



2018 AVMA & AAVMC Report on

# THE MARKET FOR VETERINARY EDUCATION







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Veterinary Economics Division  
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# CONTENTS

<b>6 SUMMARY</b>	
6	How much?
6	After graduation
7	Financial rewards
7	Debt for the degree
<b>8 INTRODUCTION</b>	
<b>12 THE APPLICANT POOL FOR VETERINARY COLLEGES</b>	
13	Demand for Veterinary College Seats
14	Applicant-to-Seat Ratio
16	Veterinary Colleges Supply of Seats
19	The Applicants' Estimate of the DVM Debt
21	The 2017 Graduating Class
<b>22 DESCRIPTIVE STATISTICS FOR GRADUATES</b>	
<b>28 NEW VETERINARIAN INCOMES</b>	
33	Factors Affecting Incomes of New Veterinarians
<b>36 NEW VETERINARIAN DEBT</b>	
44	Factors Affecting Debt of New Veterinarians
<b>46 NEW VETERINARIAN DEBT-TO-INCOME RATIO</b>	
48	Factors Significant in Explaining the Debt-to-Income Ratio
51	Debt-to-Income Ratio Projections
<b>52 DEBT AND INCOME OF THE 2017 GRADUATING CLASS</b>	
62	Regional Exchanges and State-to-State Arrangements
<b>64 IMPROVING THE DEBT-TO-INCOME RATIO</b>	
65	Historical Perspective
66	Setting a New Target
<b>72 FOREIGN GRADUATES</b>	
<b>76 DISCUSSION</b>	
<b>77 REFERENCES</b>	
<b>77 APPENDIX</b>	

## LIST OF TABLES

Table 1:	Mean GPA for Accepted Students . . . . .	15
Table 2:	Response Rate by Veterinary College 2017 . . . . .	21
Table 3:	Factors Affecting Starting Salaries of New Veterinarians . . . . .	34
Table 4:	The Distribution of Students with More than \$320,000 DVM Debt by College . . . . .	39
Table 5:	Factors Affecting Debt of New Veterinarians . . . . .	45
Table 6:	Factors Affecting the Debt-to-Income Ratio . . . . .	49
Table 7:	Cost of Living Census . . . . .	58
Table 8:	Number of Graduates, Post-Graduation Plans and Mean Debt and Income by School, 2017 . . . . .	62
Table 9:	Debt-to-Income Ratio by School 2017, Full-Time Only . . . . .	66
Table 10:	Debt-to-Income Ratio by School 2017, ALL Graduates . . . . .	67
Table 11:	Total Cost-to-Income Ratio by School, 2017 . . . . .	68
Table 12:	Total Cost plus Interest-to-Income Ratio by School, 2017 . . . . .	69
Table 13:	Debt-to-Cost and Debt-to-Cost plus Interest by School, 2017 . . . . .	70
Table 14:	Debt Below and Above Total Cost plus Interest by School, 2017 . . . . .	71
Table 15:	Clinical Competencies, Expectations and Experience by School . . . . .	78

## LIST OF FIGURES

Figure 1: Regions of the United States . . . . .	10	Figure 28: Mean DVM Debt, Public Practice . . . . .	40
Figure 2: AAVMC Veterinary School Applicant Figures . . . . .	13	Figure 29: Mean Starting Salaries & Debt of New Veterinarians . . . . .	41
Figure 3: Applicant Demand, 2015, 2016 & 2017 . . . . .	14	Figure 30: Mean Debt by Gender . . . . .	41
Figure 4: VMCAS Applicants and First-Year Seat, U.S. and International Institutions . . . . .	14	Figure 31: U.S. Veterinary Colleges Tuition and Fees . . . . .	42
Figure 5: U.S. Veterinary Graduates, All Sources . . . . .	16	Figure 32: Resident and Non-Resident Debt . . . . .	43
Figure 6: Supply of Veterinary Education Tuition & Fees and Total Cost 2017 . . . . .	17	Figure 33: Debt of All Students vs. Only Students with Non-Zero Debt . . . . .	43
Figure 7: Supply and Demand for Veterinary Education, 2016 & 2017 . . . . .	18	Figure 34: New Veterinarians with No DVM Debt . . . . .	44
Figure 8: Supply of Veterinary Education Cost for 2017 Grads . . . . .	18	Figure 35: Real Indexed DVM Debt & Unweighted Debt . . . . .	44
Figure 9: Applicants' Estimate vs. Actual Debt Load of 2016 Graduates . . . . .	19	Figure 36: Debt-to-Income Ratio Measures . . . . .	47
Figure 10: DVM Graduates Receiving Offers from Jobs or Advanced Education . . . . .	23	Figure 37: Debt-to-Income Ratio by Post-Graduate Plans . . . . .	47
Figure 11: Distribution of New Veterinarians . . . . .	23	Figure 38: Debt and Income: Graduates of U.S. Colleges with Full-Time Employment . . . . .	51
Figure 12: Distribution of New Veterinarians, Private Practice . . . . .	24	Figure 39: Debt and Income: Graduates of U.S. Colleges with Full-Time Employment, Historic and Projections . . . . .	51
Figure 13: Distribution of New Veterinarians, Public Practice . . . . .	25	Figure 40: Distribution of Debt, 2017 . . . . .	53
Figure 14: Distribution of New Veterinarians Private, Public Practice and Internships . . . . .	25	Figure 41: Distribution of Starting Salary, 2017 . . . . .	53
Figure 15: Species Focus of Internship . . . . .	26	Figure 42: Salaries 2015 Grads One Year Out . . . . .	54
Figure 16: Distribution of New Veterinarians in Advanced Education . . . . .	26	Figure 43: Distribution of Debt-to-Income Ratio, 2017 . . . . .	55
Figure 17: Mean Starting Salaries of New Veterinarians . . . . .	29	Figure 44: Debt and Income of 2017 Graduating Class . . . . .	55
Figure 18: Distribution of Starting Salaries for New Veterinarians . . . . .	29	Figure 45: Distribution of Debt and Income of 2015 Grads One Year Out . . . . .	56
Figure 19: Mean Starting Salaries, Private Practice . . . . .	30	Figure 46: 2017 Mean Reported Debt by School . . . . .	56
Figure 20: Mean Starting Salaries, Public Practice . . . . .	31	Figure 47: Mean DVM Debt over Discount Tuition by School, 2017 . . . . .	57
Figure 21: Mean Starting Salaries, Advanced Education . . . . .	31	Figure 48: Mean DVM Debt over Non Discount Tuition by School, 2017 . . . . .	58
Figure 22: Indexed Real Income & Nominal Income of New Veterinarians . . . . .	32	Figure 49: Mean DVM Debt over Discount Tuition by School and Cost of Living, 2017 . . . . .	60
Figure 23: Impact of Real GDP and N on Income . . . . .	35	Figure 50: Mean Debt over Non-Discount Tuition by School and Cost of Living, 2017 . . . . .	61
Figure 24: Debt of New Graduates Mean of All Debt vs. Mean of Non-Zero Debt . . . . .	37	Figure 51: Net Tuition as a Percent of Public Higher Education Total Educational Revenue, U.S., FY 1992-2017 . . . . .	65
Figure 25: Difference in Mean Debt Between All Graduates and Only Those with Non-Zero Debt . . . . .	37	Figure 52: DVM Debt of Foreign Graduates . . . . .	73
Figure 26: DVM Debt by Post-Graduate Plans . . . . .	38	Figure 53: Starting Salary of New Graduates . . . . .	73
Figure 27: Mean DVM Debt, Private Practice . . . . .	39	Figure 54: Distribution of DIR of 2017 Foreign Grads . . . . .	74
		Figure 55: Mean and Median Debt of 2017 Graduates with Non-Zero Debt . . . . .	75

# SUMMARY

As the preceding Table of Contents suggests, this latest look by the AVMA Economics Division at the market for veterinary education explores topics concerning the supply of and demand for “seats” in schools of veterinary medicine, as well as looks at the group of students that recently occupied those seats.

Through a collaboration with the Association of American Veterinary Medical Colleges (AAVMC), AVMA gathers applicant information from the Veterinary Medical College Application System (VMCAS) and from the veterinary colleges data on tuition, fees and estimated living expenses.

Trends associated with the careers and finances of new veterinarians are examined in the *2018 AVMA & AAVMC Report on the Market for Veterinary Education*, with a critical focus on the debt situation that figures so prominently in scholastic fields across our society, and which has certainly been an acute concern within the veterinary profession.

Reaching back into the “supply chain” that represents the process by which aspiring veterinarians are transformed into practicing professionals, the analysis rendered begins with observations of the applicant pool – those seeking admittance to the AVMA-accredited domestic and foreign schools of veterinary medicine. Looking at the pipeline to the schools offers insight into how the supply is being developed – in response to perceived demand, or otherwise.

Apparently, that pipeline has become pretty well populated: The report’s analysis of applicant volumes finds the number of applicants in 2017 and 2018 on an upswing, with 7,076 applicants in 2017, and 7,507 applicants vying for a 2018 seat – the highest number of applicants in more than 40 years, and a continuation of an ascending trend since what 2015 figures reflected.

And, finds the report, the quality of the applicant pool remains robust: GPA or GRE scores and the North American Veterinary License Exam pass rate levels have been steady in recent years – with a constant pre-vet GPA of 3.6 prevailing.

## HOW MUCH?

In working to understand the demand for a veterinary education, the AVMA Economics Division taps the VMCAS in surveying veterinary college applicants to gauge what they are willing to pay for their veterinary education: An aggregation of responses

offers answers to questions about the demand for veterinary education, including how the demand is affected by the price of such an education.

Although in 2014 more than half of applicants were willing to pay up to \$150,000 for a veterinary education, in 2015 and 2016, 37.1 percent and 40.2 percent of applicants, respectively, were willing to go to that level. New data reveal that in 2017 only slightly more than a quarter (27 percent) of applicants were willing to do so.

Analysis finds the applicant-to-seat ratio over four years showing a modest increase, from 1.6 in 2015 to 1.8 for 2018 applicants. In 2016 6,667 applicants vied for 4,039 available seats, yielding an applicant-to-seat ratio of 1.65; in 2017 there were 7,076 applicants and 4,126 available seats, producing a 1.72 applicant-to-seat ratio. In 2017, there were 7,507 applicants seeking some 4,200 seats for the Fall 2018 semester, equating to an applicant-to-seat ratio of 1.78.

The survey data finds that what 2017 applicants (2021 graduates) indicated they were willing to pay for a seat at a veterinary college is much less than the actual cost of the seats. And debt levels suggest that there is a disconnect between what applicants report as their willingness to pay and what they end up paying.

Currently, it is estimated that there are slightly more than 4,000 veterinary college seats per year available to U.S. students. U.S. graduates in 2017 encountered tuition and fees ranging from just over \$79,000 to more than \$300,000 for four years of matriculation through the DVM program. The most affordable seats? Those at Purdue available on a discounted tuition basis. Students paying non-discount tuition rates at The Ohio State University saw the priciest seats.

## AFTER GRADUATION

The number of new veterinarians finding post-graduate opportunities has been steadily increasing since 2012, with the number of students in 2017 either finding full-time employment or securing continuing education opportunities, reaching its highest point following the 2007-2009 financial crisis.

The percentage of the 2017 graduating class finding full-time employment or receiving offers to pursue post-graduate education was 93.8 percent. While, however, this is the highest

rate for the period analyzed, it is not significantly different from 2016, which registered 93.1 percent. While the recession had a direct impact on the number of students securing post-employment plans, concludes the report, the economy has been regaining ground.

Of significance, the percent of graduates receiving some type of income opportunity is steadily increasing even though the number of graduates is simultaneously increasing over the period. The number of new veterinarians finding full-time employment jumped from 48.9 percent in 2015 to 54.9 percent in 2016, and to 56.1 percent in 2017, while the number of new veterinarians not finding employment or receiving an invitation to pursue continuing education dropped from 6.9 percent in 2016 to 6.3 percent in 2017.

The majority of new veterinarians continue to report finding full-time employment in the companion animal exclusive sector. New entrants into food animal, companion animal predominant, mixed practice and equine practice have remained nearly steady.

## FINANCIAL REWARDS

From 2001 through 2017, the mean starting salary for new graduates increased from slightly less than \$40,000 to more than \$60,000. While these numbers are inclusive of those finding full-time employment along with those pursuing internships, residencies and advanced education, the climb in salaries has not been steady across all sectors and opportunities.

As previously reported, private-practice veterinarians working full-time have consistently been the highest – compensated group among the class since 2010, with veterinarians in public practice trailing closely. Since 2009, private practice has had the highest starting salaries, though before the 2007-2009 financial crisis salaries in public practice were competitive with these.

Numerous factors, outside of the economy, affect starting salaries, with variances attributed to the number of new veterinarians pursuing internships, the change in the gender distribution among new veterinarians, the change in the distribution of the practice type new veterinarians pursue, and the result of changing one's employment location. The report analysis, for example, indicates that on average new veterinarians entering equine practice will receive a starting salary that is about \$19,000 less than new veterinarians going into a

companion animal exclusive practice, who make over \$35,000 more than new veterinarians entering internships.

## DEBT FOR THE DEGREE

The mean debt of a new veterinarian has increased by an average of \$5,078 each year for nearly two decades now. Considering only the veterinarians with non-zero debt, the mean debt has increased by an average of \$6,219 each year.

The largest factor noted in the increasing debt is the cost of education.

DVM debt incurred by new veterinarians continued to vary by post-graduation plans. Over the period 2001 through 2017, new veterinarians finding employment in public practice consistently had the lowest debt load. Within the 2017 class, of those pursuing public practice, 68 percent had debt between \$12,277 and \$207,050; 68 percent incurred debt between \$37,000 and \$216,000 in 2016, and within the 2015 class, 68 percent incurred DVM debt between \$35,000 and \$198,000.

For the 2017 graduating class, within private practice, two-thirds of graduates had debt between \$48,000 and \$321,000. Comparatively, 68 percent of graduates within private practice had a debt load between \$54,500 and \$232,000 in 2016, while 68 percent of the 2015 graduating class within private practice had a debt load between \$50,000 and \$222,500.

While the number of students with no debt remained relatively constant from 2001 through 2015, with an increasing class size, the proportion has been declining. And, although a decrease in the mean DVM debt was seen in 2017, the growth rate of DVM debt in each veterinary sector has continued to outstrip the growth rate of new veterinarian starting salaries. Interestingly, the real weighted debt-to-income ratio in 2017 is 1.86, down from 2.00 in 2016, in part attributable to more graduates reporting having zero debt, coupled with an increase in starting salaries.

# INTRODUCTION

This report, the latest entry on the subject in what has been a series of annual veterinary economic market reports, provides updates on the market for veterinary education – the first market in the supply chain of the veterinary service industry. An installment that is now a fourth iteration, this report presents updates on the debt and income of new veterinarians, along with information on veterinary college applicants, a breakdown of tuition, fees, living expenses by veterinary college and year, debt and income levels of new veterinarians, demand for and supply of seats and important key performance indicator (KPI), the debt-to-income ratio (DIR).

New to this report is the inclusion of debt and income data on U.S. graduates of foreign veterinary colleges. At present, it is estimated that 19 percent of U.S. citizens enrolled in veterinary college are enrolled at institutions outside the United States and this number has been on the increase. As a result, it is critical to analyze that market, as those returning to the United States to practice will certainly impact the domestic economy.

Also continuing last year's approach to analyzing the market for veterinary education, this report engages the Association of American Veterinary Medical Colleges to produce a joint publication. Through this collaboration, we gather applicant information from the Veterinary Medical College Application System and data on tuition, fees and estimated living expenses is obtained from the veterinary colleges. The primary goal of this partnership is to provide consistent data reporting across multiple channels as well as provide convenient access to data in a single location.

As noted in previous reports, in addition to VMCAS and AAVMC the source of much of this data is AVMA's annual, "senior survey." The senior survey continues to be distributed to graduating veterinary students, weeks before graduation, gathering data on graduates' post-graduation plans, including job offers or continuing education prospects, location, debt levels, practice type and other relevant information. Although these data have been reported for more than a decade, this series of reports is the beginning of AVMA reporting trend data. Consequently, we produce weighted datasets along with an index to measure the economic impact on the market for new veterinarians while controlling for a changing demographic.

Controlling for a changing demographic became critical when analysis revealed that several demographic factors, unrelated to

market forces, affected the starting salary of new veterinarians. Among these are gender, age, practice type, location of place of employment, debt load, and work hours per week. For instance, new female veterinarians earn significantly less than new male veterinarians, holding all else constant. As a result, a profession with an increasing female population may appear to have a decreasing mean salary or at least decreasing with respect to the rate of inflation. However, the real phenomenon is an increase in the number of lower-earning, female veterinarians entering the profession and deflating starting salaries, a trend independent of market conditions involving supply and demand for veterinary services. This is just one example, but many demographic factors affect starting salaries and need to be controlled for to obtain an unbiased picture of the market for new veterinarians. Unfortunately, due to poor response rates we were unable to create a comparable index for the graduates of foreign colleges.

Although this process is relatively new to the veterinary profession, it is standard in economics across the globe. This analytical method of controlling the characteristics of a good or bundle of goods to measure the market impact is a common practice in economics and is perhaps most recognized in the Consumer Price Index. This index holds steady the quantity of a specific number of goods (basket of goods) year to year to measure the change in price as an indicator of inflation. Holding constant the demographic characteristics of new veterinarians, (e.g., a constant percentage of a certain gender, practice type and distribution by region) allows for a valid examination of how the changing number of graduates affects the income they receive.

Also, extensively addressed in this report is the DIR, a KPI for the veterinary profession. The ratio does not only measure the performance of the market for new veterinarians but also allows us to quantify the success or impact of implemented programs and strategies. Tracking any KPI would be futile if not tracked accurately and consistently.

In this report we identify the factors that are associated with the variation in the DIR. As evidenced, controlling for these factors allows us to accurately measure the change in this KPI over time and potentially identify strategies that would have an optimal impact on reducing the debt.

We also thoroughly focus on the starting point of the supply side for the market for veterinary services, the market for education.



As noted in previous reports, the three vertically, related markets are the market for education, the market for veterinarians and the market for veterinary services. These markets, though separate, ideally communicate their interconnectedness through price signals. That is, the demand for a veterinary education should react to the prices paid to obtain a veterinarian and likewise the market for veterinarians should react to the demand for veterinary services. As more pre-veterinary students interact with veterinarians who enjoy a financially rewarding career, for example, the demand for a veterinary education increases; likewise, as the demand for veterinary services increases, this is reflected in increased wages for veterinarians, and so market participants respond by increasing the supply of veterinarians.

Nonetheless, the focus of this report, the market for education, represents a complex body of 30 AVMA-accredited veterinary colleges located in the United States, 19 AVMA-accredited colleges located outside the United States, and dozens of other veterinary colleges not accredited by the AVMA but whose graduates are able to enter the market for veterinarians in the United States through various streams.

In addition to analyzing tuition and fees across colleges, this report will examine the student debt incurred by recent graduates, as attributed to both tuition and fees and living expenses. We make this distinction here because, although becoming a veterinarian creates opportunity costs, the cost of living cannot be quantified as cost foregone to become a veterinarian, as one incurs living expenses whether or not they attend veterinary college. This report presents a detailed description of the cost of living in various regions of the country as well as the tuition incurred to matriculate through veterinary college.

The debt-to-income ratio, the KPI measuring the market for a veterinary education is important. Presumably, the income awarded to veterinarians is indicative of animal owners' willingness to pay for veterinary services, which subsequently represents their willingness to pay the cost necessary to train veterinarians to care for their animals. The fact that the DIR is almost 2.0, however, indicates that it costs a veterinarian twice what animal owners are willing to pay for their services to become trained to provide the services. In other words, the market is signaling that the price of veterinary services is too high relative to the cost of producing veterinarians.

## Market for Education KPI

The value of KPIs stems from the need to measure the impact of a strategy or protocol that might be implemented to address the high DIR within the veterinary profession. Unless we determine the effect of any initiatives, these actions may be futile or possibly a waste of resources.

Developed by the AVMA's Economics Division, the DIR is essentially the individual debt divided by the individual income. This ratio captures the linkage between the demand and supply of new veterinarians, as the debt is directly related to educational costs while the income is the payoff to the veterinarian for obtaining the DVM degree. Presenting this as an accurate representation of the market for new veterinarians, however, can be challenging.

To accurately determine a trend for the DIR there are several cases that must be considered. The DIR that the AVMA computes is derived from analyzing AVMA's senior survey. The senior survey is distributed to the graduating seniors of the AVMA-accredited U.S. colleges each spring. The survey asks seniors to report their post-graduate plans, educational debt, starting salaries and other basic demographic information. However, some of the information provided is just a rough estimate. Questions such as the number of hours expected to work per week, educational debt and annual production are conjectures made by students based on the information they have available. Students can't pinpoint exactly how many hours they will work per week and they have an even foggier idea of what their production would be as their skills progress. Consequently, it is important to note that a number representing the DIR is not nearly as critical as the direction of these numbers over time.

While the DIR provides a snapshot of the economic state of new veterinarians as they enter the profession, this number varies greatly. Starting salaries range from less than \$40,000 per year to more than \$90,000 per year and vary by practice type, location and other (more difficult to control and measure) factors. Some students report graduating with zero debt (17.2 percent of the 2017 graduating class, up from 14.2 percent in 2016); others report having obtained no job offers or invitations to pursue continuing education at the time the survey was distributed (6.3 percent in the 2017 graduating class). Others elect to pursue additional education (34 percent of the 2017 graduating class, down from 35.6 percent in 2016 who reported receiving an

offer to pursue an internship, residency or continuing education) and then there are some (an additional 7.7 percent in the 2017 graduating class) who simply do not answer the questions pertaining to their debt, income or other specific and relevant information, up from 7 percent in 2016.

Consequently, there are numerous ways to measure and report the DIR. There is the question of whether those with zero debt should be included; or whether those with almost zero income should be counted. How should we classify interns, residents, those in continuing education programs receiving only a stipend, and of equal importance, those who failed to respond to a pertinent question? Can we fairly assume that those who did not answer the question have a similar DIR distribution as those who did? Ultimately, the determinant factor stems from the objective of the AVMA Economics division. To effectively impact and improve the economics of the veterinary profession, we must first come up with a measure that accurately describes the current state of the profession. Then we must uniformly measure this statistic over time so that trends can be identified.

The mean debt figure is computed by aggregating all the reported debt numbers and dividing the sum by the number of respondents reporting a debt number; this calculation also includes those reporting zero debt. To give a thorough description of the graduating class' debt levels, however, this report also includes the distribution of debt across the graduating class and the mean debt of both the entire class and of only those with non-zero debt.

The mean starting salary of veterinarians was estimated using income reports of only those securing full-time positions. New veterinarians who reported income through internships, residencies and stipends from pursuing continuing education programs were omitted.

Both the mean debt and the mean starting salary are important descriptive statistics, but neither is used to compute the DIR. The DIR is computed by finding the mean of the debt-to-income ratio for each graduate who reported a value for debt, and for income from full-time employment. And these values are held to a constant demographic distribution over time so that there is no impact on the DIR attributable to changing demographics.

#### REGIONS OF THE UNITED STATES

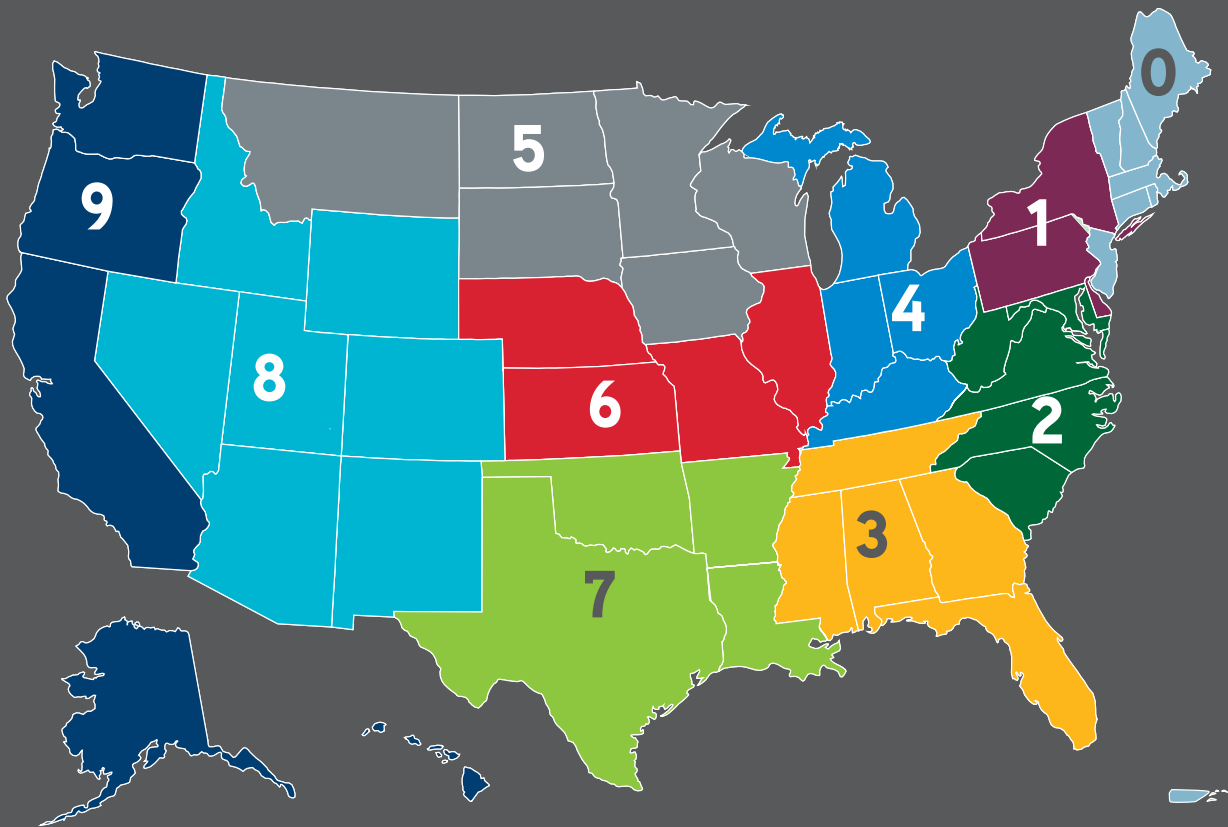


Figure 1





## THE APPLICANT POOL FOR VETERINARY COLLEGES



**Although we have been unable to determine a specific factor, or set of factors, that might be responsible for the cycle of applicants, the number of applicants has been trending upward since 2015..**

The market for veterinary education is critical as it is the source of the supply of veterinarians, which, in turn, determines the supply of veterinary services. In a perfect world, with no information asymmetry, an increase in the demand for veterinary services would signal the market for veterinarians, which would subsequently signal the market for a veterinary education. As applicants receive this signal, that it is an economically viable prospect to pursue a degree in veterinary medicine, the supply of applicants to veterinary colleges would increase to reflect an increasing demand for veterinary services. This, however, is not a perfect world. While some potential applicants might receive the market signals – such as observing a recently graduated veterinarian struggling to make ends meet – and act accordingly, many applicants are unmotivated by economic gain and might opt to pursue a veterinary education independent of perceived cost.

For several years, we reported that the number of applicants to colleges of veterinary medicine was cyclical. In 2013, the number of applicants in the current cycle peaked at 6,769, dropped slightly to 6,744 in 2014 and dropped again in 2015 to 6,600. In 2016, the number of applicants increased slightly to 6,667 and increased even further in 2017 to 7,076. The peak during the last cycle occurred in 1998 at 6,783 applicants. The number of applicants in 2017 and 2018 has been steadily increasing with 7,076 applicants in 2017, and 7,507 applicants vying for a 2018 seat, the highest number of applicants in more than 40 years. Although we have been unable to determine a specific factor, or set of factors, that might be responsible for the cycle of applicants, the number of applicants has been trending upward since 2015.

**AAVMC VETERINARY SCHOOL APPLICANT FIGURES**  
 AAVMC INTERNAL DATA REPORTS, 1980-2018



Figure 2

**DEMAND FOR VETERINARY COLLEGE SEATS**

An analysis of the VMCAS applicants allowed us to determine the demand for veterinary college seats. In this system the applicants can, and often do, apply for multiple seats with the hopes of securing an agreement with at least one institution. As a result, each veterinary college might receive several applicants vying for one seat. Each year since 2014, the VMCAS applicants were surveyed to determine (among other factors) what they are willing to pay for the veterinary education. The willingness to pay conveyed by all the applicants provides a description of the demand for veterinary education, the relationship between the quantity of seats demanded, and the price that the applicants are willing to pay for each seat.

From 2015 to 2017 the demand for veterinary education decreased at almost every price level. We observe this as the demand curves shift to the left. The 2015 and 2016 demand curves are quite similar at price points over \$100,000. In 2017, however, the shift occurs at almost every price level; for example, at \$50,000 up to \$200,000 fewer applicants demand a veterinary education than the quantity who expressed willingness to pay at these same price points in 2016 and 2015.

More specifically, in 2014 53.3 percent of applicants were willing to pay up to \$150,000 for a veterinary education, while in 2015 only 37.1 percent of the applicants were willing to pay up to \$150,000 for a veterinary education. In 2016, 40.2 percent of applicants were willing to pay up to \$150,000 for a veterinary education but only 27 percent were willing to do so in 2017.

### APPLICANT DEMAND, 2015, 2016 & 2017

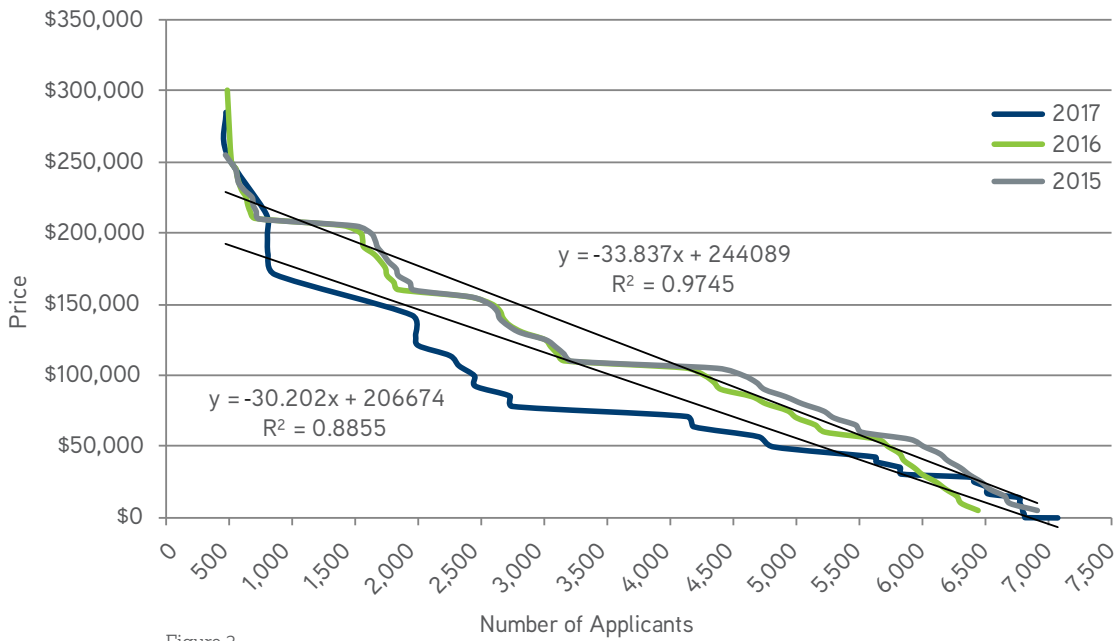


Figure 3

### APPLICANT-TO-SEAT RATIO

Over the past four years, the applicant-to-seat ratio has experienced a modest increase from 1.6 in 2015 to 1.8 for 2018 applicants. In 2017, there were 7,507 applicants through the VMCAS system applying for approximately 4,200 seats for the Fall 2018 semester, resulting in a 1.78 applicant-to-seat ratio. In 2016 there were 6,667 applicants and 4,039 available seats, yielding an applicant-to-seat ratio of 1.65; and for the Fall 2017 semester there were 7,076 applicants and 4,126 available seats, producing an applicant-to-seat ratio of 1.72.

The seats available are located both within the United States and at foreign veterinary colleges and are occupied by U.S. first-year students. It is important to note, however, that the dip in the applicant-to-seat ratio in 2009 was primarily a result of adding the U.S.-accredited foreign schools to the calculation and not reflective of any major difference in the number of U.S. applicants or U.S. veterinary college seats.

### VMCAS APPLICANTS AND FIRST-YEAR SEAT, U.S. AND INTERNATIONAL INSTITUTIONS AAVMC INTERNAL REPORTS, 2006-2018

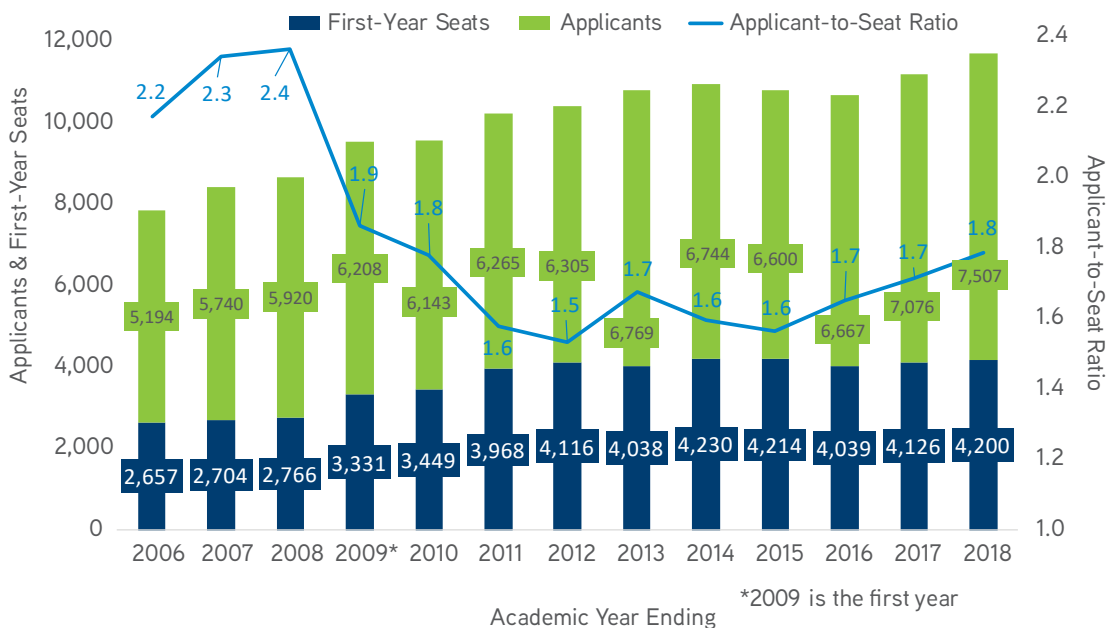


Figure 4

As found in previous trends, the gradually declining applicant-to-seat ratio has yet to translate into an applicant pool of diminished quality. Throughout the last four years, there has been no significant difference in applicants' GPA or GRE scores. Simultaneously, there has also been no significant change in the North American Veterinary License Exam pass rate.

#### MEAN GPA FOR ACCEPTED STUDENTS

Class of:	Pre-vet GPA	GRE Verbal	GRE Quantitative
2018	3.6	65.1%	58.1%
2019	3.6	65.7%	58.1%
2020	3.6	65.7%	58.1%
2021	3.6	64.8%	54.2%

Source, <http://www.aavmc.org/additional-pages/admitted-student-statistics.aspx>

Table 1



## VETERINARY COLLEGES SUPPLY OF SEATS

The number of seats available to U.S. students includes those seats available at the 30 AVMA-accredited veterinary colleges in the United States, three AVMA-accredited Caribbean colleges, 16 AVMA-accredited veterinary colleges in other countries, and numerous other veterinary colleges across the globe. The AVMA has members who graduated from more than 225 veterinary colleges. However, VMCAS tracks only U.S. citizens who apply for seats at AVMA-accredited veterinary colleges. According to AAVMC there are currently 13,068 U.S. citizens enrolled at U.S. AVMA-accredited veterinary colleges, 2,378 U.S. citizens

enrolled at accredited veterinary colleges in the Caribbean, 141 U.S. citizens enrolled at Canadian veterinary schools, and 659 U.S. citizens enrolled at other international veterinary colleges. That is, at present there are approximately 16,246 U.S. citizens enrolled in one of the four years of a veterinary program, domestically or internationally.

Using the estimated number of graduates by source of education, there are currently slightly more than 4,000 seats per year available to U.S. students. The following chart depicts graduates as recorded in the AVMA database.

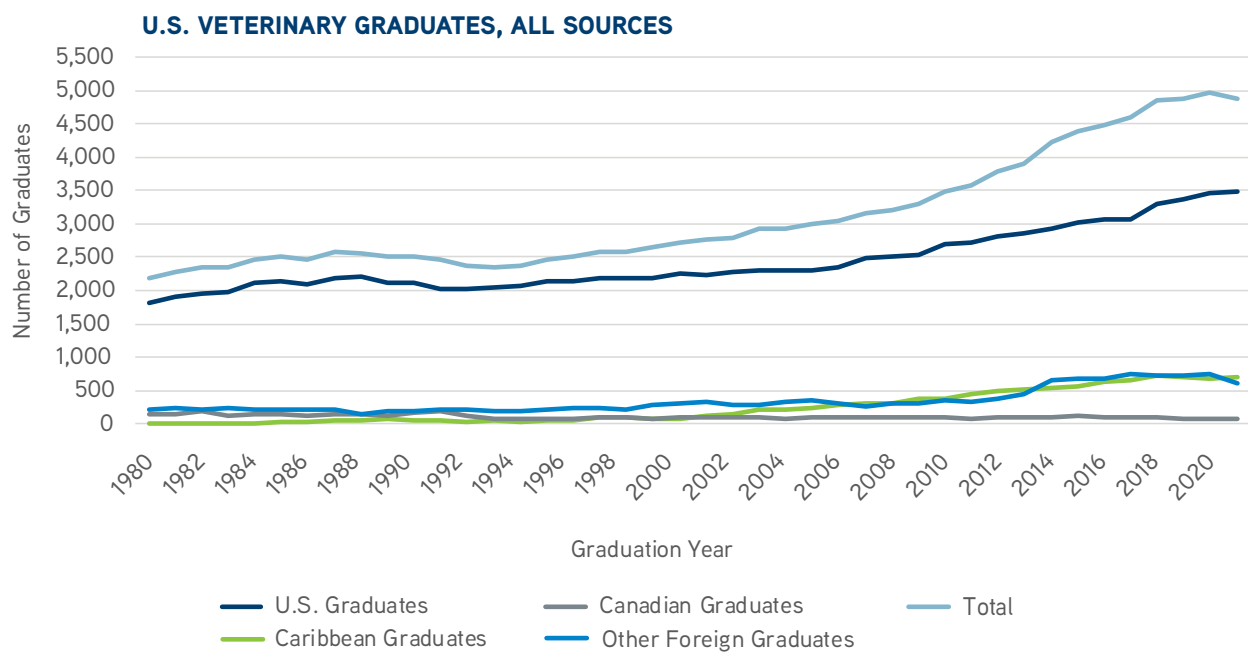


Figure 5

In 2017, 2,942 veterinary students graduated from veterinary colleges in the United States. With colleges averaging four classes in the DVM program at any given point, or roughly 12,000 seats, the income generated by this sector is certainly sustainable at least for the next four years at a time. 2017 U.S. graduates faced tuition and fees ranging from slightly more than \$79,000

to more than \$300,000 for four years of matriculation through the DVM program. The most affordable seats were supplied to students at Purdue University who were granted discount tuition, while the most expensive seats were supplied to those paying non-discount tuition rates at The Ohio State University.



**SUPPLY OF VETERINARY EDUCATION  
TUITION & FEES AND TOTAL COST 2017**

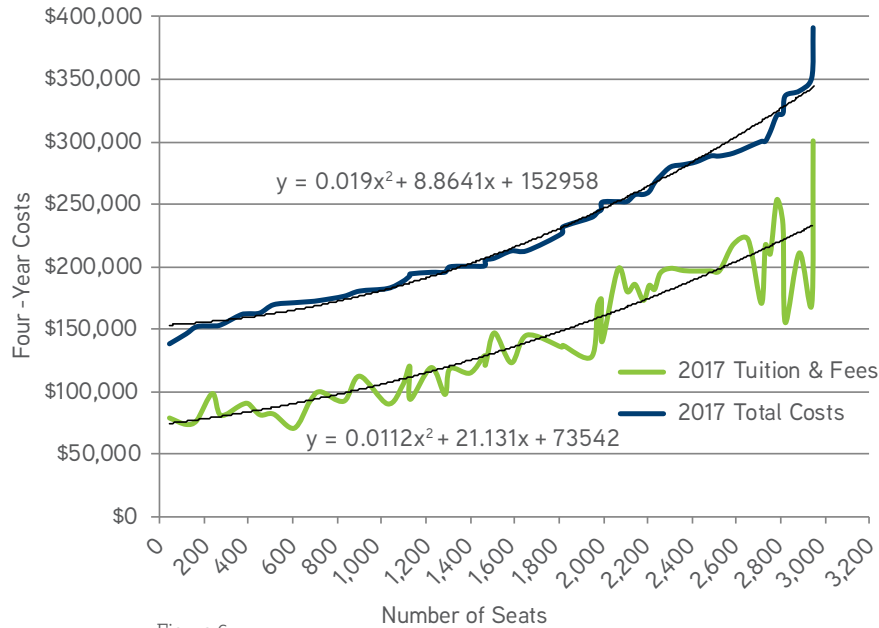


Figure 6

On supply/demand curves, at the point of equilibrium, a transaction occurs. This is portrayed graphically when the curves intersect. When we intersect the demand and supply curves in the market for education, the equilibrium points suggest that the 2017 applicants were willing to occupy 1,349 seats at a mean total cost of \$199,483. In 2016, applicants were willing to occupy 1,860 seats at a mean total cost of \$180,590. According to what applicants reported, from 2016 to 2017, there was a reduction in demand at higher costs.

At present there are more than 3,300 seats to be filled and a recently steady increase in the applicant pool. Evidently, as the chart indicates, what 2017 applicants (2021 graduates) indicated they were willing to pay for a seat at a veterinary college is far below the actual cost of the seats. Furthermore, debt levels

suggest that there is a disconnect between what applicants report as their willingness to pay to attend veterinary school and what they actually paid.

In many instances, if applicants are not accepted into their first choice for veterinary college, instead of foregoing veterinary school altogether for an entire year, they might opt to attend their second- or third-choice school, which is likely out of state and more expensive. We have no research on what factors are important in their decision to attend veterinary school or a specific veterinary college but those who seek education at an “in-state” school and those who are eligible for a discounted rate (contract seat or other form of scholarship) may well indicate a willingness to pay what is well below what they must accept to attend an out-of-state school.

### SUPPLY AND DEMAND FOR VETERINARY EDUCATION, 2016 & 2017

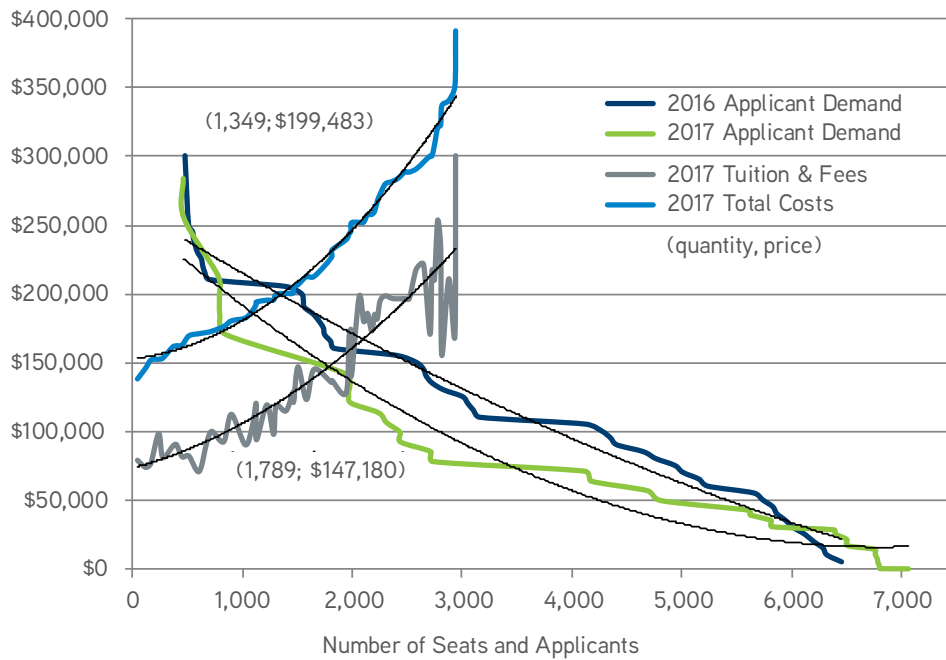


Figure 7

The following chart illustrates the aggregate, comprehensive value of tuition and fees, total cost and self-reported DVM debt. The majority of the graduating class had debt levels that lie below the total cost of matriculation through veterinary school. In 2015, less than 2 percent of students had debt levels reaching more than \$450,000 and about 11 percent reported having zero debt, in 2016, less than 1 percent of the graduating class had debt

levels more than \$450,000 and just over 14 percent reported having zero debt. In 2017, 0.2 percent reported debt levels over \$450,000, and more than 17 percent having zero debt. As noted, determining what factors affect the debt-to-cost ratio for individual students will be important to developing strategies to increase the percentage of students who have debt that is less than the cost of their education.

### SUPPLY OF VETERINARY EDUCATION COST FOR 2017 GRADS

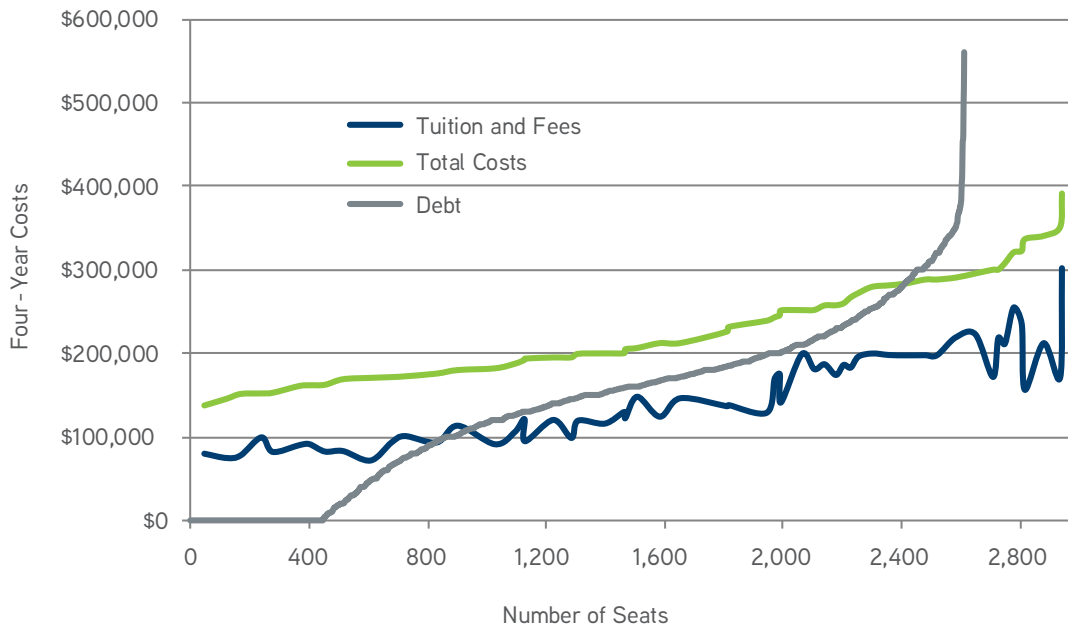


Figure 8

## THE APPLICANTS' ESTIMATE OF THE DVM DEBT

The 2017 applicants were asked to estimate the mean debt load of 2016 graduates. The following chart depicts their responses. As a comparison, the actual 2016 reported debt load of the graduates is provided in the same chart. The applicants had a relatively accurate idea of the debt load of new veterinarians. The actual aggregate debt is slightly shifted to the left, indicating

that more students paid the debt the applicants estimated than they originally perceived. Although this debt – compared to the starting salaries for new veterinarians – is high it is not high enough to have deterred applicants from pursuing veterinary college.

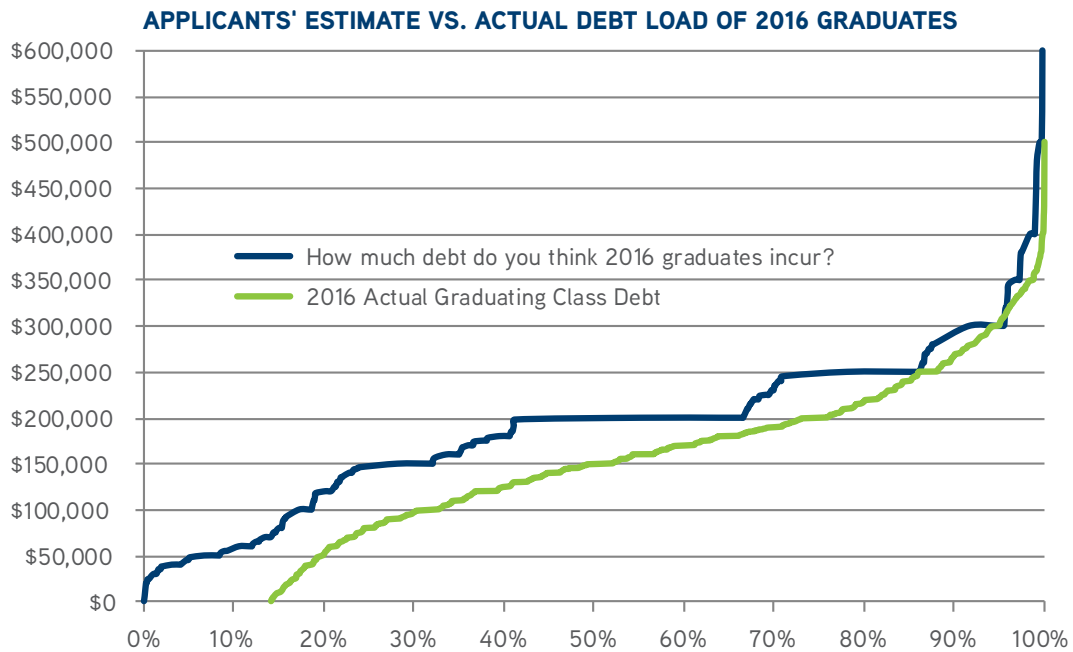


Figure 9



## THE 2017 GRADUATING CLASS

In 2017, the Senior Survey was sent to 28 AVMA-accredited U.S. veterinary colleges and three U.S.-accredited veterinary colleges outside the United States that had graduating seniors. The following table shows the response rates by school for the 2017 graduating class.

### RESPONSE RATE BY VETERINARY COLLEGE 2017

School Name	# of Graduates	Responses	Response Rate
Auburn University	118	118	100.0%
Colorado State University	137	95	69.3%
Cornell University	100	100	100.0%
Tufts University	95	80	84.2%
Iowa State University	141	134	95.0%
Kansas State University	109	72	66.1%
Louisiana State University	84	82	97.6%
Michigan State University	104	94	90.4%
Mississippi State University	80	80	100.0%
North Carolina State University	95	95	100.0%
Oklahoma State University	74	73	98.6%
Oregon State University	51	38	74.5%
Purdue University	83	83	100.0%
Texas A & M University	132	131	99.2%
The Ohio State University	163	135	82.8%
Tuskegee University	66	65	98.5%
University of California-Davis	133	133	100.0%
University of Florida	115	100	87.0%
University of Georgia	101	101	100.0%
University of Illinois	121	89	73.6%
University of Minnesota	99	95	96.0%
University of Missouri-Columbia	112	103	92.0%
University of Pennsylvania	123	83	67.5%
University of Tennessee	85	76	89.4%
University of Wisconsin	75	74	98.7%
Virginia-Maryland College	118	118	100.0%
Washington State University	123	94	76.4%
Western University of Health Sciences	105	91	86.7%
<b>Total U.S. Schools</b>	<b>2,942</b>	<b>2,632</b>	<b>89.5%</b>
<b>Foreign Schools</b>			
Ross University	91	266	34.2%
St. George's University	52	169	30.8%
University College, Dublin		4	Unknown
<b>Total</b>		147	Unknown

Table 2



## DESCRIPTIVE STATISTICS FOR GRADUATES

**Since 2001, the number of students finding either full-time employment or securing opportunities to pursue continuing education reached its highest point in 2017.**

A major component of the AVMA senior survey concerns the post-graduate plans of the graduating veterinary students. Students were asked to report their plans after graduating, indicating whether they planned to pursue an internship, residency, continuing education or full-time employment. They were also asked to report the location of their post-graduate employment or education. The following figure illustrates the percentage of new veterinarians finding employment or gaining acceptance into an educational program upon graduation. Although there are students who reported finding no employment at the time the survey was distributed, evidence suggests that many of these new veterinarians found employment within a year of graduating. Since 2001, the number of students finding either full-time employment or securing opportunities to pursue continuing education reached its highest point in 2017. Although this percentage is not a “return-to” the trend observed prior to the effects of the 2007-2009 financial crisis, as of 2012, the number of new veterinarians finding post-graduate opportunities has been steadily increasing.

### DVM GRADUATES RECEIVING OFFERS FROM JOBS OR ADVANCED EDUCATION



Figure 10

The percentage of graduating veterinary students finding full-time employment or getting offers to pursue post-graduate education in the 2017 graduating class was 93.8 percent. Although this is the highest rate for the entire period under examination, it is not significantly different from the comparable measure in 2016, 93.1 percent. As stated in previous reports, the recent economic recession had a direct impact on the number of students securing post-employment plans, but the economy has been regaining ground. This is reflected in the increasing number of new graduates finding employment or educational

opportunities. Also noteworthy, as seen trending the percent of graduates receiving some type of income opportunity is steadily increasing even though the number of graduates is simultaneously increasing over the period. The number of new veterinarians finding full-time employment showed an increase to 54.9 percent in 2016, from 48.9 percent in 2015 and is up to 56.1 percent in 2017. The number of new veterinarians not finding employment or receiving an invitation to pursue continuing education decreased from 6.9 percent in 2016 to 6.3 percent in 2017.

### DISTRIBUTION OF NEW VETERINARIANS

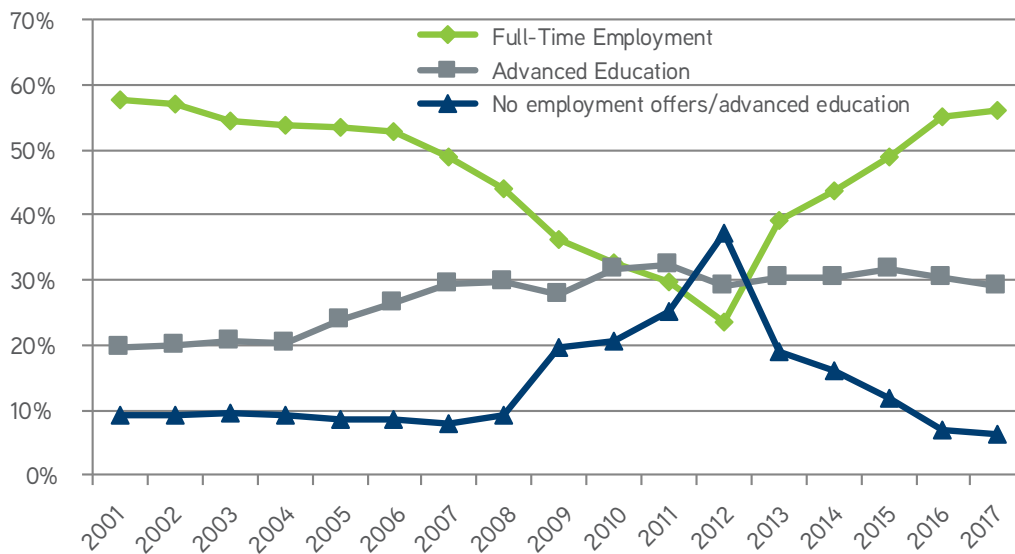


Figure 11

As observed since 2001, the majority of new veterinarians continue to report finding full-time employment in the companion animal exclusive sector. However, new entrants into this sector declined throughout the period 2004 to 2012, with a slight increase between 2012 and 2014, followed by a downward turn in 2015. The trend took a turn in 2016 with an increase to 30.4 percent and continued to rise to 31.6 percent in 2017.

New entrants into other sectors, such as food animal, companion animal predominant, mixed practice and equine practice, remained almost steady in the same period. As noted in previous reports, this information should not be used to indicate the overall supply and demand for new veterinarians in the respective sectors, as this would require data on the ratios of jobs available to available job applicants.

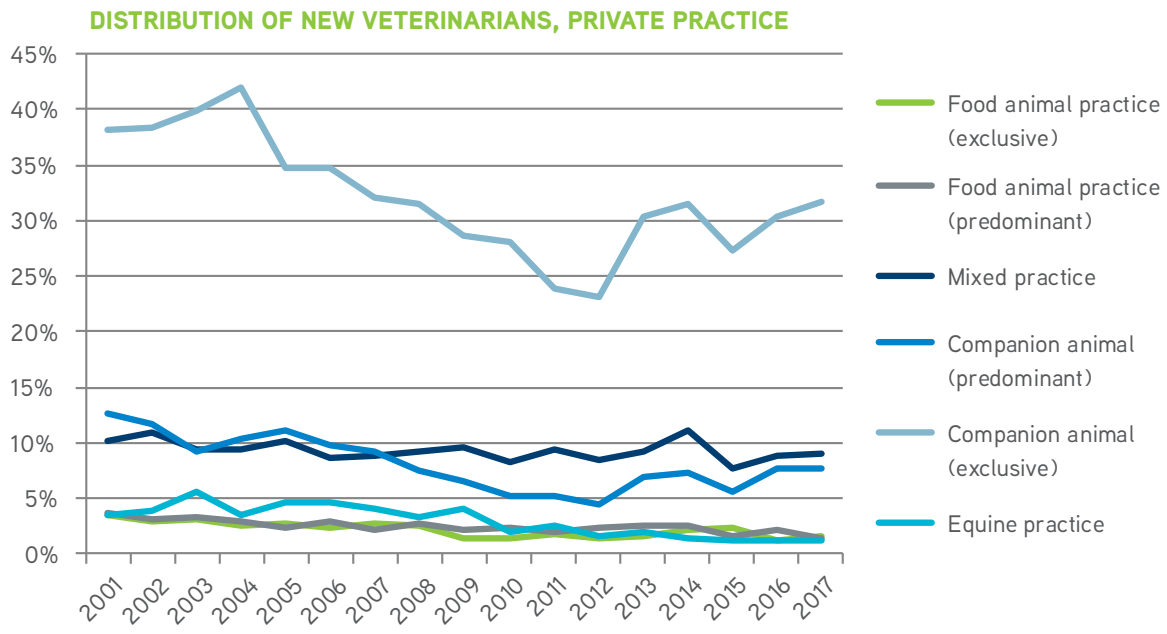


Figure 12

Over the period under observation, the percentage of new veterinarians finding full-time positions in public practice has been consistently small but steady. Between 2016 and 2017 the number of new veterinarians going into uniformed services and not-for-profit organizations increased, while the number

of new veterinarians going into college and universities and industry decreased. The percentage of new veterinarians finding employment in federal government and state/local government remained unchanged.



### DISTRIBUTION OF NEW VETERINARIANS, PUBLIC PRACTICE

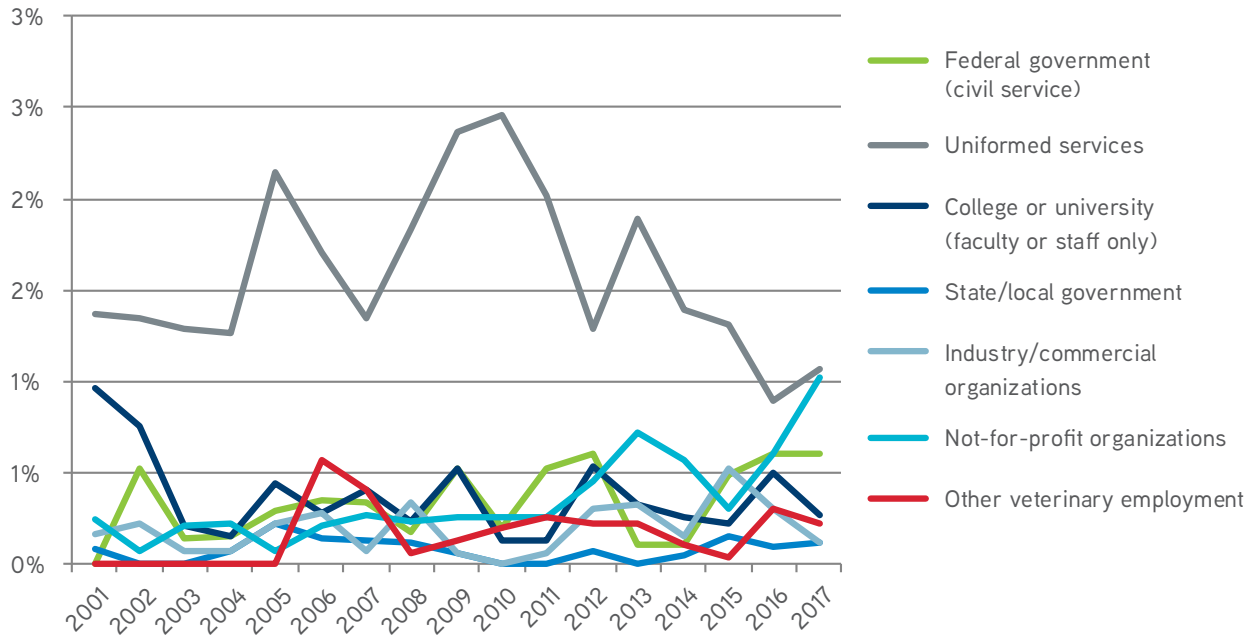


Figure 13

The percentage of new veterinarians pursuing career opportunities in private practice has increased from 56.9 percent in 2015 to 60.5 percent in 2016 to 62.3 percent in 2017. The percentage of new veterinarians pursuing careers in public practice remained primarily steady. Internship participation,

however, has decreased from 35.6 percent in 2015 to 31.6 percent in 2016 and even further to 30 percent in 2017. As previously noted, the tradeoff between internships and private practice continues to be evident, while the percentage of public practice entrants is steadily flat.

### DISTRIBUTION OF NEW VETERINARIANS PRIVATE, PUBLIC PRACTICE AND INTERNSHIPS

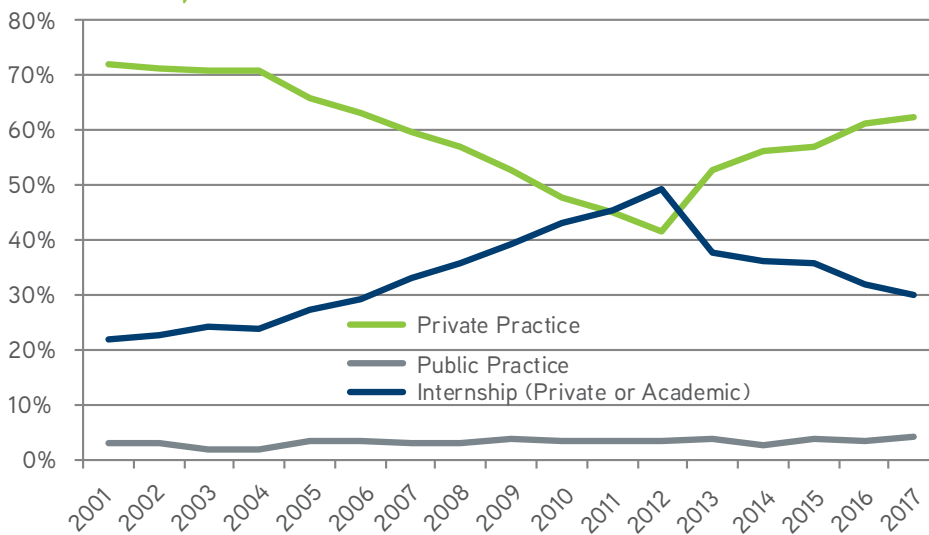


Figure 14

For almost the last decade, 75 percent of new veterinarians pursuing internships reported being in a companion animal species – focused internship. There has generally been no change in the species focus of internships accepted by new veterinarians.

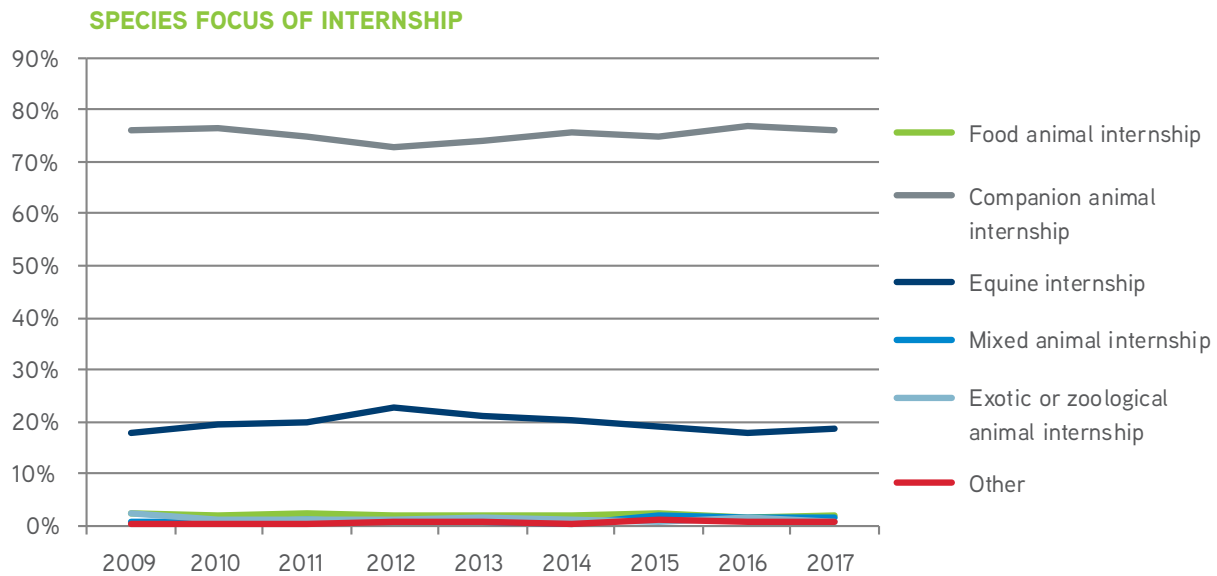


Figure 15

The percentage of new graduates pursuing advanced education after veterinary college has remained relatively constant between 2015 and 2017. After internships, the second largest group, in continuing education continues to be residency programs.

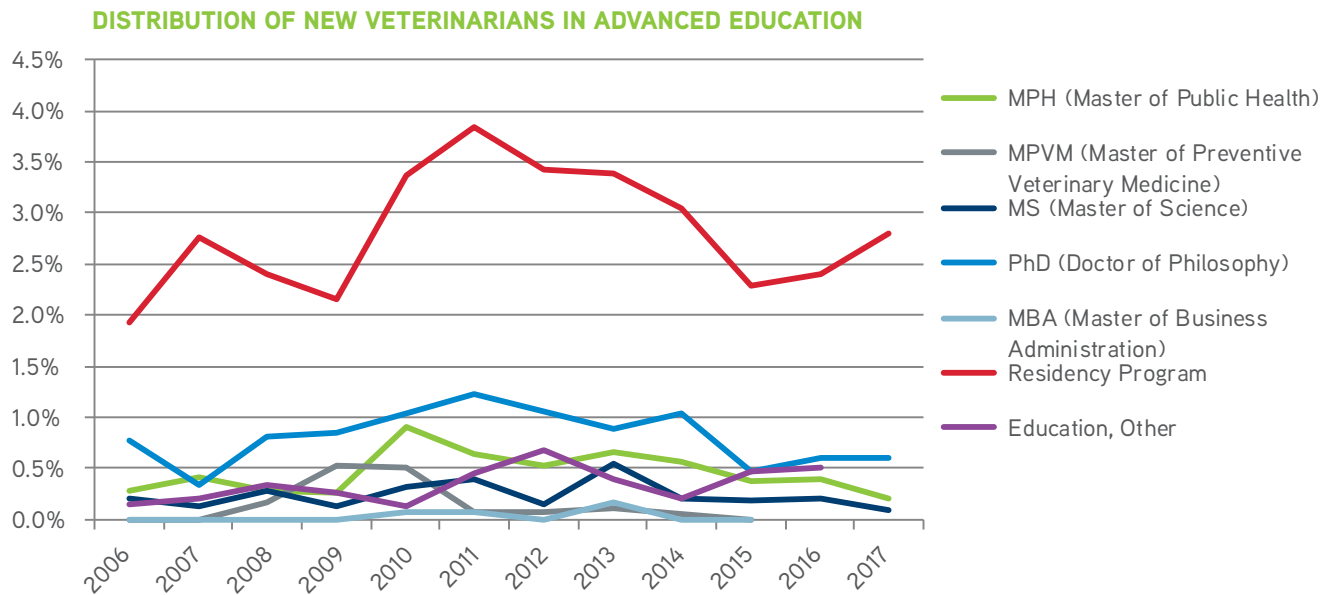
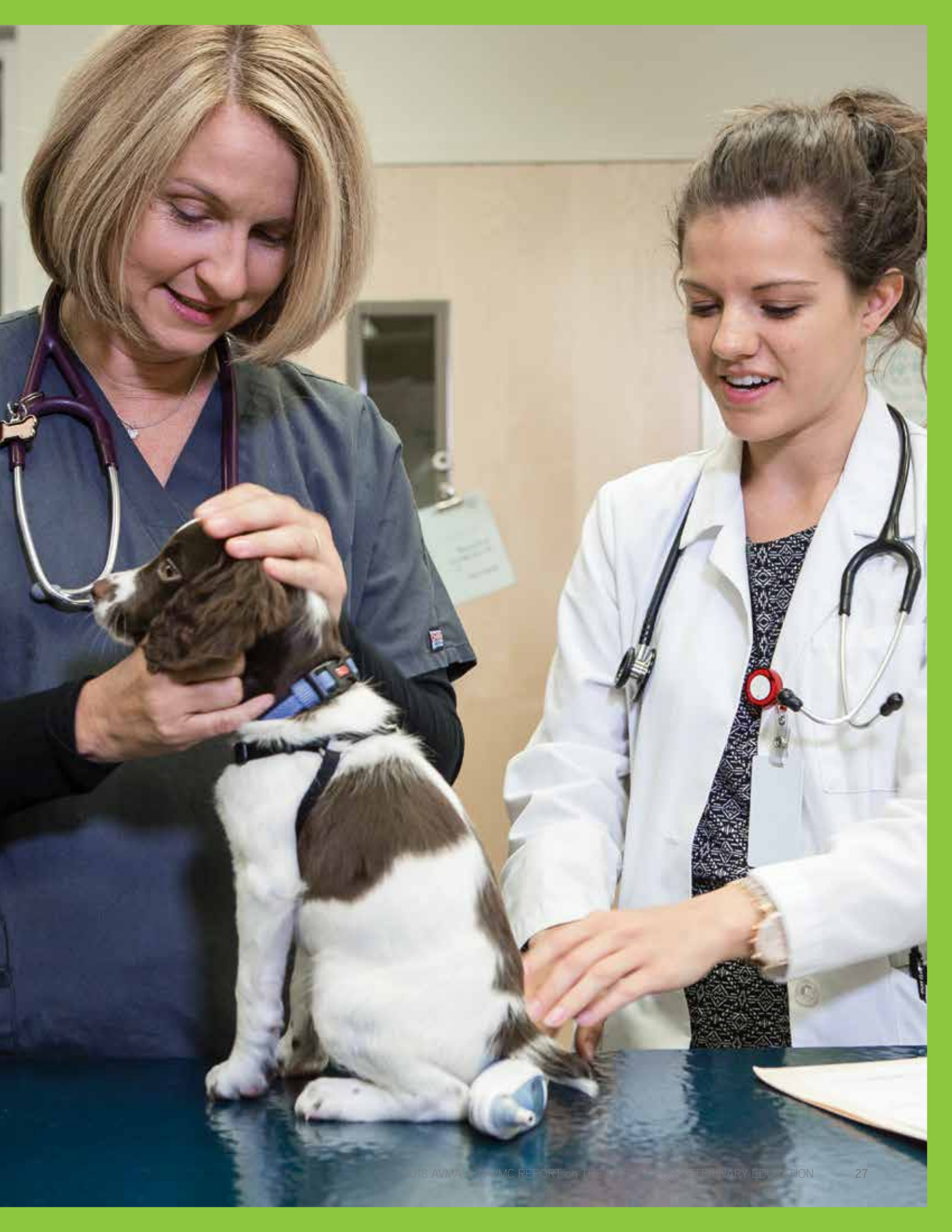


Figure 16





## NEW VETERINARIAN INCOMES

**From 2001 through 2017, the mean starting salary for new graduates increased from just under \$40,000 to more than \$60,000.**

Post-graduation, veterinarians pursue a host of opportunities. These include finding full-time employment in private practice, public practice, pursuing internships and residencies, and advancing their education. Consequently, the post-graduation income they receive is reflective of the opportunity they pursue. Graduates earn from a stipend that may accompany a graduate assistantship to a full-time salary.

From 2001 through 2017, the mean starting salary for new graduates increased from just under \$40,000 to more than \$60,000. These numbers are inclusive of those finding full-time employment along with those pursuing internships, residencies and advanced education. Across the board, this is a mean increase of \$1,404 per year over the past 17 years. These increases, however, have not been steady across all sectors and opportunities. The mean increase across the 17-year period for those in private practice has been approximately \$2,057 per year while the mean increase over the same period has been \$1,507 per year for new veterinarians in public practice. New veterinarians pursuing Internships and advanced education opportunities have experienced annual increases to their compensation of \$590 and \$710, respectively, over the same period.

As reported in years past, veterinarians in full-time positions in private practice have consistently been the highest – compensated group among the class since 2010, with veterinarians in public practice following closely behind. The lowest compensated group within the class was of those pursuing internships, with mean annual earnings of \$31,572 in 2017, a 26 percent increase since 2006.

Since 2009 private practice has had the highest starting salaries. However, it was not until the 2007-2009 financial crisis that salaries in public practice began trailing behind. Prior to that, salaries of new veterinarians in public practice and private practice

were neck and neck. Evidently, the recession had a greater impact on those in public practice than those in private practice. Currently, both are below their long-term trend but following an upward direction.

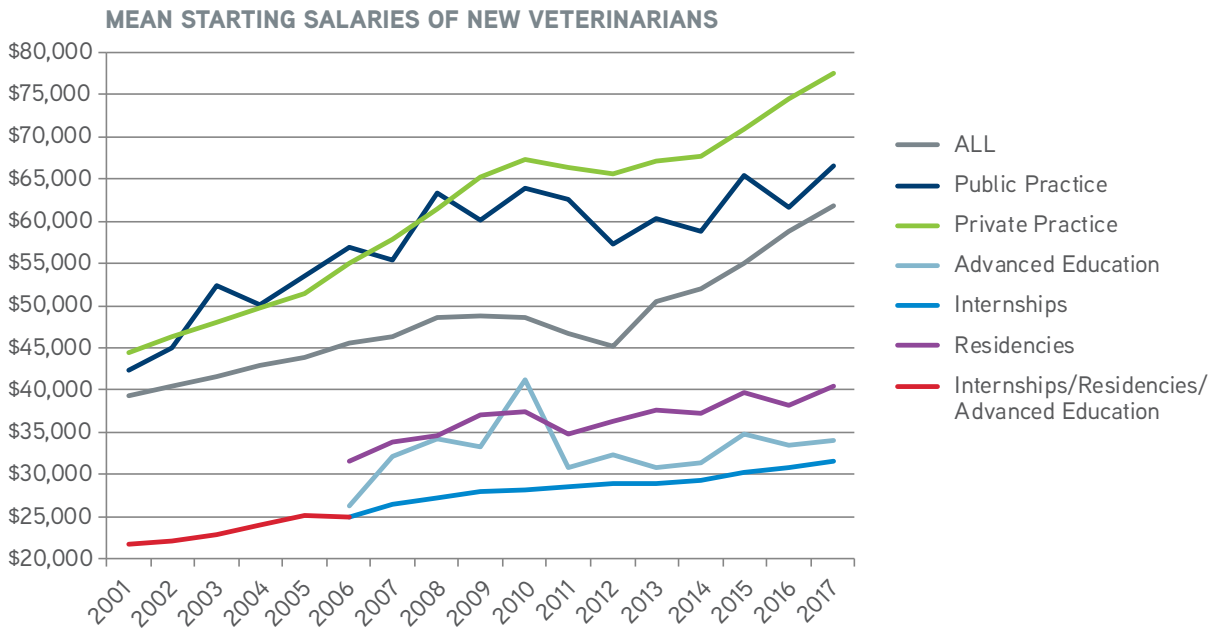


Figure 17

The weighted, mean starting salary for 2017 graduates finding full-time employment prior to graduation was \$76,130, up from \$73,380 in 2016 and \$70,117 in 2015. The following chart illustrates the mean starting salary. The amount of variation in salaries is indicated by one standard deviation around the mean. That is, 68 percent of new veterinarians employed in full-time positions earned between \$59,900 and \$93,500 in 2017.

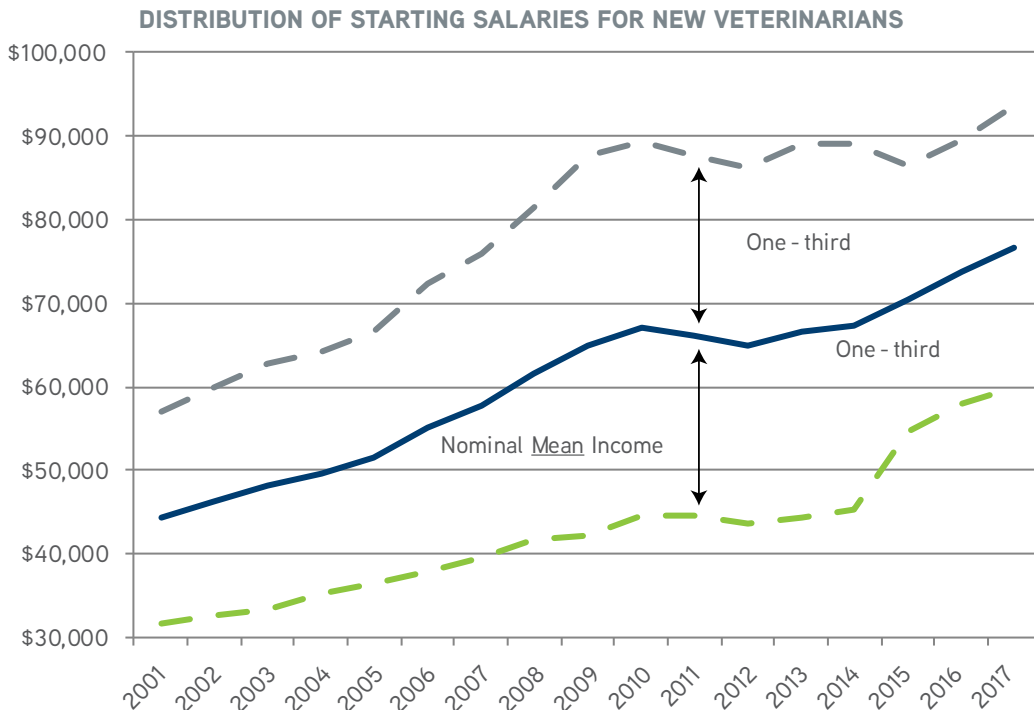


Figure 18

As noted in the previous chart, the mean starting salaries for two-thirds of the new veterinarians pursuing full-time employment had a range of more than \$30,000. This variation in starting salaries is most evident among those in private practice and those in public practice. Even within private practice there is much variation. Although starting salaries among new veterinarians in private practice have been on a steady incline, new veterinarians pursuing employment in the equine industry

have consistently experienced the lowest starting salaries. In 2017, new veterinarians finding full-time employment in the companion animal exclusive sector had the highest mean income as compared to 2016, where food animal exclusive practice yielded the highest income, with those in companion animal exclusive practice and companion animal predominant practice following closely behind.

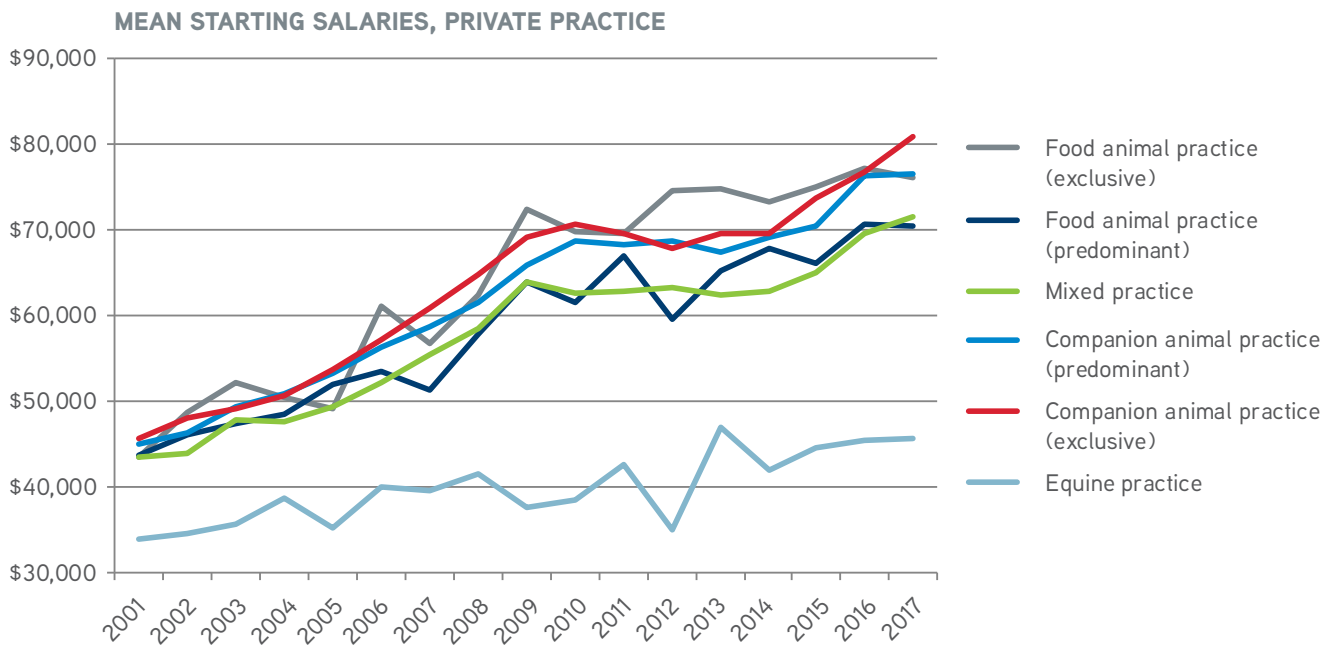


Figure 19

For a number of years, relatively few graduates have reported finding employment in public practice, where the variability in incomes is much larger than among private practices. Despite this variability in incomes, however, starting salaries in industry have consistently been the highest versus other employment options, with new veterinarians employed at colleges or universities reporting the lowest starting salary among those in public practice.

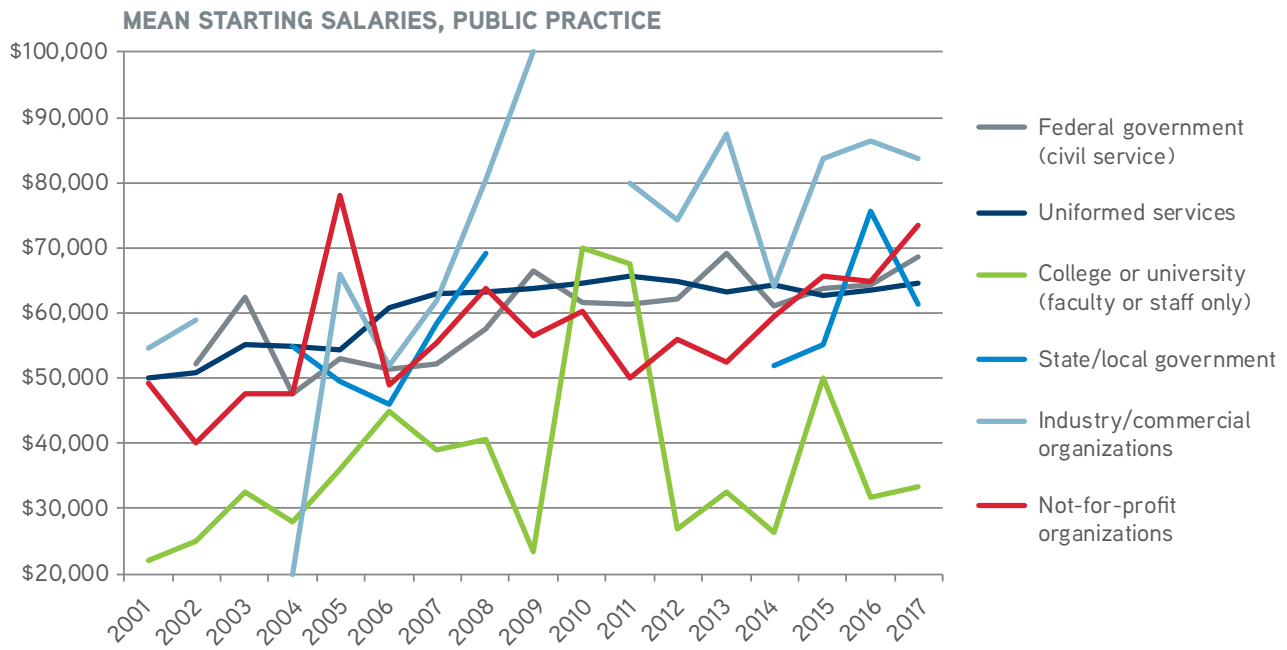


Figure 20

Year after year, the variation in incomes among the various categories of “advanced education” continues to be large. While the income of those pursuing internships, residencies and Ph.D. degrees is relatively stable, the income of those pursuing MS degrees is more volatile.

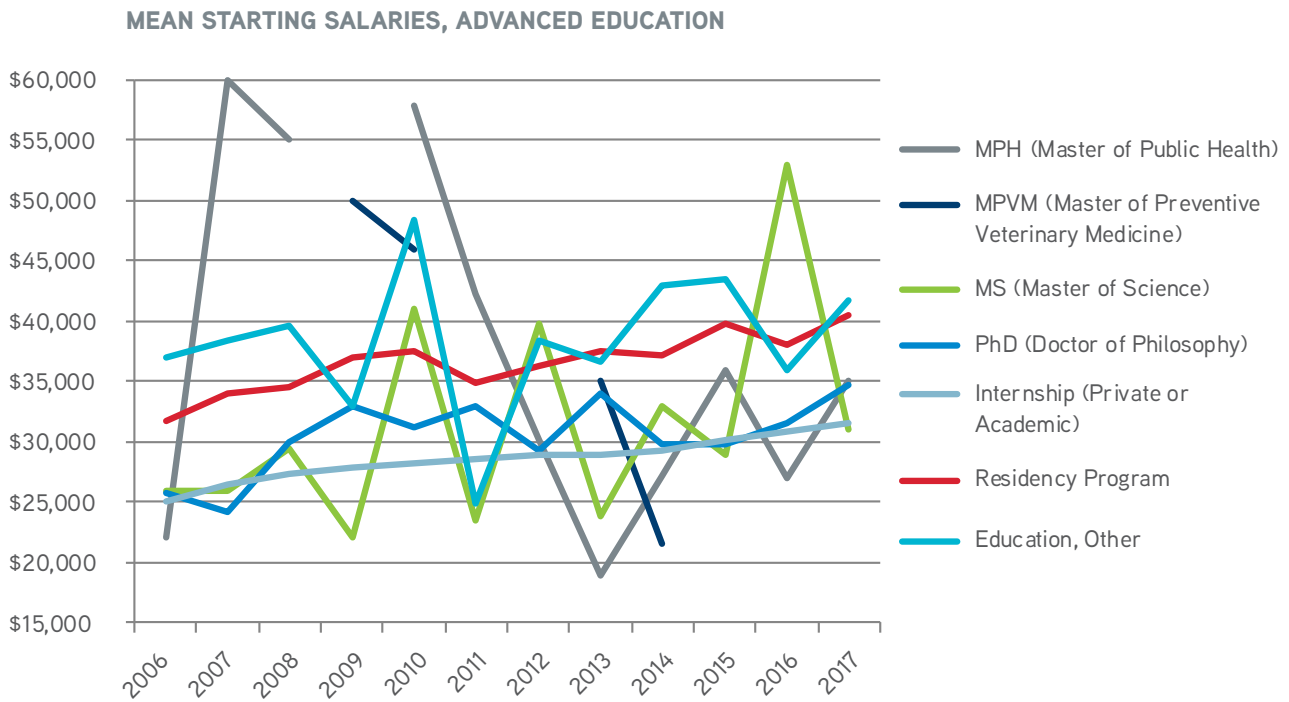


Figure 21

Numerous factors, outside of the economy, affect starting salaries. Our analysis indicates that starting salaries can be affected by the number of new veterinarians pursuing internships, the change in the gender distribution among new veterinarians, the change in the distribution of the practice type new veterinarians pursue, and the result of changing the location of their employment. To accurately identify the trends in starting salaries only impacted by economic factors (general economic growth, number of new veterinarians), 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 (RWI) index, measures the change in salary of a constant cohort of veterinarians, after controlling for variables such as gender, practice type, location and 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. It is important to note that although we know what factors affect the starting salaries of new veterinarians we have yet to identify why.

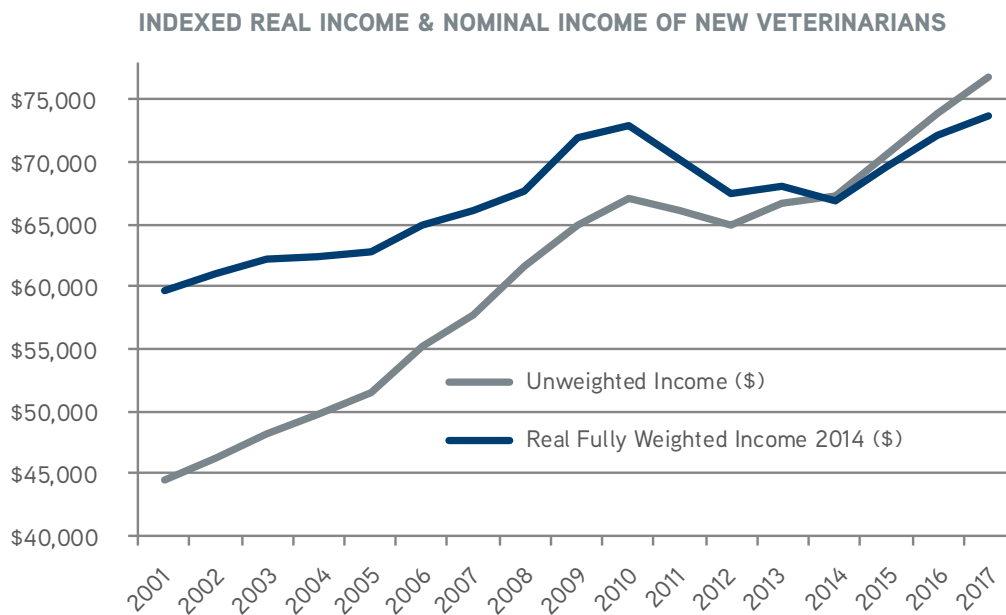


Figure 22



## FACTORS AFFECTING INCOMES FOR NEW VETERINARIANS

Numerous factors explain the variation in income. Table 3 describes the effect of various factors on starting salaries. Findings were obtained through the analysis of these starting salaries with a multiple linear regression in which the dependent variable is the starting salary of new veterinarians. The data used in this analysis comprise 17 years of responses from more than 92 percent of all graduates of the 28 U.S. veterinary colleges. We analyzed the impact on salaries of graduating college, DVM debt, age, gender, location, anticipated work hours per week, and post-graduate plans including options to pursue internships, residencies or other advanced education. The variables expressed in the table were found to be significant in explaining the variation in income.

The unstandardized coefficient indicates the dollar-value impact of the corresponding variable. Starting with a constant of \$54,721.79, for example, the value of the coefficients (multiplied by the value of the factor) are added. For instance, a graduate in 2017 would have an estimated mean income of \$82,498.09 (\$54,721.79 plus 17 times \$1,633.90).

The final column, labeled “Sig” represents the significant variables. These values, also known as the p-values, are such that for a “sig” less than 0.05, the coefficient of “B” is statistically significantly different from “0.” For instance, for Region 4 the p-value is 0.925; this means it is not statistically, significantly different from the baseline, Region 3 (See Figure 1).

The standardized coefficients tell us the relative weight of each variable within the equation. For instance, the graduation year with a standardized coefficient of 0.366 is more than four times as important as the anticipated work hours per week, which has a standardized coefficient of 0.085.

The unstandardized coefficient for the variable, “year”, is \$1,633.90 and indicates that the mean starting salary for new veterinarians increases by \$1,630 every year. However, this is the trend increase and does not consider a change in the number of new veterinarians or a change in the general economic conditions (e.g., Gross Domestic Product [GDP]).

The coefficient for Equine, (\$19,065), indicates that on average new veterinarians entering equine practice will receive a starting salary that is \$19,065 lower than new veterinarians going into a companion animal exclusive practice, the baseline variable. And new veterinarians going into internships make more than \$35,000 less than those going into companion animal exclusive.

The factors that were included in this model produced an R square of 0.728. This indicates that the inclusion of all of these factors was able to explain 72.8 percent of the variation between the individually reported salaries and the estimated, mean starting salary for all new graduates between 2001 and 2017.

**FACTORS AFFECTING STARTING SALARIES OF NEW VETERINARIANS**

		Unstandardized Coefficients		Standardized Coefficients			
		B	Std. Error	Beta	t	Sig.	
Demographics	(Constant)	54721.786	813.035		67.306	.000	
	Year (use last 2 digits of grad year)	1633.895	19.162	.366	85.267	.000	
	Age	43.464	22.135	.007	1.964	.050	
	Gender: F=1, M=0	-2388.069	169.971	-.051	-14.050	.000	
	Anticipated Hours Per Week	-121.839	6.889	-.085	-17.686	.000	
	DVM debt in thousands	7.397	1.133	.026	6.530	.000	
	Region (first digit of zip code)	Region 0	1640.504	319.454	.022	5.135	.000
		Region 1	2657.269	313.677	.036	8.471	.000
		Region 2	1380.939	285.963	.021	4.829	.000
		Region 3	0.00	0.000	0.000	0.000	.000
Region 4		27.486	292.762	.000	.094	.925	
Region 5		-888.159	343.308	-.011	-2.587	.010	
Region 6		-476.055	311.983	-.007	-1.526	.127	
Region 7		1380.182	289.756	.021	4.763	.000	
Region 8		2224.654	304.803	.031	7.299	.000	
Region 9		4370.863	285.311	.069	15.320	.000	
Outside of the U.S.	620.784	894.193	.003	.694	.488		
Additional Degrees Held	Admitted to DVM Program Before Degree Earned	-69.445	229.645	-.001	-.302	.762	
	Bachelor's Degree						
	Master's Degree	439.867	301.513	.005	1.459	.145	
	Doctorate Degree	-688.574	890.638	-.003	-.773	.439	
	Other Professional Degree (MD, JD, etc)	483.914	1366.623	.001	.354	.723	
Other Degree	-1673.884	1040.344	-.006	-1.609	.108		
Post-Graduate Plans	Private Practice	Food Animal (exclusive)	810.068	517.472	.006	1.565	.117
		Food Animal (predominant)	-3022.809	475.379	-.024	-6.359	.000
		Mixed Practice	-4247.680	266.069	-.062	-15.965	.000
		Companion Animal (exclusive)					
		Companion Animal (predominant)	-1165.323	276.904	-.016	-4.208	.000
		Equine	-19065.380	444.536	-.161	-42.888	.000
	Public Practice	Federal Government	-4490.135	1240.010	-.013	-3.621	.000
		Uniformed Services	-1527.505	578.328	-.010	-2.641	.008
		College or University	-28808.724	1226.844	-.083	-23.482	.000
		State or Local Government	-7714.091	2837.523	-.010	-2.719	.007
		Industry	8977.862	1661.659	.019	5.403	.000
		Not-for-Profit	-9615.817	1232.178	-.028	-7.804	.000
	Other	Other Veterinary Employment	-3361.343	1939.884	-.006	-1.733	.083
	Enrolling in an Educational Program	Masters of Public Health	-28697.980	1911.204	-.053	-15.016	.000
		Masters of Preventive Veterinary Medicine	-27232.304	4743.386	-.020	-5.741	.000
Masters of Science		-35238.587	1749.586	-.071	-20.141	.000	
PhD		-34988.363	952.662	-.131	-36.727	.000	
MBA		-30428.845	7498.492	-.014	-4.058	.000	
Internship		-35628.369	244.516	-.781	-145.710	.000	
Residency		-29712.713	515.229	-.210	-57.669	.000	
Education (other)		-30785.473	1523.087	-.072	-20.213	.000	

a. Dependent Variable: Sum of base, starting and production bonus incomes

**ANOVA**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6592369161465	41	160789491743	1431.722	.000
	Residual	2467902491606	21975	112305005		
	Total	9060271653071	22016			

**MODEL SUMMARY**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.853	.728	.727	10597.40559

Table 3

We projected income using GDP, the number of new veterinarians (N) finding new employment annually, and the year. The graph below illustrates this projection out until 2027. On the same chart we also inserted the real weighted income for comparison. Using our previously defined index, the real weighted income measures the change in income independent of changing demographic variables. The real weighted income appears to trend toward our GDP projected line but salaries, like GDP, still have not returned to pre-financial crisis trends.

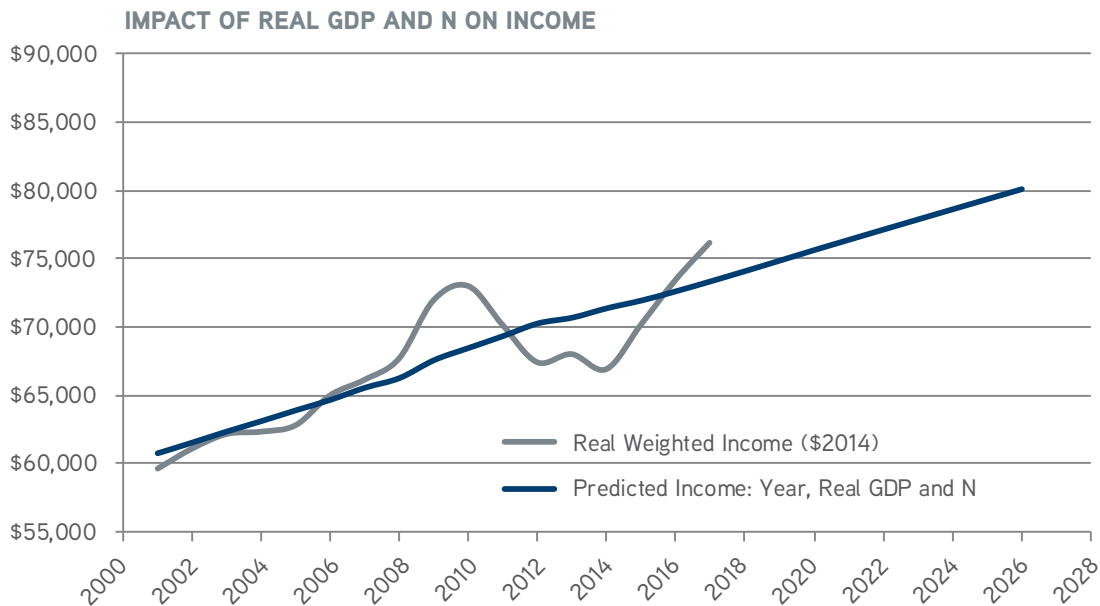


Figure 23



## NEW VETERINARIAN DEBT

**In 2017, there was a 21 percent difference in the mean debt of new veterinarians who graduated with non-zero debt versus the mean debt of the entire class.**

For almost two decades the mean debt of the new veterinarian has increased by an average of \$5,078 each year. Considering only those veterinarians with non-zero debt, the mean debt has increased by an average of \$6,219 each year. Year after year, the mean debt of the graduating class has been increasing, experiencing a decline only between 2013 and 2014, an average reduction of \$80, and now a much larger decline between 2016 and 2017, an average reduction in the mean debt of \$5,691.

### DEBT OF NEW GRADUATES MEAN OF ALL DEBT VS. MEAN OF NON-ZERO DEBT

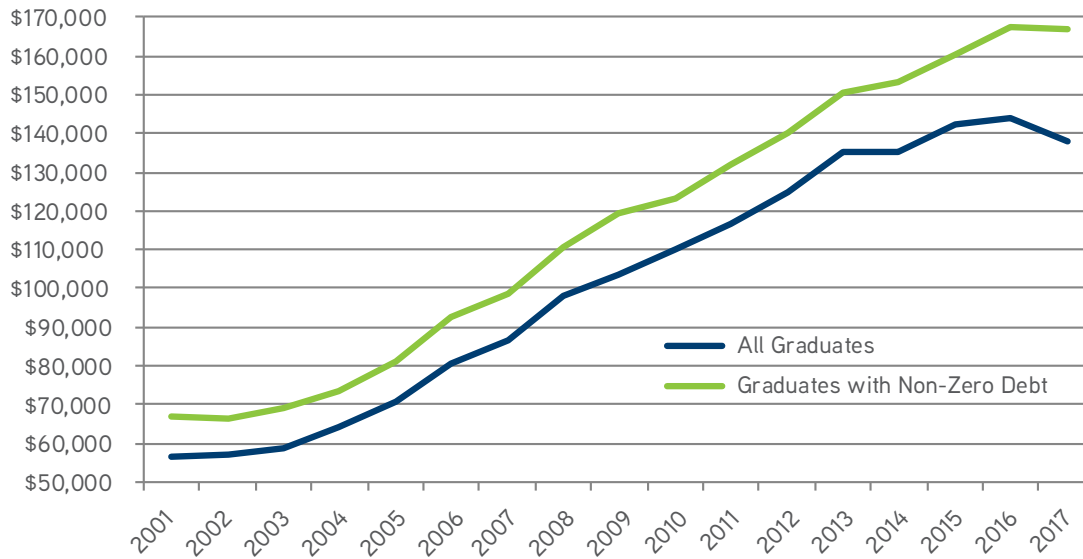


Figure 24

In 2017, there was a 21 percent difference in the mean debt of new veterinarians who graduated with non-zero debt versus the mean debt of the entire class. This difference in mean debt amounted to \$28,647. That is, the mean debt of the 2017 graduating class was \$28,000 less than the mean debt of those with non-zero debt only. Evidently, this gap is widening since, in 2015 the mean debt of all students was \$18,041 less than the mean debt of persons reporting non-zero debt, and in 2016, the mean debt of all students was \$23,777 less than the mean debt of graduates reporting zero debt, a 16.5 percent difference in debt.

### DIFFERENCE IN MEAN DEBT BETWEEN ALL GRADUATES AND ONLY THOSE WITH NON-ZERO DEBT

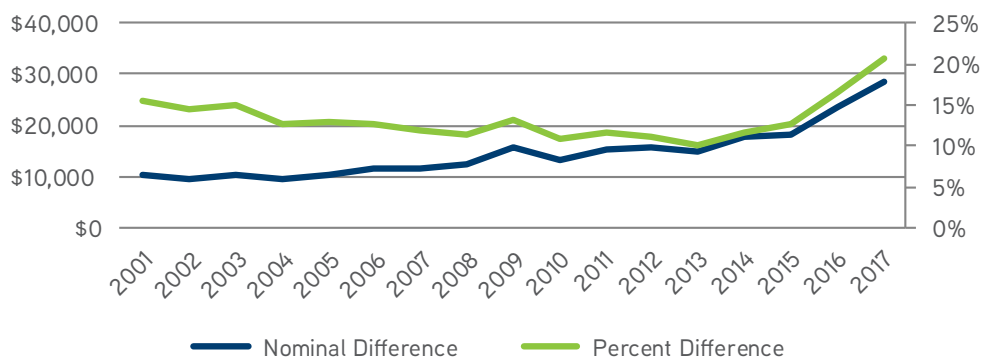


Figure 25

DVM debt incurred by new veterinarians continued to vary by post-graduation plans. Over the period 2001 through 2017 new veterinarians finding employment in public practice consistently had the lowest debt load. In 2017 new veterinarians pursuing advanced education had the highest debt load. As noted in previous reports, it is beyond the scope of this report to identify a research hypothesis as to why a significant difference exists in the DVM debt of new graduates based on post-graduation plans. We can hypothesize that perhaps veterinary students predisposed to public practice are more financially savvy.

Or perhaps those with lower debt feel less financially constrained to enter lower paying careers in public practice. We can even also surmise that maybe those with higher debt feel more obligated to pursue higher paying careers through specialization that requires internships and residencies. There are certainly many plausible hypotheses to explain the larger differences in debt by post-graduate careers, but research on the factors that influence the career choices of graduating seniors is certainly needed.

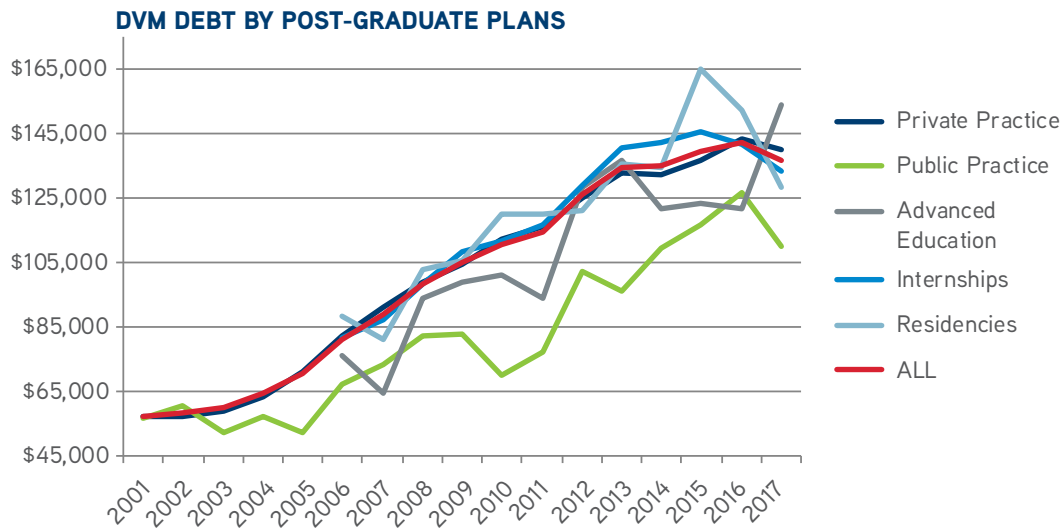


Figure 26

During the period 2015, 2016 and 2017, two standard deviations above the mean debt of the graduating classes has been within \$308,000, \$320,000 and \$321,000, respectively. That is, 95 percent of all new veterinarians who've graduated from U.S. institutions in those years graduated with debt that ranged from \$0 to below \$308,000, \$320,000 and \$321,000, respectively. The following table depicts the distribution, by school, of the 2.5 percent of the 2015, 2016 and 2017 classes who graduated with more than \$320,000 in student debt.

During the years 2015 through 2017, Western University, Tuskegee University, Kansas State University, University of Minnesota, Michigan State University, University of Tennessee, University of Pennsylvania and Louisiana State University each had students graduating with more than \$320,000 in

student debt. In 2017, for the first time since 2015, Oregon State University and the University of Illinois graduated new veterinarians who exited with more than \$320,000 in debt.

Between 2016 and 2017, of the group graduating with more than \$320,000 in debt, Tuskegee University, Kansas State University, Michigan State University, University of Tennessee and Virginia-Maryland College each had a reduction in the percentage of graduates having high debt while Western University, University of Minnesota, University of Pennsylvania, Louisiana State University, Mississippi State University, Colorado State University, The Ohio State University and Tufts University experienced an increase in the percentage of graduates with debt levels among outliers.

## THE DISTRIBUTION OF STUDENTS WITH MORE THAN \$320,000 DVM DEBT BY COLLEGE

	2015	2016	2017
Western University - California	43.7%	35.6%	36.5%
Tuskegee University	15.5%	22.1%	16.7%
Kansas State University	2.8%	8.7%	5.2%
University of Minnesota	14.1%	4.8%	9.4%
Michigan State University	5.6%	4.8%	4.2%
University of Tennessee	4.2%	3.8%	2.1%
University of Pennsylvania	4.2%	2.9%	5.2%
Louisiana State University	2.8%	2.9%	3.1%
Colorado State University		2.9%	3.1%
Virginia-Maryland College	1.4%	1.9%	1.0%
Iowa State University		1.9%	
Mississippi State University		1.9%	2.1%
Oklahoma State University		1.9%	
University of Georgia		1.9%	
The Ohio State University	1.4%	1.0%	2.1%
Purdue University		1.0%	
Auburn University	1.4%		1.0%
Tufts University	1.4%		5.2%
North Carolina State University	1.4%		
Oregon State University			2.1%
University of Illinois			1.0%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Table 4

Even within public and private practice, the DVM debt owed by new veterinarians varied greatly. For the 2017 graduating class, two-thirds of graduates finding employment within private practice had debt between \$48,000 and \$321,000. Comparatively, 68 percent of the 2015 graduating class within private practice, had a debt load between \$50,000 and \$222,500 while 68 percent of graduates within private practice had a debt load between \$54,500 and \$232,000 in 2016.

### MEAN DVM DEBT, PRIVATE PRACTICE

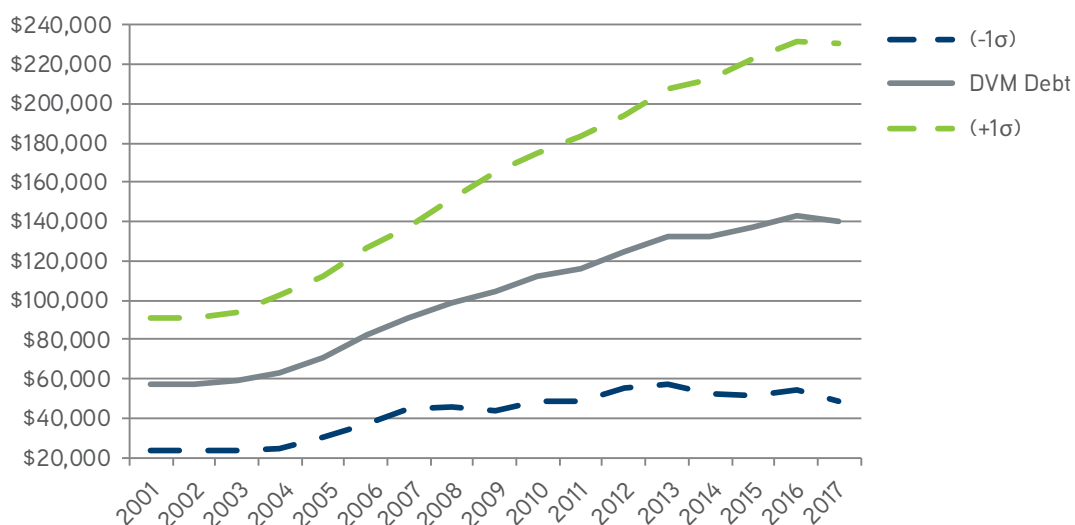


Figure 27

The variation in debt among new veterinarians pursuing public practice was also relatively large. Within the 2017 class, of those pursuing public practice, 68 percent had debt between \$12,277 and \$207,050, a range of almost \$195,000. Comparatively, within the 2015 class, 68 percent incurred DVM debt between \$35,000

and \$198,000, and 68 percent incurred debt between \$37,000 and \$216,000 in 2016. Similar to trends observed in 2016, in the 2017 class more graduates pursuing public practice had larger debt levels, a range of \$194,777 compared to the range of \$161,210 for 2015 graduates and \$178,761 for 2016 graduates.

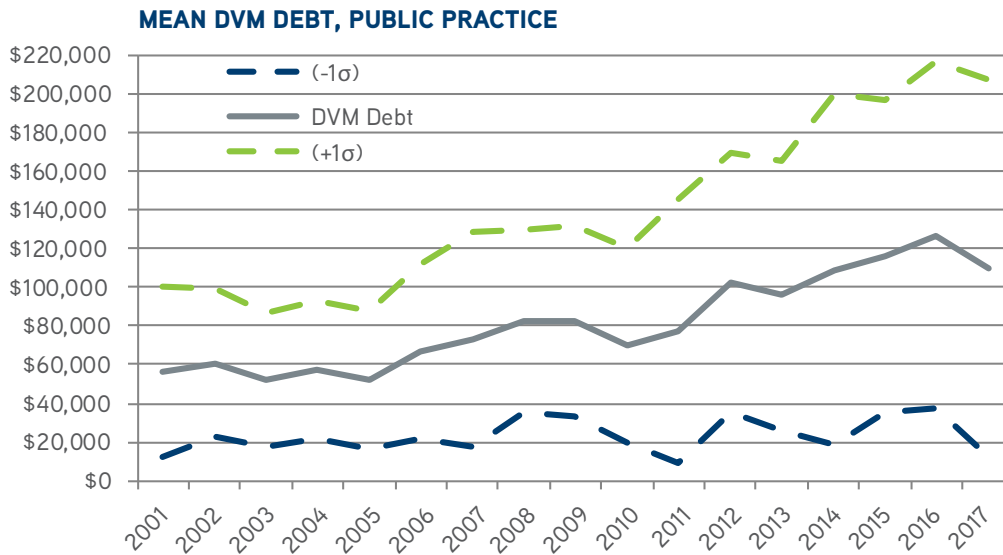


Figure 28

For each sector, whether public practice, private practice or advanced education, the growth rate of DVM debt has continued to outpace the growth rate of starting salaries of new veterinarians. Although the growth rates of debt and starting salaries prior to 2005 were comparable, the rate of growth in debt began to accelerate in 2006 and continued to grow much faster than incomes almost continually through 2016. In 2017, however, a welcome decline in the mean DVM debt was observed.

The largest factor in the increasing debt is the cost of education. This increased cost of education is tied closely to the declining amount of state and federal funding received by the veterinary colleges. In addition, the proportion of female veterinarians, whose debt is significantly higher than male veterinarians, has increased over time, and now comprises more than 80 percent of each new class of veterinarians.



### MEAN STARTING SALARIES & DEBT OF NEW VETERINARIANS

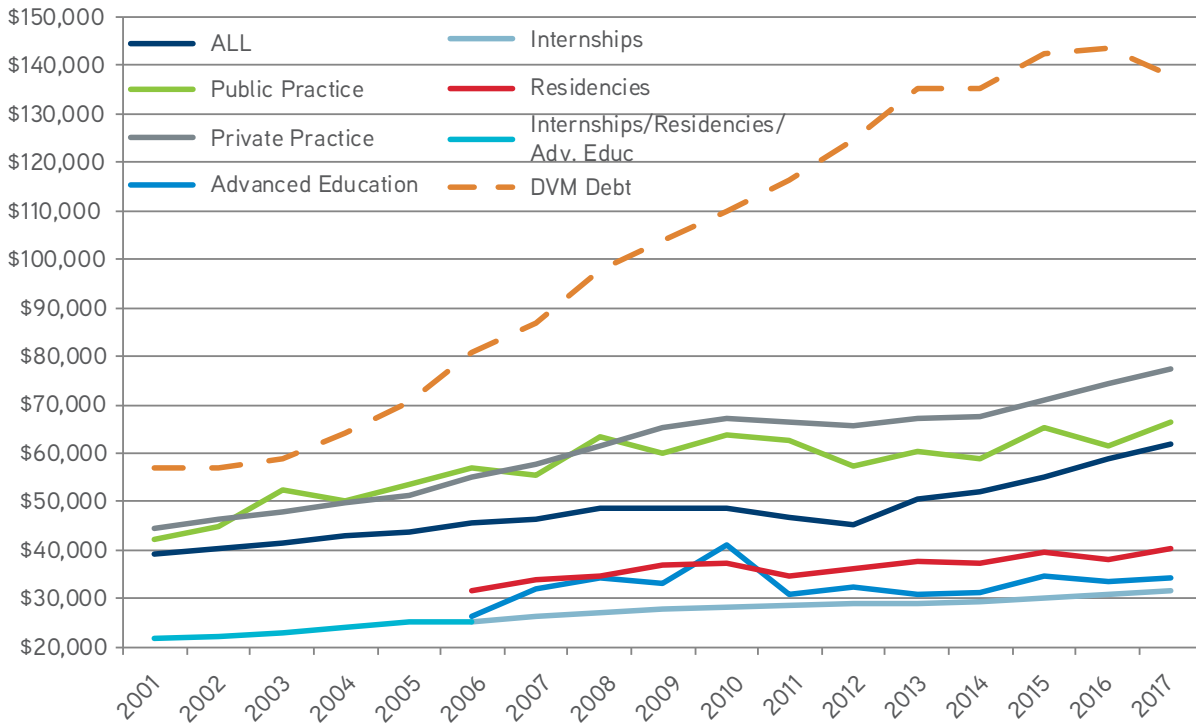


Figure 29

Not only were the starting salaries of female veterinarians significantly lower than those for men in 2017, but new female veterinarians had an average debt load of \$9,149 more than new male veterinarians, up from \$7,030 more in 2016 and \$7,519 more in 2015. Female graduates have had higher veterinary college debt than their male counterparts throughout the period observed.

### MEAN DEBT BY GENDER

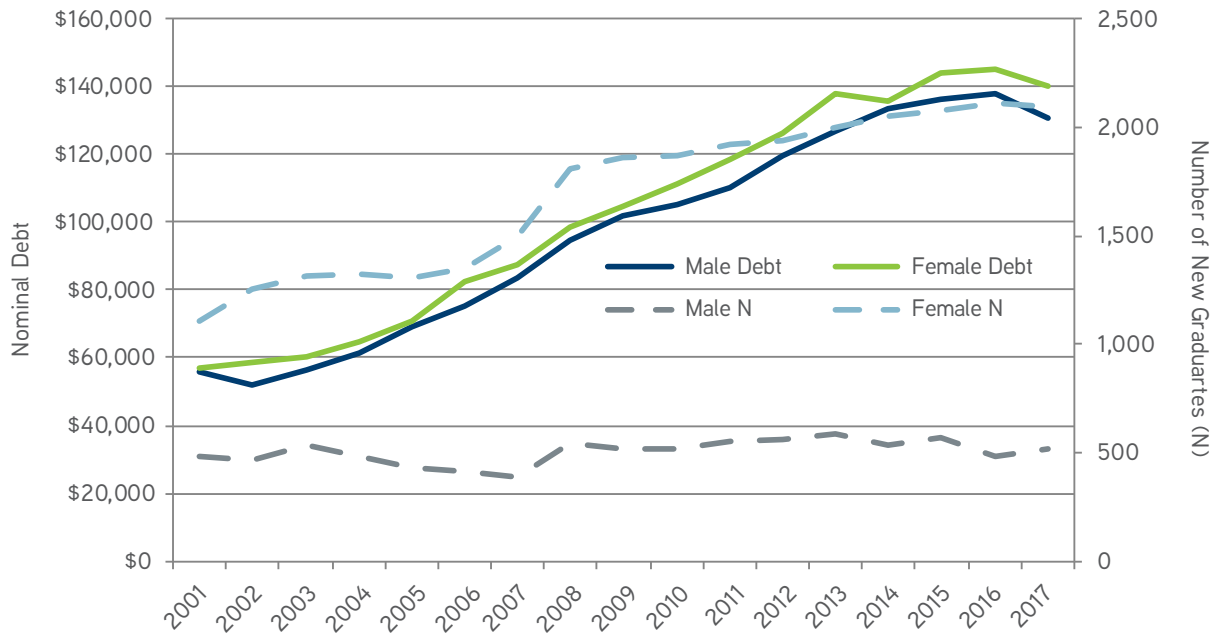
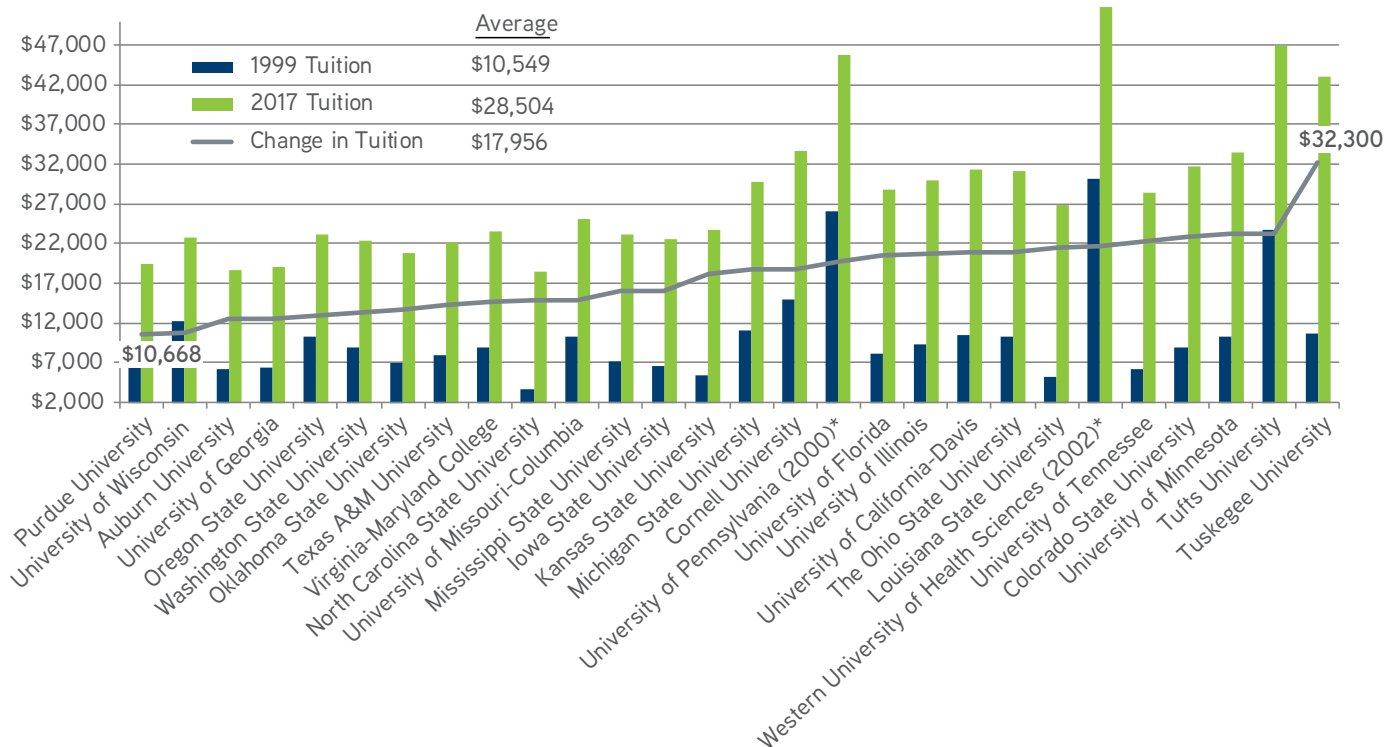


Figure 30

Over the period 1999 through 2017, discounted tuition and fees across veterinary colleges increased by more than 400 percent. The largest increase occurred at North Carolina State University, an increase of 406 percent, followed by Louisiana State University with an increase of 405 percent. The smallest increases occurred at the University of Pennsylvania at 75 percent, and at the University of Wisconsin at 88 percent. The average increase across all colleges throughout the period was 205 percent.

### U.S. VETERINARY COLLEGES TUITION AND FEES



\* Earliest year tuition data available

Figure 31

One significant factor contributing to the variation in the debt level of new veterinarians is their residency status (e.g., resident is in state, non-resident is out of state). Residents are those who attend veterinary college in the state where they reside, while non-residents are those who attend veterinary colleges outside of the state of their primary residence. At some institutions, however, students who entered the college as a non-resident may be able to attain residency status after their first year in veterinary college. So, more aptly, we refer to discounted and non-discounted seats. Discounted seats refer to those students who pay less than the full cost of attendance either because

they are residents of the state where the veterinary college is located or because their state has a contract with the veterinary college to make up the difference in the out-of-state (non-residency) tuition and fees. Over the past 12 years, the mean debt of graduating veterinary students reporting resident status was more than \$35,000 less than the mean debt of graduating veterinary students reporting non-resident status. In 2017 the mean debt of students graduating with residency status was almost \$45,000 less than the mean debt of students graduating with non-residency status, as compared to a \$58,000 difference between these two groups in 2016.

### RESIDENT AND NON-RESIDENT DEBT

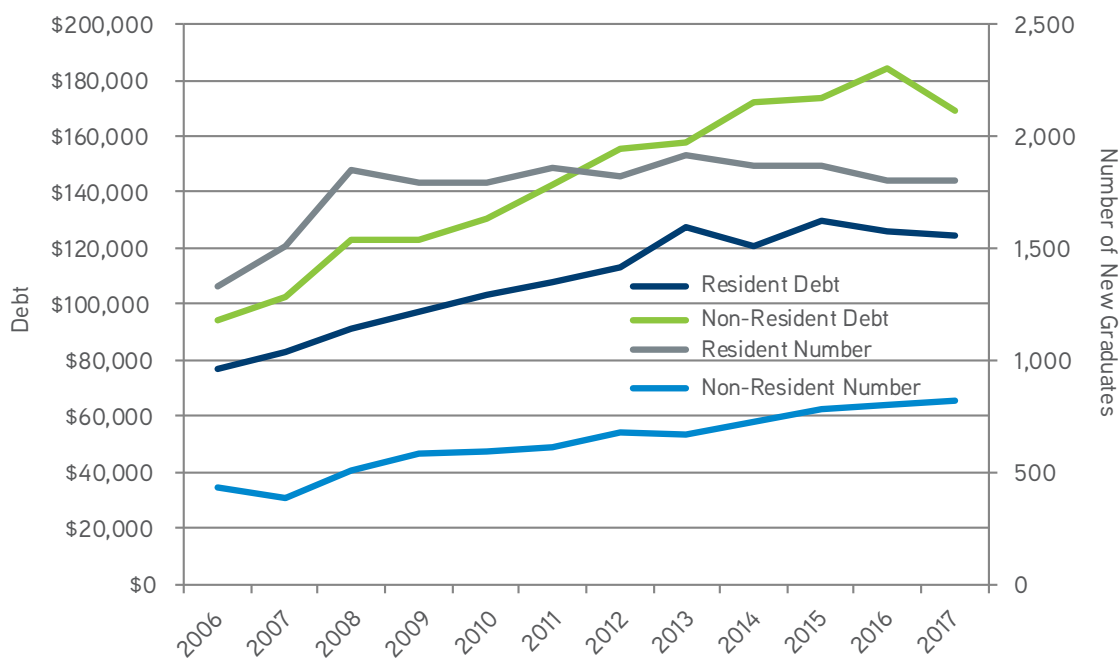


Figure 32

The following chart illustrates the number of new veterinarians graduating, who have reported zero debt or otherwise, and those graduating with non-zero debt. From 2001 through 2015, although the number of students with no non-zero debt remained relatively constant, with an increasing class size, the proportion has been shrinking. In 2001, 15.4 percent reported graduating with no debt and this proportion has been on a steady decline,

with 11.2 percent reporting graduating with no debt in 2015. However, a large increase occurred in 2016 with just over 14 percent of the graduating class reporting having no educational debt followed by another increase to 17.2 percent of new graduates reporting no debt in 2017. This most recent year's measure is the highest percent over the last 17 years, the entire period under observation.

### DEBT OF ALL STUDENTS VS. ONLY STUDENTS WITH NON-ZERO DEBT

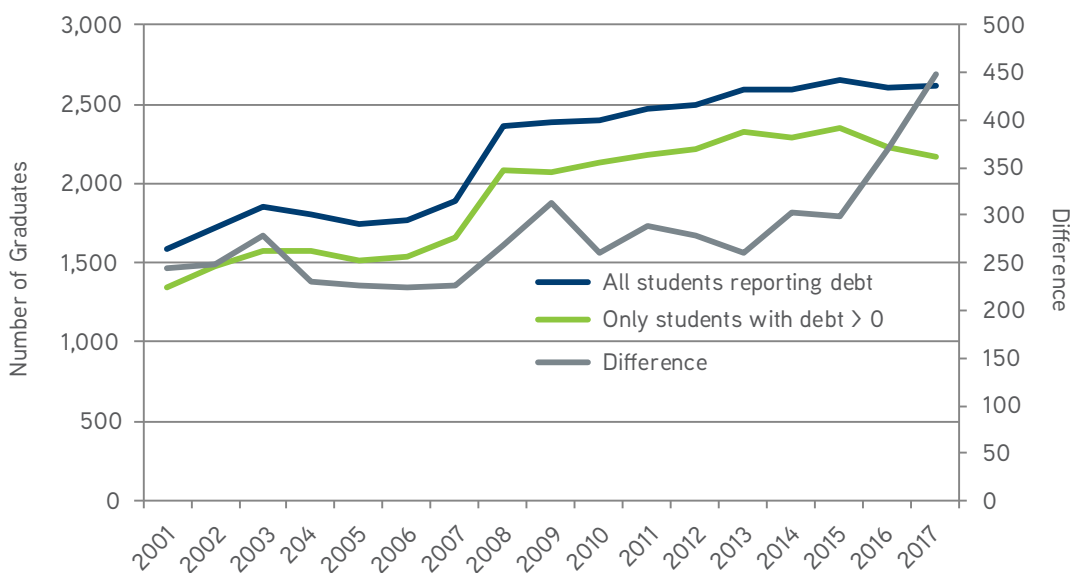


Figure 33

The following chart shows the proportion and number of new veterinarians who've reported they graduated with zero debt. As previously mentioned, in 2017 the highest proportion of the class graduated with zero debt since 2001. At 17 percent, this was the largest proportion as well as the greatest number of new veterinarians graduating without DVM debt.

### NEW VETERINARIANS WITH NO DVM DEBT

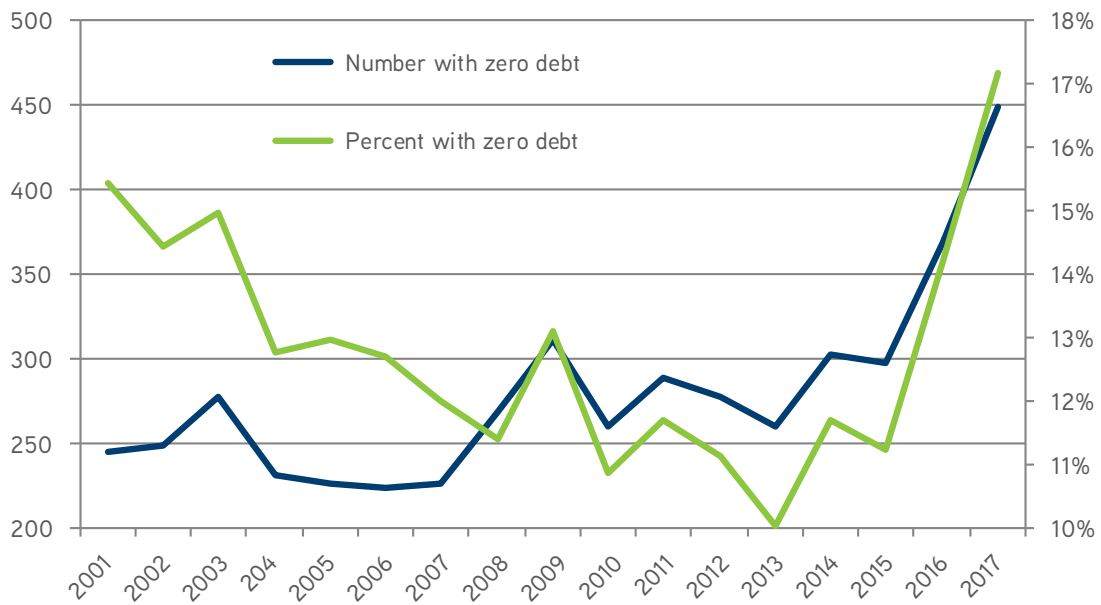


Figure 34

Similar to the methods used to determine the real weighted mean income index, we determine the real weighted mean DVM debt index (RWD) by measuring the annual change in the debt load of a constant cohort of graduates and adjusting for inflation. In 2014 dollars, The RWD nearly doubled from slightly over \$75,000 in 2001 to just over \$141,000 in 2016 and declined in 2017 to \$131,543. To determine this measure, we held constant the following: ratios of gender, the percentage of students in residency status, and the distribution of graduates across schools based on cost of tuition.

### REAL INDEXED DVM DEBT & UNWEIGHTED DEBT

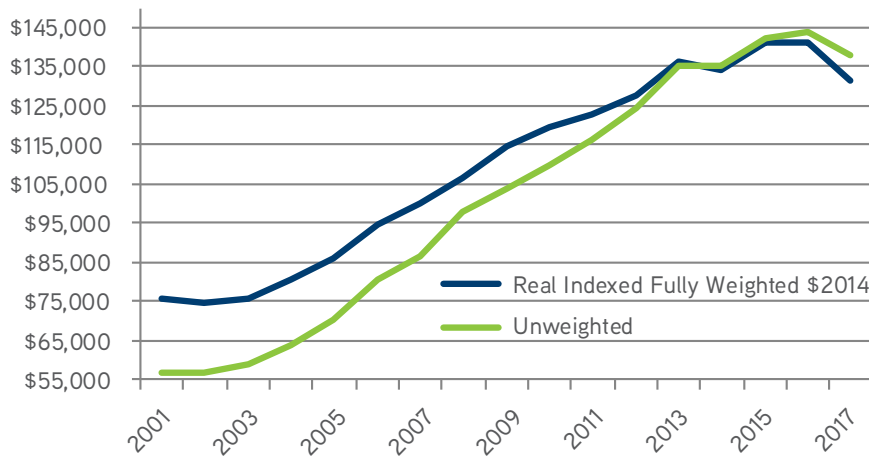


Figure 35

### FACTORS AFFECTING DEBT FOR NEW VETERINARIANS

Like the methods used to determine the factors explaining the variation in income, we calculated a multiple linear regression to determine the factors significant in explaining the variation in debt. The factors under observation were the region in which the school is located, the tuition range, age, gender, income, residency status, and a time series factor – year of graduation.

Our baseline variables were schools in Region 3 and schools with “low tuition.” Schools in Region 3 are schools located in

an area with a ZIP code beginning with 3. To determine tuition grade, we determined by year, the mean tuition and categorized as “low tuition” those schools with tuition that was within two standard deviations below the mean; “median tuition” referred to those schools with tuition above the mean tuition but within two standard deviations above the mean; and schools labeled “pricy tuition” were those with tuition above two standard deviations above the mean tuition.

According to our regression model, new veterinarians graduating from schools in Region 6 had \$8,170 more debt than new veterinarians graduating from schools in Region 3, and new veterinarians graduating from schools with “pricey tuition” had \$70,611 more debt than those graduating from schools with “low tuition.”

Female veterinarians graduated with over \$6,200 more debt, on average, than male veterinarians, and non-residents graduated with an average of \$37,970 more debt than residents had. In addition, each year, mean DVM debt increased by approximately \$5,023.

As in the regression explaining the variation in income, the non-standardized coefficients in this regression explaining the variation in debt represent the dollar value attached to the variable in question, whereas the standardized coefficients represent the

relative value of each coefficient. For example, the standardized coefficient for “pricey tuition,” 0.198, indicates that the debt incurred from graduating from a school that has “pricey tuition” carries more than five times more weight than the debt incurred from going to a school in Region 0, with a coefficient of 0.037.

Of importance is the unstandardized coefficient for year of the survey, which indicates that the mean value of costs has increased by nearly \$5,023 per year, as opposed to an annual increase of \$5,800 in 2016. An additional finding of importance is that, while the model explaining the variation in income explains more than 71 percent of the variation with the factors available, this model to explain the variation in debt among students at graduation was only able to explain approximately 18 percent of the variation with the same set of variables. Thus, there are important variables which have not been accounted for that determine how much debt each student has at graduation.

## FACTORS AFFECTING DEBT OF NEW VETERINARIANS

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	\$(10,141,506)	301,896		-33.593	.000
	Year of the survey	\$5,023	150	.221	33.444	.000
	Region of School 0	\$(15,922)	3,166	-.037	-5.029	.000
	Region of School 1	\$(20,975)	2,368	-.070	-8.858	.000
	Region of School 2	\$(4,899)	2,259	-.016	-2.169	.030
	Region of School 3	Baseline				
	Region of School 4	\$10,707	1,988	.044	5.385	.000
	Region of School 5	\$5,441	1,934	.022	2.813	.005
	Region of School 6	\$8,170	1,913	.033	4.271	.000
	Region of School 7	\$(15,104)	1,904	-.062	-7.932	.000
	Region of School 8	\$(4,184)	2,679	-.011	-1.561	.118
	Region of School 9	\$2,851	1,985	.012	1.436	.151
	Low Tuition	Baseline				
	Median Tuition	\$22,124	1,286	.134	17.207	.000
	Pricey Tuition	\$70,611	2,648	.198	26.663	.000
	Age	\$2,943	158	.121	18.595	.000
Gender	\$6,271	1,222	.033	5.130	.000	
Income	\$0	0	.031	4.731	.000	
Resident/Non-Resident	\$37,970	1,179	.211	32.196	.000	
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	22,653,014,990,503	16	,415,813,436,906	273.008	.000
	Residual	104,455,781,103,836	20,142	5,185,968,678		
	Total	127,108,796,094,339	20,158			
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	0.422	.178	.178	72,013.67		

Table 5



## NEW VETERINARIAN DEBT-TO-INCOME RATIO

### The debt-to-income ratio varies significantly by post-graduate plans.

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 DIR measures the percentage of debt covered by annual income. Although some economists suggest that a debt-to-income ratio of 1:1 may be the limit that should be considered to guarantee personal financial sustainability, this best applies to non-professional undergraduate degrees. Because the increases in income associated with experience is much greater for those with professional degrees, especially graduate professional degrees, the level of debt-to-income that can be serviced without posing serious financial stress is likely closer to 1.4:1.

In the following chart we illustrate several measures for the DIR. The first (highest DIR) represents the mean of the individual debt-to-income ratios. The middle line represents the mean of the individual debt-to-income ratios adjusted to maintain a constant cohort of veterinarians over time. The last (bottom line) provides the simple ratio of the mean of all reported incomes and all reported debt. In all cases, only the incomes of those graduates with full-time employment are included and all reported debt values are included. In other words, the sample of observations of debt is larger than the sample of income from graduates with full-time employment and thus this measure is inaccurate. The first two measures

are based on graduates who have both incomes from full-time employment and reported debt. The AVMA DIR that is used as a KPI is the fully weighted, individual DIR or the real weighted mean Index. The real weighted DIR in 2017 is 1.86, down from 2.00 in 2016, in part attributable to more graduates reporting having zero debt, coupled with an increase in starting salaries.

### DEBT-TO-INCOME RATIO MEASURES

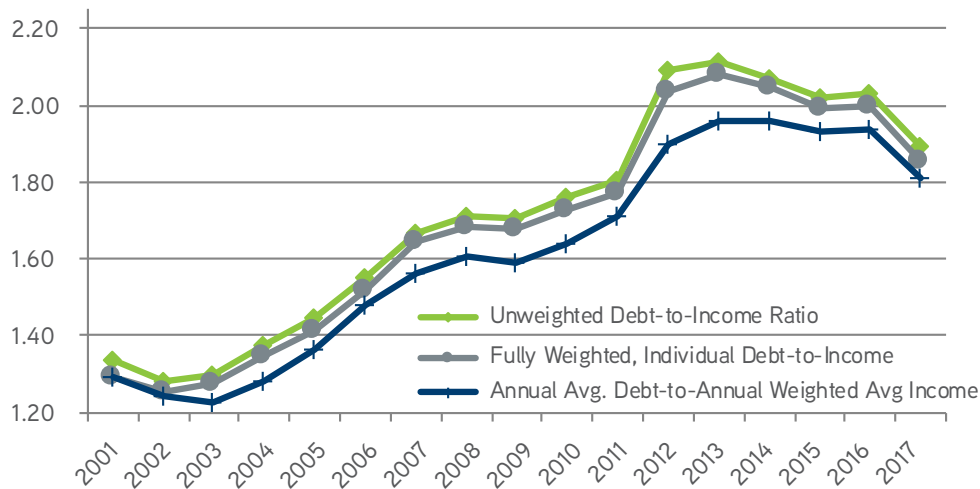


Figure 36

The debt-to-income ratio varies significantly by post-graduate plans. This is somewhat intuitive since we know that practice type is significant in explaining the variation in incomes. The variation in incomes can also be explained by the shifting demand for veterinarians in the respective sectors. Consequently, to portray an accurate picture of the debt-to-income ratio of the profession it is necessary to observe a constant cohort of veterinarians. By doing this, we avoid observing the effects of a changing demographic and attributing these to economic factors.

New veterinarians pursuing public practice have had on average the lowest debt-to-income ratio for most of the period 2001 through 2016. The new, public practitioners' DIR overtook the

DIR of new veterinarians pursuing private practice in 2016 but returned to the lowest DIR in 2017. In 2016 new veterinarians pursuing employment in private practice reported a debt-to-income ratio of 1.99, the lowest of the group, while new veterinarians pursuing employment in public practice had an increase in DIR from 1.85 in 2015 to 2.5 in 2016. In 2017 the lowest DIR was held by new veterinarians in public practice, at 1.79, with private practice hovering closely at 1.89. On the other hand, new veterinarians pursuing internships had the highest debt-to-income ratio for most of the same period, with a mean debt-to-income ratio of 4.89 in 2015, 4.69 in 2016 and 4.34 in 2017. Though declining, it was still double that of those securing employment in public practice.

### DEBT-TO-INCOME RATIO BY POST-GRADUATE PLANS

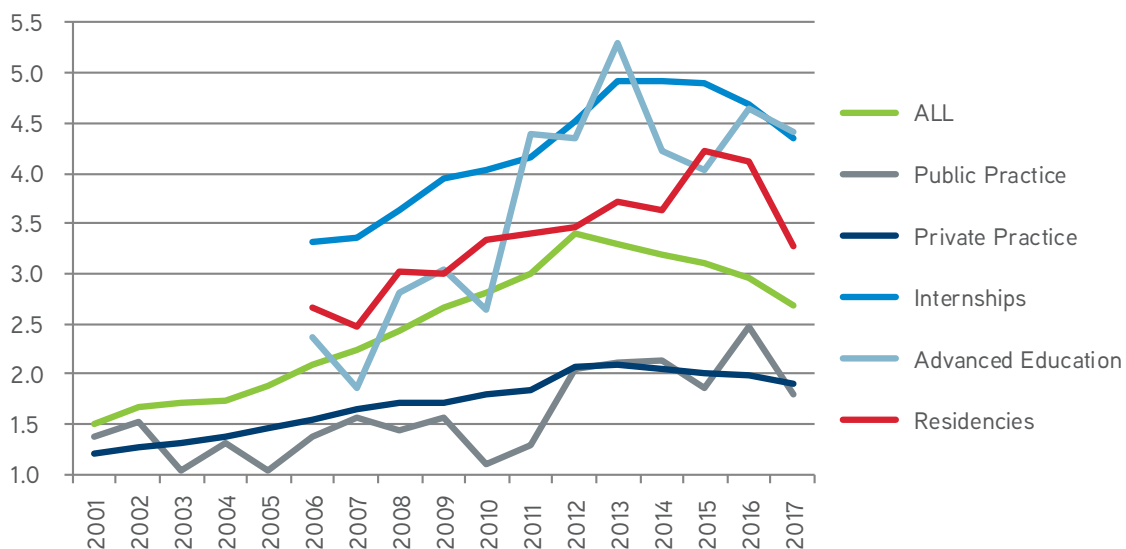


Figure 37

## FACTORS SIGNIFICANT IN EXPLAINING THE DEBT-TO-INCOME RATIO

The analyses of the factors that contribute to the difference between the individual level of income and the mean income, and for individual debt and mean debt, for graduates from 2001 to 2017 have been illustrated previously. The following analysis shows the factors that explain the differences between the DIR for each individual and the mean DIR for the sample of all graduates between 2001 and 2017 who reported income and debt. A regression of debt-to-income as a function of year, age, and gender, whether the respondent had children, sought employment, or received any offers; and number of hours and weeks expecting to work, additional degrees held, location of anticipated place of employment, practice type, GDP lagged one year, and veterinary college was performed. Results are provided in the following table.

For comparison with the other variables in the respective groups, The Ohio State University, companion animal predominant (the most populated sector for full-time employment) and new positions located outside the United States, were designated as baselines and omitted from the model.

The following factors were found to be statistically significant in explaining the variation in the debt-to-income ratio of survey respondents, at a 5 percent level of significance: year of graduation, age, gender, hours expected to work, GDP lagged one year, various practice types (food animal, companion animal, mixed practice, equine, government services, uniformed services, industry and not-for profit) and the college of graduation. The group with the most significant variables was the college of

graduation. Out of 28 universities, 24 were significantly different from The Ohio State University in contributing to the variation in the debt-to-income ratio. Veterinary colleges at Kansas State University, Michigan State University and the University of Pennsylvania were not statistically different from The Ohio State University.

The unstandardized coefficient indicates the change to the constant debt-to-income ratio attributable to each characteristic (variable). For instance, the mean DIR of women is 0.182 higher than the mean debt-to-income ratio of men over the 2001 to 2017 period and every year older the new veterinarian is, 0.042 is added to that age group's mean DIR.

Graduates of Tuskegee University, University of Minnesota and Western University have a mean DIR that's above the mean DIR of The Ohio State University graduates. Western University had the highest mean attributable to college at 1.977 higher than the mean at The Ohio State University, while all other U.S. colleges had a mean DIR below the mean DIR of the baseline institution, The Ohio State University. This reflects the difference in costs across colleges. However, new veterinarians in the baseline practice type, companion animal predominant, had the highest mean DIR, followed by new veterinarians securing employment in college or university positions; uniform services had the lowest mean DIR, 2.056 less than companion animal predominant. This reflects the difference in starting salary across different occupational paths.



## FACTORS AFFECTING THE DEBT-TO-INCOME RATIO

		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
Basic Information	(Constant)	3.906	.783		4.987	.000
	Last 2 digits of grad year	.119	.006	.243	20.026	.000
	Age	.042	.004	.062	10.498	.000
	Gender: Female=1	.182	.030	.033	6.003	.000
	Have children: No=1	.012	.052	.001	.224	.822
	Seeking Employment or Adv. Educ.	-.330	.159	-.011	-2.078	.038
	Received offers	.131	.392	.002	.335	.738
	Anticipated Work hours/week	.026	.001	.155	24.183	.000
	Work at least 48 weeks/year	.072	.096	.004	.753	.452
	GDP lagged 1 year	-9E-05	.000	-.079	-6.542	.000
Additional Degrees	Admitted Before earning degree	BASELINE				
	Bachelor's degree	.296	.042	.049	7.103	.000
	Master's degree	.261	.066	.027	3.970	.000
	Doctorate degree	-.060	.163	-.002	-.369	.712
	Other Professional degree	-.214	.251	-.005	-.852	.394
	Other degree	.601	.198	.016	3.036	.002
Region of New Position	Region 0	.314	.146	.036	2.146	.032
	Region 1	.033	.145	.004	.230	.818
	Region 2	-.113	.144	-.015	-.785	.432
	Region 3	-.032	.143	-.005	-.223	.823
	Region 4	-.174	.145	-.022	-1.203	.229
	Region 5	-.185	.149	-.020	-1.242	.214
	Region 6	-.113	.147	-.013	-.771	.441
	Region 7	-.005	.146	-.001	-.034	.973
	Region 8	-.107	.145	-.013	-.737	.461
	Region 9	-.324	.144	-.044	-2.251	.024
Outside the US	BASELINE					
Practice Type	Food animal practice (exclusive)	-1.584	.090	-.097	-17.685	.000
	Food animal practice (predominant)	-1.499	.085	-.098	-17.638	.000
	Mixed practice	-1.332	.047	-.167	-28.510	.000
	Companion animal practice (exclusive)	-1.336	.033	-.266	-40.301	.000
	Companion animal practice (predominant)	BASELINE				
	Equine practice	-.726	.078	-.050	-9.341	.000
	Federal Government (civil service)	-1.510	.200	-.040	-7.561	.000
	Uniformed services	-2.056	.102	-.109	-20.217	.000
	College or University (faculty or staff only)	.074	.224	.002	0.329	.742
	State or Local Government	-.817	.459	-.009	-1.779	.075
	Industry or commercial organizations	-1.723	.270	-.034	-6.376	.000
	Not-for-profit organizations	-1.055	.193	-.029	-5.460	.000

## FACTORS AFFECTING THE DEBT-TO-INCOME RATIO CONT'D.

University	Auburn University	-.957	.085	-.076	-11.317	.000
	Tuskegee University	.312	.103	.019	3.020	.003
	University of California-Davis	-.872	.091	-.069	-9.593	.000
	Colorado State University	-.527	.083	-.046	-6.339	.000
	University of Florida	-.560	.089	-.043	-6.272	.000
	University of Georgia	-1.157	.084	-.096	-13.757	.000
	University of Illinois	-.638	.084	-.056	-7.609	.000
	Iowa State University	-.424	.085	-.036	-4.965	.000
	Kansas State University	-.049	.085	-.004	-.574	.566
	Louisiana State University	-.849	.090	-.065	-9.417	.000
	Tufts University	-.201	.089	-.016	-2.263	.024
	Michigan State University	-.041	.081	-.003	-.505	.614
	University of Minnesota	.449	.091	.035	4.955	.000
	Mississippi State University	-.227	.094	-.016	-2.415	.016
	Purdue University	-.732	.098	-.046	-7.492	.000
	Cornell University	-.881	.082	-.076	-10.768	.000
	Oklahoma State University	-.804	.092	-.061	-8.758	.000
	University of Pennsylvania	-.034	.091	-.003	-0.377	.706
	Texas A&M University	-1.398	.083	-.137	-16.918	.000
	Washington State University	-.773	.090	-.060	-8.635	.000
	University of Missouri-Columbia	-.688	.092	-.051	-7.515	.000
	Oregon State University	-.443	.119	-.023	-3.736	.000
	University of Tennessee	-.492	.093	-.035	-5.287	.000
	Virginia-Maryland College	-.654	.084	-.055	-7.774	.000
	North Carolina State University	-1.211	.089	-.091	-13.552	.000
	University of Wisconsin	-.651	.091	-.048	-7.117	.000
	The Ohio State University	BASELINE				
Western University of Health Sciences	1.977	.102	.126	19.360	.000	

## ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41,932	62	676.328	170.213	.000
	Residual	101,938	25,655	3.973		
	Total	143,870	25,717			

## MODEL SUMMARY

Model	R	R Square	Adj. R Square	Std. Err.
1	.540	.291	.290	1.99334

Table 6

## DEBT-TO-INCOME RATIO PROJECTIONS

Using GDP, the number of new veterinarians graduating from U.S. colleges each year, the number of new veterinarians finding full-time employment, and historical debt and income, the following chart projects debt, income and the debt-to-income ratio of new veterinarians. The solid portion of the line portrays the actual, mean debt, income, and debt-to-income ratio of the graduating classes 2001 through 2017 and the perforated portion of the line represents projected estimates.

Until about 2005, the slope of the debt curve and the income curve remained relatively parallel, growing at a comparable rate. After 2005 the rate of increase of the debt far exceeded the rate of increase of the income of new veterinarians. As a consequence, the DIR began increasing steadily. At the projected rate of increase of the debt and income levels of the graduating class, we estimate that the DIR will increase to almost 2.10 by 2027.

### DEBT AND INCOME: GRADUATES OF U.S. COLLEGES WITH FULL-TIME EMPLOYMENT

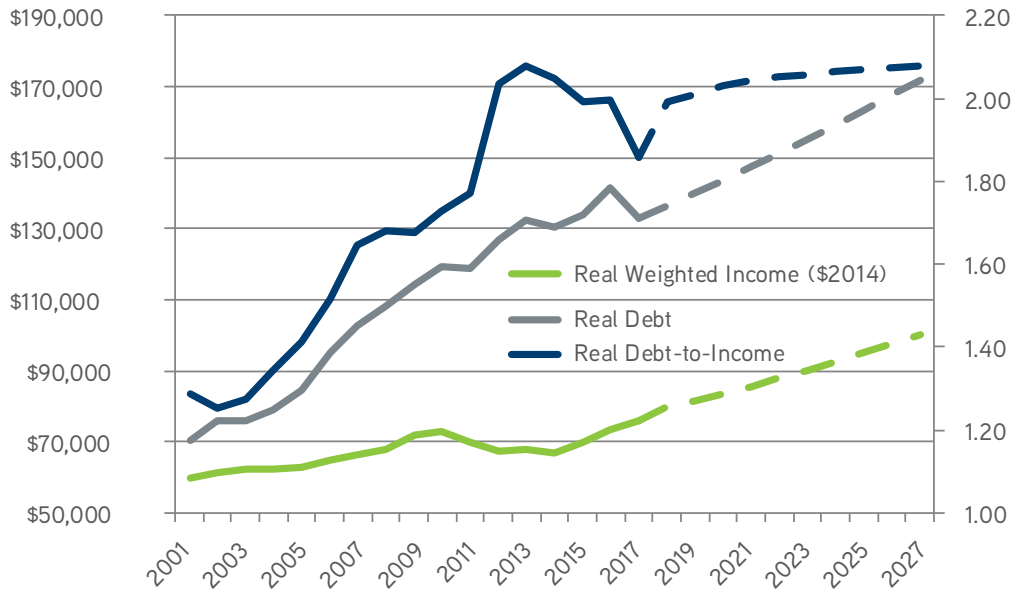


Figure 38

Similar to the updates made by the Federal Reserve Bank of St. Louis and the U.S. Census Bureau, every year, the AVMA Economics Division updates its projection of the debt, income, and debt-to-income ratio of the graduating class. The blue lines in Figure 38 represent 2016's projections, whereas

the perforated, continuous lines represent the 2017 updated projections. The income projection of 2017 was adjusted upward and the debt downward, since 2016's projections were below the actual 2017's mean. As a result, the projected DIR declined and was also shifted downward.

### DEBT AND INCOME: GRADUATES OF U.S. COLLEGES WITH FULL-TIME EMPLOYMENT, HISTORIC AND PROJECTIONS

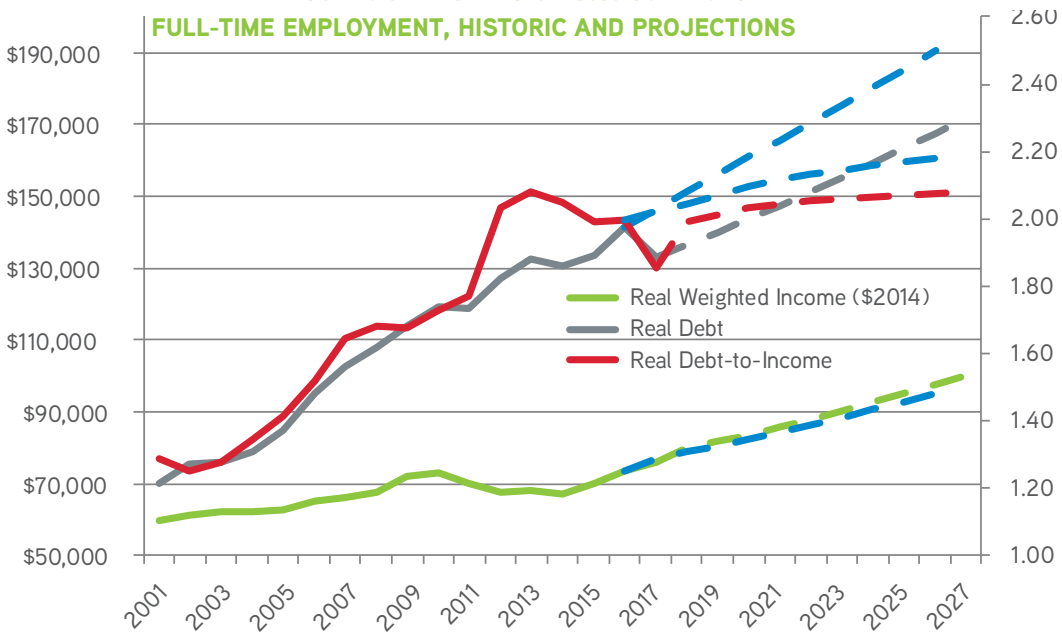
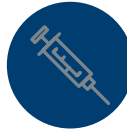


Figure 39



## DEBT AND INCOME OF THE 2017 GRADUATING CLASS



**the percentage of the class with zero debt has been steadily increasing, up from 14 percent in 2016 to 17 percent in 2017.**

The mean debt of U.S. respondents reporting debt for the 2017 graduating class was \$138,066.79 with a standard deviation of \$90,851.58. Figure 39 illustrates the distribution of debt for the 2017 graduating class. While 44 percent of the class graduated with debt levels that lie between \$100,000 and \$200,000, the percentage of the class with zero debt has been steadily increasing, up from 14 percent in 2016 to 17 percent in 2017.

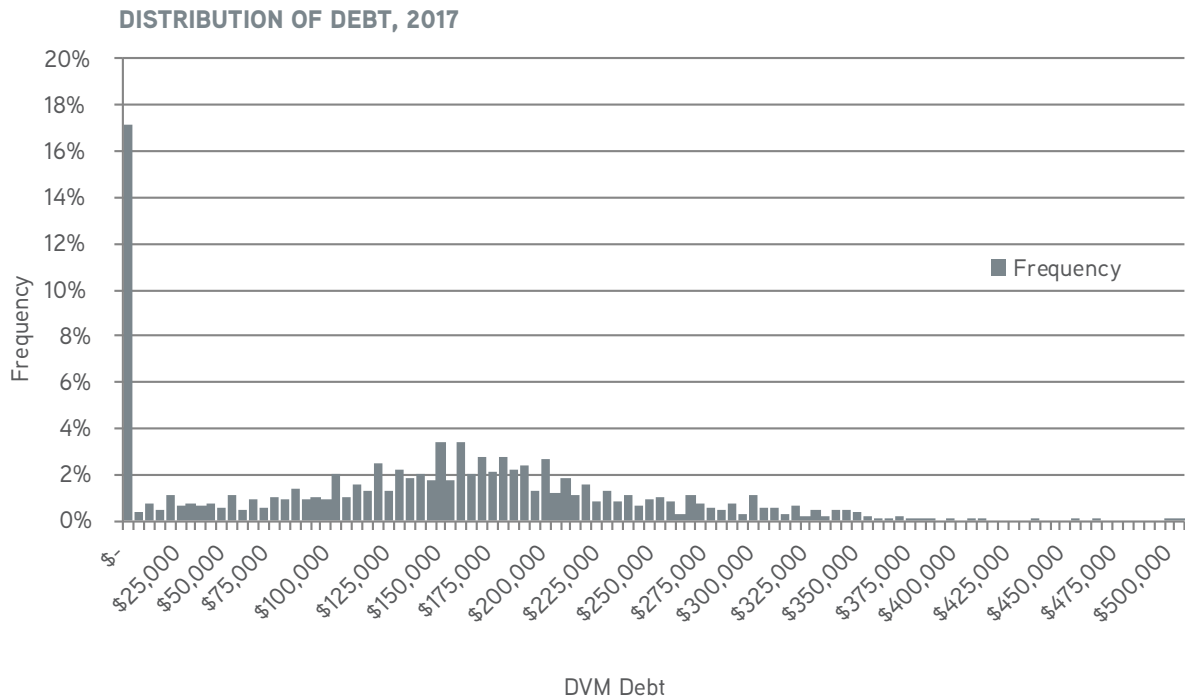


Figure 40

Within the 2017 graduating class, 67.8 percent of respondents had a debt between \$50,000 and \$270,000 and 94.7 percent had less than \$305,000 in debt. Observations beyond \$305,000 may be considered statistical outliers. The mean debt of individuals with debt under \$305,000 was \$157,482.80 excluding those with zero debt.

The following chart illustrates the distribution of reported income, including internships, residencies and other continuing education. The chart has two peaks hovering around \$30,000 and \$75,000.

The first normally distributed set of bars, peaking at a mean of \$30,000, primarily represents the compensation of new veterinarians opting to pursue internships, residencies and other continuing education. The second set of normally distributed bars primarily represents the incomes of new veterinarians securing full-time employment. Evidently, those selecting to pursue internships, residencies and continue their education earn a mean of \$40,000 less than those selecting to pursue full-time positions in veterinary medicine.

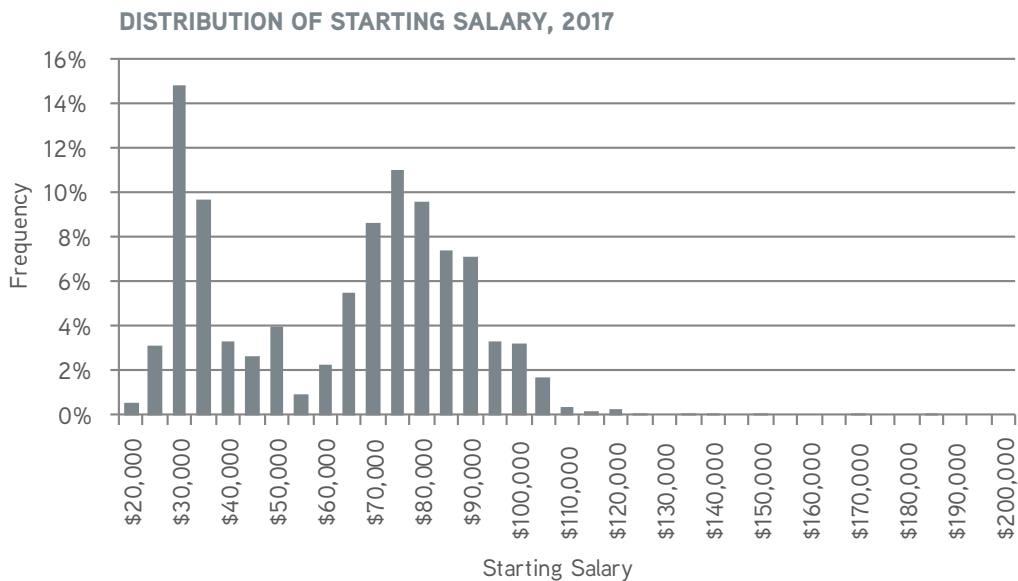


Figure 41

The distribution of starting salaries presented represents 85 percent of the 2017 graduating class. At the time the survey was distributed, approximately 95 percent of veterinary students had secured full-time employment or advanced education and 85 percent provided information about income from the positions they had secured. However, the following table shows data from AVMA's Census of Veterinarians, which was sent to all 2015 graduates in March of 2017. These graduates have approximately one year's experience.

The mean income of new veterinarians with one year's experience is \$68,250 with a 95 percent confidence interval of within \$66,133 and \$70,368. That is, statistically, we are 95 percent confident that the mean income of veterinarians with one year's experience lies within the aforementioned range.

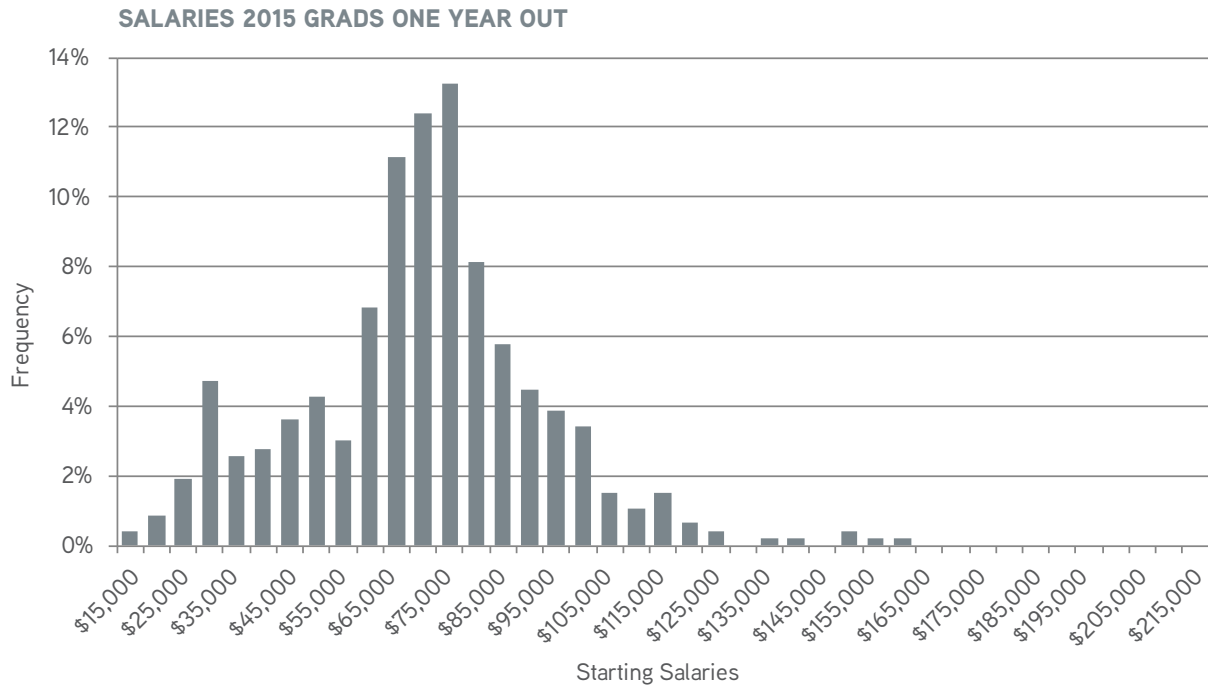


Figure 42

Using the individually reported debt and income, the distribution of the debt-to-income ratio is computed for all graduates who provided a value for debt and a starting salary for full-time employment. The distribution includes a large number of observations at both ends of what might otherwise be a normally distributed sample of graduates. More research is needed to understand what factors contribute to the large number of observations at both ends of the distribution. Most important in the illustration is that the majority of graduates have debt-to-

income ratios at the beginning of their career that far exceed the 1.4:1 DIR that establishes an upper bound for "acceptable" levels of financial stress.

For the 2017 graduating class, 76.7 percent of graduates reported a debt-to-income ratio of 1.0 or larger. More than two-thirds (69.1 percent) reported a DIR of 1.4 or greater, 53.5 percent reported a DIR of 2.0 or greater and 5.5 percent reported a DIR of more than 4.0.

### DISTRIBUTION OF DEBT-TO-INCOME RATIO, 2017

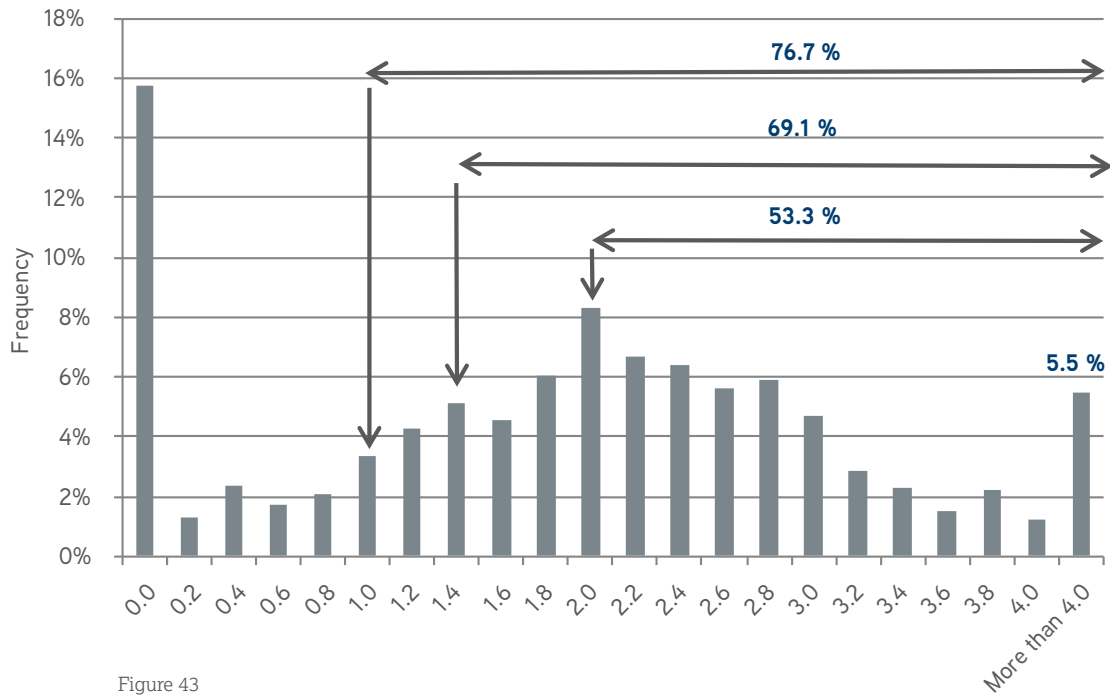


Figure 43

Similar to 2016's findings, the following chart illustrates, in general, that debt levels are about double that of income levels. In addition, the distribution of incomes of new veterinarians finding full-time employment is much more concentrated around the mean while the distribution of debt is more widely dispersed. These trends have been similar in past years.

### DEBT AND INCOME OF 2017 GRADUATING CLASS

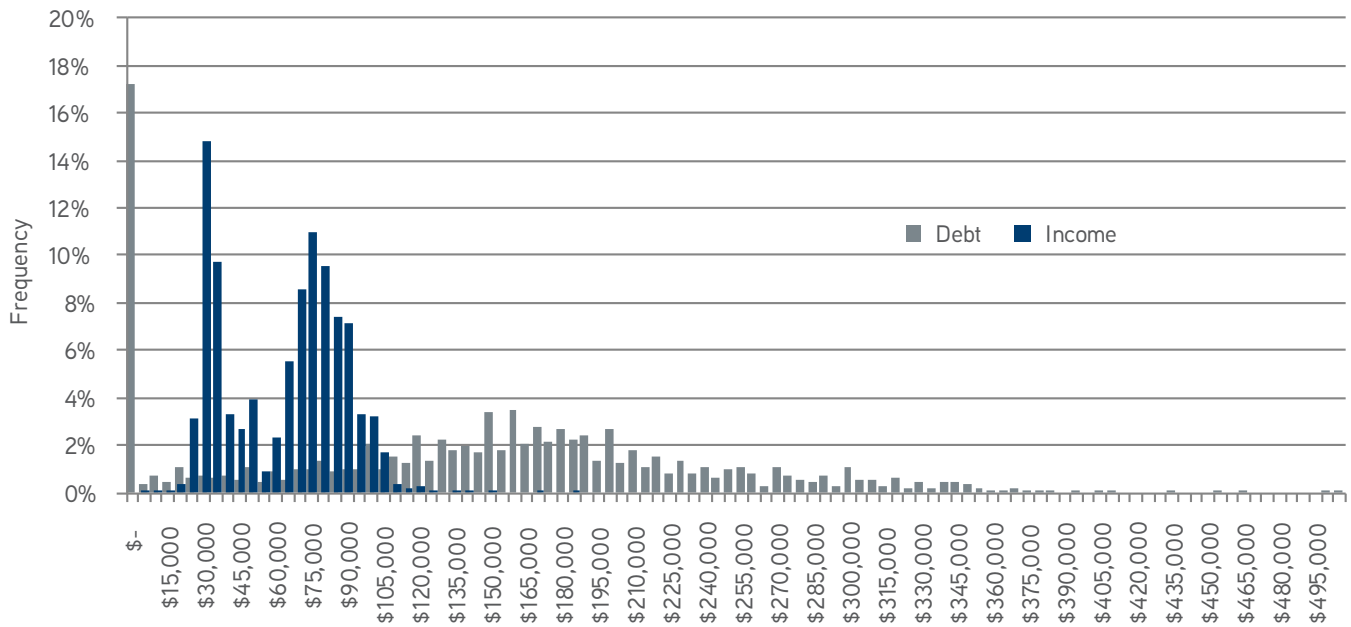


Figure 44

Because the income and debt data from the 2017 class only represents a proportion of the class, the following chart describes a sample of the population surveyed one year after graduation. Evidently, the debt and income numbers of the population one year post-graduation closely mirrors the first years from the senior survey, indicating the validity of our senior survey results.

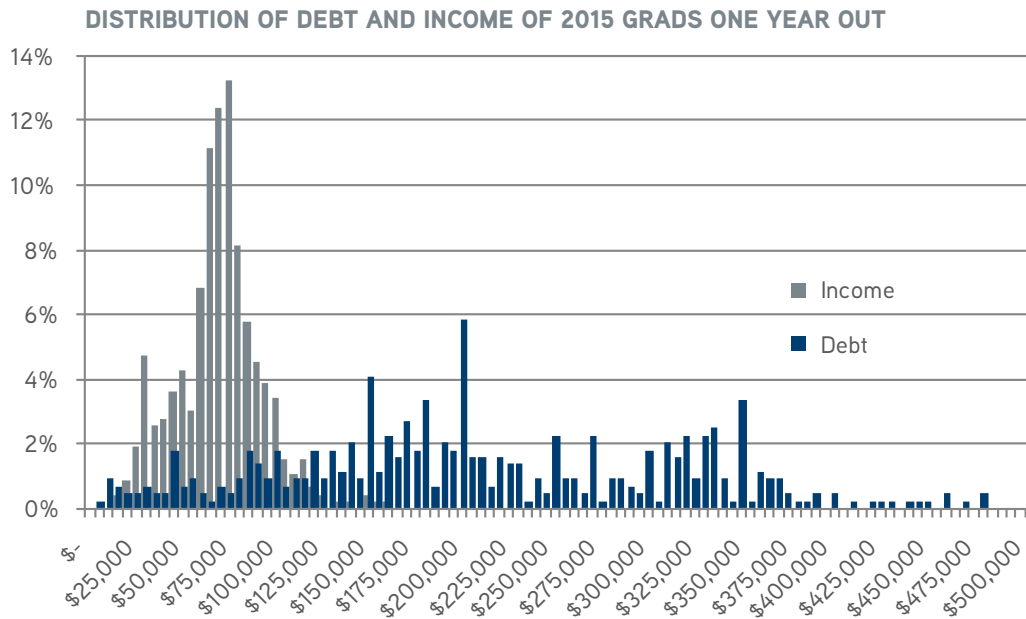


Figure 45

Mean debt for graduates of each of the U.S. veterinary colleges varied from just under \$80,000 to almost \$260,000 in 2017. The mean debt for all graduates across all the U.S. veterinary colleges was just over \$138,000. The school with the highest reported mean debt for 2017 and 2016 was Western University and the lowest was Texas A&M, for both years. Similar to 2016’s findings, each school had reported a mean debt that was significantly lower than the debt of Western University at a 5 percent level of significance, except Tuskegee University.

**2017 MEAN REPORTED DEBT BY SCHOOL**

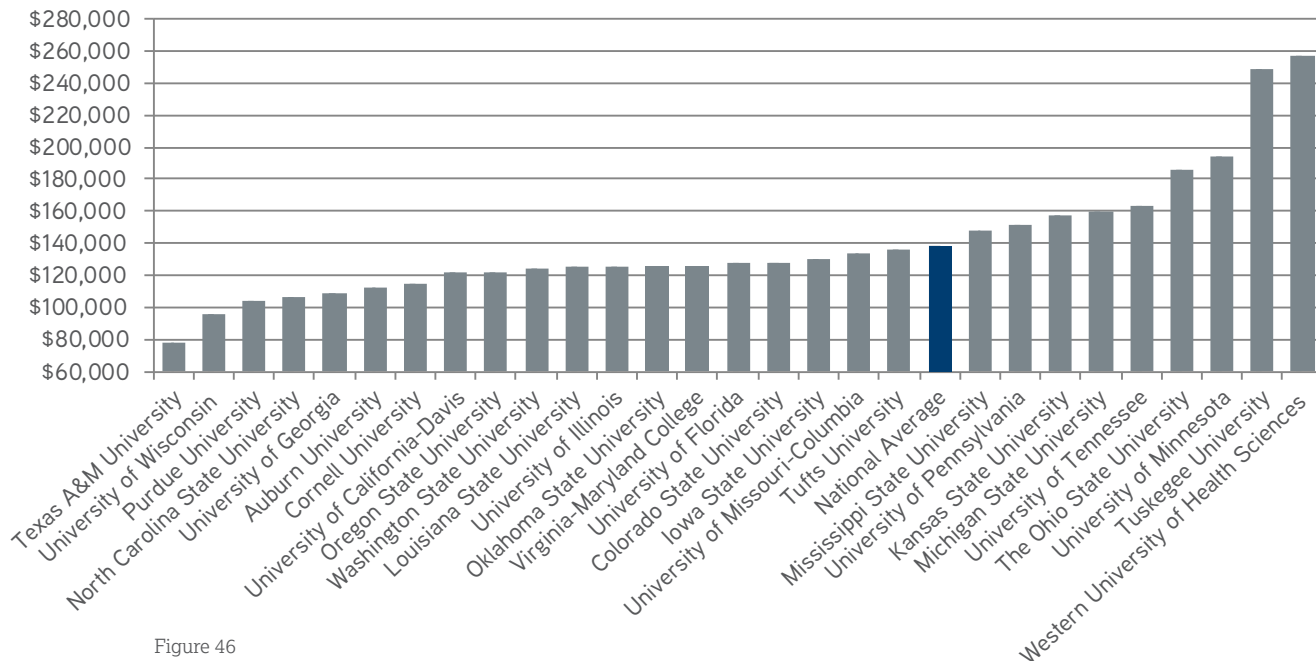


Figure 46



Using the reported residency status of graduates, four years of tuition is subtracted from the reported debt and a mean value of this difference is computed. If the reported tuition for four years was \$80,000 and the DVM debt reported for four years was \$170,000, for example, then the DVM debt over tuition in this instance would be \$90,000 (\$170,000-\$80,000). Interestingly, several of the more expensive schools have a mean debt for graduates that is below the four-year tuition costs.

For students graduating as residents, or paying discount tuition, the schools with the largest, mean debt load above tuition are Tuskegee University, with a mean debt load of \$69,000

above tuition, The Ohio State University, Western University of Health Sciences and Washington State University. With the exception of Tuskegee University, no other school had a mean debt load of \$50,000 more than tuition. Schools with residents graduating with debt loads below tuition in 2017 are University of Pennsylvania, Tufts University, Cornell University, Texas A&M University, Purdue University, University of California-Davis, University of Illinois, Kansas State University, Colorado State University, University of Wisconsin and University of Florida. Graduates of Virginia-Maryland College had a mean debt load closest to the cost of tuition, at only \$2,443 above tuition.

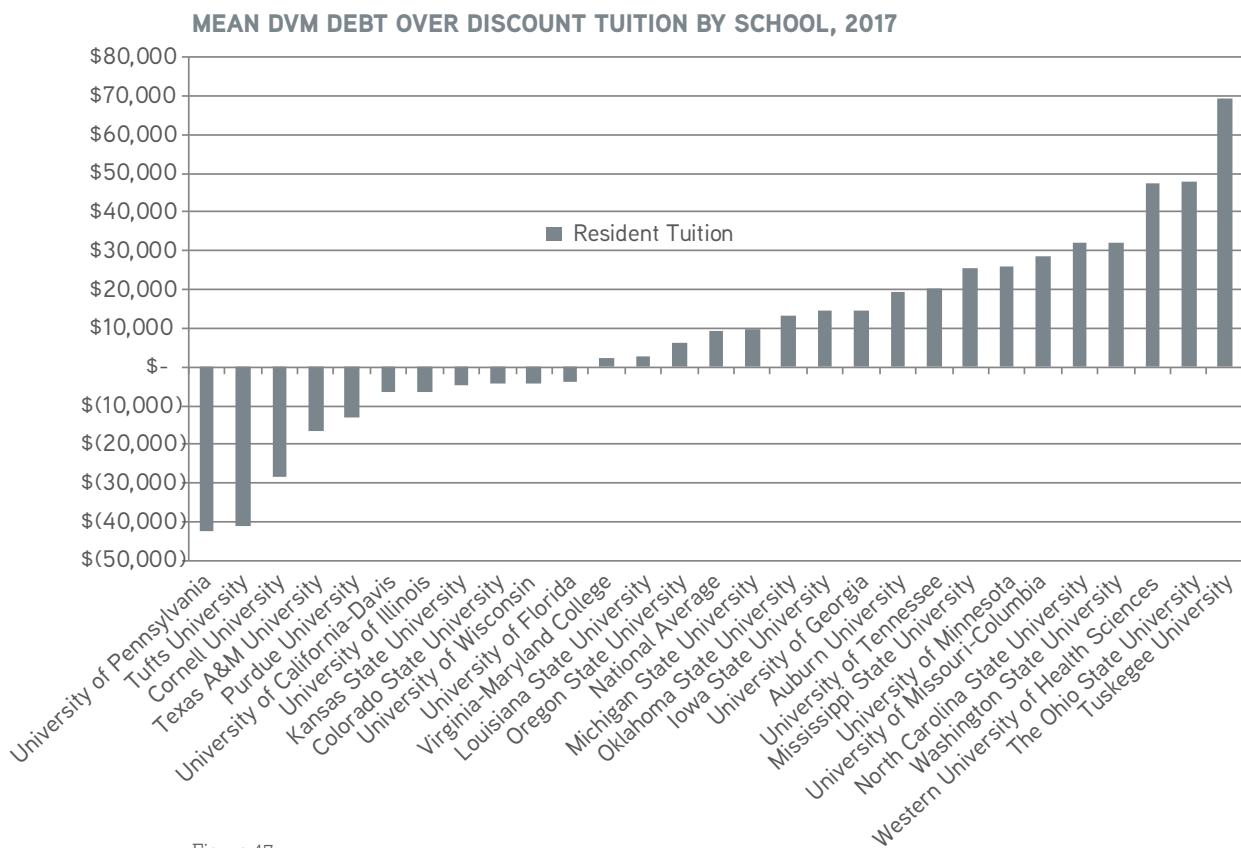


Figure 47

For students graduating with non-resident tuition, the schools with the highest mean debt load over tuition were Tuskegee University, University of Tennessee and Western University of Health Sciences. All other schools reported, for non-resident graduates, a mean debt load below the cost of non-discount tuition.

### MEAN DVM DEBT OVER NON DISCOUNT TUITION BY SCHOOL, 2017

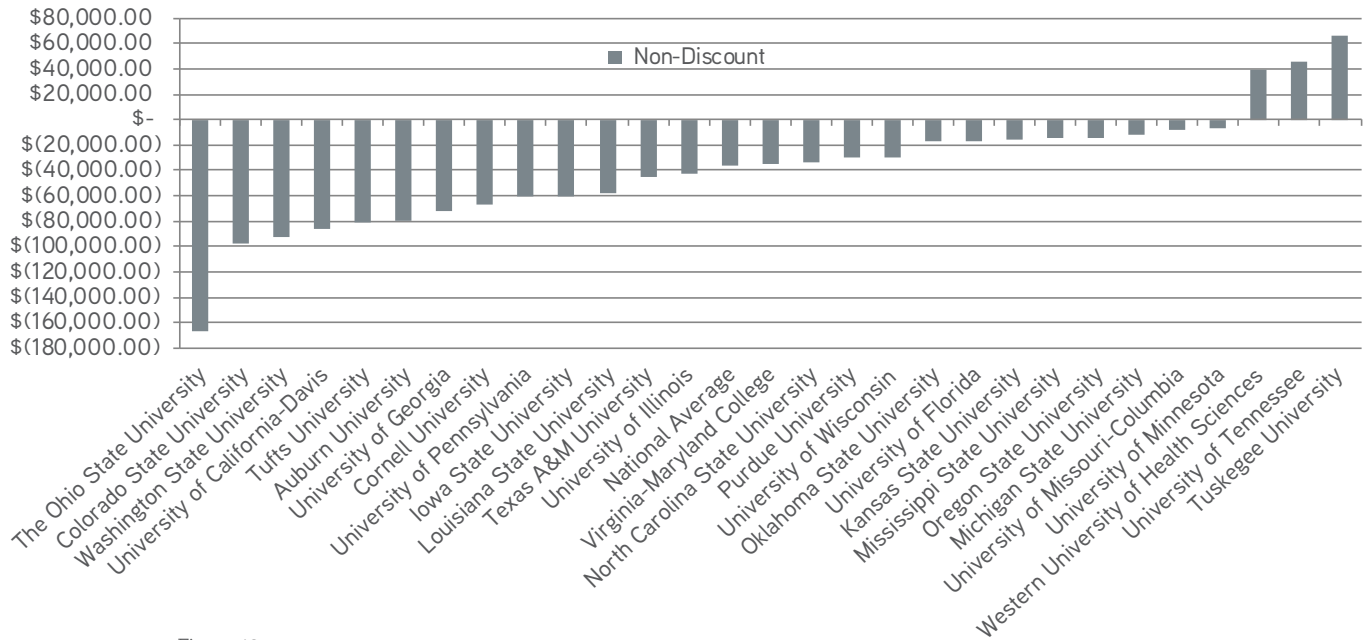


Figure 48

While the mean debt over tuition (i.e., mean debt in dollar value greater than tuition) may be considered as an indication of how much veterinary students may have potentially spent on living expenses, we know that living costs vary by location within the United States. Data on the relative costs of living by state were obtained from the Missouri Economic Research and Information Center, [https://www.missourieconomy.org/indicators/cost\\_of\\_living/](https://www.missourieconomy.org/indicators/cost_of_living/). These values represent those relative costs of living in various locations for the third quarter of 2017.

An illustration of the four-year cost of living, by school, using the U.S. average of \$50,000 as a baseline is provided in the table below. As an example, for this illustration we assume a student budgets \$12,500 per year for four years, then we determine how

much the cost would be in the other states to maintain the same standard of living as provided by the \$50,000 national average. The most affordable veterinary school with respect to cost of living, two years in a row is Mississippi State University where, in 2017, only \$42,100 is necessary to maintain the standard of living that \$50,000 would provide on average in the United States. The most expensive veterinary schools with respect to cost of living are University of California-Davis and Western University -California, where \$70,250 is necessary to maintain the standard of living that \$50,000 would provide on average in the United States. The college of veterinary medicine with a cost of living closest to the U.S. average is the University of Minnesota, where \$49,500 is necessary to sustain a lifestyle afforded to the average U.S. resident with \$50,000.

### COST OF LIVING CENSUS

	Index	Baseline (\$50,000)	College of Veterinary Medicine
Mississippi	84.2	\$42,100	Mississippi State University
Arkansas	87.7	\$43,850	
Michigan	89.0	\$44,500	Michigan State University
Oklahoma	89.3	\$44,650	Oklahoma State University
Tennessee	90.1	\$45,050	University of Tennessee
Indiana	92.5	\$46,250	Purdue University
Kansas	90.7	\$45,350	Kansas State University
Missouri	89.2	\$44,600	University of Missouri-Columbia
Kentucky	93.7	\$46,850	

	Index	Baseline (\$50,000)	College of Veterinary Medicine
Texas	91.6	\$45,800	Texas A&M University
Iowa	90.0	\$45,000	Iowa State University
Alabama	90.2	\$45,100	Auburn University, Tuskegee University
Georgia	91.1	\$45,550	University of Georgia
Nebraska	92.3	\$46,150	
Wyoming	95.5	\$47,750	
Idaho	93.3	\$46,650	
Utah	96.7	\$48,350	
West Virginia	96.8	\$48,400	
Ohio	91.7	\$45,850	The Ohio State University
North Carolina	93.9	\$46,950	North Carolina State University
Illinois	96.6	\$48,300	University of Illinois
Louisiana	93.9	\$46,950	Louisiana State University
New Mexico	92.5	\$46,250	
Wisconsin	95.6	\$47,800	University of Wisconsin
Arizona	96.0	\$48,000	
Florida	98.9	\$49,450	University of Florida
South Carolina	98.4	\$49,200	
North Dakota	99.9	\$49,950	
Minnesota	99.0	\$49,500	University of Minnesota
Montana	101.2	\$50,600	
Virginia	101.9	\$50,950	Virginia-Maryland Regional
Delaware	103.5	\$51,750	
Pennsylvania	101.5	\$50,750	University of Pennsylvania
Nevada	106.6	\$53,300	
South Dakota	95.7	\$47,850	
Colorado	104.0	\$52,000	Colorado State University
Washington	107.6	\$53,800	Washington State University
Maine	113.5	\$56,750	
Oregon	125.7	\$62,850	Oregon State University
New Hampshire	113.7	\$56,850	
Rhode Island	123.0	\$61,500	
Vermont	120.2	\$60,100	
New Jersey	120.5	\$60,250	
Maryland	128.4	\$64,200	
Connecticut	124.9	\$62,450	
New York	134.1	\$67,050	Cornell University
Alaska	131.9	\$65,950	
Massachusetts	127.3	\$63,650	Tufts University
California	140.5	\$70,250	University of California-Davis, Western University of Health Sciences
District of Columbia	157.4	\$78,700	
Hawaii	188.4	\$94,200	
Baseline	100.0	\$50,000	

Table 7

The following chart illustrates the mean DVM debt over tuition by college, coupled with the cost of living associated with the state in which the school is located.

For discount seats, primarily comprised of residents and students whose home states hold contracts with their college to ensure they pay resident tuition, the mean debt load ranges from almost

\$50,000 below the cost of tuition at University of Pennsylvania to almost \$70,000 above the cost of tuition at Tuskegee University. The schools whose resident students have debt levels closest to the cost of tuition are Virginia-Maryland College and Louisiana State University, whose mean debt lie within \$2,500 and \$2,900, respectively, of discount tuition.

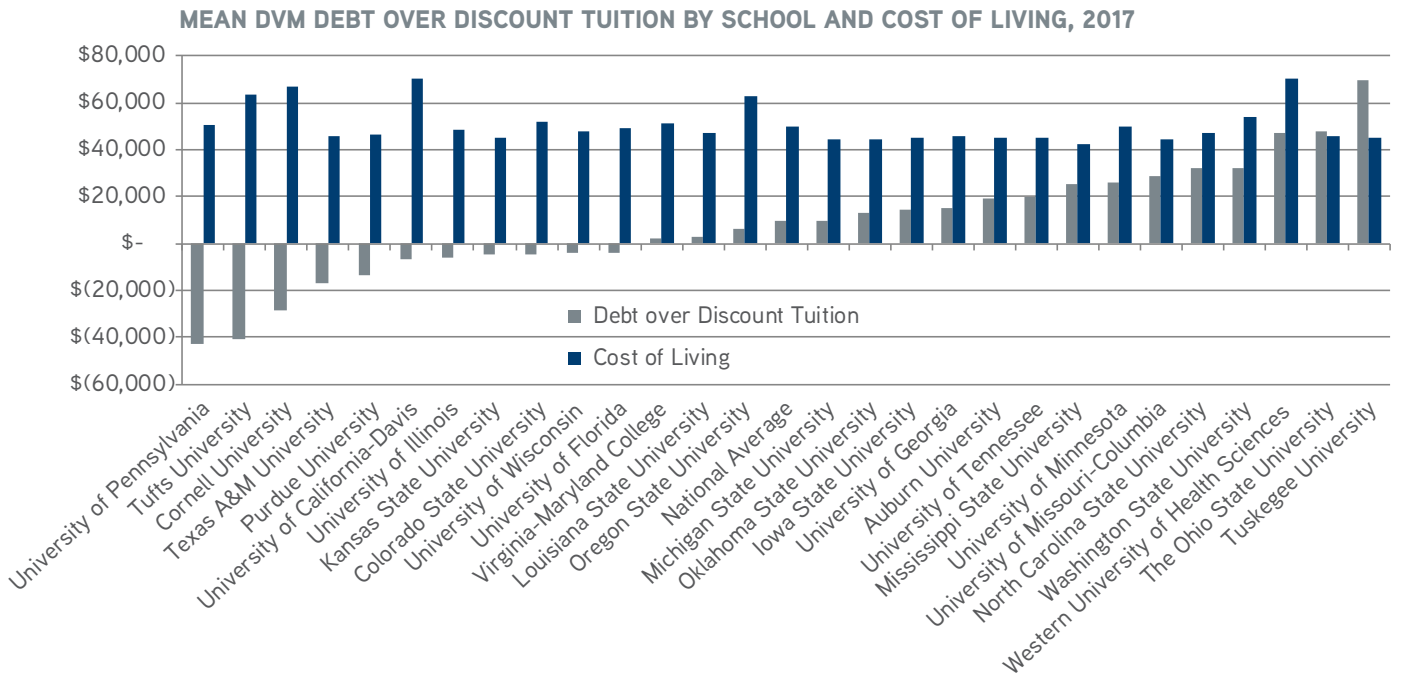


Figure 49

For the non-discount seats, which are primarily occupied by non-residents, there is a large distribution of debt around the cost of tuition. Namely, non-resident graduates of The Ohio State University have mean debt levels of over \$160,000 less than the cost of tuition, whereas graduates of Tuskegee University report mean debt levels of over \$60,000 more than the cost of tuition.

As previously mentioned, debt levels above tuition could be an indication of the cost of living. The cost of living at The Ohio State University, and Tuskegee University (in Alabama), however, are both below the mean cost of living at the national level, while at Tuskegee the mean debt is above the non-discount tuition and at Ohio State, below.

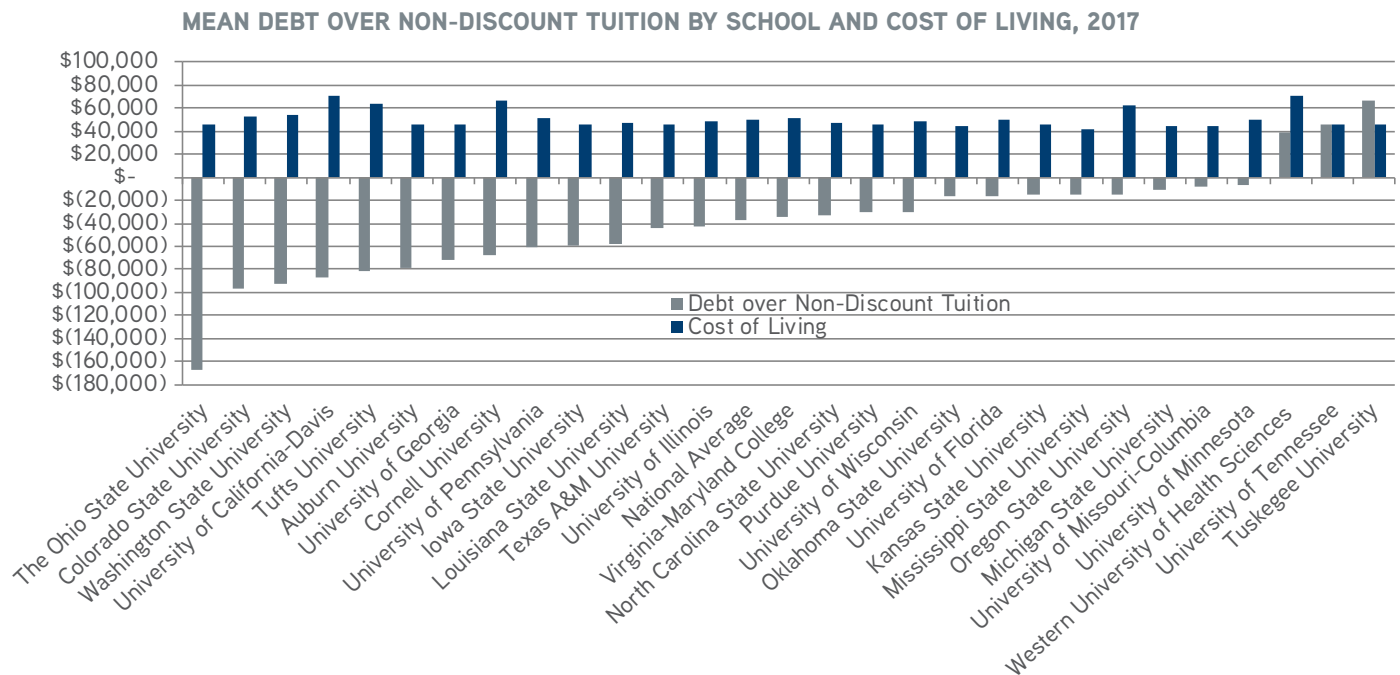


Figure 50

In the following table, we map out by school the number of graduates, mean debt upon entering veterinary college, mean debt upon graduating from veterinary college, mean starting salary and post-graduate plans.

In 2017, University of Missouri-Columbia had the largest proportion of the class reporting having secured post-graduate plans, with 97 percent reporting either finding full-time employment or securing a seat to pursue continuing education. Tuskegee University reported the lowest percentage of students securing a position post-graduation at 68 percent. University of Pennsylvania had the largest percentage of the class pursuing

internships, at 52 percent. Iowa State University had the largest percentage in pursuing positions in public practice at 8 percent and University of Missouri-Columbia had the largest percent securing full-time positions in private practice at 72 percent. Comparably, in 2016, University of California-Davis had the largest percentage of the class pursuing advanced education, inclusive of internships and residencies, at 61 percent. Purdue University had the highest proportion of new graduates pursuing public practice at 9 percent of the class, and Washington State University had the highest percentage of new veterinarians reporting pursuing full-time employment in private practice, at 84 percent of the class.

## NUMBER OF GRADUATES, POST-GRADUATION PLANS AND MEAN DEBT AND INCOME BY SCHOOL, 2017

Veterinary Medical College	2017 Grads	Mean debt upon entering veterinary college			Mean debt upon graduating from veterinary college		
		Mean	N	Std. Dev.	Mean	N	Std. Dev.
Auburn University	118	\$6,569	118	\$14,192	\$119,403	118	\$92,023
Colorado State University	95	\$10,101	95	\$23,807	\$138,228	95	\$104,341
Cornell University	100	\$11,074	100	\$20,632	\$126,096	100	\$91,302
Iowa State University	134	\$16,978	134	\$20,732	\$147,197	134	\$81,295
Kansas State University	72	\$12,824	72	\$27,645	\$170,797	72	\$123,292
Louisiana State University	82	\$8,179	82	\$20,516	\$133,266	82	\$96,380
Michigan State University	94	\$16,941	93	\$27,506	\$175,441	93	\$102,915
Mississippi State University	80	\$14,600	79	\$30,130	\$162,264	79	\$103,250
North Carolina State University	95	\$12,514	95	\$20,918	\$119,247	95	\$72,667
Oklahoma State University	73	\$8,757	72	\$14,155	\$134,503	72	\$95,532
Oregon State University	38	\$11,823	38	\$15,000	\$134,248	38	\$96,864
Purdue University	83	\$11,413	83	\$18,322	\$112,924	83	\$102,325
Texas A&M University	131	\$10,149	130	\$24,535	\$88,434	130	\$75,026
The Ohio State University	135	\$14,309	135	\$25,355	\$200,602	135	\$92,826
Tufts University	80	\$6,554	79	\$14,043	\$142,808	79	\$122,001
Tuskegee University	65	\$22,530	65	\$29,102	\$271,440	65	\$111,866
University of California-Davis	133	\$6,611	133	\$15,935	\$128,420	133	\$83,833
University of Florida	100	\$9,654	96	\$22,647	\$137,371	96	\$105,163
University of Georgia	101	\$11,633	99	\$23,422	\$119,956	100	\$82,907
University of Illinois	89	\$15,326	89	\$28,861	\$140,807	89	\$99,813
University of Minnesota	95	\$16,220	95	\$24,974	\$210,743	95	\$106,818
University of Missouri-Columbia	103	\$13,925	102	\$21,766	\$147,695	102	\$84,949
University of Pennsylvania	83	\$12,319	81	\$20,757	\$164,077	83	\$122,555
University of Tennessee	76	\$6,913	76	\$11,045	\$169,821	76	\$92,105
University of Wisconsin	74	\$15,027	74	\$29,682	\$110,315	74	\$70,465
Virginia-Maryland College	118	\$13,518	118	\$23,042	\$138,251	118	\$106,760
Washington State University	94	\$11,253	92	\$18,710	\$135,709	92	\$74,817
Western University of Health Sciences	91	\$16,469	89	\$28,955	\$273,532	89	\$131,059
<b>Total</b>	<b>2,632</b>	<b>\$12,205</b>	<b>2,614</b>	<b>\$22,780</b>	<b>\$150,025</b>	<b>2,617</b>	<b>\$105,093</b>

Table 8

### REGIONAL EXCHANGES AND STATE-TO-STATE ARRANGEMENTS

As noted in previous reports, there continues to exist a large discrepancy between the cost of resident tuition and non-resident tuition at veterinary colleges. In addition, with public veterinary colleges located in only 24 states, the number of states without a veterinary college exceeds the number of states with a veterinary college, leaving most students with limited options to obtain resident tuition. Short state arrangements that allow non-residents to pay resident tuition and in other cases,

non-residents to obtain residency status after an allotted period, most students graduate with hundreds of thousands of dollars in debt as their best option if they are to obtain a doctorate in veterinary medicine. Furthermore, not only is the likelihood of obtaining resident tuition slim for many potential students, there is also an enormous decline in state support for public education, passing on these increased costs to students.

Veterinary Medical College	Mean Starting Salary			Distribution of Post-Graduate Plans			
	Mean	N	Std. Dev.	Private Practice	Public Practice	Internship/Residency/Adv. Educ.	Total
Auburn University	\$75,063	60	\$8,393	58	2	31	91
Colorado State University	\$74,953	53	\$20,164	49	5	30	84
Cornell University	\$77,382	55	\$19,268	50	5	35	90
Iowa State University	\$72,745	92	\$14,907	83	11	22	116
Kansas State University	\$76,302	43	\$23,743	39	4	16	59
Louisiana State University	\$77,298	49	\$13,016	48	1	20	69
Michigan State University	\$78,748	58	\$11,385	58	1	19	78
Mississippi State University	\$76,696	56	\$10,884	52	4	14	70
North Carolina State University	\$71,325	41	\$18,988	39	3	27	69
Oklahoma State University	\$79,547	48	\$21,558	46	2	12	60
Oregon State University	\$76,470	23	\$12,342	21	2	12	35
Purdue University	\$81,638	50	\$16,209	47	3	19	69
Texas A&M University	\$81,987	85	\$17,053	83	2	31	116
The Ohio State University	\$76,293	92	\$15,367	86	6	32	124
Tufts University	\$76,854	24	\$21,493	23	1	40	64
Tuskegee University	\$89,133	20	\$12,062	18	2	24	44
University of California-Davis	\$79,150	51	\$21,387	45	6	64	115
University of Florida	\$80,328	58	\$16,614	53	5	31	89
University of Georgia	\$68,611	54	\$18,502	51	3	34	88
University of Illinois	\$76,527	55	\$12,633	51	4	24	79
University of Minnesota	\$72,567	54	\$14,286	54	0	30	84
University of Missouri-Columbia	\$76,998	77	\$18,314	74	3	23	100
University of Pennsylvania	\$76,206	34	\$19,917	33	1	43	77
University of Tennessee	\$74,122	41	\$11,868	39	2	18	59
University of Wisconsin	\$72,426	28	\$13,870	28	1	29	58
Virginia-Maryland College	\$76,755	83	\$15,298	76	7	19	102
Washington State University	\$80,280	56	\$19,137	54	2	27	83
Western University of Health Sciences	\$76,203	30	\$19,362	28	2	36	66
<b>Total</b>	<b>\$76,749</b>	<b>1,470</b>	<b>\$16,833</b>	<b>1,386</b>	<b>90</b>	<b>762</b>	<b>2,238</b>

Regional institutional programs such as The Southern Regional Education Board and The Western Interstate Commission for Higher Education, established in the late 1940s and 50s continue to facilitate regional contract exchanges that significantly reduce the cost of professional healthcare education for students who reside in a state without a public veterinary program (as well as other healthcare curricula).

Without these regional programs, non-resident students would be required to pay much higher tuition and would be at a distinct economic disadvantage upon graduation. Instead, the student's home state provides a "support fee" to the enrolling institution to reduce the student's tuition (students enrolled in a public program typically pay the resident rate) and give them preferential admission as a non-resident.



## IMPROVING THE DEBT-TO-INCOME RATIO



**The rising costs of tuition and fees and the rising number of students increased the supply of graduates as well as the cost of their future veterinary services.**

The debt-to-income problem in the veterinary profession is not new, having been discussed numerous times over the past two decades. However, what is new is the current size of the problem. As illustrated earlier, the current 2:1 mean debt-to-income ratio for graduates from the U.S. colleges of veterinary medicine began to expand from a longer-term plateau of around 1.4:1 in 2006. The mean obscures the fact, however, that the debt-to-income ratio was greater than 4:1 for more than 9 percent and more than 7 percent of U.S. graduates in 2016 and 2017, respectively.

At least in part, the rise in tuition and increased emphasis on recruiting and retention by universities was a response to reduced state and federal (public) funding. However, the sharp rise in tuition met legislative resistance and public universities resorted (outside the jurisdiction of most state legislatures) to raising fees and increasing efforts to enroll more students and, more importantly, ensure that they stayed enrolled.

The rising costs of tuition and fees and the rising number of students increased the supply of graduates as well as the cost of their future veterinary services. The increase in the number of seats, especially during the last economic recession, forced the supply of new veterinarians to increase faster than the increase in the demand for the services from these graduates. Part of this new disequilibrium was from the cost-push of the supply and part of it was the absence of growth in quantity demanded of the services of these graduates. More importantly, there has been very little connection between the market for education and the market for graduates.



Before laying all the blame for the high debt-to-income ratio that plagues the veterinary profession, a review of the decisions and overall conditions of the colleges should be considered. And, the

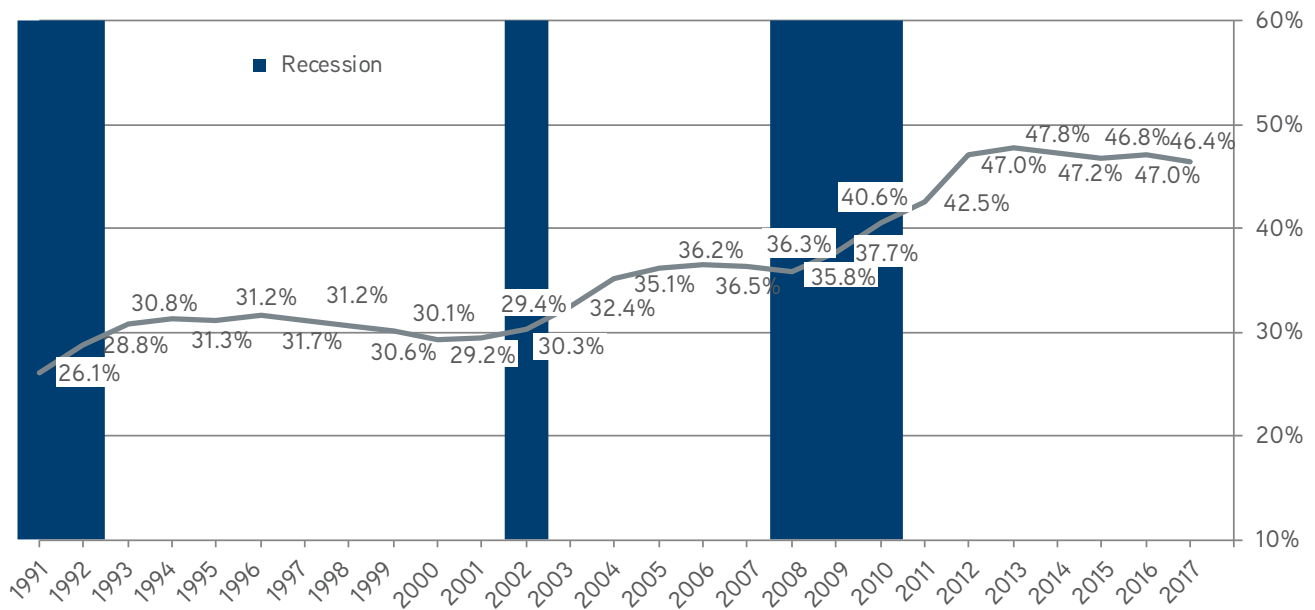
outcomes of today need to be considered in the context of the decisions that were made in the early part of the new millennium.

## HISTORICAL PERSPECTIVE

As discussed in previous reports, a considerable body of research has indicated that the rise over the last two decades in tuition as a percent of public higher education revenue stems from declining public support for all public education. Other factors contributing to increased costs per student include the cost of administration, increasing pension and health care costs, and the increasing state and federal regulations that require reporting for compliance. The growth in tuition occurred during and just after the recessions of 2001 and 2008, as state and federal legislators cut taxes to

stimulate the economy and reduced public support of colleges, both in response to declining budgets and shifting priorities. As previously mentioned, the result of reduced public support was the increasing share of the total cost that was paid by students. During the economic expansions following each recession, education budgets rarely returned to where they had been prior to the recession, resulting in the step increase in the percent of public higher education revenue for which tuition accounts.

### NET TUITION AS A PERCENT OF PUBLIC HIGHER EDUCATION TOTAL EDUCATIONAL REVENUE, U.S., FY 1992-2017



NOTE: Net tuition revenue used for capital debt service is included in net tuition revenue, but excluded from total educational revenue in calculating the above figures. SOURCE: State Higher Education Executive Officers

Figure 51

## SETTING A NEW TARGET

The current growth in the mean debt-to-income ratio is unsustainable. An appropriate near-term target would be to reduce the ratio from the current 2:0 to 1.4:1. As we have discussed in previous reports, four groups that must be involved in this effort: the general public, veterinary colleges, veterinary students and veterinary employers. Before we begin to discuss strategies to reduce the debt-to-income ratio, however, we need to take a closer look at the source of the debt.

The values for debt and income are reported by students prior to graduation. In 2017, out of 2,942 graduates, 2,617 reported a value (including zero) for debt, but only 1,461 reported both a debt, and income from full-time employment. Using these data, we compute the DIR for each school. Since there is no significant difference across schools with respect to starting salaries, a higher DIR is indicative of higher debt levels of the graduates.

## DEBT-TO-INCOME RATIO BY SCHOOL 2017, FULL-TIME ONLY

	Mean	N	Std. Deviation
Western University of Health Sciences	4.12	29	2.09
Tuskegee University	2.87	20	1.06
University of Minnesota	2.73	54	1.85
The Ohio State University	2.46	92	1.28
University of Pennsylvania	2.34	34	1.89
University of Tennessee	2.23	41	0.91
Kansas State University	2.08	43	1.97
Michigan State University	2.05	57	1.01
Tufts University	2.04	24	1.46
University of Missouri-Columbia	1.97	76	1.35
Mississippi State University	1.97	55	1.19
Colorado State University	1.94	54	1.75
National Average/Aggregate N	1.89	1,461	1.45
University of California-Davis	1.87	51	1.63
University of Georgia	1.84	53	1.46
Louisiana State University	1.84	49	1.20
Iowa State University	1.83	93	1.24
Oregon State University	1.81	23	1.38
Virginia-Maryland College	1.73	82	1.37
University of Florida	1.69	55	1.39
University of Illinois	1.68	55	1.26
Cornell University	1.66	55	1.61
Oklahoma State University	1.66	48	1.72
Washington State University	1.61	55	0.80
Auburn University	1.58	60	1.18
North Carolina State University	1.48	41	1.15
Purdue University	1.32	49	1.19
University of Wisconsin	1.31	28	0.82
Texas A&M University	0.99	85	0.78

Table 9

Although 1,461 students reported both a debt, and income from full-time employment, 52 percent more reported both a debt, and an income for positions that were not full time. The following table represents the DIR for the entire graduating class including those who opted to pursue advanced education opportunities, including internships and residencies.

#### DEBT-TO-INCOME RATIO BY SCHOOL 2017, ALL GRADUATES

	Mean	N	Std. Deviation
Western University of Health Sciences	5.36	64	3.50
Tuskegee University	5.18	44	3.59
University of Minnesota	4.12	84	3.22
The Ohio State University	3.53	124	2.60
University of Pennsylvania	3.48	77	3.39
University of Tennessee	3.25	59	2.86
Tufts University	3.23	64	3.16
Kansas State University	3.15	59	3.06
Colorado State University	2.80	84	2.82
Michigan State University	2.77	75	2.18
National Average/Aggregate N	2.69	2,218	2.54
Mississippi State University	2.59	69	2.06
University of Florida	2.55	85	2.72
University of California-Davis	2.48	115	2.02
University of Missouri-Columbia	2.43	99	1.98
University of Illinois	2.41	79	2.38
University of Georgia	2.40	87	1.89
Virginia-Maryland College	2.36	101	2.29
Cornell University	2.36	90	2.31
North Carolina State University	2.31	68	1.97
Washington State University	2.29	82	1.97
Iowa State University	2.24	115	1.70
Louisiana State University	2.20	69	1.77
Auburn University	2.19	91	2.35
Oklahoma State University	2.19	60	2.11
University of Wisconsin	2.10	56	1.98
Oregon State University	2.03	35	1.69
Purdue University	1.87	68	2.25
Texas A&M University	1.25	115	1.22

Table 10

By comparison, we can use the tuition and fees and the living costs estimated by each school to calculate a mean total cost–(tuition plus living expenses)–to–income ratio for each school. These two tables can then be used to compare the debt-to-income and cost-to-income for each school.

#### TOTAL COST-TO-INCOME RATIO BY SCHOOL, 2017

	Mean	N	Std. Deviation
University of Pennsylvania	9.55	77	4.57
Tufts University	8.07	64	3.17
Oklahoma State University	6.32	60	15.52
Western University of Health Sciences	6.31	65	2.60
Tuskegee University	6.06	44	3.13
University of Wisconsin	5.71	57	6.43
Colorado State University	5.50	83	3.16
University of California-Davis	5.34	115	2.40
Cornell University	4.88	90	2.59
University of Minnesota	4.80	84	2.66
Kansas State University	4.67	59	2.72
University of Florida	4.55	89	2.58
National Average/Aggregate N	4.51	2,231	3.93
Auburn University	4.48	91	2.67
The Ohio State University	4.42	124	2.24
Michigan State University	4.25	77	2.39
University of Illinois	4.22	79	2.29
University of Tennessee	4.15	59	2.28
Oregon State University	3.88	35	2.00
Louisiana State University	3.85	69	2.11
University of Georgia	3.80	88	2.22
Washington State University	3.77	83	2.39
North Carolina State University	3.70	68	1.65
Mississippi State University	3.67	70	2.06
Purdue University	3.65	69	2.29
Iowa State University	3.49	114	2.00
Texas A&M University	3.31	116	1.88
University of Missouri-Columbia	1.96	100	1.04
Virginia-Maryland College	1.78	102	0.96

Table 11

There is no method except using only the survey responses to determine the accuracy of the reported debt values, whether the values include interest charges, when debts were incurred, or the value of interest charges that would have accumulated (what year or semester the costs were incurred). The interest charges are estimated assuming that the total costs were distributed over the total number of semesters and a 6 percent interest

rate was charged. The total interest payments that would have accumulated with full payment of tuition and living expenses are computed for the veterinary college education provided at each college for discounted and non-discounted seats. The following table provides the ratio of total cost to income, assuming the interest charges are included as part of the costs.

#### TOTAL COST PLUS INTEREST-TO-INCOME RATIO BY SCHOOL, 2017

	Mean	N	Std. Deviation
University of Pennsylvania	10.61	77	5.07
Tufts University	8.96	64	3.52
Oklahoma State University	7.02	60	17.23
Western University of Health Sciences	7.01	65	2.89
Tuskegee University	6.72	44	3.48
University of Wisconsin	6.33	57	7.13
Colorado State University	6.10	83	3.51
University of California-Davis	5.92	115	2.67
Cornell University	5.42	90	2.88
University of Minnesota	5.33	84	2.95
Kansas State University	5.19	59	3.02
University of Florida	5.04	89	2.87
National Average/Aggregate N	5.00	2,231	4.36
Auburn University	4.97	91	2.96
The Ohio State University	4.90	124	2.49
Michigan State University	4.72	77	2.65
University of Illinois	4.68	79	2.55
University of Tennessee	4.60	59	2.53
Oregon State University	4.31	35	2.22
Louisiana State University	4.27	69	2.34
University of Georgia	4.22	88	2.46
Washington State University	4.18	83	2.66
North Carolina State University	4.10	68	1.83
Mississippi State University	4.08	70	2.29
Purdue University	4.05	69	2.54
Iowa State University	3.87	114	2.22
Texas A&M University	3.68	116	2.09
University of Missouri-Columbia	2.17	100	1.16
Virginia-Maryland College	1.98	102	1.06

Table 12

Tables 11 and 12 can be combined to provide an indication of how well students have been able to keep debt below costs. That is, have they had some method of ensuring that they keep a lid on expenses such that the amount of debt that they accumulate while in veterinary college is less than the total cost

of attendance? These ratios should not be assumed to indicate students' ability to manage their finances but rather viewed as a potential indicator of the ability of the students to draw upon other sources of income.

#### DEBT-TO-COST AND DEBT-TO-COST PLUS INTEREST BY SCHOOL, 2017

	D:C Ratio	D:(C+I) Ratio
University of Missouri-Columbia	1.2539	.9785
Virginia-Maryland College	1.2146	.6976
Tuskegee University	.9813	.9837
University of Minnesota	.8483	.8568
Western University Health Sciences	.8483	.9847
The Ohio State University	.7968	.9745
University of Tennessee	.7649	.9092
Iowa State University	.6996	.7212
Mississippi State University	.6959	.8669
University of Georgia	.6845	.8240
Washington State University	.6797	.9158
National Average	.6697	.7538
North Carolina State University	.6561	.9293
Michigan State University	.6468	.7759
Kansas State University	.6346	.7039
Oregon State University	.6238	.7565
Louisiana State University	.6213	.7133
University of Illinois	.5786	.6872
University of Florida	.5715	.4978
Auburn University	.5351	.6609
Colorado State University	.5214	.6378
Oklahoma State University	.5142	.8408
University of California-Davis	.5049	.6560
Purdue University	.5006	.6594
Cornell Veterinary College	.4940	.5854
University of Wisconsin	.4662	.7110
Texas A&M University	.4368	.5706
Tufts University	.4350	.5538
University of Pennsylvania	.4065	.5721

Table 13

In general, the tables above would indicate that the DIR is still a problem, with nine schools having a DIR of 2:1 or higher (compared to 15 in 2016). And, the mean value of debt to total costs (tuition, living and interest) being substantially less than 1.0 would seem to imply that the problem of high debt to income is a problem of the high cost of education only, albeit one of considerable variation among the schools.

Looking at the distribution of debt-to-total costs for each reporting student by college, however, indicates that there are some students who have not found sufficient outside resources or are not frugal in their finances resulting in their debt exceeding the total cost of their education. This high debt-to-total cost ratio occurs at only two schools, University of Missouri-Columbia and Virginia-Maryland College, where it exceeded 1:1 in 2017.

## DEBT BELOW AND ABOVE TOTAL COST PLUS INTEREST BY SCHOOL, 2017

	Is my debt greater than total cost plus interest?			
	Debt Below Total Cost plus Interest	Debt Above Total Cost plus Interest	Total	Percent (Debt over TC + int)
Virginia-Maryland College	48	70	118	59.3%
University of Missouri-Columbia	37	66	103	64.1%
Tuskegee University	39	26	65	40.0%
University of Georgia	77	24	101	23.8%
Western University of Health Sciences	69	22	91	24.2%
University of Minnesota	74	21	95	22.1%
The Ohio State University	114	21	135	15.6%
Iowa State University	120	14	134	10.4%
Mississippi State University	66	14	80	17.5%
Washington State University	83	11	94	11.7%
Kansas State University	63	9	72	12.5%
Louisiana State University	74	8	82	9.8%
Auburn University	112	6	118	5.1%
North Carolina State University	89	6	95	6.3%
Colorado State University	90	5	95	5.3%
University of Illinois	84	5	89	5.6%
Oregon State University	33	5	38	13.2%
University of Florida	96	4	100	4.0%
University of Tennessee	72	4	76	5.3%
Purdue University	80	3	83	3.6%
Tufts University	78	2	80	2.5%
Michigan State University	92	2	94	2.1%
Texas A&M University	129	2	131	1.5%
Cornell University	99	1	100	1.0%
Oklahoma State University	72	1	73	1.4%
University of California-Davis	133	0	133	0.0%
University of Pennsylvania	83	0	83	0.0%
University of Wisconsin	74	0	74	0.0%
<b>Total</b>	<b>2,280</b>	<b>352</b>	<b>2,632</b>	<b>13.4%</b>

Table 14

The national average for the percent of the graduating class whose debt exceeded total cost of attendance plus interest was 13.4 percent in 2017. Some universities, however, had up to five times this ratio, led by 64.1 percent graduates of University of Missouri-Columbia who had mean debt levels above total cost of attendance plus interest. This record was followed by Virginia-Maryland College's at 59.3 percent and Tuskegee University with 40 percent of the class having debt exceeding total cost plus interest. University of California-Davis, University of Pennsylvania and University of Wisconsin had no students whose debt exceed the total cost of attendance plus interest.

These estimates of debt, tuition and fees, living expenses and interest charges provide context to inform the discussion of the

relative merits of reducing tuition and fees, better managing living expenses, reducing or eliminating interest charges on loans while in school and aiding students in becoming better with personal financial management.

In 2017, total debt for the 2,942 graduates of U.S. veterinary colleges was estimated at just over \$403 million, down from 2016's estimate of \$418 million. The estimate of the aggregate cost of tuition and fees was \$418 million, up from \$403 million in 2016. Aggregate living expenses were estimated at \$220 million with interest expense estimated at \$70 million. This adds up to an aggregate total cost of \$708 million, approximately \$305 million more than the debt accumulated by 2017 graduates.



## FOREIGN GRADUATES

**The debt accumulated by foreign graduates differs significantly from the debt accumulated by U.S. graduates, though there is no difference between U.S. and foreign graduates with respect to income.**

At present, 19 percent of U.S. citizens enrolled in veterinary school are enrolled at veterinary colleges outside the United States and, as previously illustrated, this number has been rising. With the growth in the number of U.S. graduates from foreign veterinary colleges increasing, and, because the loans taken by these students are frequently larger than those of students at U.S. veterinary colleges, it is critical to extend our analysis to include these students, as their return to the United States, to find employment and repay their student loans – as many do – would affect the supply of and demand for veterinarians. New veterinarians with larger loans will demand higher salaries to maintain a decent standard of living while repaying their loans. The ripple effect of this would be an increase in the cost of veterinary services to consumers, without necessarily any increase in value.

The following chart displays the mean debt of foreign graduates. These data must be interpreted cautiously, however, since the response rates of foreign graduates are much lower than that of the graduates of U.S. colleges. The differing graduation cycle in Caribbean schools, provided a survey sample of less than 50 percent of students (compared to a 100 percent sample for domestic schools) and yielded debt and income data on only 20 percent to 75 percent of that reduced sample (compared to a 60 percent-100 percent response rate for domestic schools).



### DVM DEBT OF FOREIGN GRADUATES

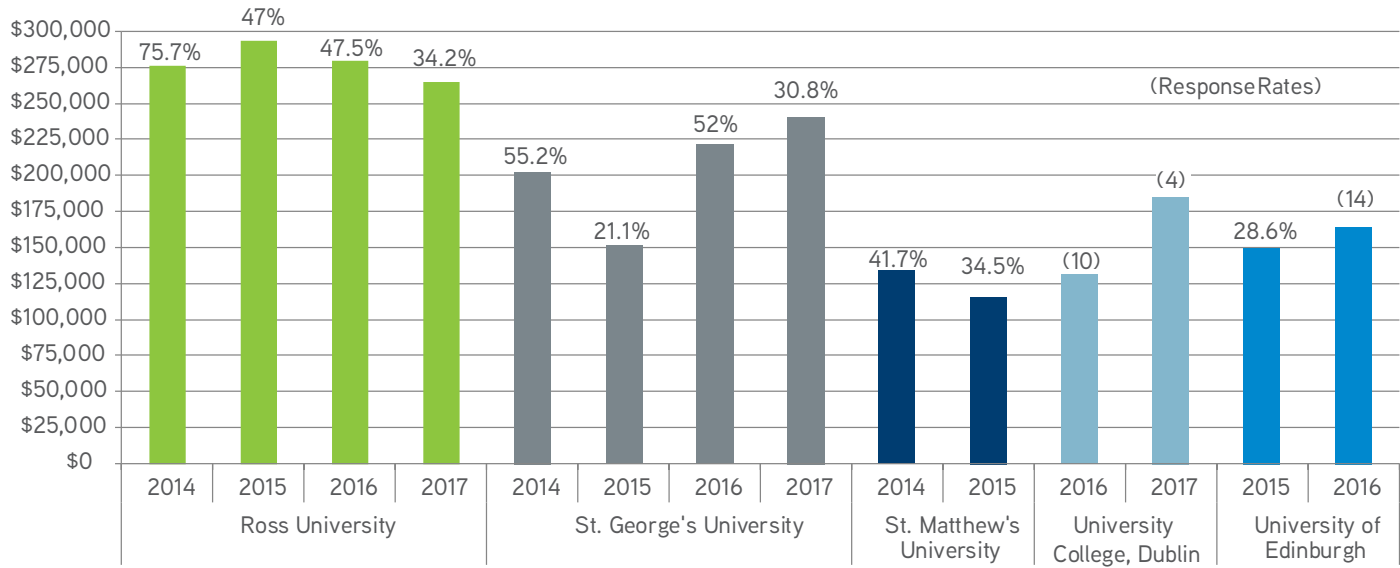


Figure 52

Over the past four years, the mean debt reported from graduates of Ross University has been north of \$250,000. In 2017, the mean debt of St. George's graduates was reported as just over \$225,000. These findings, however, emerge from a modest response rate of 30.8 percent and so cannot be appropriately compared to the mean debt of U.S. graduates, which hovers around \$140,000.

The debt accumulated by foreign graduates differs significantly from the debt accumulated by U.S. graduates, though there is no difference between U.S. and foreign graduates with respect to income. During the years 2014 through 2016, the mean starting salaries – representing those finding full-time employment only – of foreign graduates was slightly higher than that of U.S. graduates, but in 2017 the mean starting salary of U.S. graduates surpassed that of foreign grads. The difference across these years, however, has not been significant.

### STARTING SALARY OF NEW GRADUATES

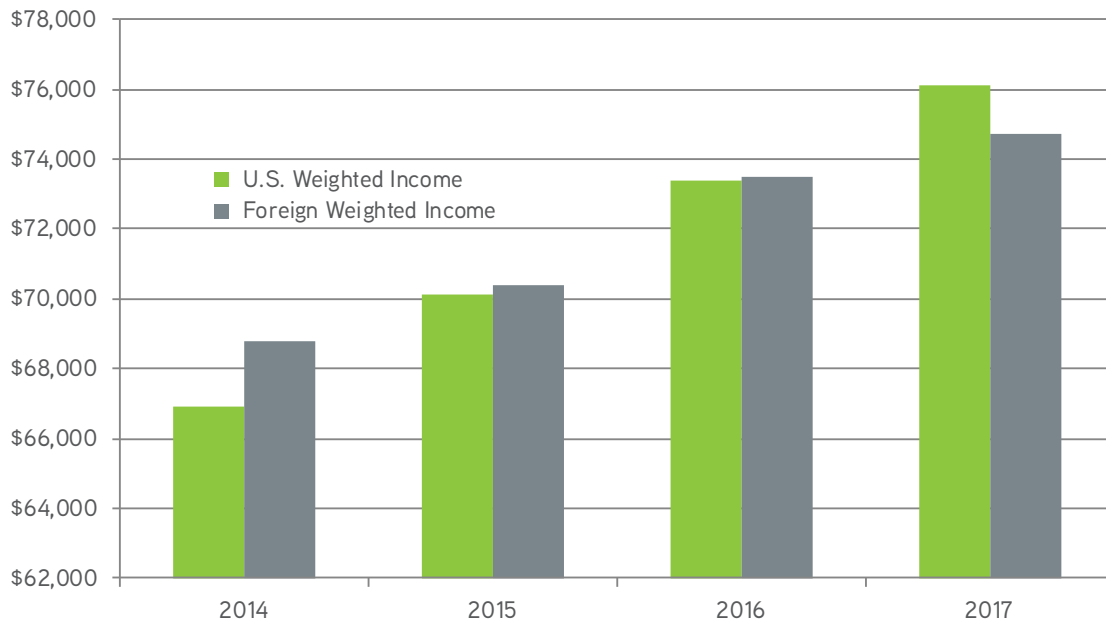


Figure 53

Consequently, with comparable income levels and significantly higher debt levels, the DIR of foreign graduates is bound to be higher than that of U.S. graduates. The following chart illustrates the distribution of the DIR of U.S. graduates of foreign colleges who have secured full-time employment. It is critical to note that because of poor response rates, this distribution represents only 95 respondents.

Excluding the nearly 15 percent of the class that graduated with zero debt, the central tendency of the DIR was 4:1. The vast majority (79 percent) of the class had a DIR between 2:1 and 6:1, with 22 percent reporting a DIR of 4:1.

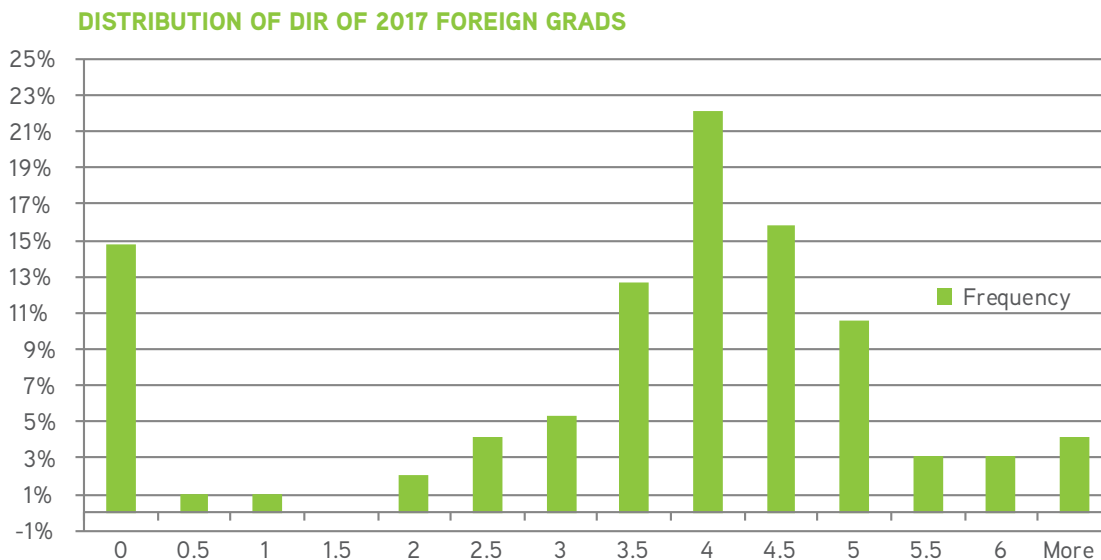


Figure 54

The debt of foreign grads – which is evidently significantly higher than the debt of grads of U.S. institutions – is generally correlated with tuition costs and the amount of state funds appropriated to the institution to cover educational costs. Consequently, because private and public institutions are financed differently, the most appropriate comparison is the debt of students who graduated from private veterinary colleges in the United States. The following chart depicts the 2017 mean and median debt numbers of resident and non-resident graduates of U.S. private and public veterinary colleges and Caribbean veterinary colleges.

As expected, the group with the lowest debt levels – with mean debt between \$125,000 and \$150,000 – are resident graduates of public institutions. They pay the lowest tuition, benefitting from state appropriations. Graduates of private institutions have larger mean debt levels, with mean debt between \$195,000 and \$230,000. These schools don't receive federal funding and all costs are passed onto students. Finally, the group with the largest mean debt is graduates of Caribbean schools whose mean debt lies between \$275,000 and \$310,000.

### MEAN AND MEDIAN DEBT OF 2017 GRADUATES WITH NON-ZERO DEBT

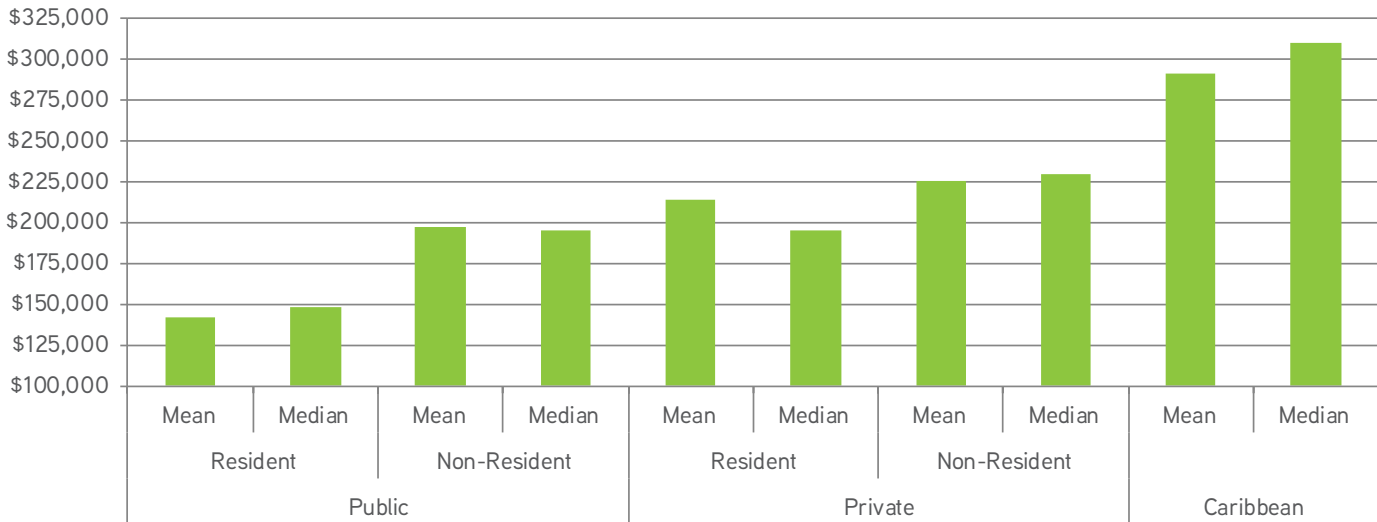


Figure 55

Tuition and fees, however, are no small proportion of the total cost of attendance of veterinary school as reported by their respective financial aid offices, but one pattern does emerge. For non-residents at U.S. institutions and graduates of colleges in the Caribbean, tuition and fees, on average, are 64.2 percent, 64.1 percent and 64.2 percent of total costs for U.S. public schools, U.S. private schools and Caribbean schools, respectively.

For resident graduates of public schools and private schools' tuition and fees, on average, are 51.4 percent and 60.5 percent of total costs, respectively. Consequently, this provides more evidence that, in general, students are fiscally responsible, and it is indeed the cost of tuition and fees that drives total costs and subsequently student debt.

# DISCUSSION

This report takes an exploratory and analytical approach to the market for new veterinarians. We observe new veterinarians over the period 2001 through 2017, including their post-graduate plans, income levels, debt levels, and debt-to-income ratios.

New veterinarians come from a pool of applicants that we have recently begun analyzing through the survey of VMCAS applicants. AAMVC analyzes these applicants, observing their decision-making process and willingness to pay for a veterinary education. This is an important area of research that will be beneficial over time and is necessary to better understand how to aid potential veterinary students in preparing for the financial obligations of obtaining their education.

Applicants who have successfully secured a seat and matriculated through veterinary college, generally graduate and become new veterinarians. The main source of data for new veterinarians is AVMA's Senior Survey, which is distributed to graduating seniors just a few weeks before graduation. This survey solicits information on veterinary students' career plans, starting salary, debt and other demographics. However, the survey data have limitations. First, there is limited information on expenditure patterns of the students, the actual costs of their education and any interest payments on the loans they have acquired. While each veterinary college provides the exact cost of tuition and fees for residents and non-residents, and an estimate of living expenses, we have no information on the role of scholarships or other forms of external support, to provide for a precise estimate of costs per student or the amount paid per student. Having this information will be important in developing strategies to reduce the DIR. Other ambiguities arise when graduates securing full-time employment report estimates of the number of hours they anticipate working, forcing estimation of hourly compensation patterns.

The Senior Survey has been distributed by the AVMA for decades and although we have made attempts to expand the respondent pool to AVMA-accredited institutions outside the United States, our data are primarily comprised of responses from the 28 U.S.-located veterinary colleges. This situation presents a caveat in this research piece, since a proportion of U.S. students attend AVMA-accredited foreign colleges and return to the United States to find jobs and repay student loans. It is expected that these

students will tend to have significantly larger debt loads and consequently higher debt-to-income ratios. We will continue to work with AAVMC to collect data on the graduates of the AVMA-accredited foreign veterinary colleges.

This report is also in large part a replacement for AVMA's "Facts and Figures" feature report previously published in *JAVMA*. Our efforts here are to go beyond a year-to-year comparison of mean income, toward the use of an index that measures the impact of the economy on a constant cohort of veterinarians. We also will provide an annual update on the model of new graduates' starting salaries, debt, and debt-to-income level. These models will help us, veterinary applicants and students estimate the mean starting salary for a target demographic and debt at graduation, and enable us to better assist them in developing personal strategies for managing their post-graduate finances, and in turn, optimize their standard of living.

We analyze the changing distribution of veterinarians across various practice types and view cases such as real incomes at trend GDP versus projected incomes at current GDP. Also new in this report is an analysis of graduates of foreign veterinary colleges. Every year an increasing number of students opt to pursue their veterinary education outside the borders of the United States. Consequently, the debt of these students, fueled by both tuition costs and cost of living, is much higher than the debt of graduates of veterinary colleges located in the United States. Because we have only captured data on about 30 percent of this market, it is critical for us to continue to report on these students, as they directly impact the domestic economy when they return to the United States to work and repay their debt.

The market for veterinary education is a critical market for the veterinary profession, but it is a market that is not performing optimally. Many new veterinarians are ill-prepared for the financial stress that awaits them, and the percentage of consumers who are willing to pay a price for their services that is in line with veterinary education costs continues to decline. The result will continue to be an increase in untreated animals that also pose a threat to human health. In attempting to select effective strategies to bridge this gap, the focus should be on reducing the DIR while increasing the potential for meeting the veterinary needs of all animals.

# REFERENCES

2017 AVMA-AAVMC Report on the Market for Veterinary Education

AAVMC Admitted Students Statistics, <http://www.aavmc.org/additional-pages/admitted-student-statistics.aspx>

AVMA Senior Survey

State Higher Education Executive Officers Association, <https://www.insidehighered.com/news/2018/03/29/state-support-higher-ed-increased-2017-so-did-tuition-revenue>

# APPENDIX

The table in this appendix, Clinical Competencies, Expectations and Experience by School, depicts the self-reported scores on listed clinical competencies by veterinarians who've graduated within the past five years. They were asked to rate their expectations based on their college training appropriate to the listed clinical competencies, against their experiences based

on time spent on the job. The scores were ranked 1-5, with expectations ranked as 5 if respondents expected to perform exceptionally well in the corresponding clinical competency, and 1 in experience, if while on the job they felt exceptionally ill-prepared. The mean score by school and competency is reported.

**CLINICAL COMPETENCIES, EXPECTATIONS AND EXPERIENCE BY SCHOOL**

		Do a physical examination		Do history taking		Diagnose lameness	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
Auburn University	Mean	4.20	4.37	4.17	4.29	3.31	3.68
	N	35	35	35	35	35	34
Tuskegee University	Mean	3.63	4.53	3.89	4.37	3.00	3.63
	N	19	19	19	19	19	19
University of California-Davis	Mean	4.49	4.36	4.59	4.26	3.61	3.37
	N	37	36	37	34	36	35
Colorado State University	Mean	3.86	4.28	4.18	4.32	3.18	3.66
	N	50	47	50	47	50	47
University of Florida	Mean	3.82	4.27	4.18	4.30	3.32	3.79
	N	34	33	34	33	34	33
University of Georgia	Mean	4.18	4.56	4.35	4.45	3.15	3.70
	N	34	34	34	33	34	33
University of Illinois	Mean	3.78	4.15	4.15	4.20	3.24	3.57
	N	46	46	46	45	46	44
Iowa State University	Mean	3.96	4.27	4.04	4.35	2.98	3.42
	N	53	49	53	48	52	48
Kansas State University	Mean	3.67	4.23	3.76	4.13	2.98	3.54
	N	42	40	42	40	41	39
Louisiana State University	Mean	3.94	4.29	4.24	4.53	3.41	4.06
	N	17	17	17	17	17	16
Tufts University	Mean	3.81	4.11	4.08	4.14	2.97	3.39
	N	37	36	37	36	37	36
Michigan State University	Mean	4.00	4.32	4.08	4.22	3.13	3.42
	N	39	38	39	37	39	36
University of Minnesota	Mean	3.73	4.12	4.08	4.24	2.85	3.33
	N	26	25	26	25	26	24
Mississippi State University	Mean	3.93	4.14	4.11	4.21	3.11	3.15
	N	28	28	28	28	27	26
Purdue University	Mean	4.12	4.27	4.15	4.36	3.38	3.88
	N	33	33	33	33	32	32
Cornell University	Mean	4.11	4.37	4.32	4.41	3.11	3.53
	N	37	35	37	34	36	34
Oklahoma State University	Mean	3.85	4.19	4.19	4.04	3.08	3.46
	N	26	26	26	26	26	26

Table 15

Diagnose and prescribe treatment for parasitic diseases		Give anesthesia		Do fluid therapy		Give an intravenous injection	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
3.97	4.23	3.46	3.69	3.63	3.94	3.77	4.37
35	35	35	35	35	35	35	35
4.00	4.47	3.58	3.95	3.37	4.11	4.00	4.53
19	19	19	19	19	19	19	17
3.47	3.74	4.06	3.88	4.17	3.94	4.62	4.47
36	35	36	34	36	35	37	36
3.00	3.60	3.78	4.06	3.50	4.09	3.92	4.42
50	47	50	47	50	47	50	48
3.68	4.21	3.79	3.97	3.76	4.09	4.09	4.55
34	33	34	33	34	33	34	33
3.76	4.19	3.65	4.06	3.65	4.09	3.68	4.39
34	32	34	33	34	33	34	33
3.15	3.80	3.61	3.89	3.48	4.00	3.93	4.27
46	45	46	45	46	45	46	45
3.34	4.02	3.17	3.91	3.29	3.81	3.77	4.60
53	48	52	47	52	47	53	48
3.64	3.95	3.86	4.00	3.19	3.78	3.71	4.40
42	40	42	40	42	40	42	40
3.76	4.38	3.59	3.88	3.71	4.18	4.00	4.65
17	16	17	17	17	17	17	17
3.14	3.94	4.00	3.97	3.78	4.00	3.65	4.06
37	36	37	36	37	36	37	36
3.18	3.97	3.62	3.81	3.64	3.92	3.54	4.08
39	37	39	37	39	38	39	38
2.92	3.60	3.42	3.68	3.54	4.04	3.69	4.48
26	25	26	25	26	25	26	25
3.82	4.14	3.86	3.79	3.61	4.00	4.25	4.46
28	28	28	28	28	28	28	28
3.82	4.25	3.73	4.00	3.74	4.13	4.30	4.52
33	32	33	32	31	30	33	33
3.16	3.82	3.32	3.63	3.51	3.85	3.97	4.35
37	33	37	32	37	33	37	34
4.27	4.04	3.81	3.77	3.69	3.88	4.15	4.50
26	26	26	26	26	26	26	26

		Do a physical examination		Do history taking		Diagnose lameness	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
University of Pennsylvania	Mean	4.00	4.51	4.05	4.57	2.98	3.46
	N	43	41	43	42	42	41
Texas A&M University	Mean	4.27	4.33	4.20	4.31	3.28	3.44
	N	41	39	40	39	40	36
Washington State University	Mean	3.84	4.07	3.97	4.13	2.94	3.25
	N	31	30	31	30	31	28
University of Missouri-Columbia	Mean	3.97	4.29	3.91	4.18	2.79	3.34
	N	35	34	35	33	34	32
The Ohio State University	Mean	3.83	4.26	4.20	4.22	3.07	3.48
	N	54	54	54	54	54	52
Oregon State University	Mean	3.74	4.09	3.91	4.22	2.83	3.27
	N	23	23	23	23	23	22
University of Tennessee	Mean	4.19	4.23	4.29	4.17	3.23	3.55
	N	31	31	31	30	31	31
Virginia-Maryland College	Mean	4.05	4.07	4.19	4.17	3.24	3.74
	N	42	41	42	42	42	42
North Carolina State University	Mean	4.32	4.46	4.41	4.36	3.18	3.56
	N	28	28	27	28	28	27
University of Wisconsin	Mean	4.11	4.11	4.36	4.40	2.83	3.27
	N	36	35	36	35	35	33
Western University of Health Sciences	Mean	4.38	4.30	4.48	4.50	3.75	3.89
	N	21	20	21	20	20	19
Ross University	Mean	4.32	4.41	4.49	4.45	3.52	3.61
	N	73	69	73	69	73	69
St. George's University	Mean	4.41	4.58	4.34	4.59	3.45	3.59
	N	29	26	29	27	29	27
St. Matthew's University	Mean	4.80	4.40	5.00	4.40	3.60	3.60
	N	5	5	5	5	5	5
Total	Mean	4.03	4.28	4.18	4.30	3.16	3.51
	N	1,146	1,110	1,144	1,104	1,134	1,081



Diagnose and prescribe treatment for parasitic diseases		Give anesthesia		Do fluid therapy		Give an intravenous injection	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
3.53	3.98	3.35	3.78	3.47	3.98	3.91	4.51
43	40	43	41	43	40	43	39
4.05	4.05	3.85	3.92	3.66	3.83	4.12	4.45
41	39	41	38	41	36	41	38
3.32	3.86	3.61	3.73	3.19	3.57	3.71	4.17
31	28	31	30	31	30	31	29
3.40	3.90	3.80	3.97	4.09	4.15	4.23	4.56
35	31	35	34	35	34	35	34
3.61	4.02	3.77	4.00	3.72	3.81	3.85	4.36
54	54	53	52	53	52	53	53
3.13	3.55	3.43	3.70	3.09	3.65	3.74	4.39
23	22	23	23	23	23	23	23
4.06	4.10	3.61	3.74	3.60	3.83	4.03	4.39
31	31	31	31	30	30	31	31
3.71	3.93	3.88	4.00	3.83	4.10	4.12	4.38
41	40	41	40	41	40	42	40
4.14	4.18	4.25	4.00	3.61	3.89	4.39	4.48
28	28	28	26	28	27	28	27
3.64	3.94	3.58	3.91	3.47	4.03	3.53	4.43
36	34	36	34	36	34	36	35
3.57	4.11	3.19	3.67	3.38	3.85	4.24	4.38
21	19	21	21	21	20	21	21
3.93	4.25	4.30	4.28	4.11	4.13	4.32	4.44
73	67	73	68	73	68	73	68
4.10	4.15	4.10	4.07	4.00	4.07	4.48	4.59
29	27	29	27	29	27	29	27
4.20	4.20	3.80	3.80	3.80	3.40	4.80	4.40
5	5	5	5	5	5	5	5
<b>3.60</b>	<b>3.99</b>	<b>3.72</b>	<b>3.90</b>	<b>3.62</b>	<b>3.94</b>	<b>4.00</b>	<b>4.41</b>
<b>1,143</b>	<b>1,085</b>	<b>1,142</b>	<b>1,092</b>	<b>1,138</b>	<b>1,089</b>	<b>1,145</b>	<b>1,098</b>

		Develop/adapt vaccination protocols		Advise clients on nutrition		Develop diagnostic plans for difficult cases	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
Auburn University	Mean	3.86	4.31	2.71	3.44	3.31	3.74
	N	35	32	35	34	35	34
Tuskegee University	Mean	3.89	4.58	2.84	3.44	3.11	3.79
	N	18	19	19	18	19	19
University of California-Davis	Mean	4.25	4.12	3.43	3.31	3.95	3.81
	N	36	34	35	35	37	36
Colorado State University	Mean	3.38	4.07	2.64	3.32	3.26	4.02
	N	50	44	50	47	50	48
University of Florida	Mean	3.76	4.16	3.15	3.61	3.68	4.03
	N	34	32	34	33	34	33
University of Georgia	Mean	3.76	4.22	3.30	3.91	3.44	3.88
	N	34	32	33	32	34	34
University of Illinois	Mean	2.82	4.03	2.26	3.20	3.59	4.00
	N	45	40	46	44	46	45
Iowa State University	Mean	3.66	4.17	2.47	3.06	3.17	3.88
	N	53	47	53	47	53	48
Kansas State University	Mean	3.60	3.95	2.56	3.10	2.88	3.58
	N	42	38	41	40	41	40
Louisiana State University	Mean	3.65	4.38	2.82	4.00	3.47	4.35
	N	17	16	17	16	17	17
Tufts University	Mean	3.00	4.00	2.95	3.43	3.38	3.97
	N	37	34	37	35	37	36
Michigan State University	Mean	2.90	4.06	2.26	3.27	3.38	3.84
	N	39	36	39	37	39	38
University of Minnesota	Mean	3.15	3.88	3.00	3.50	3.27	3.96
	N	26	24	26	24	26	24
Mississippi State University	Mean	3.54	4.04	2.39	2.93	3.21	3.50
	N	28	27	28	27	28	28
Purdue University	Mean	3.64	4.16	2.39	3.39	3.50	3.97
	N	33	32	33	31	32	32
Cornell University	Mean	3.47	4.13	2.78	3.26	3.41	3.79
	N	36	32	37	34	37	33
Oklahoma State University	Mean	3.77	4.12	2.31	3.12	2.96	3.69
	N	26	26	26	26	26	26

Investigate potential toxin exposure		Prescribe medications		Interpret cytologic specimens		Interpret post-mortem specimens	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
2.91	3.18	3.66	4.03	3.18	3.18	3.09	3.07
35	34	35	35	34	33	33	27
3.00	3.47	3.68	4.47	3.22	3.24	3.47	3.08
19	19	19	19	18	17	17	12
3.53	3.51	3.89	4.19	3.58	3.42	3.57	3.23
36	35	37	36	36	31	35	31
2.71	3.42	3.66	4.38	2.98	3.25	3.16	3.29
49	45	50	47	49	48	49	45
2.94	3.42	3.94	4.39	3.34	3.38	2.97	3.07
34	33	34	33	32	32	33	27
2.53	3.15	3.41	4.33	2.97	3.36	3.19	3.42
34	33	34	33	34	33	31	26
2.76	3.36	3.54	4.24	3.20	3.29	2.98	2.97
46	44	46	45	46	45	43	37
2.69	3.17	3.60	4.49	2.83	3.08	3.06	3.33
52	48	53	49	53	49	53	45
2.21	3.08	3.36	4.23	2.65	2.97	2.89	2.97
42	39	42	40	40	39	38	30
3.12	3.82	3.41	4.29	3.06	3.12	3.06	3.25
17	17	17	17	17	17	17	12
2.49	3.31	3.68	4.19	3.22	3.29	2.74	2.46
37	36	37	36	37	35	35	26
2.77	3.38	3.41	4.29	2.64	3.11	2.92	3.12
39	37	39	38	39	35	37	33
2.65	3.42	3.38	4.20	3.23	3.12	2.92	3.00
26	24	26	25	26	25	25	24
2.68	3.07	3.71	4.18	2.82	2.64	2.85	2.83
28	27	28	28	28	28	27	24
2.88	3.45	4.00	4.39	3.22	3.14	3.16	3.12
33	33	32	31	32	29	32	26
3.03	3.28	3.59	4.18	3.27	3.27	2.97	3.22
37	32	37	33	33	30	35	23
2.81	3.35	3.54	4.31	2.88	3.12	3.17	3.57
26	26	26	26	26	26	24	23

		Develop/adapt vaccination protocols		Advise clients on nutrition		Develop diagnostic plans for difficult cases	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
University of Pennsylvania	Mean	3.21	4.11	2.63	3.45	3.53	4.21
	N	43	38	43	40	43	42
Texas A&M University	Mean	3.80	4.21	2.73	3.08	3.95	3.97
	N	41	38	41	39	41	39
Washington State University	Mean	3.55	3.61	2.39	3.17	3.45	3.63
	N	31	28	31	29	31	30
University of Missouri-Columbia	Mean	3.79	4.06	2.97	3.59	3.40	3.94
	N	34	31	35	32	35	34
The Ohio State University	Mean	3.50	4.17	2.49	3.08	3.30	3.77
	N	54	53	53	52	54	53
Oregon State University	Mean	2.57	3.80	2.52	3.43	3.00	3.74
	N	23	20	23	21	23	23
University of Tennessee	Mean	3.74	4.10	3.48	3.84	3.52	3.61
	N	31	31	31	31	31	31
Virginia-Maryland College	Mean	3.74	4.05	3.14	3.48	3.48	3.98
	N	42	40	42	42	42	42
North Carolina State University	Mean	3.96	4.25	3.43	3.57	3.64	4.21
	N	28	24	28	28	28	28
University of Wisconsin	Mean	3.83	4.20	2.53	3.29	3.47	3.91
	N	36	35	36	35	36	34
Western University of Health Sciences	Mean	4.05	4.17	2.71	3.47	3.76	4.00
	N	21	18	21	19	21	20
Ross University	Mean	3.64	4.16	3.15	3.63	3.74	3.99
	N	73	68	73	67	73	69
St. George's University	Mean	3.83	4.16	3.07	3.65	3.90	3.93
	N	29	25	29	26	29	27
St. Matthew's University	Mean	4.00	4.40	4.20	4.20	4.40	4.40
	N	5	5	5	5	5	5
Total	Mean	3.57	4.10	2.78	3.38	3.44	3.89
	N	1,141	1,053	1,139	1,080	1,144	1,104

Investigate potential toxin exposure		Prescribe medications		Interpret cytologic specimens		Interpret post-mortem specimens	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
2.95	3.38	3.53	4.39	2.79	3.12	2.69	2.74
43	40	43	41	43	41	42	35
2.83	3.24	4.02	4.45	3.28	3.47	3.25	3.18
41	37	41	38	39	38	40	34
3.29	3.18	3.68	4.03	2.68	2.90	2.81	2.93
31	28	31	30	31	30	31	27
2.86	3.41	3.46	4.29	3.27	3.44	3.18	3.00
35	32	35	34	33	34	33	28
2.65	3.28	3.59	4.32	2.80	3.06	3.06	3.00
54	54	54	53	54	53	52	48
2.30	3.13	3.35	4.17	3.41	3.41	3.16	3.11
23	23	23	23	22	22	19	18
2.77	3.40	3.97	4.23	2.94	3.19	3.14	3.36
30	30	31	31	31	31	29	28
2.98	3.33	3.81	4.19	2.63	3.03	3.03	3.03
42	42	42	42	41	40	40	37
3.11	3.64	4.00	4.64	3.62	3.54	3.46	3.19
28	28	28	28	26	26	26	21
2.33	3.03	3.67	4.33	3.03	3.07	3.06	2.93
36	34	36	33	32	29	32	29
3.00	3.61	3.67	4.10	3.14	3.33	3.10	3.27
21	18	21	21	21	21	21	15
3.14	3.47	3.83	4.32	3.24	3.21	3.10	3.12
73	68	72	68	71	67	67	59
3.31	3.65	4.14	4.36	3.48	3.54	3.24	3.24
29	26	28	28	27	26	25	21
3.40	3.40	4.40	5.00	4.20	3.80	4.40	3.60
5	5	5	5	5	5	5	5
<b>2.84</b>	<b>3.33</b>	<b>3.67</b>	<b>4.29</b>	<b>3.06</b>	<b>3.19</b>	<b>3.08</b>	<b>3.09</b>
<b>1,141</b>	<b>1,081</b>	<b>1,142</b>	<b>1,102</b>	<b>1,115</b>	<b>1,071</b>	<b>1,083</b>	<b>918</b>

		Interpret ultrasound examinations		Interpret radiographs		Interpret hematologic values	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
Auburn University	Mean	2.63	2.97	3.34	3.52	3.69	3.79
	N	35	32	35	33	35	33
Tuskegee University	Mean	2.22	2.79	3.11	3.18	3.50	3.72
	N	18	14	18	17	18	18
University of California-Davis	Mean	3.56	3.42	3.85	3.81	4.03	3.85
	N	36	33	34	31	36	33
Colorado State University	Mean	2.76	3.25	3.34	3.59	3.70	4.04
	N	50	48	50	49	50	49
University of Florida	Mean	2.97	3.23	3.30	3.50	3.94	4.00
	N	32	31	33	32	33	33
University of Georgia	Mean	2.41	3.23	3.18	3.62	3.71	4.09
	N	34	31	34	34	34	34
University of Illinois	Mean	2.48	3.05	3.13	3.40	3.85	4.07
	N	46	43	46	45	46	45
Iowa State University	Mean	2.21	3.02	3.10	3.57	3.67	3.86
	N	52	47	52	46	52	49
Kansas State University	Mean	2.10	2.69	3.28	3.46	3.50	3.65
	N	40	32	40	39	40	40
Louisiana State University	Mean	2.65	3.13	3.71	3.56	3.76	4.06
	N	17	15	17	16	17	17
Tufts University	Mean	2.84	3.40	3.38	3.44	3.84	3.80
	N	37	30	37	36	37	35
Michigan State University	Mean	2.53	3.06	3.10	3.47	3.64	3.89
	N	38	33	39	36	39	37
University of Minnesota	Mean	2.88	3.21	3.31	3.32	4.00	3.92
	N	26	24	26	25	26	25
Mississippi State University	Mean	2.50	2.68	3.07	3.21	3.46	3.61
	N	26	25	28	28	28	28
Purdue University	Mean	2.31	2.72	3.47	3.61	4.19	4.14
	N	32	29	32	28	32	29
Cornell University	Mean	2.63	3.39	3.30	3.55	3.85	3.97
	N	35	31	33	31	33	32
Oklahoma State University	Mean	2.16	3.23	3.15	3.42	3.62	3.73
	N	25	22	26	26	26	26

Diagnose/prescribe therapy for gastrointestinal disease		Diagnose/prescribe therapy for dermatological disease		Diagnose/prescribe therapy for endocrine disease		Diagnose/prescribe therapy for cardiac disease	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
3.47	3.91	3.76	4.06	3.38	3.55	3.00	3.45
34	34	34	34	34	33	34	33
3.56	4.33	3.00	4.11	3.06	3.53	2.83	3.50
18	18	18	18	18	17	18	18
3.79	4.17	3.94	3.94	3.82	3.66	3.52	3.45
33	30	33	31	33	29	33	29
3.61	4.17	3.16	3.68	3.06	3.61	2.98	3.50
49	48	49	47	48	46	49	46
3.38	3.97	3.88	3.87	3.50	3.57	3.53	3.62
32	30	32	30	32	30	32	29
3.56	4.26	3.38	3.81	3.50	3.76	3.03	3.61
34	34	34	32	34	33	34	33
3.21	3.97	3.12	3.69	3.55	3.76	2.62	3.43
42	39	42	39	42	38	42	37
3.37	4.04	3.59	3.85	3.16	3.65	2.78	3.34
51	47	51	47	50	46	51	47
3.20	3.95	2.93	3.65	3.15	3.55	2.92	3.26
40	40	40	40	40	40	39	39
3.71	4.25	3.94	4.06	3.76	3.88	3.47	3.69
17	16	17	17	17	16	17	16
3.53	3.97	3.12	3.47	3.32	3.44	3.54	3.50
34	34	34	34	34	34	35	34
3.28	4.00	3.03	3.78	3.31	3.81	3.13	3.32
39	36	39	36	39	36	39	37
3.52	3.91	3.36	3.41	3.32	3.65	3.08	3.39
25	23	25	22	25	23	25	23
3.57	4.04	3.36	3.46	3.52	3.42	2.89	3.26
28	28	28	26	27	26	28	27
3.53	3.97	2.88	3.63	3.53	3.84	2.94	3.35
32	31	33	32	32	31	32	31
3.54	4.12	3.11	3.76	3.41	3.80	3.00	3.17
35	34	35	33	34	30	34	29
3.12	3.83	3.16	3.67	3.04	3.33	3.08	3.46
25	24	25	24	25	24	25	24

		Interpret ultrasound examinations		Interpret radiographs		Interpret hematologic values	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
University of Pennsylvania	Mean	2.43	3.51	3.26	3.83	3.65	4.05
	N	42	39	43	42	43	41
Texas A&M University	Mean	2.34	2.75	3.47	3.49	4.15	4.03
	N	38	36	38	37	39	39
Washington State University	Mean	1.97	2.70	3.13	3.46	3.71	3.90
	N	31	27	31	28	31	30
University of Missouri-Columbia	Mean	2.34	3.09	3.26	3.94	3.77	4.06
	N	35	32	35	34	35	33
The Ohio State University	Mean	2.27	3.06	3.40	3.73	3.77	4.08
	N	52	49	53	51	53	52
Oregon State University	Mean	2.05	3.18	2.82	3.62	3.59	3.77
	N	22	22	22	21	22	22
University of Tennessee	Mean	2.13	2.87	3.68	3.71	3.87	4.00
	N	31	30	31	31	31	31
Virginia-Maryland College	Mean	2.33	2.95	3.67	3.79	4.05	4.08
	N	40	38	39	39	40	40
North Carolina State University	Mean	2.75	3.20	3.68	3.89	4.26	4.23
	N	28	25	28	27	27	26
University of Wisconsin	Mean	2.41	3.03	3.42	3.63	3.85	3.91
	N	32	29	31	30	34	32
Western University of Health Sciences	Mean	2.76	3.38	3.38	3.55	3.81	4.05
	N	21	16	21	20	21	20
Ross University	Mean	2.59	3.11	3.37	3.49	3.86	4.00
	N	69	62	71	70	71	69
St. George's University	Mean	2.73	3.16	3.59	3.81	4.15	4.04
	N	26	25	27	26	26	26
St. Matthew's University	Mean	2.40	2.40	3.60	4.00	4.60	4.40
	N	5	5	5	5	5	5
Total	Mean	2.49	3.08	3.34	3.57	3.81	3.95
	N	1,107	1,003	1,114	1,070	1,119	1,085



Diagnose/prescribe therapy for gastrointestinal disease		Diagnose/prescribe therapy for dermatological disease		Diagnose/prescribe therapy for endocrine disease		Diagnose/prescribe therapy for cardiac disease	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
3.64	4.23	3.68	3.79	3.60	3.90	3.33	3.70
42	40	41	39	42	40	42	40
3.74	4.21	3.87	3.97	3.76	3.84	3.66	3.86
39	39	38	38	38	38	38	37
3.17	3.86	2.62	3.39	3.14	3.32	3.28	3.35
29	28	29	28	29	25	29	26
3.29	4.21	3.11	3.69	3.31	3.85	3.11	3.73
35	33	35	32	35	33	35	33
3.54	3.98	3.62	3.81	3.19	3.48	3.42	3.48
52	52	52	52	52	52	52	52
3.14	3.67	2.10	3.10	3.00	3.48	3.14	3.20
21	21	21	21	21	21	21	20
3.26	3.93	3.32	3.87	3.48	3.67	3.10	3.34
31	30	31	30	31	30	31	29
3.74	4.24	3.05	3.53	3.42	3.71	3.16	3.39
38	38	38	38	38	38	38	38
3.85	4.19	4.00	3.77	3.67	3.67	3.67	3.74
27	27	27	26	27	27	27	27
3.58	4.06	3.69	3.70	3.34	3.37	3.42	3.58
33	32	32	30	32	30	33	31
3.71	4.20	3.33	3.79	3.43	3.74	3.24	3.42
21	20	21	19	21	19	21	19
3.81	4.21	3.58	3.94	3.30	3.60	3.43	3.67
69	68	69	67	69	67	68	66
4.21	4.39	3.54	4.05	3.79	3.78	3.83	4.04
24	23	24	22	24	23	24	23
4.00	4.20	3.60	4.60	4.20	3.80	3.60	3.75
5	5	5	5	5	5	5	4
<b>3.53</b>	<b>4.08</b>	<b>3.34</b>	<b>3.74</b>	<b>3.38</b>	<b>3.64</b>	<b>3.21</b>	<b>3.49</b>
<b>1,092</b>	<b>1,058</b>	<b>1,090</b>	<b>1,042</b>	<b>1,086</b>	<b>1,035</b>	<b>1,089</b>	<b>1,030</b>

		Diagnose/prescribe therapy for respiratory disease		Diagnose/prescribe therapy for renal disease		Diagnose/prescribe therapy for neurological disease	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
Auburn University	Mean	3.06	3.38	3.47	3.71	3.44	3.39
	N	34	34	34	34	34	33
Tuskegee University	Mean	2.94	3.78	3.11	3.89	2.67	3.39
	N	18	18	18	18	18	18
University of California-Davis	Mean	3.52	3.70	3.88	3.81	3.73	3.68
	N	33	30	33	31	33	31
Colorado State University	Mean	2.98	3.51	3.39	3.81	3.12	3.34
	N	49	47	49	47	49	47
University of Florida	Mean	3.19	3.40	3.41	3.77	3.22	3.40
	N	32	30	32	30	32	30
University of Georgia	Mean	3.00	3.53	3.62	4.00	3.53	3.76
	N	34	34	34	34	34	34
University of Illinois	Mean	2.83	3.38	3.33	3.82	2.81	3.28
	N	42	39	42	38	42	39
Iowa State University	Mean	2.94	3.60	3.45	3.94	2.84	3.26
	N	51	48	51	47	51	47
Kansas State University	Mean	3.00	3.25	3.36	3.69	2.63	3.18
	N	40	40	39	39	40	40
Louisiana State University	Mean	3.35	3.69	3.71	3.94	3.06	3.47
	N	17	16	17	16	17	17
Tufts University	Mean	3.09	3.21	3.83	3.88	3.60	3.44
	N	35	34	35	34	35	34
Michigan State University	Mean	3.05	3.42	3.44	3.86	2.61	3.11
	N	39	38	39	37	38	38
University of Minnesota	Mean	3.32	3.61	3.40	3.61	2.84	3.35
	N	25	23	25	23	25	23
Mississippi State University	Mean	3.14	3.30	3.37	3.54	3.26	3.12
	N	28	27	27	26	27	26
Purdue University	Mean	3.38	3.58	3.75	3.97	3.38	3.58
	N	32	31	32	31	32	31
Cornell University	Mean	3.09	3.59	3.59	3.97	3.35	3.33
	N	35	34	34	29	34	30
Oklahoma State University	Mean	2.88	3.38	3.24	3.58	3.00	3.33
	N	25	24	25	24	25	24

Diagnose/prescribe therapy for ocular disorders		Perform orthopedic surgery		Perform soft tissue surgery		Spay or neuter	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
3.00	3.18	1.65	1.92	2.97	3.59	3.65	4.03
34	33	34	24	34	32	34	32
3.44	3.83	2.27	2.71	4.00	3.76	4.39	4.12
18	18	15	7	18	17	18	17
3.88	4.00	1.66	2.13	3.28	3.34	3.90	3.69
33	32	29	15	32	29	31	26
2.90	3.34	1.69	2.20	2.71	3.69	3.38	3.95
49	47	45	35	49	45	48	43
3.09	3.33	2.15	2.64	3.53	3.81	4.16	4.23
32	30	27	14	32	32	31	30
3.09	3.38	1.72	2.29	2.85	3.80	3.03	4.10
34	32	29	21	33	30	33	30
3.60	3.57	1.85	2.41	2.75	3.45	3.50	3.89
42	37	39	29	40	38	40	38
3.06	3.45	1.75	2.12	3.36	3.88	3.96	4.38
51	47	48	33	50	43	50	42
3.33	3.53	1.54	2.43	2.72	3.50	3.47	4.31
40	40	35	23	39	38	38	36
3.41	3.65	2.06	2.18	2.88	3.59	3.35	4.06
17	17	16	11	17	17	17	16
3.26	3.26	1.81	1.81	2.56	3.19	3.36	3.87
34	34	31	16	34	31	36	31
3.08	3.42	1.67	2.33	2.92	3.74	3.41	4.24
38	36	36	18	39	34	39	33
3.32	3.23	1.50	2.08	2.79	3.38	3.46	3.90
25	22	22	12	24	21	24	20
2.89	3.07	1.83	2.05	3.04	3.50	4.39	4.19
28	27	24	20	28	26	28	27
3.31	3.81	1.97	1.92	3.35	3.67	4.06	4.26
32	31	30	24	31	30	32	31
3.26	3.31	1.67	2.18	2.88	3.58	3.69	4.11
34	32	27	11	34	31	32	27
3.36	3.58	1.52	2.13	3.00	3.59	4.08	3.77
25	24	23	15	24	22	24	22

		Diagnose/prescribe therapy for respiratory disease		Diagnose/prescribe therapy for renal disease		Diagnose/prescribe therapy for neurological disease	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
University of Pennsylvania	Mean	3.29	3.85	3.76	4.03	3.17	3.63
	N	42	39	42	40	42	40
Texas A&M University	Mean	3.23	3.59	3.53	3.87	3.44	3.37
	N	39	39	38	38	39	38
Washington State University	Mean	2.86	3.37	3.28	3.52	3.24	3.19
	N	28	27	29	27	29	27
University of Missouri-Columbia	Mean	3.17	3.67	3.51	4.06	3.49	3.64
	N	35	33	35	33	35	33
The Ohio State University	Mean	3.17	3.52	3.48	3.82	3.29	3.44
	N	52	52	52	51	52	52
Oregon State University	Mean	2.81	3.24	3.24	3.67	2.62	3.10
	N	21	21	21	21	21	21
University of Tennessee	Mean	3.13	3.47	3.52	3.77	3.26	3.57
	N	31	30	31	30	31	30
Virginia-Maryland College	Mean	3.34	3.68	3.74	4.11	3.39	3.63
	N	38	38	38	38	38	38
North Carolina State University	Mean	3.33	3.67	3.89	4.07	3.59	3.81
	N	27	27	27	27	27	27
University of Wisconsin	Mean	2.97	3.22	3.50	3.87	2.84	3.47
	N	33	32	32	30	32	32
Western University of Health Sciences	Mean	3.14	3.55	3.48	3.89	2.95	3.26
	N	21	20	21	19	21	19
Ross University	Mean	3.29	3.53	3.78	3.96	3.10	3.22
	N	69	68	69	67	69	67
St. George's University	Mean	3.83	3.91	3.96	4.04	3.63	3.57
	N	24	23	24	23	24	23
St. Matthew's University	Mean	4.00	4.00	4.40	4.60	3.60	4.00
	N	5	5	5	5	5	5
Total	Mean	3.14	3.51	3.55	3.86	3.16	3.40
	N	1,092	1,056	1,088	1,042	1,089	1,049

Diagnose/prescribe therapy for ocular disorders		Perform orthopedic surgery		Perform soft tissue surgery		Spay or neuter	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
2.71	3.35	1.69	2.50	2.58	3.44	3.10	3.81
42	40	36	20	40	36	39	31
2.03	2.79	2.00	2.38	3.49	3.70	4.22	4.27
38	38	34	26	37	37	37	37
2.79	3.00	1.56	2.06	2.86	3.62	3.62	4.20
29	27	27	17	29	26	29	25
3.23	3.30	1.67	2.50	2.91	3.84	3.59	4.25
35	33	33	24	34	32	34	32
3.33	3.37	1.65	2.03	3.18	3.83	3.92	4.31
52	52	48	31	51	48	52	49
1.76	2.81	1.68	2.45	2.62	3.47	3.81	3.95
21	21	19	11	21	19	21	19
3.61	3.77	1.96	2.09	2.93	3.57	3.79	4.03
31	30	27	22	29	28	29	29
3.42	3.39	1.66	2.20	2.58	3.46	3.26	3.81
38	38	35	25	38	37	38	37
3.63	3.67	1.69	1.93	3.11	3.69	4.00	4.25
27	27	26	14	28	26	28	24
3.28	3.20	1.33	1.50	2.58	3.55	3.13	3.89
32	30	27	12	33	29	31	27
2.67	3.26	1.63	2.20	3.05	3.84	4.40	4.38
21	19	19	10	20	19	20	16
2.91	3.30	1.86	2.09	3.50	3.79	4.15	4.32
69	67	64	45	68	67	68	66
2.96	3.39	1.90	2.43	3.43	3.68	4.38	4.14
24	23	20	14	23	22	24	21
3.80	3.80	2.40	2.33	3.40	2.75	4.40	4.00
5	5	5	3	5	4	5	4
<b>3.11</b>	<b>3.36</b>	<b>1.74</b>	<b>2.18</b>	<b>3.01</b>	<b>3.62</b>	<b>3.72</b>	<b>4.10</b>
<b>1,088</b>	<b>1,044</b>	<b>980</b>	<b>633</b>	<b>1,070</b>	<b>994</b>	<b>1,065</b>	<b>964</b>

		Manage reproductive programs		Evaluate disease outbreaks		Evaluate new drugs/products	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
Auburn University	Mean	2.86	2.76	3.09	3.12	3.34	3.77
	N	35	25	34	26	35	35
Tuskegee University	Mean	2.27	3.38	3.06	3.45	2.82	3.53
	N	15	8	17	11	17	17
University of California-Davis	Mean	2.71	3.10	3.23	3.55	3.53	3.72
	N	31	20	31	22	32	32
Colorado State University	Mean	2.30	2.79	3.00	3.12	3.04	3.44
	N	46	34	45	33	47	45
University of Florida	Mean	2.35	2.43	2.83	2.90	3.44	3.68
	N	29	21	29	20	32	31
University of Georgia	Mean	1.90	2.29	2.35	2.61	2.91	3.61
	N	31	21	31	23	33	31
University of Illinois	Mean	2.06	2.44	2.78	3.04	3.05	3.48
	N	36	18	37	23	40	40
Iowa State University	Mean	2.65	2.90	2.92	3.11	2.88	3.63
	N	48	39	49	45	51	48
Kansas State University	Mean	2.26	2.65	2.43	2.71	2.87	3.31
	N	35	23	35	24	39	39
Louisiana State University	Mean	2.53	3.00	2.65	2.92	2.88	3.47
	N	17	10	17	12	17	17
Tufts University	Mean	1.77	1.86	2.39	2.16	2.94	3.36
	N	34	22	33	25	34	33
Michigan State University	Mean	2.18	2.63	2.86	3.00	2.86	3.41
	N	38	27	37	27	36	37
University of Minnesota	Mean	2.65	3.06	2.78	3.19	3.08	3.70
	N	23	17	23	16	24	23
Mississippi State University	Mean	2.50	2.65	2.78	2.94	3.35	3.74
	N	26	17	27	18	26	27
Purdue University	Mean	2.76	3.08	3.06	3.10	3.44	3.91
	N	29	25	31	30	32	32
Cornell University	Mean	2.65	3.06	2.94	3.25	3.20	3.71
	N	31	18	33	20	35	34
Oklahoma State University	Mean	2.50	2.81	2.83	3.05	2.87	3.35
	N	22	21	24	19	23	23

Interpret medical literature		Deal with people		Veterinary medicine as a business		Giving educational presentations to the community	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
3.71	3.91	3.11	3.86	2.06	2.97	2.94	3.59
35	35	35	35	35	32	34	29
3.47	3.82	3.35	3.50	2.53	3.13	3.06	3.15
17	17	17	16	17	16	17	13
3.84	3.75	3.94	4.00	3.19	3.12	2.93	3.70
32	32	31	31	31	26	29	23
3.31	3.63	3.96	4.16	2.82	3.29	2.83	3.46
49	49	49	49	49	45	48	35
3.97	3.81	3.22	3.94	2.84	3.03	2.81	3.29
32	31	32	31	32	31	32	28
3.58	3.88	3.42	3.97	2.48	3.12	2.68	3.91
33	33	33	33	33	26	31	22
3.38	3.64	3.00	3.79	2.64	3.03	2.73	3.34
39	39	39	39	39	37	37	32
3.41	3.66	3.22	4.14	2.33	3.04	2.71	3.56
51	50	51	50	49	46	48	41
3.18	3.38	2.92	3.67	1.87	2.66	2.19	3.00
39	39	39	39	39	38	37	26
3.29	3.53	3.06	4.18	2.41	3.53	2.69	3.71
17	17	17	17	17	17	16	17
3.60	3.53	3.14	3.76	2.37	2.73	2.56	3.26
35	34	35	34	35	30	32	23
3.27	3.56	3.03	3.73	2.16	2.94	2.83	3.52
37	36	37	37	37	36	36	33
3.25	3.52	3.63	4.13	2.67	3.17	2.81	3.65
24	23	24	23	24	23	21	17
3.46	3.61	3.18	3.71	2.71	3.00	2.88	3.47
28	28	28	28	28	27	26	17
3.79	3.85	3.21	4.00	2.73	3.12	3.03	3.57
33	33	33	33	33	33	32	28
3.61	3.77	3.55	4.03	2.74	3.24	3.14	3.93
36	35	38	38	35	33	36	27
3.21	3.46	2.92	3.64	2.08	2.70	2.33	3.24
24	24	25	25	25	23	24	21

		Manage reproductive programs		Evaluate disease outbreaks		Evaluate new drugs/products	
		Expectations	Experience	Expectations	Experience	Expectations	Experience
University of Pennsylvania	Mean	2.33	2.90	2.77	3.14	3.18	3.86
	N	36	20	35	21	39	37
Texas A&M University	Mean	2.22	2.70	2.94	2.96	3.32	3.78
	N	32	20	32	28	38	36
Washington State University	Mean	2.12	2.61	2.48	2.75	2.82	3.21
	N	26	18	29	20	28	28
University of Missouri-Columbia	Mean	2.50	2.75	2.71	2.72	2.88	3.68
	N	32	24	31	25	33	31
The Ohio State University	Mean	2.43	2.85	2.85	3.10	3.08	3.60
	N	47	40	52	42	53	50
Oregon State University	Mean	2.42	2.71	2.60	3.06	2.90	3.37
	N	19	14	20	16	20	19
University of Tennessee	Mean	2.462	2.74	2.75	3.13	3.38	3.62
	N	26	23	28	24	29	29
Virginia-Maryland College	Mean	2.60	3.10	2.75	2.93	3.11	3.62
	N	35	29	36	30	37	37
North Carolina State University	Mean	2.35	2.80	2.92	3.07	3.37	3.54
	N	26	15	25	15	27	28
University of Wisconsin	Mean	2.37	2.71	2.58	2.92	3.09	3.73
	N	30	21	31	24	32	33
Western University of Health Sciences	Mean	2.24	2.75	3.32	3.15	3.57	3.74
	N	17	8	19	13	21	19
Ross University	Mean	2.46	2.46	2.74	2.77	2.99	3.48
	N	59	46	62	48	68	67
St. George's University	Mean	2.29	2.53	2.68	2.77	3.35	3.78
	N	21	15	19	13	23	23
St. Matthew's University	Mean	2.25	2.67	3.40	3.00	3.40	3.80
	N	4	3	5	5	5	5
Total	Mean	2.40	2.73	2.81	2.98	3.12	3.59
	N	986	691	1,008	747	1,060	1,035



Interpret medical literature		Deal with people		Veterinary medicine as a business		Giving educational presentations to the community	
Expectations	Experience	Expectations	Experience	Expectations	Experience	Expectations	Experience
3.73	3.80	3.15	4.30	2.80	3.41	2.87	4.21
40	40	40	40	40	39	39	33
3.74	3.76	3.23	4.00	2.44	3.00	2.72	3.43
39	38	39	39	39	37	39	30
3.24	3.38	3.72	3.76	2.48	3.00	2.50	3.23
29	29	29	29	29	25	28	22
3.36	3.60	3.06	3.97	2.38	3.07	2.52	3.44
33	30	32	33	32	30	31	25
3.55	3.62	3.37	4.12	2.50	2.98	2.51	3.40
53	52	52	51	52	47	51	43
3.67	3.65	2.48	3.76	2.19	3.05	2.70	3.64
21	20	21	21	21	20	20	14
3.72	3.72	3.97	4.10	2.52	2.93	2.74	3.44
29	29	29	29	29	29	27	25
3.51	3.68	3.41	4.08	2.32	2.97	2.72	3.59
37	37	37	37	37	35	36	32
3.68	3.68	3.11	3.93	2.79	3.12	2.96	3.71
28	28	28	28	28	26	28	24
3.70	3.85	3.18	3.88	1.85	2.56	2.16	3.23
33	33	33	33	33	32	32	31
4.05	3.95	4.29	4.24	3.19	3.11	3.52	4.00
21	21	21	21	21	18	21	16
3.47	3.54	3.37	3.87	2.53	3.02	2.78	3.47
68	68	68	67	68	65	65	55
3.70	3.78	3.27	3.88	2.54	3.39	3.00	3.69
23	23	22	24	24	23	23	16
4.60	3.80	3.40	4.60	2.80	3.80	3.00	3.25
5	5	5	5	5	5	4	4
<b>3.54</b>	<b>3.67</b>	<b>3.32</b>	<b>3.95</b>	<b>2.50</b>	<b>3.04</b>	<b>2.74</b>	<b>3.51</b>
<b>1,076</b>	<b>1,060</b>	<b>1,075</b>	<b>1,071</b>	<b>1,072</b>	<b>1,003</b>	<b>1,034</b>	<b>840</b>

		Communicating with clients	
		Expectations	Experience
Auburn University	Mean	3.29	3.94
	N	35	34
Tuskegee University	Mean	3.65	3.69
	N	17	16
University of California-Davis	Mean	4.10	4.10
	N	31	31
Colorado State University	Mean	3.90	4.15
	N	49	48
University of Florida	Mean	3.41	3.97
	N	32	31
University of Georgia	Mean	3.61	4.06
	N	33	32
University of Illinois	Mean	3.23	3.92
	N	39	39
Iowa State University	Mean	3.43	4.18
	N	51	50
Kansas State University	Mean	3.08	3.82
	N	39	39
Louisiana State University	Mean	3.18	4.35
	N	17	17
Tufts University	Mean	3.34	3.85
	N	35	34
Michigan State University	Mean	3.46	4.03
	N	37	37
University of Minnesota	Mean	3.67	4.17
	N	24	23
Mississippi State University	Mean	3.43	3.79
	N	28	28
Purdue University	Mean	3.55	3.94
	N	33	33
Cornell University	Mean	3.46	3.97
	N	37	35
Oklahoma State University	Mean	3.36	3.72
	N	25	25

		Communicating with clients	
		Expectations	Experience
University of Pennsylvania	Mean	3.28	4.45
	N	40	40
Texas A&M University	Mean	3.31	4.08
	N	39	39
Washington State University	Mean	3.86	3.82
	N	29	28
University of Missouri-Columbia	Mean	3.38	4.10
	N	32	30
The Ohio State University	Mean	3.45	4.12
	N	51	50
Oregon State University	Mean	2.86	3.81
	N	21	21
University of Tennessee	Mean	4.00	4.17
	N	29	29
Virginia-Maryland College	Mean	3.59	4.17
	N	37	36
North Carolina State University	Mean	3.46	4.11
	N	28	28
University of Wisconsin	Mean	3.15	4.06
	N	33	33
Western University of Health Sciences	Mean	4.10	4.19
	N	21	21
Ross University	Mean	3.51	4.06
	N	68	65
St. George's University	Mean	3.46	4.00
	N	24	24
St. Matthew's University	Mean	4.00	4.60
	N	5	5
Total	<b>Mean</b>	<b>3.48</b>	<b>4.03</b>
	<b>N</b>	<b>1,075</b>	<b>1,057</b>

### **THE AVMA 2018 ECONOMIC REPORTS INCLUDE:**

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

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

#### **The AVMA Report on the Market for Veterinarians:**

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

#### **The AVMA Report on the Market for Veterinary Services:**

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