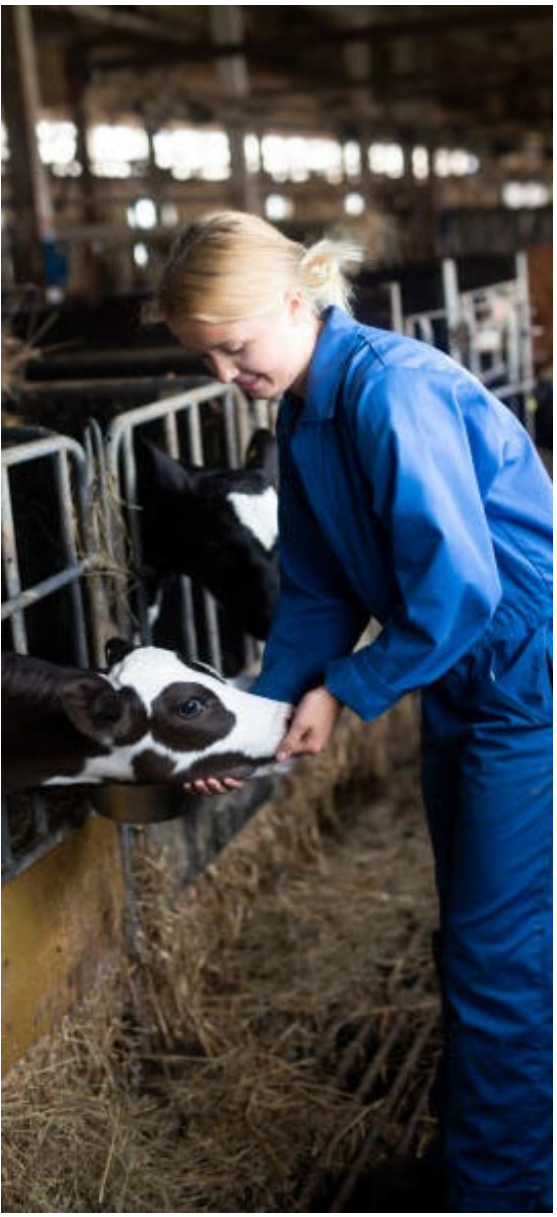
USDA National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

VETERINARY MEDICINE LOAN REPAYMENT PROGRAM

2010 TO 2022 PROGRAM SUMMARY



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USDA. 2023. "Veterinary Medicine Loan Repayment Program 2010 to 2022 Program Summary." United States Department of Agriculture-National Institute of Food and Agriculture. Kansas City, MO.

EXECUTIVE SUMMARY

Food animal veterinarians fill a critical role in ensuring the health and welfare of agricultural animals by providing essential private and public veterinary services. In response to challenges with recruitment and retention of food animal veterinarians, concurrent with rising veterinary educational debt, in 2003 the United States Congress authorized the establishment of the Veterinary Medicine Loan Repayment Program (VMLRP). Initial funding and delegation of authority to the Cooperative States Research, Education and Extension Services (previous name for the National Institute of Food and Agriculture) to manage the program came in 2005 and 2006. The first awards were made in 2011, and by 2023, annual funding reached $10 million.

Since 2010 NIFA has allocated the numbers of shortage areas to states, insular areas and federal jurisdictions based on agricultural census data, and animal health officials have used those allocations to nominate specific shortage areas. Once nominations are made the VMLRP solicits applications for veterinarians to serve the shortage areas and conducts a peer-review matching process for selection of awardees. The number of shortage areas nominated by animal health officials was lowest in 2015 (186) but increased to 226 by 2022. The largest numbers of shortage areas were nominated in the midwestern and western U.S. and in Georgia, and the species identified as having the greatest need has been beef cattle.

Over the period 2010-2022, the VMLRP received 2,061 applications from food animal veterinarians and entered into service agreements with 795 awardees. Demographics of applicants and awardees have changed over time with an increasing proportion of female applicants and awardees. Most applicants and awardees' self-reported race and ethnicity were White and non-Hispanic. The states or insular areas with the largest number of applicants have been in the western and midwestern states, and the largest number of awards have been made to veterinarians in Iowa, Nebraska and Kansas.

The VMLRP award amount has remained the same since the program's inception, $25,000 per year for a three-year service agreement. Awardees may apply for a renewal award at the end of their three-year period if they have remaining veterinary educational debt. Although the award amount has remained the same, veterinary educational debt of awardees has not. The average amount of debt in 2011, $109,000, rose to $147,000 in 2022, an increase of 35%.

This report provides an overview of the VMLRP and summarizes trends and activities of the program to respond to the needs of animal health officials, food animal veterinarians, food and fiber animal producers, and interested stakeholders, and includes program highlights and accomplishments.

BACKGROUND

Food animal veterinarians who care for and safeguard the health of livestock, poultry and aquatic animals, ensuring their welfare as well as food safety, security and quality, are critical for the sustainability of the U.S. food system. These veterinarians work in private practice, public practice and within animal agriculture industries. For decades food animal veterinarian workforce studies have reported both recruitment and retention issues (CAST, 2020; NRC, 2013), although lack of systematic and detailed employment data has created difficulties in characterizing these issues. According to the American Veterinary Medical Association (AVMA) *Economic State of the Veterinary Profession, 2023* (AVMA, 2023), food animal exclusive and food animal predominant practice together attracted only 3.2% of 2022 veterinary college graduates. One of the most significant challenges identified for entering the profession and being successful as a food animal veterinarian is the cost of veterinary medical education and the resulting pressures of repaying student debt, especially considering the differences in compensation between food animal and companion animal veterinary practice types.

Veterinary medical educational debt is tracked by the AVMA via annual surveys of graduating students from U.S. and two Caribbean veterinary colleges (AVMA, 2023). In February 2023, the AVMA reported the mean educational debt for all U.S. veterinary college graduates in 2022, including those with no educational debt, to be $147,258; excluding those with no debt the mean was $179,505. The mean weighted starting salary for students entering full-time employment was $97,175 and the mean debt-to-income ratio was 1.4:1. The AVMA also noted that the percentage of graduates without educational debt increased to 18% in 2022 from 16% in 2021. However, over 9% of new graduates had greater than $300,000 in educational debt.

In 2003, the National Veterinary Medical Service Act (NVMSA, 2003) was passed into law adding section 1415A to the National Agricultural Research, Extension, and Teaching Policy Act (NARETPA) of 1997. That law established the new VMLRP, authorizing the U.S. Secretary of Agriculture to carry out a program of entering into agreements with veterinarians under which they agreed to provide veterinary services in shortage situations (Figure 1).

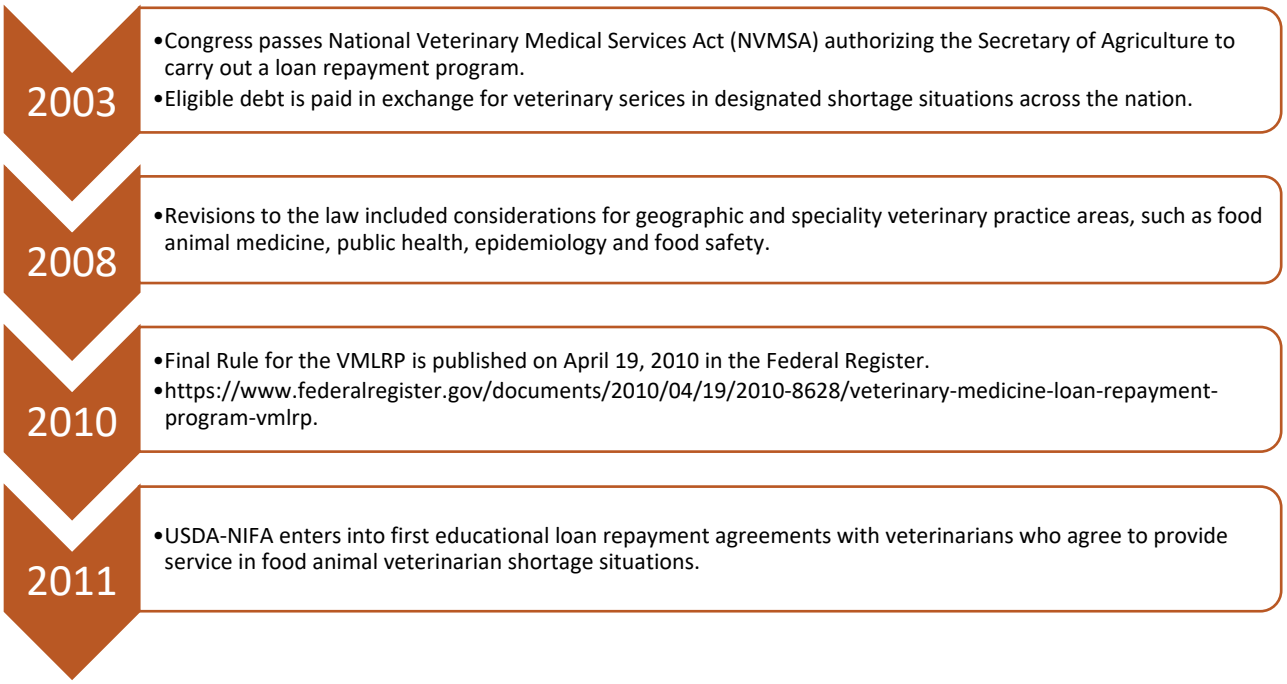


Figure 1. Timeline of authorization and appropriations for the VMLRP.

The VMLRP provides educational debt repayment support for veterinarians who work in food supply veterinary medicine as defined by the NVMSA and the Code of Federal Regulations (CFR, https://www.ecfr.gov/current/title-7/subtitle-B/chapter-XXXIV/part-3431) and who provide veterinary medical services for animals used in food and fiber

production. These animals include those specified in the original CFR language as well as those not originally cited but that are essential for production of food and fiber. Food animal veterinarians are therefore defined as those who provide services for the health and welfare of food supply animals, which include domestic livestock, poultry, equids, aquatic animals, honeybees and other income-producing animals that are essential to the nation's food supply. These services may be in exclusive food animal veterinary practice or in mixed animal practice, where services are provided to food supply animals as well as companion animals. Recognizing the continuing need to support food animal veterinarians, the U.S. Congress has appropriated funding to the VMLRP each year since 2005 (Table 1).

Table 1. Annual appropriations to the VMLRP since its inception in 2010.

Year	Annual Appropriation, $	Year	Annual Appropriation, $
2010	9,216,000*	2017	6,500,000
2011	4,790,400	2018	8,000,000
2012	4,790,000	2019	8,000,000
2013	4,430,101	2020	8,000,000
2014	4,790,000	2021	8,500,000
2015	5,000,000	2022	9,500,000
2016	5,000,000	2023	10,000,000

* Fiscal year 2010 funding represents the cumulative appropriations from FY2005 through FY2010.

GOALS AND PURPOSE OF THE VMLRP

The purpose of the VMLRP is to attract and retain food animal veterinarians to practice in designated veterinary shortage areas through educational loan repayment support.

The VMLRP has been actively supporting practicing food animal veterinarians with educational loan repayments since 2010. In this time, the landscape of veterinary educational debt assumed by graduating veterinarians and the needs identified for food animal veterinarians in both private and public practice have shifted. In 2014, the USDA NIFA Veterinary Services Grant Program (VSGP) was authorized by the Farm Bill and in 2016 was implemented as a competitive grant program associated with the VMLRP to develop, implement and sustain food animal veterinary services and relieve veterinary shortages.

This report provides an overview of the VMLRP and summarizes trends and activities of the program for stakeholders and decision makers as they respond to the needs of veterinarians and veterinary shortage areas, and includes program highlights and accomplishments.

OVERVIEW OF THE VMLRP

NIFA commits to paying up to $25,000 per year for three years to reduce eligible educational debt assumed by food animal veterinarians in obtaining a Doctor of Veterinary Medicine (DVM, VMD) degree. Only those loans received while attending an AVMA-accredited veterinary medical college resulting in a degree of a DVM or equivalent (VMD) qualify for loan repayment (see Accredited veterinary colleges | American Veterinary Medical Association (avma.org)). An additional payment of 39% of the award is allowed to cover associated income taxes which may be at the federal, state and/or local level. After the initial three-year period awardees may apply for a renewal agreement, available to veterinarians with at least $15,000 of educational debt remaining after their previous award. Renewal terms may extend one to three years based on the applicant's eligible educational debt.

The core components of the VMLRP are the designated food animal veterinary shortage situation areas, applications from food animal veterinarians to address the shortages, and a peer review process to match shortage situations with applicants.

FOOD ANIMAL VETERINARY SHORTAGE SITUATION AREAS

Veterinary shortage situation areas are identified and nominated each year by State Animal Health Officials (SAHOs, https://www.usaha.org/saho) or in the case of federal nominations, by the Chief Veterinary Officer of the United States. After their review by a panel of food animal veterinarians and other experts, nominations are designated by the VMLRP and opened for applications. These nominations:

- May be within a state, insular area (the Commonwealth of Puerto Rico, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, the Republic of the Marshall Islands, the Republic of Palau and the Virgin Islands of the United States) or federal agency.
- Describe the objectives, needs and priority for the type of food animal practitioner, including the geographic area the veterinarian is required to serve, the food animal species they must and may serve, the required time commitment (% full time equivalent (FTE) based on a 40-hour work week), and services that are required of the veterinarian.
- May be for private or public veterinary practice. Federal nominations are for service in federal agencies.

The number of nominations allocated to each state and insular area is based on the geographic size of the entity and the livestock trade, in dollars, within that entity (see https://www.nifa.usda.gov/vmlrp-shortage-situation-nomination-allocation). VMLRP developed the rationale for the allocation of shortage area nominations to 60 entities, including each of the 50 states, Washington D.C., insular areas and federal lands at the inception of the program. The rationale was developed in consultation with the National Agricultural Statistics Service (NASS) based on NASS data of Livestock and Livestock Total Sales (in U.S. dollars) and Land Area (in acres). These two variables were most strongly correlated with state-level food supply veterinary services needed. A review of the allocations is conducted every three years.

Shortage areas are posted online each year after review and designation by NIFA at https://www.nifa.usda.gov/vmlrp-map.

APPLICATIONS

Food animal veterinarians, or soon-to-graduate veterinary students planning to enter food animal or mixed animal veterinary practice, are eligible to apply to the program if they have employment or an offer of employment in a food animal or mixed animal veterinary practice by January 1 of the year after they apply.

Applications are submitted by private or public food animal veterinary practitioners to serve a specific veterinary shortage area. A veterinarian may apply to only one designated veterinary shortage area in the current fiscal year. In targeting only one shortage area, the applicant responds directly to the needs and objectives of their selected shortage area. As part of their application, in their professional narrative they describe their education, background and experience and how these meet the objectives and needs of the area. In addition, applicants demonstrate their commitment and connections to the community.

SELECTION OF BEST MATCHES

Reviews and recommendations for funding are conducted each year by a peer-review panel to identify the best matches based on the most meritorious candidates who can meet the shortage area needs. The panel of peer reviewers is recruited each year by a panel manager, who ensures that the panel meets NIFA's criteria for expertise and diversity, equity, inclusion and accessibility. Peer reviewers are drawn from private and public food animal practice, academia and animal industries. Past VMLRP awardees are often requested to participate in peer review panels.

PROGRAM CYCLE

The program cycle spans 16 months (Figure 2, Appendix Table A1). State, insular area and federal veterinary officials nominate shortage areas in the fall 15 months prior to the starting date of service agreements. Nominations are reviewed, designated and posted online for applicants to view in January. The annual Request for Applications (RFA) is

posted soon thereafter. The program allows two to three months for development and submission of applications in the spring. VMLRP convenes panels for reviewing and ranking the best-matched applicants with shortage areas in late spring. By September 30, awardees are notified of their selection, and on January 1, 15 months after the cycle begins, awardees' service agreements are active. The first payments are distributed from VMLRP at the end of the first quarter of participation and continue quarterly for the three-year period.

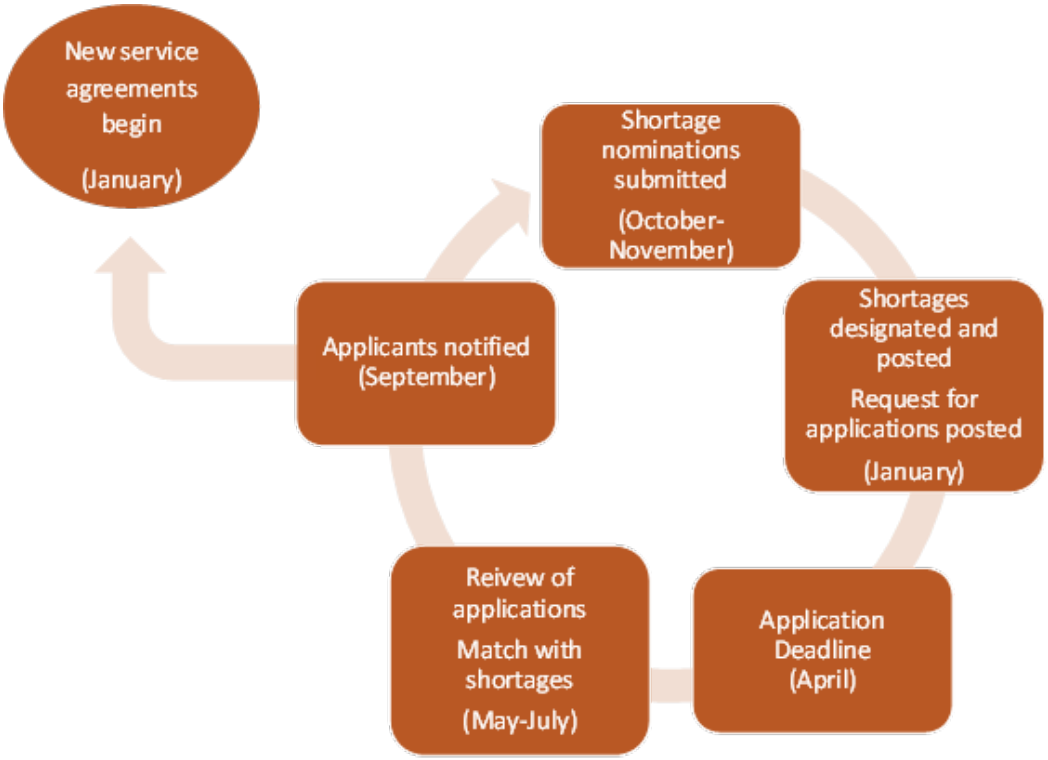


Figure 2. Cycle of nominations, applications and awards.

The first nominations for shortage areas were accepted in spring 2010 from SAHOs, the first RFA was posted in June 2010, and the first service contracts were awarded beginning in January 2011. In 2016 the cycle was changed to 16 months to align the program dates with veterinary college graduation dates to allow new graduates to base their employment searches on VMLRP shortage areas. The updated cycle dates have been in effect since then.

VMLRP TRENDS, 2010-2022

SHORTAGE AREAS

Allocations and Nominations

There are currently 267 allocations available to the 60 entities throughout the United States (USDA-NIFA, 2023). The number of shortage nominations from the 60 entities ranged from a low of 186 in 2015 to a high of 243 in 2010 (Table 2). In the early years of the program, 2010-2012, nominations and applications were higher while many initial shortages were identified and filled. In 2020-2022 the number of nominations increased again to over 200.

Table 2. Number of shortage nominations, 2010-2022.

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
243	240	219	188	189	186	188	196	187	190	217	221	226

Priority

An assessment of the priority for filling a shortage area was requested of SAHOs beginning with the 2013 nomination cycle. A SAHO may designate a shortage as a critical, high or medium priority (Table 3), based on the evaluation of the need by the SAHO.

Table 3. Definitions of shortage area priorities.

Priority for Filling Shortage Area	Definition
Moderate	An area lacking in some aspect of food supply veterinary services. Justified by the absence of, or insufficient access to, veterinary services needed for basic animal health, animal well-being, production profitability, food safety, or public health.
High	An area lacking sufficient access to food supply veterinary services. Justified by meeting the criteria for moderate priority status plus any additional concerns relating to food supply veterinary medicine and/or public health. Examples include areas with especially large census of food animals in comparison to available veterinary services or special animal or public health threats unique to the area e.g., recent or ongoing disease outbreak of high consequence, or reportable endemic animal and zoonotic diseases.
Critical	An area severely lacking in some aspect of food supply or public health related veterinary services. Justified by meeting the criteria for moderate and/or high priority status plus any additional serious concerns relating to the roles food supply veterinarians play in protecting animal and public health. Examples include areas with especially high potential for natural disasters or incursion of foreign animal disease e.g., high through-put international animal importation sites or proximity to international borders where wildlife and food animal species readily cross.

For the 1,978 nominations with a listed priority in 2013-2022, the majority, 56%, were assessed as high and 33% were assessed as critical (Table 4).

Table 4. Priority of shortage areas, 2013-2022.

Priority	Number	Percentage
Critical	644	33%
High	1115	56%
Moderate	219	11%

Shortage Type

Food animal veterinarians perform a broad range of services in private and public practice. To account for the range of needs for these services, VMLRP developed three types of shortage areas, with Types I and II designated for private practice and Type III for public practice (Table 5). Type III shortage situations are allocated 10% of each fiscal year's funding.

Table 5. Shortage area types, definitions, and minimum percentage FTE.

Shortage Area Type	Definitions	Minimum Percentage FTE*	Practice Type
Type I	May be in a rural or urban area if the service shortage to be mitigated is consistent with the definition of "practice of food supply veterinary medicine." Intended for shortage situations where the veterinarian can operate profitably by committing at least 80% time to food animal medicine activities, based on the client base and other socio-economic factors impacting viability of veterinary practices in the area.	80% (32 hours per week)	Private
Type II	Must satisfy the VMLRP definition of a "rural area." Service some remote or economically depressed rural areas that need food animal veterinary services but may be unable to fully support a practitioner predominantly serving the food animal sector.	30% (12 hours per week)	Private
Type III	Broad nomination category comprised of many types of public service veterinary training and employment. Typically found in city, county, state or federal governments and institutions of higher education.	49% (19.6 hours per week)	Public

*Full-time equivalent (FTE) is the number of working hours that represents one full-time employee during a fixed time. For VMLRP this equates to a 40-hour work week.

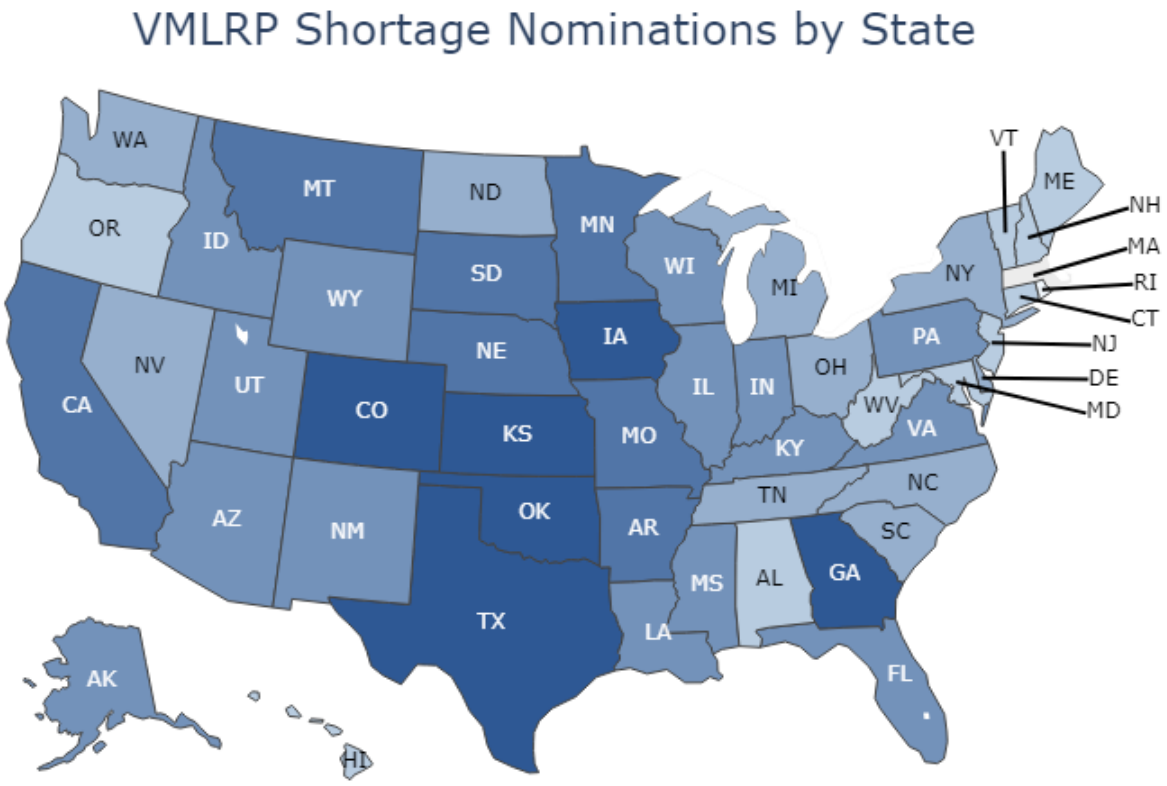
The number of nominations by shortage type for the 13-year period (Table 6) shows that most nominations have been of Type II. These nominations require a minimum 30% Full Time Equivalent (FTE) commitment. SAHO's can specify a greater percentage FTE commitment appropriate to the area nominated.

Table 6. Number and percentage of shortage situations by practice type, 2010-2022.

Type	Number	Percentage
I	390	14%
II	1853	69%
III	447	17%

Geographic Distribution

For those states or entities that nominated shortage areas, the total number of nominations for the 13-year period ranged from one in some insular areas to 104 by both Texas and Colorado (Figure 3 and Appendix Table A2). Any nomination that is not filled within a state or other entity is allowed to be carried over or renominated in the next year. VMLRP also allows states to nominate areas jointly for contiguous regions that cross state boundaries. Two states, Arizona and California, have nominated joint shortage areas (Appendix Table A2). Overall, the largest numbers of nominations over the 13-year period have been received from midwestern and western states and Georgia (Figure 3). As noted above, an important component of the number of allowed nominations is NIFA's allocation process.



Number of Shortage Nominations	States*
1-10	AS, MRI, PR, RI, RM, RP
11-25	AL, CT, HI, MD, ME, NH, NJ, OR, VT, WV
26-50	DE, MI, NC, ND, NV, NY, OH, SC, TN, WA
51-75	AK, AZ, FL, ID, IL, IN, KY, LA, MS, NM, PA, UT, VA, WI, WY
76-90	AR, CA, MN, MO, MT, NE, SD
91+	CO, GA, IA, KS, OK, TX

*States represent U.S. states, insular areas and territories. States are listed alphabetically in each row. See Appendix Table A2 for further details.

Figure 3. Number of shortage situations designated for applications, by state or insular area, 2010-2022.

Must Cover Species and Commodities

For Type I and II shortage areas, SAHOs identify species as those that the selected veterinarian "Must Cover" and provide services for within a shortage area. SAHOs may designate beef cattle, dairy cattle, small ruminants, swine, poultry or other species or commodities. Other species have included aquaculture, equine, honeybees and others specific to an area. Veterinarians are expected to commit at least 50% of their time to the Must Cover species or services. "May Cover" species include those above and may allow for up to 50% of a veterinarian's time.

The distribution of Must Cover species for Types I and II shortages are in Table 7. Services for beef cattle were identified as the greatest need, followed by small ruminants and dairy cattle.

Table 7. Number of shortage nominations requiring services for each "Must Cover" species, for private practice shortage Types I and II, 2010-2022.

Shortage Type	Beef Cattle	Dairy Cattle	Swine	Poultry	Small Ruminants	Other
Type I	328	202	140	96	178	67
Type II	1815	1023	808	446	1327	231

The distribution of species that a veterinarian must cover in Type I and Type II shortages have changed slightly over time (Figures 4 and 5). After the early implementation period in 2010-2012, the number of designated shortage areas where officials required services for beef cattle has remained fairly constant, with a low in 2018. The need for services for beef cattle was also highest by percentage (Figure 5), where >90% of shortage areas cite beef cattle as a Must Cover species.

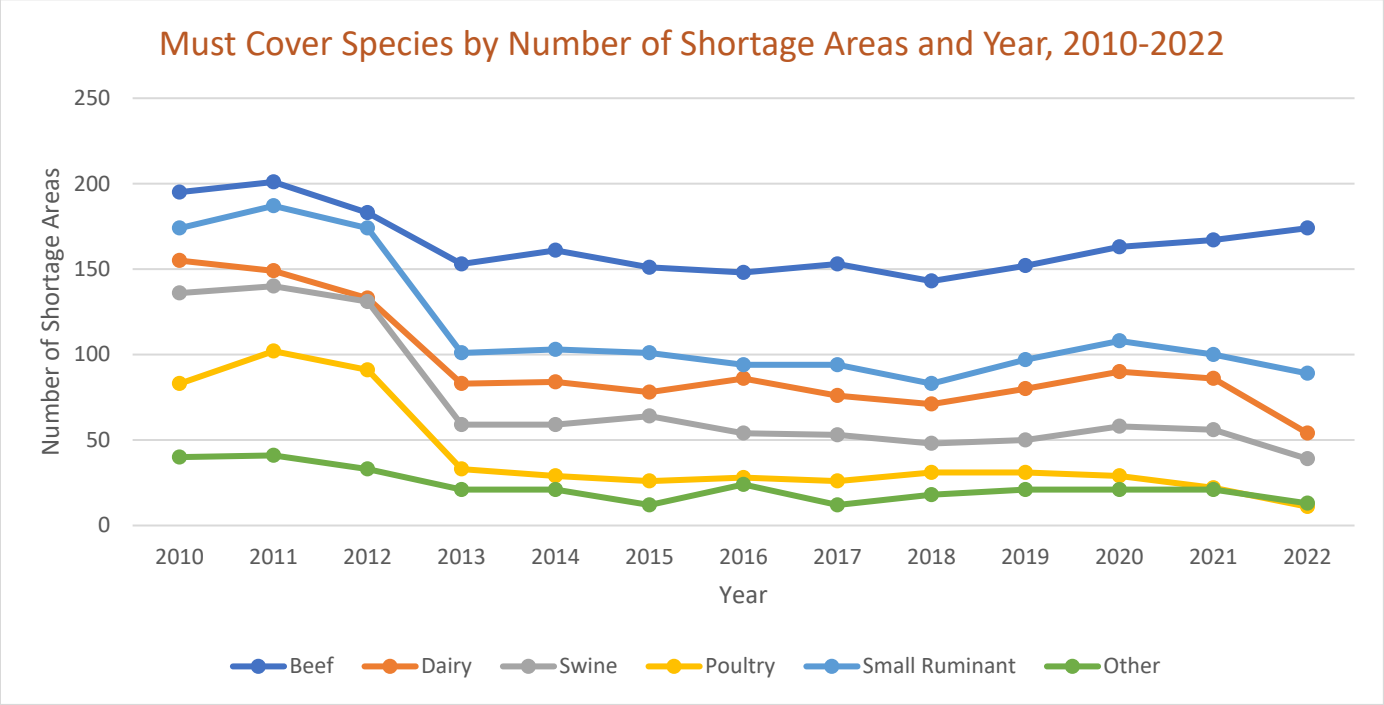


Figure 4. Must Cover species by number of shortage areas where services were required, by year.

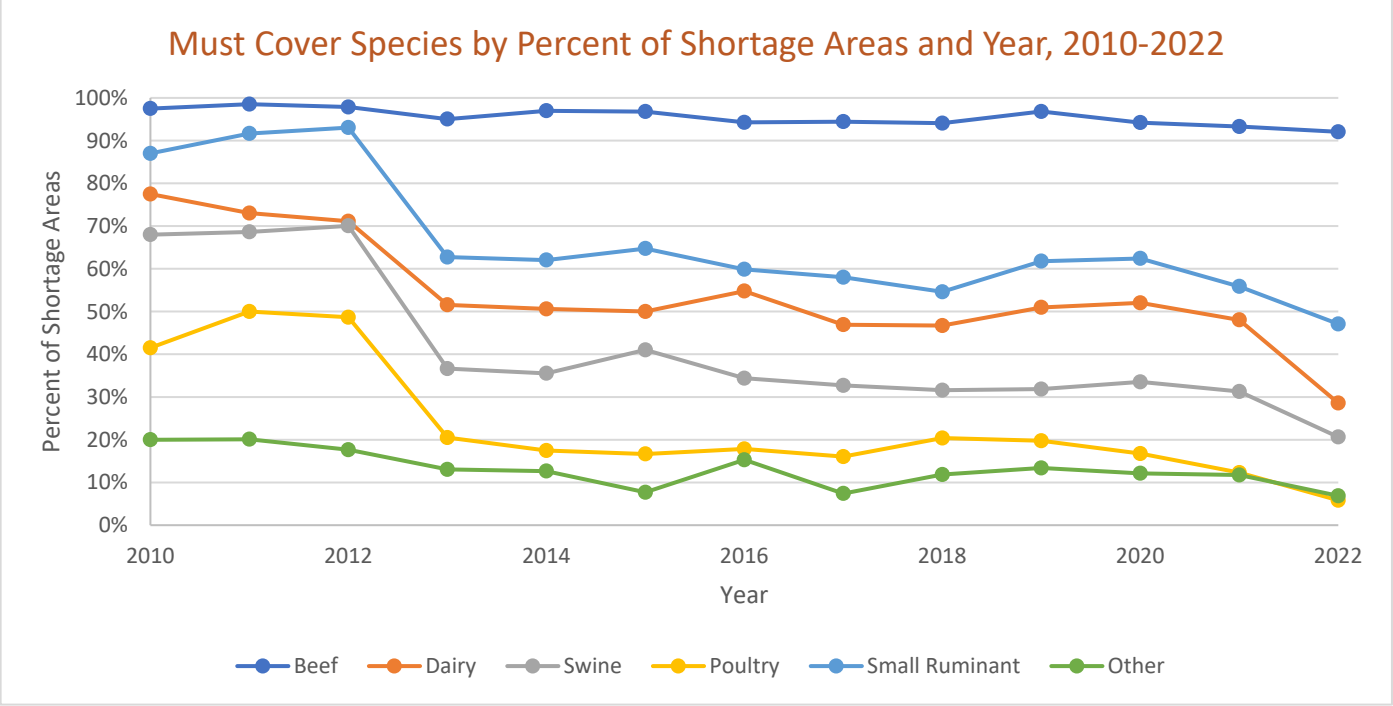


Figure 5. Must Cover species by percentage of shortage areas where services were required, by year.

Public Practice Services

Type III public veterinary practice services consist of a broad and varied range of activities, often requiring post-DVM training, graduate degrees or specialty board certifications. These may include regulatory, inspection, investigatory and emergency response activities for government agencies, academic faculty or clinical positions, and laboratory diagnostics. Of the 447 Type III shortage nominations, the largest percentage of services requested were for public health and food safety (Table 8).

Table 8. Number and percentage of Type III shortage situations by major public practice services, 2010-2022.

Type III Service	Epidemiology	Public Health	Food Safety
Number of shortages	246	326	281
Percentage	55%	73%	63%

APPLICATIONS AND APPLICANTS

Number of Applications

From 2010 through 2022, VMLRP received 2,061 applications to the program from veterinarians, including those who applied more than one time or who applied to renew their award after their first loan repayment period expired and they had remaining debt (Table 9). The total number of applications includes 61 that were withdrawn by the applicant or rejected for incomplete documentation at some time in the review process before a service agreement was finalized. The total number of agreements offered were 842 and of these 795 were established as finalized service agreements. New applications were from those who had not previously received an award. These included applicants who had applied to the program previously and not yet been awarded.

The number of applications per year peaked in 2016 with 187 applications. Of these, 162 were new applicants. The lowest number of applications received was in 2022 with 130 applications.

Table 9. Number of applications and awards, and total funding awarded, by year, 2010-2022.

Year	New Applications	Renewal Applications	Awards Offered	Agreements Established	Total Funding Awarded
2010	259	---	62	52	$5,185,978
2011	159	---	80	75	$7,250,970
2012	142	---	50	45	$4,448,652
2013	118	22	47	43	$3,838,128
2014	137	25	52	49	$4,360,121
2015	130	7	49	48	$4,504,340
2016	162	25	51	46	$4,264,574
2017	145	20	59	56	$5,427,905
2018	135	12	74	74	$6,792,005
2019	131	8	72	64	$6,132,735
2020	132	18	76	76	$7,152,453
2021	129	15	78	78	$7,558,277
2022	114	16	92	89	$8,926,394
TOTAL	**1,893**	**168**	**842**	**795**	**$75,842,532**

Demographic Characteristics of Applicants

Demographic and educational information requested from VMLRP applicants includes race, ethnicity, gender, veterinary school and year of graduation. Provision of demographic data is voluntary and is not included in the selection process. Some applicants did not report requested demographic information.

Gender

The self-reported gender of applicants over the 13-year period (Table 10, Figure 6) shows that females outnumbered males in nearly every year. Of the 1,957 applicants who self-reported their gender, 1,142 (58%) were female. In only one year, 2012, did males exceed females with 55% (73/132) of applicants, and by 2022, males comprised only 24% (30/123) of those applicants who reported gender information.

Table 10. Self-reported gender of applicants, by year, 2010-2022.

Gender	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Female	142	82	59	68	87	65	108	100	88	75	76	99	93	1142
Male	116	76	73	61	65	64	73	60	57	40	64	36	30	815
NR*	1	1	10	11	10	8	6	5	2	24	10	9	7	104
Total	259	159	142	140	162	137	187	165	147	139	150	144	130	2061

*NR=Not reported, declined to report, or other.

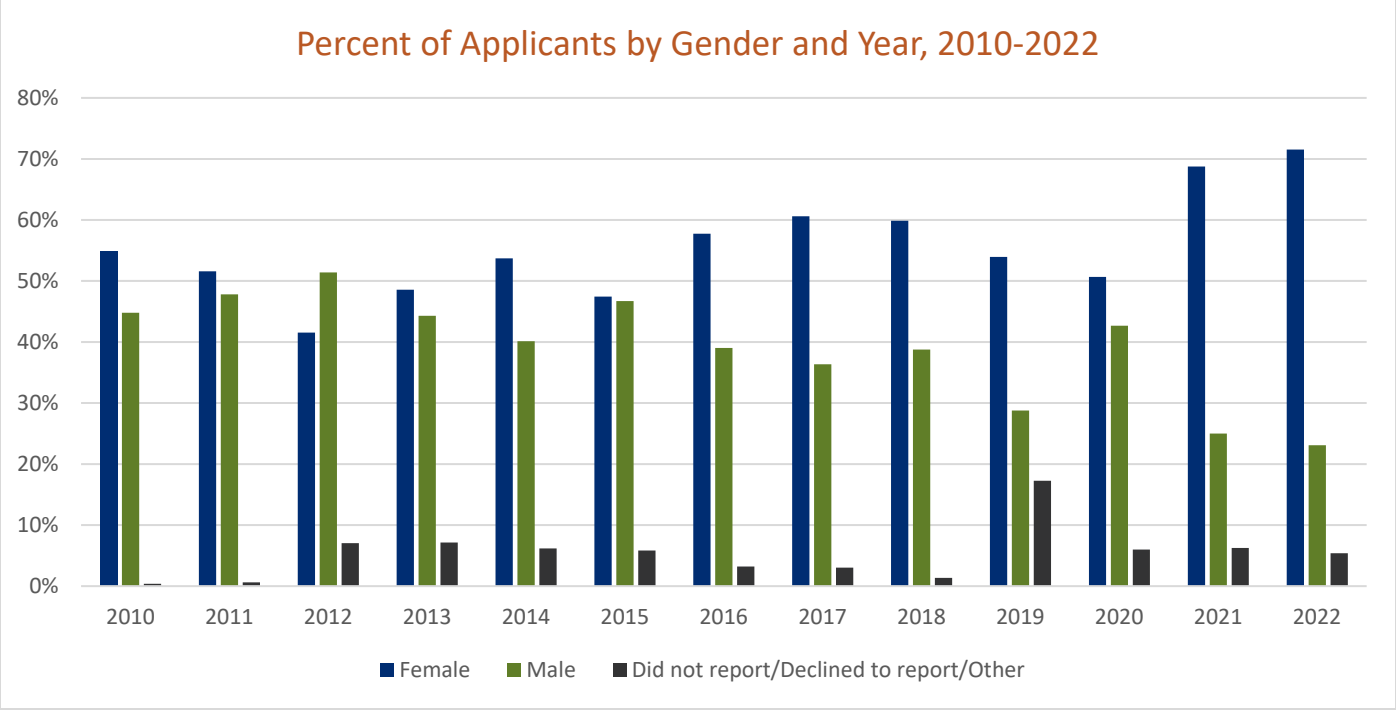


Figure 6. Percent of applicants by self-reported gender and year, 2010-2022.

Race and Ethnicity

Applicants were also asked to self-report race and ethnicity. Ethnicity, defined as Hispanic or non-Hispanic, was requested via different questions between the inception of the program and later years, so ethnicity data are only reported for years 2012-2022. Overall, of the 1,454 applicants who responded to the question and chose to report their ethnicity, 26 (1.8%) reported being of Hispanic ethnicity (Table 11).

Table 11. Number of applicants reporting ethnicity as Hispanic or non-Hispanic, by year, 2012-2022.

Ethnicity	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Hispanic or Latino	3	1	1	0	2	1	1	3	5	4	5	26
Not Hispanic or Latino	110	116	137	123	175	152	137	108	133	128	109	1428
NR*	29	23	24	14	8	12	8	24	12	12	16	182

*NR=Not reported or declined to report.

For reporting race, applicants were allowed to select one or more from the following list: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, Hispanic or Latino, White, Other or Do not wish to disclose. Most applicants reported their race as White and 9% elected to not report race (Table 12). Because of the small number of responses in some groups, self-reported race data are not presented by year.

Table 12. Number and percentage of applications, by self-reported race, 2010-2022.

Self-reported race	Number of Applications	Percentage of Applications
American Indian or Alaska Native	22	1.1%
Asian	6	0.3%
Black or African American	14	0.7%
Do not wish to disclose / Not reported	190	9.2%
More than one race selected	16	0.8%
Native Hawaiian or Other Pacific Islander	1	0.05%
White	1812	87.9%

Disability

Applicants were asked to report any disability. The majority, 92.8% (1913/2061) reported no disability. Another 39 applicants (1.9%) reported having a disability and 109 (5.3%) did not provide disability information.

Years Since Graduation from Veterinary College

Data on the year of graduation from veterinary college was inconsistently reported in 2010 and 2011. For the 1,643 applicants in 2012-2022 who reported their year of graduation, the interval from their graduation year to their application year ranged from 0 years for applicants applying immediately at graduation to 25 years post-graduation. The mean interval was 3.8 years, and the median was 3 years (Table 13).

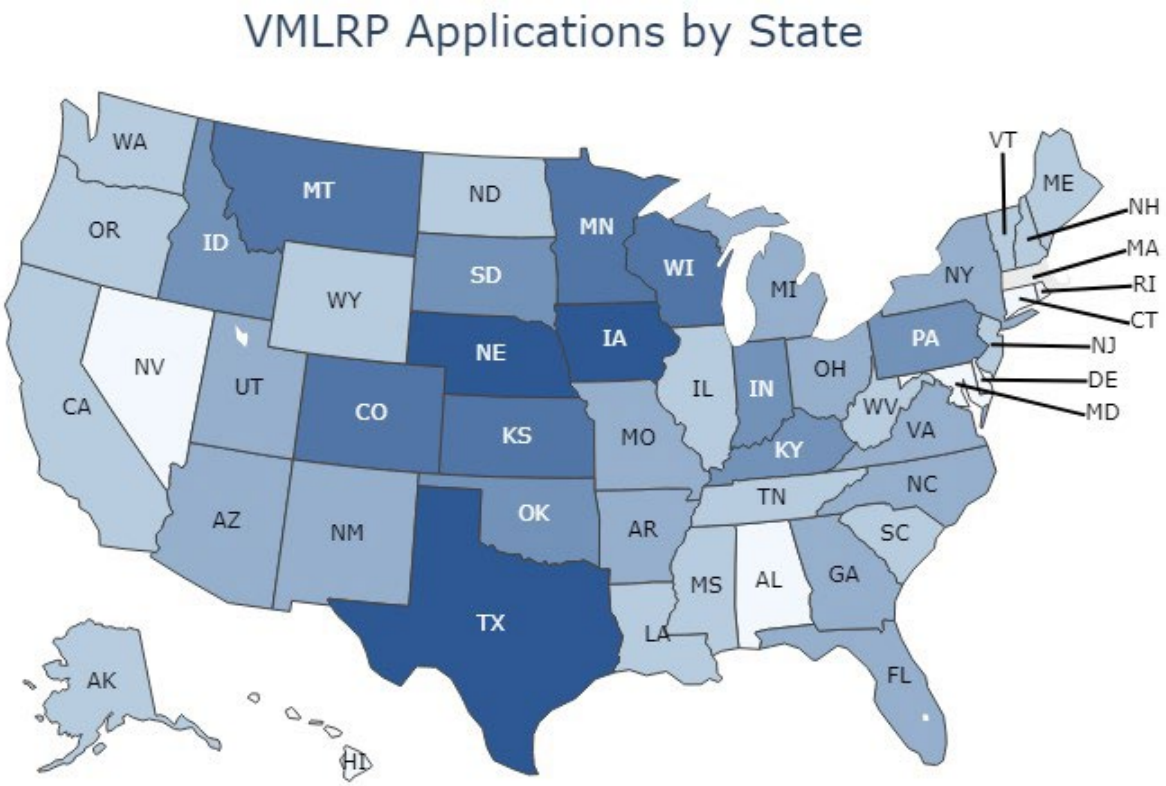
Table 13. Number and percentage of applications by years since graduation, 2012-2022.

Number of Years	0	1-5	6-10	11-15	>15
Number of Applications	351	861	308	83	40
Percentage of Applications	21.4%	52.4%	18.7%	5.1%	2.4%

A veterinarian feeding a group of chickens outside. Photo courtesy of iStock by Getty Images.

Geographic Distribution

Applicants have applied to serve every state that has had designated areas available for applications. States receiving the highest number of applications were Iowa (233), Nebraska (121), and Texas (112) (Figure 7, Appendix Table A2). Three insular areas that submitted shortage nominations -- American Samoa, Marshall Islands, and Republic of Palau – received no applications to serve in those areas.



Number of Applications	States*
1-10	AL, CT, DE, HI, MD, NV, PR, RI
11-25	AK, CA, IL, LA, ME, MS, ND, NH, NJ, OR, SC, TN, VT, WA, WV, WY
26-50	AR, AZ, FL, GA, MI, MO, NC, NM, NY, OH, UT, VA
51-75	ID, IN, KY, OK, PA, SD
76-100	CO, KS, MN, MT, WI
101+	IA, NE, TX

*States represent U.S. states, insular areas, and territories. States are listed alphabetically in each row. See Appendix Table A2 for further details.

Figure 7. Number of applications by state and insular area, 2012-2022.

Farm gate gravel path onto rural property under golden sunset. Photo courtesy of iStock by Getty Images.

Shortage Type

The shortage types that applicants applied to reflect the distribution of the types that were available for applications, with the largest number and percentage of applications for Type II positions (Table 14).

Table 14. Number and percentage of applications, by shortage type, 2010-2022.

Type	Number	Percentage
I	400	19.4%
II	1435	69.6%
III	226	11%

Veterinary Colleges

Applicants have come to the program from 30 of the veterinary colleges accredited by the AVMA and located in the United States, and from another 10 accredited colleges outside of the United States. (Figure 8, Table 15). The top four schools, each with over 100 applications, were Iowa State University (375), Kansas State University (167), Colorado State University (152) and Washington State University (130).

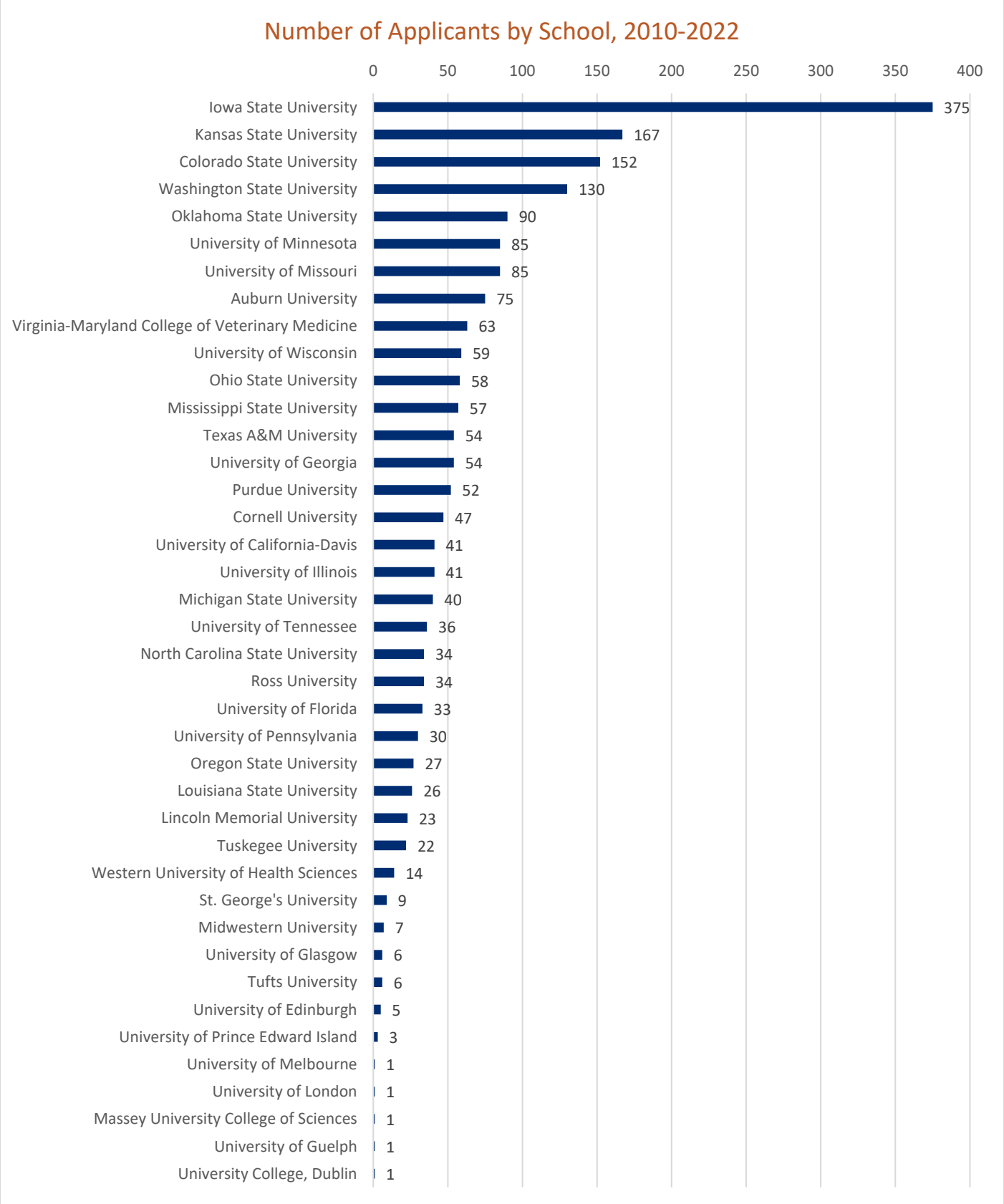


Figure 8. Number of applications by veterinary college of the applicant, 2010-2022

Table 15. Numbers of applications and awards, and award rate, by veterinary college of the applicant, 2010-2022.

Veterinary College	Number of Applicants	Number of Awards	Award Rate, %
Auburn University	75	26	34.7
Colorado State University	152	59	38.8
Cornell University	47	21	44.7
Iowa State University	375	133	35.5
Kansas State University	167	70	41.9
Lincoln Memorial University	23	9	39.1
Louisiana State University	26	12	46.2
Massey University College of Sciences	1	0	0.0
Michigan State University	40	17	42.5
Midwestern University	7	2	28.6
Mississippi State University	57	24	42.1
North Carolina State University	34	11	32.4
Ohio State University	58	24	41.4
Oklahoma State University	90	37	41.1
Oregon State University	27	14	51.9
Purdue University	52	24	46.2
Ross University	34	12	35.3
St. George's University	9	2	22.2
Texas A&M University	54	22	40.7
Tufts University	6	1	16.7
Tuskegee University	22	9	40.9
University College, Dublin	1	1	100.0
University of California, Davis	41	15	36.6
University of Edinburgh	5	0	0.0
University of Florida	33	13	39.4
University of Georgia	54	19	35.2
University of Glasgow	6	1	16.7
University of Guelph	1	0	0.0
University of Illinois	41	12	29.3
University of London	1	0	0.0
University of Melbourne	1	1	100.0
University of Minnesota	85	39	45.9
University of Missouri	85	30	35.3
University of Pennsylvania	30	8	26.7
University of Prince Edward Island	3	2	66.7
University of Tennessee	36	10	27.8
University of Wisconsin	59	19	32.2
Virginia-Maryland College of Veterinary Medicine	63	29	46.0
Washington State University	130	62	47.7
Western University of Health Sciences	14	2	14.3
Incomplete Record/Missing	16	3	21.4
Total	2061	795	38.6

AWARDS AND AWARDEES

As noted in Table 1, VMLRP established service agreements with 795 of the 2,061 applicants to the program in 2010 through 2022, for a 38.6% award rate. The percentage of awards established varied from a low of 20% in the initial year, 2010, to the highest in 2022, 68% (Table 16).

Table 16. Outcome of applications, by year, 2010-2022.

Application Outcome	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Awarded	53	75	45	43	49	49	48	56	73	61	75	79	89	795
Not Awarded	196	79	96	97	113	88	137	107	70	56	61	64	41	1205
Rejected	0	0	1	0	0	0	0	0	2	9	12	0	0	24
Withdrawn	10	5	0	0	0	0	2	2	2	13	2	1	0	37
Number of Applications	259	159	142	140	162	137	187	165	147	139	150	144	130	2061
Award Rate, %*	20.5	47.2	31.7	30.7	30.2	35.8	25.7	33.9	49.7	43.9	50.0	54.9	68.5	38.6

*Award rate, % = (number awarded/number of applications)*100. The award rate includes applications that were rejected or withdrawn as all applications undergo processing by the Program.

Demographics of Awardees

Along with the number of applications, the characteristics of awardees have shifted over the years, with more females applying for and receiving awards.

Gender

In 2010, the first year applications were accepted, males comprised 58% (31/53) of awardees. In 2017 and most recent years, this percentage declined and in 2022, 25% (21/83) of awardees who self-reported gender were male (Table 17, Figure 9).

Table 17. Self-reported gender of awardees, by year, 2010-2022.

Gender	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Female	22	37	22	15	27	21	21	29	42	30	36	51	62	415
Male	31	38	22	26	20	26	27	26	30	17	35	24	21	343
NR*	0	0	1	2	2	2	0	1	1	14	4	4	6	37

*NR=Not reported, declined to report, or other.

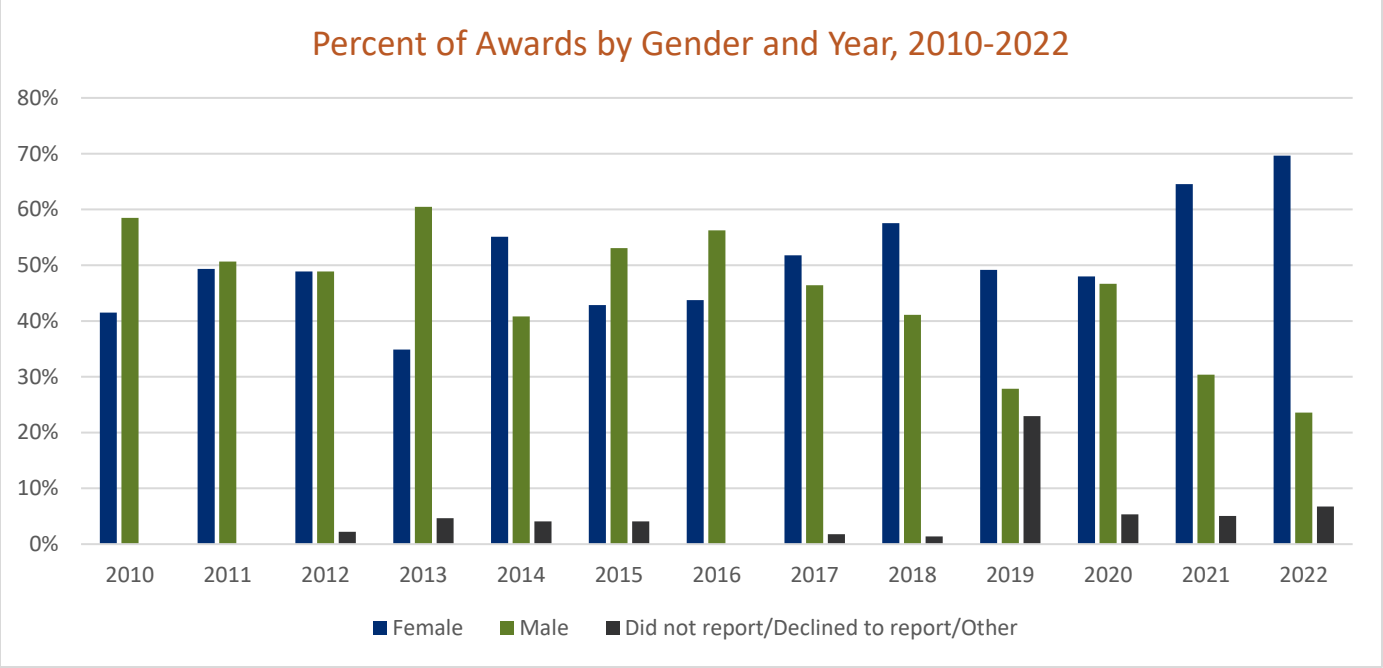


Figure 9. Percent of awards by self-reported gender and year, 2010-2022.

Race and Ethnicity

By self-reported race, the highest number and percentage of awardees were White (87.3%). The distribution of the self-reported race of awardees was reflective of the racial composition of applications (Table 18).

Table 18. Number and percentage of awardees, by self-reported race, 2010-2022.

Race	Number	Percentage
American Indian or Alaska Native	13	1.6%
Asian	2	0.3%
Black or African American	4	0.5%
White	694	87.3%
Do not wish to disclose / Not reported	74	9.2%
More than one race selected	8	1.0%
Total	795	100%

The self-reported ethnicity of awardees is in Table 19. The largest number and percentage of awardees were non-Hispanic or Latino, and 22 (2.8%) were Hispanic or Latino.

Table 19. Number and percentage of awardees, by ethnicity, 2012-2022.

Ethnicity	Number	Percent
Hispanic or Latino	19	2.8%
Not Hispanic or Latino	587	88.1%
Did not answer / Not reported	60	9%

Years Since Graduation

The distribution of the number of years since graduation for awardees (Table 20) is similar to that of applications (see Table 13). The mean number of years post-graduation was 4.0, the median was 3 years, and the range was 0 to 22 years.

Comparing award rates (Table 21, Figure 10), applicants who had graduated 1-5 and 6-10 years previously had greater success receiving awards. Among those out of school for 1-5 years, the award rate was nearly 44% and for 6-10 years the award rate was over 49%.

Table 20. Number and percent of awardees by years since graduation, 2012-2022.

Number of years since graduation	0	1-5	6-10	11-15	>15	Total
Number of Awardees	97	377	152	30	11	667
Percent of Awardees	14.5%	56.5%	22.8%	4.5%	1.6%	100%

Table 21. Award rate (%) by years post-graduation, 2012-2022.

Number of years since graduation	0	1-5	6-10	11-15	>15	Total
Number of Applications	351	861	308	83	40	1643
Number of Awardees	97	377	152	30	11	667
Award Rate, %	27.6%	43.8%	49.4%	36.1%	27.5%	40.6%

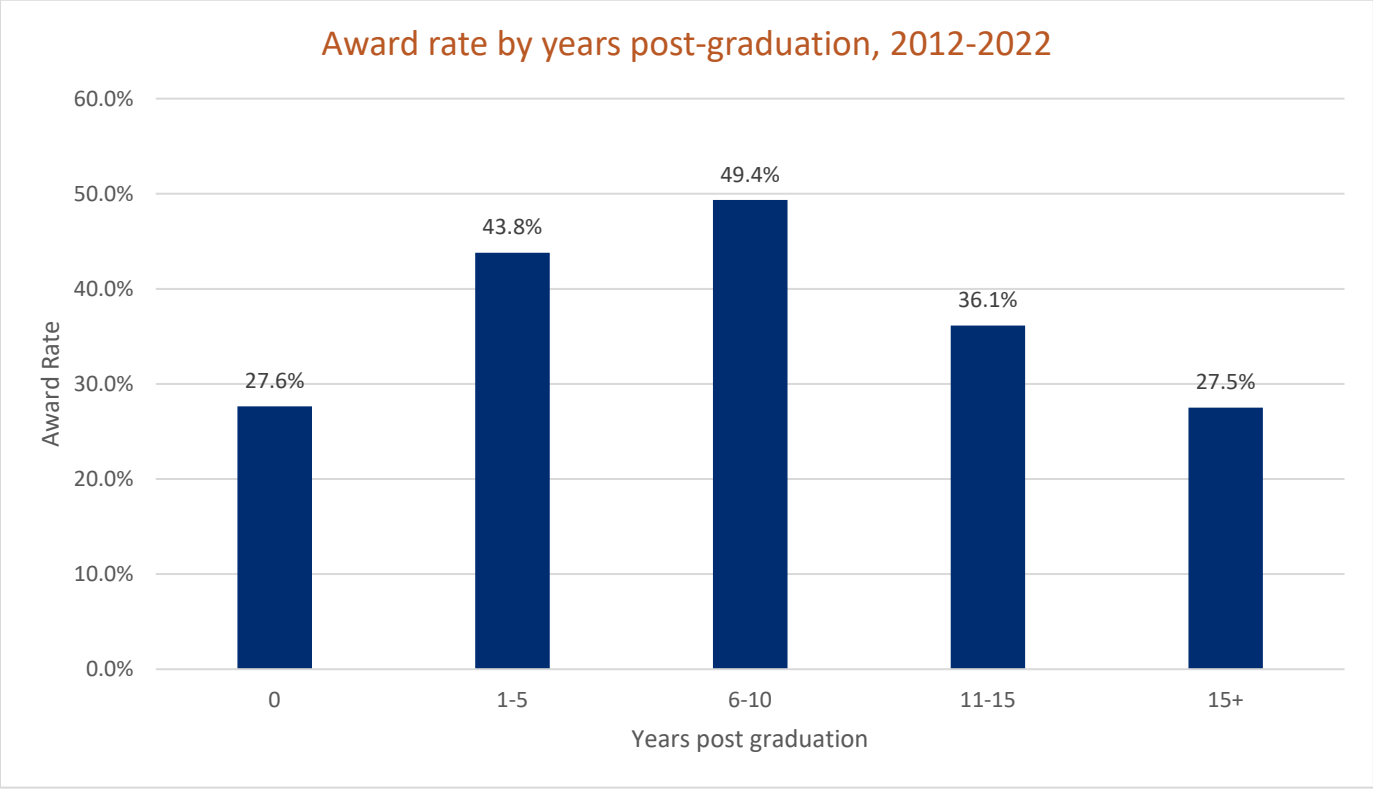


Figure 10. Award rate (%) by years post-graduation, 2012-2022.

Veterinary College

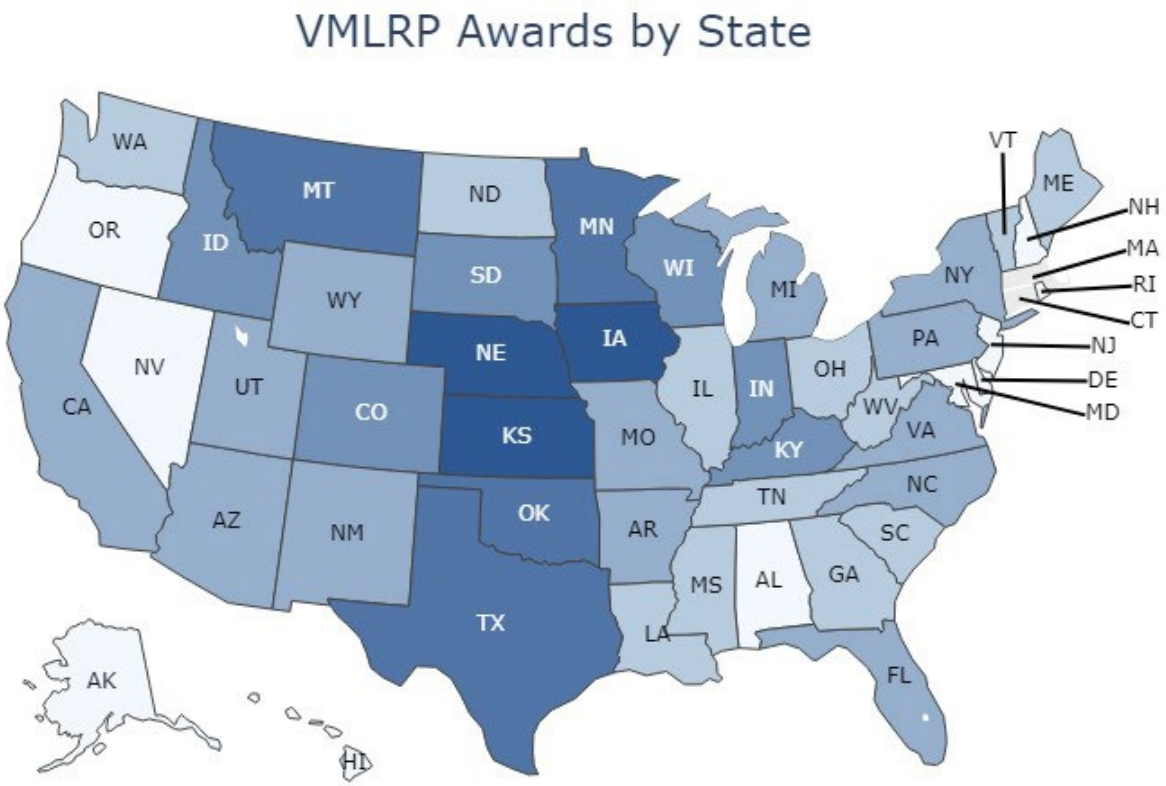
By veterinary college (see Table 15), the schools with the largest number of awardees were Iowa State University (133) followed by Washington State University (62) and Colorado State University (59).

Comparing veterinary schools by award percentage, of the schools with five or more graduates applying to the program, 13 had award percentages greater than 40%. The schools with the highest award percentages were Oregon State University (51.9%), Washington State University (47.7%), Louisiana State University and Purdue University (46.2%), Virginia-Maryland College of Veterinary Medicine (46.0%) and the University of Minnesota (45.9%) (Table 15).

Students performing an oyster dissection. Photo courtesy of University of Florida College of Veterinary Medicine-Aquatic Animal Health Program.

Geographic Distribution

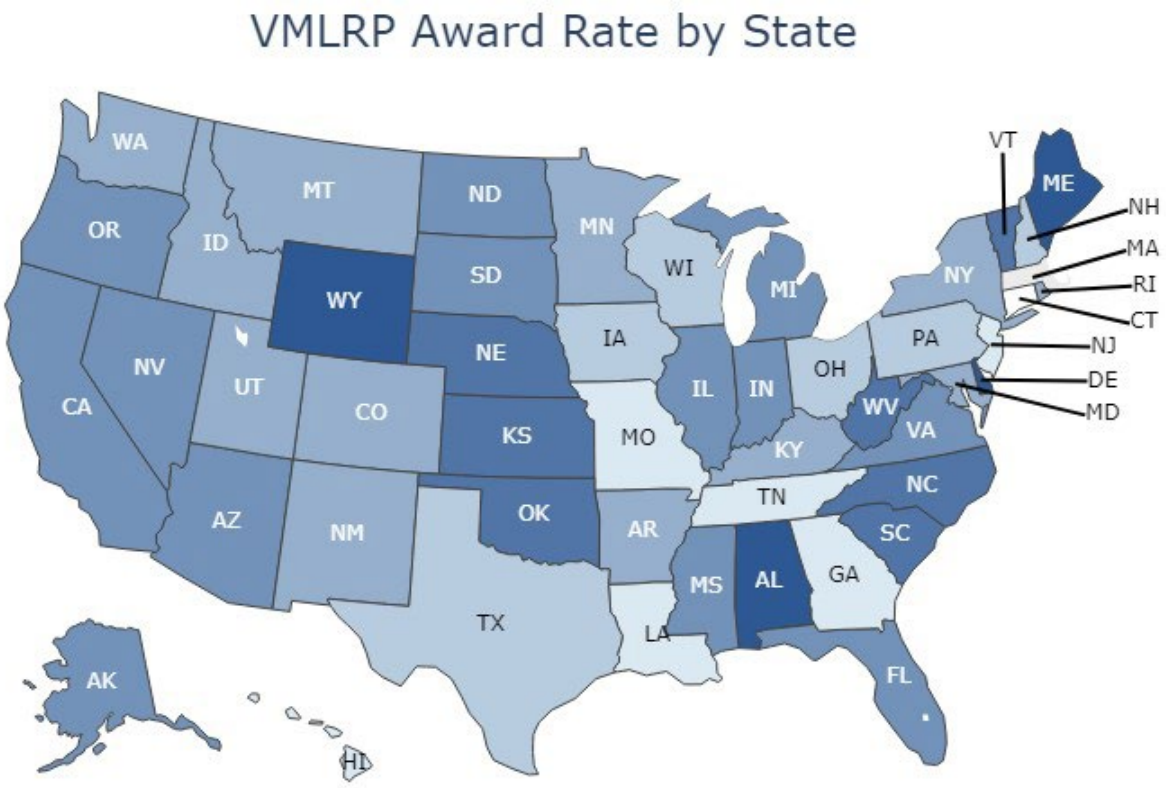
The largest number of awards by State or Insular Area (Figure 11, Appendix Table A2) went to applicants from Iowa (71), followed by Nebraska (57) and Kansas (46). Among entities with at least five applications, award rates by State or Insular Area (Figure 12, Appendix Table A2) were highest in Wyoming (75%), Alabama (71.4%), Delaware (62.5%) and Maine (52.9%).



Number of Awards	States*
1-5	AK, AL, DE, HI, MD, NH, NJ, NV, OR, PR, RI
6-10	GA, IL, LA, ME, MS, ND, OH, SC, TN, VT, WA, WV
11-20	AR, AZ, CA, FL, MI, MO, NC, NM, NY, PA, UT, VA, WY
21-30	CO, ID, IN, KY, SD, WI
31-40	MN, MT, OK, TX
41+	IA, KS, NE

*States represent U.S. states, insular areas and territories. States are listed alphabetically in each row. See Appendix Table A2 for further details.

Figure 11. Number of awards by state, 2010-2022.



VMLRP Award Rate (%)	States*
0	AS, CT, MH, RP
20.0-30.0	GA, HI, LA, MO, NJ, TN
30.1-35.0	IA, NH, OH, PA, TX, WI
35.1-40.0	AR, CO, ID, KY, MD, MN, MT, NM, NY, RI, UT, WA
40.1-45.0	AK, AZ, CA, FL, IL, IN, MI, MS, ND, NV, OR, SD, VA
45.1-50.0	KS, NC, NE, OK, SC, VT, WV
50.1+	AL, DE, ME, PR, WY

*States represent U.S. states, insular areas and territories. States are listed in alphabetical order in each row. See Appendix Table A2 for further details.

Figure 12. Award rate (%) by state, 2010-2022.

Shortage Type

The VMLRP awards 10% of funding each year to applicants applying to Type III shortages. A comparison of shortage types (Table 22) shows that, although the program receives a greater proportion of Type III nominations, the number and percentage of applications and awards have met the requirement for limiting the funding for these shortage types to approximately 10% of awards each year.

Table 22. Number and percent of nominations, applications and awards, by shortage type, 2010-2022.

Type	Number of Shortage Nominations	Percentage of Shortage Nominations	Number of Applications	Percentage of Applications	Number of Awards	Percentage of Awards
I	390	14.5%	400	19.4%	154	19.4%
II	1853	68.9%	1435	69.6%	554	69.7%
III	447	16.6%	226	11.0%	87	10.9%
Total	2690	100%	2061	100%	795	100%

AWARDEE DEBT

Veterinary college educational debt amounts were available only for awardees, and debt data were only collected consistently beginning in 2015. For the period 2015-2022, the average eligible veterinary college debt of awardees rose from $109,616 in 2015 to $151,799 in 2022, an increase of over $42,000 (38%) (Figure 13). The average award amount remained constant over the eight-year period, only varying according to the number of renewals (with expected lower award amounts), as required by program policies. The maximum educational debt reported by an awardee was $450,000.

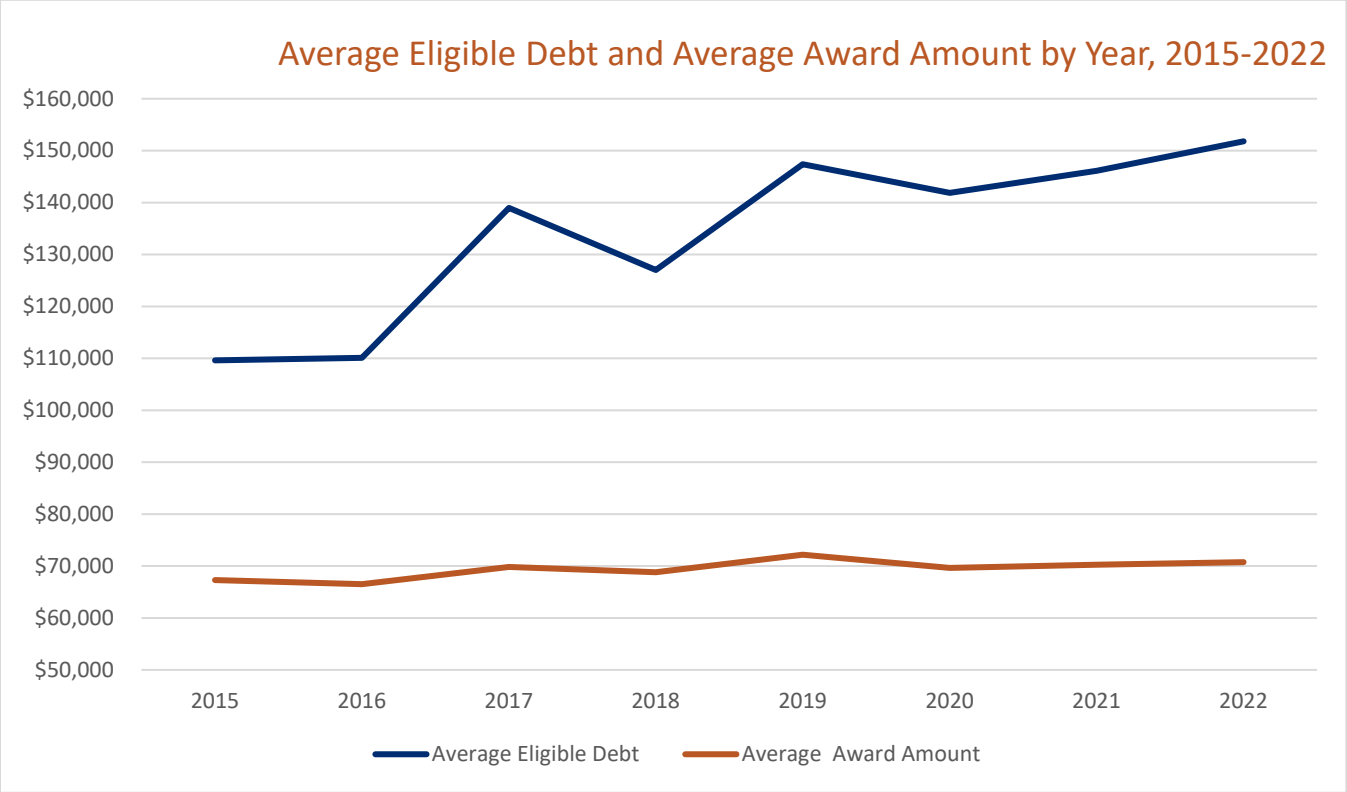


Figure 13. Awardee average eligible debt and award amount, 2015-2022.

Awardee Debt by Self-reported Gender

Female awardees tended to have higher debt than males. Among those who self-reported gender, the mean debt for female applicants in 2015-2022 was $145,245 and for males, $120,713. The median debt for females and males was $128,451 and $111,531, respectively (Figure 14).

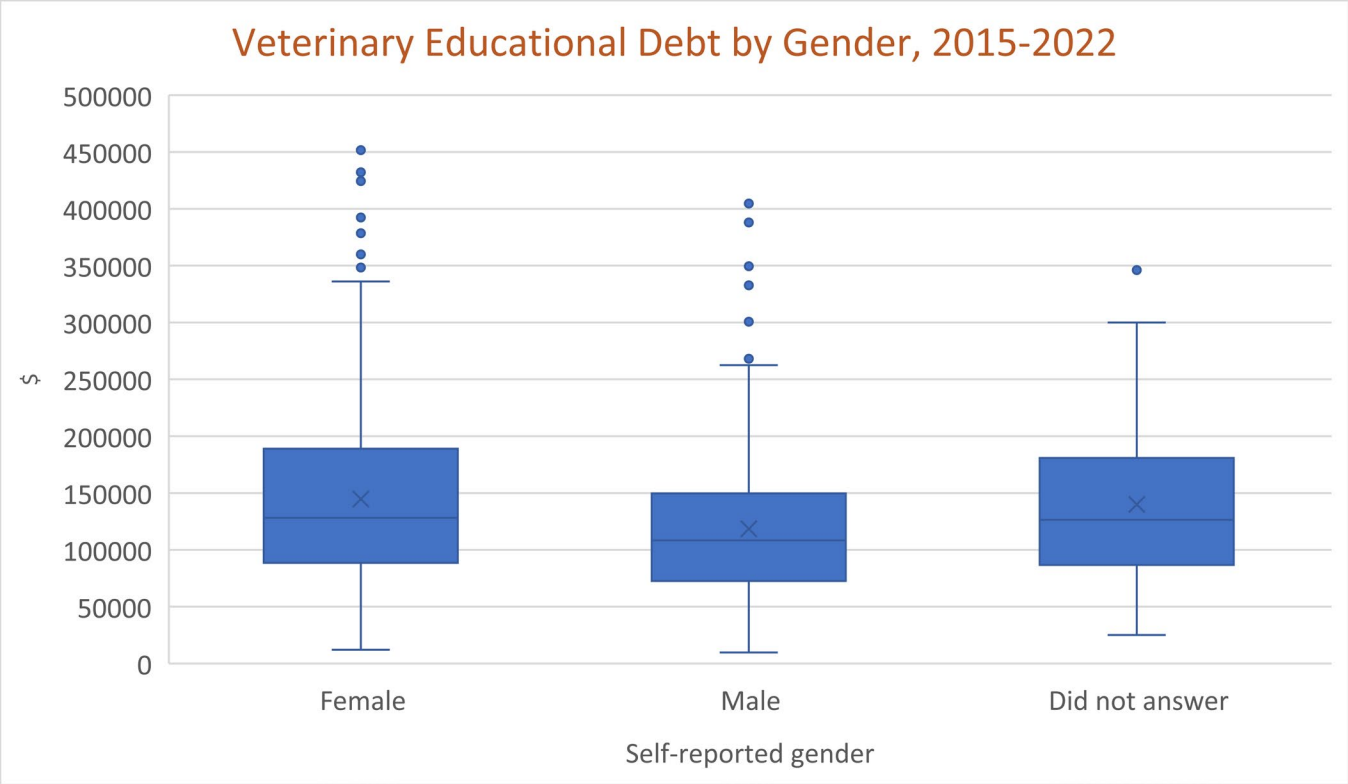


Figure 14. Distribution of veterinary educational debt by self-reported gender, 2015-2022.

A veterinarian checking the dairy cattle at a farm. Photo courtesy of iStock by Getty Images.

Awardee Debt by Race

As noted above, for reporting race applicants were allowed to select one or more from the following list: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, Hispanic or Latino, White, Other or Do Not Wish to Disclose. The number of awardees who self-reported race other than White was too

small for reporting summary debt levels by race. For the three categories of White, Other (Non-White) and Did Not Report (Figure 15), among those in the category listed as Other, the average debt level was higher than the other two groups.

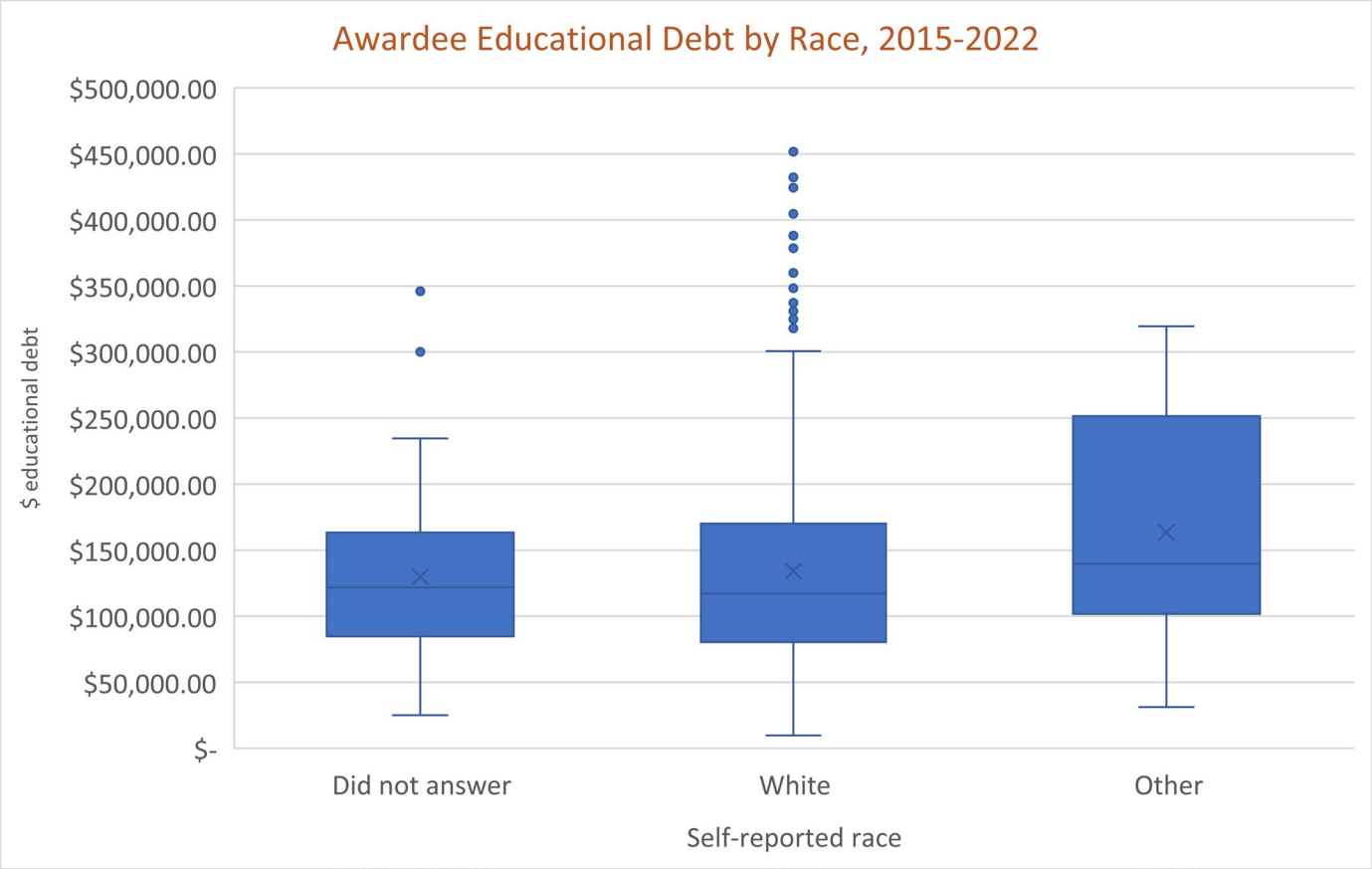


Figure 15. Distribution of awardee educational debt by race, 2015-2022.

CHALLENGES AND FUTURE DIRECTION OF THE VMLRP

In the future, the VMLRP and its associated Veterinary Services Grant Program, along with food animal veterinary practitioners, animal health officials and food animal industries will continue to be challenged by shifts occurring in food animal production, agricultural markets, veterinary education and unmet needs in the profession.

NIFA will continue to rely on VMLRP and VSGP stakeholders for their knowledge, expertise and guidance to provide NIFA programs with the insight to address obstacles food animal veterinarians face, and market and workforce changes. In demonstrating the steady increase of educational DVM debt, the VMLRP provides an incentive for food animal veterinarians to engage with the program to assist them in their careers ensuring the health and welfare of agricultural animals. Participating in the VMLRP assists in providing essential private and public veterinary services to their communities and state, which impacts animal agriculture at a national level.

APPENDIX A: TABLES

Table A 1. Timeline of nominations, applications, and awards over a 16-month period. Example of nomination, application and award cycle for calendar years 2021 and 2022.

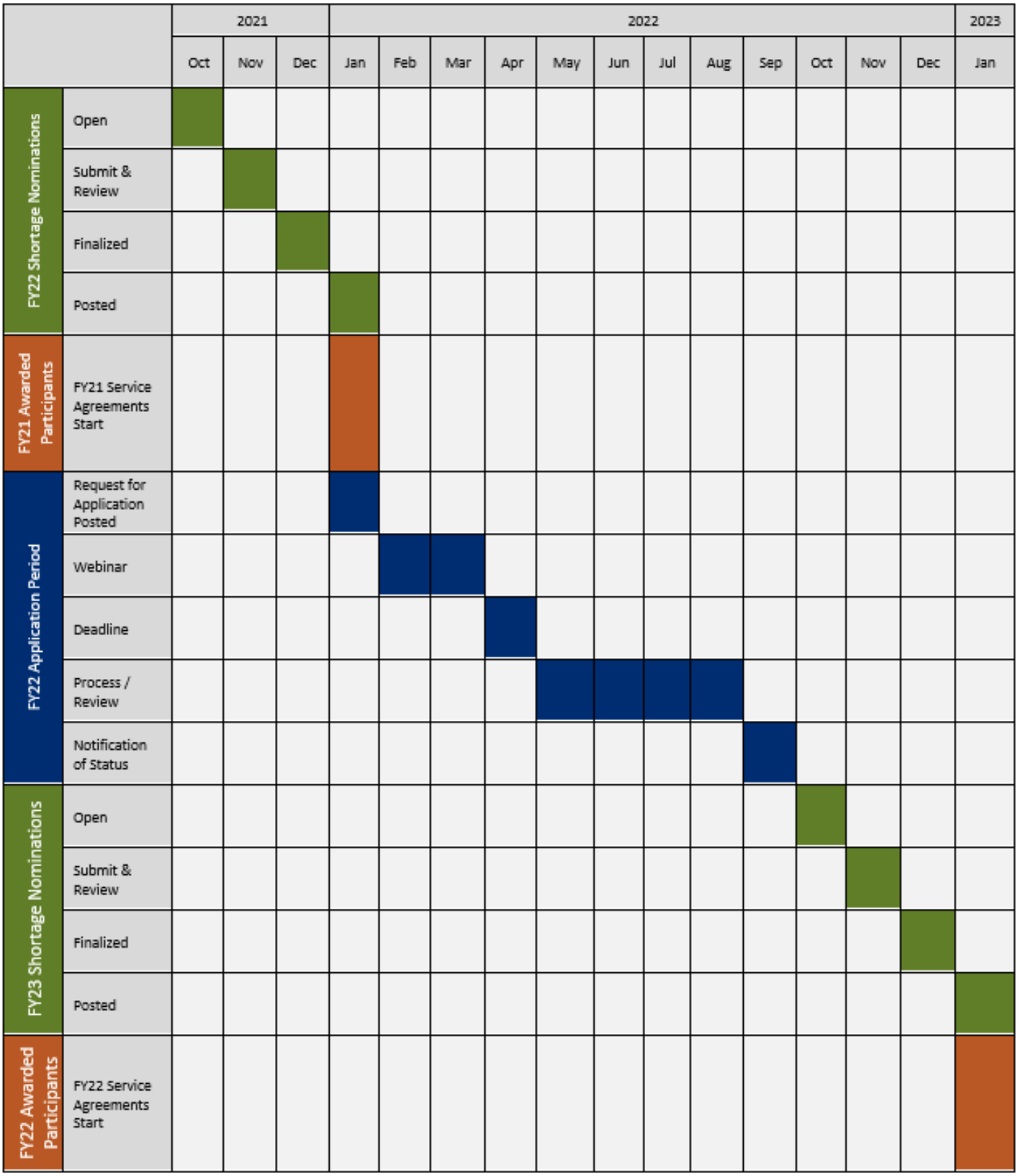


Table A2. Number and percent of nominations, applications and awards per state, 2010-2022.

State/Area	Number of Nominations	Percent of Nominations (%)	Number of Applications	Percent of Applications (%)	Number of Awards	Percent of Awards (%)	Award Rate (%)
Alaska (AK)	55	2.04	12	0.58	5	0.63	41.7
Alabama (AL)	24	0.89	7	0.34	5	0.63	71.4
Arkansas (AR)	76	2.83	31	1.50	12	1.51	38.7
American Samoa (AS)	1	0.04	0	0.00	0	0.00	0.0
Arizona (AZ)	57	2.12	27	1.31	11	1.38	40.7
California (CA)	80	2.97	23	1.12	10	1.26	43.5
Colorado (CO)	104	3.87	82	3.98	29	3.65	35.4
Connecticut (CT)	21	0.78	3	0.15	0	0.00	0.0
Delaware (DE)	31	1.15	8	0.39	5	0.63	62.5
Federal *	45	1.67	14	0.68	6	0.75	42.9
Florida (FL)	51	1.90	37	1.80	15	1.89	40.5
Georgia (GA)	91	3.38	31	1.50	9	1.13	29.0
Hawaii (HI)	18	0.67	5	0.24	1	0.13	20.0
Iowa (IA)	91	3.38	233	11.31	71	8.93	30.5
Idaho (ID)	61	2.27	75	3.64	29	3.65	38.7
Illinois (IL)	66	2.45	24	1.16	10	1.26	41.7
Indiana (IN)	63	2.34	53	2.57	22	2.77	41.5
Joint – CA/AZ	4	0.15	1**	0.05	1**	0.13	100.0
Kansas (KS)	91	3.38	97	4.71	46	5.79	47.4
Kentucky (KY)	56	2.08	69	3.35	26	3.27	37.7
Louisiana (LA)	52	1.93	20	0.97	6	0.75	30.0
Maryland (MD)	23	0.86	8	0.39	3	0.38	37.5
Maine (ME)	23	0.86	17	0.82	9	1.13	52.9
Michigan (MI)	41	1.52	31	1.50	13	1.64	41.9
Minnesota (MN)	81	3.01	88	4.27	34	4.28	38.6
Missouri (MO)	84	3.12	49	2.38	14	1.76	28.6
Marshall Islands (MRI)	2	0.07	0	0.00	0	0.00	0.0
Mississippi (MS)	62	2.30	19	0.92	8	1.01	42.1
Montana (MT)	79	2.94	88	4.27	34	4.28	38.6
North Carolina (NC)	49	1.82	33	1.60	16	2.01	48.5
North Dakota (ND)	42	1.56	21	1.02	9	1.13	42.9
Nebraska (NE)	88	3.27	121	5.87	57	7.17	47.1
New Hampshire (NH)	19	0.71	13	0.63	4	0.50	30.8
New Jersey (NJ)	25	0.93	12	0.58	3	0.38	25.0
New Mexico (NM)	55	2.04	35	1.70	14	1.76	40.0
Nevada (NV)	46	1.71	9	0.44	4	0.50	44.4
New York (NY)	32	1.19	34	1.65	12	1.51	35.3

Ohio (OH)	48	1.78	31	1.50	10	1.26	32.3
Oklahoma (OK)	91	3.38	69	3.35	33	4.15	47.8
Oregon (OR)	19	0.71	12	0.58	5	0.63	41.7
Pennsylvania (PA)	66	2.45	62	3.01	19	2.39	30.6
Puerto Rico (PR)	3	0.11	1	0.05	1	0.13	100.0
Rhode Island (RI)	2	0.07	5	0.24	2	0.25	40.0
Republic of Palau (RP)	1	0.04	0	0.00	0	0.00	0.0
South Carolina (SC)	38	1.41	19	0.92	9	1.13	47.4
South Dakota (SD)	78	2.90	74	3.59	30	3.77	40.5
Tennessee (TN)	42	1.56	22	1.07	6	0.75	27.3
Texas (TX)	104	3.87	112	5.43	36	4.53	32.1
Utah (UT)	73	2.71	38	1.84	15	1.89	39.5
Virginia (VA)	62	2.30	39	1.89	16	2.01	41.0
Vermont (VT)	13	0.48	17	0.82	8	1.01	47.1
Washington (WA)	28	1.04	16	0.78	6	0.75	37.5
Wisconsin (WI)	56	2.08	77	3.74	24	3.02	31.2
West Virginia (WV)	22	0.82	20	0.97	10	1.26	50.0
Wyoming (WY)	55	2.04	16	0.78	12	1.51	75.0
Missing / Incomplete			1	0.05			
Total	2690		2061			795	38.6%

* Federal nominations are primarily submitted by federal agencies under the purview of the U.S. Chief Veterinary Officer, USDA Animal and Plant Health Inspection Service, Veterinary Services.

**Four nominations were available for applicants in 2021-2022 for the two Joint CA-AZ shortage areas. Only one application was received, and it was awarded.

Table A3. Number and percent of applications and awards and award rate, by veterinary school, 2010-2022.

Veterinary College	Number of Applications	Number of Awards	Award rate (%)	Percent of applications (%)	Percent of awards (%)
Auburn University	75	26	34.7	3.6	3.3
Colorado State University	152	59	38.8	7.4	7.4
Cornell University	47	21	44.7	2.3	2.6
Iowa State University	375	133	35.5	18.2	16.7
Kansas State University	167	70	41.9	8.1	8.8
Lincoln Memorial University	23	9	39.1	1.1	1.1
Louisiana State University	26	12	46.2	1.3	1.5
Massey University College of Sciences	1	0	0.0	0.0	0.0
Michigan State University	40	17	42.5	1.9	2.1
Midwestern University	7	2	28.6	0.3	0.3
Mississippi State University	57	24	42.1	2.8	3.0
North Carolina State University	34	11	32.4	1.6	1.4
Ohio State University	58	24	41.4	2.8	3.0
Oklahoma State University	90	37	41.1	4.4	4.7
Oregon State University	27	14	51.9	1.3	1.8
Purdue University	52	24	46.2	2.5	3.0
Ross University	34	12	35.3	1.6	1.5
St. George's University	9	2	22.2	0.4	0.3
Texas A&M University	54	22	40.7	2.6	2.8
Tufts University	6	1	16.7	0.3	0.1
Tuskegee University	22	9	40.9	1.1	1.1
University College, Dublin	1	1	100.0	0.0	0.1
University of California, Davis	41	15	36.6	2.0	1.9
University of Edinburgh	5	0	0.0	0.2	0.0
University of Florida	33	13	39.4	1.6	1.6
University of Georgia	54	19	35.2	2.6	2.4
University of Glasgow	6	1	16.7	0.3	0.1
University of Guelph	1	0	0.0	0.0	0.0
University of Illinois	41	12	29.3	2.0	1.5
University of London	1	0	0.0	0.0	0.0
University of Melbourne	1	1	100.0	0.0	0.1
University of Minnesota	85	39	45.9	4.1	4.9
University of Missouri	85	30	35.3	4.1	3.8
University of Pennsylvania	30	8	26.7	1.5	1.0
University of Prince Edward Island	3	2	66.7	0.1	0.3
University of Tennessee	36	10	27.8	1.7	1.3
University of Wisconsin	59	19	32.2	2.9	2.4
Virginia-Maryland College of Veterinary Medicine	63	29	46.0	3.1	3.6
Washington State University	130	62	47.7	6.3	7.8
Western University of Health Sciences	14	2	14.3	0.7	0.3
Did not report	16	3	18.8	0.8	0.4
Total	2061	795			

APPENDIX B: ACRONYMS USED

AVMA	American Veterinary Medical Association
CFR	Code of Federal Regulations
DVM	Doctor of Veterinary Medicine
FTE	Full Time Equivalent
NASS	National Agricultural Statistics Service
NIFA	National Institute of Food and Agriculture
NVMSA	National Veterinary Medical Services Act
RFA	Request for Applications
SAHO	State Animal Health Official
USDA	US Department of Agriculture
VMD	Veterinary Medical Doctor
VMLRP	Veterinary Medicine Loan Repayment Program
VSGP	Veterinary Services Grant Program

APPENDIX C: AUTHORIZING LEGISLATION, REGULATIONS AND FINAL RULE

AUTHORIZING LEGISLATION, 7 USC 3151A SECTION 1415A

- National Veterinary Medical Service Act (NVMSA), 2003. Public Law 108–161 108th Congress (https://www.congress.gov/108/plaws/publ161/PLAW-108publ161.pdf). Added section 1415A (https://www.govinfo.gov/content/pkg/USCODE-2021-title7/pdf/USCODE-2021-title7-chap64-subchapIII-sec3151a.pdf) to the National Agricultural Research, Extension, and Teaching Policy Act of 1997.

REGULATIONS, 7 CFR PART 3431

- Chapter XXXIV of Title 7 of the Code of Federal Regulations, Part 3431, Subpart A and Subpart B. https://www.ecfr.gov/cgi-bin/text-idx?SID=e3cd63123b08ca3a6cff8bdbc5bb2c9b&node=pt7.15.3431&rgn=div5#se7.15.3431_12

FINAL RULE

- https://www.federalregister.gov/documents/2010/04/19/2010-8628/veterinary-medicine-loan-repayment-program-vmlrp

APPENDIX D: REFERENCES

AVMA, 2023. AVMA Economic State of the Profession 2023. Baln, B.; Ouedraogo, F.; Hansen, C. February 2023. American Veterinary Medical Association, https://ebusiness.avma.org/

CAST, 2020. Impact of Recruitment and Retention of Food Animal Veterinarians on the U.S. Food Supply. Issue Paper 67. Council for Agricultural Science and Technology, Ames, Iowa. Available at https://www.cast-science.org/publication/impact-of-recruitment-and-retention-of-food-animal-veterinarians-on-the-u-s-food-supply/. Accessed July, 2023

NRC, 2013. *Workforce Needs in Veterinary Medicine*. National Research Council, Washington, DC: The National Academies Press. Available at https://doi.org/10.17226/13413. Accessed July, 2023.

NVMSA, 2003. National Veterinary Medical Service Act, 2003. https://www.congress.gov/bill/108th-congress/senate-bill/1858/text

USDA-NIFA. 2023. FY2023-25 Maximum Nomination Allocation-VMLRP. USDA-National Institute of Food and Agriculture. https://www.nifa.usda.gov/sites/default/files/2022-07/FY2023-25%20Maximum%20Nomination%20Allocation-VMLRP.pdf

APPENDIX E: VMLRP RESOURCES AND PROGRAM CONTACTS

RESOURCES

www.nifa.usda.gov/grants/programs/veterinary-medicine-loan-repayment-program

www.nifa.usda.gov/grants/programs/veterinary-medicine-loan-repayment-program/vmlrp-general-information

www.nifa.usda.gov/grants/programs/veterinary-medicine-loan-repayment-program/vmlrp-shortage-situations

www.nifa.usda.gov/grants/programs/veterinary-medicine-loan-repayment-program/vmlrp-request-applications-rfa

www.nifa.usda.gov/vmlrp-annual-reports

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