

EVALUATING THE DEPTH OF QUALITY IN THE 2018 AAVMC APPLICANT POOL

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James W. Lloyd, DVM, PhD, Animal Health Economics, LLC

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BACKGROUND

Over recent years, a decided trend has emerged among Association of American Veterinary Medical Colleges (AAVMC) member institutions toward expanded capacity to train veterinarians, with an accompanying increase in size of veterinary medical student cohorts being admitted each year. During the same period, new colleges/schools of veterinary medicine have been launched in Tennessee and Arizona, with another appearing likely in Arizona this year. As a direct consequence, both the total number of students entering into and graduating from veterinary medical programs in the US and Canada is experiencing a noteworthy upward trajectory.

In the context of this significant growth curve, two critical questions are being asked with increasing frequency:

- 1) Is the system-wide applicant pool of sufficient size and quality to sustain the increasing rate of admission to colleges/schools of veterinary medicine?
- 2) Is the employment market sufficiently robust to provide sustained, high quality career opportunities for the increased number of veterinarians graduating annually?

To help address the first question, a study was designed to critically assess the number of quality 2018 applicants who were not offered admission to an AAVMC member institution. The overall goal was to estimate the prevalence of candidates with acceptable potential for academic

success who were not accepted into an AAVMC program during the 2018 admissions cycle.

METHODS

Using data provided by AAVMC from the Veterinary Medical College Application Service (VMCAS), key indicators of academic capability in 2018-cycle applicants to veterinary medical college were summarized and compared between those candidates who did and did not receive an offer for admission. Factors that were considered as indicators included

- Grades – baccalaureate only
 - Total GPA
 - Science GPA
 - Non-science GPA
- Standardized test scores – GRE scores and percentile rankings
 - Quantitative
 - Verbal

Because quality cannot be fully captured through evaluating only grades and test scores, certain demographic variables available in the database were also considered. These included

- First-generation college student status
- Gender identification
- Race/ethnicity identification
- Age

For each indicator and demographic variable, descriptive statistics were calculated separately for all candidates who did, and did not, receive an offer of admission, and then comparisons were made between these two groups. Basic statistical tests (two-sample t-test and two-variable chi-square) were applied where appropriate.

RESULTS

For the 2018 admissions cycle, VMCAS was used by 39 AAVMC member institutions (see Table 1). This included 29 of 30 US members (all except Texas A&M), 2 of 2 Caribbean members, 2 of 5 Canadian members, 4 of 6 in Europe, and 2 of 5 in Australia/New Zealand.

Data from a total of 7507 unique applicants were analyzed. Of these, 4032 candidates (53.7%) received at least one offer of admission. Descriptive statistics for GRE scores/percentiles and grades – within admission offer group (yes/no) – are

presented in Table 2. Demographic variables are similarly presented in Table 3 – within the same groups.

Two-sample t-tests indicated a highly significant ($p < 0.000$) difference between the two admission offer groups for each of the variables related to GREs and grades (see Table 2). However, the numerical differences between means were not particularly large relative to the size of the respective ranges, and the ranges themselves demonstrated substantial overlap. For this reason, histograms were created along with approximate-normal probability density curves for each variable to enable visualization of the actual degree of overlap between the two groups. These graphs are presented in Figures 1 through 7.

To better understand these overlapping ranges, the number of non-admitted candidates whose GPAs and GRE performance exceeded 1) the minimum value and 2) the mean for the admitted pool was evaluated. Both the actual count and the percentage of the total non-admitted group for each GRE/grade variable are presented in Table 4.

Two-variable chi-square tests also indicated a significant ($p \leq 0.05$) difference between the two admission offer groups for several of the demographic variables (see Table 3). To enable visualization of these differences, bar graphs were created for categorical variables that demonstrated a significant difference and a histogram was created for age. These graphs are presented in Figures 8 through 14.

DISCUSSION

Because nearly all AAVMC member institutions in the U.S. and Canada used VMCAS for the 2018 admissions cycle, the data provide invaluable, and valid, insights into the 2018 veterinary medicine applicant pool in the US, Canada, and the Caribbean. Almost universally, admissions decisions in veterinary medical education incorporate some version and/or combination of grades and standardized test scores, although the specific indices used and their formulaic weightings can vary considerably between institutions. Based on the widespread use, it is not surprising that significant differences were identified for these variables between the two admission offer groups in the current study. Also given the widespread use, these measures should be expected to provide unparalleled information on the potential of applicants who did not receive an admission offer. Although many other quantitative and qualitative factors are generally considered in the selection process, analysis of academic indicators provides a solid foundation for evaluating the depth of quality in the non-selected pool.

From this perspective, it is easy to see that a rich VMCAS applicant pool clearly existed in 2018 beyond the group that

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was offered admission. Figures 1-7 reveal a remarkable overlap in academic capability between those candidates who received admission offers and those who didn't. Stated differently, it appears that a large proportion of the non-offer group was every bit as capable academically as the majority of those in the pool of admitted candidates.

In fact, depending on the measure selected, results presented in Table 4 suggest that from 61% to 91% of the non-admitted candidates were as capable academically as the least capable students in the admitted pool. Numerically, this represents over 2000 academically-qualified candidates in this dataset who were not offered admission. Further, data presented in the same table suggest that the academic qualifications of between 15% and 24% of the non-admitted students actually exceeded the mean qualifications of those students offered admission (over 500 potential students).

Of course, as mentioned above, admissions selection processes rely on many factors in addition to those that carry direct information on potential for academic success. Achieving success as a veterinary medical student is clearly a necessary condition as a foundation for a successful career as a veterinarian, but it is not sufficient in and of itself. The vital importance of non-technical competencies to success in veterinary medicine have long been recognized, and to the extent possible, some admissions selection processes are designed to incorporate such factors in some fashion. Lists of these competencies generally include communication skills, dealing with stressful situations, ability to work in teams, leadership skills, business acumen, and even emotional intelligence.

In addition, non-academic measures of preparation for admission to veterinary medical college are frequently considered, including things like animal experience, veterinary experience, past employment, and previous leadership roles. It was, no doubt, some sort of consideration for factors such as these that led, in part, to the lack of admission offers to the relatively large number of 2018 VMCAS candidates who were seemingly qualified academically. Whatever the reason, it is

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clear from this analysis that the number of qualified candidates in 2018 far exceeded the number of available seats at in VMCAS-participating AAVMC member institutions.

From analysis of the demographic variables in this study, the possible existence of unintentional selection bias is strongly suggested (see Table 3 and Figures 8-14). To be definitive, a more robust assessment than was possible within the scope of this study would be necessary, including rigorous multivariate statistical modelling. However, enough evidence exists in these preliminary results to signal a real need for vigilance in selection processes going forward. And possible selection bias notwithstanding, the relative lack of representation for URVM candidates in the overall 2018 applicant pool, in particular for African-Americans, is also an important area for future focus. A well-designed national recruitment strategy would likely be helpful. Diversity and inclusion are absolutely vital to the future of veterinary medicine, and so it is critical that active and equitable inclusion of historically under-represented groups be a priority for recruitment and admissions. The spectrum of individuals, identities, ideas, and perspectives in our classrooms needs to adequately reflect that of the society we seek to serve.

SUMMARY

In summary, results of the current study indicate that the number of academically qualified candidates substantially exceeded the number of admissions offers extended, and by extension the number of available seats, across VMCAS-participating institutions during the 2018 admissions cycle. In absolute numbers, it is safe to say that at least 500, and perhaps as many as 2000, additional qualified candidates had acceptable potential for success as veterinary medical students, but were not offered that opportunity. Because VMCAS did not include all AAVMC member institutions in 2018, it is probable that an even greater number existed system-wide.

In an environment where the number of available admissions slots is substantially less than the number of seemingly qualified candidates, educational institutions are afforded the “luxury” of considerable selectivity in admissions processes beyond traditional measures of academic capability. It is precisely innovative use of these “go-beyond” processes that will lead to selection of successful candidates from what would heretofore have likely been the non-offer pool. Although many non-academic competencies are widely recognized as necessary for sustained success throughout a professional career, implementation of admissions processes to consider such factors must be well designed, carefully implemented, and closely monitored – vigilantly – to strictly avoid unintentional selection bias.

An apparent over-abundance of qualified candidates might also suggest that intentional recruitment programs need not be a top priority. However, diversity, inclusion, and equity will provide the vital foundations for sustained success in the future. As the veterinary medical profession continues to grow, and veterinary medical education continues to expand, these will be critical considerations if we are to aptly meet societal needs.

Note: This work would not have been possible without support from the Animal Policy Group, LLC and the Association of American Veterinary Medical Colleges (AAVMC).

SUGGESTED CITATION

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Table 1: AAVMC member institutions using VMCAS, 2018 admissions cycle

Auburn University	Oklahoma State University	University of Glasgow
Colorado State University	Oregon State University	University of Guelph-Ontario Veterinary College
Cornell University	Purdue University	University of Illinois
Iowa State University	Ross University School of Veterinary Medicine	University of Minnesota
Kansas State University	Royal Veterinary College	University of Missouri
Lincoln Memorial University	St. Georges University	University of PEI-Atlantic Veterinary College
Louisiana State University	Tufts University	University of Pennsylvania
Massey University	Tuskegee University	University of Sydney
Michigan State University	University College Dublin	University of Tennessee
Midwestern University College of Veterinary Medicine	University of California, Davis	University of Wisconsin
Mississippi State University	University of Edinburgh	Virginia-Maryland College of Veterinary Medicine
North Carolina State University	University of Florida	Washington State University
Ohio State University	University of Georgia	Western University of Health Sciences

Table 2: VMCAS candidates' grades and GRE scores, 2018 admissions cycle

	Admission Offer – Yes			Admission Offer – No			p diff.
	Mean	Minimum	Maximum	Mean	Minimum	Maximum	
Quantitative GRE score	154.0	136	170	150.2	130	170	<0.000
Verbal GRE score	154.5	134	170	151.2	130	170	<0.000
Quantitative GRE percentile	55.6	2.0	97.0	42.1	1.0	97.0	<0.000
Verbal GRE percentile	65.9	6.0	99.0	53.3	1.0	99.0	<0.000
Overall GPA	3.5	2.07	4.0	3.2	1.6	4.0	<0.000
Science GPA	3.4	1.04	4.0	3.1	1.0	4.0	<0.000
Non-science GPA	3.7	2.06	4.0	3.4	1.7	4.0	<0.000

Table 3: VMCAS candidates' demographics, 2018 admissions cycle

		Admission Offer – Yes		Admission Offer – No	p diff.
First-Generation Status		24.7%		35.1%	<0.000
Gender ID	Female	82.7%		83.9%	0.05
	Male	17.1%		15.7%	
	Did Not Specify	0.2%		0.5%	
Race/Ethnicity ID	Latino	10.5%		12.3%	0.01
	American Indian	1.7%		1.9%	0.385
	Asian	8.0%		6.5%	0.011
	Black	3.2%		5.8%	<0.000
	Pacific Islander	0.4%		0.4%	0.899
	URVM*	22.1%		24.9%	0.005
	White	84.1%		82.9%	0.17
Age	Mean	22.7		23.3	<0.000
	Minimum	17		17	
	Maximum	55		64	

*URVM (under-represented in veterinary medicine) candidates are those who identified with *any non-white race/ethnicity*.

Table 4: VMCAS candidates' overlapping ranges for grades and GRE scores, 2018 admissions cycle

	Number of non-admitted candidates whose performance exceeded performance in the admitted group		Percentage of non-admitted candidates whose performance exceeded performance in the admitted group	
	Minimum	Mean	Minimum	Mean
Quantitative GRE score	2702	753	77.8%	21.7%
Verbal GRE score	2700	802	77.7%	23.1%
Quantitative GRE percentile	2111	529	60.7%	15.2%
Verbal GRE percentile	2103	666	60.5%	19.2%
Overall GPA	3145	770	90.5%	22.2%
Science GPA	3155	742	90.8%	21.4%
Non-science GPA	3149	839	90.6%	24.1%

Figure 1: VMCAS candidates' quantitative GRE scores by admission offer group, 2018 admissions cycle

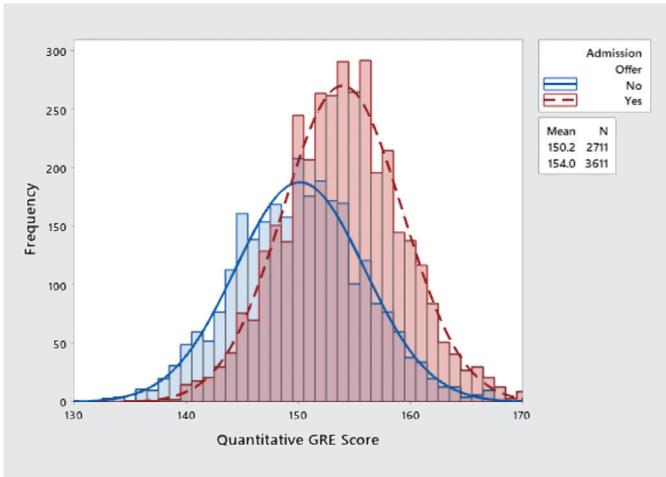


Figure 3: VMCAS candidates' quantitative GRE percentiles by admission offer group, 2018 admissions cycle

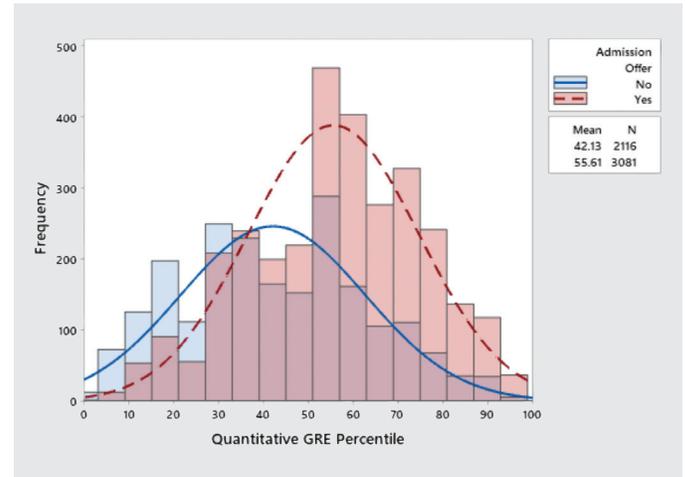


Figure 2: VMCAS candidates' verbal GRE scores by admission offer group, 2018 admissions cycle

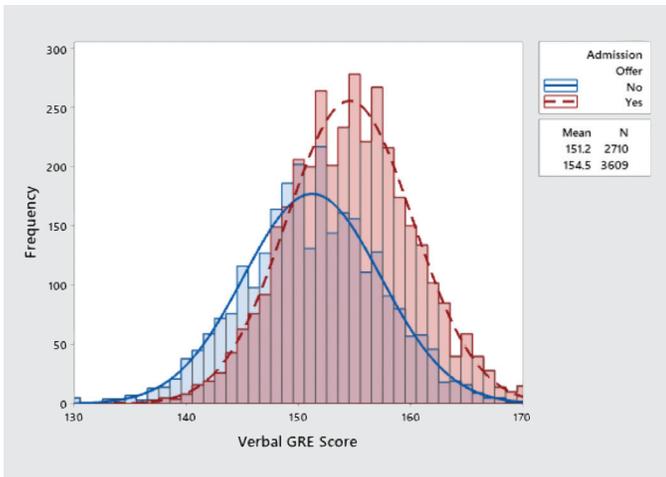


Figure 4: VMCAS candidates' verbal GRE percentiles by admission offer group, 2018 admissions cycle

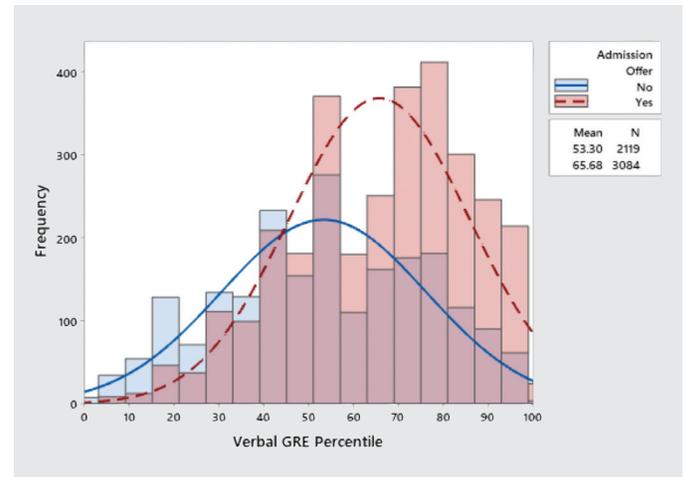


Figure 5: VMCAS candidates' overall GPA by admission offer group, 2018 admissions cycle

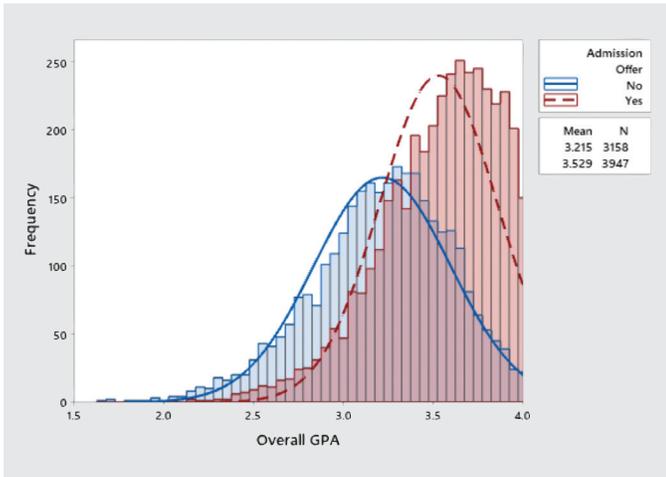


Figure 7: VMCAS candidates' non-science GPA by admission offer group, 2018 admissions cycle

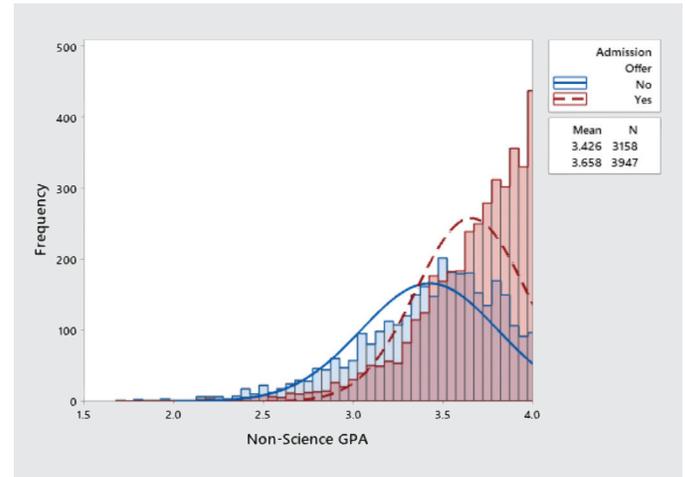


Figure 6: VMCAS candidates' science GPA by admission offer group, 2018 admissions cycle

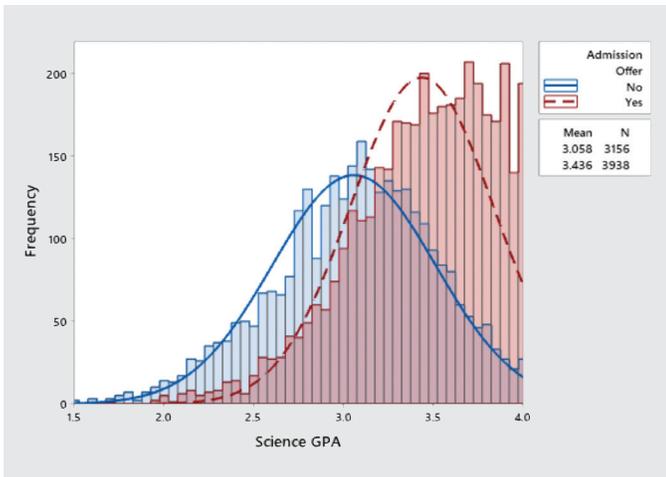


Figure 8: VMCAS candidates' admission offers by first-generation status, 2018 admissions cycle

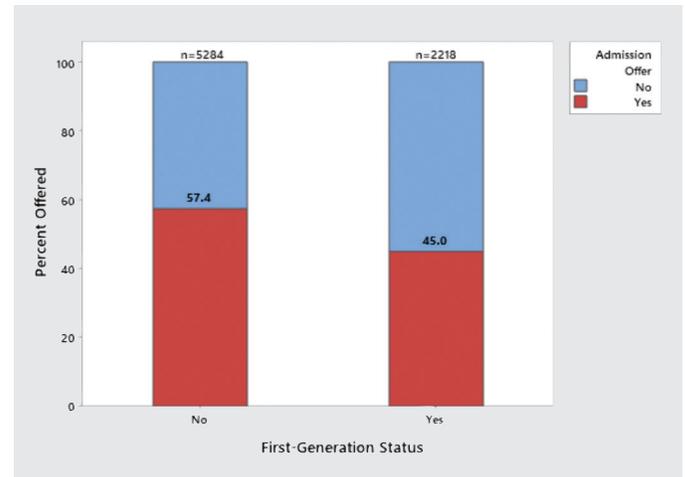


Figure 9: VMCAS candidates' admission offers by gender identification, 2018 admissions cycle

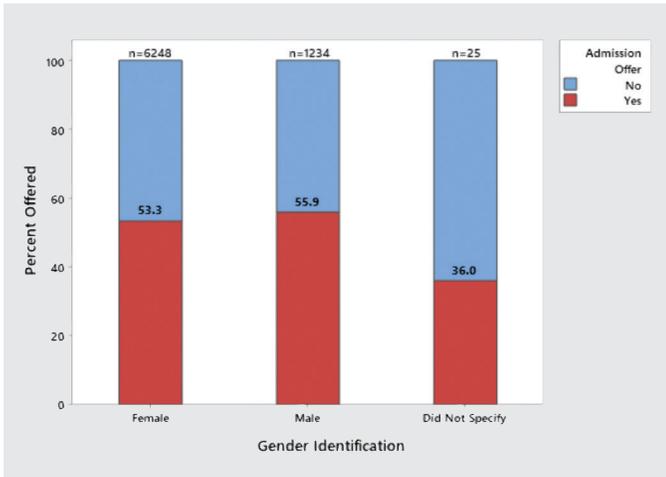


Figure 11: Admission offers for VMCAS candidates who identified as Asian, 2018 admissions cycle

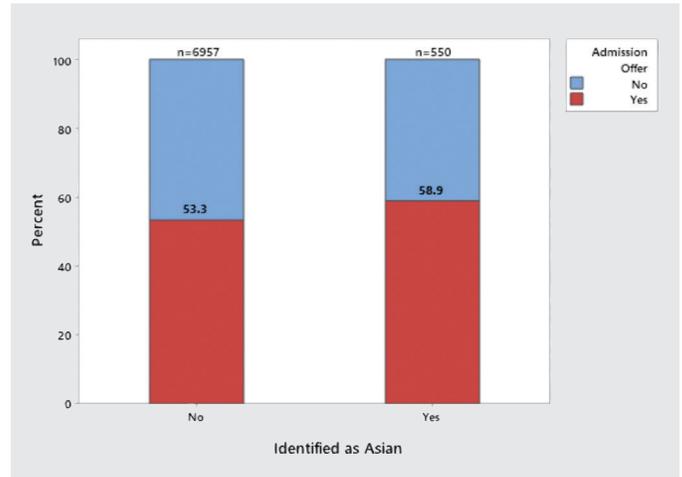


Figure 10: Admission offers for VMCAS candidates who identified as Latino, 2018 admissions cycle

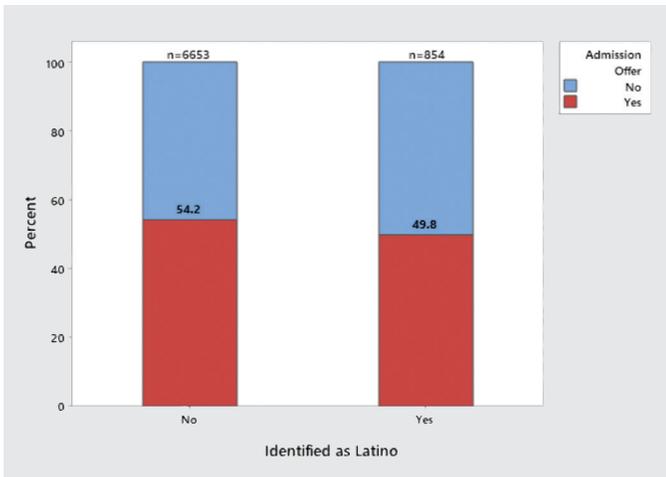


Figure 12: Admission offers for VMCAS candidates who identified as Black, 2018 admissions cycle

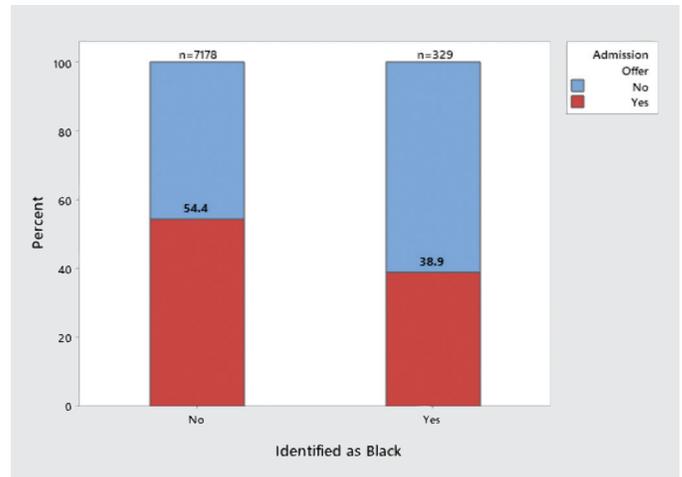


Figure 13: Admission offers for VMCAS candidates who identified as URVM*, 2018 admissions cycle

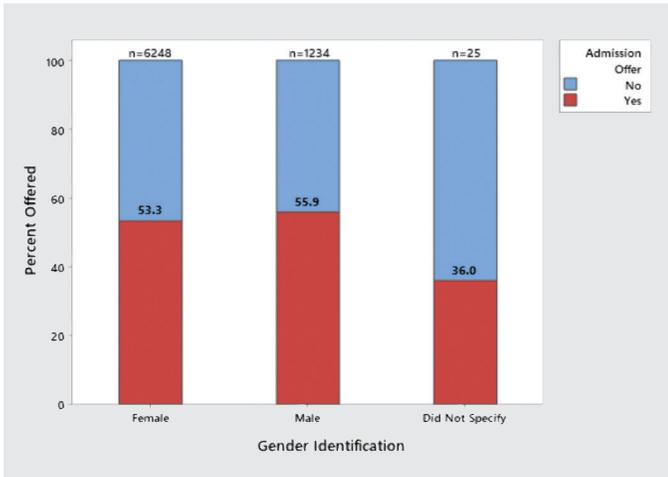
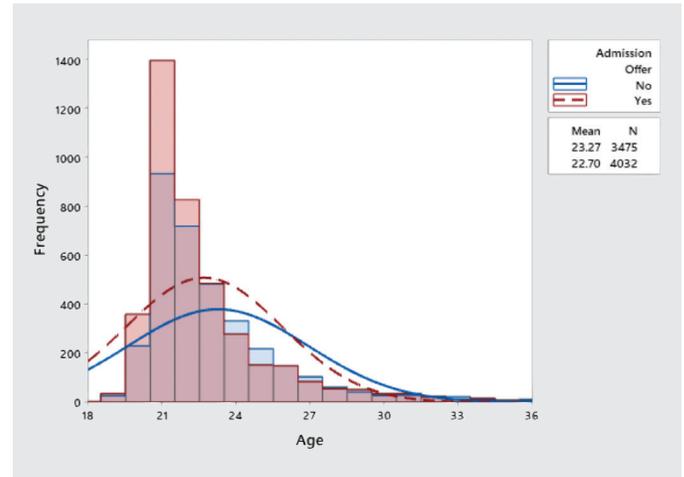


Figure 14: VMCAS candidates' age by admission offer group, 2018 admissions cycle



*URVM (under-represented in veterinary medicine) candidates are those who identified with any non-white race/ethnicity.