

2019 ECONOMIC STATE OF THE VETERINARY PROFESSION



2019 AVMA Report on

ECONOMIC STATE OF THE VETERINARY PROFESSION

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INTRODUCTION

Economic forces influence every facet of our economy, and the veterinary profession is no exception. The supply of veterinarians continues to expand as veterinary schools grow the number of graduates and new veterinary schools open. Record unemployment rates for veterinarians continue to challenge practice owners looking to fill open positions. Pet-owner demand for veterinary services remains strong, with household expenditure at veterinary clinics and hospitals estimated at \$28 billion in 2016, up 8% from 2012 (*2017-2018 Edition AVMA Pet Ownership & Demographic Sourcebook*). While the U.S. economy continues to see record growth, the longest economic expansion in history will inevitably peak and begin to slowdown.

This report provides a summary of the economic state of the veterinary profession and examines the major trends in veterinary education, veterinary employment, and veterinary services. A general overview is provided, laying a solid foundation to support decision-makers in the veterinary profession by describing where we are and where we need to go with respect to the economic trends and practice profitability. The report is organized by the three major economic markets that make up the veterinary profession:

- *The Market for Veterinary Education*
- *The Market for Veterinarians*
- *The Market for Veterinary Services*

The market for veterinary education is the beginning of the pipeline to the market for veterinary services and encompasses characteristics of veterinary college applicants, the supply and demand for veterinary education, and the performance of the market in providing new veterinarians. The market for veterinarians explores the demographics and employment of the veterinary profession: where veterinarians are located, what type of work they do, how much they are compensated, and how is their wellbeing. This market also takes account of unemployment and underemployment and identifies the contributing factors, and explores the performance of the market, based on the value of the DVM degree. Lastly, the market for veterinary services, which examines the financial performance of veterinary practices and includes an assessment of staff utilization, practice efficiency, and capacity utilization. The key objective of this report is to succinctly inform leaders, practice owners, senior executives, managers, and practicing veterinarians in the veterinary profession about the key economic trends influencing the supply and demand in each of the three veterinary markets.

This report is organized as follows. The first section of the report, the market for veterinary education, assesses the debt, postgraduate plans, income, and debt-to-income ratio of the 2018 graduating class. Aggregated communication from university officials affirm that 2,774 new graduates matriculated through 30 U.S. veterinary colleges. Survey data on these graduates allow us to estimate the impact of location, practice type and other demographic variables on debt and income. The response rate for U.S. colleges was 88.3 percent. Among the 2018 graduates, 94.7 percent were made a post-graduate offer to either pursue a fulltime position or continue their education and 57 percent opted to pursue a fulltime position. The companion animal exclusive sector was the most popular with over one third of the class selecting this practice type in 2018. Among public practice, uniformed services were the most selected by 0.9 percent of the class. Almost 30 percent of the 2018 class reported opting to pursue an internship.

The second section of the report, the market for veterinarians, provides an update on the supply chain of the veterinary service industry. In 2018 there were an estimated total of 113,394 veterinarians actively engaged in the profession in the United States, in public or private practice. The largest segment of the profession provides medical services to animals in private and corporate practices. Of these practices, companion animal practices employed the largest number of veterinarians (59.9 percent), followed by food animal (4.8 percent), equine (4.5 percent) and mixed animal practices (4.5 percent). In public practice, colleges and universities employ the most veterinarians, followed by industry, and state and local governments.

The final section of the report, the market for veterinary services, describes the veterinary workforce over the past 10 years (2008- 2018). Specifically, key statistics and trends related to the current veterinary workforce will be presented and discussed. Data used for this analysis are from the AVMA central database. The purpose of the workforce analysis is to help understand the supply for veterinary services, inform the veterinary leadership about potential shortages of veterinarians, and guide the decision on potential policies that might affect efficiencies in the supply of animal health care services. Key statistics about veterinary practices are also presented in this section. Lastly, this section provides statistics on the number of veterinary establishments, the ratio of veterinary establishment to household units, and the ratio of DVM to household units.

The Economic State of the Veterinary Profession is essential reading and a key resource for those veterinary students about to enter the veterinary workforce, for practicing veterinarians seeking to enhance their understanding of the economic forces and trends that are impacting their profession, for educational leaders responsible for managing the schools of veterinary medicine, and for business and industry leaders working in the veterinary sector.

THE MARKET FOR VETERINARY EDUCATION

The mean starting salary of new veterinarians in private practice in 2018 was \$82,894; for public practice, \$71,905; and internships, \$32,794. Each year, on average, incomes increase by \$1,648, with female veterinarians earning a starting salary of approximately \$2,600 less than male veterinarians. Those finding first time employment in rural communities earn approximately \$3,200 less than those finding fulltime employment in urban or suburban areas.

The mean debt of the 2018 graduating class was \$152,358. However, 17.3 percent of the class reported graduating with no debt. In addition, 30.4 percent graduated with less than \$100,000 in debt and 10.3 percent incurred over \$300,000 in debt.

Overall, the weighted debt-to-income ratio (DIR) of all graduates securing fulltime positions was 2.26. Those in private practice had an average DIR of 1.93 and although not representative of incomes earned from fulltime positions, new graduates opting to pursue advanced education, residencies or internships had a mean DIR of over 4.5. The mean debt of graduates pursuing fulltime positions was lowest at Texas A&M at 1.3 while graduates pursuing fulltime positions at Tuskegee University had a mean DIR of 3.7.

2018 graduating class

In the first quarter of 2018, the senior survey was sent to 30 AVMA-accredited U.S. veterinary colleges and two U.S. accredited veterinary colleges located outside of the United States that trains and graduates U.S. veterinarians. Table 1 shows the response rates by school for the 2018 graduating class:



RESPONSE RATE BY VETERINARY COLLEGE, 2018

School Name	Number of Grads	# of Returns	Response Rate
Auburn University	120	120	100.0%
Cornell Veterinary College	98	98	100.0%
Louisiana State University	85	85	100.0%
Mississippi State University	82	82	100.0%
North Carolina State University	97	97	100.0%
Oklahoma State University	80	80	100.0%
Purdue University	79	79	100.0%
Tuskegee University	66	66	100.0%
University of California-Davis	133	133	100.0%
University of Georgia	110	110	100.0%
University of Tennessee	82	82	100.0%
Virginia - Maryland College	122	122	100.0%
University of Missouri-Columbia	111	109	98.2%
University of Wisconsin	88	81	92.0%
Lincoln Memorial	87	80	92.0%
University of Florida	111	101	91.0%
Texas A&M University	129	116	89.9%
University of Pennsylvania	113	101	89.4%
University of Illinois	121	106	87.6%
Oregon State University	56	48	85.7%
Midwestern University	90	77	85.6%
University of Minnesota	100	85	85.0%
The Ohio State University	152	128	84.2%
Tufts University	98	76	77.6%
Western University of Health Sciences	104	80	76.9%
Colorado State University	138	104	75.4%
Michigan State University	111	83	74.8%
Iowa State University	143	101	70.6%
Kansas State University	105	71	67.6%
Washington State University	131	73	55.7%
Total U.S. Schools	3142	2774	88.3%
Foreign Schools			
St. George's University	165	79	47.9%
Ross University	430	136	31.6%

Table 1

Overall, the response rate across the U.S. was 88.3 percent with 12 of the 30 schools participating at 100 percent. Simultaneously, the average response rate between the two foreign institutions participating in the survey was 36.1%. The low response rate of foreign institutions as compared to that of U.S. institutions limits the ability to conduct analysis on foreign institutions. Future publications will report on the demographic assessment of foreign institutions and the consequential data limitations discussed. This section solely focuses on the 2018 graduates of U.S. institutions.

Descriptive statistics for graduates

A major component of the senior survey addresses the post-graduate plans of graduating veterinary students. Students were asked to report their plans after graduating, describing whether they planned to pursue an internship, residency, continuing education or full-time employment. They were also asked to report the location of any postgraduate employment or education. Figure 1 illustrates the percentage of new veterinarians securing employment or gaining acceptance into an educational program upon graduation. Although some students reported securing no employment at the time the survey was distributed, (narrowing to just 5.3 percent in 2018), evidence from other AVMA economic surveys suggest that many of these new veterinarians find employment within a year of graduating. Over the 18-year period observed, a peak of 38.5 percent of the graduating class secured no post-graduate plans, neither employment nor continuing education, in 2012. The decline in the percentage of graduates securing a postgraduate position began in 2008 just in the middle of the 2007-2009 financial crisis. In 2008, 10.2 percent of graduates reported securing no postgraduate opportunities and this number rose to 20.5 percent in 2009. This trend persisted until 2012 where nearly two fifths of the class reported receiving no postgraduate offers of employment or continuing education. Since 2012, however, the percentage of the graduating class reporting securing offers for jobs or to continue their education has been steadily increasing, reaching the highest point since 2001 of 94.7 percent in 2018 (Figure 1).

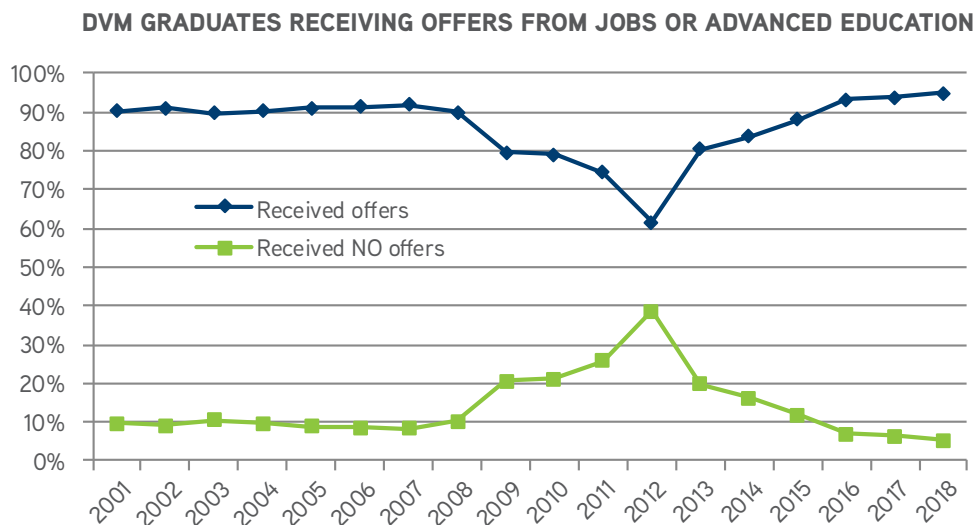


Figure 1

Throughout the same period, 2001 through 2018, of the respondents receiving offers for jobs or opportunities to pursue continuing education, 20 to 60 percent reported finding full time employment. The lowest point in the period occurred in 2012 where 23.6 percent of the class reported finding fulltime employment and 29.1 percent reported plans to pursue continuing education. Since then, however, the percentage of the class reporting having secured full time employment has been steadily increasing, reaching up to 57.0 percent in 2018. The percentage of graduates reporting having secured positions within continuing education has remained primarily flat, ranging from 29.4 percent to 31.7 percent between 2007 and 2018 (Figure 2).

DISTRIBUTION OF NEW VETERINARIANS

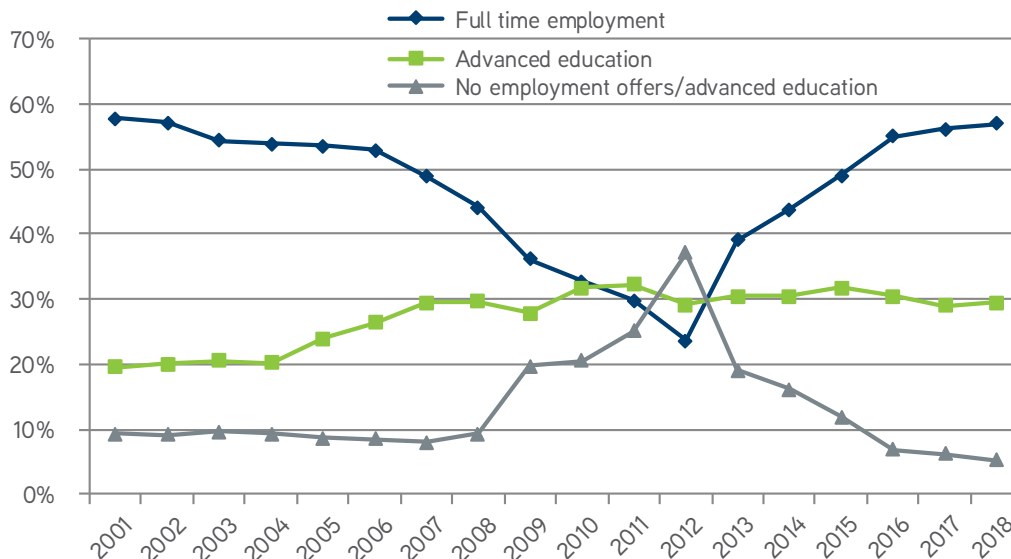


Figure 2

Among those securing full time positions, most graduates opted for positions within private practice versus public practice. Figures 3 & 4 depict the distribution of new graduates pursuing a variation of opportunities in private practice. The percentage represents the percent of the named group of over all graduates. Other opportunities, portrayed in other charts, include those in public practice, continuing education or those failing to respond to the survey question.

Among positions within private practice, the companion animal (exclusive) sector was the most popular. Over the last 18 years graduates opting to pursue positions in companion animal (exclusive) sectors ranged from 23.1 percent of the class in 2012 to a high of 42 percent in 2004. In 2018, one third of the graduating class opted to pursue a position in the companion animal exclusive sector. This very closely parallels the perfect inverse of graduates opting to pursue internships, the majority of which occurred in the companion animal sector. Starting in the early 2000s internship participation was on the rise while fulltime positions in the companion animal (exclusive) sector dwindled. Just after the 2007-2009 financial crisis, this trend reversed, with fulltime positions in companion animal (exclusive) practice gaining traction and positions in internships simultaneously dwindling. This appears to be in response to the economic hardships experienced by participants in the U.S. economy during recessionary periods while the swap also mirrors the up pacing of the economy in the 2010s when employers were able to hire more fulltime positions.



In 2018, one third of the graduating class opted to pursue a position in the companion animal exclusive sector.

DISTRIBUTION OF NEW VETERINARIANS, PRIVATE PRACTICE

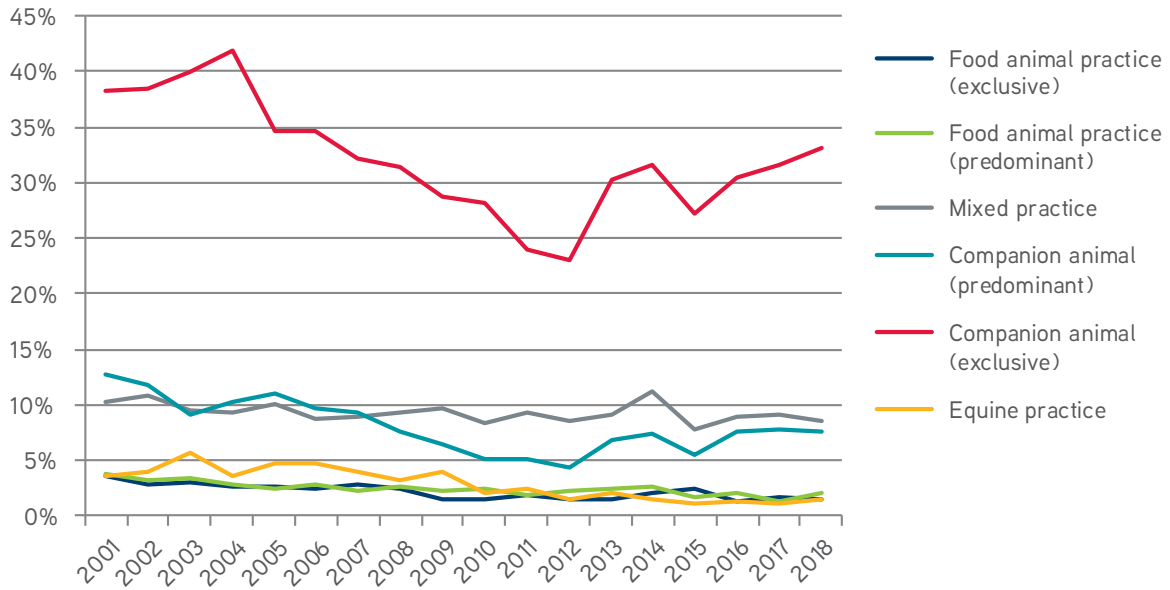


Figure 3

Veterinary positions within public practice are not as popular among new graduates, with uniformed services being the dominant field within public practice (Figure 4). Graduates opting to pursue positions in uniformed services ranged from 0.9 percent to almost 2.5 percent of the graduating class. Throughout the last 18 years less than 1 percent of the graduating class reported accepting positions in the federal/state government, college or university, industry or not-for-profit sectors.

DISTRIBUTION OF NEW VETERINARIANS, PUBLIC PRACTICE

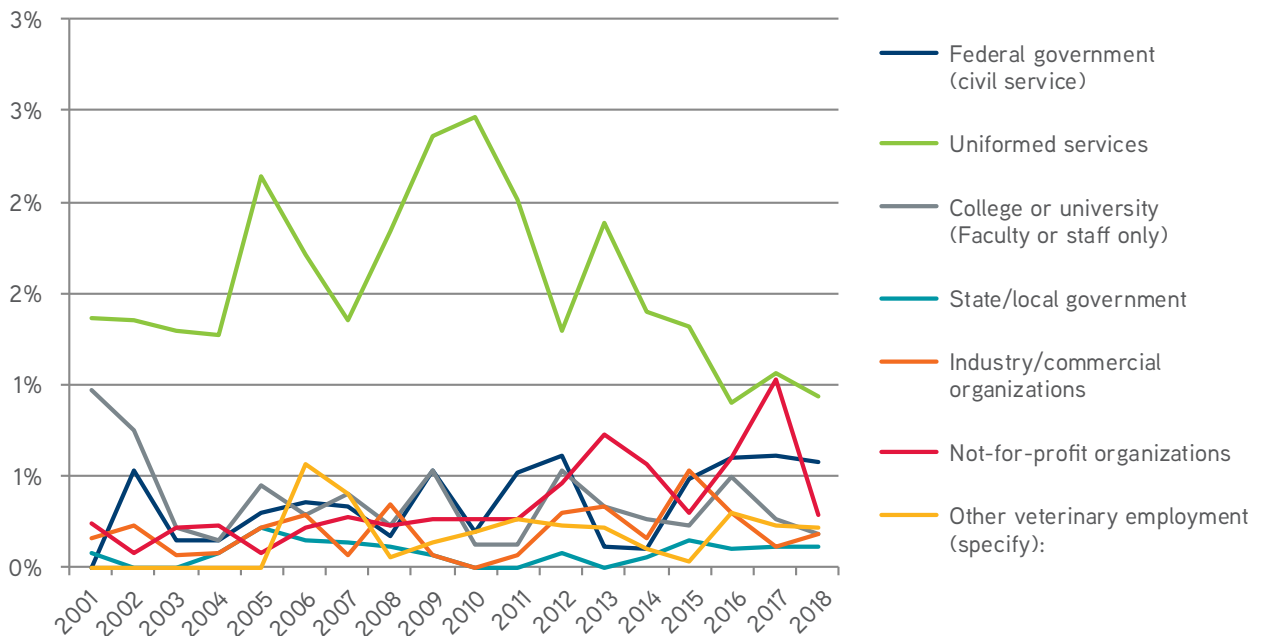


Figure 4

Over the last two decades, an inverse relationship existed between new veterinarians pursuing positions in private practice and those pursuing internships (Figure 5). From 2001 through 2012 the number of new veterinarians pursuing internships grew at the same rate that the number of new veterinarians pursuing private practice shrank. Throughout the same period the number of new veterinarians pursuing public practice remained relatively flat, below 5 percent throughout the entire period. As mentioned earlier, this appears to be in response to the economic hardships experienced by market participants during this time. The recession led to diminished disposable income for consumers of veterinary medicine, and so perhaps practice owners found it more financially viable to hire interns instead of fulltime practitioners during slower periods.

DISTRIBUTION OF NEW VETERINARIANS, PRIVATE, PUBLIC PRACTICE AND INTERNSHIPS

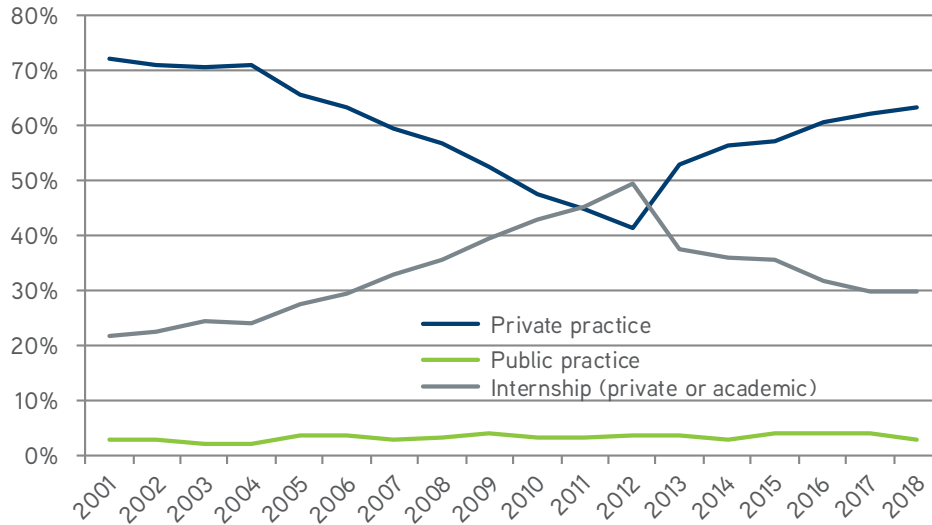


Figure 5

Among graduates reporting their intent to pursue internships throughout the last 10 years, between 70 to 80 percent of internships were in the companion animal sector. Roughly one fifth of internships were in the equine sector, and fewer than 5 percent in either food animal, mixed animal, exotic or zoological animal or other sector (Figure 6).

SPECIES FOCUS OF INTERNSHIP

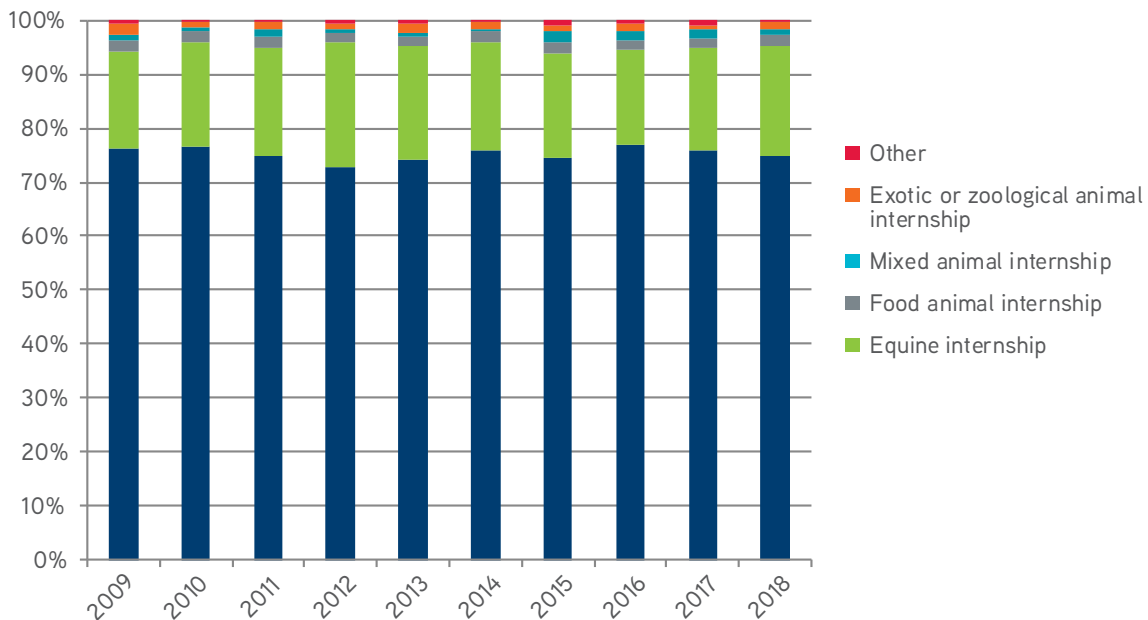


Figure 6

Among the graduates reporting their intent to pursue advanced education, 2 to 4 percent reported plans to pursue residency, landing at 2.2 percent in 2018, while fewer than one in every hundred graduates reported plans to pursue either a master's or doctoral degree (Figure 7).

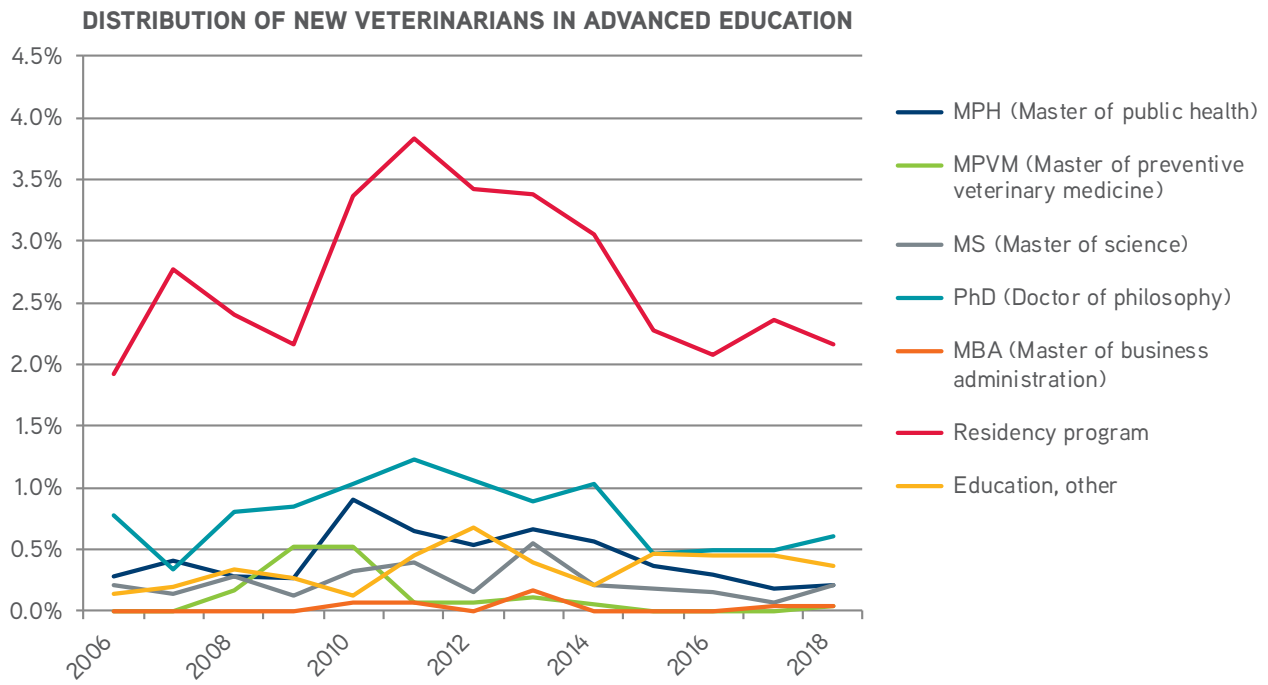


Figure 7

New veterinarian incomes

Throughout the period 2001 through 2018 there remained a significant difference in income based on postgraduate employment position (Figure 8). Prior to 2008, positions in public and private practice were leading the pack with the highest level of compensation. After 2008, positions in private practice had a clear lead. Interestingly enough, this occurs on the heel of the largest consolidation of veterinary hospitals founded in 2009, boasting over 2,900 clinics, Community Vet Clinics/VIP Pet Care (Who Is Buying Veterinary Hospitals?, 2018). Well-managed practices that benefit from economies of scale seem poised to benefit from the increasing intensity of the human-animal bond. The impact of incomes of graduates pursuing industry on public practice salaries is later discussed.

In 2018, the mean income for new graduates accepting fulltime positions in private practice was \$82,894, followed by positions in public practice which were compensated at a mean of \$71,905. The average of all graduates receiving compensation was \$65,983, and those pursuing internships had the lowest level of compensation in 2018 at \$32,794. Please note, prior to 2006, internships, residencies and advanced education opportunities were reported singularly. After 2006, these categories were separated.

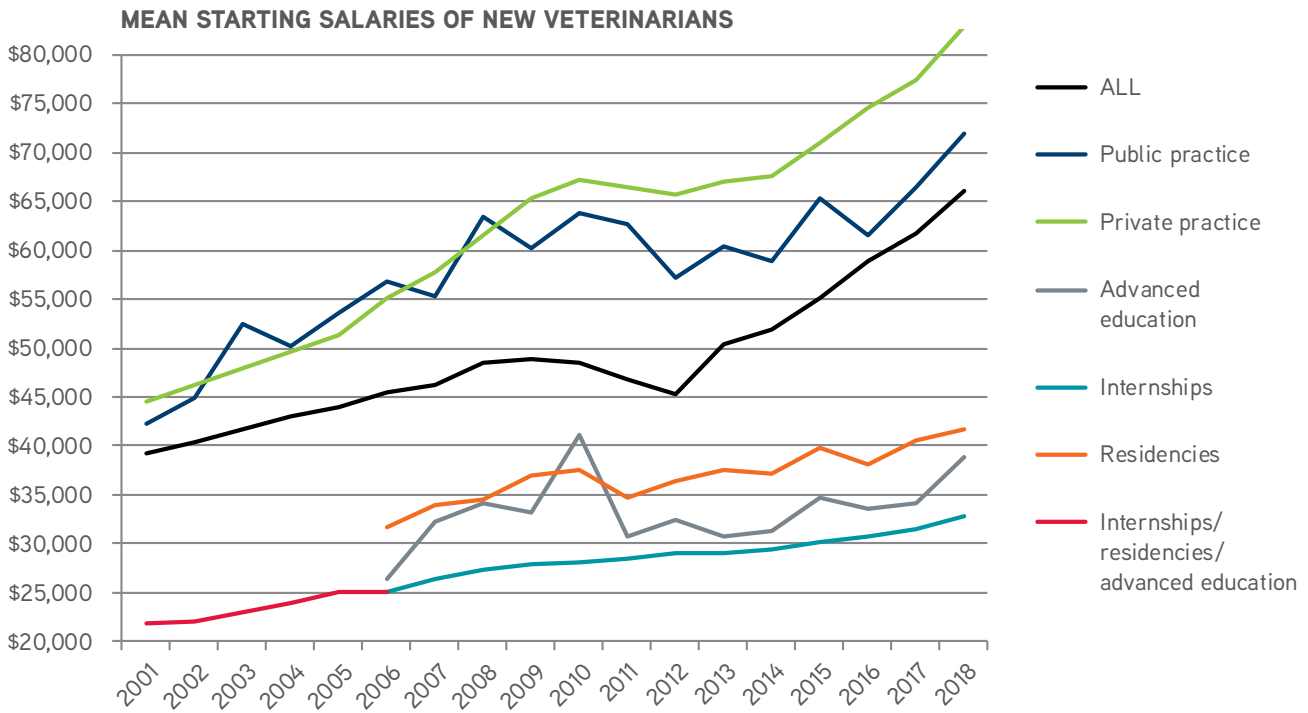


Figure 8

Among those in private practice, companion animal (exclusive) had the highest mean level of compensation, just shy of \$87,000, followed by companion animal (predominant) and food animal (exclusive), all of which had starting salaries averaging over \$80,000 in 2018. Those in food animal (predominant) and mixed practice sectors received a mean level of compensation of \$74,016, and those in the equine sector received a mean level of compensation of \$51,893. What emerges is that they all follow a similar trend: strong growth from 2000 to 2007, some flat to declining trends during the recessionary period, with a rebound post-2012 recovery (Figure 9).

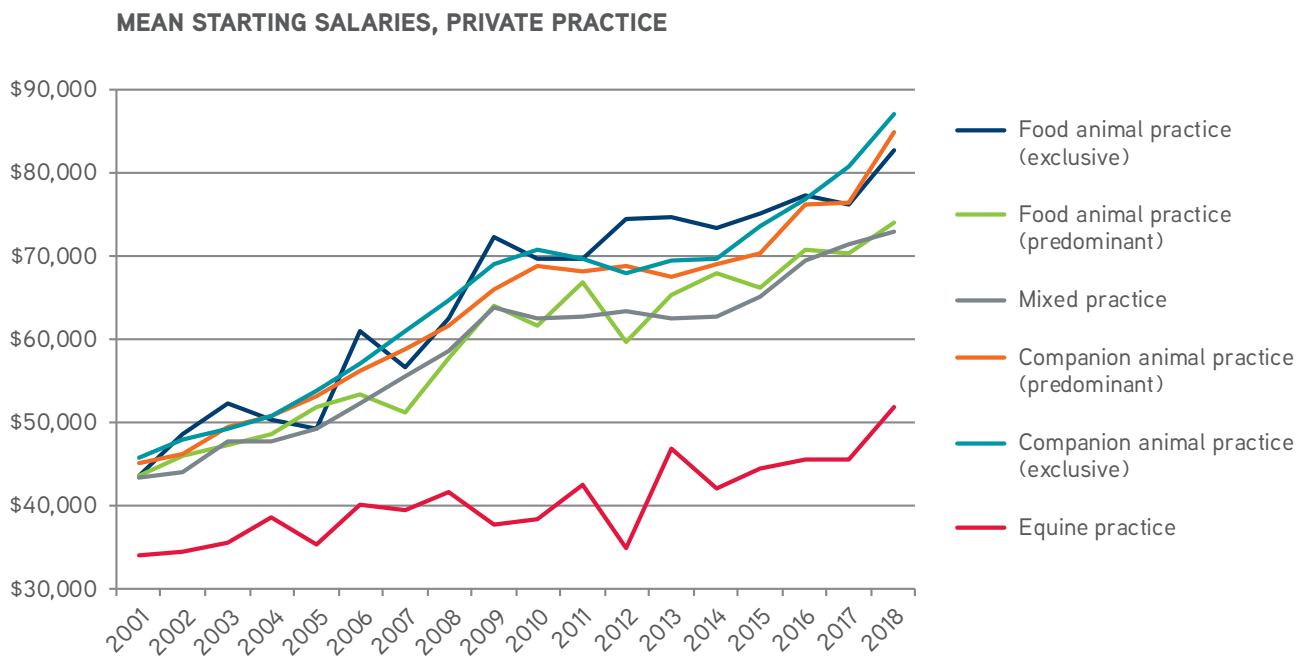


Figure 9

Among those finding fulltime positions in public practice, over the last decade, the highest compensated sector has been industry, with a mean compensation of over \$110,000 in 2018. This was followed by compensation levels for those finding positions in state or local government, with a mean of \$89,340. Positions in not-for-profit organizations, federal government or uniformed services were compensated on average between \$60,000 and \$70,000, and the average compensation for new graduates securing a position as a faculty or staff member at a college or university was just over \$50,000 (Figure 10).

MEAN STARTING SALARIES, PUBLIC PRACTICE

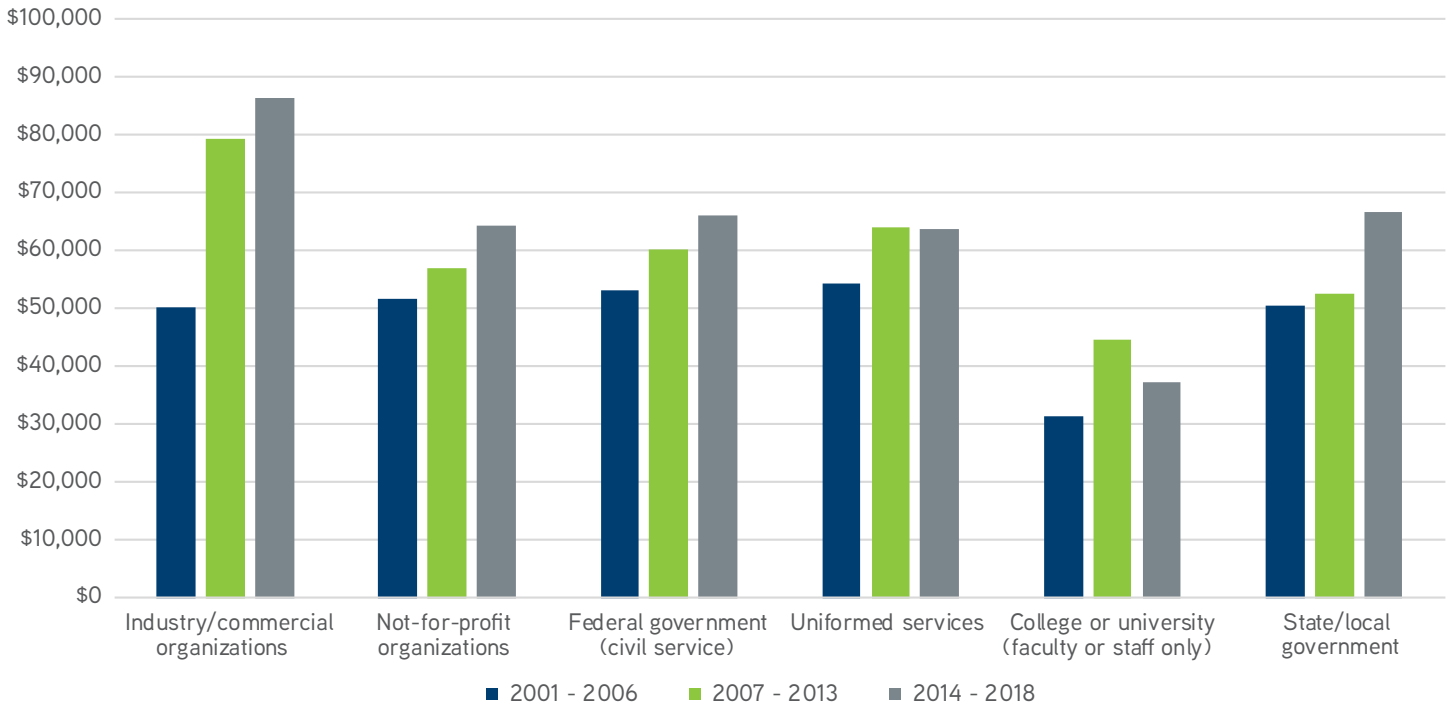


Figure 10



Among those finding fulltime positions in public practice, over the last decade, the highest compensated sector has been industry.

Compensation levels for graduate assistantships or stipends secured for an advanced education position ranged from \$30,000 for internships to almost \$60,000 awarded to those pursuing degree programs (Figure 11).

MEAN STARTING SALARIES, ADVANCED EDUCATION

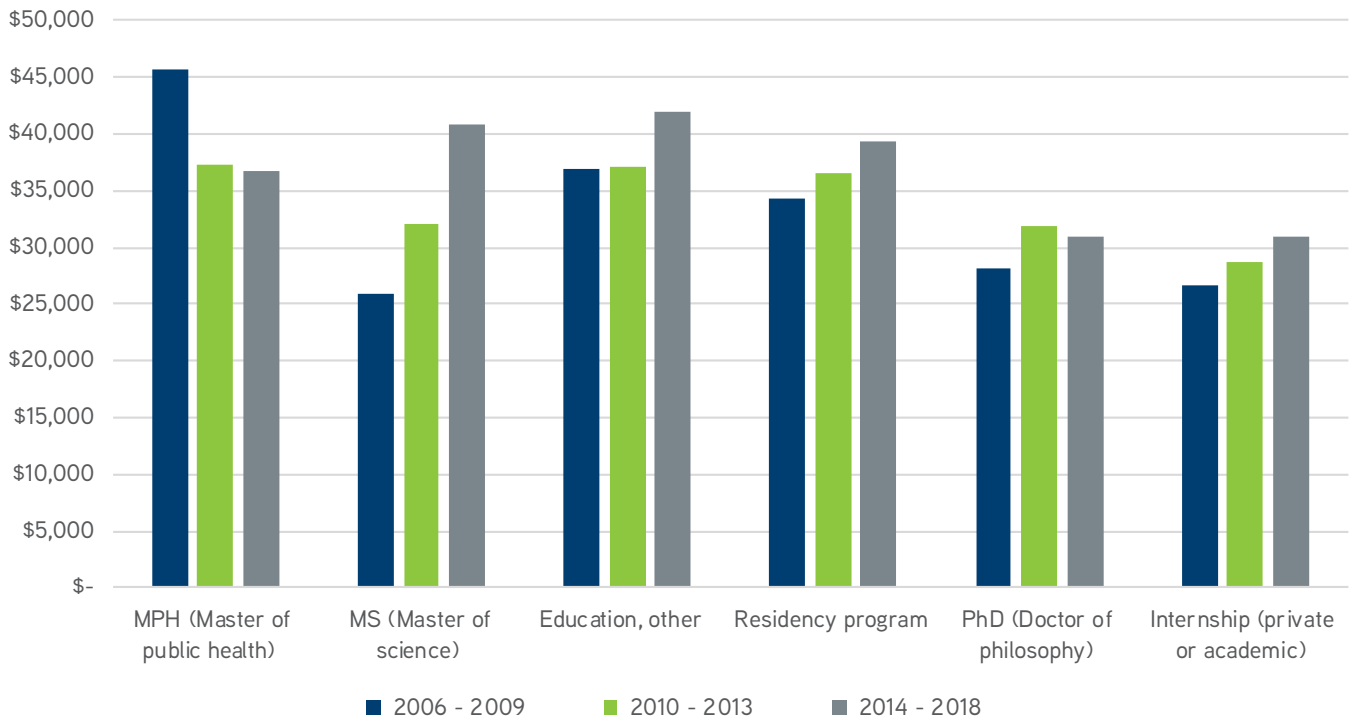


Figure 11

Numerous factors affect starting salaries independent of the economy. Starting salaries can be influenced by the number of new veterinarians opting to pursue internships, a change in the gender distribution among new veterinarians, variation in the distribution of practice types new veterinarians pursue, and a change in the location trends where new veterinarians pursue employment. To accurately identify the trends in starting salaries impacted only by economic factors (general economic growth, the quantity of veterinarians supplied), an index is created to control for all other factors (changes in demographic characteristics, inflation).

The value of starting salaries, known as the real weighted mean income index (RWI), measures the change in salary of a constant cohort of veterinarians holding variables such as gender, practice type and location constant and controlling for inflation.

The RWI produces a starting salary “index,” a mean starting salary that represents the inflation-adjusted mean starting salary for a constant gender distribution, practice type distribution, and locational distribution for the new graduates who received full-time employment prior to graduation. Between 2017 to 2018, the RWI of new veterinarians finding fulltime employment increased from \$73,626 to \$76,733 (2014 \$’s) respectively. The unweighted mean income of veterinarians finding fulltime employment in 2018 was \$82,425 (Figure 12).

INDEXED REAL INCOME & NOMINAL INCOME OF NEW VETERINARIANS



Figure 12

Factors affecting income for new veterinarians

There are several factors that explain the variation in income. Table 2 describes the effect on starting salaries of several demographic variables identified by analyzing starting salaries through a multiple linear regression in which the dependent variable is the starting salary of new veterinarians.

The color scheme in the left column identifies categories that are grouped together, to which the baseline refers. The grey bars throughout the rows illustrate factors that are not significant or not significantly different from the baseline. The column labeled 'B' represents the dollar value impact of the corresponding variable.

As estimated by the regression, each year, starting salaries increase by an average of \$1,648. Women are offered, on average, \$2,683 less than men, and each additional \$1,000 of debt incurred is associated with a \$5 increase in salaries. This is certainly not to imply that if you incur more debt your employer will pay you higher wages; this relationship is not causal but correlated. Seemingly, individuals with higher debt levels negotiate higher salaries (\$5 more for every additional \$1,000 in debt) so as to ensure they earn a living wage while maintaining loan repayments.

Among postgraduate plans, new veterinarians opt to pursue either private practice, public practice or enroll in an educational program. The baseline within this category is companion animal (exclusive). As compared to those securing fulltime positions in the companion animal exclusive sector, new veterinarians in food animal (exclusive) earn approximately \$5,785 more, those in mixed practice earn on average \$3,891 less and those in industry earn \$14,057 more. New veterinarians pursuing continuing educational programs, such as a master's degree and those pursuing an internship or residency earn on average \$30,000 to \$50,000 less than new veterinarians employed fulltime in the companion animal (exclusive) sector.

Among regions identified by the first number of the area's ZIP code, region 3 was selected as the baseline. New veterinarians finding fulltime employment in region 1 earned an average of \$2,326 more than new veterinarians in securing positions in region 3, new veterinarians in region 5 earn on average \$2,531 less than new veterinarians in region 3 and there was no significant difference between the compensation of new veterinarians in region 4 as compared to that of region 3.

Finally, considering the type of community in which the job is located, we selected 'suburban' community as the baseline. As estimated by the regression, new veterinarians finding fulltime positions in rural communities earn on average \$3,287 less than new veterinarians finding fulltime positions in urban or suburban communities.

The explanatory power of the model is 76.2 percent, illustrating that 76.2 percent of the variation in the starting salaries of new veterinarians could be explained by the variables identified in the model (basic demographics, practice type and region). The model, however, could not explain 23.8 percent of the variation in starting salaries. This is likely attributable to character traits and attributes of the individual independent of demographics.

FACTORS ASSOCIATED WITH THE VARIATION IN INCOME

		Impact	Probability impact ≠ \$0
	Variable	\$52,950	100.0
Basic info	Year (use last 2 digits of grad year)	\$1,648	100.0%
	Age	\$137	99.0%
	Gender: F=1, M=0	(\$2,683)	100.0%
	Anticipated hours per week	(\$99)	100.0
	DVM debt in thousands	\$5	99.2%
Private practice	Food animal (exclusive)	\$5,785	100.0
	Food animal (predominant)	\$97	7.1%
	Mixed practice	(\$3,891)	100.0%
	Companion animal (exclusive)	BASELINE	100.0%
	Companion animal (predominant)	(\$281)	35.7%
	Equine	(\$24,235)	100.0%
Public practice	Federal government	(\$9,220)	99.9%
	Uniformed services	(\$8,143)	100.0%
	College or university	(\$41,277)	100.0%
	State or local government	(\$646)	9.0%
	Industry	\$14,057	100.0%
	Not-for-profit	(\$13,825)	100.0%
Other	Other veterinary employment	(\$7,792)	94.8%
Enrolling in an educational program	Masters of public health	(\$47,233)	100.0%
	Masters of preventive veterinary medicine	(\$37,499)	100.0%
	Masters of science	(\$37,199)	100.0%
	PhD	(\$39,225)	100.0%
	MBA	(\$29,805)	99.9%
	Internship	(\$40,485)	100.0%
	Residency	(\$34,276)	100.0%
	Education (other)	(\$34,281)	100.0%
Region (first digit of zip code)	Region 0	\$1,290	92.8%
	Region 1	\$2,326	99.9%
	Region 2	\$979	88.4%
	Region 3	BASELINE	100.0%
	Region 4	(\$404)	47.33%
	Region 5	(\$2,531)	99.9%
	Region 6	(\$1,411)	96.9%
	Region 7	\$2,228	99.9%
	Region 8	\$2,220	99.9%
	Region 9	\$4,085	100.0%
	Outside of the U.S.	\$1,669	63.8%
Community in which job is located	Urban	\$304	57.8%
	Suburban	BASELINE	100.0%
	Rural	(\$3,287)	100.0%

Table 2

New veterinarian debt

Figure 13 illustrates the mean debt levels incurred during matriculation through veterinary college. The chart represents only debt incurred during veterinary school and does not include prior debt, including debt incurred from undergraduate programs. The mean debt incurred during veterinary school by all 2018 graduates was \$152,358. The mean debt of only those graduates who incurred debt was \$184,299.

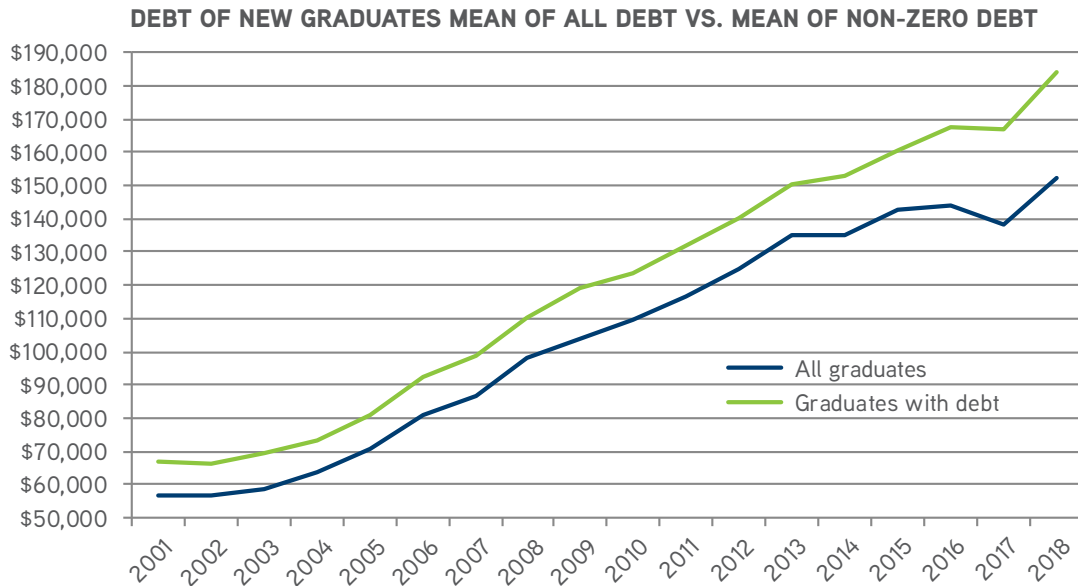


Figure 13

This debt, however, also varied by gender, with the mean debt of 531 male graduates averaging \$146,300 in 2018 and the mean debt of 2,227 female graduates averaging \$153,802 (Figure 14).

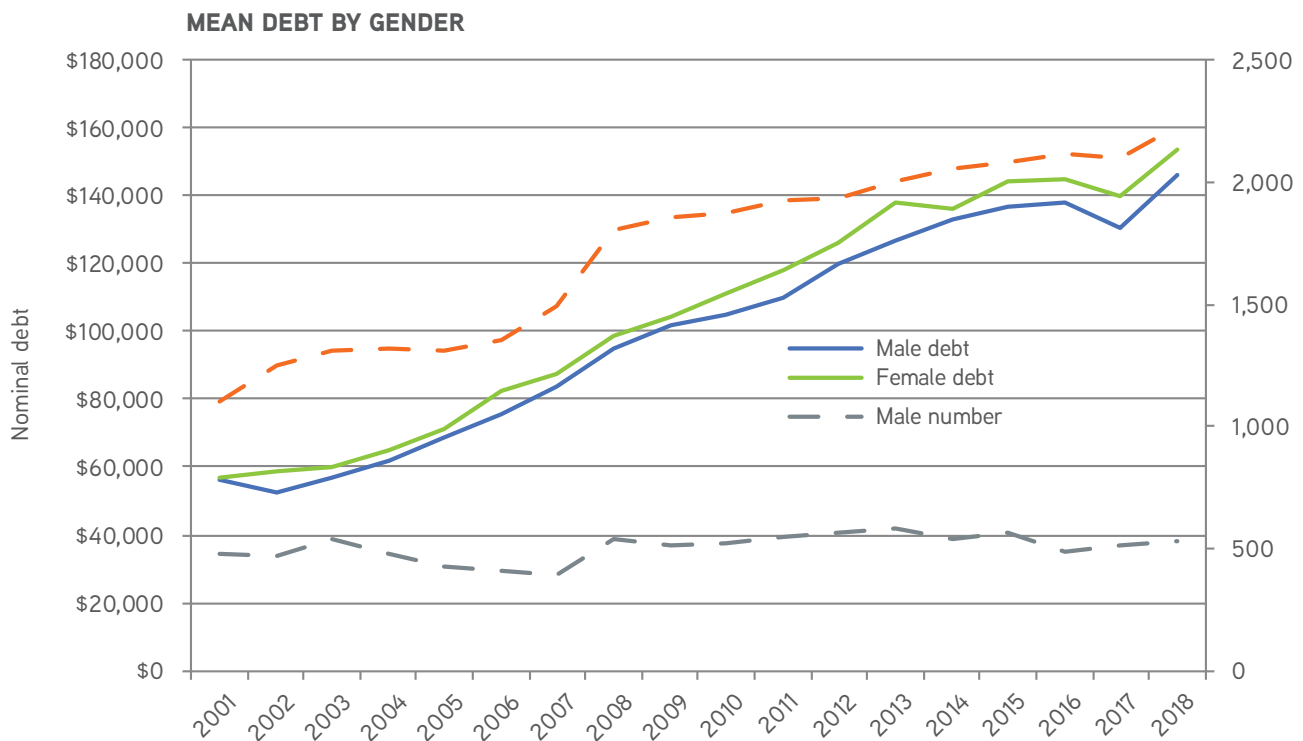


Figure 14

Distribution of debt

Although the mean debt of the 2018 graduating class was \$152,358, the distribution of debt across the class was variable. 17.3 percent of 2018 graduates reported graduating with no debt, 22.1 percent graduated with less than \$50,000 in debt, and 10.3 percent of the 2018 graduating class with more than \$300,000 in debt (Figure 15).

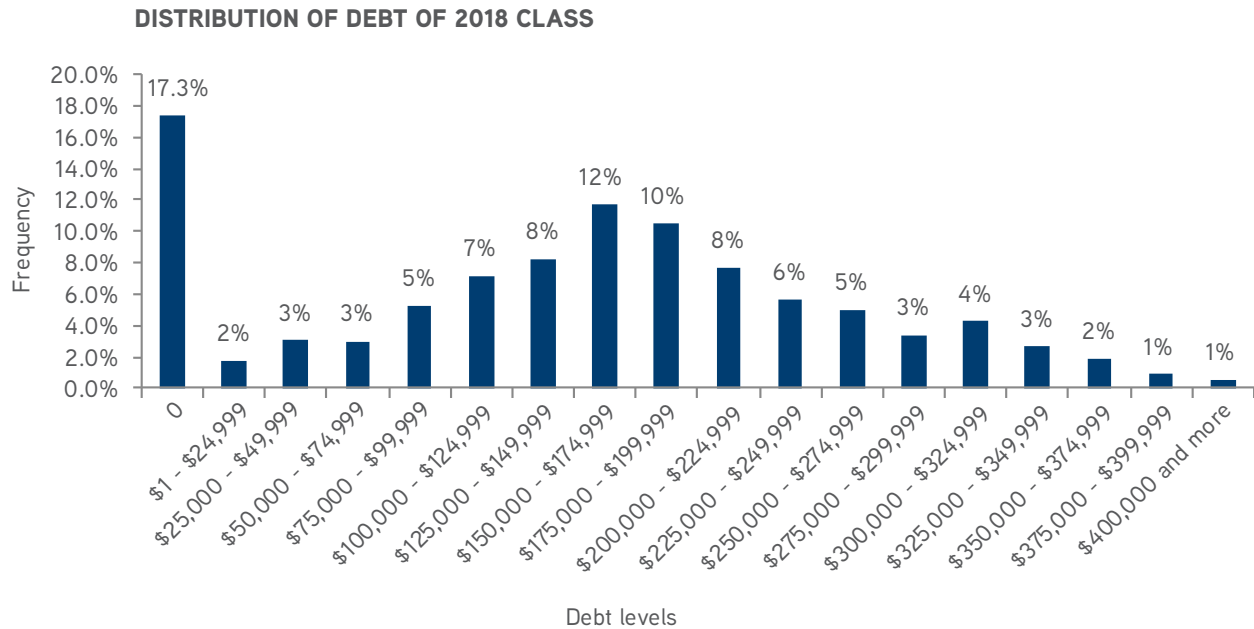


Figure 15

To assess the distribution of student debt across schools, Figure 16 depicts the median debt of graduates by veterinary college. The results are staggering. Median debt across veterinary colleges range from \$76,150 at Texas A&M University to \$320,000 at Midwestern University. To elaborate, 50% of veterinary students at Texas A&M graduated in 2018 with less than \$76,150 in debt. Conversely, 50% of veterinary students at Midwestern University graduated with over \$320,000 in debt in 2018. The median debt across all schools in 2018 was \$159,000. To be noted, however, is that although the median debt across schools varies from \$76,150 to \$320,00, a range of over \$240,000, the median starting salary across schools for graduates securing fulltime employment varies from \$71,000, median for graduates at Iowa State University, to \$98,000, median for UC Davis, a range of just \$27,000.



The mean debt incurred during veterinary school by all 2018 graduates was \$152,358.

MEDIAN DEBT & MEDIAN INCOME OF 2018 GRADUATES BY COLLEGE

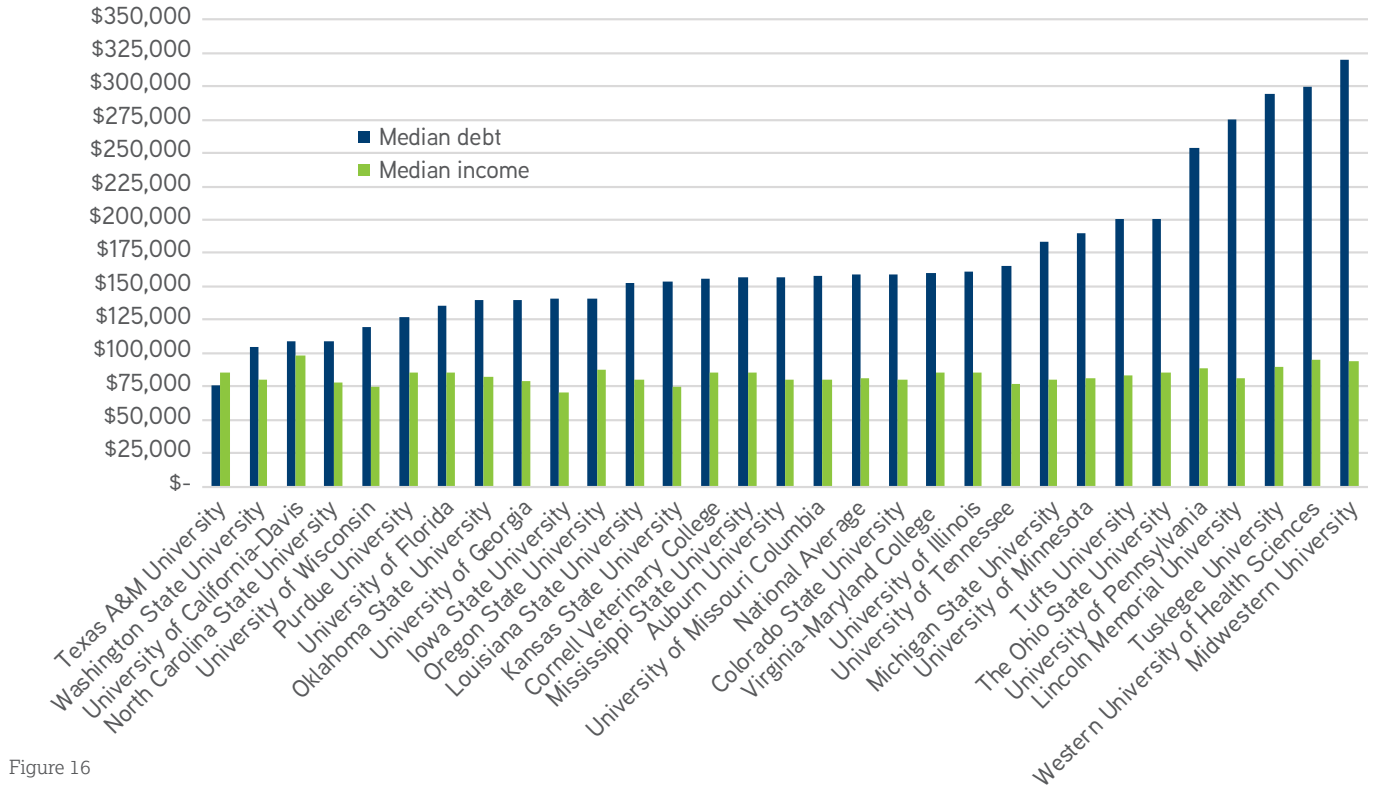


Figure 16



Factors affecting the debt of new veterinarians

There are several factors that influence debt levels. These factors include the location of the school, levels of tuition and other demographic factors. Tuition was divided into four categories: very low tuition (more than two standard deviations below the mean), low tuition (within two standard deviations below the mean), median tuition (within two standard deviations above the mean), and high tuition (above two standard deviations above the mean). The region of the school is the first number of the ZIP code in which the school is located. Graduates of schools located in regions 4, 5, 6 and 9 incur more debt those graduating from veterinary colleges in region 3.

In 2018, no school had “very low” tuition, but graduates of schools in the high tuition category had on average an additional \$131,344 in debt, and those in the median tuition category had an additional \$82,737 of debt. Females had on average \$6,000 more debt than male graduates, and non-residents graduated with approximately \$38,000 more debt than residents. The factors identified in Table 3 were found to explain 17.8 percent of the variation in debt. Consequently, 82.2 percent of the variation in debt levels were not explained by cost of living (location of the school), tuition levels and other demographic variables. Other factors explaining the variation in debt are possibly the distribution of scholarships, grants, working while in school or family support.

FACTORS ASSOCIATED WITH THE VARIATION IN DEBT

		Impact	Probability impact ≠ \$0
	(Constant)	(\$10,254,119)	100.0%
	Year of the survey	\$5,049	100.0%
Location	Region of school 0	(\$15,629)	100.0%
	Region of school 1	(\$20,863)	100.0%
	Region of school 2	(\$4,880)	96.9%
	Region of school 3	Baseline	
	Region of school 4	\$10,882	100.0%
	Region of school 5	\$5,879	99.8%
	Region of school 6	\$8,112	100.0%
	Region of school 7	(\$15,098)	100.0%
	Region of school 8	(\$4,215)	88.4%
	Region of school 9	\$2,767	83.7%
Tuition category	Very low tuition	BASELINE	
	Low tuition	\$60,859	100.0%
	Median tuition	\$82,737	100.0%
	High tuition	\$131,344	100.0%
Demographic data	Age	\$2,936	100.0%
	Gender: F=1, M=0	\$6,210	100.0%
	Income	\$0.11	100.0%
	Resident/non-resident	\$38,216	100.0%

Table 3

New veterinarian debt-to-income ratio

The debt-to-income ratio is an important measure of the economic performance of the market for veterinary education. The debt-to-income ratio ties together the market for education and the market for new veterinarians. By definition, the debt-to-income ratio measures what percentage of debt is covered by annual income.

Upon examining the debt-to-income ratio (DIR), the variability could most plainly be identified among postgraduate plans. Figure 17 portrays the DIR of new veterinarians planning to pursue public practice, private practice, internships, residencies and other programs in advanced education. The mean DIR of graduates pursuing private practice in 2018 was 1.93 and for those pursuing public practice, 2.08. Although we can estimate a DIR for individuals pursuing internships, residencies and continuing education, it is not a justifiable measure since the compensation or stipend that they receive is not representative of the earning potential of a new veterinarian.

DEBT-TO-INCOME RATIO BY POST-GRADUATE PLANS

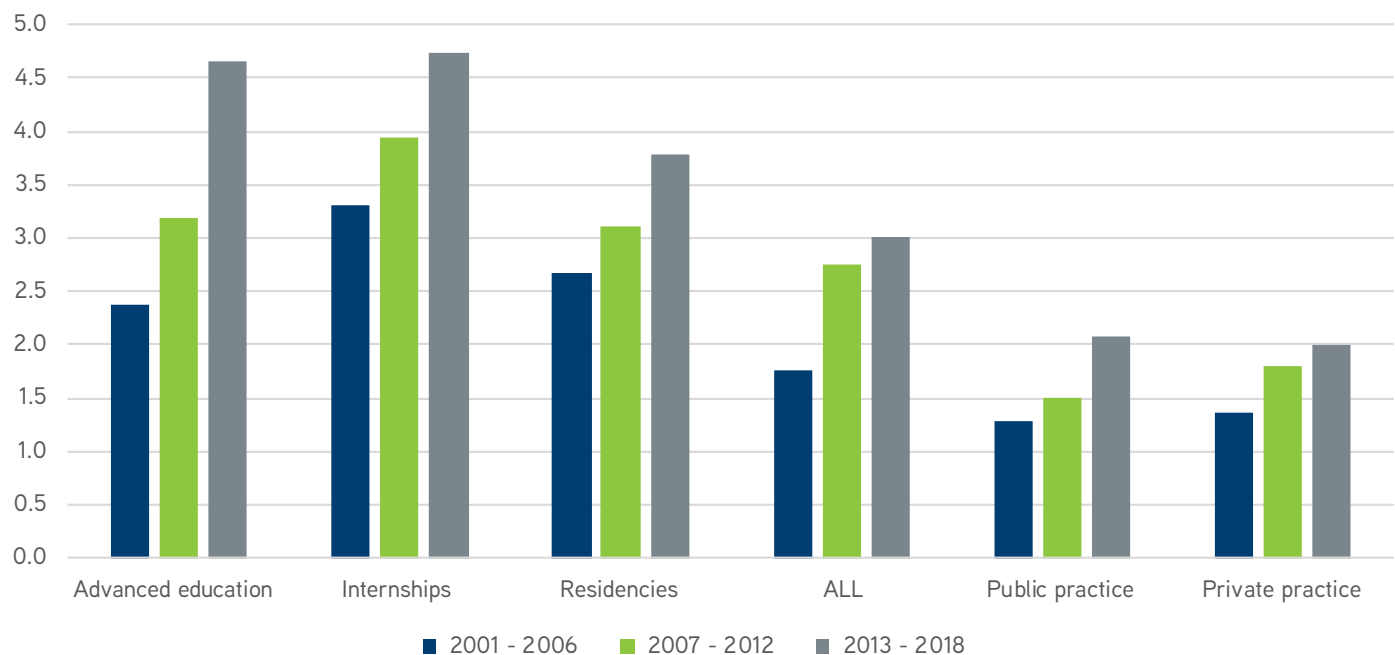


Figure 17

Not unlike the factors explaining the variability in debt and income, there are several factors that explain the variability in the DIR. Among them are gender, age, hours expected to work per week, location of new postgraduate position, practice type, tuition category and university. The most influential (significant) variables were practice type and university. Among universities, The Ohio State University was used as the baseline. The Ohio State University was selected as the baseline as it was the school with the most respondents providing a debt and income over the past 18 years. The only schools estimated to have an average DIR above that of The Ohio State University graduates were graduates of Western University of Health Sciences (a mean DIR of approximately 1.46 more) and University of Minnesota graduates (a mean DIR of approximately 0.371 more.) All else constant, every year the DIR increases by approximately 0.066 (Table 4).

FACTORS ASSOCIATED WITH THE VARIATION IN THE DEBT-TO-INCOME RATIO

		Impact	Probability impact ≠ 0
		B	p val
Basic information	(Constant)	-1.818	99.8%
	Last 2 digits of grad year	.066	100.0%
	Age	.055	100.0%
	Gender: Female=1	.193	100.0%
	Have children: No=1	.033	38.9%
	Resident/non resident	.820	100.0%
	Anticipated work hours/week	.024	100.0%
	Work at least 48 weeks/year	.047	31.8%
Additional degrees	Admitted before earning degree	BASELINE	
	Bachelor's degree	.294	100.0%
	Master's degree	.294	100.0%
	Doctorate degree	-.022	8.8%
	Other professional degree	-.351	68.1%
	Other degree	.656	97.5%
Region of new position	Region 0	.146	59.5%
	Region 1	-.140	57.6%
	Region 2	-.322	93.6%
	Region 3	-.056	25.5%
	Region 4	-.272	88.1%
	Region 5	-.206	75.1%
	Region 6	-.179	69.0%
	Region 7	-.037	16.7%
	Region 8	-.273	88.5%
	Region 9	-.460	99.2%
	Outside the US	BASELINE	
Practice type	Food animal practice (exclusive)	-1.818	100.0%
	Food animal practice (predominant)	-1.675	100.0%
	Mixed practice	-1.515	100.0%
	Companion animal practice (exclusive)	-1.541	100.0%
	Companion animal practice (predominant)	BASELINE	
	Equine practice	-.799	100.0%
	Federal government (civil service)	-1.724	100.0%
	Uniformed services	-2.393	100.0%
	College or university (faculty or staff only)	.206	56.5%
	State or local government	-.980	94.1%
	Industry or commercial organizations	-1.991	100.0%
	Not-for-profit organizations	-1.157	100.0%

		Impact	Probability impact ≠ 0
		B	p val
Tuition category	Very low tuition	BASELINE	
	Low tuition	.957	95.2%
	Median tuition	1.023	96.5%
	High tuition	1.248	98.8%
University	Auburn University	-1.408	100.0%
	Tuskegee University	-.174	83.2%
	University of California-Davis	-.887	100.0%
	Colorado State University	-.831	100.0%
	University of Florida	-.642	100.0%
	University of Georgia	-1.360	100.0%
	University of Illinois	-.767	100.0%
	Iowa State University	-.715	100.0%
	Kansas State University	-.234	96.0%
	Louisiana State University	-1.065	100.0%
	Tufts University	-.669	100.0%
	Michigan State University	-.191	95.2%
	University of Minnesota	.371	99.9%
	Mississippi State University	-.593	100.0%
	Purdue University	-.983	100.0%
	Cornell University	-1.172	100.0%
	Oklahoma State University	-1.110	100.0%
	University of Pennsylvania	-.502	100.0%
	Texas A&M University	-1.641	100.0%
	Washington State University	-1.075	100.0%
	University of Missouri-Columbia	-.734	100.0%
	Oregon State University	-.670	100.0%
	University of Tennessee	-.504	100.0%
	Virginia-Maryland College	-.739	100.0%
North Carolina State University	-1.213	100.0%	
University of Wisconsin	-1.046	100.0%	
The Ohio State University	BASELINE		
Western University of Health Sciences	1.463	100.0%	

Table 4

Figure 18 depicts the DIR of new graduates finding fulltime employment in veterinary medicine. These do not include new veterinarians pursuing internships, residencies or continuing education programs. 18.3 percent of new graduates securing fulltime employment in veterinary medicine had a DIR of 0.0. Thirty percent had a DIR of 1.0 or less, and 2.9 percent have a DIR over 3.0.

DEBT-TO-INCOME RATIO OF NEW GRADUATES - FULLTIME EMPLOYMENT

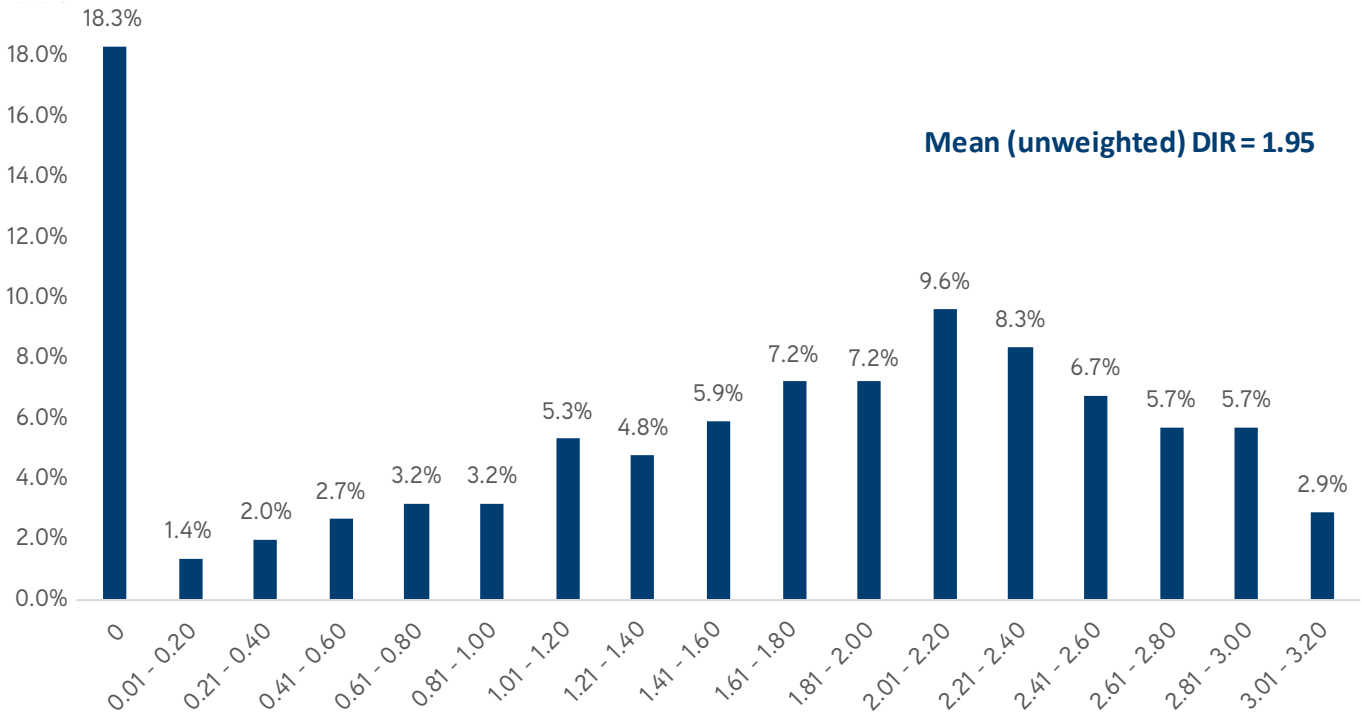


Figure 18

The DIR also varied across schools. Considering only graduates who reported debt and income for fulltime employment, the mean DIR across schools ranged from 1.3 at Texas A&M University to 3.7 at Tuskegee University. Nine of the 30 veterinary colleges graduated new veterinarians with a mean DIR of less than 2.0. Fifteen out of 30 colleges had a mean DIR between 2.0 and 3.0, and six colleges had a mean DIR of over 3.0 (Figure 19).

MEAN DIR BY SCHOOL OF 2018 GRADUATES SECURING FULLTIME EMPLOYMENT

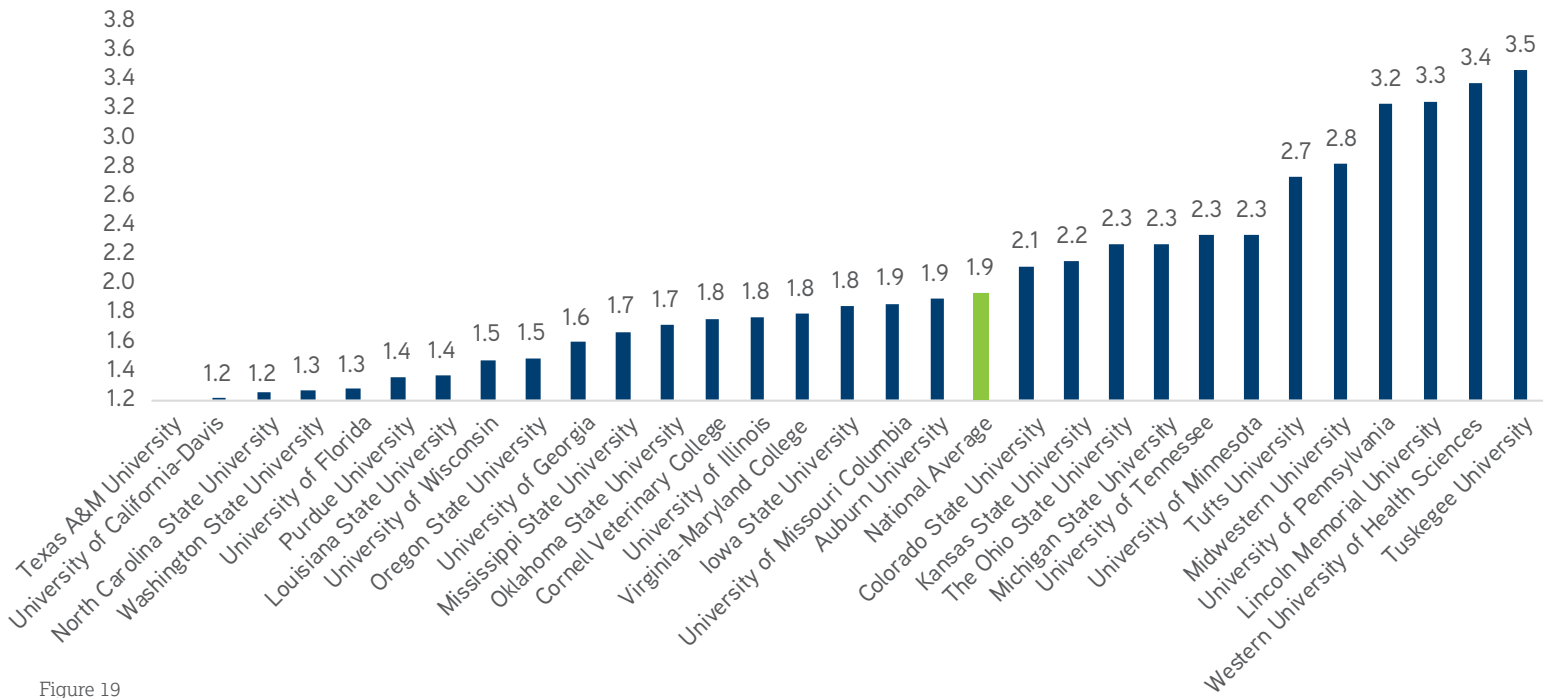
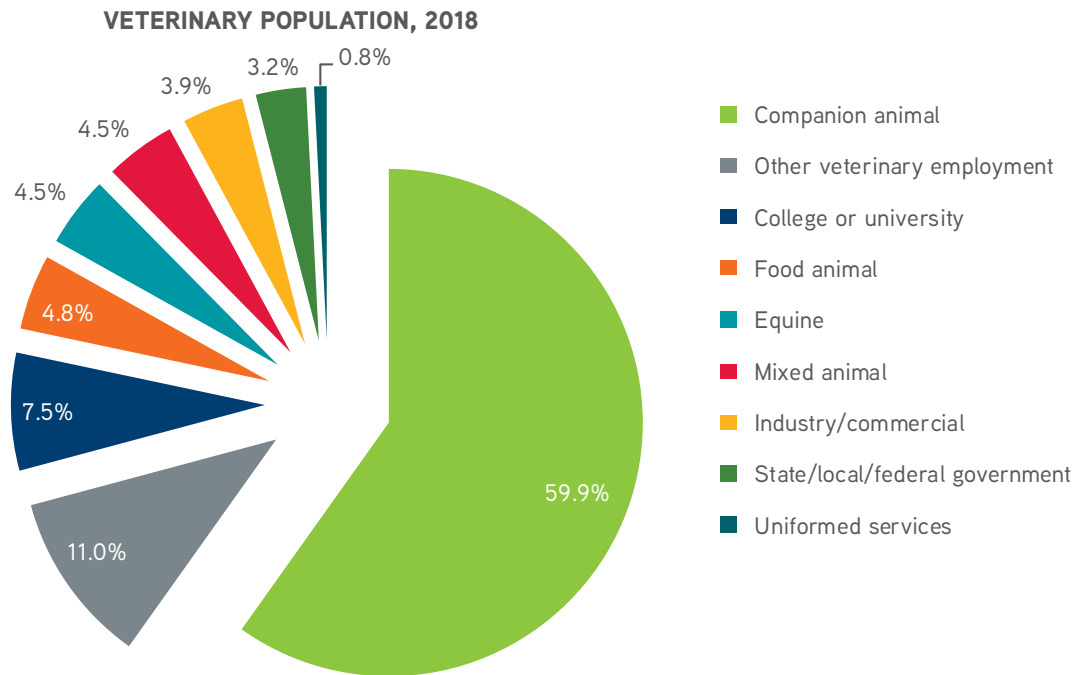


Figure 19



THE MARKET FOR VETERINARIANS

In 2018 there were an estimated total of 113,394 veterinarians actively engaged in the profession in the United States in public or private practice. The largest segment of the profession provides medical services to animals in private and corporate practices. Of these practices, companion animal practices employed the largest number of veterinarians (59.9 percent), followed by food animal (4.8 percent), equine (4.5 percent) and mixed animal practices (4.5 percent). In public practice, colleges and universities employ the most veterinarians, followed by industry and state and local governments (Figure 20).



Estimated number of veterinarians as of December 31, 2018: 113,394

Figure 20

The AVMA Census of Veterinarians continues to be the primary source of data that collects information on educational background, veterinary education debt, incomes, employment status, hours worked, underemployment, and wellbeing. The census is distributed to AVMA member veterinarians at the beginning of the calendar year in January and February, gathering data from the previous year on the economics of veterinary practice and veterinary compensation. Also covered in this report is the net present value of the DVM degree (NPV), a key performance indicator for the veterinary profession. The 2018 Census of Veterinarians was fielded to 16,000 recipients (15,904 in 2017), with 3,025 responding to the survey (2,780 in 2017), for an 18.9 percent response rate, an increase from the previous year's 17.5 percent response rate (Table 5).

AVMA SURVEYS RESPONSE RATES

	2014	2015	2016	2017	2018
Employment survey	22.7%	19.0%			
Compensation survey	14.7%	11.8%			
Census of veterinarians			11.8%	17.5%	18.9%

Table 5

Descriptive statistics of veterinarians

The respondents to the 2018 Census of Veterinarians represented the distribution of veterinarians across the profession by region (Table 6) and by practice type (Figure 21). While the data collected is enough to gather trends across broad categories, there was not enough responses to provide detailed information for each practice type in each region.

2018 CENSUS OF VETERINARIANS

	2018 census of veterinarians	AVMA membership	U.S. population (est. 2017)
Region 0	9.5%	8.2%	7.3%
Region 1	8.6%	9.4%	10.3%
Region 2	11.9%	11.1%	9.7%
Region 3	10.8%	14.4%	14.1%
Region 4	9.3%	10.2%	10.1%
Region 5	8.3%	7.6%	5.3%
Region 6	7.5%	8.3%	7.3%
Region 7	10.9%	11.4%	12.3%
Region 8	9.1%	8.5%	7.1%
Region 9	14.3%	10.8%	16.4%

Table 6

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY PRACTICE TYPE

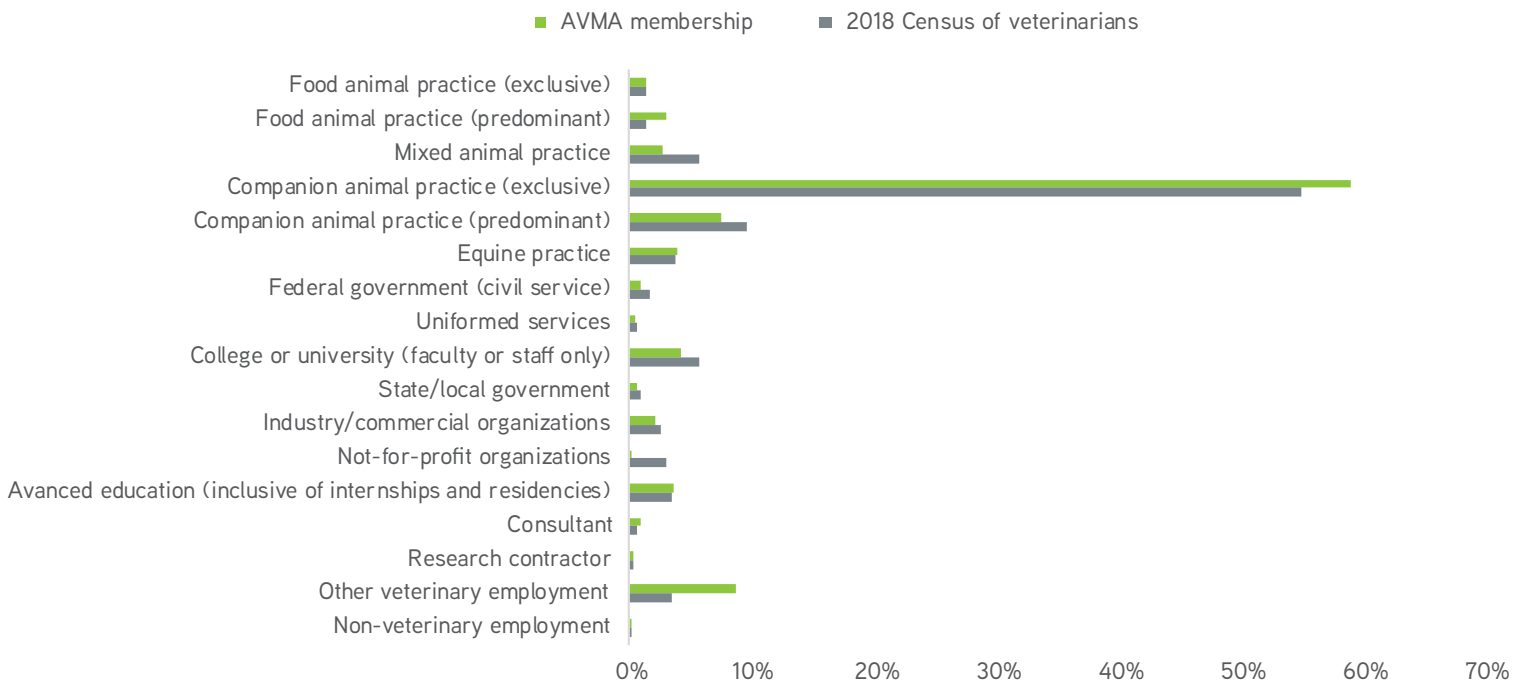


Figure 21

A compilation of key indicators by U.S. region is provided in Appendix A. U.S. regions are based off U.S. zip codes, with the first number in a five-digit zip code corresponding to its region (example, zip code 60173 is in region 6) (Figure 22).

U.S. POSTAL SERVICE REGIONS OF THE UNITED STATES

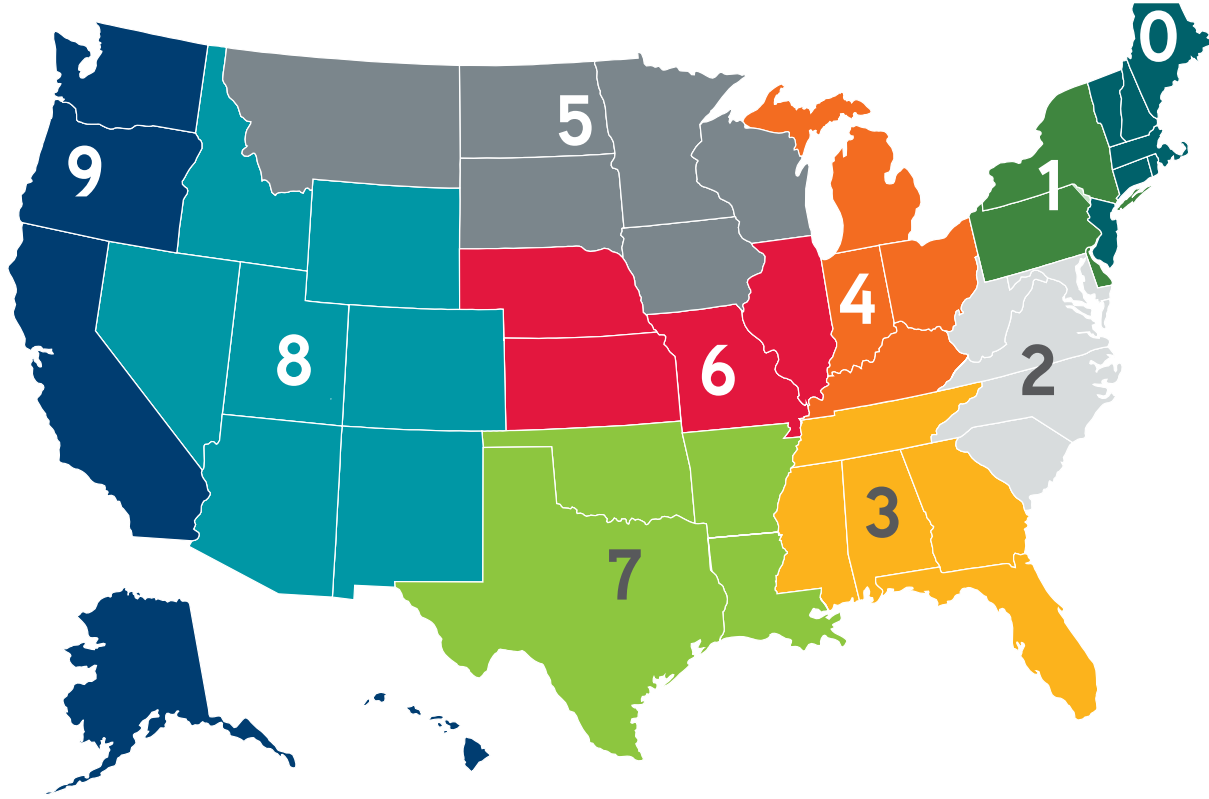


Figure 22

A higher percentage of females (73.9 percent) than males (26.1 percent) responded to the survey compared to the gender distribution found in the profession (63.9 percent female and 36.1 percent male). 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).

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY GRADUATION YEAR

	2018 Census of veterinarians		AVMA membership	
	N	Percent	N	Percent
2010-2017	1,751	57.9%	24,934	30.0%
2000-2009	539	17.8%	21,081	25.4%
1990-1999	462	15.3%	17,479	21.0%
1980-1989	149	4.9%	15,039	18.1%
1970-1979	80	2.6%	4,436	5.3%
1960-1969	31	1.0%	138	0.2%
1950-1959	1	0.0%	8	0.0%
Missing	13	0.4%		
Total	3,026		83,115	

Table 7

By looking at year of graduation by gender, one can see the gender shift start to occur in the 1980s, where AVMA membership between male and female were closer together than at other time periods (Figure 23). Since then, more females have entered the profession than males. There was, however, very little difference in the distribution of respondents by veterinary college attended, compared to the veterinary population (Figure 24).

YEAR OF GRADUATION BY GENDER

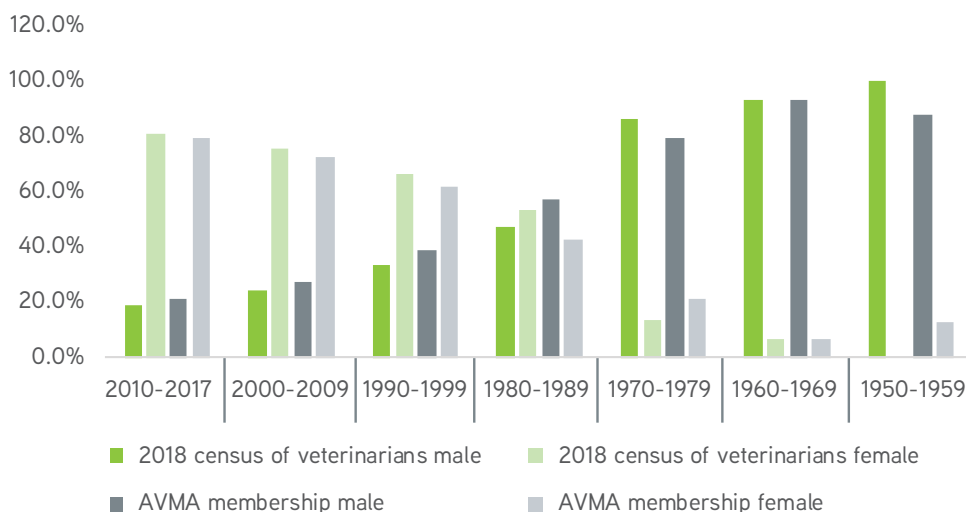


Figure 23

SAMPLE RESPONDENTS AND AVMA MEMBERSHIP BY VETERINARY COLLEGE ATTENDED

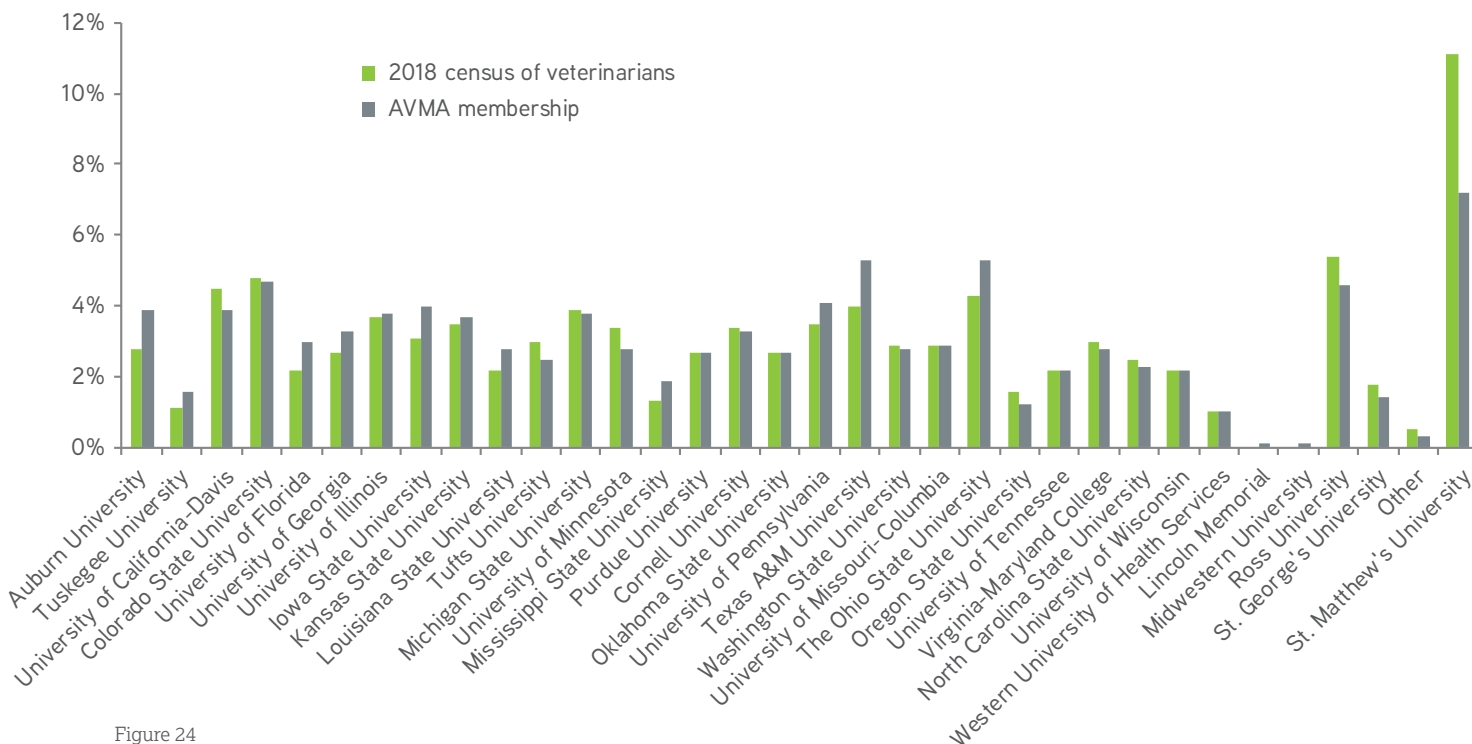


Figure 24

The sample respondents by type of community show that more than half of the respondents were working a suburban area in 2016 to 2018. There is a steady increase of respondents working in suburban and urban communities over the past three years with a steady decrease in the rural community.

SAMPLE RESPONDENTS BY TYPE OF COMMUNITY

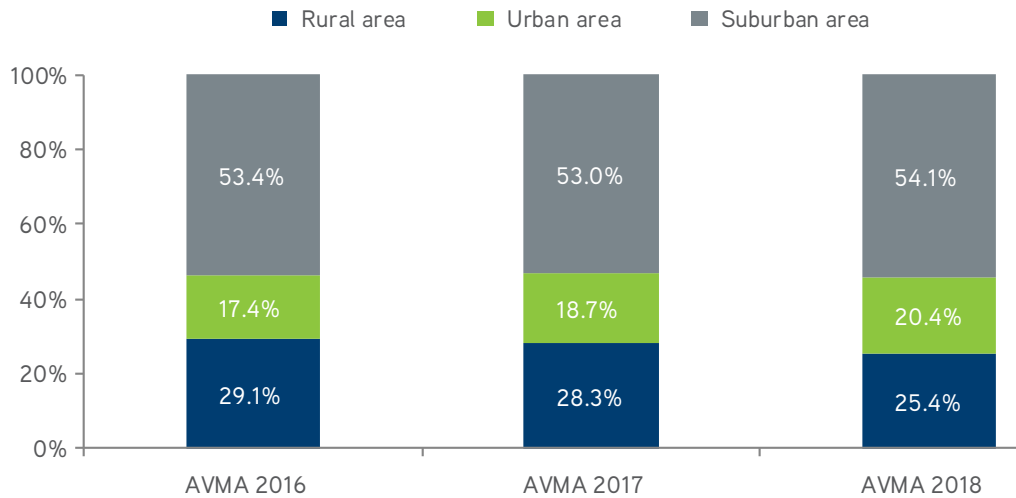


Figure 25

Veterinarian incomes

Incomes reported in this section are based on responses from veterinarians who earned less than \$500,000 in 2017. Veterinarians who earned more than \$500,000 were outliers for this analysis. An outlier is an observation that is far away from other observations and can decrease or increase the overall average. \$500,000 was chosen because it was two standard deviations above the mean (95 percent of incomes are less than or equal to \$500,000). Around 67 percent of veterinarians' incomes were between \$60,000 and \$149,999 (Figure 26).

RESPONDENTS BY INCOME

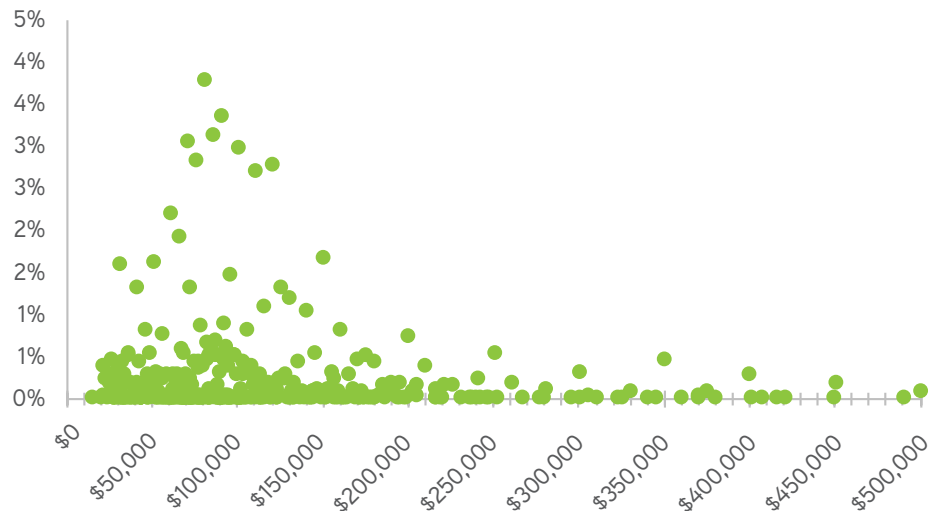


Figure 26

Incomes increase with experience The range of incomes increases as experience increases for the first five decades post-graduation and then the mean income growth slows and declines along with the variation in income (Figure 27).

INCOME BY GRADUATION YEAR

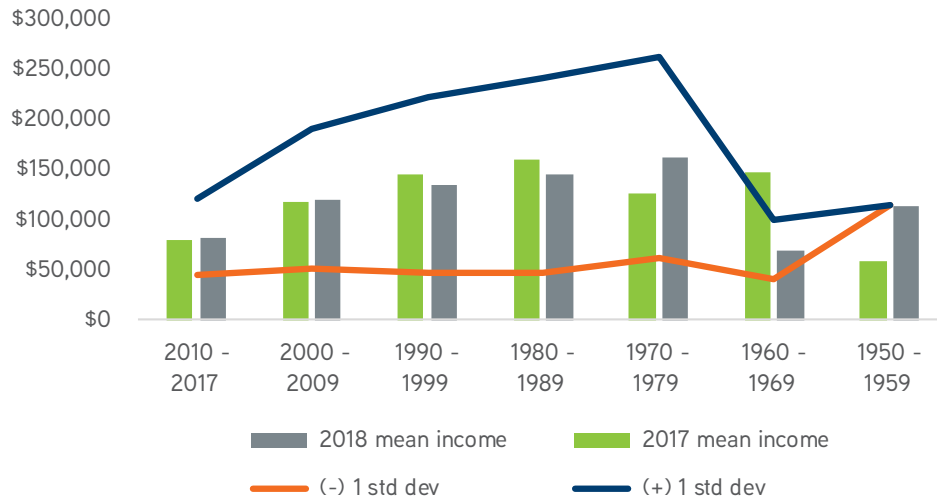


Figure 27

Consultant, equine and food animal practice types have the greatest range of reported incomes within one standard deviation of the mean (Figure 28).

MEAN PROFESSIONAL INCOME BY PRACTICE TYPE, 2018

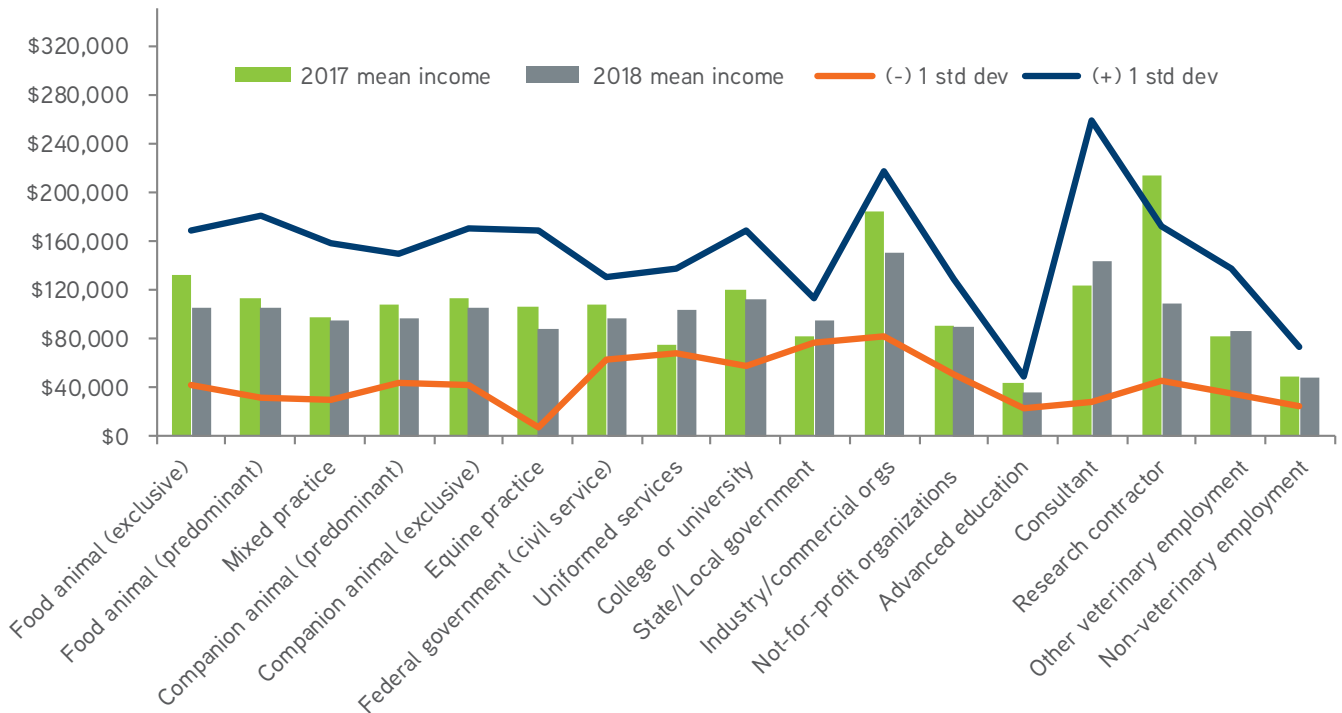


Figure 28

Additional degrees acquired besides the DVM degree have little impact on income, however, there is a statistically significant increase in income as a result of obtaining board certification (Table 8).

INCOME PERCENTILES BY ADDITIONAL EDUCATION, 2018

Degree/certification	10%	25%	Median	75%	90%	Mean	Std Dev	Obs.
DVM only	\$30,000	\$54,500	\$86,000	\$132,000	\$200,000	\$104,964	\$71,596	188
DVM and specialized degree (JD, MD, etc.) or other	\$38,500	\$60,000	\$81,000	\$120,000	\$158,000	\$94,262	\$60,060	80
DVM & bachelor's	\$41,000	\$68,000	\$86,000	\$115,000	\$158,000	\$98,386	\$59,441	1,874
DVM & master's	\$44,000	\$68,000	\$94,000	\$125,000	\$177,000	\$108,574	\$72,295	367
DVM & PhD	\$50,000	\$83,000	\$120,000	\$165,000	\$239,000	\$136,404	\$76,627	66
Board certification	10%	25%	Median	75%	90%	Mean	Std Dev	Obs.
Board certified	\$65,000	\$100,000	\$130,000	\$170,000	\$240,000	\$145,323	\$76,049	283
Not board certified	\$40,000	\$65,000	\$85,000	\$110,000	\$154,000	\$95,802	\$58,931	2,309

Table 8

In some of the practice types, such as college and university, there are significant differences in incomes associated with different positions. Executives and managers on average reported higher incomes than professors, researchers, and clinicians (Figure 29).

INCOME BY COLLEGE/UNIVERSITY POSITION, 2018

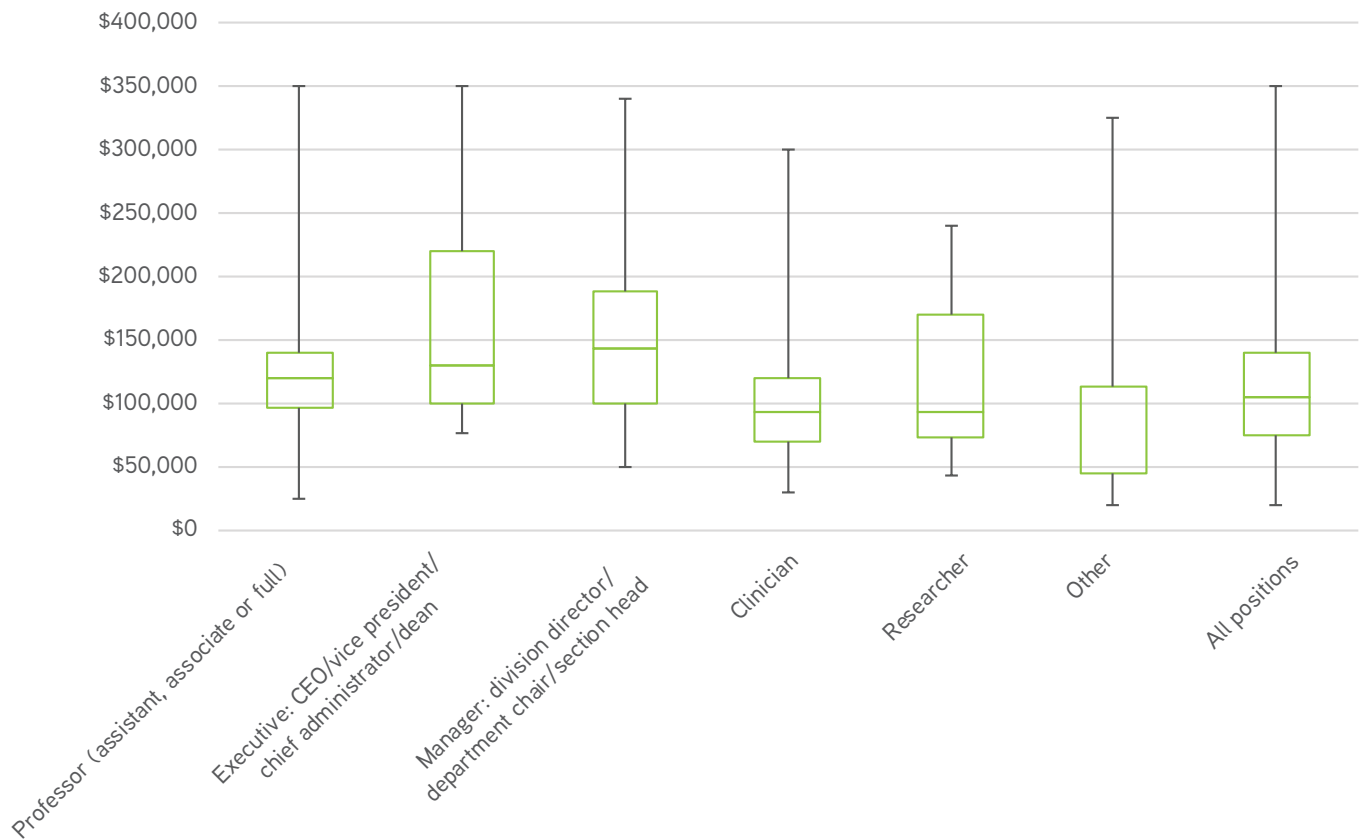


Figure 29

There is very little difference seen in average incomes across the different regions in the United States (Figure 30).

INCOME BY REGION, 2018

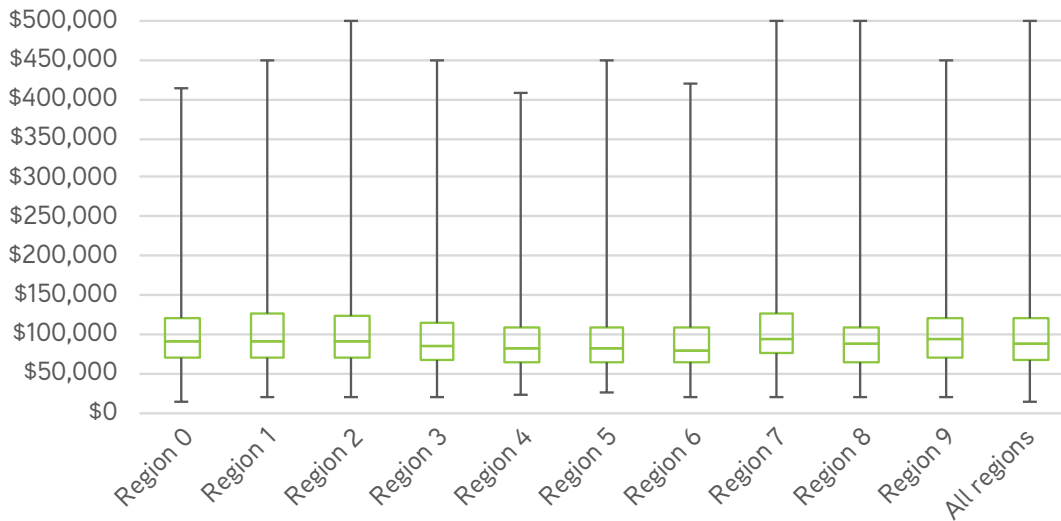


Figure 30

Veterinarian employment

The unemployment rate for the veterinary profession in 2018 was 1.6 percent, which is well below the 4.1 percent national unemployment rate reported at the end of 2017. This accounts for only those veterinarians who were actively seeking employment in 2018 (at the time they filled out the survey). This estimate better aligns with the Bureau of Labor Statistics (BLS) estimates of unemployment. About 18.4 percent of respondents currently not employed in veterinary medicine were seeking enrollment in an internship, residency or advanced education, while 50.7 percent were not seeking any employment at the time of the survey (Table 9).

TABLE TITLE

Are you currently employed in veterinary medicine?	2016 survey	2017 survey	2018 survey
Yes	90.2%	94.9%	92.2%
No	3.4%	1.5%	4.3%
Retired	6.0%	3.5%	3.3%
Missing	0.4%	0.2%	0.2%
If unemployed, are you seeking employment in veterinary medicine?			
Seeking employment in veterinary medicine	38.8%	29.3%	30.9%
Seeking enrollment in an internship, residency, or advanced education program	12.9%	4.9%	18.4%
Not seeking employment (and not retired)	48.2%	65.9%	50.7%
Unemployment rate	1.4%	0.4%	1.6%

Table 9

Males reported higher unemployment for 2018 than women, with unemployed males 20 to 30 years out of veterinary school reporting the highest unemployment from veterinary medicine. Most of the respondents are pursuing enrollment in an internship, residency, or advanced education, or not seeking employment at this time (and not retired) (Figure 31).

UNEMPLOYMENT BY GENDER AND YEAR OF GRADUATION, 2013-2017

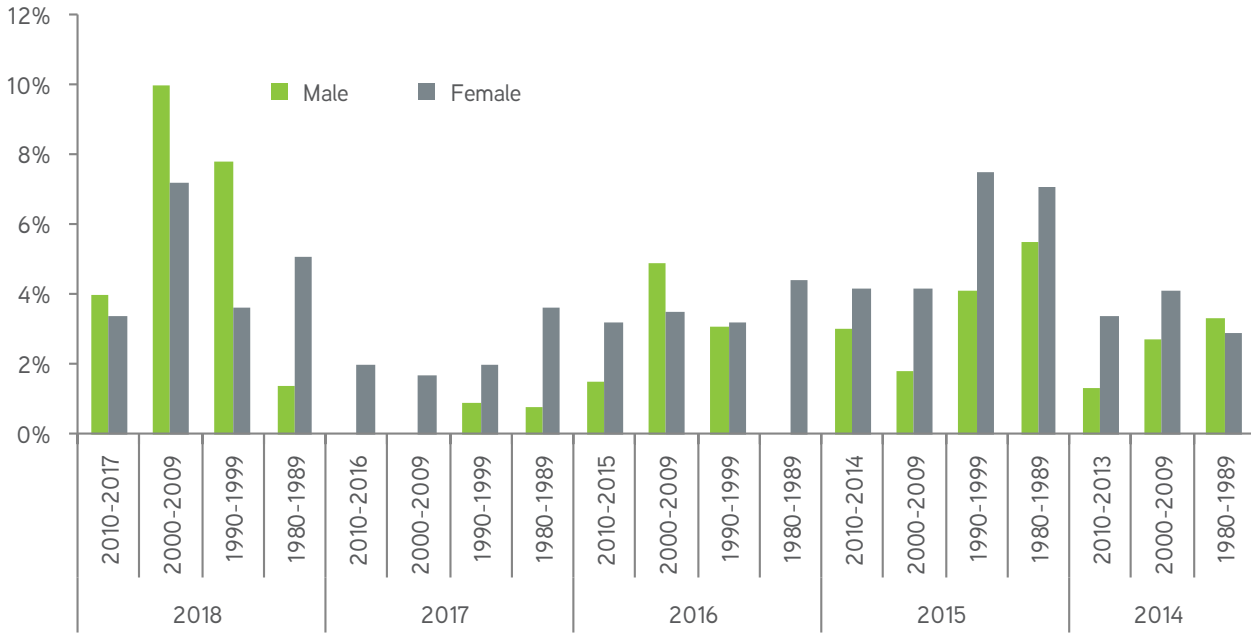


Figure 31

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 (Figure 32).

SEEKING EMPLOYMENT BY GRADUATION YEAR

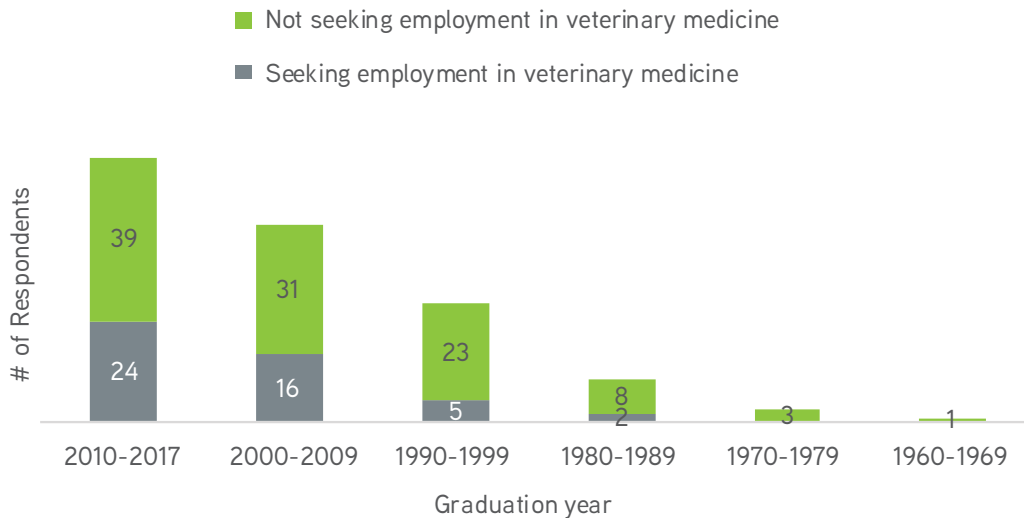


Figure 32

Underemployment

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. 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.

Underemployment was again negative in 2018 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 2018, an additional 6,291 veterinary FTEs (40 hours per week equals one FTE) was needed to eliminate the negative underemployment. This was more than 3,000 additional veterinarians needed than in 2017 (3,330), 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 (Figure 33).

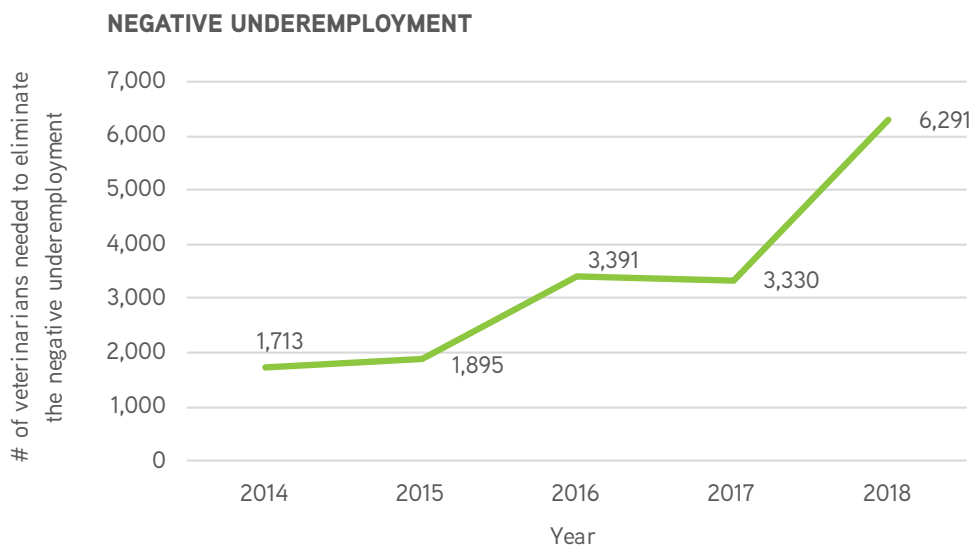


Figure 33

While the majority of veterinarians are content with their current number of work hours per week, 10.3 percent indicated a desire to increase the number of hours per week for increased compensation, while 20.4 percent indicated a desire to reduce the number of hours worked per week for reduced compensation. Many respondents who wish to increase their work hours are working between 0-39 hours per week, and those who wish to decrease their work hours are working 40 or more hours per week (Figure 34).

PREFERENCE TO CHANGE WORK HOURS PER WEEK

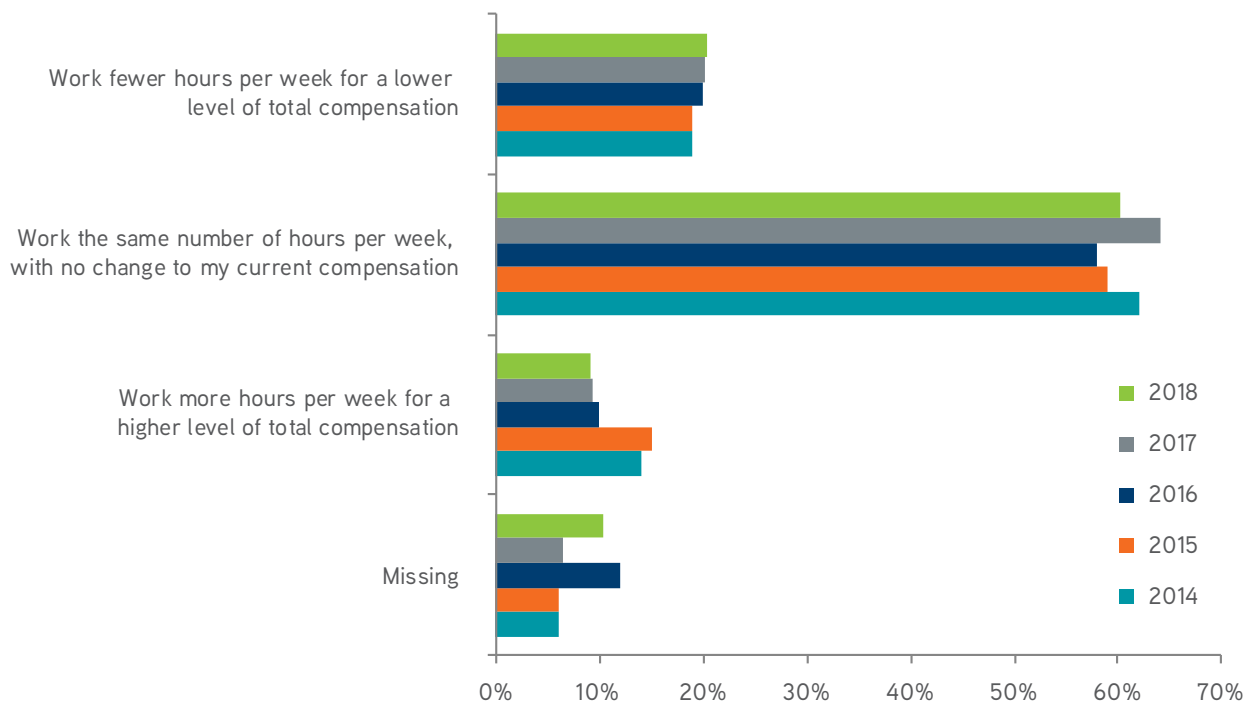


Figure 34

As with unemployment, underemployment varies by gender. More females want to work fewer hours than wanting to work additional hours, and for the third time since 2016, the percent of men who wish to work less is also greater than the percent who wish to work more hours per week (Figure 35).



UNDEREMPLOYMENT BY GENDER

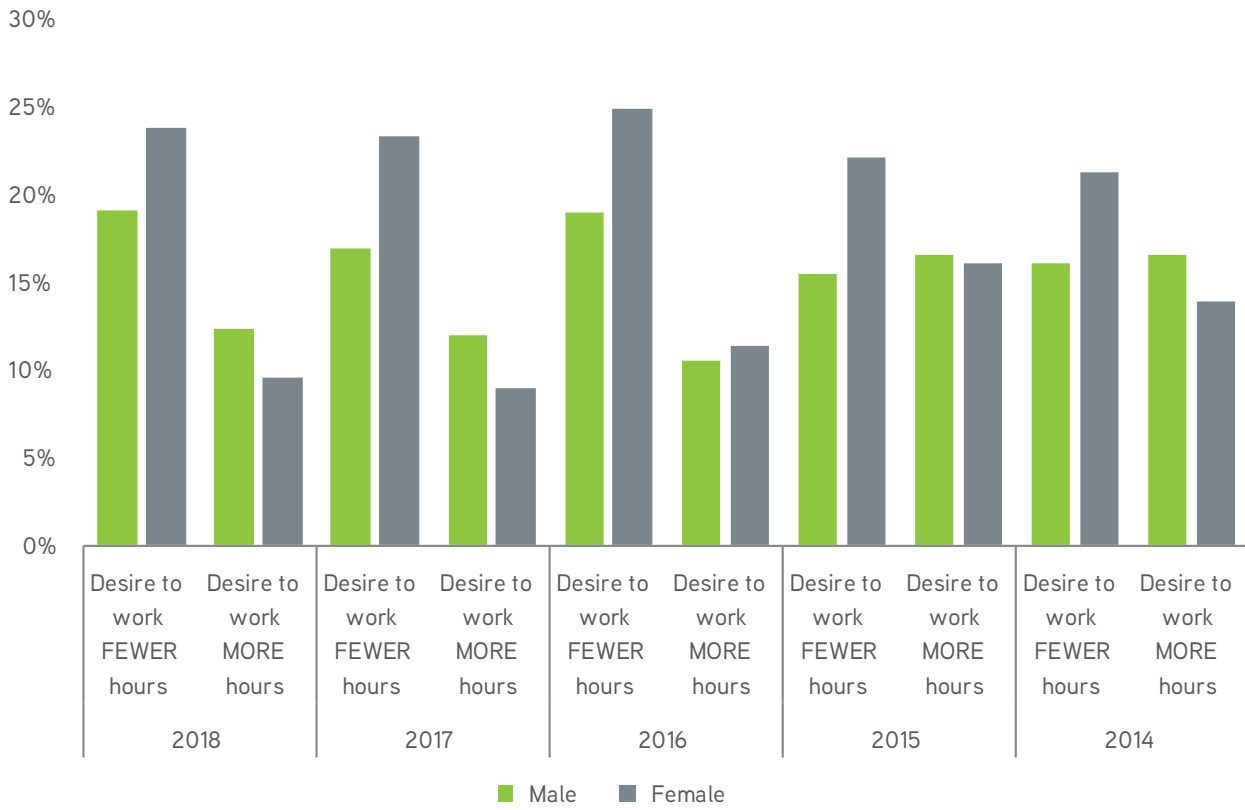


Figure 35

For both men and women in 2018, 31 percent of males and 37 percent of females desired a reduction in hours per week of 10 to 19 hours, an increase from 2017. After accounting for the change in hours desired by gender and the current hours that are currently worked, over 60 percent of males and females preferred 30-50 working hours (typically a standard full-time work week) (Figure 36).

CHANGE IN HOURS DESIRED BY GENDER, 2018

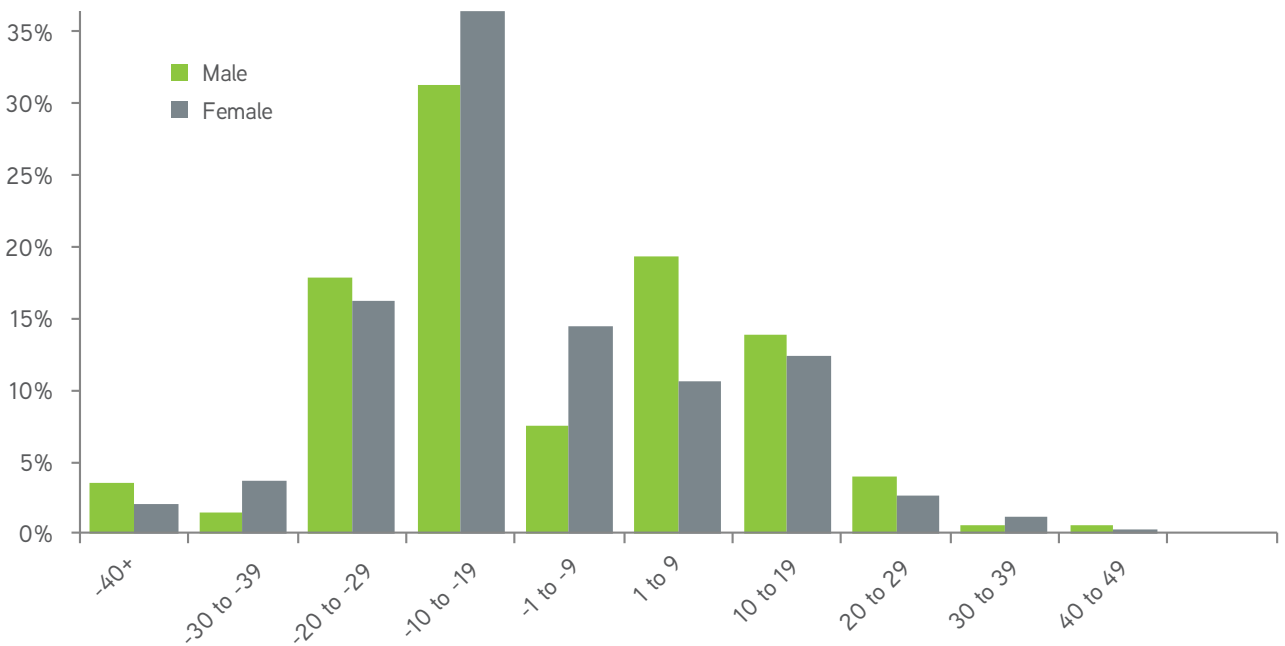


Figure 36

Within the 2018 sample, 9 percent of veterinarians indicated wanting to work a mean of 19.8 (17.4 in 2017 and 18.9 in 2016) additional hours per week. Respondents who recently graduated from veterinary college tend to want to work more hours than those who graduated a longer time ago (Figure 37).

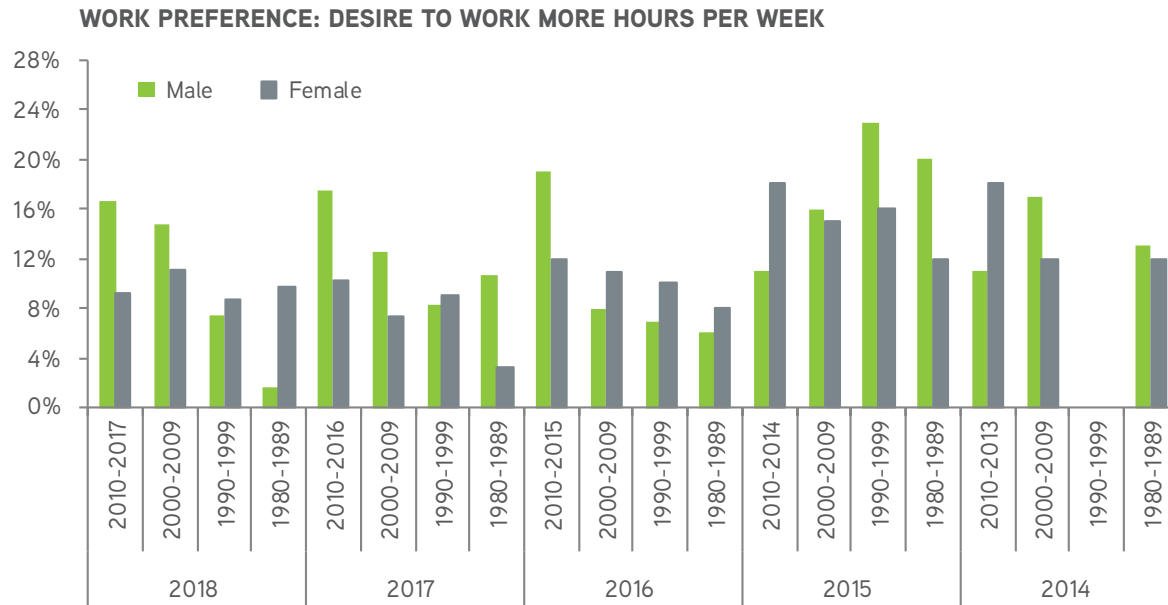


Figure 37

In contrast to those who indicated a desire to work more hours for increased compensation, in 2018, 20.4 percent (20.2 percent in 2017 and 20.6 percent in 2016) of the respondents indicated wanting to work an average of 15.3 hours less per week for less compensation (14.2 hours in 2017 and 14.9 hours in 2016). More females reported wanting to work fewer hours than men, and this desire or want increases the further out one is from when they entered the veterinary workforce (Figure 38).



Respondents who recently graduated from veterinary college tend to want to work more hours than those who graduated a longer time ago.

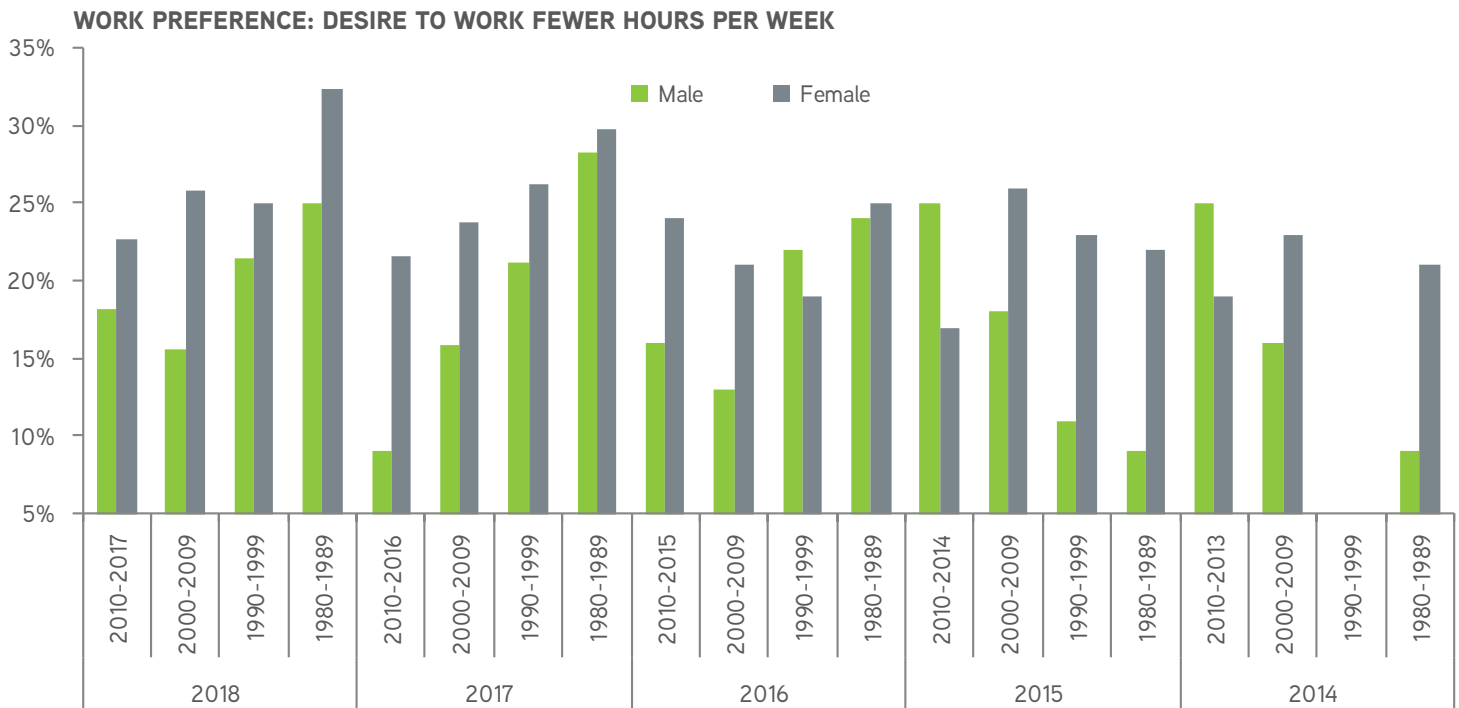


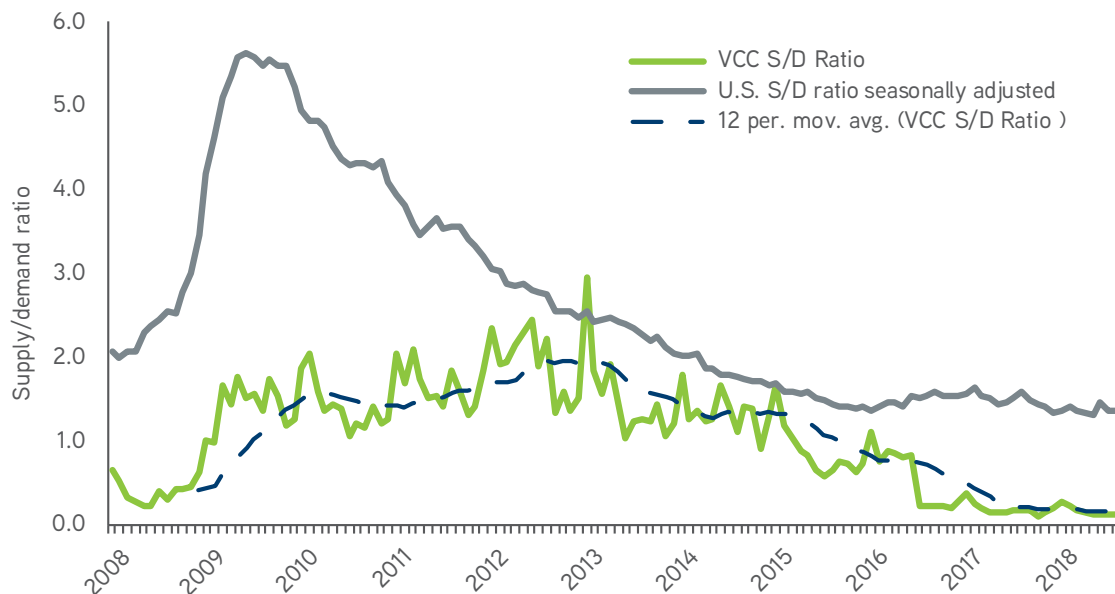
Figure 38

Veterinarian job market

The market for veterinary labor can be compared to the national labor market using the information collected from the AVMA's Veterinary Career Center (VCC), the Conference Board's Help Wanted OnLine (HWOL) data series and Bureau of Labor Statistics unemployment data. Like the national labor market, the number of jobs exceeds the number of people looking for employment. A simplified measure of the national labor markets is the supply/demand (S/D) ratio. The S/D ratio is the number of unemployed persons divided by the number of jobs posted online. The S/D ratio provides an indication of the general tightness of the national labor market and indicates the extent to which the national labor supply and demand is out of balance.

At the height of the recession, there were more than five unemployed persons seeking each available employment opportunity. At the end of 2018, the S/D ratio is 1.35:1. This suggests that there are about three unemployed persons for every two employment opportunities and thus the relative scarcity of labor is high compared to what it was in 2009. 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 U.S. S/D and changes in the veterinary labor market (Figure 39).

JOB APPLICANTS (SUPPLY) AND AVAILABLE JOBS (DEMAND)



Source: Conference Board's Help Wanted OnLine; Bureau of Labor Statistics; AVMA Veterinary Career Center

Figure 39

Employment opportunities listed on the VCC are for any veterinary service position. Some of the opportunities are for the various staff positions in a veterinary hospital. However, about 94 percent of the posted jobs do require a DVM degree¹ (Figure 40).

VCC DESCRIPTIVE STATISTICS OF JOBS POSTED, JANUARY 1 TO DECEMBER 31, 2018

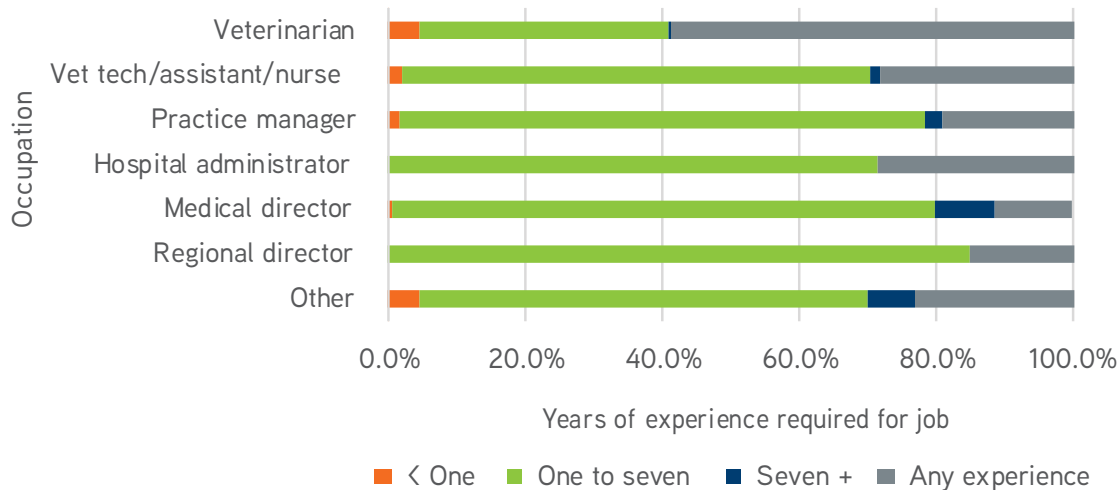


Figure 40

The location of jobs from the VCC are in every state, with a lot of jobs along the east and west coasts and metropolitan areas (Figure 41). However, when the number of job applications in each state is compared to the job postings in each state in 2018, it is seen that in several states, such as Colorado and Wyoming, the number of job applicants far exceeds the number of jobs in that state. So, while there are a lot of DVM jobs available in the veterinary industry, some states are more saturated with applicants per jobs (Figure 42).

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.

VCC DVM JOB LISTINGS, 2018

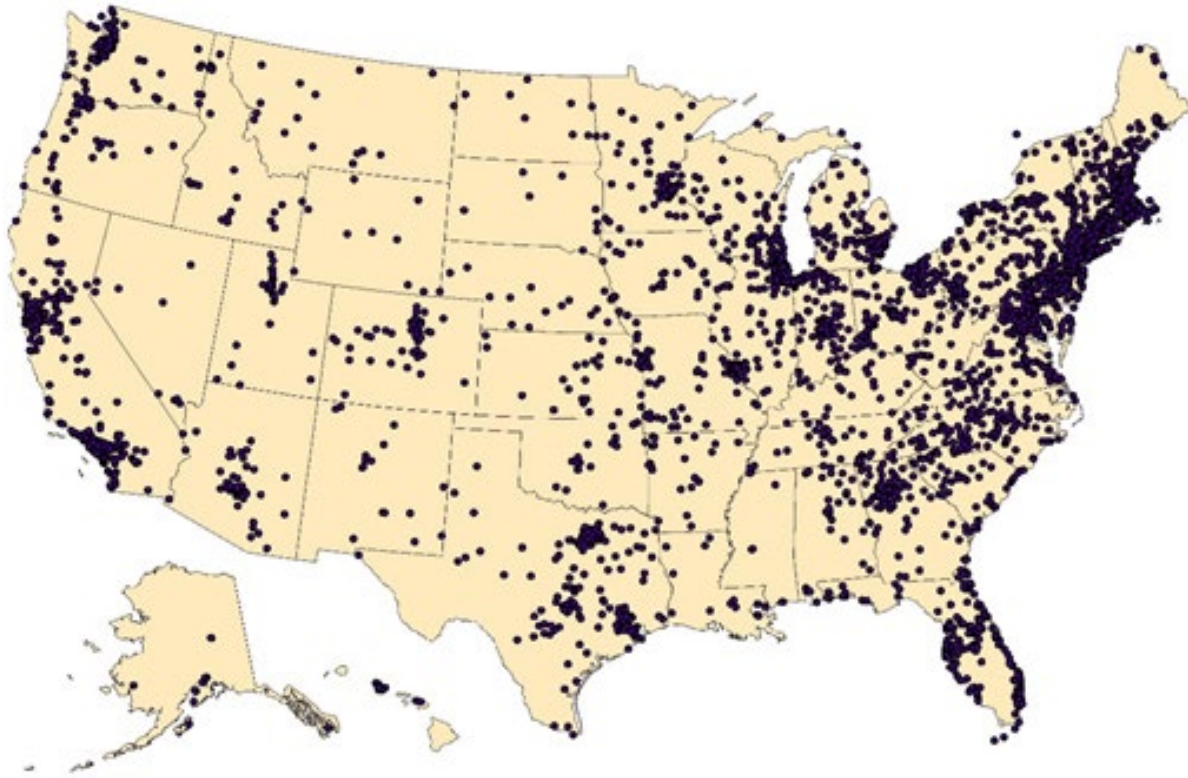


Figure 41

VCC TOTAL APPLICANTS TO TOTAL JOBS PER STATE

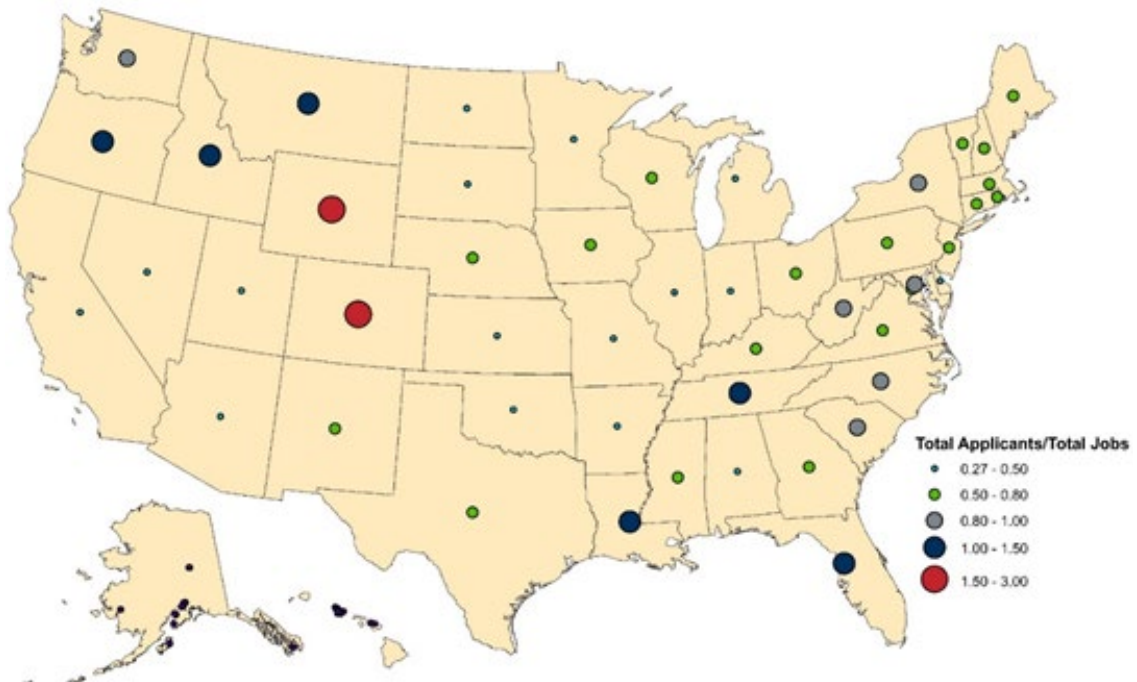


Figure 42

Veterinarian wellbeing

It is important to know what factors are contributing to lower levels of wellbeing in the veterinary profession. To address this concern, the AVMA collects data on self-reported wellbeing of veterinarians, with the main objective being to find correlations of wellbeing with employment and demographic characteristics.

In addition to self-reported wellbeing measures, the Professional Quality of Life (ProQOL) Scale² questions are included in surveys and compassion satisfaction and compassion fatigue scores calculated for each respondent. Compassion fatigue is reported as “Burnout” scores and “Secondary Traumatic Stress” scores, and these two scores can be used as dependent variables in measuring the impact of factors that, conceptually, are thought to contribute to either or both burnout or secondary traumatic stress.

Overall, respondents were satisfied (scale 4-7) with their current job, compensation, lifestyle, and the veterinary profession as a whole. However, about a quarter of respondents were not satisfied (scale 1-3) (Figure 43).

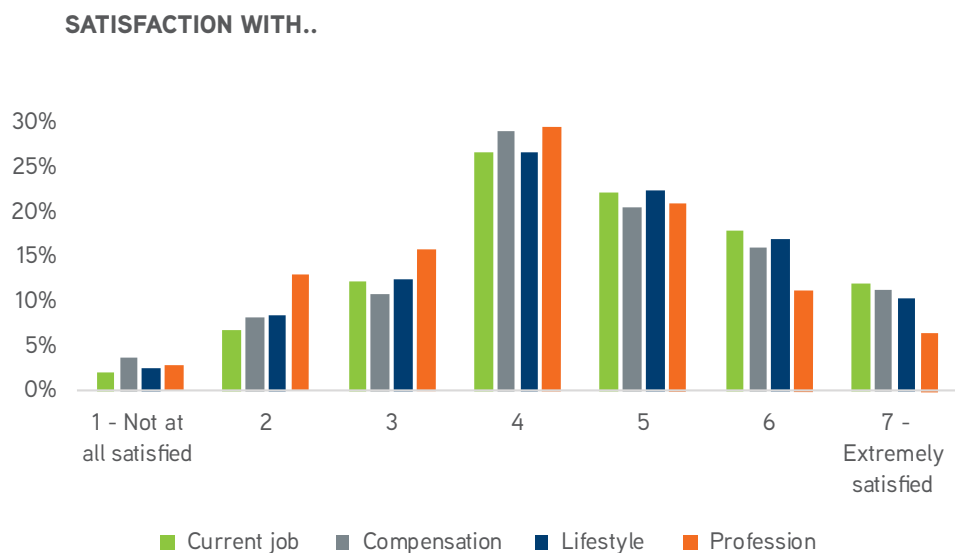


Figure 43

The relationship that exists between level of satisfaction with employment and mean income is statistically significant. 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. On average, the mean income at each level of satisfaction is \$7,000 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 having respective mean incomes of \$111,275 and \$133,218 (Figure 44).

² B. Hudnall Stamm, 2009. Professional Quality of Life: Compassion Satisfaction and Fatigue Version 5 (ProQOL). /www.isu.edu/~bhstamm or www.proqol.org

SATISFACTION WITH EMPLOYMENT AND MEAN INCOME

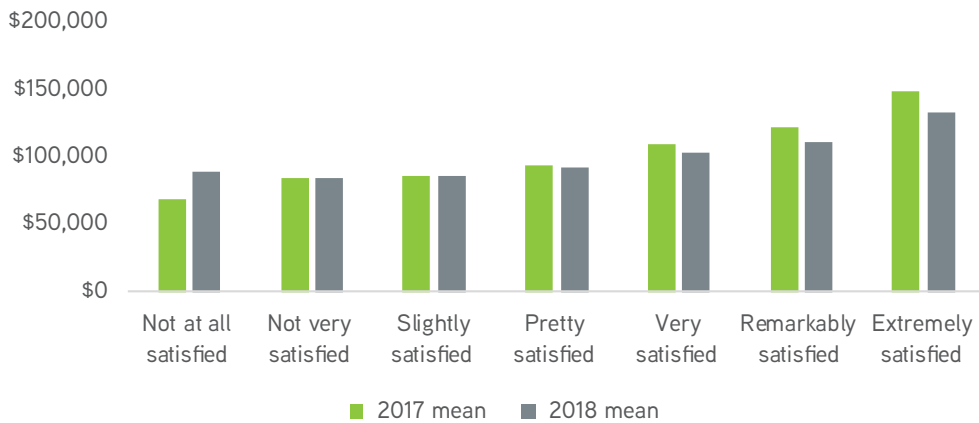


Figure 44

Self-reported health shows that over 90 percent of both males and females are in overall good health (good to excellent) (Figure 45).

SELF-REPORTED HEALTH BY GENDER

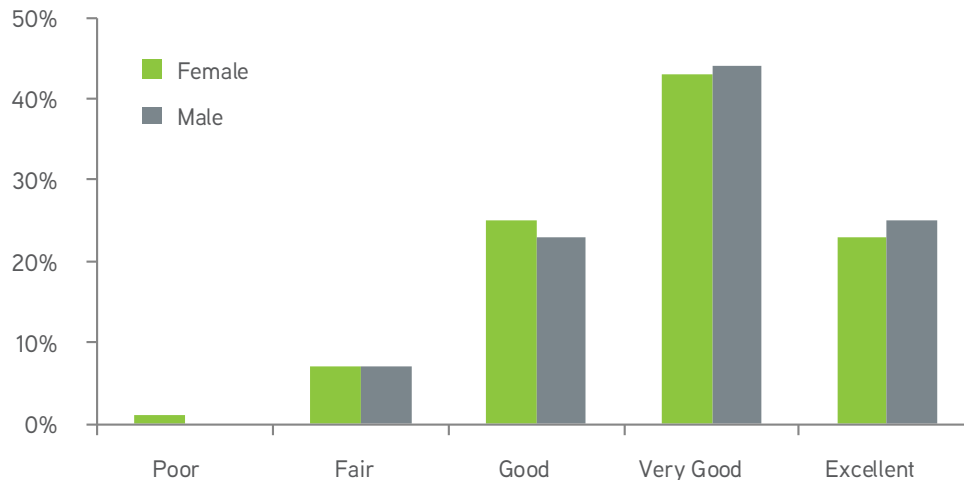


Figure 45

When looking at the following compassion satisfaction, burnout and secondary traumatic stress charts (from the ProQOL questions in the survey), the majority of respondents fall within the average across all other professions (scores between 23 and 42). 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. The factors that continue to be associated with higher compassion satisfaction are satisfaction with current employment and how well the respondent’s education has prepared them to be a veterinarian (Figure 46).

COMPASSION SATISFACTION SCORE DISTRIBUTION

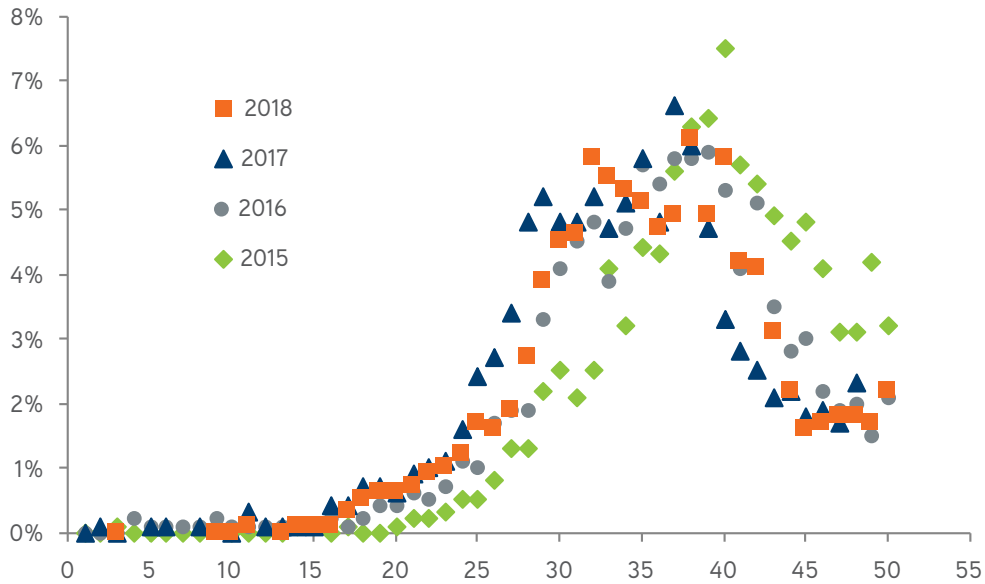


Figure 46

Two sources of compassion fatigue-burnout and secondary traumatic stress-were also measured. A score above 35 on the burnout or secondary trauma stress scale might suggest a need to seek help to deal with the factors that are causing either burnout, secondary trauma stress or both. The burnout scores from the past and present surveys were normally distributed with the mean at the low end of the normal range. However, 12.0 percent of 2018 respondents (9.6 percent in 2017) had scores of more than 35, an increase from 2017. When looking at burnout scores, dissatisfaction with current employment, feeling their education didn't prepare them well to be a veterinarian, and higher hours worked were associated with higher burnout (Figure 47).

BURNOUT SCORE DISTRIBUTION

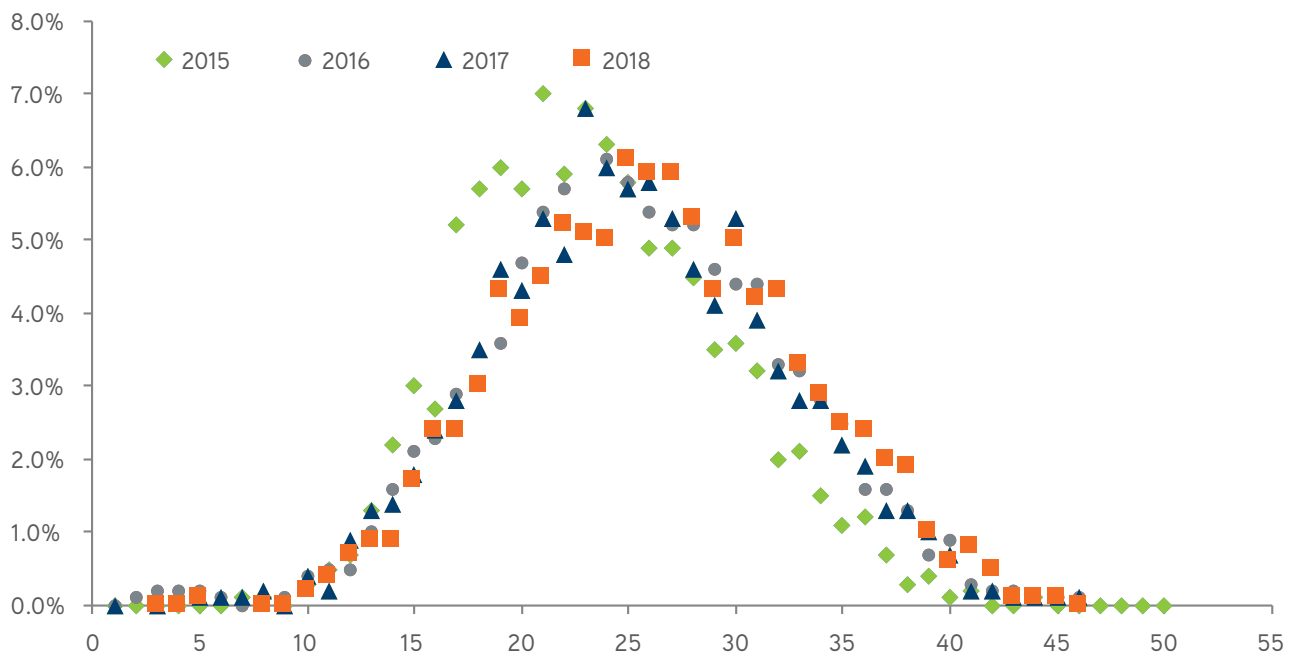


Figure 47

Secondary traumatic stress scores had a similar distribution to that of the burnout scores but the secondary traumatic stress score mean in 2018, and the percent of respondents with a score above 35 (9.2 percent; 3.6 percent in 2017), is lower compared to the burnout scores. Following the same trend since 2015, dissatisfaction with current employment and being female were associated with higher secondary traumatic stress scores (Figure 48).

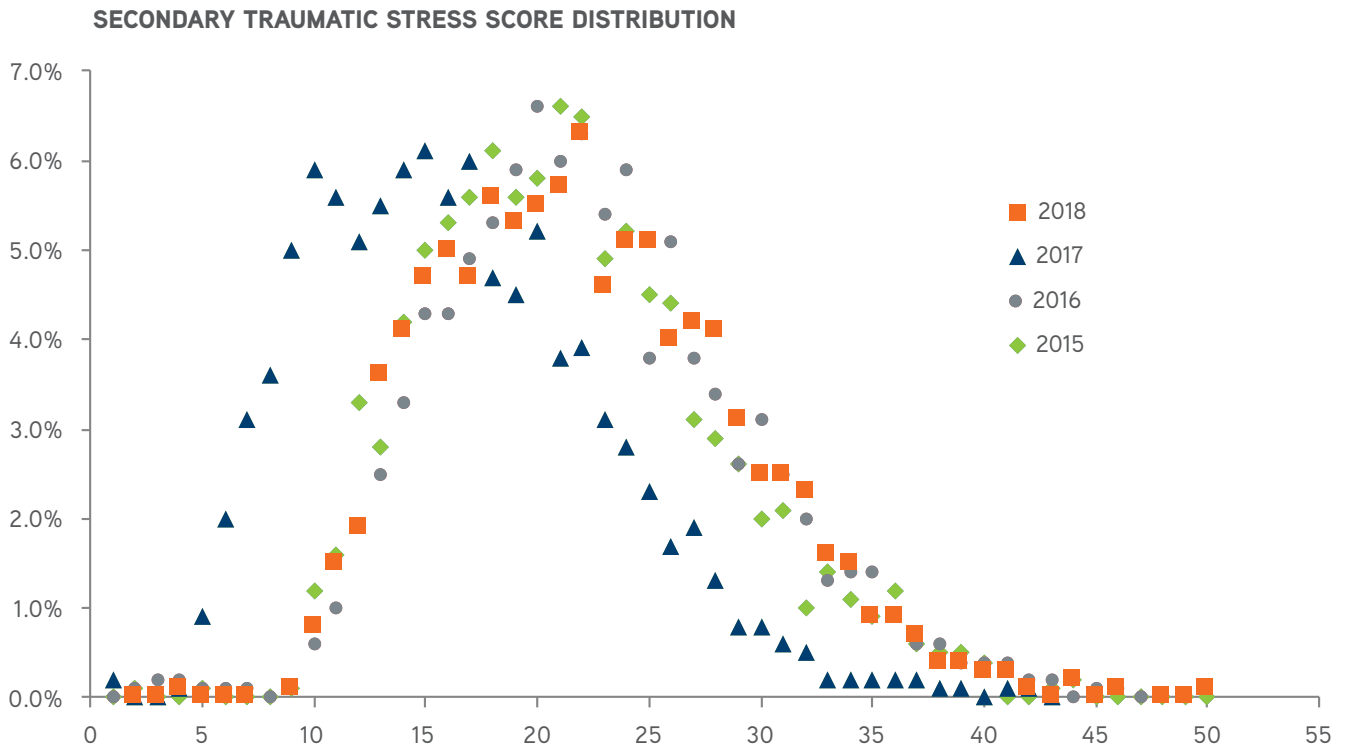


Figure 48

Veterinary market key performance indicator: Net present value

The net present value (NPV) of the DVM degree is a key performance indicator for the profession. In short, the NPV shows how much one is gaining by getting a DVM degree instead of taking a job right after school with a bachelor's degree. A positive NPV is where the financial benefits of obtaining a DVM degree are greater than the costs associated with the degree (cost of education, interest on any money borrowed, and income not earned while in veterinary school). A negative NPV indicates the costs exceed the benefits of obtaining the degree. The NPV is determined by the present value of all future earnings minus all investment costs. The present value is then discounted to translate future revenue to today's dollars, hence, the net present value.

The NPV is driven by increase in incomes and student debt. For 2018, females could expect to earn on average \$590,000 more, and males \$191,000 more, with their veterinary degree than if they went and worked right after their undergraduate education (this includes all bachelor's degree types) (Figure 49). 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 opportunity cost of men to gain a DVM is decreasing, making the economic decision to obtain a DVM slightly easier than before, hence the now upward trend in the NPV.



NET PRESENT VALUE OF THE DVM DEGREE

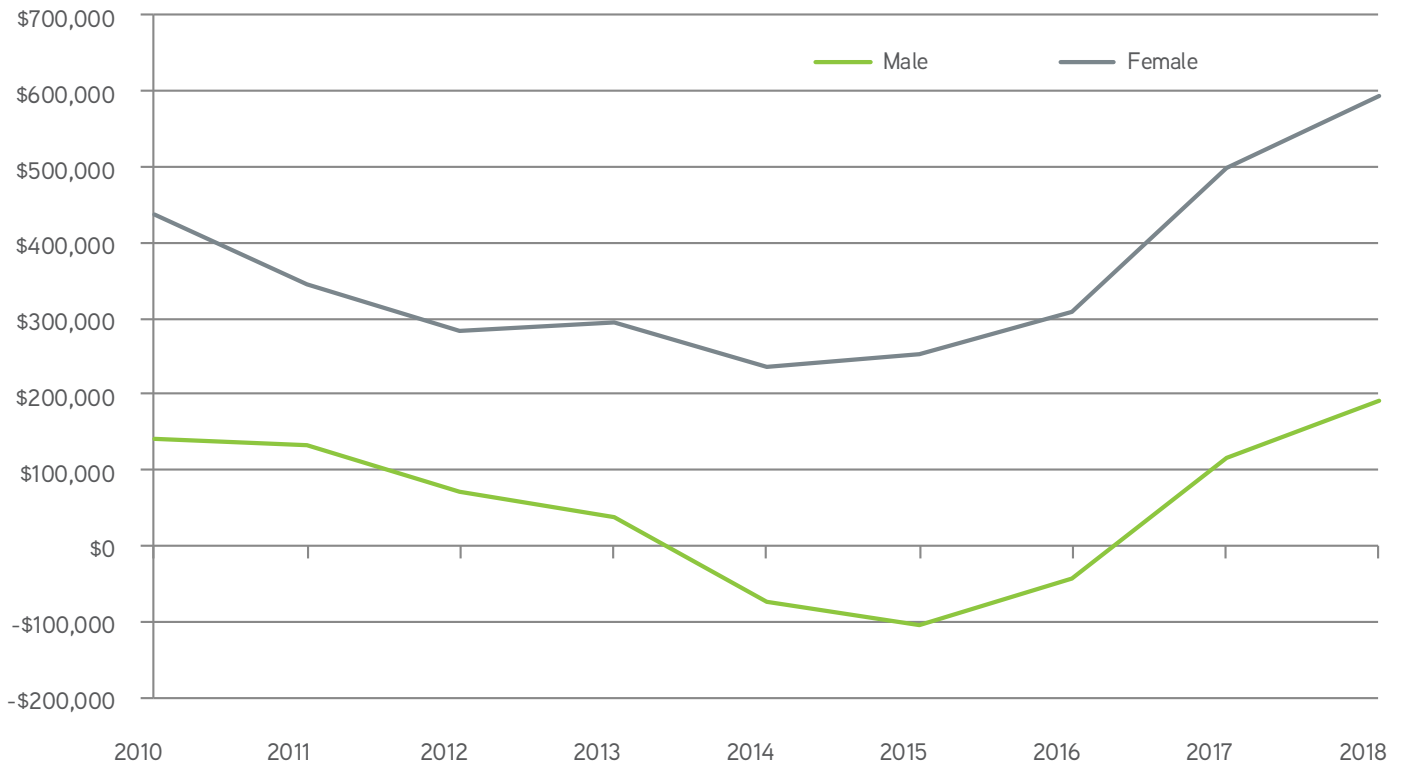


Figure 49

THE MARKET FOR VETERINARY SERVICES

Meeting the national demand for veterinary services requires a certain commitment from veterinarians. Commitment in terms of number of hours of work per week or number of animal patients treated per week, commitment in acquiring the right technology available to meet specific needs, and commitment to serve in remote areas. A better understanding of the current workforce demographics might help address some of these concerns. Statistics presented in this section could be used in predicting shortages or surpluses in the supply of services. Variables under examination include gender, age, type of employment, board certification, and hours worked.

Veterinary workforce

For this analysis, only veterinarians age 65 or below are included. This is to be consistent with the official workforce age for U.S. veterinarians. The proportion of women in the U.S. veterinary profession continues to grow from 50 percent in 2008 to 62 percent in 2018. While the number of male veterinarians declines at an annual average rate of 2.7 percent, that for female veterinarians has increased on average at 2.2 percent annually since 2008 (Figure 50).

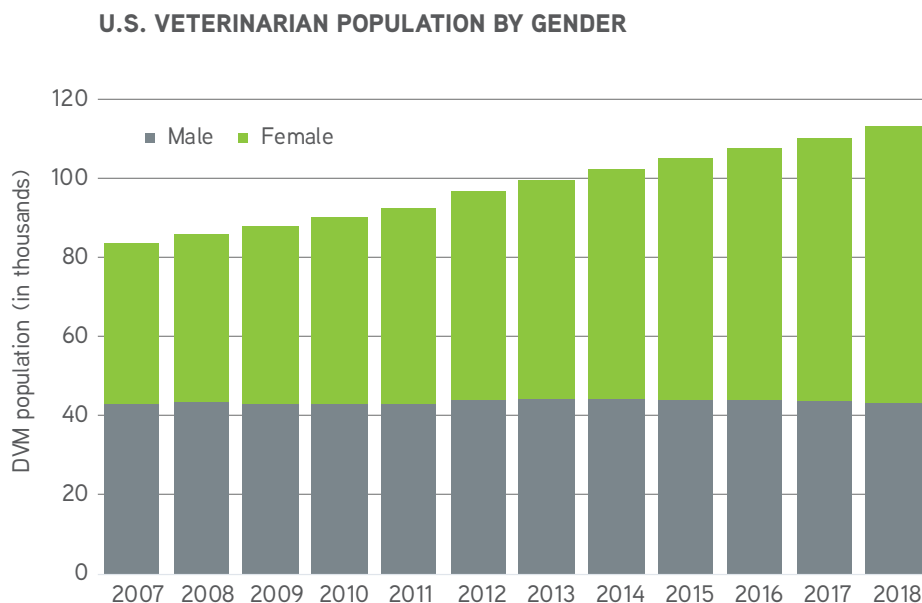


Figure 50

In general, the U.S. veterinarian population is relatively young, with more than 60 percent of veterinarians less than 50 years old. The age breakdown is presented in Figure 51 with a five-years interval starting in 2008. In 2018, 38 percent of U.S. veterinarians were 40 years of age or below and only 14 percent were near the official age of retirement (65 years).

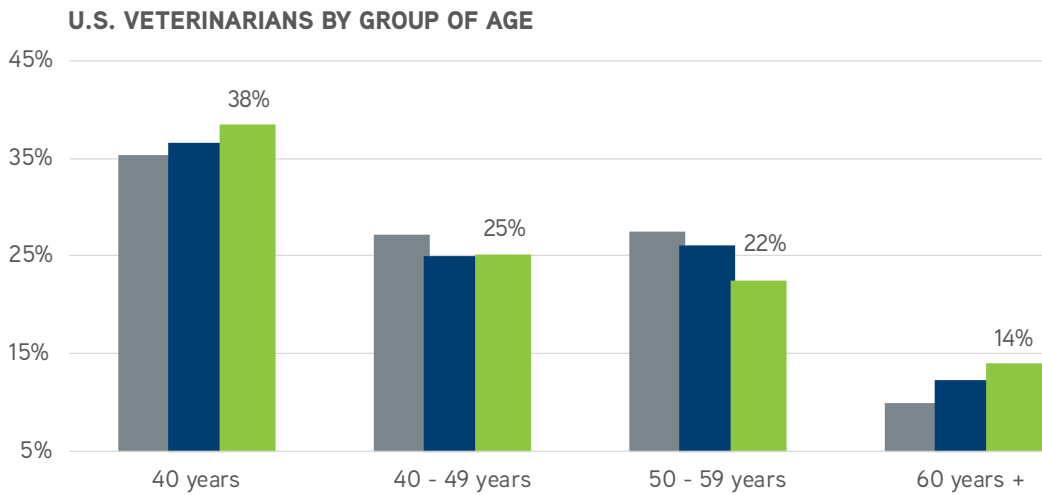


Figure 51

The gender-age distribution shows that male practicing veterinarians are older on average than female practicing veterinarians. The age distribution for female veterinarians is skewed to the right, with a large majority (62 percent) of them being 40 years or younger (Figure 52).

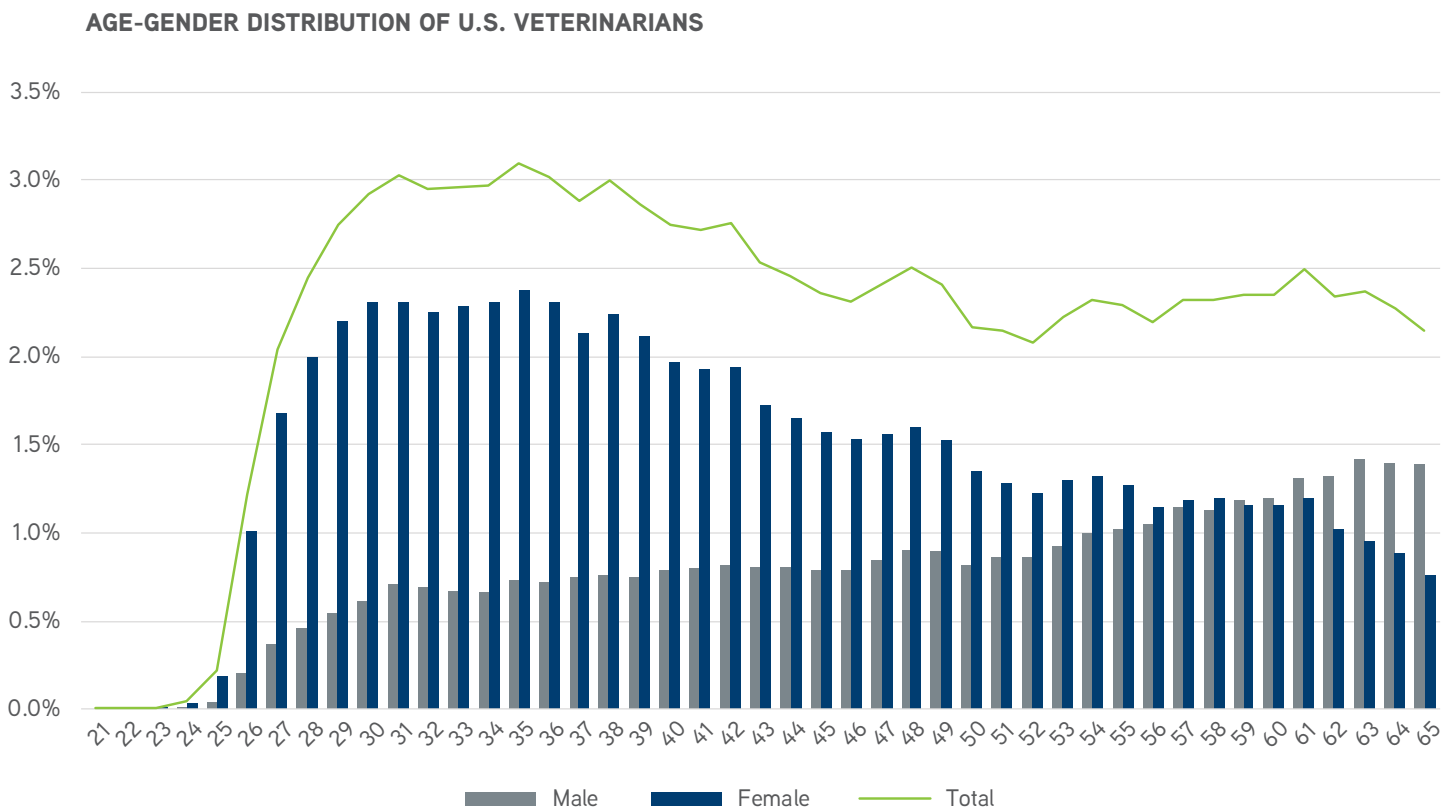


Figure 52

The total number, or U.S. population, of private practice veterinarians has increased by 28 percent during the last decade (2008–2018). Looking at the individual practice types within the private practices, it appears that the sub-population representing production medicine has continuously declined during the period 2008–2018. Emergency/critical care medicine has witnessed the highest increase (63 percent) over the last five years, followed by referral/specialty medicine (53 percent) (Table 10).

VETERINARIANS IN PRIVATE PRACTICES

Type of employment	2008	2013	2018	% Change	
				2008/13	2013/18
Emergency/critical care medicine	954	2,227	3,636	133.5%	63.3%
General medicine/surgery	57,284	63,662	70,526	11.1%	10.8%
Production medicine	4,868	4,112	3,413	-15.5%	-17.0%
Referral/specialty medicine	1,686	3,345	4,988	98.4%	49.1%
Other private clinical practice	465	781	1,194	68.1%	52.7%
Total DVMs in private practices	65,256	74,127	83,757	13.6%	13.0%

Table 10

The population of DVMs employed in academia has increased by 27 percent between 2008 and 2018. During the last five years the change in population has been modest but positive (5 percent). The highest increase goes to the sub-population of DVMs in animal science departments (87 percent) followed by the sub-population of DVMs in veterinary technician programs (48 percent). The sub-population representing DVMs employed in veterinary medical colleges has experienced a slight decline (0.2 percent) (Table 11).

VETERINARIANS IN ACADEMIA

	2008	2013	2018	% Change	
				2008/13	2013/18
Animal science department	27	65	122	140.9%	87.3%
Veterinary medical college/school	5,510	6,335	6,325	15.0%	-0.2%
Veterinary science department	71	106	107	48.8%	1.2%
Veterinary technician program	103	181	269	75.3%	48.8%
Other academia	390	674	908	72.7%	34.8%
Total DVMs in academia	6,101	7,361	7,731	20.6%	5.0%

Table 11

The number of DVMs employed by federal, state, and local government has increased by 14 percent during the period 2008–2018. Among the various segments of employment, Air Force and Army have a negative percent change in population indicating a possible loss of workforce between 2013 and 2018. The highest increase is reported in foreign positions (81 percent), local government (57 percent), and public health commission corps (23 percent) (Table 12).

VETERINARIANS IN PUBLIC SECTORS

	2008	2013	2018	% Change	
				2008/13	2013/18
Air Force	71	80	80	13.9%	-0.2%
Army	422	713	682	68.9%	-4.4%
Foreign	12	11	20	-6.1%	80.6%
Local	144	159	249	9.9%	56.7%
Public health commission corps	24	30	37	21.7%	23.5%
State	705	673	676	-4.6%	0.5%
U.S. federal	1,562	1,689	1,763	8.1%	4.4%
Other government	308	250	185	-18.9%	-25.8%
Total DVMs in government positions	3,249	3,605	3,692	11.0%	2.4%

Table 12

The population of DVMs in the industry has increased by 14 percent between 2008 and 2018. The positive increase has been driven by the high changes observed in agriculture/livestock production medicine during the period 2013-2018 (74 percent), feeds/nutrition companies (36 percent), and laboratories (35 percent) (Table 13).

VETERINARIANS IN INDUSTRIES

	2008	2013	2018	% Change	
				2008/13	2013/18
Agriculture/livestock production	42	116	201	173.8%	74.0%
Business/consulting services	329	280	273	-14.6%	-2.7%
Feeds/nutrition	87	121	164	39.1%	35.6%
Laboratory	116	200	270	73.0%	35.0%
Pharmaceutical/biological	841	1,114	1,301	32.4%	16.8%
Other industry/commercial	1,218	962	788	-21.0%	-18.1%
Total DVMs in industry	2,632	2,793	2,997	6.1%	7.3%

Table 13

Not-for-profits have witnessed a massive entry of DVMs. During the period 2008-2018, the number of DVMs employed in not-for-profit organizations has increased by approximately 136 percent. Looking at the recent five years (2013-2018), foundation/charitable organizations have witnessed a 130 percent increase in their population, humane organizations an 84 percent increase, and zoo/aquarium a 54 percent increase. Not all not-for-profits benefited from the entry of DVMs; missionary and wildlife groups have declined by 35 percent and 15 percent, respectively, between 2013 and 2018 (Table 14).

VETERINARIANS IN NOT-FOR-PROFIT ORGANIZATIONS

	2008	2013	2018	% Change	
				2008/13	2013/18
Foundation/charitable organization	15	49	113	223.1%	130.4%
Humane organization	269	523	962	94.7%	83.8%
Membership assn/professional society	101	98	100	-2.0%	1.2%
Missionary/service	26	30	19	12.7%	-35.1%
Wildlife	164	149	125	-9.6%	-15.5%
Zoo/aquarium	107	187	288	74.6%	54.0%
Total DVMs in not-for-profit organizations	682	1,036	1,608	51.9%	55.2%

Table 14

Figure 53 shows the percentage change in the number of veterinarians with each type of board certification between 2008 and 2018. In 2018, a total of 7,036 were identified to be diplomate in one or more of these areas of certification. This corresponds to an increase of 15 percent of total diplomates since 2008. Emergency and critical care medicine has the highest increase. The number of DVMs who obtained this certification has increased by 32 percent between 2008 and 2013 and by 63 percent between 2013 and 2018. The second highest change comes from zoological medicine, from which the number of diplomates increased from 75 DVMs in 2013 to 98 in 2018, equivalent to a 31 percent change in the number.

DISTRIBUTION OF VETERINARIANS BY SPECIALTY BOARD

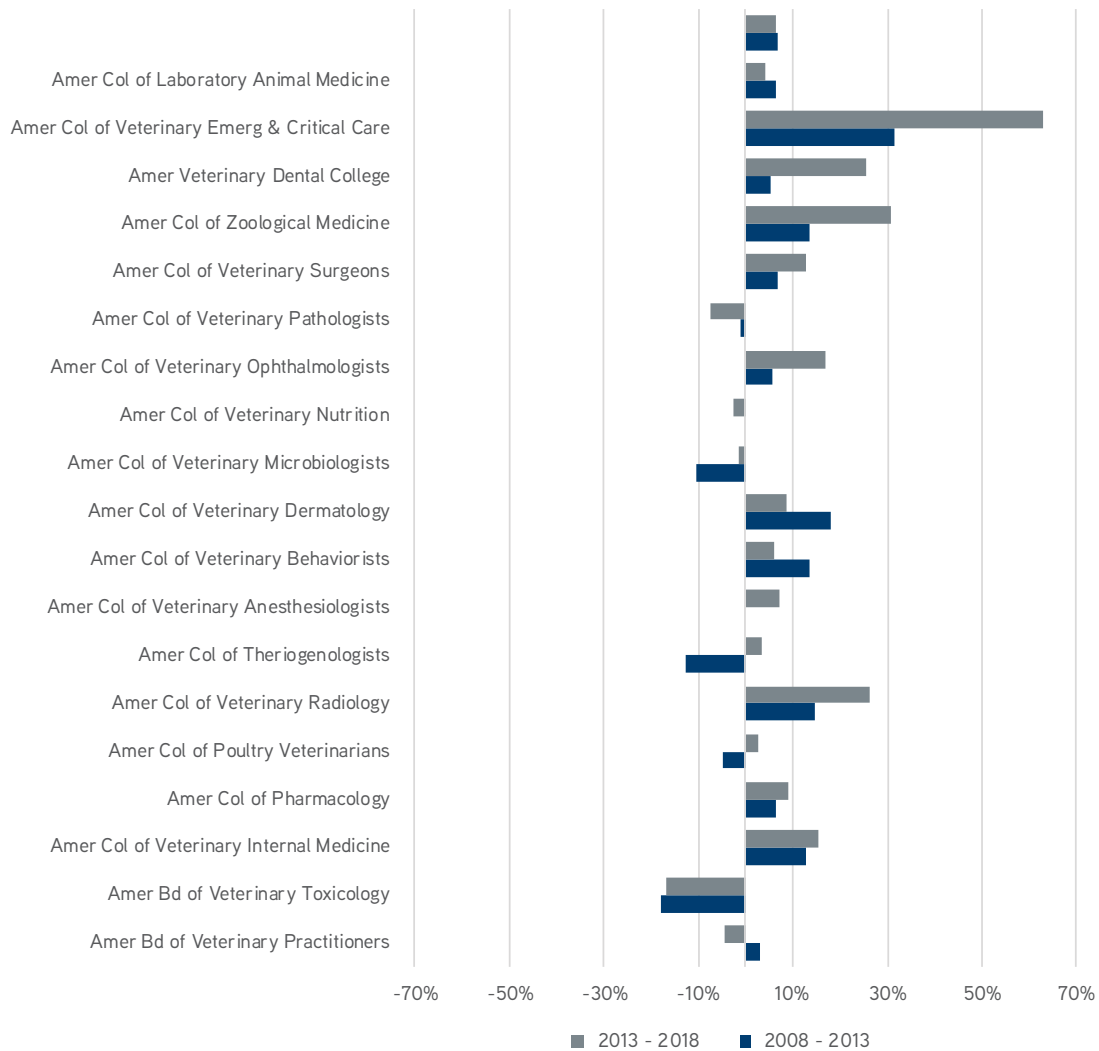


Figure 53

The age distribution of diplomates is presented in Figure 54. The statistics show that 56 percent of diplomates have 50 years of age or more with 24 percent being 60 years old or above. Only 15 percent of all diplomates have less than 40 years. This implies that our diplomates are getting older, and efforts should be undertaken to ensure that the retirement of the older diplomates will not create a shortage situation of diplomates.

AGE DISTRIBUTION OF DIPLOMATES

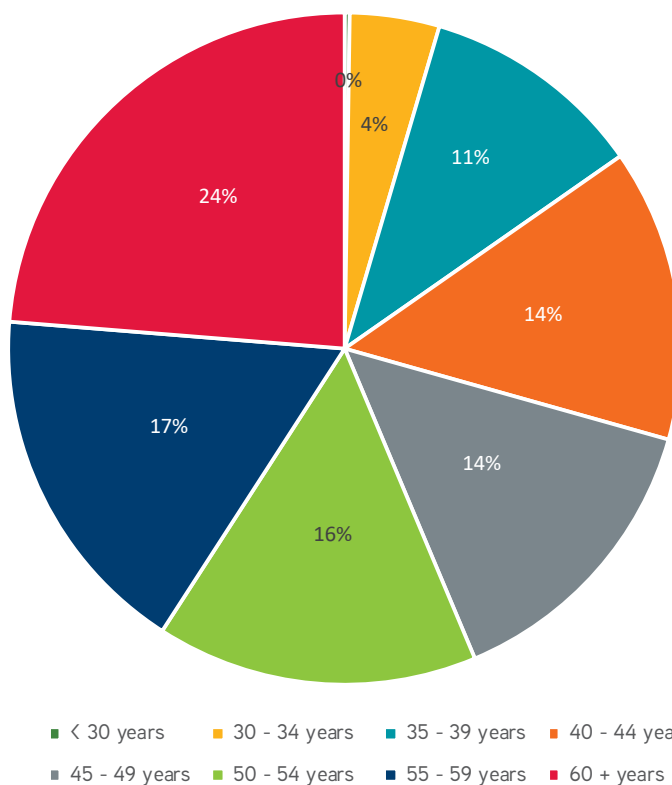


Figure 54

Hours worked per week vary substantially across practice type. In 2018, while food animal, mixed, and companion animal practices had on average around 50 hours of operation per week, equine practices typically operated 61 hours weekly, and exotic/specialty practices on average operated 40 hours per week (Figure 55).

MEAN HOURS WORKED PER WEEK

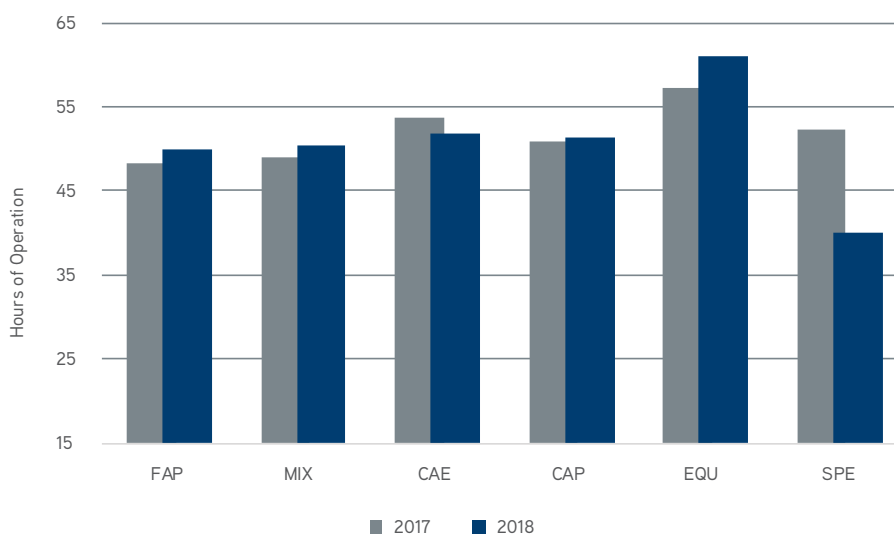


Figure 55

Veterinary practice

Key statistics about veterinary practices including the mean number of exam rooms per type of practice, the average number of DVM and non-DVM full-time equivalents (FTE) per practice, the average number of operation days per week, and the mean revenues per practice are discussed in this section. In addition, a new segment focused on practice expenses is added in this report. Data for this analysis comes from the 2018 AVMA Capacity Survey. The Capacity Survey was sent to a random sample of 16,000 members of the AVMA electronically with a response rate of 16 percent.

The number of exam rooms per practice is on average around 3 rooms for small and mixed animal practices and 1.6 for equine practices (Figure 56).

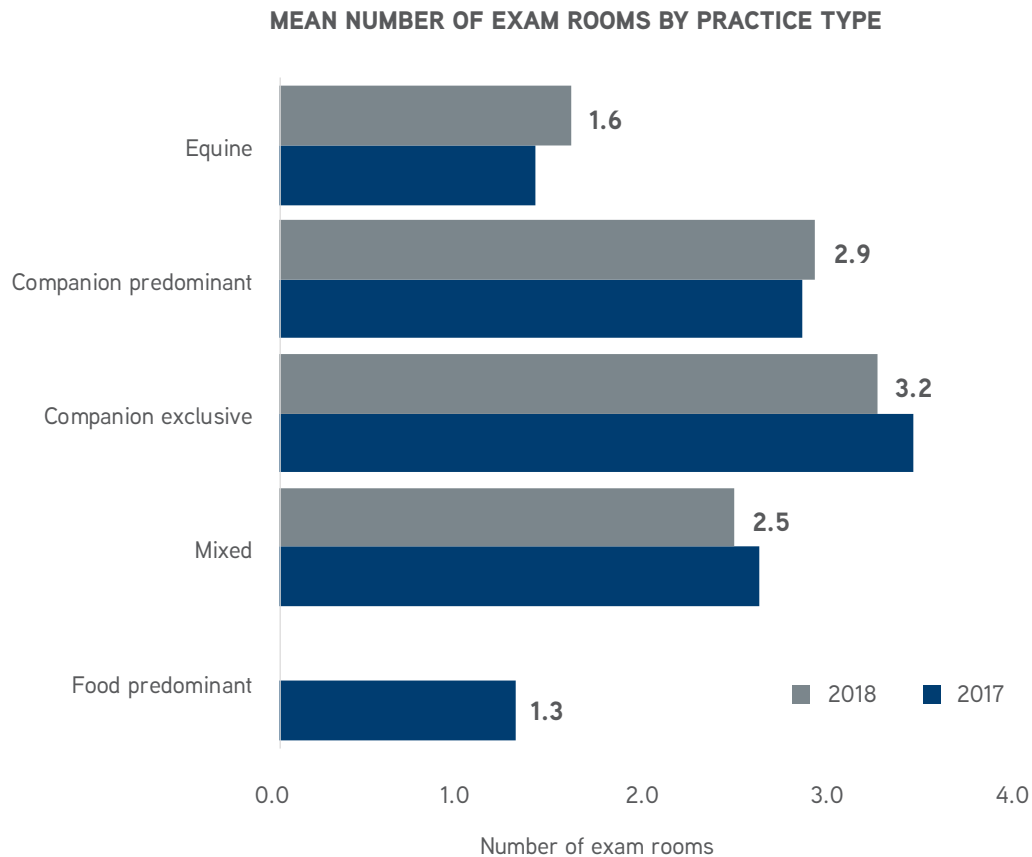


Figure 56

The mean number (and their standard deviations) of DVMs, certified technicians (CVT), non-certified technicians (NCVT), and non-medical staff (NMS) per practices is presented in Figure 57. For mixed animal practices, the mean number of DVMs has slightly declined, going from 2.7 DVMs in 2017 to 2.4 DVMs in 2018. The mean number of CVTs, NCVTs, and NTSs for these types of practices in 2018 was 1.1, 1.9, and 2.5, respectively.

Companion animal practices have on average 2 DVMs per practice with between 3 to 5 vet technicians. The number of non-medical personnel is around 3 per practice on average.

Equine practices have on average around 2 DVMs but typically have fewer vet technicians compared to companion and mixed animal practices. A typical equine practice in 2018 had 0.9 CVTs and 1.4 NCVTs (Figure 57).

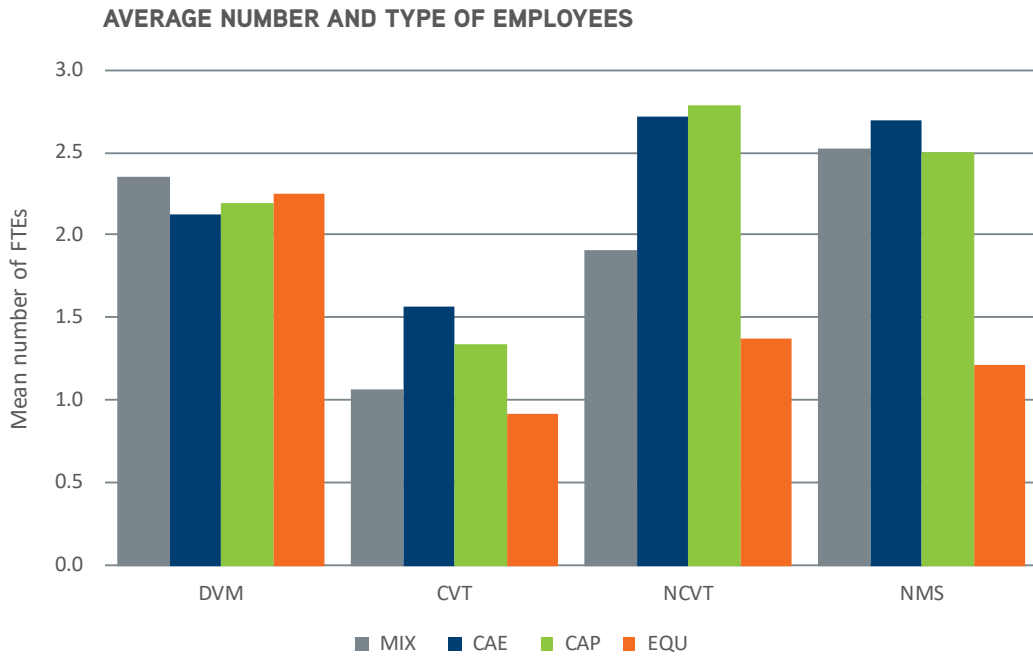


Figure 57

The average number of DVMs per exam room also varies by type of practice. For equine practices, an exam room is typically occupied by 1 DVM whereas for small and mixed animal practices, the mean number of DVMs per exam room is between 1.4 and 2. The mean number of DVMs per exam room seems to be increasing. The statistics show an increasing trend in mean number of DVMs per exam room during the last two years (Figure 58).

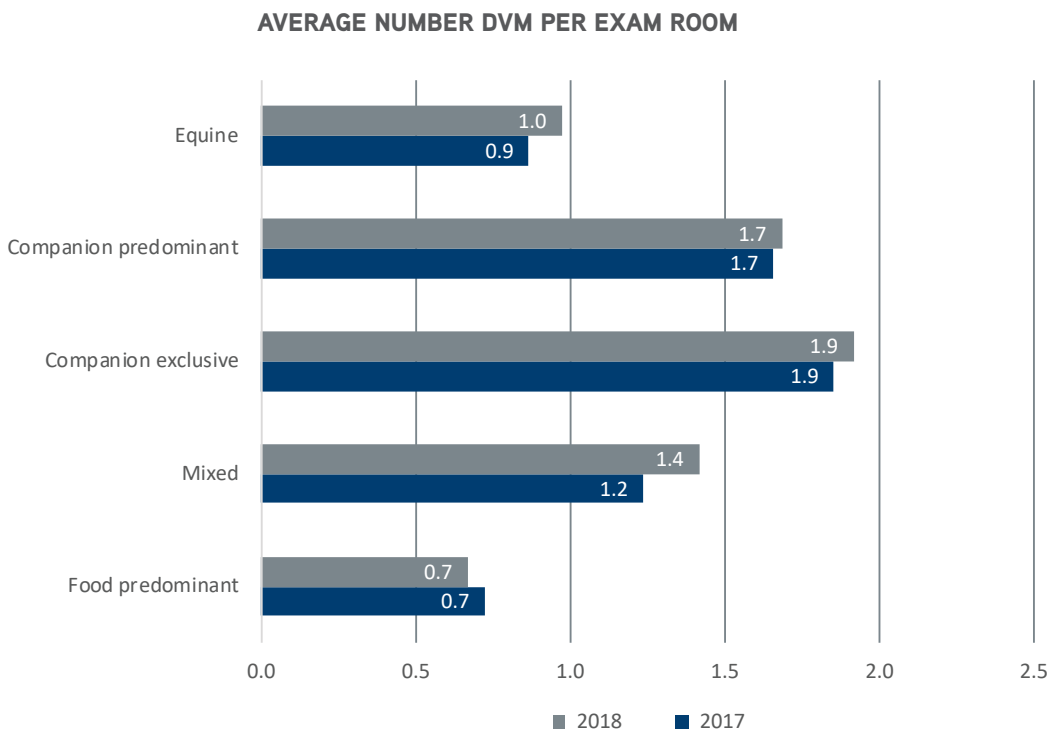


Figure 58

The DVM-to-non-DVM ratio also varies across type of practice. The results indicate that the ratio was around 1:4 for companion animal practices, 1:2.5 for equine practices, and 1:2.8 for mixed animal practices in 2018 (Figure 59).

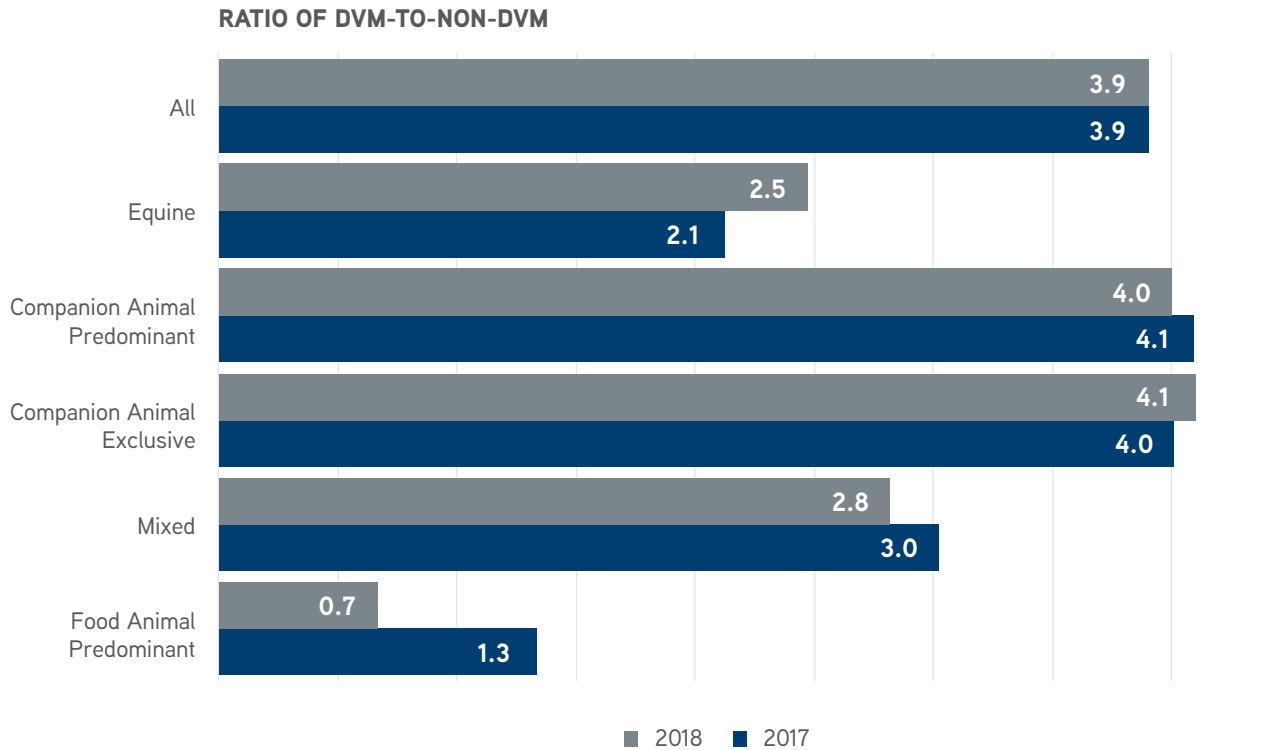


Figure 59

In terms of ratio of DVM-to-CVT, the summary statistics show that for companion animal practices, the ratio in 2018 was approximately 1:0.6, and 1:0.4 for both mixed animal and equine practices (Figure 60).

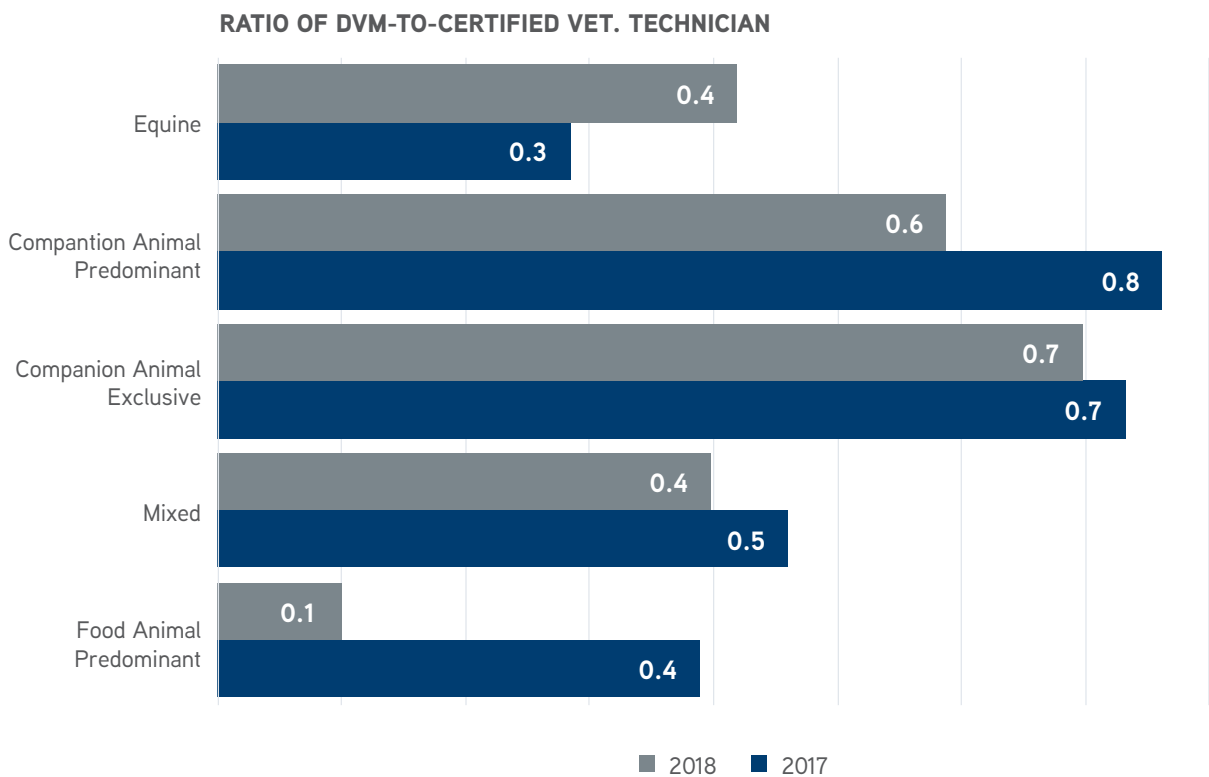


Figure 60

The ratio of DVM-to-NMS is presented in Figure 61. For companion animal practices, there are on average around 2 non-technical staff associated with each DVM. The ratio is 1.4 for equine and mixed animal practices.

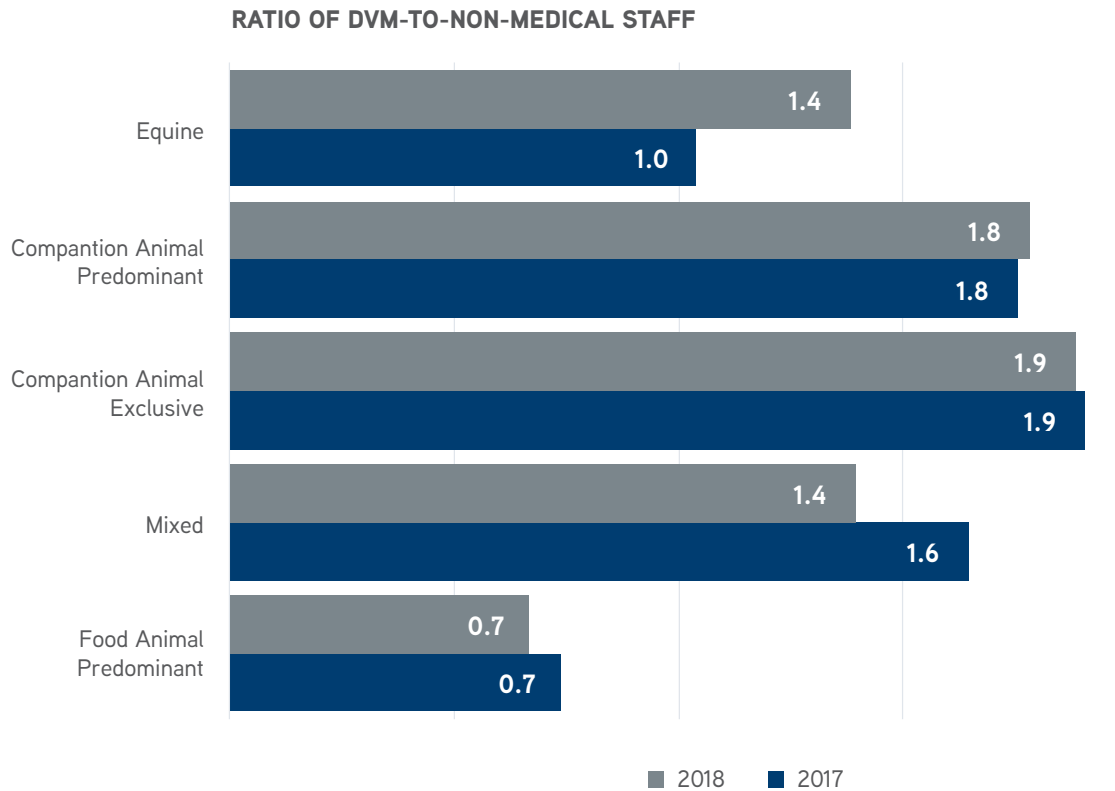


Figure 61

The average revenue per practice varies between \$300,000 and \$1.2 million. Companion animal (exclusive) practices have constantly maintained the highest mean revenue among all practices. However, their mean revenue has slightly declined compared 2017. Most practices except companion animal (exclusive) and equine have witnessed an increasing trend in their mean practice revenue between 2017 and 2018. Food animal (exclusive) has the lowest mean practice revenue (\$369,448) (Figure 62).



The average revenue per practice varies between \$300,000 and \$1.2 million.

MEAN REVENUE PER TYPE OF PRACTICE

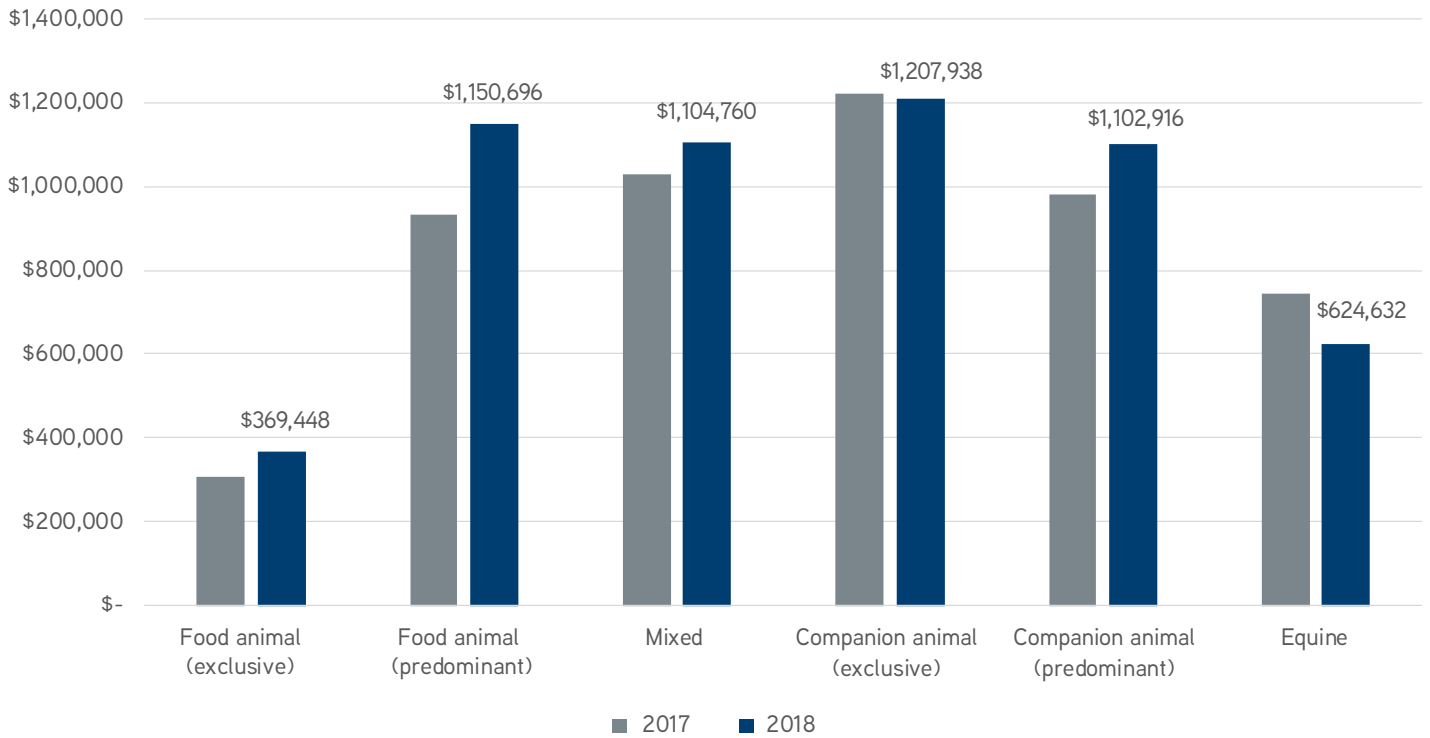


Figure 62



Expenses excluding owner compensation represent 50 to 65 percent of practice revenues. Table 15 lists common expense items and their share of practice revenue across different types of practices. For instance, non-owner salary and bonuses represent about 6 percent of mixed animal practice revenue, 7 percent of companion exclusive practice revenue, and 5 percent of equine practice revenue.

In general, drugs and medical supplies use approximately a quarter of the practice revenue. If we assume that owner compensation could use up to 25 percent of the revenue, we can conclude that salaries and bonuses represent approximately 35 to 45 percent of the practice revenue.

PRACTICES AND PRACTICE EXPENSES

	All	Food Animal Exclusive	Food Animal Predominant	Mixed	Companion Animal Exclusive	Companion Animal Predominant	Equine
Operating expenses	Percentage of Total Revenue						
Non-owner salary	6.5%	2.4%	3.0%	6.2%	7.1%	5.8%	5.3%
Non-veterinary salary	14.4%	3.0%	4.0%	10.5%	16.3%	15.5%	5.1%
Pension and profit sharing	0.6%	0.1%	0.3%	0.5%	0.7%	0.4%	0.5%
Payroll taxes	3.6%	5.1%	3.4%	3.0%	3.7%	4.3%	1.9%
Insurance	2.0%	3.0%	1.2%	1.9%	2.0%	1.5%	2.7%
Drug and medical supplies	19.9%	35.2%	27.3%	29.0%	17.3%	21.0%	22.6%
Pet food/feed products	2.1%	0.0%	2.4%	1.9%	2.3%	2.4%	1.0%
Lab and radiology fees	3.1%	1.0%	1.7%	1.7%	3.6%	2.5%	3.0%
Office rent	1.9%	0.4%	0.8%	1.0%	2.2%	2.4%	0.3%
Equipment rental	0.4%	0.0%	0.0%	0.6%	0.3%	0.5%	0.6%
Building/equipment R&M	1.0%	0.2%	0.7%	1.0%	1.0%	0.8%	0.9%
Property taxes and insurance	1.0%	0.6%	0.6%	0.7%	1.1%	1.0%	1.0%
Vehicle lease or expenses	0.7%	1.8%	2.0%	1.6%	0.4%	0.4%	2.8%
Telephone and utilities	1.2%	1.3%	1.2%	1.1%	1.2%	1.2%	1.1%
Office supplies	1.1%	0.3%	0.6%	0.8%	1.2%	1.1%	0.8%
Accounting and legal fees	0.5%	0.7%	0.5%	0.4%	0.5%	0.6%	0.7%
Promotion and advertising	0.6%	0.3%	0.2%	0.5%	0.7%	0.4%	0.3%
Cont. education expenses	0.4%	0.2%	0.3%	0.4%	0.4%	0.4%	0.8%
Interest paid on liabilities	0.7%	0.0%	0.7%	0.7%	0.7%	0.7%	0.6%
Miscellaneous	2.0%	0.0%	2.2%	2.1%	2.1%	1.4%	2.6%
Total	63.6%	55.6%	53.0%	65.6%	64.7%	64.3%	54.5%

Table 15

Excess capacity (EC) occurs in a production facility when the amount produced is less than the amount that is achievable under the current resource endowment. Such a situation could imply inefficiencies in the production units, but it may also indicate that the market demand for the product is below the quantity that the production unit could supply. To investigate the level of excess capacity in the veterinary practices, a set of questions was added to the Capacity Survey. The questions are divided into two parts, emphasizing the two scenarios that could face the practice owners.

For the first scenario, it is assumed that (1) there are no changes in the way the practice is organized, (2) there are no changes in the number of veterinarians or support staff, and (3) there are no changes to the physical structure of the practice. The second scenario assumed that (1) the practice manager can hire additional well-trained veterinarians, technicians and support staff, but (2) the physical structure of the facility remains unchanged. The question being asked now is, "If there were an unlimited supply of clients and patients, by what percent could your practice increase the number of patients per week relative to the current number of patients your practice typically receives per week?" The responses by type of practice are summarized below and provides a comparison between 2017 and 2018. Only the summary statistics for the first scenario are presented since it reflects the definition of excess capacity.

A distribution skewed to the left is desirable. In fact, such distribution indicates that most of the practices are able to produce at or near optimality or full capacity. The results indicate that in general, EC has improved in 2018 compared to 2017. For year 2017, about 24 percent of large animal practice owners revealed having an EC of 50 percent or more while in 2018 only 14 percent revealed having such a rate of EC (Figure 63). For companion animal practices, levels of EC 50% or more declined from 17 percent to 11 percent (Figure 64). For equine practices, the percentage of practices with revealed EC of 50 percent or more has slightly increased from 18 percent in 2017 to 19 percent in 2018 (Figure 64).

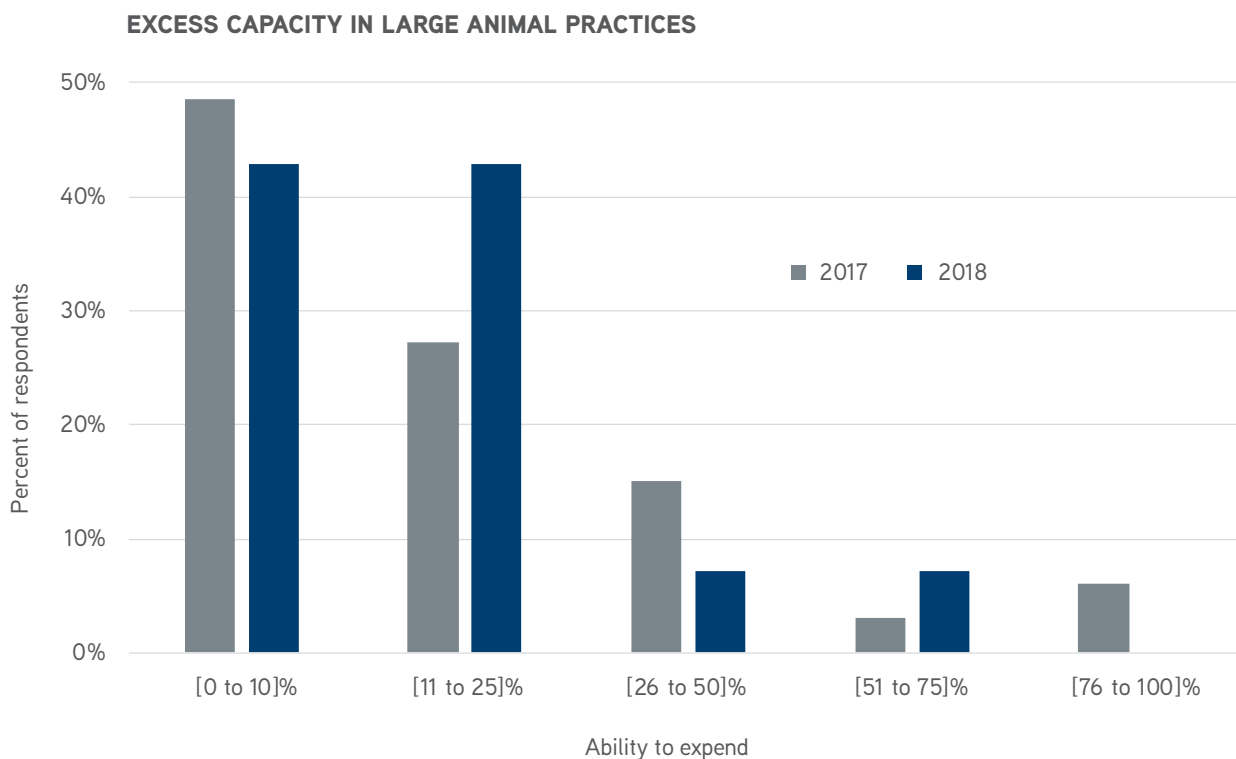


Figure 63

EXCESS CAPACITY IN COMPANION ANIMAL PRACTICES

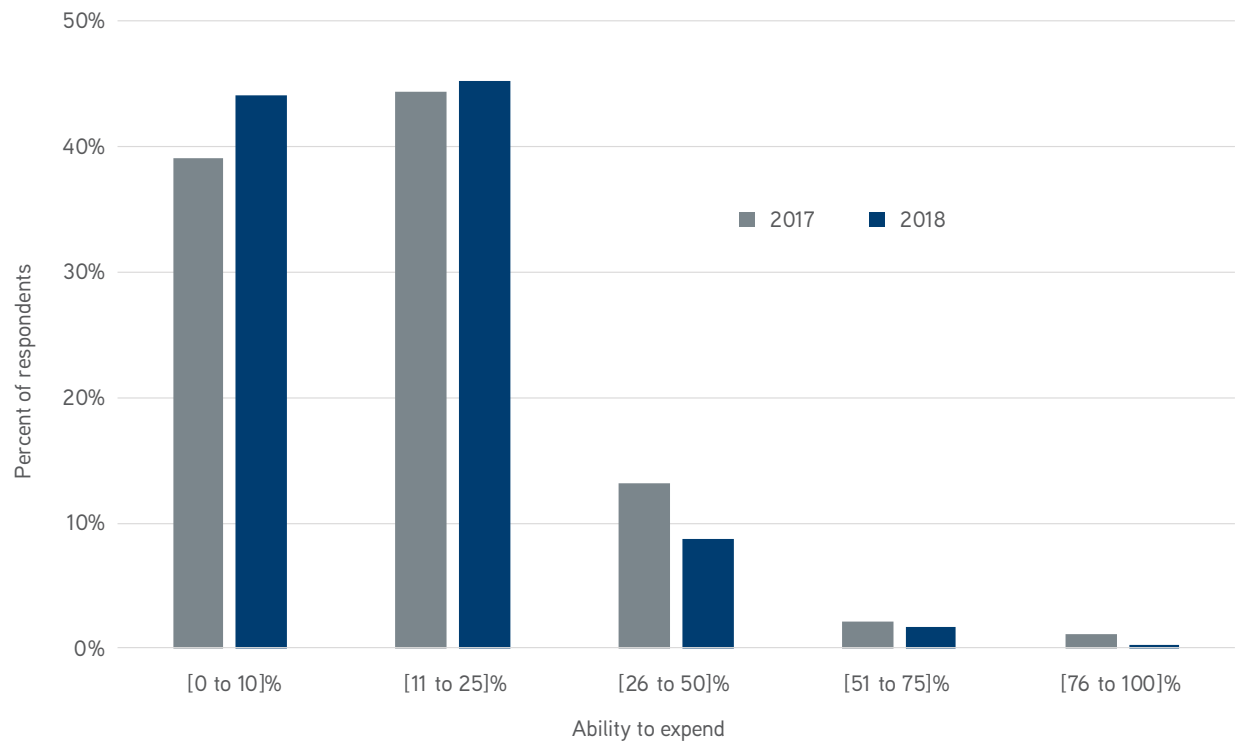


Figure 64



EXCESS CAPACITY IN EQUINE PRACTICES

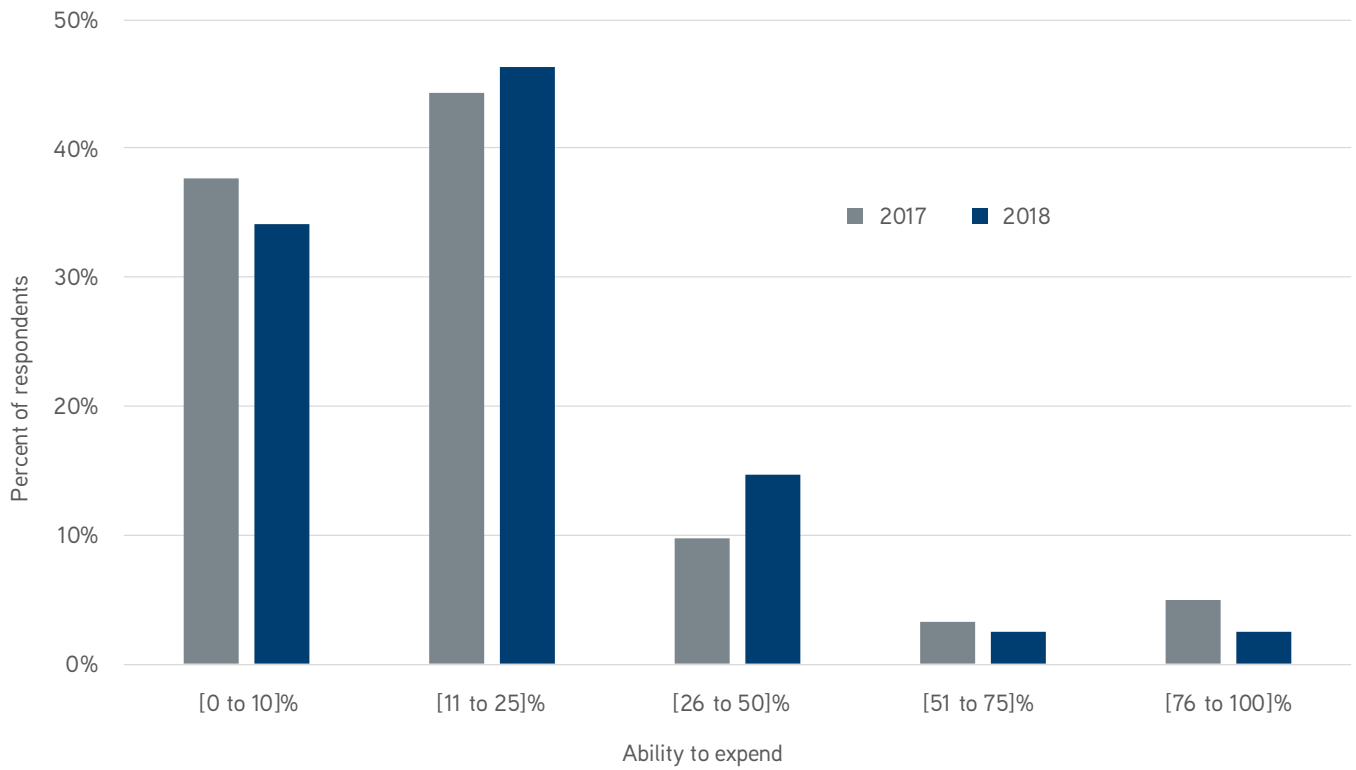


Figure 65

EXCESS CAPACITY IN MIXED ANIMAL PRACTICES

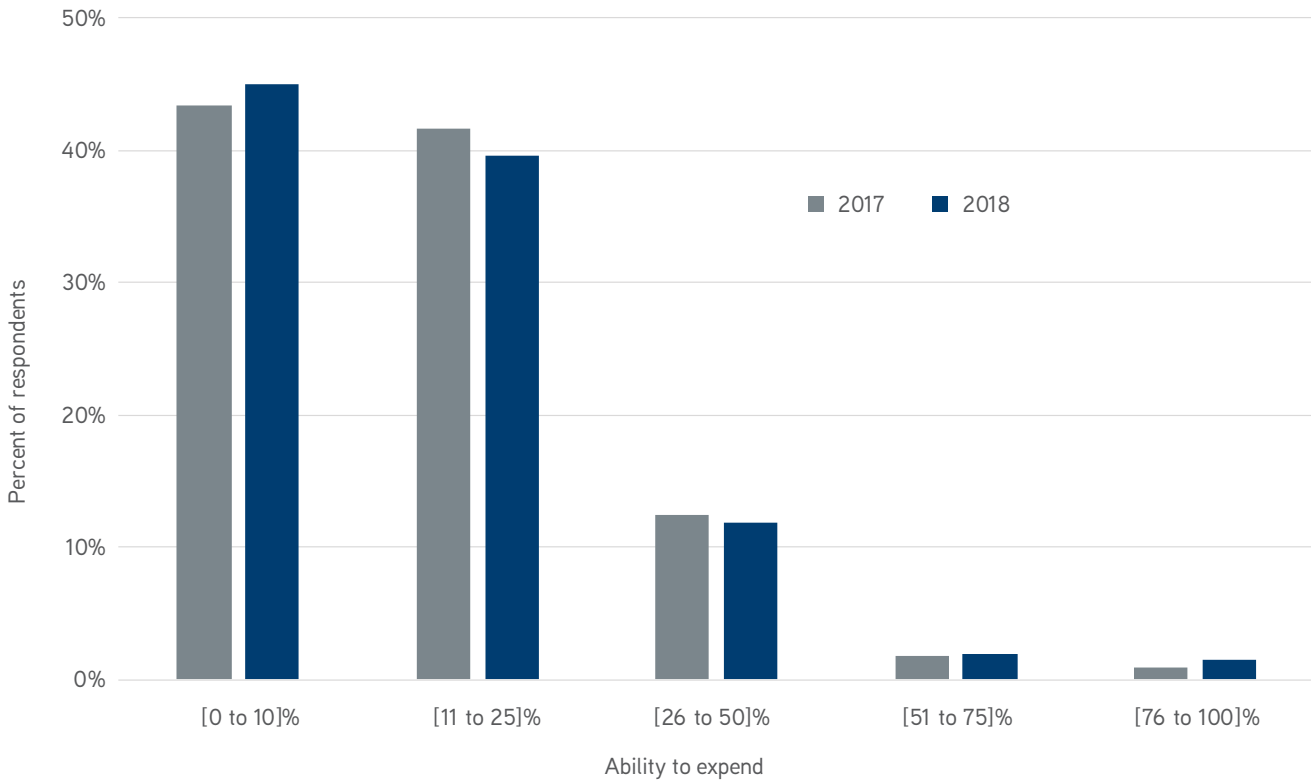


Figure 66

Veterinary services

According to the U.S. Census Bureau statistics, there were approximately 31,000 veterinary establishments in the U.S. at the year-start of 2017. According to the U.S. Census Bureau, a veterinary establishment is “a single physical location” at which animal health care service is provided. This definition is different than the definition of a veterinary practice which might have many locations (establishments). States with the highest number of establishments are California, Texas, New York, Illinois, Florida, Ohio, Pennsylvania, and North Carolina. Among the states with low numbers of establishments are Alaska, Wyoming, North Dakota, South Dakota, and West Virginia (Figure 67).

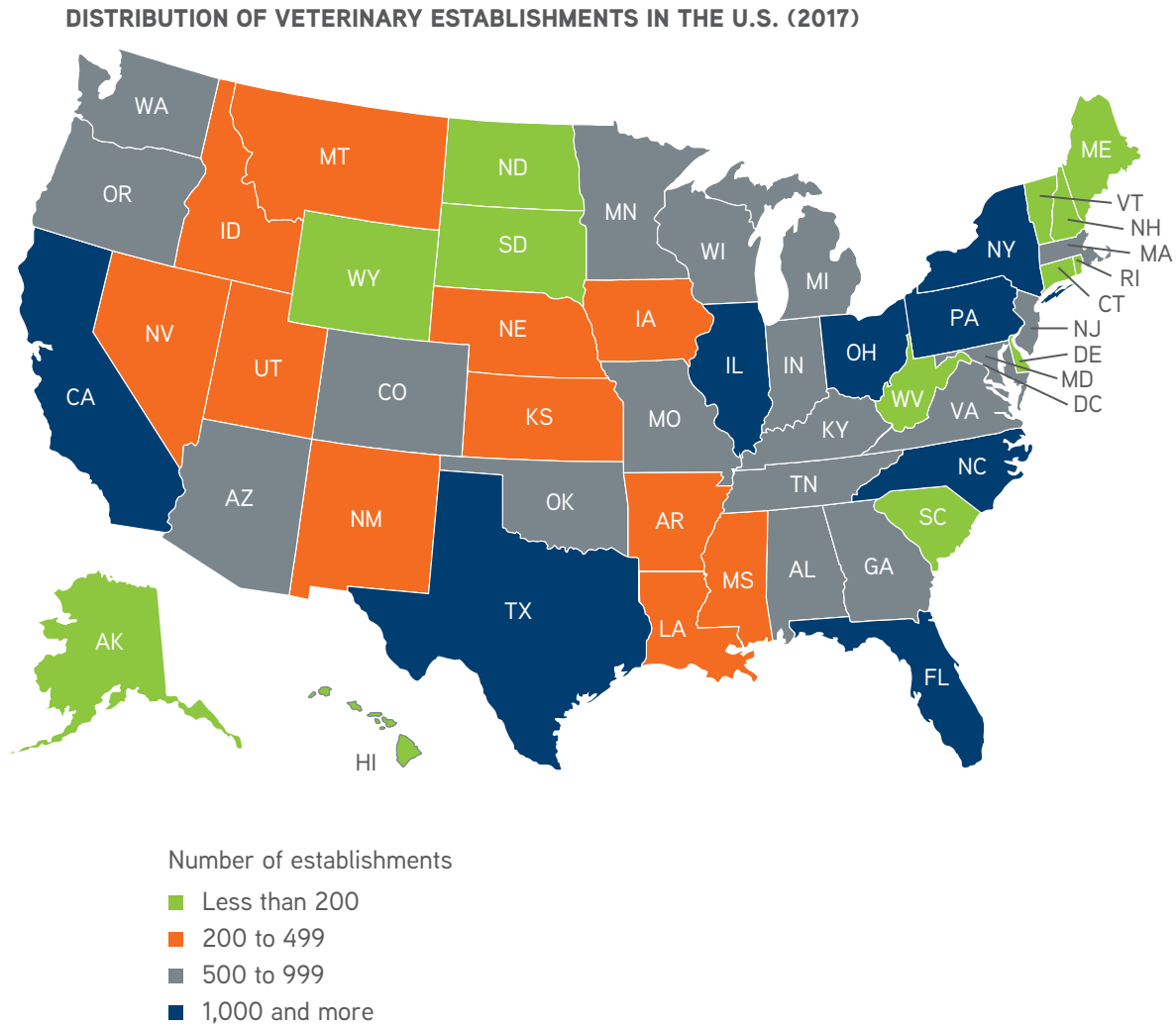


Figure 67

The ratio of establishment to household units captures the total number of households per veterinary establishment. The results indicate that the majority of states have a ratio of 1 establishment for 4,000 to 5,000 household units. New York and Delaware have the highest ratio of 1 establishment for at least 6,000 household units (Figure 68).

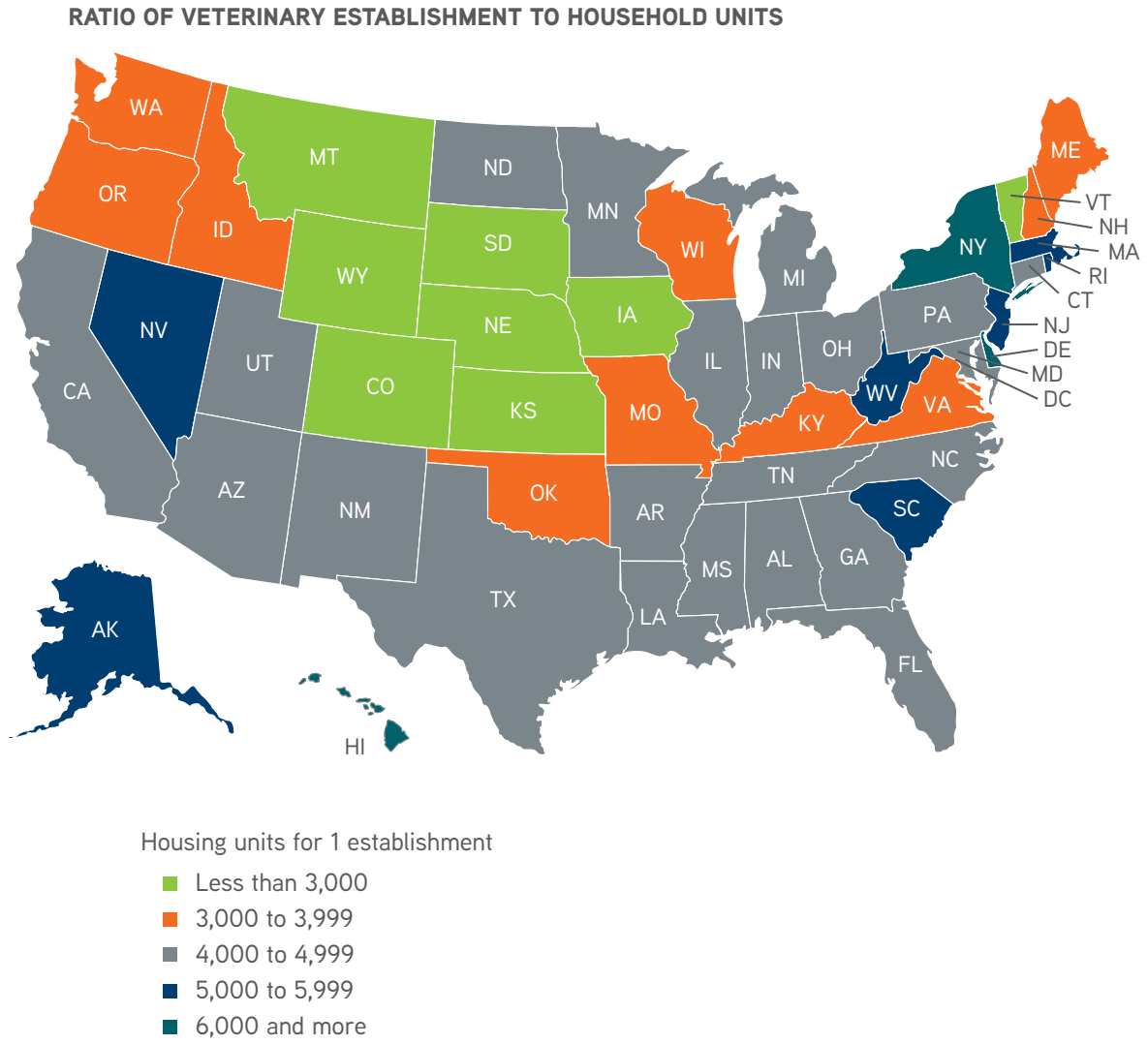


Figure 68

The ratio of DVM to household shows the number of household units covered by each DVM. The results show that in most states, the ratio is 1 DVM for 1,000 to 2,000 household units. The majority of states with the lowest ratios are located in the West North Central Region. West Virginia and Delaware have the highest ratios (Figure 69).

RATIO OF DVM TO HOUSEHOLD UNITS

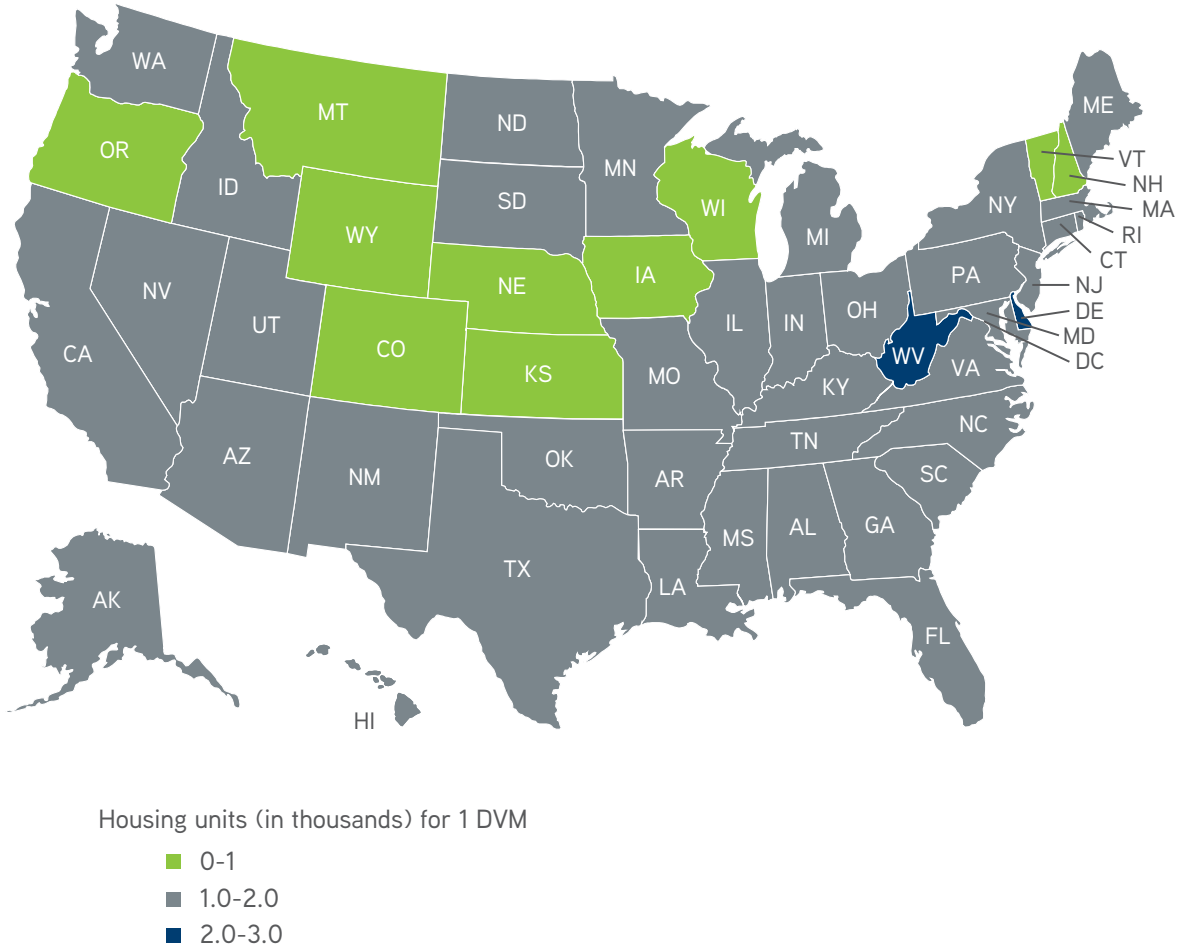


Figure 69

SUMMARY & ADDITIONAL READING

Overall, the economic state of the profession is strong, largely in part due to an expanding economy. The market for veterinarians continues to improve from the impacts of the 2008 recession and is considered quite 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. This reliance of the profession on the overall health of the economy will strongly influence the economic future of veterinary medicine over the next two years, as some economists predict a slowing economy.

The body of knowledge in the economics of the veterinary profession continues to expand at rapid rates. Indeed, the pace of growth in big data, technology, and innovations seem to out-pace our ability to use this knowledge to improve the overall performance and economic viability of the veterinary profession. The AVMA has responded by creating the Veterinary Economics Division in addition to volunteer groups - the Veterinary Economics Strategy Committee (VESC) and the Economic Research Advisory Council (EARC) - to address economic matters strategically.

As part of the economic strategy, a number of topic areas and issues rise to the top of the priority list. This includes issues related to economic resiliency (e.g., student debt, practice efficiency, staff utilization), access to care (e.g., alternative pricing and business models, addressing affordability of care), and consumer/pet-owner demand (e.g., consumer attitudes and preferences for veterinary care). A partial list of recommended reading and available tools to enhance your understanding of the economics of the veterinary profession and helpful resources are provided:

Appendix

2018 CENSUS OF VETERINARIANS KEY INDICATORS 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 respondent experience	Percentage female
0	Mean	-10.39	\$102,762.00	26.45	4.91%	0.17	12.20	76.20%
	N	64	232	241	13		265	
	Std. deviation	17.28	\$65,885.00	6.11			11.42	
1	Mean	-6.09	\$103,486.00	26.78	3.38%	0.18	12.21	72.69%
	N	62	205	218	8		238	
	Std. deviation	15.47	\$62,980.00	6.99			12.18	
2	Mean	-8.16	\$102,168	25.75	3.72%	0.18	13.03	76.09%
	N	85	291	306	12		323	
	Std. deviation	12.41	\$56,382.00	6.53			11.31	
3	Mean	-8.98	\$97,024.00	26.09	4.35%	0.30	12.36	70.23%
	N	81	265	275	13		298	
	Std. deviation	17.25	\$58,318.00	7.19			11.78	
4	Mean	-7.99	\$96,622.00	26.05	2.00%	0.19	11.74	76.40%
	N	73	226	238	5		250	
	Std. deviation	13.33	\$62,680.00	6.99			11.85	
5	Mean	-5.87	\$98,607.00	25.99	2.19%	0.40	11.85	73.13%
	N	80	203	211	5		227	
	Std. deviation	15.68	\$58,583.00	6.53			11.92	

Region of workplace	Statistic	Change in hours desired	Total personal income	Burnout score	Unemployed in veterinary medicine	S/D ratio (externally sourced)	Years of respondent experience	Percentage female
6	Mean	-6.57	\$94,830.00	26.20	2.46%	0.20	11.84	69.95%
	N	61	179	192	5		203	
	Std. deviation	13.78	\$59,637.00	6.22			12.29	
7	Mean	-9.66	\$111,010.00	25.77	3.36%	0.22	12.10	67.79%
	N	92	266	277	10		298	
	Std. deviation	13.33	\$69,617.00	6.77			12.56	
8	Mean	-9.10	\$98,425.00	26.67	4.28%	0.18	11.46	76.17%
	N	79	215	233	11		255	
	Std. deviation	14.01	\$62,676.00	6.91			11.46	
9	Mean	-6.25	\$106,565.00	26.70	3.52%	0.14	11.46	82.58%
	N	112	348	364	14		396	
	Std. deviation	14.51	\$62,930.00	6.46			10.92	
Total	Mean	-7.89	\$101,688.00	26.24	3.48%	0.11	12.03	73.93%
	N	789	2430	2555	96		2753	
	Std. deviation	14.71	\$62,201.00	6.68			11.71	

Table 16



As the economy has improved and household incomes have risen, so too has the demand for veterinary services and, hence, the demand for veterinarians.



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