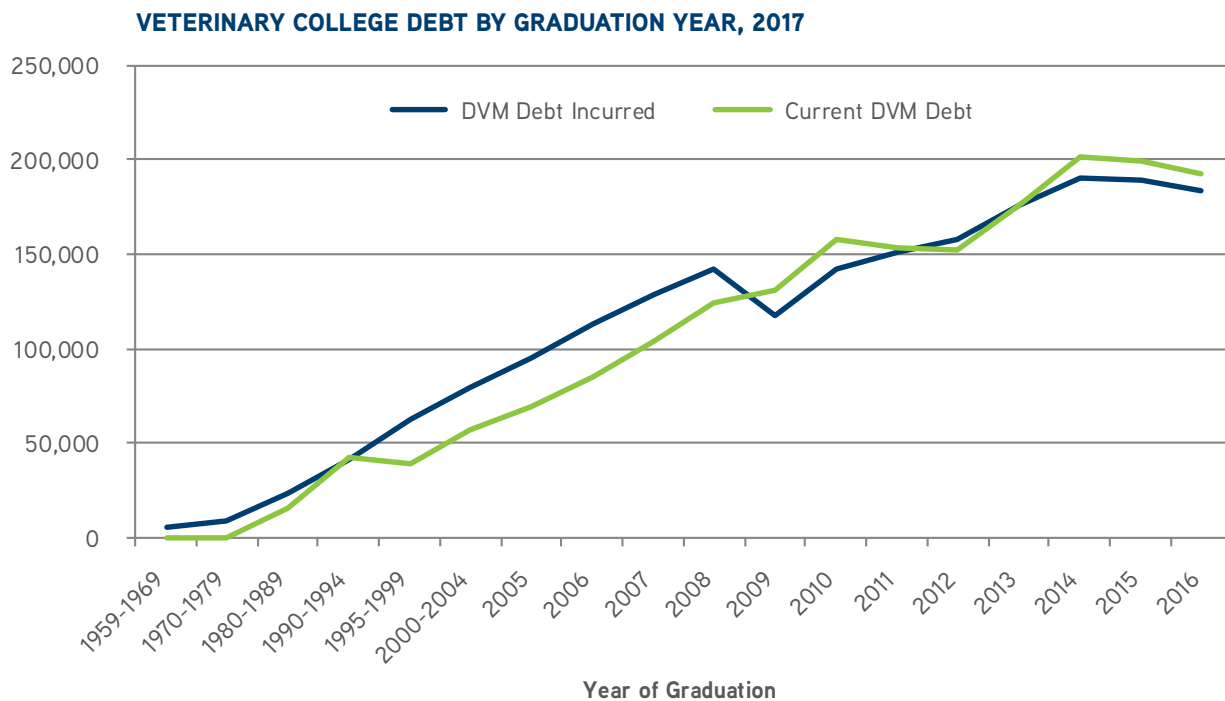


Figure 47

The next debt chart shows the dynamics of how that student loan debt has been paid off (Figure 48). Most veterinarians who graduated before 1990 have paid off their student loans and did so in less than 10 years. For those who graduated after 1990, the proportion of borrowers who still owe on their loans increases proportionally according to their year of graduation, with 5 percent to 30 percent of those who graduated since 2006 having paid off their loans. As a comparison, those who graduated prior to 1995 and paid off their student loans did so in less than 10 years, while for years later than 1995 fewer veterinarians have been able to

pay off their loans in a 10-year period. For those who graduated between 1995 and 1999 only 69 percent paid off their loans in 10 years, for those who graduated between 2000 and 2004 that drops to 38 percent and for those who graduated in 2006, only 16 percent were able to pay off their loans in 10 years or less. After 2006 there is fluctuation with the percent of veterinarians having been able to pay off their loans in a 10-year period by graduation year, but overall, fewer and fewer veterinarians are able to pay off their loans in 10 years or less time.

TIME TAKEN TO REPAY STUDENT LOANS BY GRADUATION YEAR

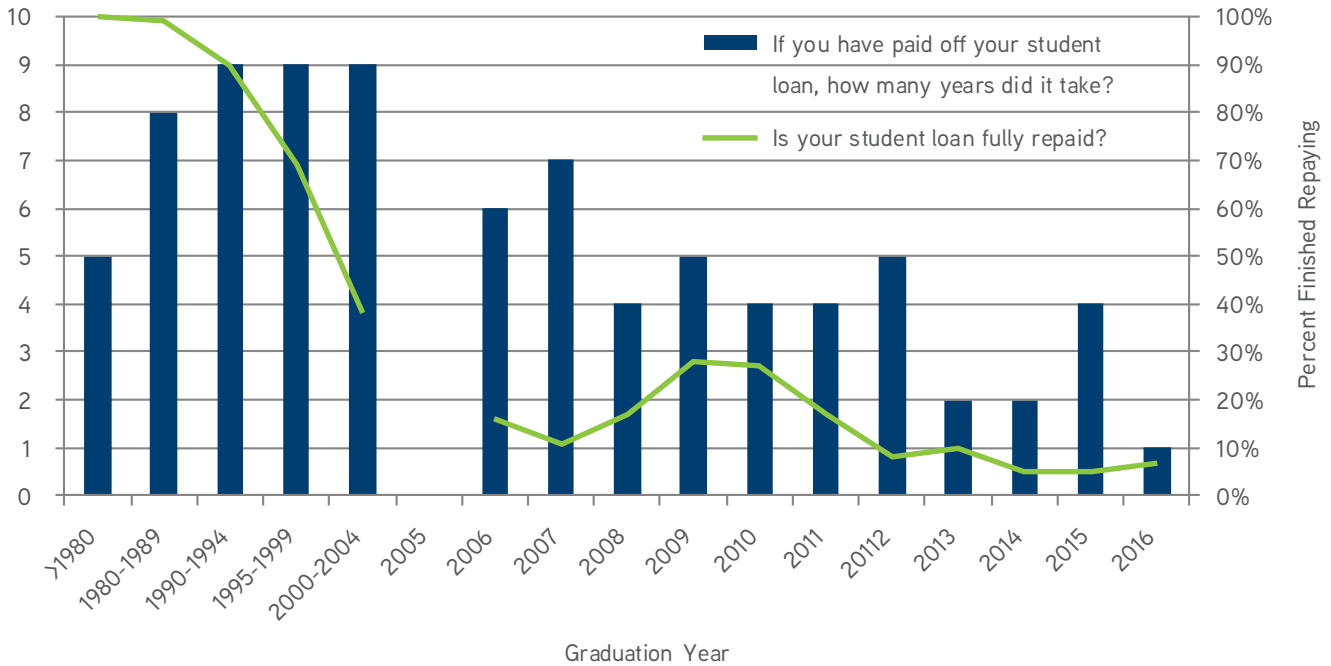


Figure 48

Although student loan debt was significantly lower in previous decades, the time taken to repay loans was generally five-10 years. With student loan balances much higher now, both in nominal dollars and as a percent of income, one would expect that the time required 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. Thus, as the majority of new graduates will require a full 25 years to repay their loans and this group will continue to grow as a percentage of the total veterinary workforce, a negative impact on job, career and lifestyle satisfaction might begin to appear.

JOB, CAREER AND LIFESTYLE SATISFACTION

The compensation that a veterinarian receives from an employer should represent the price at which the veterinarian is willing to sell his or 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 his or 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. But because the veterinarian is not a homogenous product and each veterinarian can be differentiated by differences in veterinary medical skills, business acumen, client services and individual characteristics, 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 census survey, it is clear that there were both veterinarians working more hours and fewer hours than they wished. More specifically, some veterinarians indicated they wished to work more 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 analyzing 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 his or her 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 level of income should be both economically and statistically significant. An analysis of the respondents to the 2017 Census of Veterinarians Survey found a large and statistically significant relationship between income and job satisfaction.

From the survey, the relationship between the expressed level of satisfaction on a seven-point scale where “1” was “not at all

satisfied” and “7” was “extremely 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 seven-point scale), while the majority of higher earners indicated they were at least pretty to extremely satisfied (a 5 to 7 on the seven-point scale). However, there were low earners (below \$50,000) who indicated all levels of satisfaction.

In the 2017 Census of Veterinarians, the job satisfaction reported by respondents is similar to that of the 2016 census. Most respondents fell between an annual income of \$50,000 and \$99,000. Within this group the majority of respondents were neither satisfied nor dissatisfied with their job, giving the median rank of 4 out of 7. Within the group whose income was the highest, above \$200,000, the majority of respondents were extremely satisfied with their jobs, selecting a score of 7 out of 7 (Figure 49).

In line with their satisfaction with current employment, respondents indicated a very similar pattern in satisfaction with compensation. Approximately 52.8 percent indicated satisfaction above the central measure (5-7) while 20.5 percent indicated a greater level of dissatisfaction (1-3) with compensation. Only 9.8 percent of those who were satisfied with their employment indicated a stronger dissatisfaction with their compensation (Figure 50 and Figure 51).

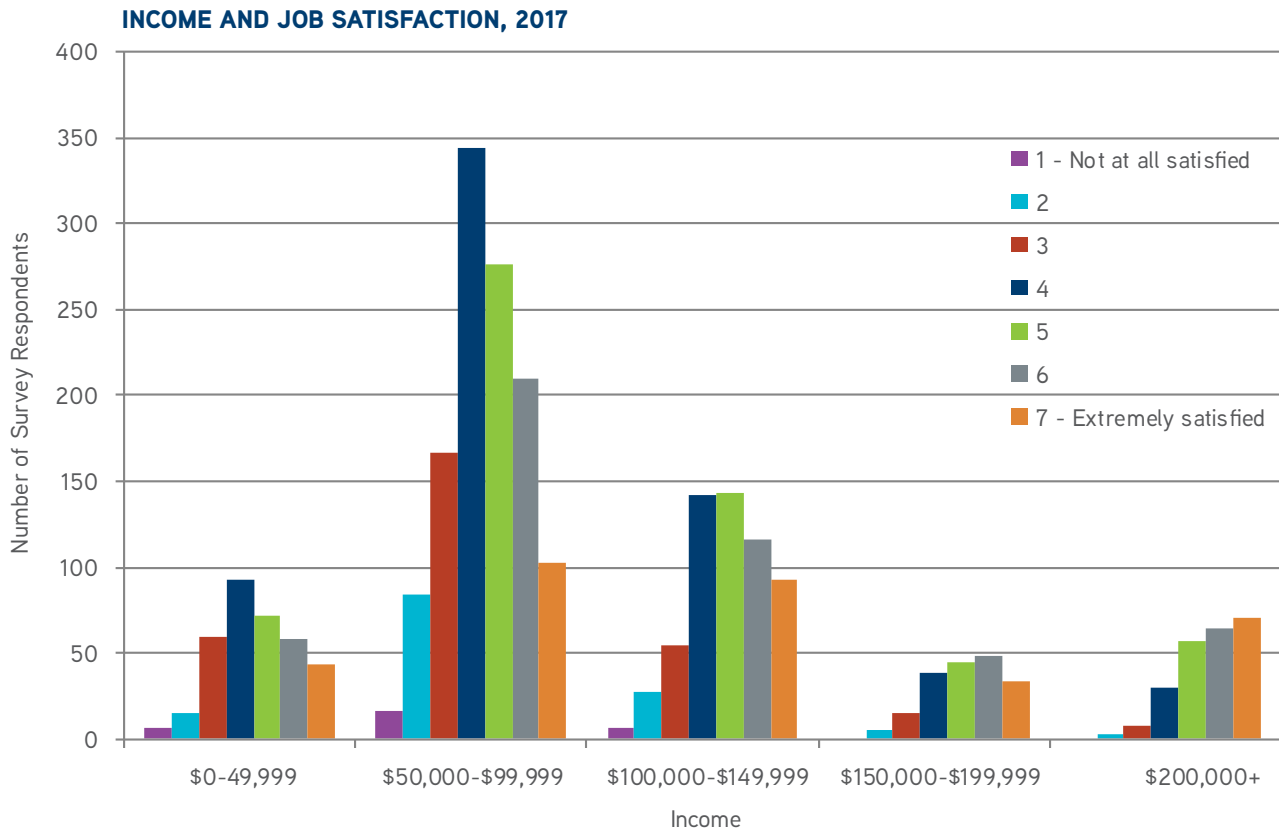


Figure 49

SATISFACTION WITH CURRENT JOB

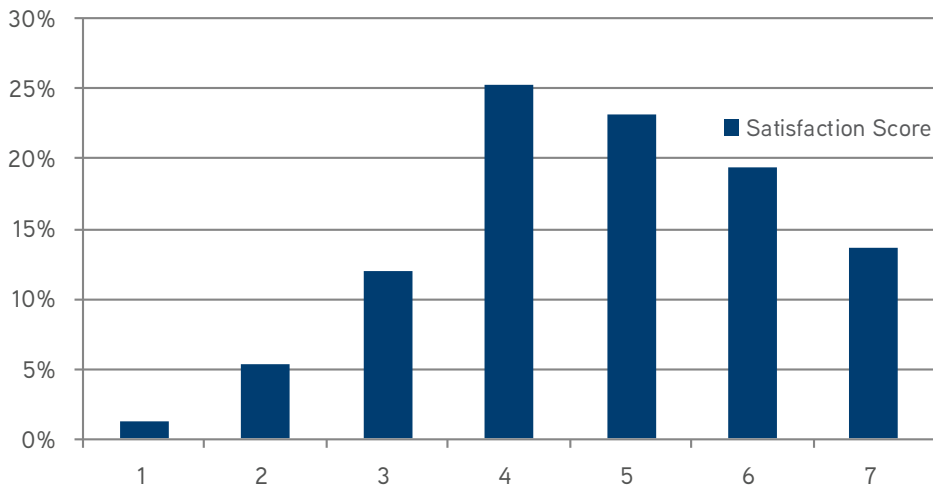


Figure 50

Veterinarians reported that they were less satisfied with their profession than with their current employment or compensation. Only 44.3 percent indicated satisfaction above the central point (4) while 25.5 percent indicated satisfaction below the central point (Figure 52).

SATISFACTION WITH COMPENSATION

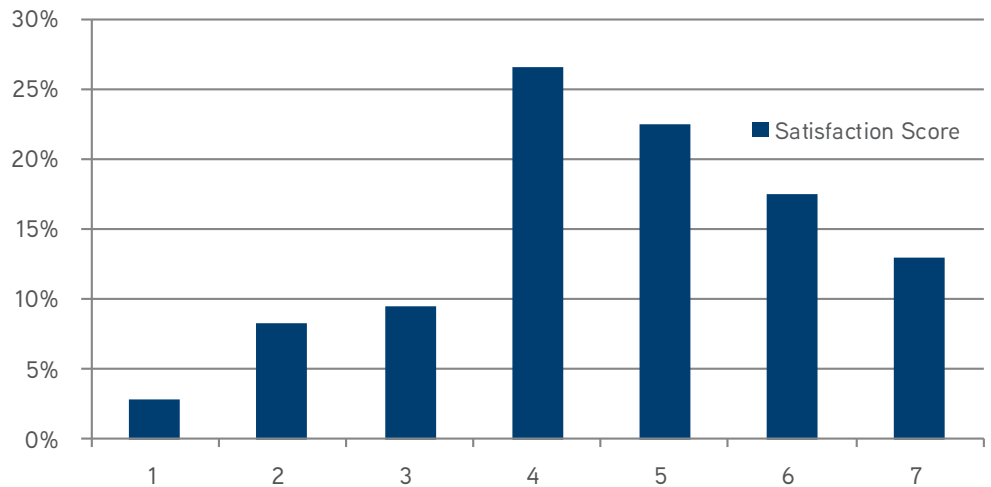


Figure 51

SATISFACTION WITH THE VETERINARY PROFESSION

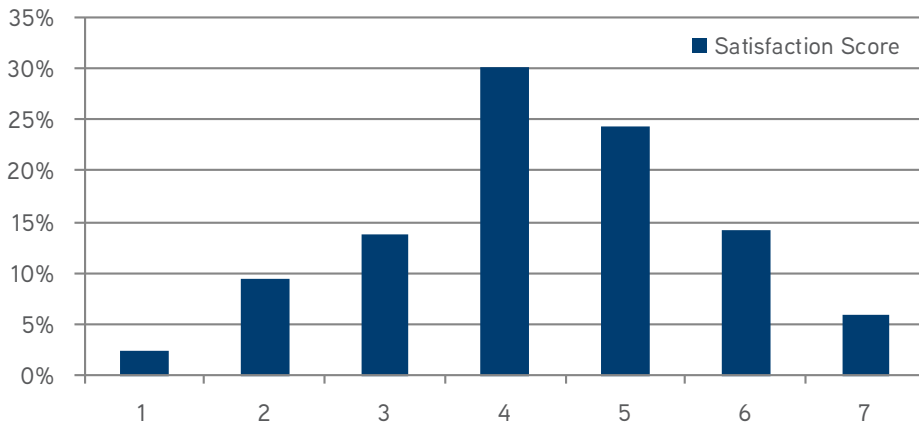


Figure 52

Following closely with the distribution of satisfaction with compensation, 53.4 percent of respondents indicated a level of satisfaction with their lifestyle above the central level while 21.2 percent indicated a level of dissatisfaction with their current lifestyle (Figure 53).

SATISFACTION WITH LIFESTYLE

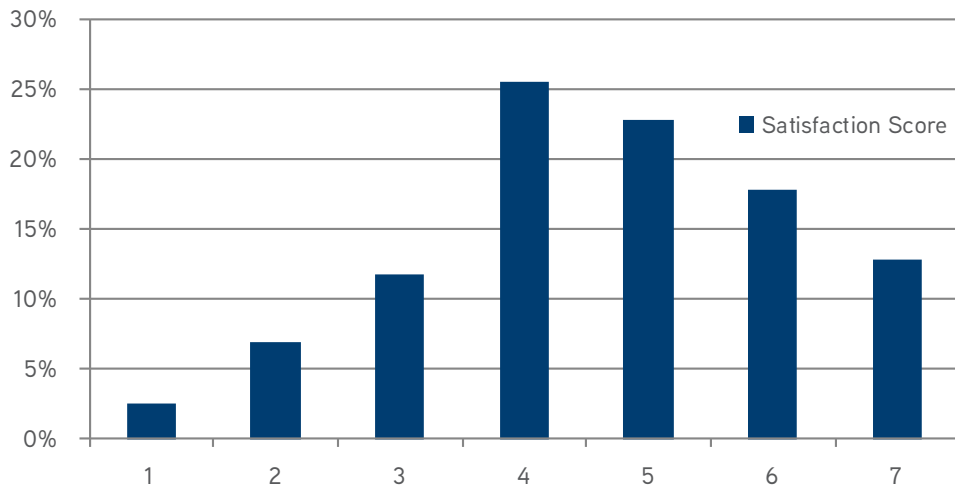


Figure 53

The four measures of satisfaction (employment, compensation, profession, lifestyle) illustrated in this series of charts appear to have similar distributions across levels of satisfaction. To determine how closely respondents replied to each question, a Pearson product-moment correlation matrix was generated for the four measures. The Pearson correlation coefficient measures the linear relationship between two variables. A positive coefficient indicates a positive or direct linear relationship and a negative value indicates a negative or indirect linear relationship. The coefficient value is between 0 and negative or positive 1; the greater the coefficient, the stronger the linear relationship. The level of significance (Sig. 2 tailed) provides a probability that the value of the relationship is 0. For all of the measures the probability that there is not a linear relationship is essentially 0 (.000). A measure of 1 would indicate that the satisfaction measures are perfectly correlated. That is, every respondent who indicated they were extremely satisfied with their employment would also indicate the same level of satisfaction with the correlated measure.

The correlation between each of the measures is strong and statistically significant and this indicates that those who are satisfied with one aspect (employment, compensation, profession and lifestyle) have the same or close level of satisfaction with the other aspects. Thus, these measures of satisfaction suggest a cohort that is dissatisfied with many aspects of their life (Table 28).

The relationship that exists between level of satisfaction with employment and mean income is statistically significant. On average, the mean income at each level of satisfaction is \$12,000 greater than the previous, lower level of satisfaction. The biggest difference exists between those who have reported being remarkably satisfied with their job and those reporting being extremely satisfied with their job, with the two groups with respective mean incomes of \$122,434 and \$148,281 (Figure 54).

CORRELATIONS BETWEEN TYPES OF SATISFACTION

		How satisfied are you with your current employment?	How satisfied are you with the level of your total compensation?	How satisfied are you with the veterinary profession as a whole?	How satisfied are you with your current job?	How satisfied are you with your current lifestyle?
How satisfied are you with your current employment?	Pearson Correlation	1	.487**	.402**	.797**	.546**
	Sig. (two-tailed)		.000	.000	.000	.000
	N	2,298	2,291	2,274	2,283	2,283
How satisfied are you with the level of your total compensation?	Pearson Correlation	.487**	1	.426**	.624**	.566**
	Sig. (two-tailed)	.000		.000	.000	.000
	N	2,291	2,620	2,601	2,610	2,611
How satisfied are you with the veterinary profession as a whole?	Pearson Correlation	.402**	.426**	1	.540**	.500**
	Sig. (two-tailed)	.000	.000		.000	.000
	N	2,274	2,601	2,603	2,601	2,610
How satisfied are you with your current job?	Pearson Correlation	.797**	.624**	.540**	1	.659**
	Sig. (two-tailed)	.000	.000	.000		.000
	N	2,283	2,610	2,601	2,612	2,610
How satisfied are you with your current lifestyle?	Pearson Correlation	.546**	.566**	.500**	.659**	1
	Sig. (two-tailed)	.000	.000	.000	.000	
	N	2,283	2,611	2,610	2,610	2,613

**Correlation is significant at the 0.01 level (two-tailed).

Table 28

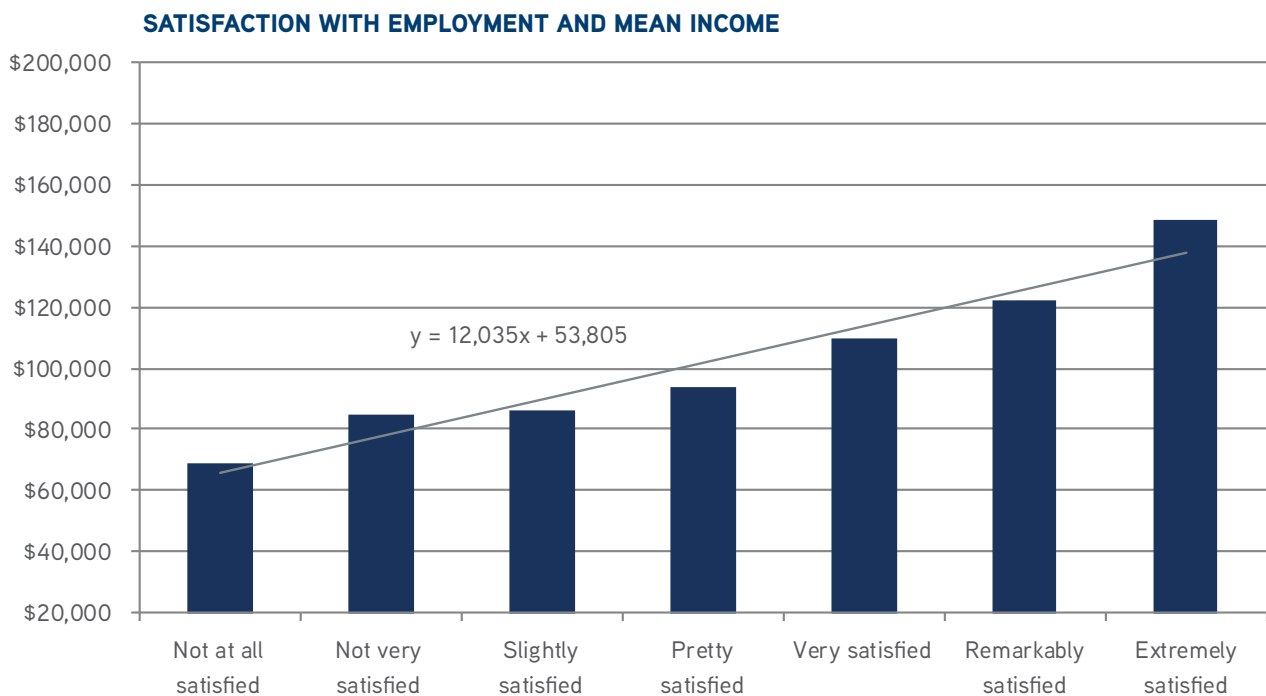


Figure 54

Of course, many factors contribute to satisfaction with employment, including actual hours worked compared to the number of hours desired, 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 2015 Compensation Survey data and 2016 Census of Veterinarians data.

The seven levels of responses provided a larger range of mean incomes, from a low of \$69,149 from those who responded with a 1 (not at all satisfied), to a high of \$148,281 from those who responded with a 7 (extremely satisfied). The linear relationship predicts a \$12,000 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, generally, veterinarians seem to be satisfied with their career choice with more than 50 percent of respondents indicating that they are at least very satisfied. Between 75 and 80 percent of respondents claimed to be at least a 4 (pretty satisfied) on the satisfaction scales.

The willingness of veterinarians to provide veterinary service labor, as indicated by this simple analysis, increases as compensation climbs. And this analysis suggests that a satisfaction level of 4 would generally require a level of compensation in the range of \$90,000-110,000. In addition, according to previous findings, this level of compensation should occur at the optimum level of hours worked. 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.

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 contain 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 might 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 he or she would have been 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 he or she was willing to accept, and the employer of veterinarian labor would not pay more for the labor needed than the employer was 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 can 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.

PERSONAL EXPENDITURE PATTERN

In the 2017 calendar year, a sample of 792 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 2012 and 2016, which are the five most recent graduation years studied.

The expenditures of these early career veterinarians were aggregated by expense category and compared to a similar age group and national income averages for the United States. The average early career veterinarian completing the Personal Financial Planning Tool in 2017 had a mean household income of \$88,836 and this falls between the seventh (\$73,568) and eighth decile (\$94,739) of American households (Table 29).

COMPARISON OF MEAN EXPENSES

	Veterinarian Household, Recent Graduate, 2017	General Population, 25-34 Years Old, 2016	Seventh 10 percent
Demographics			
Age	29	30	48
Household Size	1.6	2.7	2.8
Home Ownership Rate	26%	38%	68%
College Education Rate	100%	74%	70%
Gross Household Income	\$88,836	\$65,467	\$73,568
Expenses			
Federal and State Taxes	\$25,696	\$7,402	\$6,892
Student Loan Payments	\$10,122	n/a*	n/a*
Credit Card Debt Payments	\$3,557	n/a*	n/a*
Housing	\$14,263	\$18,466	\$19,285
Transportation	\$3,162	\$9,452	\$10,136
Food	\$4,431	\$6,774	\$7,502
Healthcare, Insurance and Medicare	\$2,796	\$2,828	\$5,160
Professional Development	\$840	\$1,160	\$913
Recreation and Leisure	\$1,811	\$2,161	\$2,291
Savings, Retirement and Social Security	\$4,340	\$6,227	\$15,813
Personal and Miscellaneous	\$1,260	\$4,423	\$2,344
Child Care**	\$486	n/a*	n/a*
Pet Expenses	\$413	\$437	\$625
Annual Expenditures	\$73,177	\$52,448	\$70,961

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

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

Table 29

There are similarities between the veterinarian and similar-aged general and similar-income population households. Expenditures on healthcare, insurance and Medicare were almost identical between veterinarians and the similar-aged general population. Less than a \$75 difference between veterinarians and similar-income households was spent on professional development. Recreation and leisure spending is close across the three groups with a few hundred dollars separating the low (veterinarians) and high (similar-aged general population) end. There is a difference of more than \$3,000 in average personal and miscellaneous spending between veterinarians and similar-aged households, with similar-income households falling in the middle of the two groups. Pet expenses were comparable between veterinarians and similar-aged general population.

While the similarities are interesting, the differences are even more so. First, notice that the average household size of 1.6 for recent graduates versus 2.7 for the similar-aged and 2.8 for the similar-income households. Furthermore, the home ownership

rate in the similar-aged household is 12 percent higher than that of veterinarians while the similar-income households is nearly triple. Of course the similar income households have a mean age of 48 while the veterinarians mean age is 29.

The amount of taxes paid by the similar-aged and similar-income households is considerably less than for the veterinary households. This large variance reflects the difference in income, number of people in the household and the effect of the mortgage interest deduction.

The third large difference is in the amount spent on transportation. The similar-aged households spent almost three times more than the veterinary households while the similar-income households spent more than three times that of a veterinarian household.

The census data do not specifically itemize school loans or credit card debt and thus a comparison cannot be made, but recent graduates pay an average of \$10,122 in student loan payments and have an average of \$3,557 in credit card payments.

COMPASSION SATISFACTION, BURNOUT AND SECONDARY TRAUMATIC STRESS

Over the last several years, the wellbeing of veterinarians has become a major concern within the profession. The high rate of suicides among veterinarians compared to other professions has led to a call for action.

Starting in 2015, the ProQOL tool was included in the annual survey of veterinarians (employment survey in 2015, Census of Veterinarians in 2016, Census of Veterinarians in 2017) to begin to understand the factors that might contribute to compassion satisfaction, burnout and secondary traumatic stress.

The ProQOL⁷ tool is a measure of compassion satisfaction, burnout and secondary traumatic stress associated with helping others who have experienced suffering. Compassion satisfaction is about the pleasure you derive from your work. For example, you might feel like it is a pleasure to help others through what you do at work. You might feel positively about your colleagues or your ability to contribute to the work setting or even the greater good of society through your work with people who need care. On the other hand, negative feelings derived from work is measured by scoring of burnout (exhaustion, frustration, anger, depression) and secondary traumatic stress (work-related trauma).

Responses to the ProQOL questions are scored based on the responses of thousands of individuals across a number of occupations. The ProQOL survey instrument contains a set of 30 questions and asks respondents to consider each of the questions in the context of “you and your current work situation.”

A five-point scale is provided (1=never, 5=very often) to reflect honestly how frequently over the last 30 days the respondent experienced each of the feelings listed. The scores have been established to describe low-, normal- and high-compassion satisfaction, burnout and secondary traumatic stress. The results from the AVMA surveys indicated that the mean ProQOL scores for compassion satisfaction were in the higher normal range, while, burnout and secondary traumatic stress were in the lower normal range. But these mean scores fail to illustrate the number of respondents who were in the high range for burnout and secondary traumatic stress. The results of the ProQOL scores are plotted against the percent of respondents with each specific score. The distribution of compassion satisfaction scores follows a normal distribution that is skewed left. A score of less than 22 is considered a low score for compassion satisfaction (Figure 55).

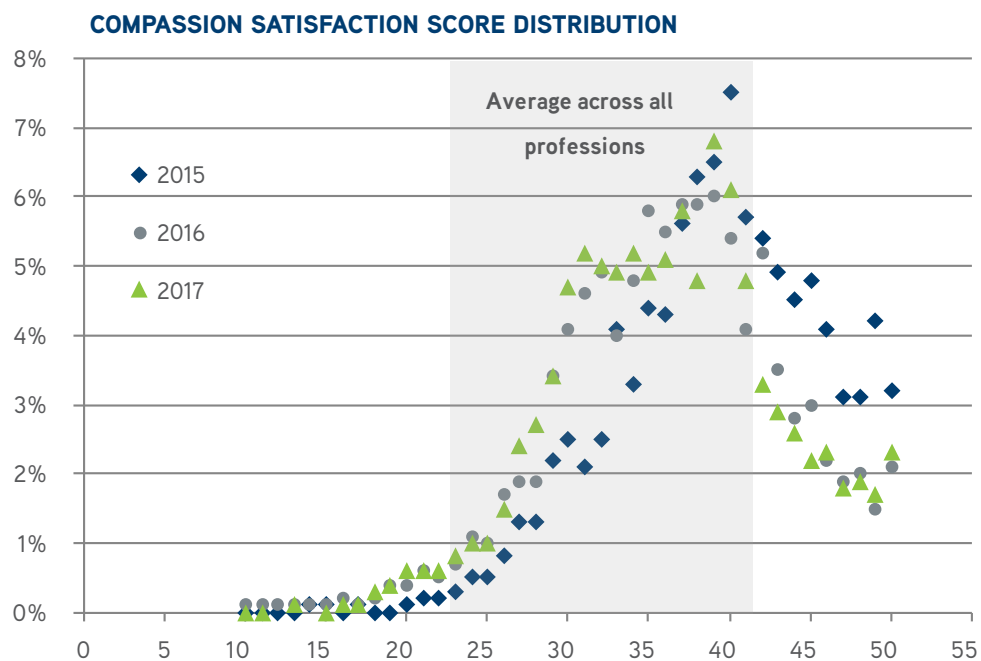


Figure 55

⁷ B. Hudnall Stamm, 2009. Professional Quality of Life: Compassion Satisfaction and Fatigue Version 5 (ProQOL). /www.isu.edu/~bhstamm or www.proqol.org

Looking at what factors are associated with compassion satisfaction, a multiple linear regression was conducted with the variables that were thought might contribute to the variation in compassion satisfaction. The result of this analysis indicated that only two factors, satisfaction with current employment and how well the veterinarian felt prepared for his or her career, were statistically significant in both 2015, 2016 and 2017. Both of these factors were positively associated with compassion satisfaction.

In 2017, companion animal practice (predominant and exclusive), community population size of 2,500-49,999 residents where the practice is located, white, single, and married (or living with a partner) were found to be statistically significant in a negative association with compassion satisfaction, while widowed and increased age were positively associated with compassion satisfaction (Table 30).

FACTORS AFFECTING COMPASSION SATISFACTION SCORE

	2017		2016		2015	
	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value
(Constant)	17.90	0.000	16.00	0.000	18.85	0.000
Satisfaction with current employment	2.81	0.000	3.02	0.000	2.75	0.000
How well your education has prepared you to be a veterinarian	2.09	0.000	1.76	0.000	1.68	0.000
Professor (assistant, associate, or full)			4.49	0.025		
Industry/commercial organizations			-4.44	0.038		
Companion animal practice (exclusive)	-2.09	0.000				
Companion animal practice (predominant)	-1.66	0.009				
Advanced Education					-1.76	0.018
Size of community in which practice is located: 2,500 to 49,999 residents	-0.77	0.034	0.66	0.035		
Compensation mode: Hourly			-1.16	0.026		
Personal Income			0.00	0.048		
Gender: Female=1/ Male=0					1.02	0.001
Age	0.09	0.000	0.05	0.000		
Hours worked per week					0.04	0.002
Ethnicity: Asian					2.00	0.012
Ethnicity: White (Eastern & South Eastern European descent)	-2.53	0.001				
Marital Status: Single	-2.59	0.006			-0.93	0.003
Marital Status: Divorced					1.36	0.038
Marital Status: Married or living with a partner	-1.74	0.043				
Marital Status: Widowed	7.73	0.028				

Table 30

Burnout and secondary traumatic stress, were also measured. A score above 35 on the burnout or secondary traumatic stress scale might suggest a need to seek help to deal with the factors that are causing either burnout, secondary traumatic stress or both. The burnout scores from all of the 2015, 2016 and 2017

surveys were normally distributed with the mean at the low end of the normal range. However, 9.6 percent of 2017 respondents (7.2 percent in 2016) had scores in excess of 35 (Figure 56).

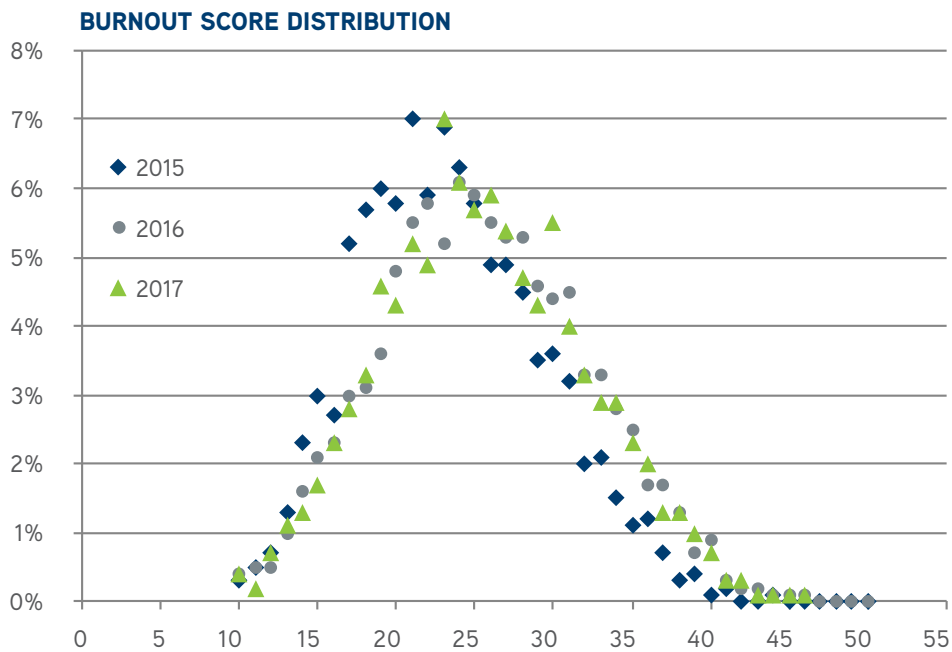


Figure 56

Using the same approach to examine the factors associated with burnout that was used with compassion satisfaction, three factors were found to be statistically significant in 2015, 2016 and 2017. The less satisfied with current employment and the less prepared the respondent thought their education had

prepared them for a career in veterinary medicine, the greater the burnout score. The more hours worked per week, the greater the burnout score. Again, there were several other factors that were statistically significant in their association with higher and lower levels of burnout (Table 31).

FACTORS AFFECTING BURNOUT SCORE

	2017		2016		2015	
	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value
(Constant)	36.06	0.000	37.04	0.000	36.15	0.000
Satisfaction with current employment	-2.73	0.000	-2.71	0.000	-2.59	0.000
Food animal practice (predominant)					-3.89	0.000
Food animal practice (exclusive)					-3.33	0.000
Equine practice					-1.66	0.008
Companion animal practice (predominant)	3.22	0.000				
Companion animal practice (exclusive)	2.16	0.000				
Not-for-profit organizations			-4.63	0.024		
Hours worked per week	0.09	0.000	0.08	0.000	0.05	0.000
How well your education has prepared you to be a veterinarian	-1.03	0.000	-1.06	0.000	-1.19	0.000
Gender: Female=1/ Male=0	1.78	0.000	1.04	0.002		
Educational Debt			0.00	0.032		
Ethnicity: Black/African American			-3.39	0.038		
Ethnicity: Hispanic/Latino					-2.79	0.001
Ethnicity: Asian					-1.89	0.009
Marital Status: Single					1.02	0.000
Marital Status: Widowed	-7.55	0.016				
Age	-0.08	0.000	-0.05	0.001		
Graduation year					-0.38	0.038
Size of community in which practice is located: 50,000 to 499,999 residents	-0.76	0.026				

Table 31

Secondary traumatic stress scores had a similar distribution to that of the burnout scores. However, the mean in 2017 is to the left (lower) than for burnout and the percent of respondents with a score above 35 (3.6 percent; 4.1 percent in 2016) is lower than for burnout (Figure 57).

SECONDARY TRAUMATIC STRESS SCORE DISTRIBUTION

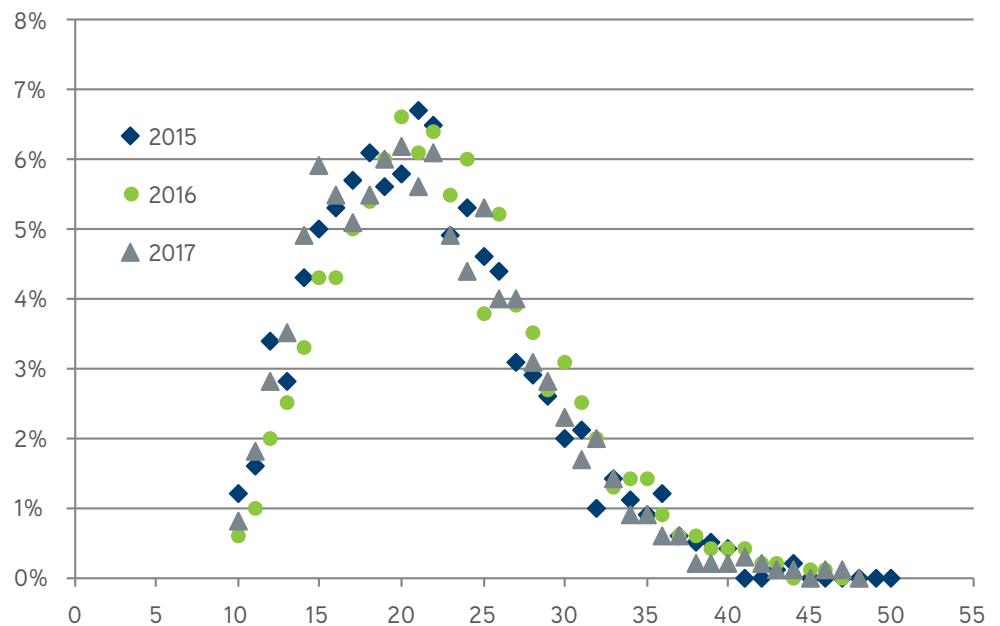


Figure 57

Again, using the same approach to examine the factors associated with secondary traumatic stress that was used with compassion satisfaction and burnout, three factors were found to be statistically significant in 2015, 2016 and 2017. The less satisfied with current employment the greater the secondary traumatic stress score. Females, and the more hours worked per week were associated with greater levels of secondary traumatic

stress. Unlike the years 2015 and 2016, and in the compassion satisfaction and burnout regressions above, education preparation was not significant in 2017. As with both compassion satisfaction and burnout, there were several other factors that were statistically significant in their association with higher and lower levels of secondary traumatic stress (Table 32).

FACTORS AFFECTING SECONDARY TRAUMATIC STRESS SCORE

	2017		2016		2015	
			Coefficient	P Value	Coefficient	P Value
(Constant)	23.57	0.000	26.38	0.000	23.24	0.000
Graduation year			-0.75	0.000		
Satisfaction with current employment	-1.48	0.000	-1.35	0.000	-1.31	0.000
Hours worked per week	0.06	0.000	0.08	0.000	0.07	0.000
Gender: Female=1/ Male=0	2.05	0.000	1.46	0.000	1.88	0.000
How well your education has prepared you to be a veterinarian			-0.58	0.009	-0.70	0.001
Food animal practice (predominant)					-3.25	0.014
Food animal practice (exclusive)	1.48	0.007			-2.73	0.017
Companion animal practice (exclusive)					1.72	0.000
Companion animal practice (predominant)	3.02	0.000			1.28	0.015
State/local government					-3.82	0.015
Uniformed services			13.00	0.032		
Researcher			12.11	0.005		
Ethnicity: Black/African American					-3.43	0.032
Age	-0.06	0.006			-0.04	0.033
Current educational debt owed	0.00	0.003				

Table 32

Burnout score also varies across graduation year. Those graduating within the last 10 years on average have the highest burnout scores, with a mean of 26.8. The scores decrease with the number of years since graduation, with those graduating between 1957 and 1966 reporting a mean burnout score of 21.1 (Table 33).

BURNOUT SCORE AND GRADUATION YEAR

Graduation year	Mean	N	Std. Deviation
2007-2016	26.82	1,162	6.20
1997-2006	25.75	611	6.37
1987-1996	24.12	337	6.41
1977-1986	21.49	162	5.98
1967-1976	19.84	62	5.65
1957-1966	21.14	7	3.58
Total/average	25.58	2,341	6.49

Table 33

Those who are board certified reported a mean burnout score of 25.6 versus the mean burnout score of those not board certified, 25.4 (Table 34).

BURNOUT SCORE AND BOARD CERTIFICATION

	Mean	N	Std. Deviation
Not board certified	25.35	286	6.46
Board certified	25.60	2,061	6.49
Total/average	25.57	2,347	6.49

Table 34

The burnout scores among regions within the United States ranged from 24 to 26, with Region 5 having the lowest burnout score and Region 9 having the highest burnout score at 26.4 (Table 35).

Additionally, respondents working full time with an income range exceeding \$200,000 reported the lowest burnout score at 23.1 and those working full time within the income range of \$50,000-\$99,999 reported a mean burnout score of 26.4, the highest within the income ranges (Table 36).

BURNOUT SCALE AND WORKPLACE LOCATION

Region of Workplace	Mean	N	Std. Deviation
Region 0	25.31	186	6.20
Region 1	26.07	198	6.51
Region 2	25.18	267	6.51
Region 3	25.80	270	7.26
Region 4	25.58	252	5.84
Region 5	24.72	199	6.32
Region 6	24.86	207	6.42
Region 7	25.13	197	6.67
Region 8	25.93	203	6.34
Region 9	26.45	283	6.62
Total/average	25.54	2,262	6.51

Table 35

BURNOUT SCALE AND INCOME RANGE

Income Range	Mean	N	Std. Deviation
\$0-\$29,999	25.22	126	7.07
\$30,000-\$49,999	25.52	190	6.22
\$50,000-\$99,999	26.40	1,070	6.37
\$100,000-\$149,999	25.61	516	6.35
\$150,000-\$199,999	24.55	175	6.60
\$200,000 +	23.11	271	6.40
Total/average	25.57	2,348	6.49

Table 36

Females also had a significantly higher burnout score, 26.3 as compared to male respondents who reported a mean score of 23.5 (Table 37).

Also, understandably, burnout score increases with debt levels. Respondents with less than \$10,000 of DVM debt have a mean burnout score of 23.2 while respondents whose debt levels range within \$200,000 and \$249,999 report a mean burnout score of 26.8 (Table 38).

BURNOUT SCORE AND GENDER

	Mean	N	Std. Deviation
Male	23.49	618	6.52
Female	26.33	1,723	6.32
Total/average	25.58	2,341	6.50

Table 37

BURNOUT SCORE AND CURRENT DVM DEBT

	Mean	N	Std. Deviation
\$0-\$9,999	23.20	65	7.60
\$10,000-\$19,999	22.30	85	5.40
\$20,000-\$29,999	23.00	110	6.00
\$30,000-\$39,999	24.10	105	6.50
\$40,000-\$49,999	24.60	108	6.20
\$50,000-\$59,999	26.20	67	7.10
\$60,000-\$69,999	26.00	72	5.50
\$70,000-\$79,999	25.10	83	6.20
\$80,000-\$89,999	26.10	128	6.00
\$90,000-\$99,999	25.10	61	6.80
\$100,000-\$124,999	26.60	223	6.40
\$125,000-\$149,999	26.90	168	6.00
\$150,000-\$174,999	27.20	181	6.00
\$175,000-\$199,999	26.20	116	6.80
\$200,000-\$249,999	26.80	158	6.30
\$250,000 +	25.40	612	6.70
Total/average	25.60	2,342	6.50

Table 38

Burnout scores vary across practice types. Veterinarians reporting as a consultant had the lowest burnout score, 20.7 and those reporting employment in uniformed services register the highest burnout score, at 29.1 (Table 39).

BURNOUT SCORE AND PRACTICE TYPE

	Mean	N	Std. Deviation
Food animal practice (exclusive)	24.88	40	6.67
Food animal practice (predominant)	23.37	30	6.90
Mixed animal practice	25.12	122	6.56
Companion animal practice (predominant)	25.92	293	6.78
Companion animal practice (exclusive)	25.83	1,236	6.37
Equine practice	25.80	64	6.73
Federal government (civil service)	22.17	42	5.84
Uniformed services	29.06	16	8.43
College or university (faculty or staff only)	24.97	127	6.09
State/local government	25.33	21	5.60
Industry/commercial organizations	22.18	62	5.98
Not-for-profit organizations	26.66	64	7.09
Advanced education (inclusive of internships and residencies)	26.96	90	6.20
Consultant	20.73	15	5.82
Research contractor	26.43	7	3.78
Other veterinary employment	24.59	86	6.20
Non-veterinary employment	27.60	25	5.96
Total/average	25.57	2,340	6.49

Table 39

PERSONAL HEALTH ASSESSMENT

The 2017 Census Survey asked respondents to broadly evaluate their own health. Of the Survey's 2,780 respondents who reported being currently employed (2,638), 24 percent of those working full time and 22 percent of those working part-time reported excellent health, and 45 percent of both groups reported very good health; 25 percent of full-time and 22 percent of part-time respondents reported good health; and 6 percent of full-time veterinarians and 11 percent of veterinarians working part-time reported fair to poor health. These contrast with the health of

unemployed and retired veterinarians, where 24 percent of unemployed and 13 percent of retired veterinarians report being in excellent health; 38 percent of unemployed and 41 percent of retired veterinarians were in very good health, 24 percent and 31 percent, respectively, were in good health; and 14 percent and 16 percent were in fair or poor health. The overall health of retired and unemployed veterinarians is lower than for employed veterinarians; however, it would be premature to say that one factor causes the other (Figure 58).

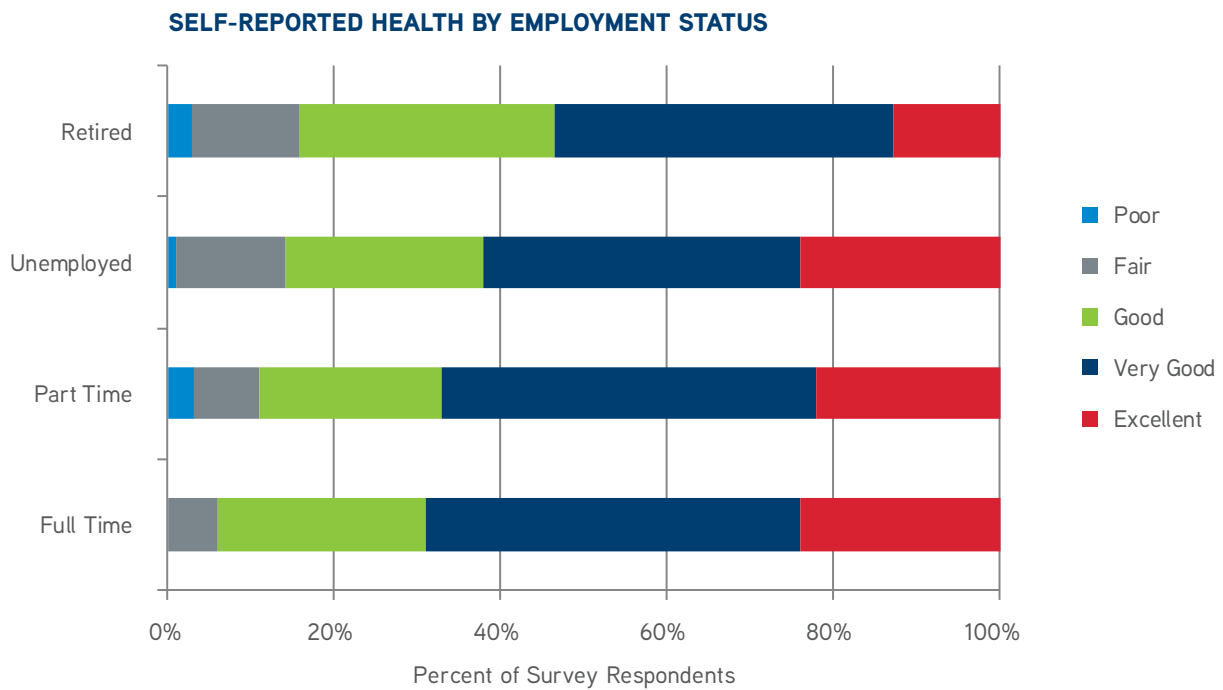


Figure 58

SELF-REPORTED HEALTH BY PRACTICE TYPE

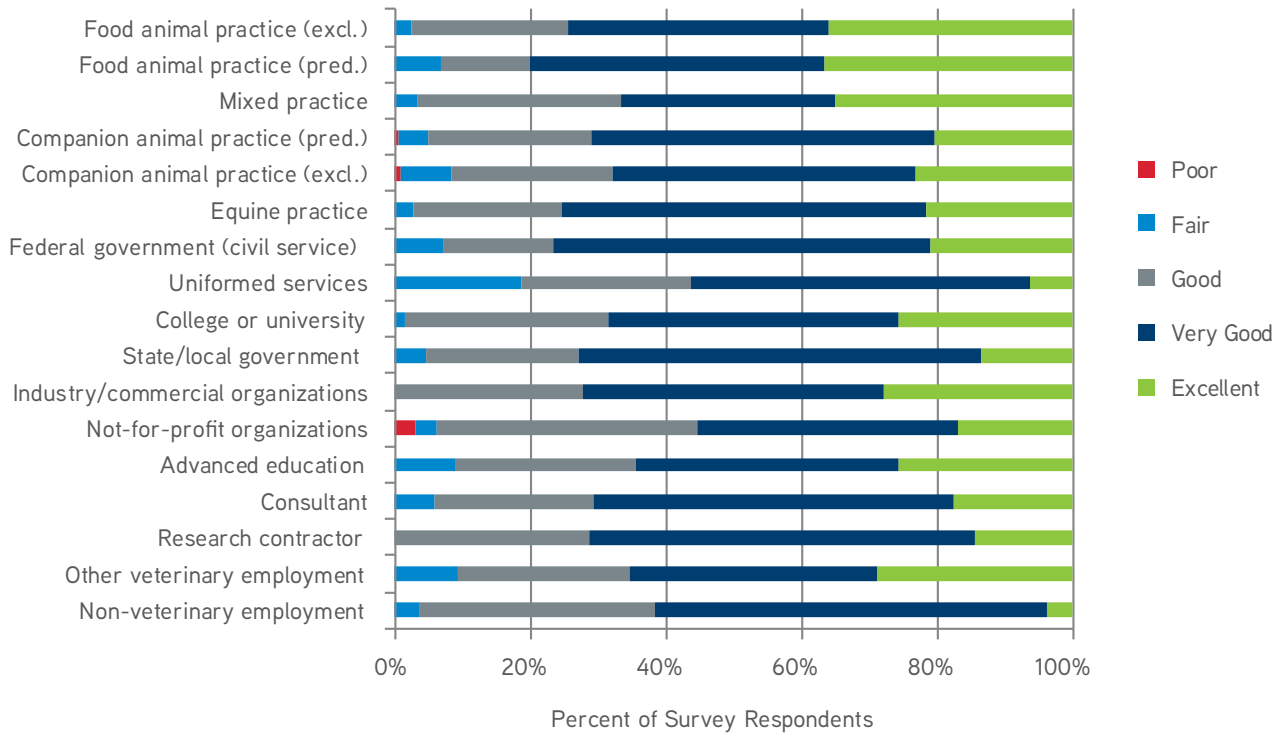


Figure 59

The self-reported health scores also varied by practice type with food animal predominant veterinarians indicating the largest percentage in excellent health, and not-for-profit and uniformed services categories reporting the two largest percentages for good to poor health (Figure 59).

There was little difference in the self-reported health rating by gender with both the mean value and the distribution being very similar (Figure 60).

SELF-REPORTED HEALTH BY GENDER

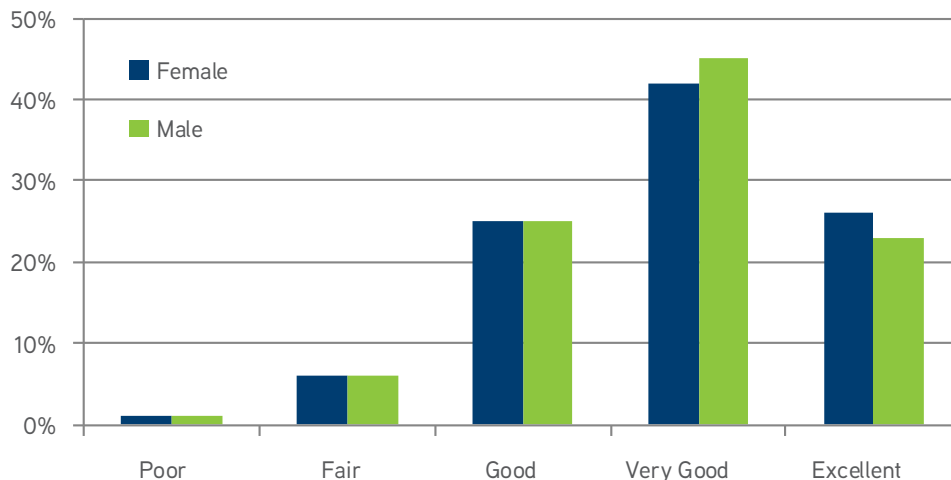


Figure 60

Self-reported health scores also varied little by year of graduation, although respondents who graduated in earlier years had, with one exception, higher percentages indicating they were in excellent health. Only 23 percent of new graduates report excellent health while roughly 30 percent of graduates from 1980 to 1989 reported excellent health (Figure 61).

Self-reported health appears to differ little from region to region. More than 70 percent of respondents from Region 0, Region 2 and Region 6 reported very good to excellent health (Figure 62).

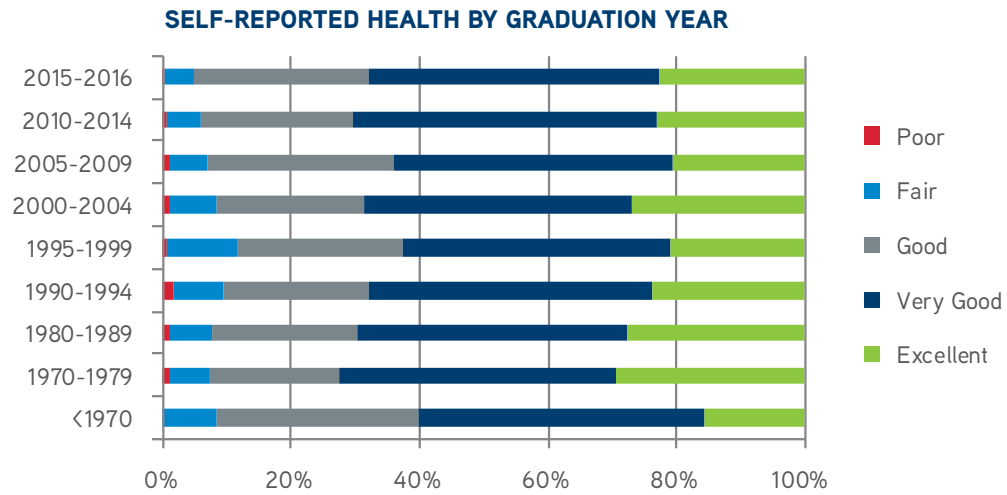


Figure 61

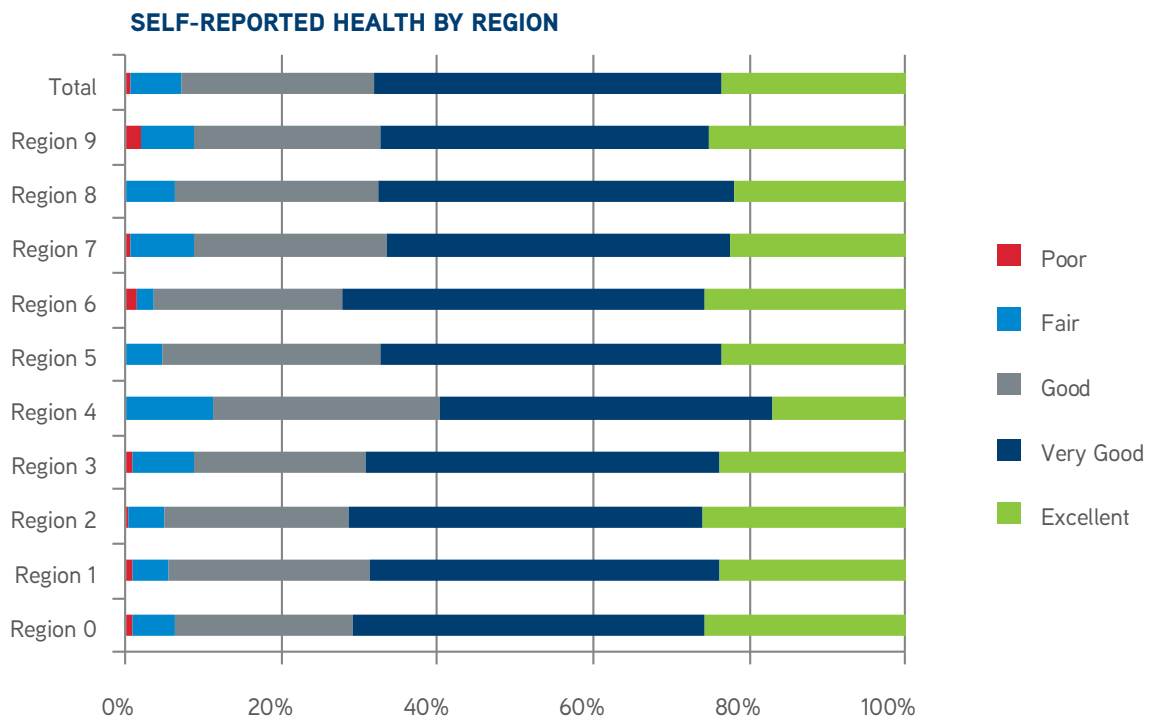


Figure 62





VETERINARY MARKET KEY PERFORMANCE INDICATOR: NET PRESENT VALUE

In 2017 there is an increase in the value of the NPV degree for both men and women, and for the first time since 2013, male NPV is positive.

The discussion of the veterinary incomes, unemployment, underemployment, applicant-to-jobs ratio and wellbeing provides an indication of the internal function of the market for veterinarians. The change to each of these measures over time provides an overview of how the market is changing and the direction the market is headed. But these measures only provide a view of how well the market is functioning internally, not how well the market is performing within the vertically related veterinary markets.

The output of the market for veterinarians is the capacity to provide veterinary services. The performance of this market is the efficiency with which veterinary resources are used to produce veterinary services that are valued by society at or above the cost of producing them, and, one of the main costs is veterinary compensation. An efficient market would enable veterinarians to receive a normal economic return on the cost of becoming a veterinarian. A normal economic return is a percent return on the investment for comparable investments.

Given money to invest, the decision on where to invest is based on how much money can be made by investing in alternative opportunities. The opportunity that provides the greatest return for every dollar invested may be the best investment choice.

Money spent on the DVM degree is an investment and the return is the increased future earnings. Taking a closer look, the DVM degree investment includes three components:

- actual cost of the education including tuition and fees, books, supplies and equipment needed for the education and any other expenses that were required to obtain the degree;
- the interest on any money borrowed to pay these education expenses; and
- income not earned while in veterinary school, an “opportunity cost” that is considered part of the investment.

The value of the investment in veterinary education is the sum of all costs to obtain the DVM: the actual costs to attend veterinary college, the interest on any money borrowed, and the income foregone while in veterinary college and not working.

The returns, as noted earlier, are the lifelong earnings received as a result of the DVM degree. This is not the total income received as a veterinarian, but the income received that is above what might have been earned with a bachelor’s degree. This is the value-added earnings that can be attributed to the DVM degree.

The difference between the returns and the total investment over the lifetime of veterinary work is the net value of the DVM degree: Considering the returns a percent of the total investment provides a measure of the returns on investment.

Because most people prefer current rewards over future rewards, however, the value of an earnings dollar declines each year. This conversion of dollars received or spent in the future to a current value is known as “discounting,” and reflects the social time-preference of money. Another way to look at discounting is to ask, “how much would I have to offer to pay you a year from now to not pay you \$100 today?” If you replied \$110, then you have indicated that next year’s dollar has to be discounted by 10 percent to be equal to the value of a dollar today.

When both returns and investment are discounted, the net value of the DVM degree becomes the net present value (NPV) of the DVM degree and provides an indication of the value of increased earnings resulting from obtaining the DVM degree in today’s dollars. The average NPV of the DVM (or VMD) degree varies greatly by location, practice type, hours worked, specialization and other factors.

Of course, there are also non-measurable benefits and costs that can be attributed to the DVM degree, such as the benefits of daily interaction with animals and the satisfaction of helping animals and animal owners, or the costs of client conflicts. So, the NPV represents only the measurable value of the DVM degree and not the total value.

Knowing the NPV of the DVM degree enables a comparison of alternative careers and career paths, just as one compares alternative investment opportunities. This measure can be used

with the perceived non-measurable benefits and costs to make more informed career choices and track the performance of the veterinary profession over time.

The NPV of the DVM is calculated by estimating the income received from the veterinary career less the compensation that might have been received without the DVM degree and the costs of obtaining the DVM degree. Consider the following measures for the 2017 graduating class from the 28 U.S. veterinary colleges:

- Mean total debt (debt plus the servicing costs) of a 2017 graduating veterinarian is \$266,870;
- Mean lifetime income of 2017 graduates (26-75 years old) was estimated at \$5,429,896;
- NPV for men is estimated at \$117,235;
- NPV for women is estimated at \$497,546.

The NPV hit a low in 2014 for women and in 2015 for men. The difference in the NPV for men and women is due to the higher debt and lower incomes of women at graduation and the higher opportunity costs of pursuing a veterinary education for men as compared to women. In 2017 there is an increase in the value of the NPV degree for both men and women, and for the first time since 2013, male NPV is positive (Figure 63).

The opportunity costs refer to the lifetime income earning potential had veterinarians pursued an alternative career prior to entering veterinary college. The lifetime mean earnings of a typical bachelor’s degree recipient are used to estimate the opportunity costs. The alternative earning profile begins at graduation and thus a veterinarian gave up four years of alternative earning potential while in veterinary school, and this must be overcome before there is a positive gain in earnings with the DVM versus the Bachelor’s degree only.

The difference in the NPV of the DVM for women and men is mostly a result of the higher opportunity costs for men compared to women. The difference between the starting salary of a DVM and a Bachelor’s degree has increased for women and for the first time since 2011, increased for men. The increase in the difference of DVM and Bachelor’s degrees for men from \$21,132 to \$21,786 indicates that the opportunity cost of men to gain a DVM is decreasing, making the economic decision to obtain a DVM slightly easier than before; however, the cost is still greater than it is for women. For women, the opportunity cost of obtaining the DVM is declining, as the difference between the DVM and Bachelor starting salary has increased from \$27,739 to \$29,184 (Figure 64)¹⁰. The positive NPV for men yields a return on the DVM in 2017, compared to 2016; the NPV for women continues to indicate a positive return on investment.

¹⁰ Salary Trends Through Salary Survey: A Historical Perspective on Starting Salaries for New College Graduates. (2017). Naceweb.org. Retrieved 5 January 2017, from <https://www.naceweb.org/job-market/compensation/salary-trends-through-salary-survey-a-historical-perspective-on-starting-salaries-for-new-college-graduates/#appendix>

NET PRESENT VALUE OF THE DVM DEGREE

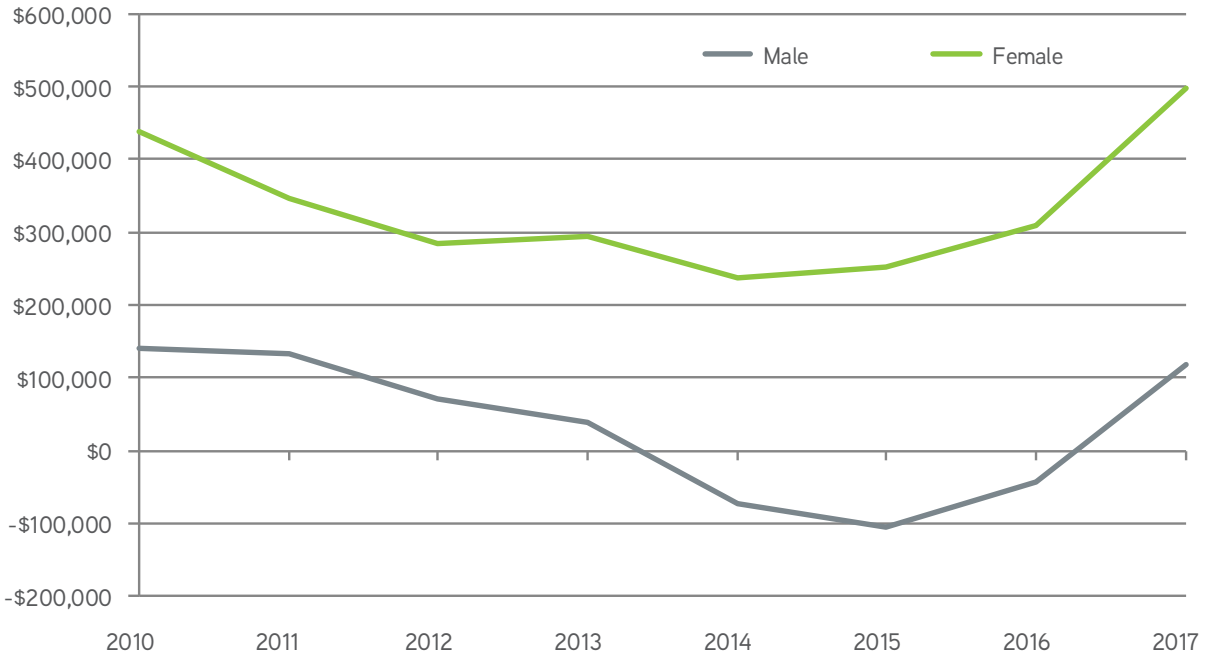


Figure 63

STARTING SALARIES BY DEGREE AND GENDER

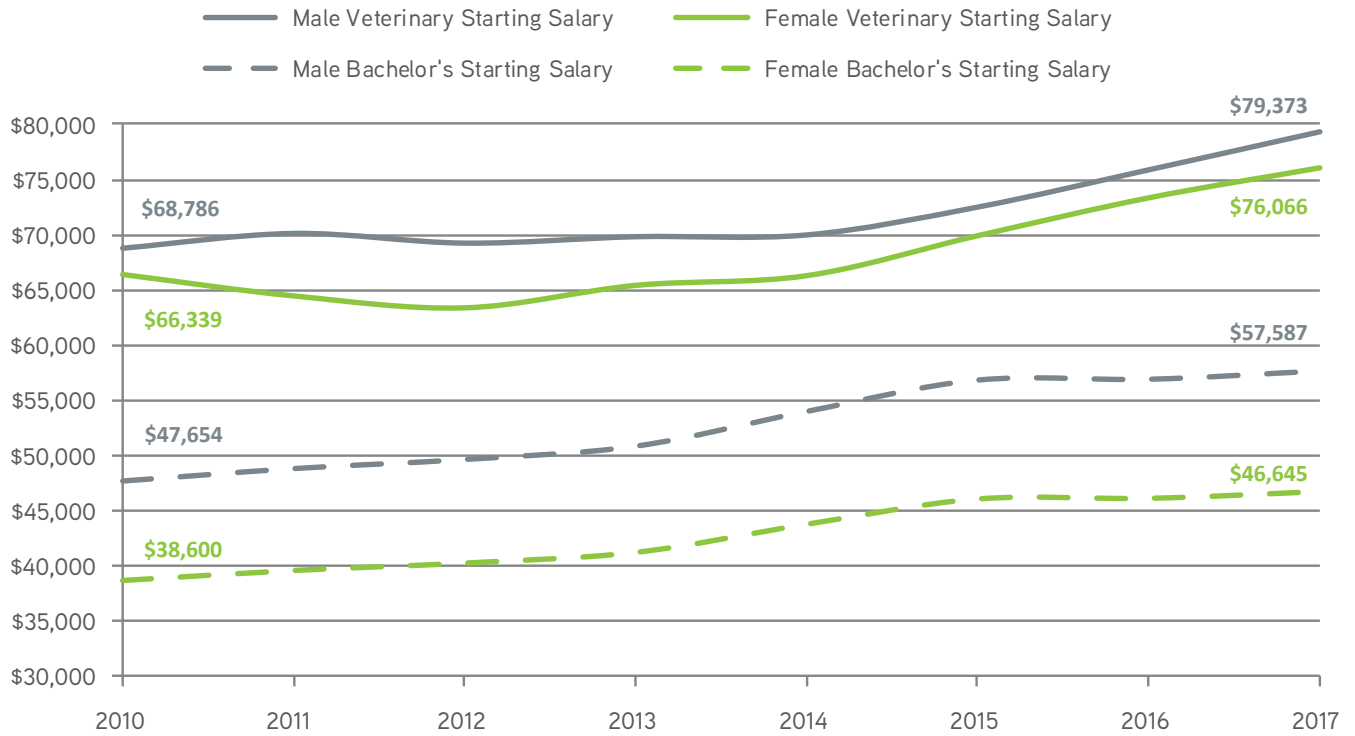


Figure 64

OWNERS' VS. ASSOCIATES' NPV

For many veterinarians, owning a practice is a primary career objective. But what exactly are the financial incentives, and how much is it worth, on average? Using the 2002-2017 compensation data from AVMA surveys that include roughly 26,000 full-time private practice veterinarians, some 10,000 of whom are practice owners and some 16,000 associates, the effect of practice ownership on NPV of the DVM can be estimated (Table 40).

NUMBER OF OBSERVATIONS USED IN ANALYSIS

		Number of Owners	Number of Associates
Companion Animal	Male	2,722	3,007
	Female	2,348	7,074
Food Animal	Male	1,529	1,129
	Female	239	514
Mixed Animal	Male	1,364	1,158
	Female	546	1,474
Equine	Male	836	776
	Female	483	1,071
Total		10,067	16,203

Table 40

DIFFERENCE IN ANNUAL INCOME

The difference in the mean income between practice owners and associates could be due to factors other than practice ownership. In this dataset the difference in the mean income of all owners to all associates is approximately \$20,000; owners earn almost 25 percent more than associates. But there are many factors that are different among owners and associates. For example, owners tend to be older and have more experience. The survey data indicate that owners are on average six years older and have five more years of experience. In addition, though the sample has only slightly more men than women, 37 percent of men are owners

compared to 22 percent of women. Each all of these factors, and others, have an impact on veterinary income and thus might explain at least a part of the difference in income between practice owners and associates.

To separate the effect of the various potential factors from strictly the effect of practice ownership on incomes, four separate regression models were estimated. The other factors that affect income were discussed previously and listed in the experienced veterinary salary calculator (Table 41).

EFFECT OF OWNERSHIP ON ANNUAL INCOME BY GENDER AND PRACTICE TYPE

		Effect	Coefficient	Std. Err.	t-statistic	p-value
Companion Animal	Male	9.42%	0.094	0.014	6.81	0.000
	Female	n/a	0.017	0.014	1.26	0.207
Food Animal	Male	9.98%	0.100	0.019	5.14	0.000
	Female	n/a	0.020	0.040	0.5	0.614
Mixed Animal	Male	6.25%	0.063	0.021	3.02	0.003
	Female	n/a	-0.004	0.027	-0.14	0.886
Equine	Male	n/a	0.021	0.027	0.79	0.427
	Female	n/a	0.006	0.032	0.19	0.853

Note: Estimates in this table are based on a statistical analysis that controls for relevant correlates. Data are from 2002-2017 AVMA surveys. Incomes are deflated to be in real 2015 dollars.

Table 41

As Table 41 indicates, when controlling for relevant factors, most owners do indeed still earn more than associates. The income difference between owners and associates, however, varies across gender and practice type. Male practice owners earn a higher premium for ownership compared to women. By practice type, female food animal, female mixed animal, and female and male equine practice owners do not appear to make statistically significant different income from associates.

These estimates of the income premium to practice ownership are based on the sample collected and could change from year to year. For example a drought could greatly affect the compensation for food animal veterinarians in a specific year. However, the length of the dataset, spanning 16 years, should minimize any sector-specific, year-to-year variation in income.

DIFFERENCE IN LIFETIME INCOME

Using the regression equations that produced the salary calculator, along with the 2016 reported starting salaries of new veterinary graduates, age-earnings profiles are examined by gender, practice type, and ownership status. These are estimates, based on what veterinarians earn with different levels of experience, which is calculated as the year the survey was administered, minus the veterinarian's year of graduation,

Lastly, these estimates might be overestimating the effect of practice ownership, due to what is termed "omitted variable bias." An extensive body of literature in the field of Labor Economics details this potential for omitted variable bias. The omitted variable here is something like "business acumen." Veterinarians with a high degree of business acumen might earn a higher income, and the effect of this factor on income may not be captured by any other factor other than practice ownership; veterinarians with high levels of business acumen might be more likely to own a veterinary practice. The AVMA surveys have no measure of business savviness, and had it been included in the statistical models, might have reduced the effect of practice ownership on incomes.

minus the number of years spent out of the labor force. If we assume a 40-year-long career with an age at graduation of 27, and retirement at 67, with practice owners owning a practice immediately upon graduation, we can estimate the additional lifetime income received from practice ownership (Figures 65-68).

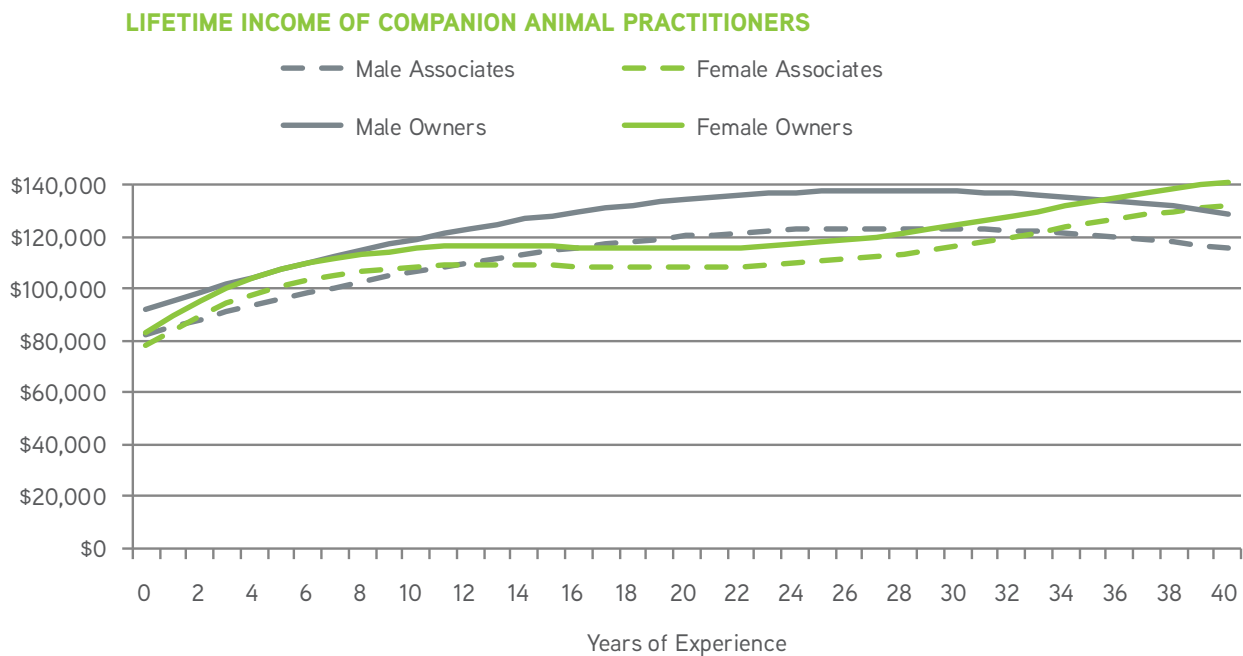


Figure 65

LIFETIME INCOME OF FOOD ANIMAL PRACTITIONERS

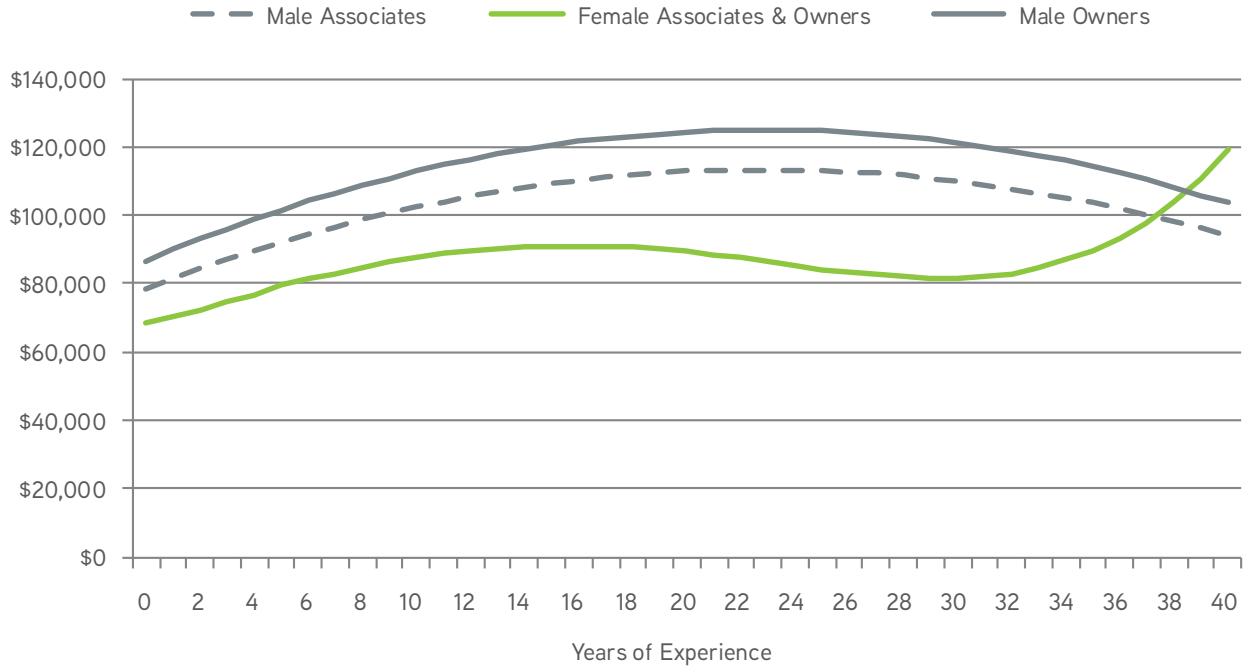


Figure 66

LIFETIME INCOME OF MIXED ANIMAL PRACTITIONERS

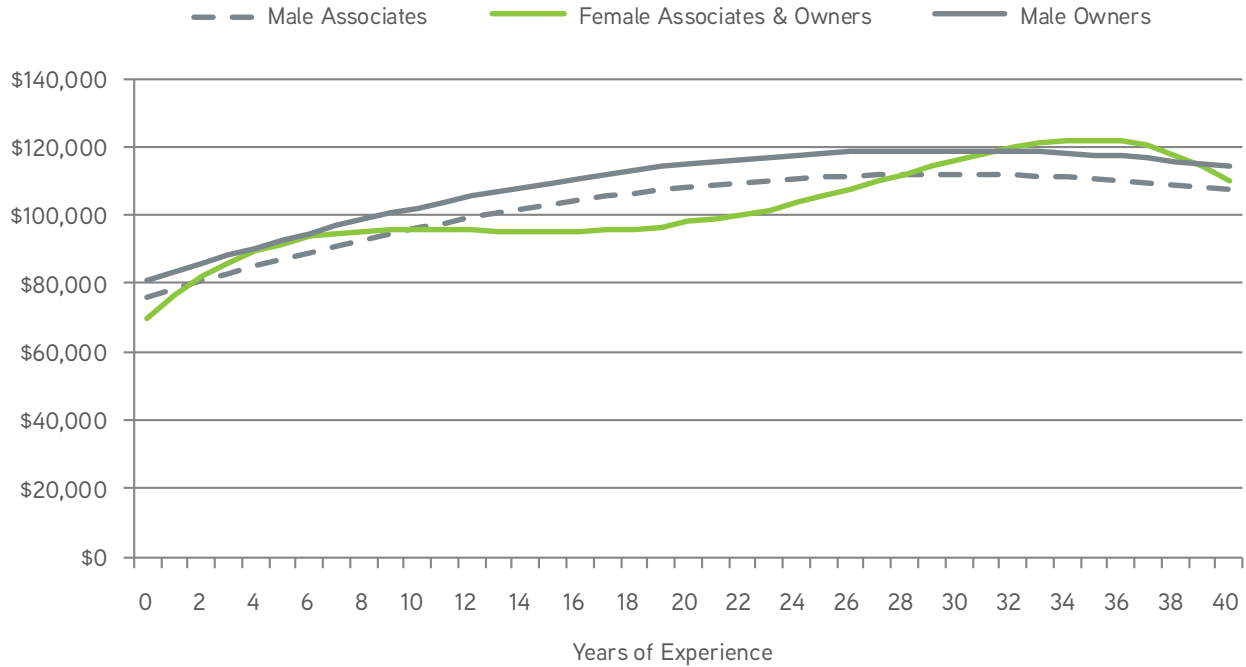


Figure 67

LIFETIME INCOME OF EQUINE PRACTITIONERS

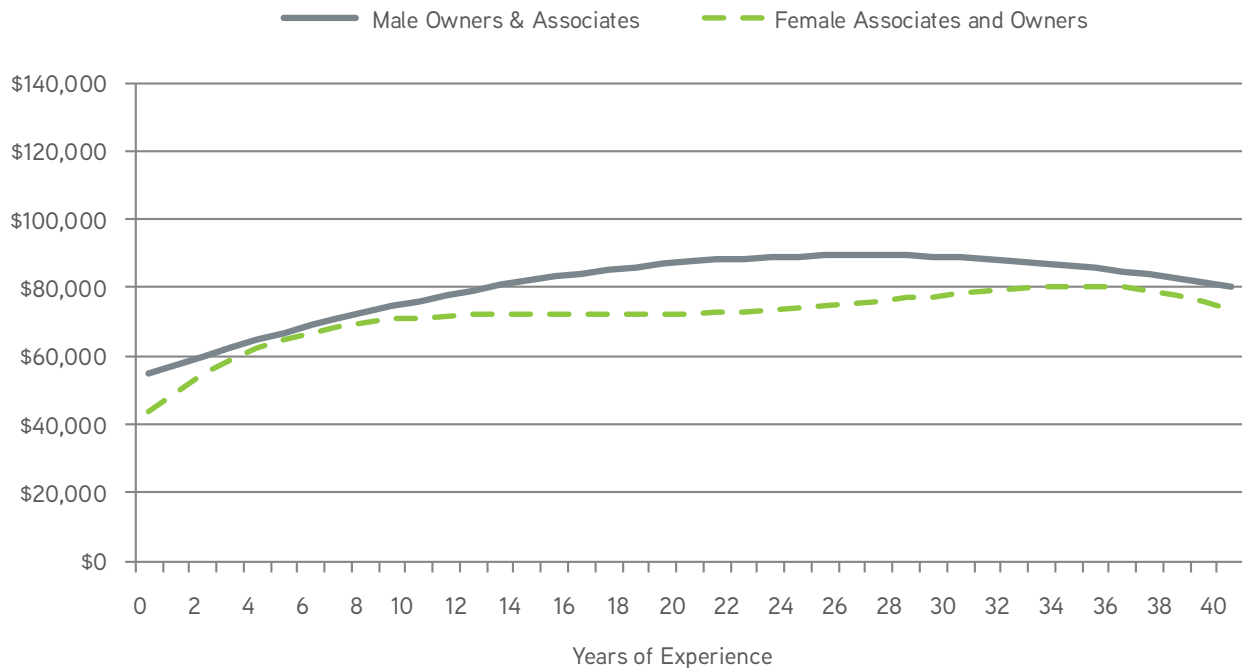


Figure 68

This analysis describes the difference in income between owners and associates, all other factors held constant. However, this analysis doesn't account for the potential wealth aspect or non-measurable benefits of practice ownership. In many businesses an integral part of the business plan, "asset rich and cash poor," is achieved by drawing the income that is necessary to meet lifestyle expectations and putting the other earnings back into the business to grow wealth for retirement.

There are other non-measurable benefits to being a practice owner such as increased work schedule flexibility. Studies like

Goldin (2014) illustrate the relationship between flexibility and compensation: Careers that offer greater flexibility are more evenly compensated between genders, whereas careers with less flexible work schedules – where business depends on the relationship between a professional and his or her clients (like that of a veterinarian) – tend to have larger gender-wage gaps. If, as Goldin asserts, women tend to more highly value flexibility in their time, then it would make sense that they would become practice owners. Being a practice owner would increase their overall income to offset the effect of their desire for flexibility.

REFERENCES

Goldin Claudia. (2014) "Grand Gender Convergence: Its Last Chapter" American Economic Review 104(4):1091-1119.

DISCUSSION

This report has provided information on the market for veterinary labor, nationally, regionally and by practice type. Key indicators of the health of the market are unemployment rate, underemployment rate, income, wellbeing and satisfaction, and net present value. But these key indicators for a given year only provide a snapshot in time and provide neither a rear-view mirror to see where you have been nor a windshield to see where you are going. An understanding of trends developed over a long period can only be obtained through the continued collection of the data and annually reporting of each indicator in a time series. In addition, knowing what has happened, what is happening and what might happen is not useful without knowing how to change course. Forecasting a course-change to date requires the econometric analysis of the factors that affect each of these indicators. The importance of the econometric analysis is not just to determine the factors that affect the indicators but the relative importance of those factors. This knowledge allows a focus on the most important factor that drives change to produce the best results for the markets.

Over the last four years, the key indicators have been reported and each year, and across the board the indicators generally point to an improving market for veterinary labor. Unemployment remains below national levels, underemployment is negative, indicating an overall need for additional veterinarians in the workforce, the applicant-to-job ratio is below 1, incomes continue to rise and wellbeing is generally good throughout the profession.

The market still has considerable maldistribution problems, however, both between larger areas like regions and states and within states and metropolitan centers. Underemployment differs by gender and as the profession increasingly becomes largely female this difference in desired hourly work week may have implications for the number of veterinarians needed to provide the level of services demanded and the price of those services.

While wellbeing is generally good in the profession, there is clearly a percentage of the profession that is dissatisfied with their employment, compensation, the profession and their lifestyle and we have identified individuals' perception of their college preparation and their satisfaction with their current employment (the culture of the practice) as being statistically significant in explaining burnout. The ProQOL tool consists of three subscales that measure facets of wellbeing – compassion satisfaction, burnout, and secondary traumatic stress. Other tools are available to measure rates of depression, anxiety, substance abuse, suicidal ideation and other barriers to wellbeing. We suggest that identifying the appropriate professionals to develop the best tools

for measurement and determining the factors that contribute to thriving professionals remain a priority for the profession.

The NPV of a DVM has been on a downward trend since 2010. This indicator provides a window into the value society places on veterinarians versus the investment required to become a veterinarian, and currently for males the investment cost exceeds the social value. Men's opportunity cost to attend veterinary college is high in comparison to women's, as men's earning potential with a bachelor's degree is much higher than for women. If the earnings from a STEM (Science, Technology, Engineering and Math) Bachelor's degree were considered instead of an average across all bachelor's degrees (general) the opportunity cost would be considerably higher and the NPV more negative. This represents a market failure to produce veterinarians at a cost society is willing to pay and points to a problem embedded in the cost of education as well as in the value assigned to veterinary services.

The cost of education has changed rapidly over the last two decades as society has made a fundamental shift away from support of college education that serves to foster a more enlightened populace, embracing the idea that college grads earn more than other workers and thus should pay for their own college. This change in thinking will take time to work through the different markets (market for education, market for veterinarians and market for veterinary services) to shift support of the veterinarian supply chain from the taxpayer to the animal owner support.

The value of veterinary services creates the demand for veterinarians. This is the main factor in determining veterinary salaries. The focus on medical care rather than preventative care may have influenced the animal owner's perception of value. This will be discussed in the following report in this series, the report on the market for veterinary services.

The market for veterinarians continues to improve and is considered to be robust. As the economy has improved and household incomes have risen, so too has the demand for veterinary services and hence the demand for veterinarians. During this economic expansion, veterinarians are likely to be busy, some of them extremely busy, as the large negative underemployment number would suggest. Unfortunately, this may lead some to forget the lessons of the last recession and remove any urgency at improving value or reducing education costs. This is exactly the wrong message to draw from industry observation, and these problems should be addressed when resources are available – not when resources become scarce.

THE AVMA 2018 ECONOMIC REPORTS INCLUDE:

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.

The AVMA Report on the Market for Veterinarians:

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.

The AVMA Report on the Market for Veterinary Services:

The demand for veterinarians and veterinary education begins with the demand for veterinary services. This report provides an overview of the veterinary workforce and projections for the supply and demand for veterinary services using recent AVMA Pet Demographics and Ownership study data. The report also presents the results of an efficiency analysis of the veterinary practices. In addition, the economic impact of veterinary businesses on a national scale is discussed.