



SURVEY RESEARCH LABORATORY

A Unit of the College of Urban Planning and Public Affairs

VETERINARY PATHOLOGIST SURVEY: FINAL REPORT

Prepared for
American College of Veterinary Pathologists, Recruitment Committee
Society of Toxicologic Pathology

Prepared by
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■ INTRODUCTION ■

The Recruitment Committee of the American College of Veterinary Pathologists (ACVP) contracted with the Survey Research Laboratory (SRL) at the University of Illinois at Chicago to survey employers and trainers of veterinary pathologists. The purpose of this mail study was to determine if there currently is or will be a shortage of veterinary pathologists. The study was funded by the ACVP and the Society of Toxicologic Pathology.

The following pages summarize the responses of the 169 respondents to the employer survey and the 39 respondents to the training program survey. Since the questionnaires for these surveys contained two sections—one asking about anatomic pathology employees/trainees and one asking about clinical pathology employees/trainees—results are presented separately for these two groups. Further, the foregoing contains a number of graphs. The data on which these graphs are based are included in tabular form in Appendix A.

Appendix B contains a detailed discussion of the study methodology and response rates. Copies of all survey materials (i.e., introductory letters, questionnaires, reminder/thank you postcards, interviewer training manual) are included in Appendix C.

■ RESULTS: EMPLOYERS OF VETERINARY PATHOLOGISTS ■

For the employer survey, 169 organizations returned questionnaires from a total 278 eligible institutions for an overall response rate of 60.8%. (A complete list of organizations that participated in the survey can be found in Appendix D.) The anatomic pathologist section was completed by 164 respondents; of those 164, 57 also completed the clinical pathologist section. Five organizations completed the clinical pathologist section only, meaning that overall, 62 respondents provided information on clinical pathologists.¹

Current employment of and current demand for veterinary pathologists

Current employment. Two items near the beginning of the questionnaire—before the separate anatomic and clinical pathology sections—asked respondents to supply the number of veterinary pathologists they currently employ. The bulleted items below summarize the responses.

Anatomic Pathologists

- Of the 162 institutions that provided information on number of anatomic pathologists employed, almost all (160, or 98.8%) employ anatomic pathologists.
- Those 160 organizations collectively employ 939 anatomic pathologists, with each employing an average of 5.8 anatomic pathologists.
- The number of anatomic pathologists ranges from 1 to 34, with the majority of respondents (66.9%) employing one to five anatomic pathologists. Slightly more than 14% of respondents employ more than ten anatomic pathologists.

Clinical Pathologists

- Of the 140 institutions that provided information on the number of clinical pathologists employed, 81 (57.9%) currently employ **no** clinical pathologists.
- The remaining 59 organizations collectively employ 153 clinical pathologists, with each employing an average of 2.6 clinical pathologists.
- The number of clinical pathologists ranges from 1 to 20, with over a third of respondents employing only one clinical pathologist and slightly less than a third employing two.

Current demand. Respondents were asked how many veterinary pathologist positions are open currently at their institutions. The results are summarized below.

Anatomic Pathologists

- Of the 163 respondents to this question, 84 (51.5%) reported there are no anatomic pathologist positions currently open.
- The remaining 79 reported a total of 127 open anatomic pathologist positions, with each organization having an average of 1.6 open positions.
- The number of open positions ranged from one to six, with most organizations (57.0%) having only one such position.

Clinical Pathologists

- Of the 61 respondents to the question about clinical pathologist positions, 42 (68.9%) had no such positions currently open.
- The remaining 19 institutions reported a total of 22 open clinical pathologist positions, with each having an average of 1.2 open positions.
- The number of open clinical pathologist positions ranged from one to three, with 89.5% having only one such position.

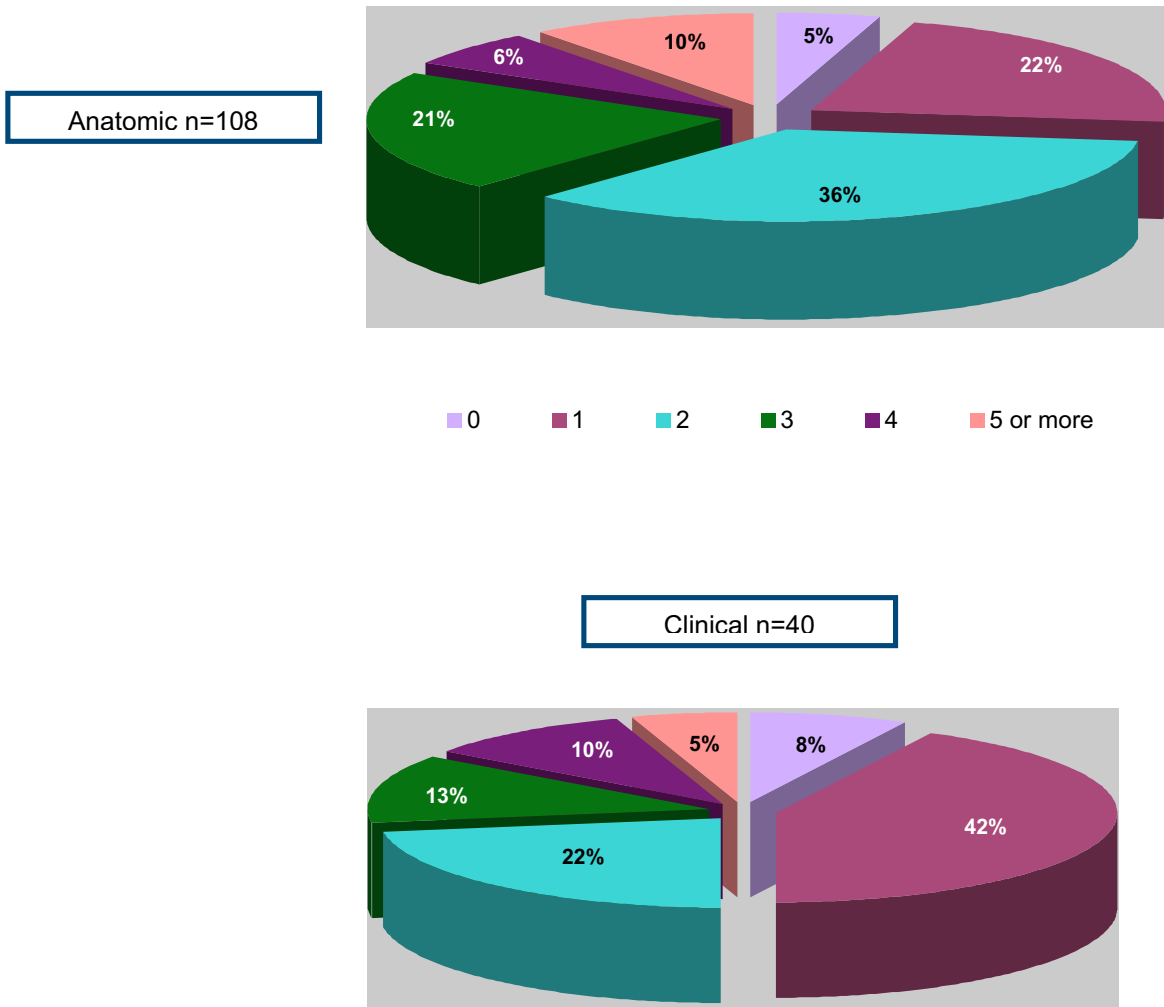
¹ The totals for individual items may differ due to “don’t know” and missing responses.

Recent demand for veterinary pathologists

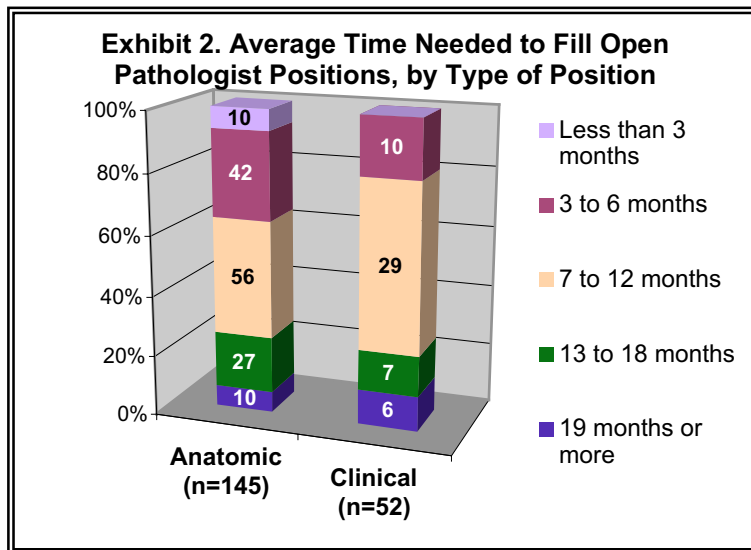
Open positions in the past two years. Just over 70% (115 of 163) of respondents to the anatomic pathology portion of the questionnaire indicated they had had open anatomic pathology positions in the last two years. A smaller proportion of respondents to the clinical pathology portion reported having one or more open clinical pathology positions in the preceding two years (64.5%, or 40 of 62).

Number of qualified applicants per open position in the past two years. Institutions that had had open positions in the past two years were asked to estimate the number of qualified applicants for each open position; their responses are displayed in Exhibit 1. A small percentage of institutions indicated they had no qualified applicants for open positions; most had one or two qualified applicants, regardless of type of position.

Exhibit 1. Applicants per Position in the Last Two Years, by Type of Position



Average time needed to fill open positions. As can be seen in Exhibit 2, 64% and 81% of respondents reported that it takes more than 6 months to fill an open anatomic or clinical pathology position, respectively.



Future demand for veterinary pathologists

Three items on the questionnaire asked respondents to estimate the number of veterinary pathologists they would be hiring during three different periods: 2002–2003, 2004–2007, and 2008–2011. Additional items allowed respondents to indicate how many of those openings would be due to retirements.² Exhibit 3 displays the number of responses to each item, the percentage of respondents who indicated they would have any pathology openings during the years asked about (and the percentage indicating that any would be due to retirements), and the average number of openings during those years (and the average number due to retirements) by type of position. As indicated in the table, respondents to both the anatomic and clinical pathology portions of the questionnaire were more likely to anticipate having **any** openings in 2004–2007 and 2008–2011 than in 2002–2003; further, they estimated having a larger number of openings in 2004–2007 and 2008–2011. Note that the columns titled “Total # of positions” and “Total # of retirements” are sums of the numbers provided by respondents for each year and each type of position; these numbers are meant to be instructive only. Naturally, they fluctuate quite a bit as the number of respondents decreases and should be viewed as indicators only. **Readers also should keep in mind that these numbers are very low compared to the actual number of positions, considering that not all employers surveyed returned questionnaires.**

Exhibit 3. Anticipated Total Number of Pathology Job Openings and the Subset Due to Retirements by Type of Position

Openings in...	Anatomic Pathology				Clinical Pathology			
	<i>n</i>	% with any open positions	Avg # of open positions*	Total # of positions	<i>n</i>	% with any open positions	Avg # of open positions**	Total # of positions
2002–2003	149	53.0	1.5	120	47	42.6	1.0	20
2004–2007	149	80.5	1.9	227	53	77.4	1.2	50
2008–2011	125	75.2	2.3	212	41	56.1	1.3	40
Openings due to retirements in...	<i>n</i>	% with any due to retirements	Avg # due to retirements [†]	Total # of retirements	<i>n</i>	% with any due to retirements	Avg # due to retirements ^{††}	Total # of retirements
2002–2003	103	30.1	1.3	40	32	12.5	1.0	4
2004–2007	123	61.0	1.5	113	40	42.5	1.1	19
2008–2011	120	71.7	1.8	153	33	42.4	1.1	15

*Of those reporting **any** open positions. Ranged from 1–5 for 2002–3 and from 1–15 for 2004–7 and 2008–11.

Of those reporting **any open positions. All anticipated only 1 opening in 2002–3; ranged from 1–3 for 2004–7 and from 1–2 for 2008–11.

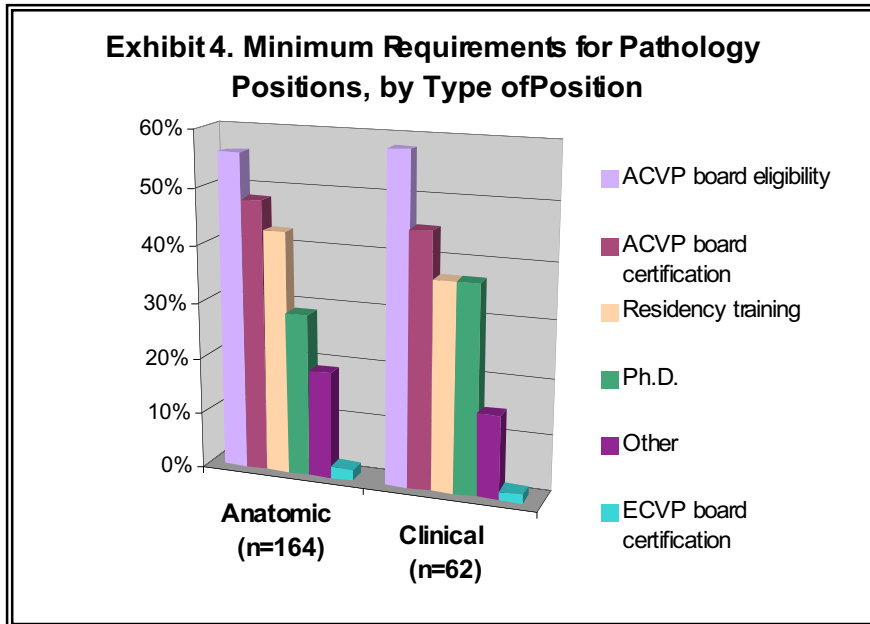
[†]Of those reporting **any** retirements. Ranged from 1–3 for 2002–3, from 1–4 for 2004–7, and from 1–5 for 2008–11.

^{††}Of those reporting **any** retirements. All anticipated only 1 in 2002–3; ranged from 1–2 for 2004–7 and 2008–11.

² Of all the items on the employer questionnaire, this series about openings and openings due to retirements seemed most problematic for respondents, as evidenced by the number who left some or all of them blank. For the anatomic pathology portion of the instrument, as many as 36% of responses had to be coded as “missing/refused.” For the clinical pathology portion, the percentage reached as high as 25%. It could be that those with zero expected open positions chose to skip these items, but we do not know for certain. Therefore, the results for these items must be interpreted cautiously.

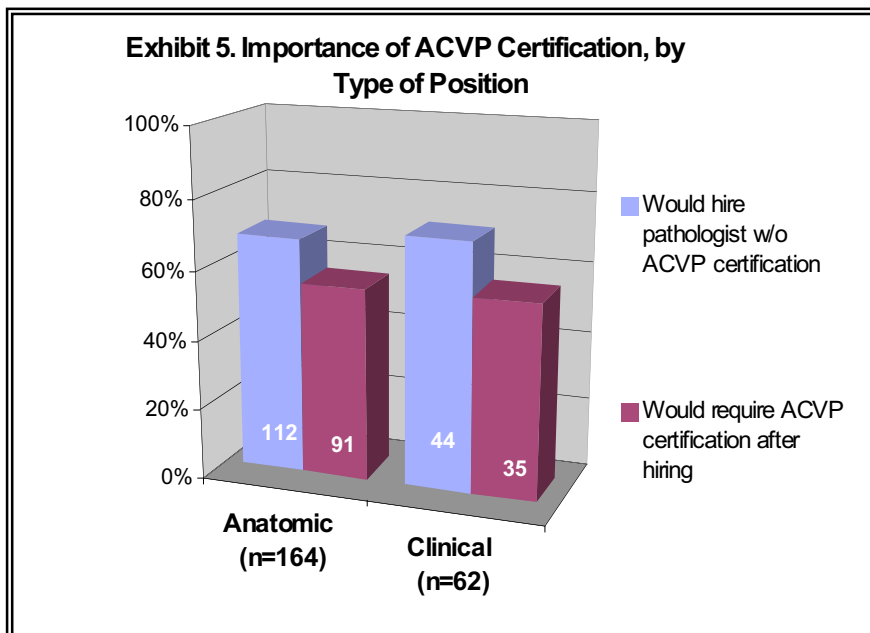
Openings due to retirements. The percentage of anticipated anatomic pathology job openings that will be due to retirements increases dramatically for each time period. According to the information provided by respondents, about one-third of open positions in 2002–2003 will be due to retirements. For 2004–2007, almost half (49.8%) will be due to retirements, and retirements will account for almost three-quarters (72.2%) of anticipated anatomic pathology job openings in 2008–2011. In contrast, retirements will account for one-fifth of open clinical pathology positions in 2002–2003, 38.0% in 2004–2007, and 37.5% in 2008–2011.

Institutional requirements for veterinary pathologist positions



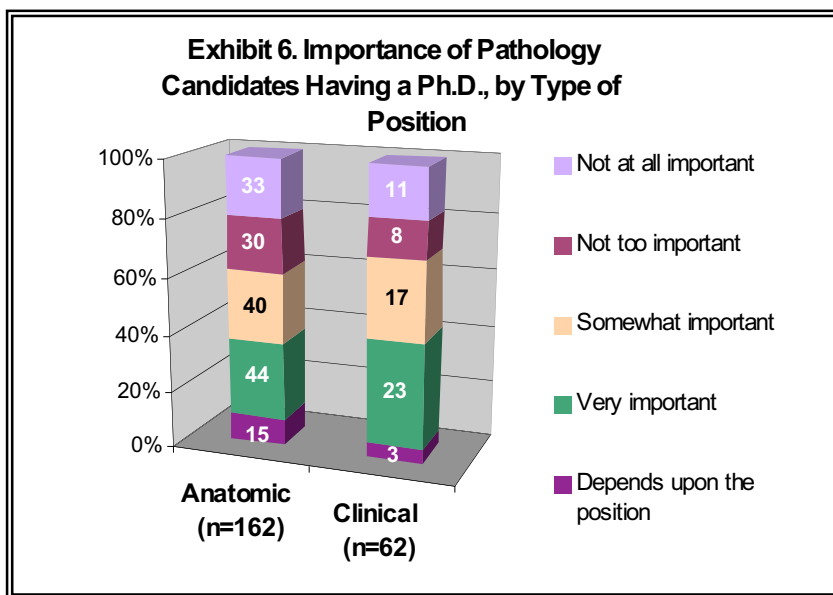
Minimum requirements.

Respondents were asked to indicate their institutions' minimum requirements for veterinary pathologist positions. As can be seen in Exhibit 4, a majority of responding institutions require ACVP board eligibility for both anatomic and clinical pathology positions; a slightly lower percentage require certification. The next most-cited requirement was residency training, followed by a Ph.D. and "other" skills and experiences. Respondents named training in specific areas (e.g., toxicologic pathology, anatomic pathology), specific degrees (e.g., DVM, M.S. in Pathology), and specific types of experience (e.g., diagnostic lab experience, wildlife experience, industry experience) as additional requirements (see Appendix D, Q8 and 19, for a complete listing of the skills and experiences added by respondents).



The low proportion of institutions requiring ECVP board certification is not surprising, given that the sample contained U.S. and Canadian institutions only. Finally, there were some differences in the requirements for anatomic pathology vs. clinical pathology positions, as the chart shows.

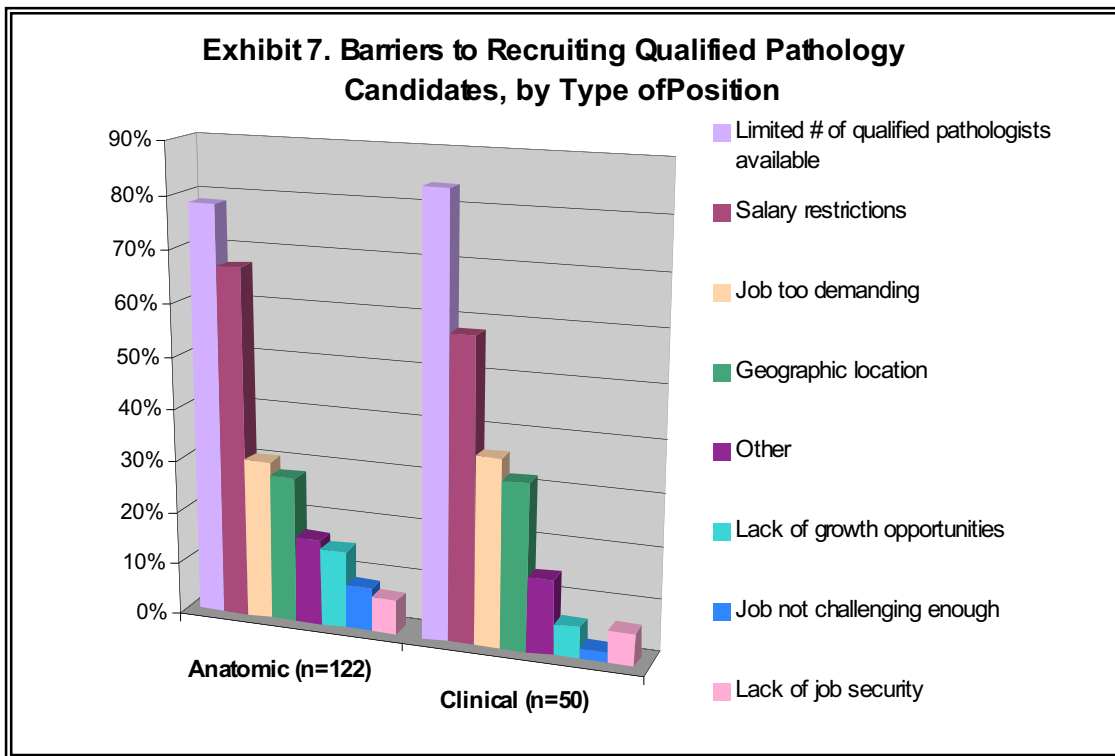
Importance of ACVP Certification. Just over 68% of responding institutions would hire an anatomic pathologist who is not ACVP certified, but the majority of those (81.3%) would require that pathologist to become certified at some point after being hired. Similarly, 71% of respondents would hire a non-ACVP-certified *clinical* pathologist, and about 80% of those would expect the new employee to become certified. These results are presented in Exhibit 5 on the previous page.



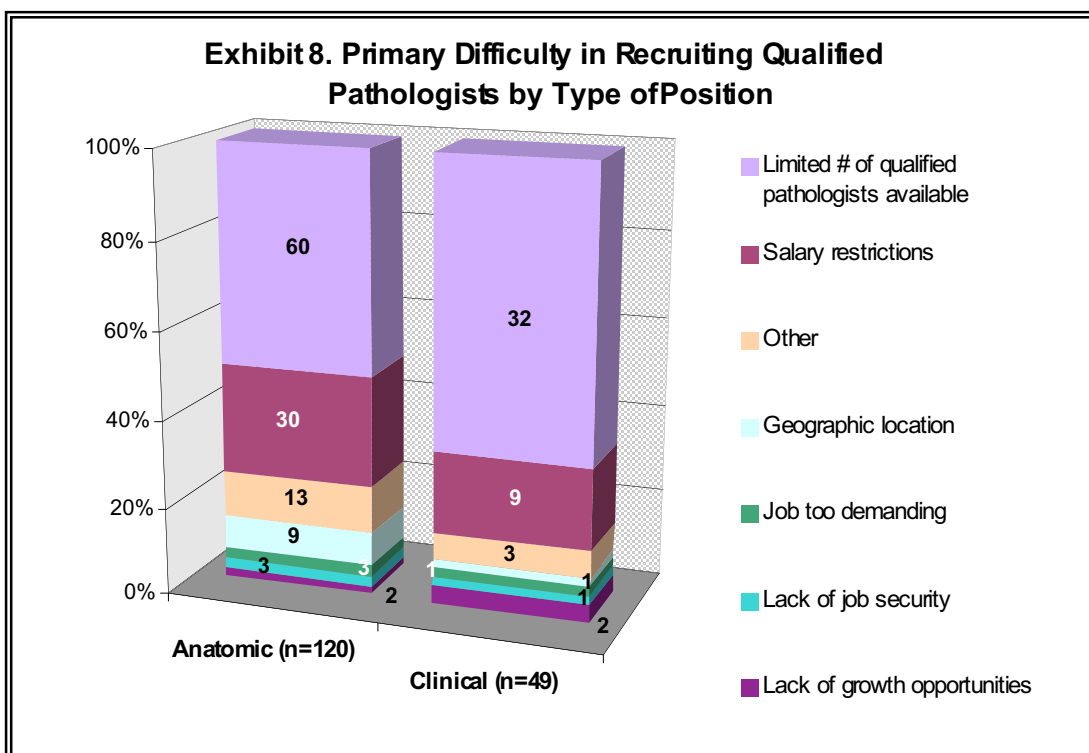
Importance of a Ph.D. Exhibit 6 indicates that candidates having a Ph.D. is important to a majority of respondents for both anatomic and clinical veterinary pathologist positions: 51.8% of respondents to the anatomic pathology portion of the questionnaire and 64.5% of respondents to the clinical pathology portion said it is “very important” or “somewhat important.” However, it does appear that respondents see having a Ph.D. as more critical for clinical pathology positions.

Barriers to recruiting qualified pathology candidates

When asked if it is difficult to recruit qualified pathologists, 78.8% (123 of 156) of respondents to the anatomic pathology portion of the questionnaire and 82% (50 of 61) of those to the clinical pathology portion said that it is. Another question provided respondents with the opportunity to identify the reasons it is difficult to recruit qualified candidates, which are summarized on the following page in Exhibit 7. **The most cited reason was the limited number of qualified pathologists available, followed by salary restrictions.** About a third (31.1% for anatomic pathology, 36% for clinical pathology) suggested that **candidates see the job as too demanding**, and slightly less (27.9% for anatomic pathology, 32% for clinical pathology) named the program’s geographic location as a barrier to recruiting qualified candidates. A number of reasons seen as important were written in by respondents, such as cost of living, candidates’ lack of training and/or experience in specific areas, and candidates’ expectations and interests. (A complete listing of answers provided by respondents can be found in Appendix D.)

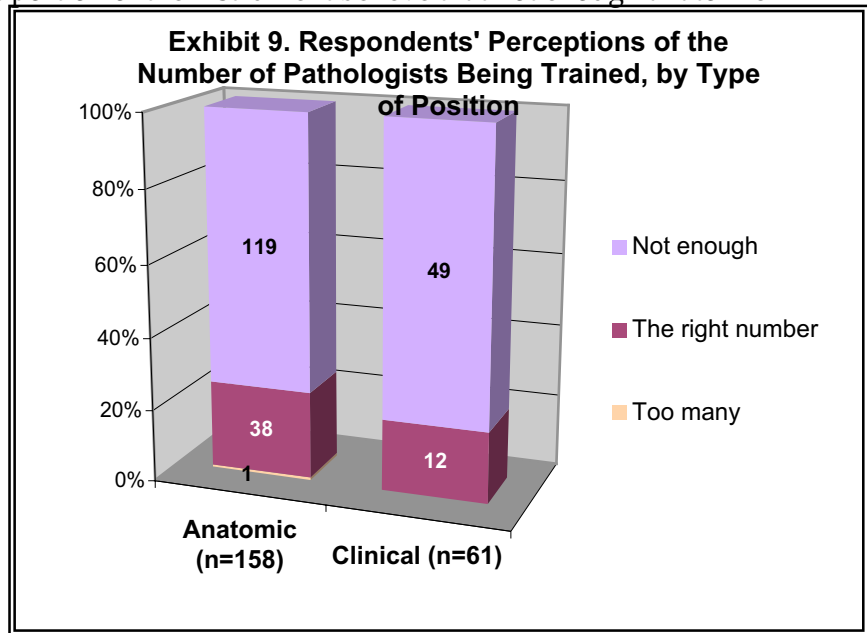


Primary difficulty in recruiting qualified job applicants. The limited number of qualified pathologists also was the option most often selected by respondents as the primary difficulty in recruiting qualified pathologists, followed by salary restrictions. Respondents also selected the “other” option and wrote in such difficulties as cost of living, cost of housing, and candidates’ lack of training and/or experience in specific areas (e.g., wildlife, toxicologic animal pathology). (A complete listing of difficulties added by respondents can be found in Appendix D.) Geographic location was an issue for a number of organizations. These results are presented in Exhibit 8.

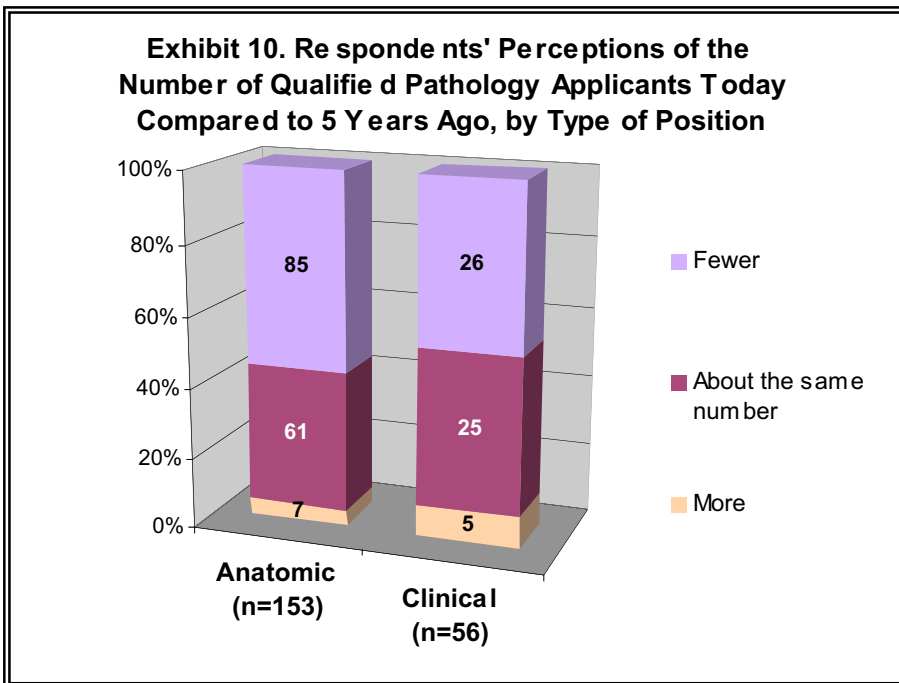


Perceptions of the number of pathologists being trained and number of qualified pathologists for open job positions

Number of pathologists being trained. The employer questionnaire asked if, given the current supply and demand of veterinary pathologists, enough pathologists are being trained, too few are being trained, or too many are being trained. Regardless of type of position, a majority of respondents suggested that not enough are being trained, as can be seen in Exhibit 9. Over three-quarters of respondents to that portion of the instrument believe that not enough anatomic pathologists are being trained, while 80% of respondents to the clinical pathology portion indicated that not enough clinical pathologists are being trained. Those reporting that the right number are being trained represented 24% of the anatomic pathology respondents and 20% of the clinical pathology respondents. One person suggested that too many anatomic pathologists are being trained.



Number of qualified job applicants. Exhibit 10 presents responses to questions asking about the number of qualified pathology job candidates today compared to five years ago. Most



respondents (55.9%) indicated that there are fewer qualified anatomic pathology candidates today; few (4.6%) claimed there are more. With regard to clinical pathology candidates, about an equal proportion of respondents to that section of the questionnaire suggested that there are fewer (46.4%) and that there are about the same number (44.6%). Nine percent said there are more clinical pathology candidates today than five years ago.

Skill sets needed for veterinary pathologist positions in the future

Open-ended items invited respondents to identify the skill sets that will be required at their institutions for pathologist positions in the future that are not required currently. Summary lists of the skills sets needed and the frequency of each response is provided in Exhibit 11 (for anatomic pathology) and Exhibit 12 (for clinical pathology). (All responses to these items can be found in Appendix D.)

Exhibit 11. Perceived Skill Sets Needed for Future Success in Anatomic Pathology

Skill Set	# Responses*
Molecular/Cellular Biology, Molecular Genetics <i>(including in situ hybridization)</i>	33
Toxicologic Pathology/Pharmacology <i>(including drug development)</i>	17
Post-Doctoral Training/Research Skills <i>(including publication, program funding, mentoring)</i>	16
Diagnostic/Epidemiology <i>(including comparative pathology, statistics, cytology, animal production)</i>	15
Laboratory Animal Pathology/Medicine <i>(including transgenics, NHP)</i>	15
Panomics (Genomics/Metabonomics/Proteomics)	12
Management/Administrative/Entrepreneurial Skills	9
Computer Skills/Bioinformatics	8
Imaging Technologies <i>(including confocal, digital, morphometry, LCM, photography, MRI, CT, PET)</i>	7
Immunohistochemistry	5
Immunology/Virology/Microbiology	3
Statistics	3
Medical Devices Training <i>(including materials science, nanotechnology)</i>	2
Exotics/Aquatic	2
Food Safety	2
Veterinary Practice Experience	1
Slide Reading	1

* Respondents (94) to Q14 and Q25 (Appendix D) often mentioned more than one skill set. Each mention of a specific skill set was counted as an individual response.

Exhibit 12. Perceived Skill Sets Needed for Future Success in Clinical Pathology

Skill Set	# Responses*
Molecular/Cellular Biology, Molecular Genetics	5
Panomics (Genomics/Metabonomics/Proteomics)	5
Post-Doctoral Training/Research Skills (including publication, program funding)	4
Flow Cytometry	4
Toxicologic Pathology/Pharmacology (including drug development)	3
Management/Administrative/Entrepreneurial Skills	3
Imaging Technologies (including LSC, NMR)	3
Laboratory Animal Pathology/Medicine	2
Computer Skills/Bioinformatics	2
Veterinary Practice/Clinical Experience	2
Clinical Chemistry	1
Quality Control	1
Histopathology	1

* Respondents (20) to Q14 and Q25 (Appendix D) often mentioned more than one skill set. Each mention of a specific skill set was counted as an individual response.

Additional commentary provided by respondents

A final open-ended questionnaire item allowed respondents to record their comments, concerns, and observations on whatever topic they chose. Some used the opportunity to discuss conditions at their own institutions in greater detail:

- In 2001–2002, we have hired 3 anatomic pathologists and 1 clinical pathologist. We are fortunate that we now have a faculty to retain long-term. Of these 4 positions, 3 were due to retirements. Now we face retaining faculty in the face of many job opportunities. We have also hired some of our graduate students (2), but they were in high demand (4 offers), and the best departments tend to retain more of their own students.
- Our department is very small at this time, so the information provided is very limited. We expect to grow over the next 5 years from 5 to approximately 12, but will likely only increase from 2 to 3 or 4 pathologists.
- While we have been successful in recruiting qualified anatomic pathologists, there seems to be a limited number of younger candidates.

Others' comments focused on issues surrounding the different environments in which pathologists are employed:

- Even if there are enough pathologists, they do not graduate with the skill sets to fill current positions available in toxicologic pathology and pathology in a commercial environment.
- Diagnostic pathologists are in demand now, as indicated by the number of employment advertisements. Industry/private laboratories are recruiting from the university rank, which in turn recruit from the general pool. Small state-run [diagnostic] laboratories on budgeting restraints are and will continue to have difficulty in competing with these institutions for the qualified candidates. How this will be in 10 years is uncertain, but there is no indication of a change on the immediate horizon.
- We all recognize that industry is robbing academia to find qualified pathologists. This further limits the through-put for training pathologists of any type (diagnostic, academic, industry). Reasons for leaving often are financial. It would seem that industry cuts its own throat by doing this. I would love to see more academic centers supported by industry to facilitate training, but also to increase the collaboration of industry and academia; it would benefit both.

The text of all respondent commentary for this item is in Appendix D.

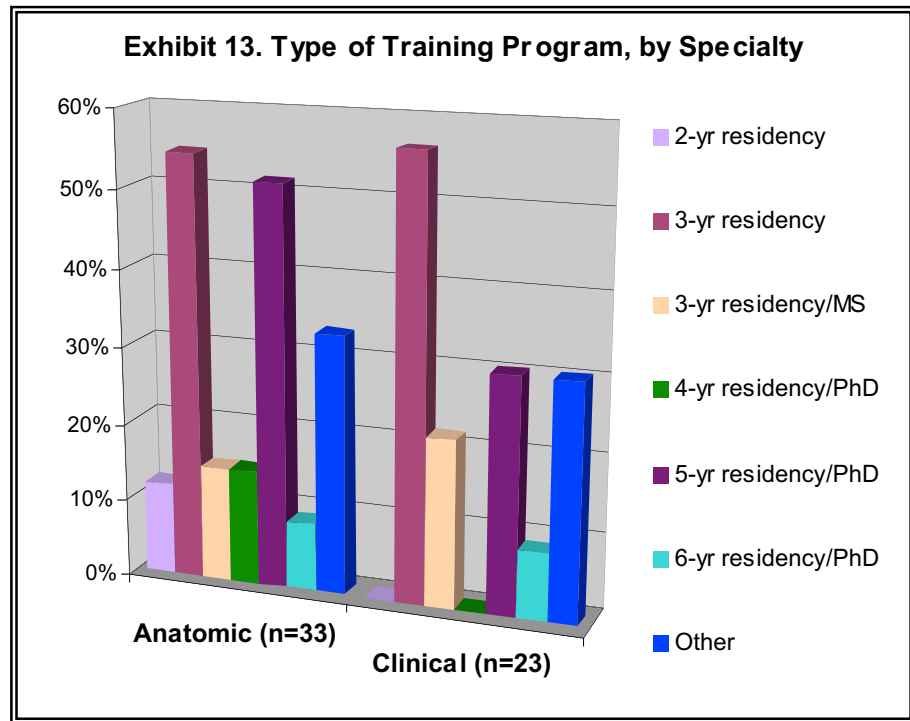
■ RESULTS: VETERINARY PATHOLOGIST TRAINING PROGRAMS ■

Thirty-eight training program questionnaires were completed out of 56 total eligible institutions for an overall response rate of **69.6 %** (a complete list of organizations that participated is included in Appendix E).³ The section of the questionnaire dealing with anatomic pathologist trainees was completed by 34 respondents. Of those 34, 19 also completed the clinical pathology section. Four questionnaires contained responses on the clinical pathology section only. Thus, the foregoing represents information on 34 anatomic and 23 clinical pathology training programs.⁴

Types of veterinary pathologist training programs

The questionnaire asked respondents to provide descriptive information on their programs and provided a list of program types (e.g., two-year residency, six-year residency/Ph.D.) and an “other” option that allowed them to write in program descriptions.

Respondents could select multiple options. As presented in Exhibit 13, a majority of respondents to both the anatomic and clinical pathology portions of the instrument described their programs as *three-year residencies*. Half of the anatomic respondents selected five-year residency/Ph.D., while 30% of clinical pathology respondents did so. About one-third of respondents to both parts of the questionnaire chose the “other” option and wrote in a program description, such as the following:



- 2-year MVetSc, 1-year Senior Residency (Post MVetSc or equivalent)
- Post-residency fellowship
- 3-year post doc/Ph.D. option with specialty training in mouse pathology, and basic biomedical research training grants can extend this program
- Opportunity for Ph.D. training only when funding is identified

A complete list of “other-specify” responses to this question can be found in Appendix E.

³Thirty-nine questionnaires were returned, but one was a duplicate and was removed from the analysis file.

⁴The totals for individual items may differ due to “don’t know” and missing responses.

ACVP board certification as program purpose

The questionnaire asked if the training program is designed to produce ACVP board-certified pathologists. Of the 33 anatomic programs that responded, 21 (63.6%) said that it is, while nine (27.3%) said it is not. Three (9.1%) indicated their programs had some other primary purpose:

- The program is designed to produce excellent anatomic pathologists who are expected to become board-certified.
- We place equal value on ACVP certification and development of research career.
- Ph.D. and boards are considered equally as the purpose.

For clinical pathology programs, 20 of the 22 respondents (90.9%) reported that board certification is a primary purpose of their programs. The remaining two indicated it is not a primary purpose.

Current enrollment in veterinary pathology training programs

Because of inconsistencies in respondent reporting (e.g., skipping some but not all items), it is difficult to interpret the results regarding current, minority, and noncitizen/nonresident enrollees. However, Exhibit 14 presents basic summary information on responses to these items.

Exhibit 14. Number of All Enrollees and the Subsets of Minority and Noncitizen/Nonresident Enrollees by Specialty

All Enrollees in...	Anatomic Pathology				Clinical Pathology			
	<i>n</i>	% with any enrollees	Average # of enrollees*	Total # of enrollees	<i>n</i>	% with any enrollees	Average # of enrollees**	Total # of enrollees
Residency only	33	57.6	3.2	61	20	60.0	1.5	18
Combined residency/MS	33	9.1	3.7	11	20	15.0	1.3	4
Combined residency/PhD	33	54.5	3.9	71	20	45.0	1.9	17
Other	34	20.6	2.7	19	20	10.0	1.0	2
Total ⁰	33	87.9	5.5	170	21	90.5	2.3	43
Minority enrollees in...	<i>n</i>	% with any enrollees	Average # of enrollees [†]	Total # of enrollees	<i>n</i>	% with any enrollees	Average # of enrollees ^{††}	Total # of enrollees
Residency only	33	--	--	0	22	11.0	1.0	2
Combined residency/MS	33	6.1	5.5	11	22	--	--	0
Combined residency/PhD	33	9.1	1.0	3	22	4.5	1.0	1
Other	33	12.1	2.0	8	22	11.0	1.0	2
Total ⁰	33	21.2	1.7	12	22	29.4	1.0	5
Noncitizen/nonresident enrollees in...	<i>n</i>	% with any enrollees	Average # of enrollees [‡]	Total # of enrollees	<i>n</i>	% with any enrollees	Average # of enrollees ^{‡‡}	Total # of enrollees
Residency only	33	27.3	1.6	14	22	18.2	1.0	4
Combined residency/MS	33	6.1	4.5	9	22	--	--	0
Combined residency/PhD	33	21.2	1.7	10	22	4.5	1.0	1
Other	33	12.1	2.0	7	22	4.5	1.0	1
Total ⁰	33	45.5	1.8	28	22	27.3	1.0	6

⁰In some cases, the column totals do not sum to the row totals. The number for the row total is based upon the total provided by respondents. The discrepancy is due to missing data (e.g., a respondent provided totals but did not break them down by program type).

*Among those reporting any enrollees. Ranged from 1–8 for residency only, from 1–6 for residency/MS and other, from 1–13 for residency/PhD, and from 1–20 for total.

**Among those reporting any enrollees. Ranged from 1–3 for residency only, from 1–2 for residency/MS, and from 1–5 for residency/PhD and total. For other, both respondents had 1 enrollee.

[†]Among those reporting any minority enrollees. All had only one minority enrollee.

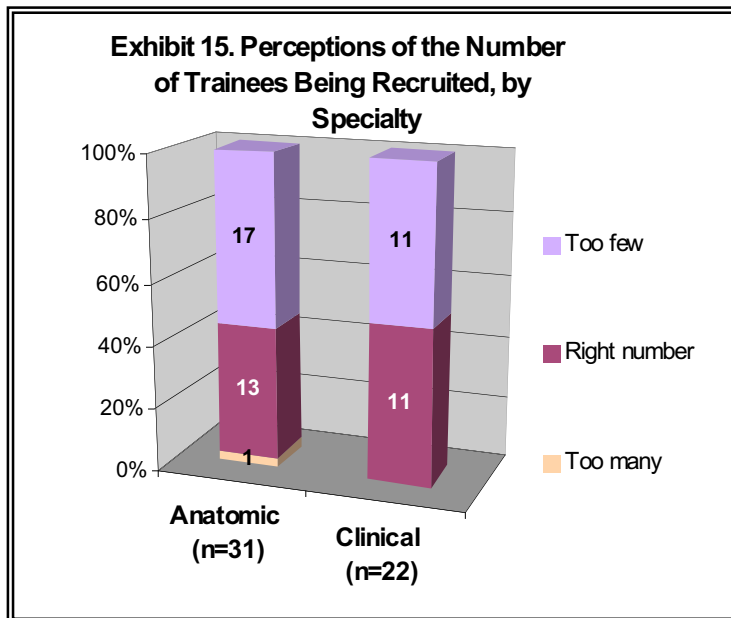
^{††}Among those reporting any minority enrollees. Ranged from 1–2 for 2001, 2002, and 2004; all anticipated only 1 in 2003.

[‡]Among those reporting any noncitizen/nonresident enrollees. Ranged from 1–3 for residency only, residency/PhD, other, and total. For residency/MS, one respondent had 3 minority enrollees; the other, 6.

^{‡‡}Among those reporting any noncitizen/nonresident enrollees. All had only one such enrollee.

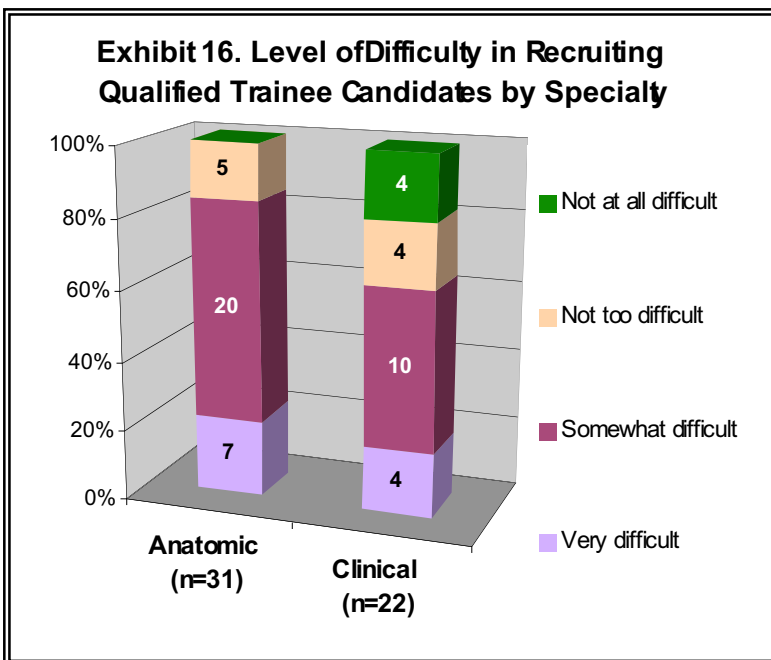
Perceived adequacy of the number of veterinary pathology trainees being recruited

With regard to current recruitment, respondents were asked their opinion of the number of trainees being recruited, given the teaching and service support provided by trainees. Over half (54.8%) of anatomic pathology program respondents believe too few trainees are being recruited, while about 42% reported the right number are being trained. One anatomic pathology respondent said there are too many. Clinical pathology training program respondents were equally split between “too few” and “the right number.” These results are presented in Exhibit 15.



Barriers to recruiting qualified veterinary pathology trainee candidates

Level of difficulty in recruiting qualified trainee candidates. As can be seen in Exhibit 16, most respondents (84.4%) reported it is very or somewhat difficult to recruit qualified anatomic pathology candidates; the remaining 15.6% indicated it is “not too difficult.”

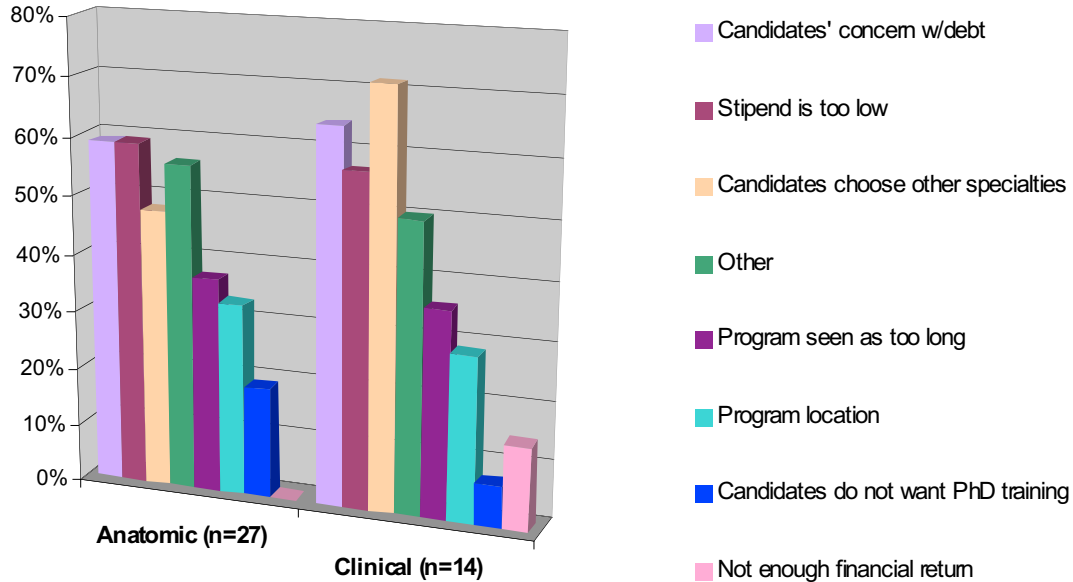


From responses to the clinical pathology portion of the questionnaire, it appears that recruiting this type of candidate is somewhat less difficult: 63.6% of these respondents described recruitment efforts as very or somewhat difficult, 18.2% said it is not too difficult, and 18.2% suggested it is not difficult at all.

Barriers to recruiting qualified trainee candidates. Respondents who reported that recruitment of qualified candidates is very or somewhat difficult were asked to identify the barriers to recruitment efforts. Exhibit 17 (see following page) summarizes their responses. As that figure shows, there are some differences in the difficulties faced

when recruiting anatomic vs. clinical pathologists; the following bullet points describe the results for each specialty.

Exhibit 17. Barriers to Recruiting Qualified Training Candidates by Specialty



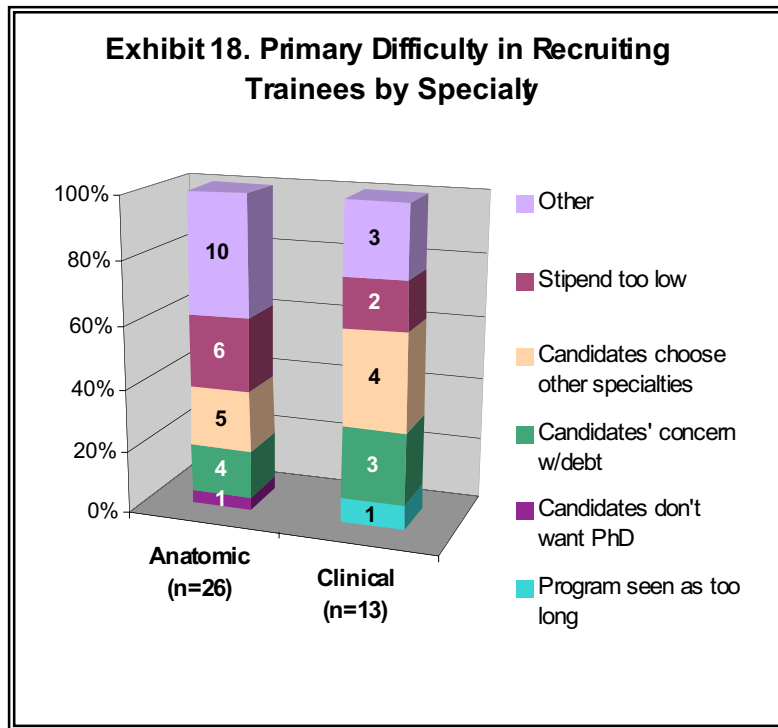
Anatomic Pathology

1. Respondents to the anatomic pathology portion of the instrument chose candidates' concern with **debt burden** and **low stipends** equally (57.1% each).
2. Almost 56% selected "other" reasons, including the lack of qualified applicants and insufficient promotion of pathology as a worthwhile career option (also see Appendix E, Q8b and Q22b).
3. Just over 48% reported that candidates choose other specialties, such as laboratory animal medicine, internal medicine, and small animal surgery (also see Appendix E, Q8b@7 and Q22b@7).
4. Approximately 37% suggested that candidates see their programs as too long.
5. One-third indicated that the geographic location of the program serves as a barrier.
6. About 18% believe that candidates do not want Ph.D. training with a residency.

Clinical Pathology

1. Over 71% of clinical pathology program respondents indicated that candidates choosing other specialties is a barrier to recruitment efforts. Specialties named include anatomic pathology, internal medicine, and emergency medicine (also see Appendix E, Q8b@7 and Q22b@7).
2. Candidates' concern with debt burden also was cited as a reason by a majority (64.3%) of clinical respondents.
3. A slightly smaller percentage (57.1%) suggested that stipends are too low.
4. Exactly half of respondents chose "other" reasons, such as too few candidates, limited college funding, and too few faculty to provide adequate program support (also see Appendix E, Q8b and Q22b).
5. Slightly more than 35% indicated that candidates see their programs as too long.
6. The program's geographic location was named as a barrier by 28.6% of respondents.
7. About 14% said there is not enough financial return for employment as a pathologist.
8. About 7% believe that candidates do not want Ph.D. training with a residency.

Primary difficulty in recruiting qualified training candidates. As Figure 18 shows, respondents to the anatomic pathology portion of the questionnaire were most likely to report that “other”



factors serve as the primary recruitment barrier: almost 40% chose this option. These “other” reasons include **lack of training funds, lack of anatomic pathology faculty, and students’ inadequate exposure to pathology career options** (see also Appendix E, Q8c and Q22c). Slightly more than 23% suggested that stipends are too low, and about 19% reported that candidates choose other specialties besides anatomic pathology. About 15% named candidates’ concern with debt burden as the primary recruitment barrier, while one anatomic pathology respondent (3.8%) indicated that candidates not wanting a Ph.D. with a residency is the primary barrier.

Respondents to the clinical pathology section of the trainer questionnaire were most likely to

choose candidates’ selection of other specialties as the primary difficulty in recruiting qualified candidates—four of the thirteen respondents (30.8%) singled out this factor. An equal number (3, or 23.1%) chose candidates’ concern with debt burden and “other” reasons, which included too few candidates, too few funded positions, and the combination of candidates seeing the program as too long and not wanting Ph.D. training with a residency. Two clinical pathology respondents (15.4%) indicated that low stipends are their programs’ primary barrier to recruitment, while one (7.7%) identified candidates not wanting Ph.D. training with a residency as the key culprit of recruitment difficulties.

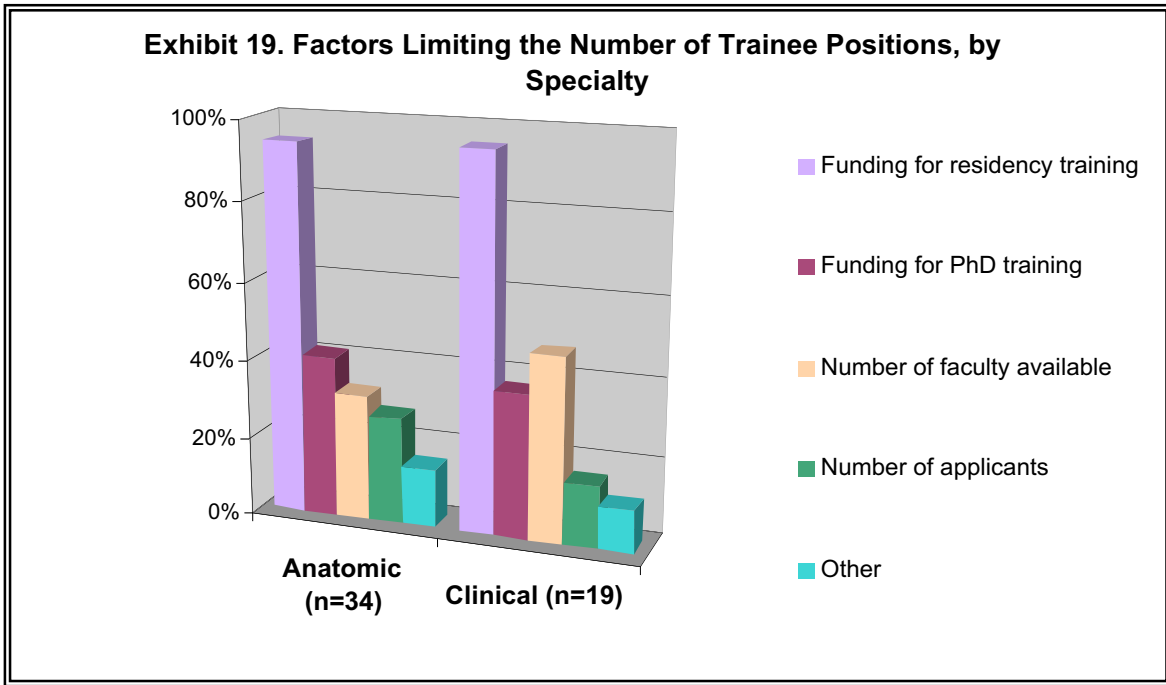
Limitations on the number of veterinary pathology training positions

When asked if there are limitations on the number of pathology training positions available currently at their institutions, 34 of 38 (89.5%) anatomic pathology program respondents and 21 of 22 (95.5%) clinical pathology program respondents reported that there are. Subsequent questions asked them to identify the reasons for those limitations.

Factors limiting the number of positions. As shown in Figure 19, almost all (94.1%) anatomic pathology program respondents indicated that **funding for residency limits the number of anatomic trainee positions**, while 41% named **funding for Ph.D. training** as a factor. Slightly less than a third (32.4%) cited **number of available faculty as a limitation**, and 26.5% suggested that **the number of applicants is an issue**. Finally, 14.7% of anatomic pathology respondents wrote in “other” limitations, which included limited case loads (four respondents), Department of Defense mandates, and lack of funding for non-Canadians.

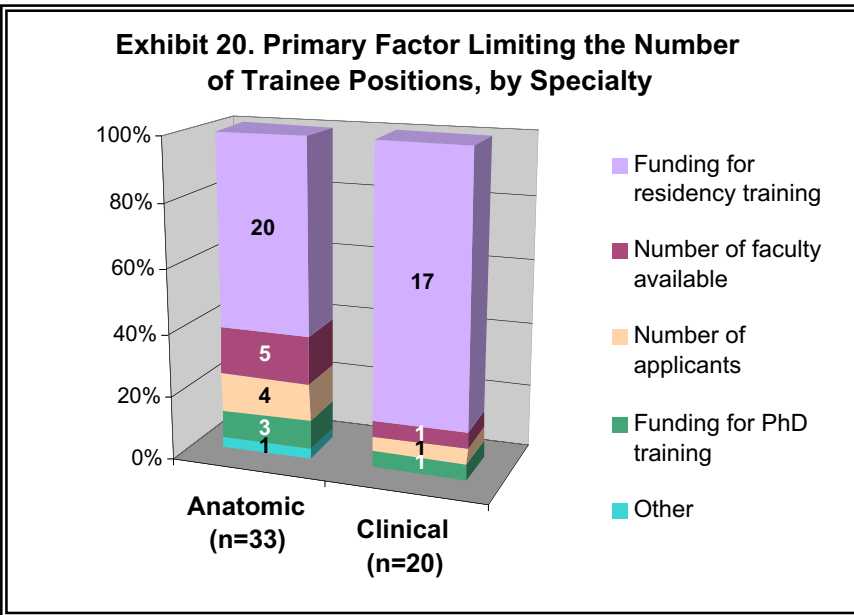
Similarly, almost all (94.7%) clinical pathology program respondents named funding for residency training as limiting the number of positions. However, these respondents were more likely to indicate that the number of available faculty is an issue: 47.4% did so. Funding for Ph.D. training is a limiting factor for about 37%, and for 15.8%, the number of applicants limits the number of training positions. Two clinical pathology respondents named “other” factors:

- space limitations, lack of funding for non-Canadians
- Previous [department] chair more concerned about anatomic pathologists. Current department chair may be more supportive.



Primary factor limiting the number of positions. According to almost 61% of anatomic and 85% of clinical pathology program respondents, **funding for residency training is the primary factor**

that limits the number of training positions (see Exhibit 20). Other respondents to the anatomic pathology section of the questionnaire selected number of faculty available (15.2%), number of applicants (12.1%), funding for Ph.D. training (9.1%), and “other” reasons (3.0%). As for clinical pathology respondents, the number of available faculty, number of applicants, and funding for Ph.D. training each were identified by one respondent as the key limiting factor.



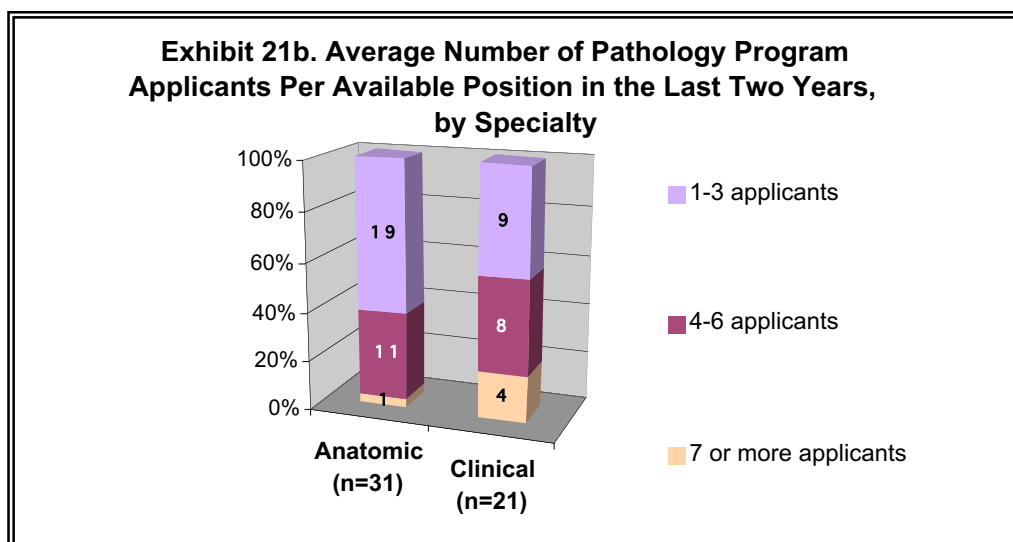
Number of qualified veterinary pathology program applicants in the recent past

One question asked respondents to estimate the average number of qualified candidates they had for each available pathology training position in the last two years. Exhibits 21a and 21b provide two different ways to view responses to this item.

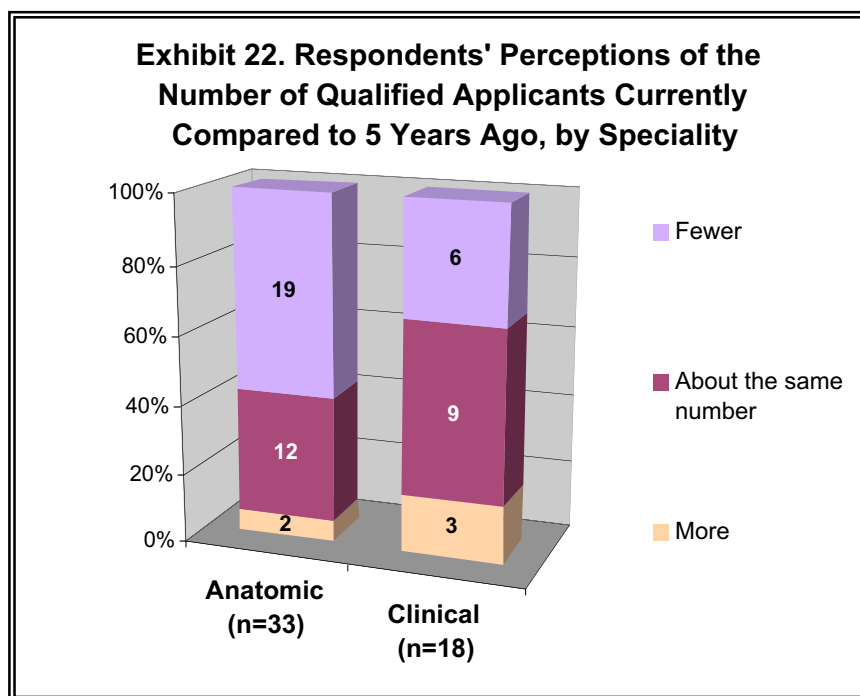
As Exhibit 21a shows, anatomic pathology training programs reported 3.3 applicants per position, while clinical pathology training programs reported 5.1 applicants per position. Nineteen anatomic pathology programs (61.3%) reported having 1 to 3 applicants in the last two years, while eleven (35.5%) had 4 to 6 applicants and one (3.2%) had 7 or more applicants (see Exhibit 21b). Among clinical pathology programs, similar numbers reported having 1 to 3 and 4 to 6 applicants during the last two years (9 or 42.9% and 8 or 38.1%, respectively); four programs (19.0%) indicated having 7 or more applicants per available position in the last two years.

Exhibit 21a. Average Number of Pathology Program Applicants Per Available Position in the Last Two Years, by Specialty

Anatomic Pathology			Clinical Pathology		
<i>n</i>	Average # of applicants	Range	<i>n</i>	Average # of applicants	Range
31	3.3	1–10	21	5.1	1–15



Number of applicants currently compared to five years ago. Respondents also were asked to indicate if the number of qualified veterinary pathology program applicants has increased, decreased, or stayed the same in comparison to five years ago. About 58% of anatomic program respondents reported there are fewer today, while 36.4% suggested there are about the same number. The remaining 6% said there are a greater number of qualified candidates currently. Clinical pathology respondents, on the other hand, were less likely to report there are fewer candidates now (33.3%) and more likely to judge that there are the same number of (50%) or more (16.7%) qualified candidates today than five years ago. These results are summarized in Exhibit 22 on the following page.



Veterinary pathology program completions in the last five years

Roughly equal proportions of anatomic and clinical pathology training program respondents reported that one or more trainees had completed their programs in the last five years (88.2% and 86.4%, respectively). Exhibit 23 provides summary statistics on the number of trainees graduating in the last five years.

Exhibit 23. Number of Pathology Program Graduates in the Last Five Years, by Speciality

Anatomic Pathology				Clinical Pathology			
<i>n</i>	% with any graduates	Average # of graduates*	Total # of graduates	<i>n</i>	% with any graduates	Average # of graduates**	Total # of graduates
30	88.2	6.2	185	19	86.4	2.9	55

*Among those with any graduates. Ranged from 1–17.

**Among those with any graduates. Ranged from 1–6.

Placement of trainees following program completion. Respondents were asked to identify the employment or other placement of those who had graduated in the previous five years. As Exhibit 24⁵ on the next page shows, **both anatomic pathology graduates and clinical pathology graduates were most likely to accept positions in the academic arena** (28.2% of anatomic pathology graduates and 38.7% of clinical pathology graduates). Beyond this, however, there are few similarities between the two specialties in job placement. The following bullet points describe the primary post-graduation placements of veterinary pathology trainees.

Anatomic

- Approximately 28% of anatomic pathologists took jobs in academia after graduating.

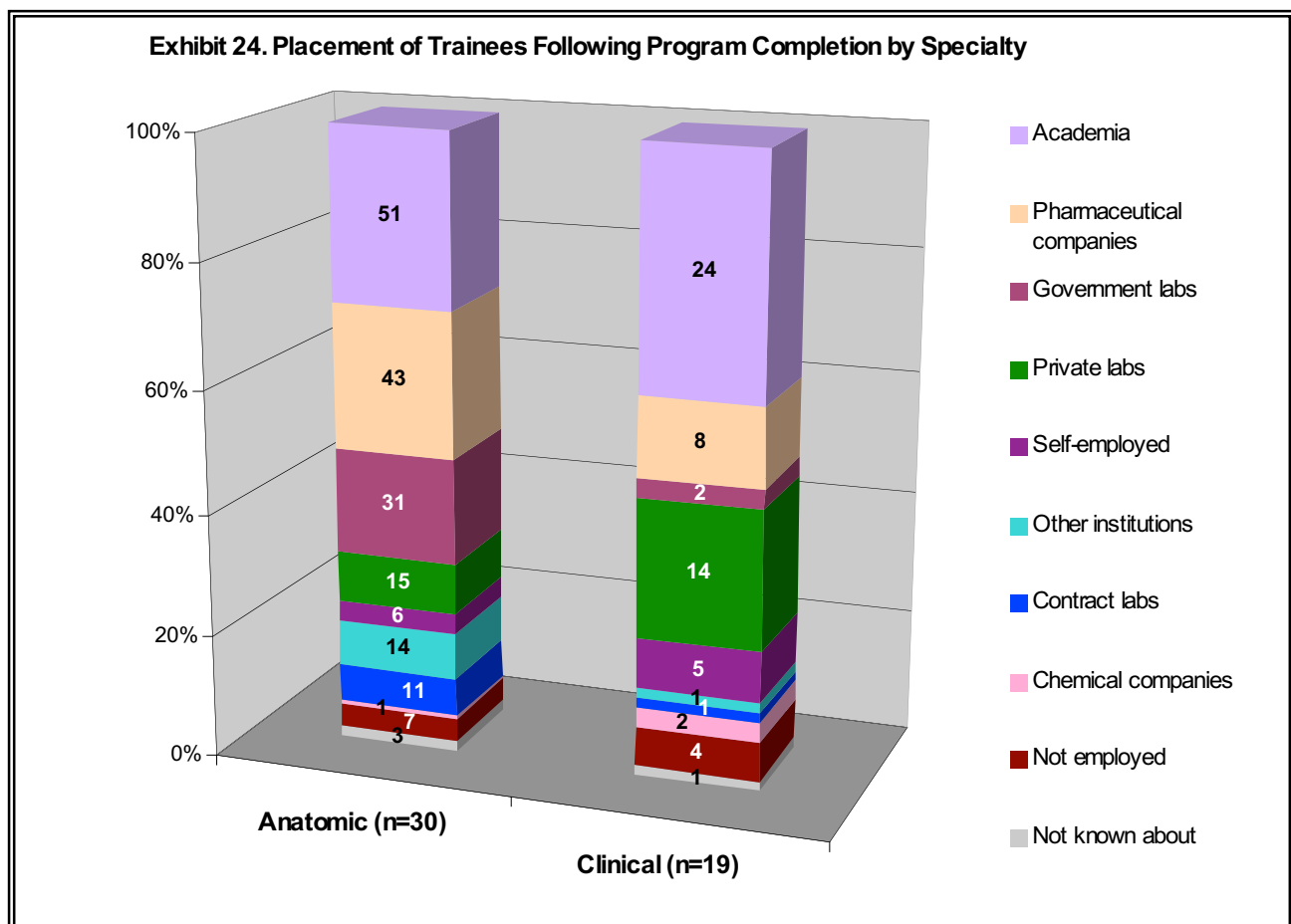
- Pharmaceutical companies hired a slightly smaller percentage (24.0%).
- Government labs hired 17% of the graduates.

⁵ The total number of graduates for Exhibit 23 and Exhibit 24 *should* be equal but are not. The discrepancy is due to differences in the number of graduates respondents reported for the two items on which these figures are based.

- Just over 8% accepted positions with private laboratories.
- Slightly less than 8% found employment with other types of institutions.

Clinical

- Approximately 39% of the clinical pathology graduates went into academia
- Following academia, clinical pathology graduates were most likely to take jobs with private laboratories: 22.6% did so.
- Almost 13% found employment with pharmaceutical companies.
- About 8% of clinical pathology graduates were reported to be self-employed.



Anticipated veterinary pathology program graduates and recent/anticipated program position openings

Exhibit 25 provides a summary of the number of anticipated program graduates for 2002 through 2007 and beyond. It also presents information on open program positions from 2001 through 2004. Note that the columns titled “Total # of graduates” and “Total # of positions” are sums of the numbers provided by respondents for each year and each specialty; these numbers are meant to be instructive only. Naturally, they fluctuate quite a bit as the number of respondents decreases and should be viewed as indicators only. Readers should also keep in mind that these numbers are very low compared to the actual number of graduates/positions, considering that not all training programs surveyed returned questionnaires.

Exhibit 25. Anticipated Number of Pathology Program Graduates and Number of Open Training Positions, by Specialty

Graduates in...	Anatomic Pathology				Clinical Pathology			
	<i>n</i>	% with any graduates	Average # of graduates*	Total # of graduates	<i>n</i>	% with any graduates	Average # of graduates**	Total # of graduates
2002	34	58.8	1.5	30	21	28.6	1.2	7
2003	34	67.6	2.2	51	22	59.1	1.2	15
2004	33	78.8	1.7	44	21	52.4	1.1	12
2005	32	62.5	1.6	31	21	47.6	1.0	10
2006	29	37.9	2.4	26	15	33.3	1.0	5
2007 or later	27	25.9	2.1	15	15	33.3	1.4	7

Open positions in...	Anatomic Pathology				Clinical Pathology			
	<i>n</i>	% with any open positions	Average # of positions [†]	Total # of positions	<i>n</i>	% with any open positions	Average # of positions ^{††}	Total # of positions
2001	33	84.8	2.1	59	21	61.9	1.1	14
2002	34	76.5	2.1	55	22	59.1	1.2	15
2003	32	78.1	2.3	57	20	50.0	1.4	14
2004	30	86.7	2.2	56	19	57.9	1.2	13

*Among those reporting any graduates. Ranged from 1–3 for 2002, from 1–4 for 2003 and 2004, and from 1–6 for 2005, 2006, and 2007 or later.

**Among those reporting any graduates. Ranged from 1–2 for 2002, 2003, 2004, and 2007 or later. All anticipated 1 in 2005 and 2006.

[†]Among those reporting any openings. Ranged from 1–7 for all years.

^{††}Among those reporting any openings. Ranged from 1–2 for 2001, 2002, and 2004; all anticipated only 1 in 2003.

Respondents’ suggestions on what ACVP could do to help them find more qualified training candidates

The training program questionnaire invited suggestions as to what ACVP could do to assist programs in locating more qualified training candidates. Many respondents commented on ACVP’s potential role in **raising awareness of career opportunities in veterinary pathology**. The following is a summary of these suggestions:

1. **Raise awareness of career opportunities in veterinary pathology.**
 - a. Educate/reach out to students—especially early in veterinary school curriculum, but also pre-vets and perhaps even at high school level
 - b. Educate/reach out to newly graduated veterinarians and to clinicians who may be ready to explore new employment opportunities
 - c. Several methods suggested for raising awareness
 - (1) Presentations at AVMA and SCAVMA meetings
 - (2) Formation of student pathology clubs
 - (3) Publish articles about / advertise pathology in targeted journals

- (4) Sponsor site visits by ACVP diplomates to veterinary schools
 - (5) Publicize Web site with links to schools/institutions offering externships and training programs
2. **Create centralized system for matching prospective trainees with programs.**
 - a. Centralized application pool would facilitate distribution of applications from qualified candidates
 - b. Recruitment efforts would be coordinated
 3. **Increase funding for pathology training programs.**
 - a. ACVP could provide funding in several ways
 - (1) Stipends for pathology residents
 - (2) Consider funding for international students
 - (3) Fund summer experiences for veterinary students at competitive financial levels
 - (4) Provide travel money to ACVP meetings or training courses
 - b. ACVP could take a more active role in lobbying for increased funding from other sources
 - (1) Lobby academic institutions to increase salaries for faculty members and financial support to pathology trainees
 - (2) Partner with industry to provide more funding
 4. **Recognize that the difficulty and perceived low pass rate of the ACVP Board Certification Examination may be a barrier to recruitment of some candidates.**
 - a. Provide candidates with more academic guidance and preparation information regarding the examination
 - b. Encourage training programs to offer better exam preparation through training guidelines for descriptive pathology, sample questions, etc.
 - c. Improve first-time pass rate on ACVP examination; a more welcoming, supportive college might have increased appeal

All commentary provided for this item can be found in Appendix E.

Additional commentary provided by respondents

A final questionnaire item allowed respondents to provide commentary on whatever topic they chose. Some viewed this as an opportunity to discuss areas of difficulty further:

- Recruitment of clinical pathology faculty seems more problematic than recruitment of trainees. Opportunities with corporations have apparently decreased the attractiveness of academia. Corporations often offer higher salaries for a shorter week. Most do not contribute monetarily to training programs; they just siphon off the trainees at the end.
- Our training programs must educate our students in latest cutting edge techniques in addition to classical pathology. I'm afraid that we have almost let molecular biology, molecular pathology, and molecular diagnostics slip away to the non-DVM sector.

Others provided their perceptions of applicant goals and desires:

- I have found that most applicants look for a straight residency program. When applying to a program, they may express an interest in graduate work but later decide it is outside their interest for a variety of reasons (often time commitment vs. financial reward). The upsurge of commercial labs has increased interest in residency only programs over combined.
- Some applicants like the idea of teaching and diagnostic work but do not think academia is a viable option because of research expectations (not their preference).

A couple of respondents offered suggestions on ways to attract qualified candidates:

- Exchange programs can be viable options to expand training programs and attract candidates. We specialize in mouse basic research/pathology. Exchange programs with vet schools gave our trainees opportunities to learn domestic animal pathology and their residents mouse path.

- I think that it would be very helpful if industry partnered with academia to support and train residents. This has been done on a very limited basis in the past. I feel that I could double the number of residents in our program if Angell/Tufts could partner with industry pathologists in the Boston area (such as Millennium Pharmaceuticals, Wyeth-Ayerst/Genetics Institute, etc. What are the prospects for governmental support of more positions? (Such as training grants other than NIH research supported positions).

For a complete listing of respondent commentary, refer to Appendix E, Q31.

■ PROJECTED SUPPLY AND DEMAND OF VETERINARY PATHOLOGISTS ■

Estimated total supply of veterinary pathologists in 2002–2007. Calculating the total supply of veterinary pathologists involved using the information provided by training program respondents to estimate the number of veterinary pathologists that will be “supplied” in the coming years by nonresponding programs. This calculation was made somewhat easier by the fact that the population of training programs is a finite and accessible one (meaning that we can state with some confidence that we know *about* how many programs exist and the type[s] of veterinary pathologists they produce) with relatively clear and stable boundaries (meaning that there is not a large variation in the number or focus of programs from year to year). The estimates presented in **Exhibit 26** are based upon the following assumptions:

- At the time this survey was conducted, there were approximately 51 anatomic and 24 clinical pathology training programs in the U.S. and Canada.
- Programs that did not return questionnaires are similar to programs that did:
 - A similar proportion will have one or more graduates in each year of interest.
 - Those that will have graduates will have a similar *number* of graduates in each year of interest.
- Programs that returned questionnaires but left the items dealing with number of graduates blank are similar to those that provided this information:
 - A similar proportion will have one or more graduates in each year of interest.
 - Those that will have graduates will have a similar *number* of graduates in each year of interest.⁶

For example, 17 institutions that train anatomic pathologists did not return questionnaires, and two that did return questionnaires did not provide graduate information for 2005, resulting in 19 non-respondents for this item.

- If we assume that an equal proportion of those 19 will have one or more graduates in 2005 as will the 32 respondents, then 62.5% (or almost 12) of them will have graduates.
- If we assume they will have a similar number of graduates (an average of 1.6), then they will have about 19 graduates.
- Adding this total to the **known supply** of 31 graduates in 2005 results in an **estimated total supply** for 2005 of 50 anatomic pathologists.

Exhibit 26. Estimated Total Supply of Veterinary Pathologists, by Specialty and Year[†]

ANATOMIC PATHOLOGISTS					
Year	A. Known supply (# of graduates)	B. Average # of graduates	C. # nonrespondents * % respondents w/any graduates	D. Estimated additional supply (B * C) [‡]	E. Estimated total supply (A + D)
2002	30	1.5	10.00	15	45
2003	51	2.2	11.49	25	76
2004	44	1.7	14.18	24	68
2005	31	1.6	11.88	19	50

⁶ The risk in making this assumption is the possibility that all the programs that returned questionnaires but did not provide answers to these items may have **zero** graduates during the years about which they were asked (rather than leaving these items blank because they were unsure of the number, for example). The consequence of making this assumption in error would be that the estimated supply would be **lower** than what is presented in Exhibit 26.

2006	26	2.4	8.34	20	46
2007	15	2.1	6.22	13	28

**CLINICAL
PATHOLOGISTS**

Year	A. Known supply (# of graduates)	B. Average # of graduates	C. # nonrespondents * % respondents w/any graduates	D. Estimated additional supply (B * C) [‡]	E. Estimated total supply (A + D)
2002	7	1.2	.86	1	8
2003	15	1.2	1.18	1	16
2004	12	1.1	1.57	2	14
2005	10	1.0	1.43	1	11
2006	5	1.0	3.00	3	8
2007	7	1.4	3.00	4	11

[†]The numbers upon which these estimates are based can be found in Exhibit 25.

[‡]Rounded to the nearest whole number.

Estimated total demand for veterinary pathologists in 2002–2007. Calculating the total demand for veterinary pathologists involved using the information provided by responding employers to estimate the number of veterinary pathologists that will be “demanded” in the coming years by nonresponding employers. This calculation was more difficult, since there is likely to be much more variation from year to year in the identities of companies who employ veterinary pathologists (e.g., companies go out of business or merge with other companies), in companies’ labor needs (e.g., companies restructure or changes in the market lead to changes in labor needs), and in the number of anatomic vs. clinical pathologists companies might employ. The estimates presented in **Exhibit 27** are based upon the assumption that the 109 employers who did not return questionnaires are similar to the employers that did return questionnaires:

- A similar proportion will employ or plan to employ anatomic pathologists, and a similar proportion will employ or plan to employ clinical pathologists.
- A similar proportion of those that employ or plan to employ anatomic pathologist will have one or more open positions in the years of interest. Similarly, a similar proportion of those that employ or plan to employ clinical pathologists will have one or more open positions in the years of interest.
- Those that employ or plan to employ anatomic pathologists will have a similar number of open anatomic pathology positions in the years of interest. Similarly, those that employ or plan to employ clinical pathologists will have a similar number of open clinical pathology positions in the years of interest.

For example, we know that 36.7% of respondents employ clinical pathologists.⁷ Therefore, we assume that 36.7% of the 109 nonrespondents employ clinical pathologists (40 respondents).

- For 2002–2003, 42.6% of respondents reported having open positions, so we assume that 42.6% of nonrespondents would have open positions (about 17).

⁷ Based on the number of respondents who provided information on the anatomic pathology portion (164 of the total 169 that returned the survey) of the questionnaire and the number who provided information on the clinical pathology portion (62 of the total 169 that returned survey).

- If we assume they will have a similar number of open positions (an average of 1.0), then they will have about 17 open positions.
- Adding this to the **known demand** of 20 open positions results in an **estimated total demand** of 37 clinical pathologists for 2002–2003.

Exhibit 27. Estimated Total Demand for Veterinary Pathologists, by Specialty and Year[†]

ANATOMIC PATHOLOGISTS					
Anatomic pathologist employer nonrespondents =		total # nonrespondents (109) * % respondents that completed anatomic pathology portion of employer questionnaire (97.0%) = 106 nonrespondents			
Year	A. Known demand (# of open positions)	B. Average # of open positions	C. # nonrespondents * respondents w/any open positions	D. Estimated additional demand (B * C) [‡]	E. Estimated total demand (A + D)
2002–2003	120	1.5	56.18	84	204
2004–2007	227	1.9	85.33	162	389
CLINICAL PATHOLOGISTS					
Clinical pathologist employer nonrespondents =		total # nonrespondents (109) * % respondents that completed clinical pathology portion of employer questionnaire (36.7%) = 40 nonrespondents			
Year	A. Known demand (# of open positions)	B. Average # of open positions	C. # nonrespondents * respondents w/any open positions	D. Estimated additional demand (B * C) [‡]	E. Estimated total demand (A + D)
2002–2003	20	1.0	17.04	17	37
2004–2007	50	1.2	30.96	37	87

[†]The numbers upon which these estimates are based can be found in Exhibit 3.

[‡]Rounded to the nearest whole number.

Known, estimated, and average deficit of veterinary pathologists. Survey results and results from the calculations described above allow us to ascertain, by comparing supply and demand figures, if there is or will be a deficit of veterinary pathologists and, if so, the potential size of that deficit. As Exhibit 28 shows, it appears that the number of new veterinary pathologists being produced will be insufficient to fill the number of expected open positions. For anatomic pathology

- The **known deficit** ranges from 9 to 42 (9 in 2003, 42 in 2007).
- The **estimated total deficit** ranges from 29 to 69 (29 in 2004, 69 in 2007)
- The estimated **average deficit** ranges from 17 to 55 anatomic pathologists.

The data also suggest that there will be fewer new clinical pathologists than there are open clinical pathology positions:

- The **known deficit** for clinical pathology ranges from –5 (indicating a surplus in 2003) to 8 (2006).
- The **estimated total deficit** ranges from 2 (2003) to 14 (2006).
- The estimated **average deficit** ranges from –1 (indicating a surplus in 2003) to 11 (2006).

**Exhibit 28. Known, Estimated, and Average Deficit of Veterinary Pathologists,
by Specialty and Year[†]**

ANATOMIC PATHOLOGISTS								
Year	A. Known supply	B. Known demand	C. Known deficit (B – A)	D. Estimated total supply	E. Estimated total demand	F. Estimated total deficit (E – D)	G. Range of deficit (C & F)	H. Average deficit ((C+F)/2)
2002	30	60	30	45	102	57	30–57	43
2003	51	60	9	76	102	26	9–26	17
2004	44	57	13	68	97	29	13-29	21
2005	31	57	26	50	97	47	26–47	36
2006	26	57	31	46	97	51	31–51	41
2007	15	57	42	28	97	69	42–69	55
CLINICAL PATHOLOGISTS								
Year	A. Known supply	B. Known demand	C. Known deficit (B – A)	D. Estimated total supply	E. Estimated total demand	F. Estimated total deficit (E – D)	G. Range of deficit (C & F)	H. Average deficit ((C+F)/2)
2002	7	10	3	8	18	10	3–10	6
2003	15	10	-5	16	18	2	(-5)–2	-1
2004	12	13	1	14	22	8	1–8	4
2005	10	13	3	11	22	11	3–11	7
2006	5	13	8	8	22	14	8–14	11
2007	7	13	6	11	22	11	6–11	8

[†]The questionnaire items dealing with demand (number of open positions) asked about ranges of years (2002–2003, 2004–2007, and 2008–2011), while those dealing with supply (number of graduates) asked about specific years (2002, 2003,...2007). To calculate demand **per year**, the total for the range of years was divided by the number of years and rounded to the nearest whole number. For example, there was an estimated demand of 227 anatomic pathologists for 2004–2007. $227/4 = 56.75$ or 57 per year. This procedure was used to calculate the estimated total demand per year as well.