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Regular Article

The phenotype of pathology residency program directors

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A B S T R A C T

Pathology residency programs vary greatly across the United States. To the authors' knowledge, little is formally known about the "phenotype" or career pathways of pathology residency program directors (PDs). PDs, former PDs (FPDs), and associate PDs (APDs) were surveyed, aiming to address whether or not dominant phenotypes or pathways to graduate medical education leadership exist. Several trends emerged including: 76% Whites, 70% females, 15% MD/PhDs, and more junior faculty (33% being <5 years in practice, another 24% being in practice <10 years, and 41% assistant professors at time of first PD/APD appointment). Anatomic and clinical pathology-certified individuals represented 79%. Sixty-two percent of respondents were on a nontenure employment track, with only 18% indicating tenure track. For subspecialty focus, cytopathology (25%), transfusion medicine (16%), and hematopathology (14%) represented the most common subspecialties practiced. A majority (65%) had served as a chief resident during residency, and most (61%) of PDs had served as APDs first. Most (60%) had not served as fellowship director. Most (65%) had not participated in any education leadership training, with 27% having participated in certificate programs or other educational professional development. Thematic analysis of perceived key criterion in selection for the role was passion for education, demeanor, emotional intelligence, and willingness to serve the department. This information may influence training or experience pursued by individuals aspiring to pathology graduate medical education leadership, inform chairs on qualities to look for, and supplement future educational sessions of the Association of Pathology Chairs Program Directors Council.

Keywords: Diversity, Pathology residency, Program directors, Leadership development, Graduate medical education, Career pathways

Introduction

The Accreditation Council for Graduate Medical Education (ACGME) outlines specific qualifications for pathology residency program directors (PDs) including: at least 3 years of specialty expertise and educational and administrative experience. The PD must maintain current medical licensure, appropriate medical staff appointment, and current certification in the specialty by the American Board of Medical Specialties, as well as have qualifications acceptable to the institutional Graduate Medical Education Committee with final approval granted by the Review Committee.[1] Programs with 16 or more residents should have an associate PD (APD) to assist the PD with administration and management.[1] While these qualifications and criteria are quite clear, there are little published data about the individuals serving in the roles of pathology PD or APD, including gender, diversity, and pathways to academic leadership. There is some literature to this effect in other specialties such as cardiothoracic surgery, gastroenterology, and plastic surgery, including data on gender disparities, and diversity or lack thereof in academic leadership. A number of articles in other medical specialties highlight a lower proportion of women, not only at the chair and division chief level but also the residency or fellowship PD level. A study on cardiothoracic surgery fellowship directors or integrated residency/fellowship directors found that only 10.4% of PDs were female.[2] Other specialties with recent publications on this subject found that the percentage of female PDs included 14.3% in cardiology, 13% in plastic surgery, and 17.8–24% in gastroenterology (studies conducted in different years).[2–9] Encouragingly, more female pathology chairs had served as PDs than their male counterparts (44% vs 22%), which suggests pathology program directorship might be a career pathway toward ascending leadership roles such as department chair.[10] This study queries the background, credentials, and career goals of PDs and APDs with the intention to highlight possible pathways to pathology graduate medical education leadership and to provide a look at the diversity already represented in these roles. Another goal was to look at possible differences in responses between male and female PDs. The authors conducted a survey of current and past PDs, as well as APDs of Association of Pathology Chairs (APC) member departments querying their educational, subspecialty, and leadership history, as well as their impressions as to whether service in educational leadership helped or hindered their career advancement. We also asked for words of wisdom on experiences and skills that were instrumental in their journeys, and if there were any surprises in assuming the role. A better understanding of pathways toward becoming a PD or associate director may inspire others to pursue opportunities that increase their likelihood of success, as well as potentially inform pathology chairs on qualities they should be looking for in the leaders of their residency programs. This information may also supplement future educational

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sessions of the Association of Pathology Chairs Program Directors (PRODS) Council. We are not aware of any other formal publication on this topic.

Materials and methods

A 28-question survey was designed to capture information regarding the academic credentials, leadership background, and subspecialty focus of pathology PDs and associate PDs and was administered through the Association of Pathology Chairs. Permission to undertake this survey was granted by the Program Directors (PRODS) Council of the APC. This survey project underwent expedited review from the Penn State University institutional review board, and was deemed exempt (Supplemental Material S1).

Contact information for PDs and APDs was identified from the APC Program Directors (PRODS) member listings, which includes PDs, APDs, and a few former PDs. Nonacademic pathology residency program leadership was not included. Fellowship directors were excluded as well. In addition, osteopathic schools were not included as these institutions typically do not have graduate medical education programs and are often not directly affiliated with a hospital or healthcare system providing diagnostic pathology services. The survey was developed and administered via REDCap. A cover letter containing a link to the survey was sent via email to all PDs (PRODS) members using contact information from the APC membership directory. A 4-week response time was suggested. A reminder was sent at 2 weeks and at 4 weeks to encourage responses from individuals who had not yet participated.

Data collected were stored without identifiers. At the time the survey was administered, APC had 151 PD (PRODS) members, of which 139 represented US programs, 11 from Canada, and 1 from Singapore. There were 180 APD members of the APC PRODS group, 177 represented US programs, 3 from Canada, and in total there were 6 Emeritus status PRODS members.

The survey was constructed such that respondents could skip any question, and free text commentary was not mandatory. Thus, the number of respondents to a given question was the denominator used to determine percentages.

Results

For all data presented, percentages were rounded to the nearest whole number.

Demographics

At the time of the survey, there were 144 pathology residency programs per the ACGME.[11] If calculated based upon ACGME data, assuming one PD per program, 44% (N = 64 of 144) current PDs responded. Nineteen percent (N = 27 of 144) of APDs responded, although some programs may have more than one APD, and this rate may actually be lower. Due to anonymity of the survey, it is not possible to link PDs or APDs to any particular program or to identify if both PD and APD(s) from the same program responded. Five former PDs (FPD) responded to the survey.

Geographic

Geographic regions were defined as by the United States Census Bureau and were further consolidated during data analysis for greater confidentiality of results as shown in Table 1.

Survey respondents included 30% (N = 29 of 96) from the Northeast, 19% (N = 18 of 96) from the Midwest, 34% (N = 33 of 96) from the South, 15% (N = 14 of 96) from the West, and 2% (N = 2 of 96) from Abroad. There were no statistically significant trends across any of the other parameters studied pertaining to geographical region.

Table 1
Geographic regions represented by respondents.

Northeast	New England	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut
	Mid-Atlantic	New York, Pennsylvania, New Jersey
Midwest	East North Central	Wisconsin, Michigan, Illinois, Indiana, Ohio
	West North Central	Missouri, North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa
South	South Atlantic	Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida
	East South Central	Kentucky, Tennessee, Mississippi, Alabama
	West South Central	Oklahoma, Texas, Arkansas, Louisiana
West	Mountain	Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico
	Pacific	Alaska, Washington, Oregon, California, Hawaii

Institution type

Sixty-nine (72%, N = 69 of 96) departments had a Liaison Committee on Medical Education (LCME)-accredited medical school (regular members), and 27 (28%, N = 27 of 96) departments were affiliated with a medical school (affiliate members). All medical schools represented were allopathic medical schools. Osteopathic medical schools were not included as noted previously. There were no significant trends when comparing responses from regular members versus affiliate members across all subsequent categories of responses.

Program director status

Current and former PDs and current APDs were included in the study. Fellowship directors were not included. Of respondents, 67% were current PDs (N = 64 of 96), 28% APDs (N = 27 of 96), and 5% (N = 5 of 96) were former PDs.

Gender

When asked about gender, respondents were given the choices male, female, transgender, or prefer not to answer. Seventy percent (N = 66 of 94) of respondents indicated that they are female, and 30% (N = 28 of 94) are male. No respondents chose transgender or omitted their response. Of PDs, 66% (N = 42 of 64) were female, and 34% (N = 22 of 64) were male; for APDs, 81% (N = 22 of 27) were female and 19% (N = 5 of 27) were male; and former PDs consisted of 40% females (N = 2 of 5), and 60% males (N = 3 of 5). Leadership status by gender is shown in Fig. 1.

Ethnicity

In total, 95 respondents answered the question regarding ethnicity. Queried about ethnicity, survey respondents were given the select all that apply options of American Indian or Alaska Native (0%, N = 0 of 95), Asian (12%, N = 11 of 95), South Asian (4%, N = 4 of 95), Black or African American (3%, N = 3 of 95), Hispanic or Latinx (7%, N = 7 of 95), Native Hawaiian or Other Pacific Islander (0%, N = 0 of 95), White (76%, N = 72 of 95), prefer not to answer (0%, N = 0 of 95), and Other (0%, N = 0 of 95). Given that respondents could select all that apply, 102 total responses were recorded, indicating that some respondents chose more than one selection (mixed race).

Credentials

Queried about credentials, respondents could select all that apply and were given the options of Medical Doctor (MD), Doctor of Osteopathy (DO), Doctor of Philosophy (PhD), Bachelor of Medicine Bachelor of

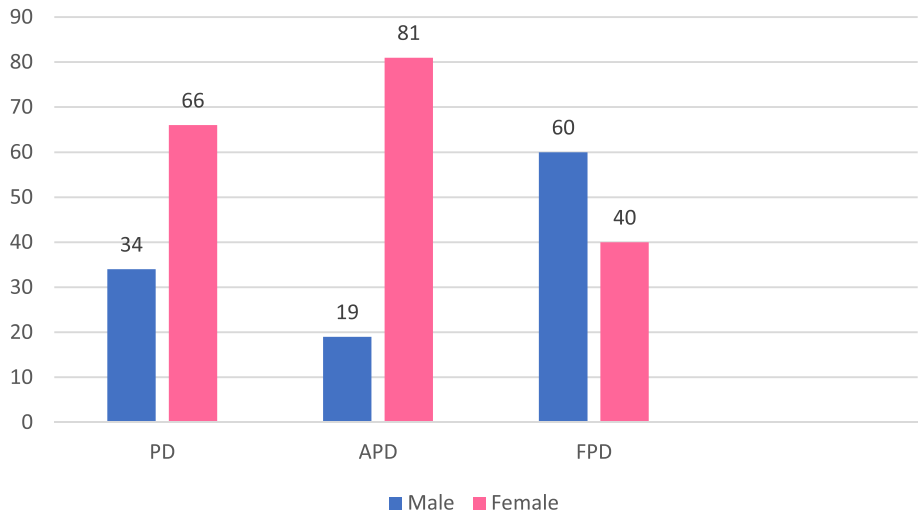


Fig. 1. Leadership status by gender, percentages. PD = program director, APD = associate program director, FPD = former program director.

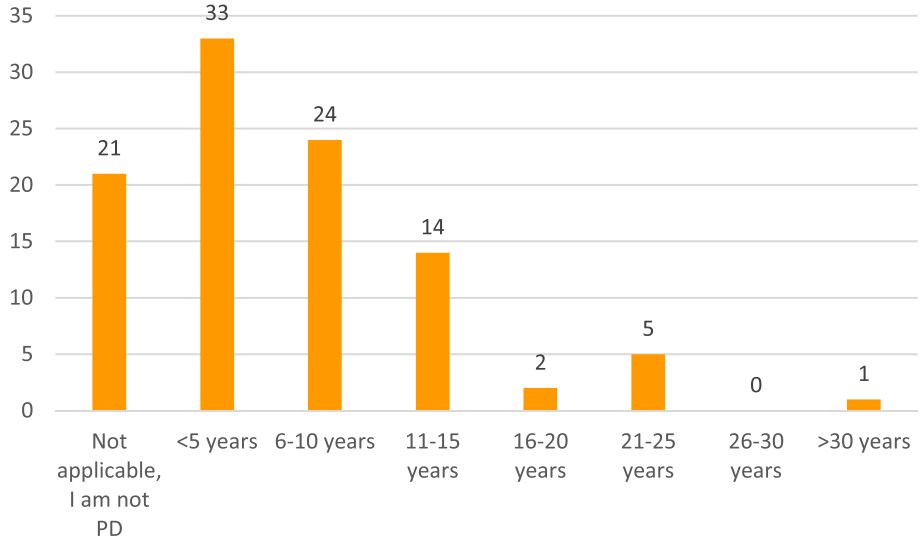


Fig. 2. Years in practice when first appointed as PD, percentages.

Surgery (MBBS), Master of Business Administration (MBA), Doctor of Jurisprudence (JD) or Other, with a request to specify in a free text field. Of 96 responses, 93% were MDs (N = 89 of 96), 15% were MD/PhDs (N = 14 of 96), 2% were MBBS (N = 2 of 96), 6% were DOs (N = 6 of 96), and 1% (N = 1 of 96) held an MBA. Given ACGME requirements that a PD must be a physician certified in anatomic pathology (AP) and clinical pathology (CP), or AP-only or CP-only, no PDs held a PhD without a medical degree. No respondents had a JD. Eight percent selected "other" with other being defined in free text responses as: master's degrees and DMJ(Path) FRCPath.

Experience

Respondents were queried as to their years in practice at the time they were appointed PD, as shown in Fig. 2. The vast majority of PDs had been in practice <10 years at the time of appointment, with the most common demographic being <5 years of practice, as noted in Fig. 2. A greater percentage of women were in practice >6 years when first appointed than their male counterparts, as shown in Fig. 3. All other age demographics did not differ dramatically. Most PDs were assistant professors at the time of their first appointment as a PD, as shown in Fig. 4. Notably, a higher percentage of women were associate professors, and a higher percentage of men were Professors. Clinical academic ranks likely reflect affiliate members. Not applicable likely refers to PDs at community-based programs where academic ranks are not used. No specific comments were provided from the three respondents who selected "other." The breakdown by gender and clinical academic rank is shown in Fig. 5. Percentages were rounded to the nearest whole number and reflect the percentage of men or women, respectively, comprising a given academic rank.

Career track

In total, 114 responses were received in response to career track. This number is greater than the total number of survey takers as respondents could select more than one option. Options included nontenure track, tenure track, clinical educator, physician scientist, N/A, and other, please specify. Responses are shown in Fig. 6.

Primary pathology training and subspecialty focus

Ninety-six respondents provided their primary pathology certification/training. Fig. 7 shows the distribution by primary pathology training with the majority having AP/CP certification. Respondents were queried

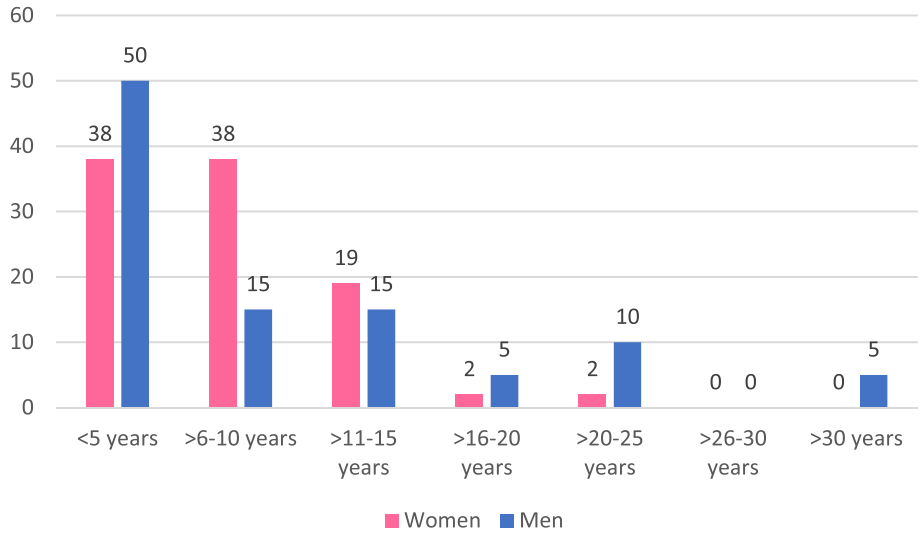


Fig. 3. Years in practice when first appointed as PD by gender, percentages.

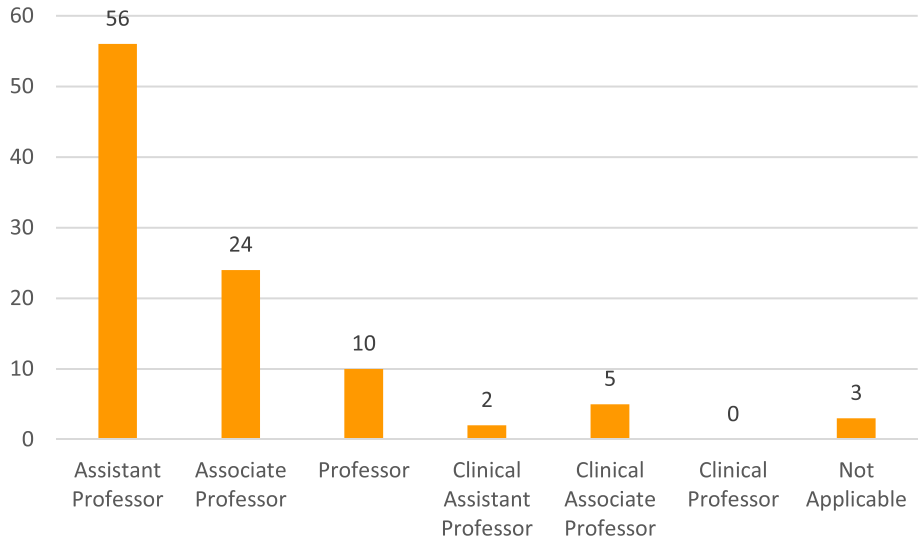


Fig. 4. Academic rank at time of first PD appointment, percentages.

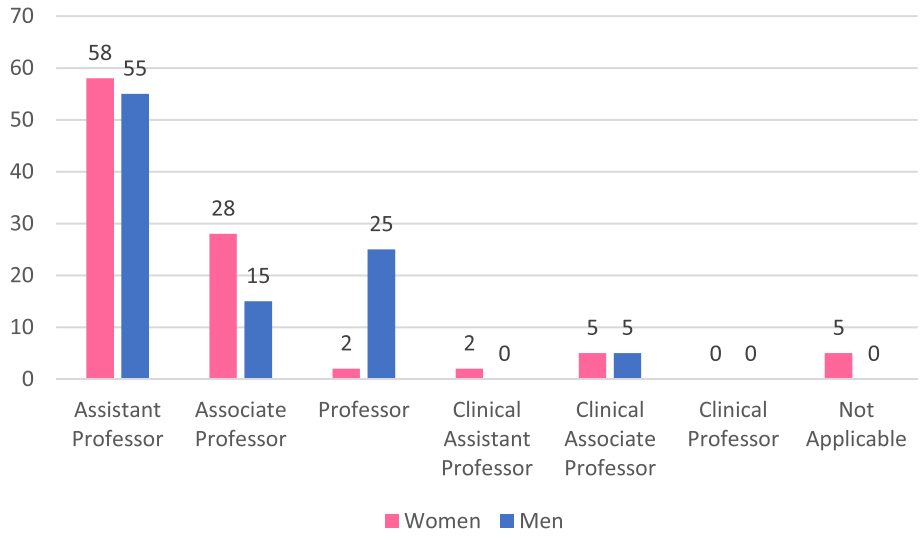


Fig. 5. Academic rank of PDs by gender, percentages.

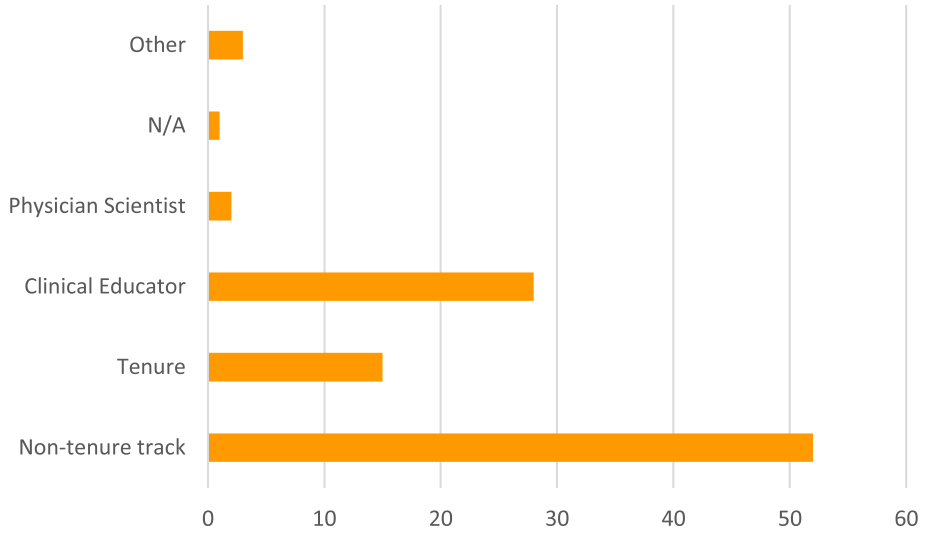


Fig. 6. Career track, percentages.

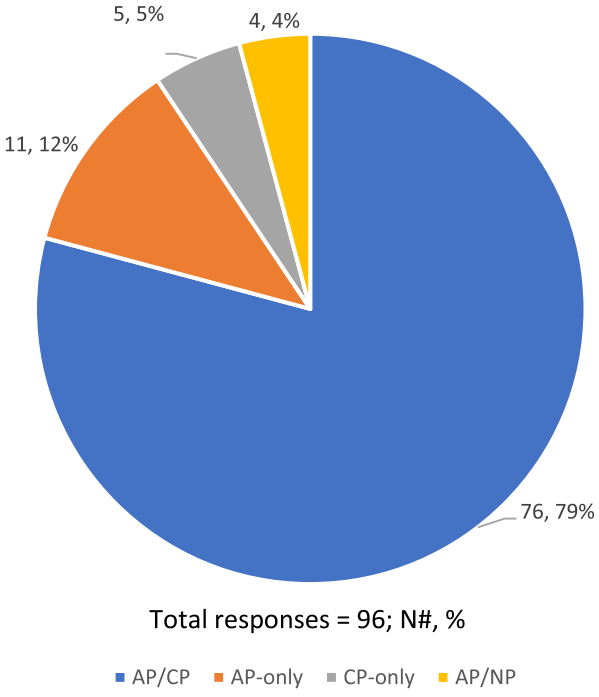


Fig. 7. Primary pathology certification.

about additional subspecialty certifications held, primarily pertaining to certification conferred by the American Board of Pathology. Additionally, they were asked about their primary clinical practice focus. In many cases, these categories overlapped; however, there are a number of common anatomic pathology organ-specific subspecialties for which there is no separate board certification. These findings are presented in Table 2.

Other educational leadership roles, succession planning, career aspirations, and personal traits

Sixty-five percent of respondents (N = 62 of 96) had served as a chief resident. Seventy-two responses were provided as to whether one had served as APD before becoming PD. Sixty-one percent had served as APD before becoming PD. Of those who served as APD, respondents were

Table 2
Subspecialty certification and primary clinical practice focus.

Specialty/ Sub-Specialty	Respondents (N = 96) Boarded in Specialty/ Sub-Specialty	Percentage	Respondents (N = 96) Primary Practice Focus	Percentage
Non-ABPath Certification or No additional subspecialty certification	21	23%	N/A	N/A
Cytopathology	24	26%	20	21%
Blood Banking/ Transfusion Medicine	15	16%	16	17%
Hematopathology	13	14%	13	14%
Neuropathology	7	8%	9	9%
Molecular/Genetic Pathology	7	8%	7	7%
Medical Microbiology	1	1%	3	3%
Dermatopathology	3	3%	3	3%
Pediatric Pathology	3	3%	3	3%
Forensic Pathology	2	2%	2	2%
Chemical Pathology (Clinical Chemistry)	1	1%	1	1%
Clinical Informatics	0	0%	0	0%
Histocompatibility (ASHI)	0	0%	0	0%
Bone and Soft Tissue	N/A	N/A	7	7%
Breast Pathology	N/A	N/A	8	8%
Cytogenetics	N/A	N/A	0	0%
Gastrointestinal Pathology	N/A	N/A	10	10%
General Anatomic Pathology	N/A	N/A	14	15%
General Clinical Pathology	N/A	N/A	7	7%
General Anatomic and Clinical Pathology	N/A	N/A	2	2%
Gynecologic Pathology	N/A	N/A	12	13%
Genitourinary Pathology	N/A	N/A	5	5%
Other	N/A	N/A	23	24%
Genetics	N/A	N/A	0	0%

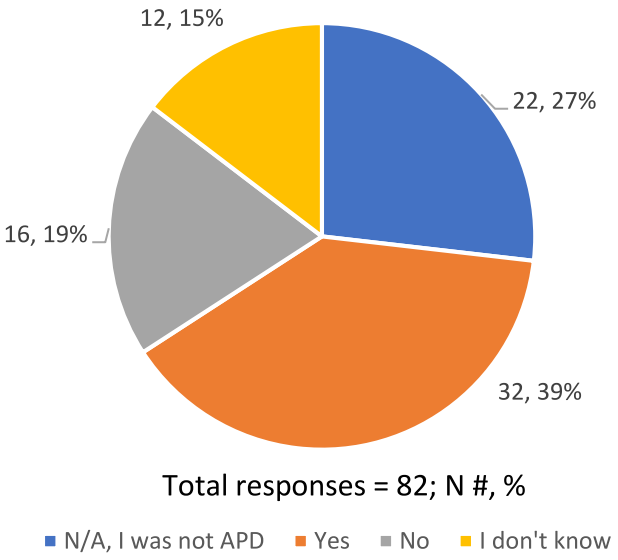


Fig. 8. Was serving APD as part of a succession plan to become PD.

Table 3
Past fellowship subspecialty director or concurrent residency/fellowship subspecialty director.

Type of fellowship	Number of responses (Total N = 34)	Percentage
Blood Banking/Transfusion Medicine	7	21%
Bone and Soft Tissue Pathology	0	0%
Breast Pathology	3	9%
Chemical Pathology	1	3%
Clinical Informatics	0	0%
Cytogenetics	0	0%
Cytopathology	9	27%
Dermatopathology	1	3%
Forensic Pathology	2	6%
Gastrointestinal Pathology	1	3%
General Surgical Pathology	3	9%
Genetics	0	0%
Gynecologic Pathology	0	0%
Genitourinary Pathology	0	0%
Hematopathology	3	9%
Histocompatibility	0	0%
Informatics	0	0%
Medical Microbiology	0	0%
Molecular Genetic Pathology	2	6%
Neuropathology	2	6%
Pediatric Pathology	0	0%
Other	0	0%

asked how long they had served in the APD role, if they aspired to become PD, and if their service was part of a succession plan. Years of service as APD before becoming PD ranged from 3 months up to 11 years. When queried "did you aspire to become PD?" 85 individuals responded with 57% having aspired to become PD. Eighty-two respondents indicated whether or not serving as an APD was part of a succession plan. Just over a third had been appointed as part of a succession plan. Results are shown in Fig. 8.

Ninety-five individuals responded regarding service as a fellowship director, previously or concurrent with residency program directorship. This does not include those who were only fellowship PDs who were excluded from this study. Of these responses, 12% (N = 11 of 95) had served as a fellowship director previously, 25% (N = 24 of 95) currently serve in both capacities, and 63% (N = 60 of 96) had not served as a fellowship director at any time. Thirty-four responded with the subspecialty program they oversaw, with cytopathology and transfusion medicine being the most common subspecialties. Findings are shown in Table 3.

Table 4
Years of service as PD.

Years of service as PD	Number of responses (Total N = 95)	Percentage
<5 years	57	60%
6–10 years	20	21%
11–15 years	6	6%
16–20 years	9	9%
>20 years	3	3%

Table 5
Compensation for service as PD/APD.

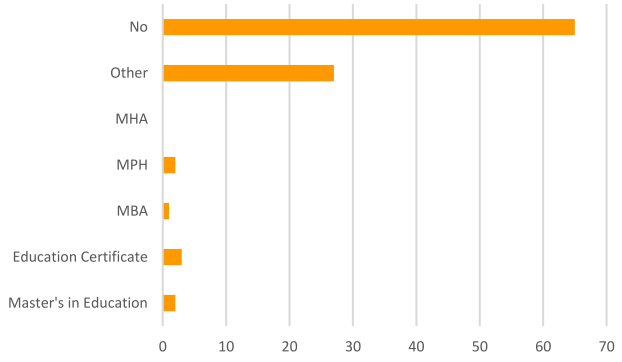
Type of compensation	Number of respondents (Total N = 96)	Percentage
Effort allocation offset	49	51%
Stipend	18	19%
Not compensated	14	15%
Other	15	16%

Of the 95 respondents who provided the number of years of service, most have been in service as a PD or APD for <5 years. Additional data on years of service are shown in Table 4. Of note, based on available data through the ACGME from 2001 through 2021, the average turnover rate for pathology PDs each year is 14% (low of 8% to high of 23% in the years reviewed).[12]

Respondents were queried about how their effort as PD or APD was compensated whether it be via effort allocation, stipend, or other. A little over half responded that they were compensated by effort allocation. Responses are shown in Table 5. Of those who indicated "other," specific responses included both an effort allocation and stipend, base pay raise, endowed professorship with education and travel fund to be used to support our residency and fellowship program.

Ninety-four individuals responded regarding formal education/leadership training. Results are shown in Fig. 9. Of individuals who responded "other," most cited institutional or military sponsored training. Others identified American Association of Medical Colleges program workshops and the GME Leadership Certificate, mini-MBA program for health care, Laboratory Medical Director course from the College of American Pathologists, APC Pathology Leadership Academy, Executive Leadership in Academic Medicine, and the APC Diversity and Inclusion Leadership program. Women were more likely to have participated in formal education or leadership training than their male counterparts as shown in Fig. 10.

Of the 96 respondents, 68% (N = 65 of 96) individuals indicated that academic promotion was important to them, whereas 12% (N = 11 of 96)



MHA = Master's in Health Administration

MPH = Master's in Public Health

MBA = Master's in Business Administration

Fig. 9. Formal education/leadership training.

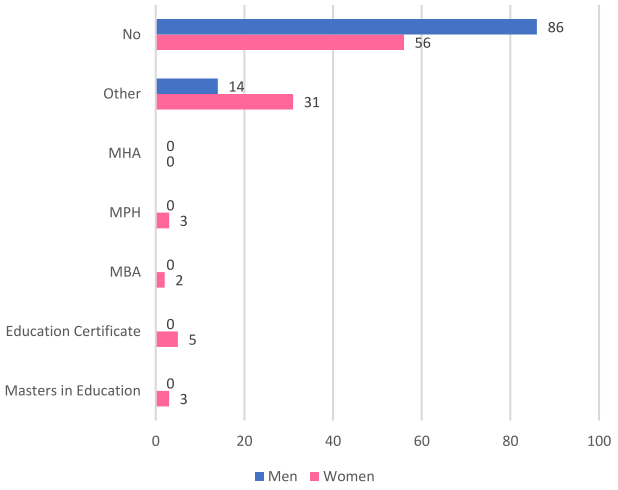


Fig. 10. Formal education/leadership training by gender, percentages.

Table 6
Impressions of impact of being a PD on academic promotion.

Impact of being PD on Promotion	Number of responses (Total N = 96)	Percentage
Helped	45	47%
Hindered	14	15%
Neutral	37	39%

said no, and another 21% (N = 20) were neutral. Slightly more men felt academic promotion was important, and slightly more women were neutral toward promotion, as shown in Fig. 11. Differences in perception of how service as PD impacted academic promotion were noted by gender as shown in Fig. 12. Impressions of the impact of being a PD on academic promotion are shown in Table 6. Of note, these impressions varied by gender as shown in Fig. 12. Specific responses clarifying a "helped" or "hindered" response are outlined in Table 7. Thematic analysis of free text responses regarding reasons one was selected as PD are outlined in Table 8.

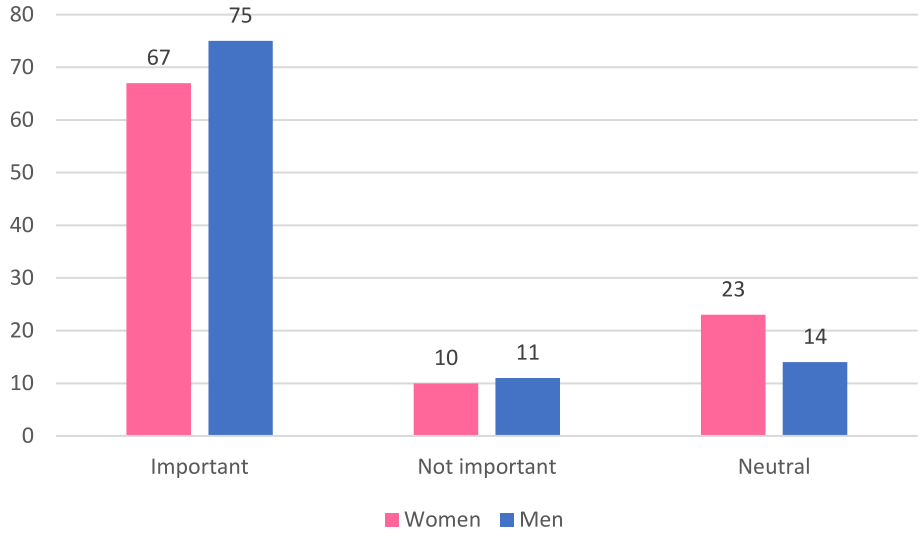


Fig. 11. Importance of academic promotion by gender, percentages.

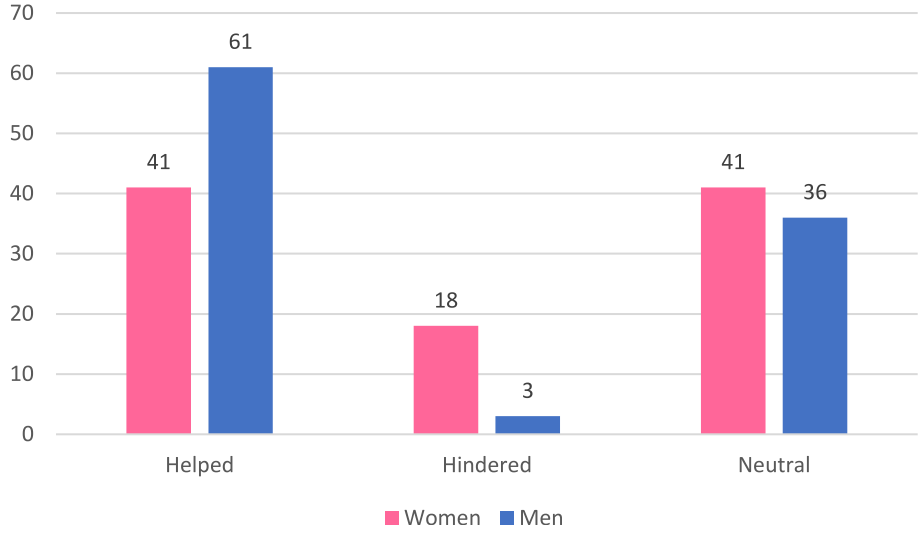


Fig. 12. Impressions of impact of being PD on academic promotion by gender, percentages.

Table 7
Comments regarding impact of PD service on academic promotion.

	Specific comments
Helped	Although I have lost time to dedicate to research, it has brought me leadership experience in other ways. It has expanded my role and helped me find a new focus towards promotion. I'm not sure this would be true at every institution, but it was helpful at mine. Education is valued, both at the UME and GME level. I do think national GME work was essential in the process. I was able to do a lot of educational scholarship and curricular development as an associate PD, and later as PD. This became a strong focus of my CV and was helpful in meeting the criteria for promotion. My work as a PD has been shared on a national platform. I think my role as program director was appreciated by faculty and considered as a positive trait in my overall performance as a faculty. Evidence of leadership for portfolio. Networking opportunities around the country. Gives me ideas for educational research/scholarly productivity. Residents turn to me for abstract and manuscript help and editing and it has resulted in more abstracts and publications on my CV. That being said, I have no desire to rise to the level of clinical professor. I am satisfied where I am.
Hindered	A lot of time devoted to the program director that is not reflected or viewed as part of promotion There is little time for anything else. No bandwidth. But also, I'm not really inclined to seek promotion. Between learning how to be PD, and then with COVID causing disruptions (including switching to virtual recruitment) just as I was getting a hang of the new role, there has been limited time to focus on academic projects. Education and service commitments don't help as much in obtaining tenure. Our promotion is still quite publication focused and I feel my education responsibilities limit my time to participate in that.

Table 8
Perceived reasons for selection as PD.

Theme	Specific Comments
Enthusiasm/passion for teaching	Passion for education and effectiveness in other roles Formal Training in medical education, interest in curriculum/program development for GME
Willingness to fulfill a need	Willingness to take on the role when there was a need
Process of elimination	No one else wanted to. Lack of other pathologists willing to take on the role. Junior and vulnerable, upcoming ACGME inspection
Personality	Availability, willingness, and naivete Good rapport with residents Calm demeanor Even temperament Willingness to challenge status quo

Career planning and advice

Respondents were queried as to whether they faced surprises upon becoming a PD. The most common response was that PDs were surprised at the number of human resources issues they had to deal with, followed closely by the amount of administrative work they had to do. Responses are shown in Fig. 13. Respondents were given the opportunity to provide free text comments to give advice on career planning and how best to prepare to become a PD or APD. Thematic analysis of these comments is shown in Table 9.

Discussion

This survey aimed to identify demographics, training background, subspecialty focus, experience/rank, and attitudes toward service as a PD. Not surprisingly, and in keeping with other well-documented demographics of academic pathology leadership, 76% of PDs were White. Interestingly, compared to some other specialties such as surgical fields and gastroenterology, where PDs are predominantly male,[2–9] pathology PDs were 70% female.

Educational background

As compared to academic pathology chairs,[10] only a minority of PDs were MD/PhDs, at 15%, which likely suggests a clinical/education focus rather than a research focus. The majority of PDs and APDs were more junior in years in practice and by academic rank with a total of 57% being in practice <10 years, with 33% being in practice <5 years. This is not particularly surprising given that individuals more recently having completed training may have more of a vested interest in education, and a fresher memory of what educational structures and habits that they found to be effective or ineffective. Given that this was a survey of AP/CP residencies, it is not surprising that most PDs were AP/CP trained. ACGME Pathology Program Requirements state that if a single track trained individual is the PD, an APD should carry complementary credentials to ensure adequate oversights of all aspects of training.[1]

Career focus

The subspecialty focus of respondents roughly approximates the general trends in fellowship choices as published in the past several years of the American Society for Clinical Pathology Fellowship and Job Market Survey as surveyed during various residency and fellowship in-service examinations.[13] There did not appear to be any subspecialty disproportionately represented among PDs. Anecdotally, there are some subspecialties such as transfusion medicine/blood banking that may be advantageous as a PD, as dealing with multiple regulatory agencies involved in blood safety may make one especially attuned to accreditation requirements for residency programs.

Given the heavy administrative workload of being a PD/APD, it is not surprising that only a small fraction of respondents (18%) were on a tenure track. In general, tenure track tends to be more heavily research focused and publication dependent. The majority of PDs/APDs indicated that they are on a nontenure or clinical educator track.

Not surprisingly, the majority of those serving in educational leadership had served as chief residents. This may be a reflection of leadership traits identified in residents leading to their selection as chief residents, as well as an inherent interest in leadership that continues into practice as a faculty member/staff pathologist. This information may be helpful in counseling residents regarding serving as a chief resident. Additionally, information from a recent survey of chairs demonstrates that 44% of female and 22% of male academic pathology chairs had served as a residency PD, suggesting that service as a PD may be part of a trajectory toward ascending levels of leadership.[10] The majority had not served as a fellowship director, which is likely a function of being selected <5 years into their careers, and the prohibition of allowing one individual to serve concurrently as both residency and fellowship PD at many institutions.

Gender-specific trends

A greater percentage (38%) of female respondents were in practice >6–10 years (when first appointed PD than their male counterparts, 15%), whereas 38% of women were appointed PD at <5 years of practice, compared to 50% of men. It would seem that women needed to have established their credentials longer to be considered for educational leadership. This trend also appears to be true of consideration of women for an academic pathology chair position. Female chairs tend to have been in practice longer at their first chair appointment than their male counterparts.[10]

Academic rank reflects a similar trend with similar proportions of assistant professors between women and men, at 58% and 55%, respectively, whereas 28% of female PDs were associate professors as compared to only 15% of their male counterparts. This study did not

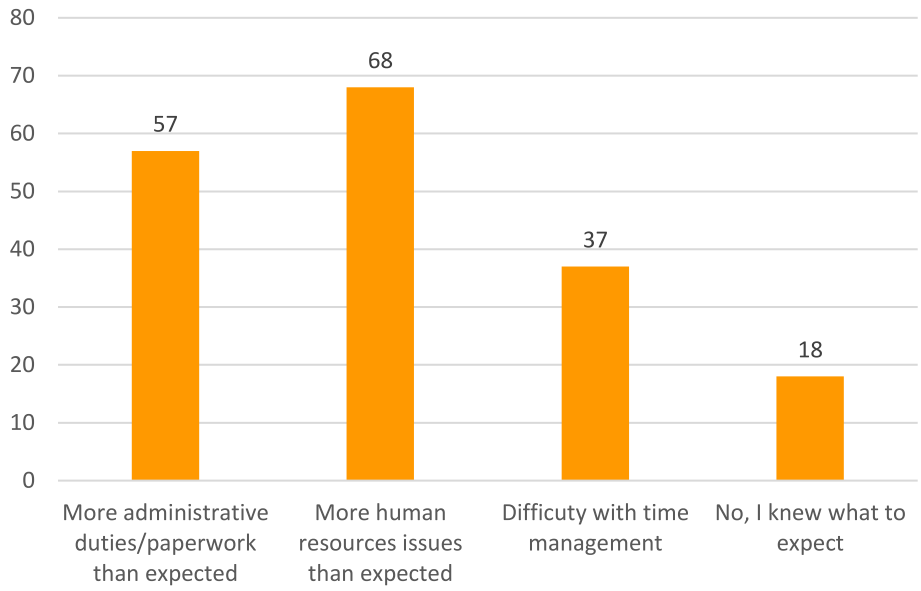


Fig. 13. Surprises faced as PD, percentages.

Table 9
Words of wisdom.

Theme	Excerpted comments
Essential traits	Humility, honesty, administrative, as well as communication skills are essential for success as a PD/APD.
	I don't believe that many individuals plan to become a PD or associate PD when they enter pathology, …but I would say that it is an enriching experience that one should seriously consider if offered the role, though I realize not everyone is cut out for the position.
	Learn to compartmentalize work/life, clearly define your role and other people's roles
	Job requires a lot of patience, grace, compassion, and good communication skills. Sometimes job feels like parenting adult children, Hard work is not always appreciated at the time.
Helpful experiences	Chief Residency is an excellent prelude to graduate medical education as a program director. Involvement in organized medicine early in training, including positions in PRODS offered to residents.
	Get a graduate certificate/degree to help with HR issues like an MBA. Serve on Program Evaluation Committee (PEC) and Clinical Competency Committee (CCC) within department Get familiar with applicable ACGME standards Serve as a mentor to residents to help understand their problems
Critical department/ institutional resources	Hire a good, technologically savvy program administrator/coordinator.
	Spend at least 3 years as associate PD. have a good mentor (who is PD). Need supportive chair and excellent Program Coordinator to be successful.
	Have a direct line of communication with Chair. Have direct line of communication with DIO.
	Get involved with any general medical education programs within your institution such as Teaching Academies or other learning communities; this helps to network and establish core understanding of teaching/learning frameworks.
	Have a low threshold for reaching out to other programs and PDs even within your own institution for solutions.
Helpful resources	Reach out to your peers and other (APC/PRODS, ACGME, etc) for help and support!
	Get involved with PRODS early and often.
	Formal Training in education and leadership as and attendance at APC meetings are extremely helpful!
	Ask for help when you need it! Other program directors are a wonderful resource.
Time management	As a recent graduate, I do not have much advice other than only those with a true passion for education and mentorship should take on these roles as they require time and effort outside of normal working hours.
	Be prepared and willing to work nights and weekends, but remember, you're helping build the future of our profession and the health care system
	Expect time demands cut into opportunities for scholarly activity. Gauge your institution's valuation of educational activities as a substitute when it comes to promotion.
	Learning the rhythm of the year is hard the first time through (because each event is new), but it gets easier every year. It allows me more time to work on academic pursuits as I'm accustomed to the "running" of the program. The biggest time suck, and it can be unexpected, is when a trainee is having trouble progressing.
	Need to have sufficient protected time or specialty that allows flexibility both in the day and in the overall schedule. Make sure your institution values the residency program and your role in it. Have support from a good Program Coordinator and Chairperson
	I anticipated rough time commitment regarding HR issues, administrative/record-keeping, but did not anticipate the amount of time devoted to residency-related departmental meetings and GME meetings. If it's something you care about, I don't see issues with just diving right in as an APD. If it is not something one has an interest for, do not do it for promotion track reasons.
Words of wisdom	Don't tell people what to do. Don't try to make everybody happy. Challenge the successful, support the struggling. Groom successor(s) Know when to bow out.
	It is important to document everything. You need concrete examples when counseling residents about academic or personal struggles. Encourage your faculty to not be afraid to truthfully complete the residents' evaluations as we cannot take action (e.g. remediation) if we have no proof other than hearsay about trainee struggles/ issues.
	Whatever you think the job is, it's that x100. It is constantly putting out little (or big) fires. You will be involved in HR-like activities, operational activities, financial status of department, etc.
	Check out all the resources available on the ACGME website. Learn about effective feedback and remediation strategies, and how to have difficult conversations- there are a lot of good books out there on these things. Remember this is a job you are doing for the good of the program as a whole, not yourself. Being PD is a service, and if you like being of service it can be very rewarding, but it is unlikely to lead to significant career advancement given the way different contributions are valued differently in the current academic model.
	Even with APDs- it is still a full-time job. I wasn't prepared for the mental and emotional exhaustion of carrying the load for a relatively large residency program. Often times there are things that cannot be shared and it weighs on you. Words of wisdom: get to know your DIO and don't be afraid to utilize them for the really tough things
	Make sure that you have a great team around you and that your department leadership is committed to supporting you and your team. Identify others in your department, especially junior faculty, who are interested in graduate medical education, and help them build their education portfolio with leadership opportunities that will help improve the program. This builds collaboration and mutual benefit.

delve into the potential impact of maternity leave on one's career trajectory. Interestingly, a higher percentage of male PDs were professors (25%) at the time of their first appointment, compared to only 2% of female PDs. While the reasons for this difference by gender are unclear, appointment of a professor-level PD may reflect a faculty member who is nearing retirement and paring back on clinical responsibilities or aiming to take on different leadership roles. Of note, in other specialties, namely surgical specialties, PDs are often in practice longer, and often at the associate professor rank or higher, as compared with the more junior faculty who serve as PDs in pathology.[2–9] Additionally, other articles have explored the potential for different criteria or qualifications required of women versus men in achieving academic leadership. Of note, however, cardiology and orthopedics appear to have women in leadership with fewer publications and lower academic rank compared to men, largely because they assumed a position of leadership earlier in their careers than men and had less time for other academic pursuits.[8,9] This is in contrast to a recent study of academic pathology chairs, where women appeared to have needed more years of experience, and greater academic credentials to be considered.[10] Additionally, in plastic surgery, female chairs had significantly more publications (128) versus their male counterparts (averaging 72 publications). This disparity did not seem to hold true at the PD level, however, and overall qualifications were roughly equivalent.[4]

Other studies have demonstrated that women were less likely to achieve higher academic rank and senior leadership positions, even after adjusting for publication productivity.[14] While years of service and academic rank in pathology program leadership are somewhat in keeping with this general trend, this survey did not explore other qualifications, and further generalizations cannot be made.

While most respondents indicated that academic promotion was important to them, a small difference was seen in that a slightly higher percentage of males (75%) considered promotion as important compared to 67% of females. Some studies of internal medicine physicians have suggested that those who spend more than 50% of their effort on clinical service on a clinical educator track were less likely to advance in academic promotion.[15] Other studies have shown that female internal medicine physicians may spend more time in clinical activities and less on scholarly works and did not have promotion and tenure criteria reviewed with them. They also tended to value leadership, scholarship, and national recognition less than their male counterparts as indicators of their career success. Women also reported less time for career development.[16] It is unclear whether this holds true in pathology, particularly for those on a clinical educator track, and this might be an interesting area for further study. Of note, however, 44% of female academic pathology chairs had served as a residency PD, as compared to 22% of male chairs, suggesting that pathways to leadership may differ by gender.[10] Given the predominance of female pathology PDs in this survey, program directorship may represent a more attainable leadership pathway for women in pathology.

Additionally, there were differences in the perception of how serving in program leadership impacted academic promotion with 61% of men indicating that it helped them, compared to 41% of women, and 18% of women perceiving that it hindered promotion, compared to 3% of men. Review of the comments indicated that the administrative burden of the role decreased time devoted to other academic pursuits and publishing. It would have been interesting to query whether there is a difference in how much PDs delegate or depend upon their program coordinators by gender. It is possible that female PDs take on more of the administrative work, whereas their male counterparts might be more comfortable delegating such tasks. This study did not explore differences in the handling of program related administrative tasks by gender. However, a body of literature in the business world suggests that women are less likely to delegate tasks, and this may hamper their advancement in other aspects of their careers.[17–20]

Preparation for role/participation in formal education/ leadership training

Most (65%) had not participated in any education leadership training, with 27% having participated in certificate programs or other educational professional development. Interestingly, female PDs/APDs (44%) were more likely to have participated in formal training than their male counterparts (only 14%). The reasons for this are unclear. It may reflect that women may have more purposefully chosen a career track focused on education. There are articles in the literature suggesting that women are more likely to pursue a career in academic medicine based upon an interest in teaching.[21]

Words of wisdom

Not surprisingly, thematic analysis of perceived key criterion in selection for the role was passion for education, demeanor, emotional intelligence, and willingness to serve the department. Most respondents were somewhat surprised by the volume of administrative duties, documentation, and human resources issues that the role entails. Even with serving as an APD, there is often little preparation for the true burden of documentation and personnel issues that a PD handles on a regular basis, depending on how much the PD involves the APD. It may also vary based upon how many tasks are handled by the program coordinator compared to the PD, which may skew impressions of the time needed to devote to the role, and different approaches to leadership.

Limitations of this study

The response rate of the survey was fair with 44% of current PDs responding. However, the response rate for APDs was substantially less at 19% (and possibly lower, given that programs may have more than one APD), which may limit interpretation of results from this group. Branching logic exempted APDs from certain questions, and therefore, this should not have impacted the overall findings significantly.

As with any survey, there is a potential for bias based upon whether demographics represented are truly representative of the entire group or those who tend to take surveys. This survey captures a snapshot in time and has not evaluated trends in the composition of program leadership over years. It would be interesting to repeat a similar survey at 5–10 year intervals, especially as the overall resident recruitment process has changed dramatically over the past few years with virtual interviews being the norm, the pass/fail grading of the United States Medical Licensing Examination and Comprehensive Osteopathic Medical Licensing Examination of the United States, and the increased documentation requirements for programs. It is unclear whether these changes would have an impact on the types of individuals willing to serve in educational leadership.

Additionally, despite many publications citing decreasing numbers of U.S. medical graduates (USMGs) entering pathology residencies in recent years, the composition of residency programs is still predominantly USMGs (both MDs and DOs).[22,23] In the 2022 National Residency Match Program, USMGs (MDs and DOs, and USIMGs) matched into 407 of 619 filled positions, while non-USIMGs filled 212 of 619 positions.[24] While respondents were predominantly White, respondents were not specifically queried as to whether they were USMGs or IMGs. It would be interesting to see how program leadership compares to the constituents of residency programs. The survey also did not capture program size to investigate whether there were any variations in leadership based upon the size of the program or whether the ethnicity or gender of the PD impacted the constituency of residents in the program.

The questions were written to be easily understood, however, there is always a potential for variations in interpretations or misinterpretation. As with all surveys, respondents may be self-selected toward those who

have strong feelings, either positive or negative toward being a PD, which may have especially influenced free text responses. Standard survey methodology was used, and while respondents could skip questions, the majority of surveys were complete with every question answered. In retrospect, some questions should have been worded as "select all that apply," as some responses listed as "other" included combinations of previous answer choices.

Conclusion

In summary, residency program leadership is likely not as diverse as their residents. Male and female PDs may have somewhat different career trajectories, including a larger percentage of female academic pathology chairs who have served as PDs during their leadership journey.[10] In general, individuals serving in this capacity must have a passion for education, high emotional intelligence, and strong organizational skills. While most individuals suggested that educational leadership helped their academic promotion, some words of wisdom suggest that individuals need to carefully balance priorities, look for ways to publish from their residency leadership experience, and optimize time management to stay on track for promotion. This information may influence training or experience pursued by individuals aspiring to pathology graduate medical education leadership, inform chairs on qualities to look for, and supplement future educational sessions of the Association of Pathology Chairs Program Directors (PRODS) Council.

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Supplementary data

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