

Fellowship Trends of Pathology Residents

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• **Context.**—Recent changes in pathology residency education have included a decrease in the program length (from 5 years to 4 years for combined anatomic and clinical pathology training) and a national mandate for programs to assess 6 general competencies of trainees. These have undoubtedly led to changes in program curricula and in residents' desires to seek fellowship training.

• **Objective.**—This study was designed to gather information about what residents are seeking from fellowship training programs.

• **Design.**—This study used an online survey to assess attitudes of residents in training programs toward fellowship training. The survey instrument had 26 questions pertaining to fellowship choices, motivations for pursuing fellowships, expectations of the fellowships, and postresidency concerns.

• **Results.**—There were 213 respondents from a mix of program types and representing each postgraduate year.

In 2001, the American Board of Pathology eliminated the credentialing year of pathology training, thus shortening the combined anatomic and clinical (AP/CP) residency from a total of 5 years to a total of 4 years. During the same time period, the American Council for Graduate Medical Education (ACGME) began the Outcomes Project, which was aimed at improving the ability of residency programs to assess and measure the outcomes of the educational curriculum. Part of this initiative included specifying 6 core competencies.^{1,2} The core competencies are (1) patient care, (2) medical knowledge, (3) practice-based learning and improvement, (4) interpersonal and communication skills, (5) professionalism, and (6) systems-based practice.

Both of these changes, in the core length of residency education and in the emphasis on measuring outcomes, have affected the structure and content of AP/CP resi-

Most residents will seek at least 1 or 2 fellowships after residency training. The most popular first-choice fellowship was surgical pathology (26%), followed by cytopathology (16%), hematopathology (15%), gastrointestinal pathology (10%), dermatopathology (8%), and forensic pathology (5%). The most common reasons for pursuing fellowship training were to "increase marketability" (43%) or to "become an expert in a particular area" (33%). Most trainees got their information about fellowship training programs from Internet sources.

• **Conclusions.**—Fellowship programs will benefit from an optimally designed Web site because residents seek information predominantly from the Internet. Residents seeking fellowships are particularly concerned with selecting programs that provide job connections, an increase in their marketability, and the opportunity to develop diagnostic expertise.

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dency programs. The changes have almost certainly affected trainee's opinions on what type of postresidency training (fellowship) programs they are seeking. To date, however, trainee opinions, such as their motivations, expectations, and ultimate goals regarding fellowship training programs and career, have not been well assessed and remain poorly understood. Having a greater understanding of what trainees are looking for in fellowship programs will help programs better define the structure of the application process, the curricular content, and the goals and objectives. This study assessed attitudes toward postresidency training and career in a group of residents from different programs across the country, with specific questions focused on what type and number of fellowships residents are planning to pursue, their attitudes regarding fellowships and the application process, as well as how residents are obtaining information about specific fellowships.

MATERIALS AND METHODS

Using an online tool, Survey Monkey (www.surveymonkey.com; accessed November 1, 2008), an anonymous Web-based survey was designed. The survey included 26 questions pertaining to fellowship choices, motivations for pursuing fellowships, expectations of the fellowships, and postresidency concerns.

Participants were selected based on their membership in either the College of American Pathologists Residents Forum or the American Society of Clinical Pathology Resident Liaison Network. Participants were also asked to forward the link to the trainees in their training program in addition to responding to the survey directly. The survey was open for a total of 4 weeks. One reminder e-mail was sent at 2 weeks into the survey period.

The results were analyzed for percentages in each category and

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Parameters	Response, %
Type of institution	
Large academic	76
Small academic	15
Community hospital	7
Other (please specify)	2
PGY year distribution	
PGY1	15
PGY2	22
PGY3	25
PGY4	26
PGY5	10
PGY6	2
Track for residency training	
AP only	4
CP only	2
AP/CP combined	93
AP/subspecialty (eg, AP/NP)	1

Abbreviations: AP, anatomic pathology; CP, clinical pathology; NP, neuropathology; PGY, postgraduate year.

Career Choice ^a	Response, %
Academic	26
Private practice	68
Governmental/military	4
Other (please specify)	2

^a Career choice included either a respondent's definitive choice or a respondent who was unsure but favoring a choice.

for trends. Statistical analyses were performed using SPSS statistical software (Version 11, SPSS Inc, Chicago, Illinois).

RESULTS

Demographics

The survey was sent to 234 index residents, who were asked to forward the link to other residents in their programs. There were 213 responses received from at least 40 different residency programs. The total potential number of residents that may have received the survey link could not be calculated but was estimated at approximately 800 trainees, given the number of programs included and the average number of residents per program. The total number of residency positions filled for 2006–2007 was 2316, according to ACGME data.

The demographics of the respondents are listed in Table 1. The distribution of postgraduate years represented in those who responded was approximately even; 93% of respondents were in AP/CP combined programs (7% in AP-only or CP-only programs), and 76% of respondents selected "large academic center" as the description of their program. Most respondents were US citizens. A total of 68% of the respondents planned or favored a private practice career, whereas 26% favored an academic career (Table 2).

Fellowship Application Trends

Most residents (89%) planned to continue in a postresidency training program (fellowship program; Table 3). Of those respondents, 72% planned to pursue 1 fellowship and 27% planned to do 2 fellowship programs (Table 4).

Plan Following Residency Training	Response, %
Subspecialty fellowship (boarded or nonboarded)	67
General surgical pathology fellowship	22
Job	3
Military commitment	2
Research	1
Other	4

Parameter	Response, %
Fellowships planned, No.	
1	72
2	27
Fellowships to which resident will apply, No.	
<5	56
6–10	26
>10	19
Primary sources that residents use to decide which fellowships to apply for	
Individual program Web sites	71
Information from current fellows or residents at the programs	47
ACGME Web site (www.acgme.org)	43
Communication with program director	38
Requested application materials from each program	23
The ICPI book and/or Web site	18
Fellowship fair at USCAP meeting	13
Events by programs at annual pathology meetings	8
Other	15

Abbreviations: ACGME, American Council for Graduate Medical Education; ICPI, Intersociety Council for Pathology Information; USCAP, United States and Canadian Academy of Pathology.

Nearly half (46%) of respondents had already applied to a fellowship program at the time of the survey.

Of those who had applied or were planning to apply for fellowships within 1 year of the survey date, most (56%) respondents indicated that they would apply to less than 5 programs, whereas 19% would apply to more than 10 programs (Table 4). About 34% of respondents indicated that they would not stay in their own institution for fellowship training, citing "the opportunity for new experience" and "limited number of positions" as the 2 most common reasons for leaving their primary residency program for fellowship training.

Data from ACGME-approved fellowships are provided in Table 5, detailing the number of total positions available and the number of positions that were filled in 2006–2007. Of the respondents to our survey who planned on pursuing a fellowship immediately after residency, the most common first choice was surgical pathology (26%) followed by cytopathology (16%), hematopathology (15%), gastrointestinal pathology (10%), dermatopathology (8%), and forensics (5%; Table 6). The distribution was only slightly different for the second-year fellowship for those who planned to do 2 separate fellowships (Table 7). Of those respondents who were not applying for fellowships,

Table 5. American Council for Graduate Medical Education (ACGME)–Accredited Fellowship Data for 2006–2007,^a Including the Number of Programs, the Positions Approved, the Positions Filled, and the Calculated Fill Rate

Subspecialty	Programs, No.	Positions Approved, No.	Positions Filled (2006–2007), No.	Calculated Fill Rate, %
Pathology (AP/CP)	150	2600	2316	89
Blood banking	47	72	40	56
Chemistry	2	3	1	33
Cytopathology	86	154	133	86
Forensic pathology	39	80	47	59
Hematopathology	79	133	116	87
Medical microbiology	12	15	8	53
Neuropathology	35	75	39	52
Pediatric pathology	25	36	20	56

Abbreviations: AP, anatomic pathology; CP, clinical pathology.

^a Fellowship data source, ACGME Web site (www.acgme.org; accessed September 30, 2008).

Table 6. Percentage of Residents Who List Each Type of Fellowship as Their First Choice for Their First Year of Fellowship^a

Resident's First Choice for Fellowship Training Program (First Fellowship)	Response, %
Surgical pathology (general)	26
Cytopathology	16
Hematopathology	15
Gastrointestinal/hepatic pathology	10
Dermatopathology	8
Forensic pathology	5
Blood banking/transfusion medicine	4
Genitourinary pathology	3
Molecular pathology	3
Pediatric/perinatal pathology	3
Neuropathology	2
Oncologic pathology	2
Gynecologic pathology	1
Microbiology	1
Breast pathology	1
Other	4

^a Only responses from residents who were applying for at least 1 year of fellowship following residency were used.

Table 7. Percentage of Residents Who List Each Type of Fellowship as Their First Choice for Their Second Year of Fellowship^a

Resident's First Choice for Fellowship Training Program (Second Fellowship)	Response, %
Surgical pathology (general)	19
Gastrointestinal/hepatic pathology	16
Cytopathology	15
Hematopathology	15
Dermatopathology	9
Gynecologic pathology	5
Breast pathology	4
Pediatric/perinatal pathology	4
Other (please specify)	4
Blood banking/transfusion medicine	3
Coagulation	1
Forensic pathology	1
Microbiology	1
Molecular pathology	1
Orthopedic pathology	1
Soft tissue pathology	1

^a Only responses from residents who were applying for at least 2 years of fellowship following residency were used.

Table 8. Primary Reason for Applying to a Fellowship Program^a

Most Accurate Primary Reason for Applying for Fellowship	Response, %
I feel I will be more marketable after a fellowship	43
I want to become an expert subspecialist in a particular area	33
I would like graduated responsibility and experience before practicing	9
I feel that my training program has not prepared me to enter directly into practice	9
Other reasons	7

^a Only responses from residents who were applying for at least one fellowship following residency were used.

most cited a current job offer as the reason for not going on to postresidency training.

Attitudes Toward Fellowships

When asked to identify the single, most important reason for pursuing a fellowship, the most common responses from residents were that it would “increase marketability” (43%) or that they wanted to “become an expert subspecialist in a particular area” (33%). A small percentage (9%) were pursuing additional training because they did not feel that their “training program had prepared them to directly enter practice” (Table 8).

Respondents indicated the most important expectations from a fellowship included gaining expertise, making job connections and networking opportunities, and working with known experts (Table 9). The least important factors were research and publishing opportunities, experience in practice management, and frozen-section experience. Residents agreed that location (94%), prestige (92%), and selected faculty of the program (86%) were the factors that most influenced the choice of fellowships. Family or personal reasons (73%) were also a major influence (Table 10).

When asked whether they feel there are not enough fellowship positions available, 62% agreed; 94% thought that fellowship positions fill quickly. Interestingly, most respondents (83%) thought that deadlines for fellowship applications are not clear and not consistent across programs, but there was not a strong attitude toward implementing a match system for fellowships, with only 43% of respondents favoring a match system (Table 10).

Table 9. Ranking of Reasons That Residents Are Pursuing Fellowship Training^a

What Resident Expects to Gain From Fellowship Training ^b	7–10, %	4–6, %	1–3, %
Expertise	97.3	1.4	1.4
Job connections and networking opportunities	68.8	20.6	10.6
Experience working with known experts	57.9	35.0	7.1
The chance to have an independent sign-out experience	56.4	30.0	13.6
A high volume of cases	39.1	43.0	17.9
The opportunity to learn about advanced techniques	33.9	36.3	29.8
Improving my ability to pass the boards	31.1	26.6	42.4
Frozen-section experience	22.5	27.8	49.7
Research and/or publishing opportunities	19.5	28.2	52.3
Experience in practice management	18.2	41.6	40.3

^a Scale: A 1 to 10 scale, with 1 lowest and 10 highest; 7–10, most important; 4–6, moderately important; 1–3, least important.

^b Reasons are ranked in their order of importance to the residents.

Table 10. Attitudes Toward Fellowships, Applications Process, and Related Issues

Rate How Much You Agree With the Following Statements	Agree ^a	Disagree ^a
Fellowship positions fill quickly	94	6
I am selecting fellowships based on the location of the program	94	6
I am selecting fellowships based on the faculty at the program	86	14
I am selecting fellowships based on the prestige of the program	83	17
I am selecting fellowships based on family/personal reasons	74	26
I will only apply to fellowships that are accredited by the ACGME	65	35
There are not enough fellowship positions to go around	62	38
I am selecting fellowships based on the workload of the program	57	43
It is not necessary to apply for a fellowship until the third year of residency training	56	44
I am concerned that I will not get into my first choice fellowship	55	45
If I don't get a fellowship position I have a backup plan	50	50
I am applying to most or all fellowships in a specific subspecialty	44	56
I am concerned that I will not get into my second choice fellowship	43	57
I would like there to be a match system for fellowships like there is for residency	43	57
I will only apply for fellowships that have a board examination	38	63
The deadlines for fellowship applications are clear and consistent across programs	17	83

Abbreviation: ACGME, American Council for Graduate Medical Education.

^a Responses are combined: *agree* is the combination of strongly agree and mildly agree; *disagree* is the combination of strongly disagree and mildly disagree. Respondents could select more than one answer.

Table 11. Rank of Different Issues That Concern Residents About Their Career in Pathology

I Am Worried About the Following Issues for My Career After Residency	Strongly Agree, %	Mildly Agree, %	Mildly Disagree, %	Strongly Disagree, %
Career progression and advancement	49	37	10	4
Getting my desired job	43	35	15	6
Passing the general AP, CP, or AP/CP boards	43	34	17	6
Maintenance of competency and recertification examination	34	30	20	16
My marketability as a pathologist	30	35	17	18
My future lifestyle	29	31	26	14
My ability to manage a laboratory	24	52	16	7
My initial competency for practicing pathology	23	41	28	9
My future career satisfaction	22	42	28	8
My understanding of billing and reimbursement	21	53	19	6
Getting my desired fellowship spot	18	50	27	5

Abbreviations: AP, anatomic pathology; CP, clinical pathology. Respondents answered each question.

Information Sources

Table 4 lists the sources of information that residents reported they use to obtain information about fellowship programs that they will apply to. Most reported searching for information about fellowship programs on the Internet, with the most important sources being individual program Web sites (70%) and the ACGME Web site (43%). A significant number of respondents (47%) reported that they obtained information from current fellows or residents in the programs of interest; 17.5% of residents re-

ported they use the Intersociety Council for Pathology Information book or Web site as a source.

Potential Drivers of Concern to Residents

The residents were also asked about areas that concern them currently and for their future career in pathology. These areas of concern included a number of potential drivers that might influence fellowship choices and selections. The residents reported being at least mildly concerned about most of the items (Table 11). The most sig-

nificant areas of concern included career progression and advancement (89%), getting their desired job (79%), passing the board examination (77%), their ability to manage a laboratory (77%), and their understanding of billing and reimbursement (75%).

COMMENT

Many recent changes in residency education in anatomic and clinical pathology have influenced not only training program curricula but also the outcome of educational programs.^{1,3} One of the most notable changes was the switch to a 4-year combined residency program, down from the 5-year combined programs that were in place until 2001. Another factor has been the institution of the programs from the ACGME to assess educational outcomes, with a particular focus on the core competencies.² Certainly, pathology has a long-standing history of evaluating medical knowledge, as do most other medical specialties, through use of the Resident In-Service Examination.⁴ There are mixed opinions of the success of both of these changes and also varying opinions on the effect on the competency of recent graduates from pathology residencies. However, it should also be noted that the ACGME used a phased introduction of the outcomes project, and full integration into training programs was not completed until June 2006.

There are 2 distinct angles from which our survey data can be analyzed. First, we can assess whether residents and fellows are choosing fellowships that will prepare them for sign-out in pathology practice and whether they are focusing on the areas that practicing pathology groups see as critical. Second, we can examine the residents' attitudes toward fellowship from the perspective of the fellowship directors and programs to ensure that fellowship programs are meeting the needs that trainees are identifying.

Clearly the demand for fellowship-trained pathologists is increasing in both private and academic pathology groups. Several studies have explored the perceptions of the adequacy of residency training in anatomic and clinical pathology from the perspective of practicing pathologists.

One study, by Horowitz,⁵ investigated opinions of employers about the training of the pathologists that they hire. One very interesting trend noted was that many practices are now requiring postresidency fellowship training. There was a reported perception among community pathologists who were surveyed that the 4-year residency was not adequately preparing residents for practice in surgical pathology. In another recent study, published by the Future of Pathology Task Group, Kass et al⁶ highlighted 4 areas that employers used to gauge resident preparedness to enter practice. These include (1) appropriately seeking coworker/senior pathologist consultation, (2) judicious use of special stains and studies, (3) management skills in the clinical laboratory, and (4) independent sign-out of surgical cases.² Both the Kass et al⁶ and Horowitz⁵ surveys highlighted resident deficiencies in clinical pathology, particularly in the area of laboratory management. Interestingly, the Resident In-Service Examination results show the least improvement during the training years in the area of laboratory management.⁴

In our survey, the general surgical pathology fellowship was the most popular fellowship among respondents, and most were pursuing the fellowship to make themselves

more marketable and to gain expertise. These results are similar to those obtained from residents taking the American Society for Clinical Pathology Resident In-Service Examination, who also selected surgical pathology as the most likely fellowship they would pursue (34%).⁷ In that survey, hematopathology (32%), cytopathology (27%) gastrointestinal/hepatic pathology (25%), and dermatopathology (19%) were the other popular fellowship choices.⁷

Of the 4 areas outlined by Kass et al⁶ for gauging preparedness, 3 (appropriately seeking consultation, judicious use of stains, and independent sign-out) may be the product of a good fellowship program. Interestingly, and perhaps alarmingly, however, management of a clinical laboratory was not a skill being sought by residents for their fellowship training. On the other hand, it was listed as one of the most significant concerns that residents expressed about their future in pathology. The disconnect between residents being worried about their skills in this area and yet not indicating that this is important to them in selecting fellowships suggests that trainees expect to focus on management skills in residency and not during fellowship. Some recent articles^{8,9} have outlined approaches to teaching management to residents, but it is unclear how many training programs have adopted this structured type of approach.

Also interestingly, few residents responded that they pursued additional fellowship training because they felt their residency did not prepare them to enter practice. Other potential disconnects between what trainees are seeking and what practicing pathologists value were also noted. For example, residents de-emphasized obtaining frozen-section diagnostic skills in fellowship, whereas this was considered an essential skill by community pathologists.^{5,6} Other skills, such as interpersonal and communication abilities, were considered essential skills for practicing pathologists, but were not noted by trainees. Only 3 of the top 10 most popular fellowship choices for the first year are in clinical pathology subspecialty areas (hematopathology, blood banking/transfusion medicine, and molecular pathology). This trend should be assessed in light of the continued reported need for pathologists with strong clinical pathology skills in practice.^{10,11} At least in the community practice setting (and most likely in the academic setting as well), there is a demand for a "well-rounded" candidate who possesses solid diagnostic, interpersonal, and management skills.⁶

It is also important for fellowship programs to understand resident attitudes and expectations for fellowship training to optimize their program design and structure. Residents indicated that the predominant goals from a fellowship program were to gain expertise and to facilitate job and networking opportunities. Increased responsibilities, exposure to a high caseload, and advanced ancillary techniques were also selected as important factors in post-residency training. Only 26% of respondents favored a career in academic practice, which was lower than the 36% who reported seeking academic positions in the Resident In-Service Examination survey questions.⁷ However, the opportunity for research or publishing experience was ranked as most important for selection of fellowships for only 19.5% of respondents. Similarly, despite 68% of residents favoring jobs in private practice, only 18% of respondents listed practice management experience as highly important for their fellowship training.

The application process for fellowships is known to lack

any uniformity among programs, and no match program exists in pathology for fellowship training positions as it does for residency training.¹² The respondents to our survey did indicate that there is a lack of clear and consistent deadlines for fellowships. As a result, many residents are concerned that applying during the third year of residency may be too late to secure their desired fellowship.

Although a match system for fellowships was not strongly supported by our respondents, consistency of application forms and timetables is highly desired. Such a standardized application has been proposed by the College of American Pathologists Resident Forum and is available on its Web site (www.cap.org; accessed November 1, 2008). It remains to be seen the extent to which this application will be adopted by fellowship programs. Most resident respondents indicated that they would apply to fellowships that are accredited by the ACGME. At the same time, however, most respondents obtain their information about fellowships from program Web sites, rather than from the ACGME or the Intersociety Council for Pathology. This suggests that up-to-date Web sites will be an important recruiting tool for fellowship programs and argues for a comprehensive centralized database of fellowships, both accredited and nonaccredited.

Additional training in dermatopathology, cytopathology, or gastrointestinal pathology has been considered useful by practicing pathologists for at least a decade.^{6,13} This parallels the relatively high rates of our respondents in selecting additional training in those subspecialties. A disconnect does seem to exist regarding transfusion medicine, which is considered very desirable by practicing pathologists but was not a prominent fellowship choice among the respondents.

It is beyond the scope of this article to judge the adequacy of resident training or to comment on whether 4 years is adequate to learn all the skills necessary to be a competent, well-rounded pathologist. Our survey results, however, do highlight some discordance between what practicing pathologists view as critical skills and what resident trainees are pursuing in their fellowship programs. By comparing the surveys of Horowitz,⁵ Kass et al,⁶ and our own, we can conclude that employer expectations of residency and fellowship training may differ substantially

from the expectations of residents. The employers appear to focus on diagnostic and interpersonal and management competencies, whereas the trainees focus primarily on diagnostic training and competency.

From the perspective of fellowship director and program curriculum, our results suggest that trainees are applying and interviewing for fellowships earlier during their residency. We have also identified that most trainees use the Internet as their primary source of information about fellowships, with a strong emphasis on the program-specific Web sites. Finally, programs that focus training on all areas identified as desirable for trainees and employers, including diagnostic skills, networking, job connections, interpersonal and communication skills, and laboratory management, will have a significant advantage in attracting trainees and will also be more successful in placing graduates into positions.

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