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Special Article

The current state of dermatopathology education: a survey of the association of professors of dermatology

Background: Dermatology training programs develop program-specific dermatopathology (DP) curricula. We summarize the current state of DP education in dermatology residency programs and identify opportunities for DP education resource development.
Methods: A 27-question survey was emailed to members of the Association of Professors of Dermatology (APD).
Results: Fifty-two of 109 programs responded for a response rate of 48%. Results were calculated using a non-response adjustment. Thirty per cent of the overall education time during residency is spent in DP-specific education. Lever and Weedon are the texts most often cited as primary texts utilized for DP education. Three-quarters of programs have third year residents spend three or more weeks on the DP service. The majority of dermatology residency programs have a specific DP service rotation at some point during residency.
Conclusions: The majority of training programs use a variety of resources and mechanisms for teaching DP to dermatology residents. Some programs list barriers to DP education including lack of cases, microscopes, resident education time for DP-related teaching and availability of educators. We conclude that a greater depth and breadth of resources for DP education would be of benefit to dermatology residency programs.

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Dermatopathology (DP) is a critical component of the practice of all aspects of dermatology and is therefore emphasized in dermatology residency training.[1] Previous evaluations of dermatology programs have shown that approximately 25% of resident education time is spent learning DP. Individual programs develop their own approaches to teaching DP often using a combination of text and slide review, didactics and hands-on learning in sign-out sessions.

Residents who receive outstanding DP training utilize their knowledge during their careers to improve the care they provide patients. Because of their extensive training in DP, some practicing dermatologists may sign out histology specimens.[2] Others who do not formally evaluate their own biopsies routinely utilize their knowledge of histology when correlating pathology reports with clinical situations.

More than 15 years ago, Dr A. Bernard Ackerman discussed methods for training residents in the specialty of DP.[3] In his paper, he described his experience with teaching DP including the importance of time at the microscope, commitment to a diagnosis, concentrated time on service and early exposure to DP during residency.

The Accreditation Council on Graduate Medical Education (ACGME) now requires that dermatology

residency training programs have mechanisms in place to show that their education strategies result in improved competency in key areas. Again, the details of how programs achieve these goals are left to individual training programs.

We sought to evaluate the current state of DP education in dermatology residencies across the country. The Association of Professors of Dermatology (APD) membership was selected as the survey group as they represent chairpersons and residency program directors from all 109 residency programs in America. We asked questions regarding the composition of curriculum, faculty, the number of residents who go on to DP fellowship and barriers to DP education. The aims of the study were to summarize the current state of DP education in dermatology residency programs, identify opportunities for DP education resource development and share the data with programs.

Materials and methods

The survey contained 25 multiple choice and two write-in questions and was placed on the WiscSurvey web server at the University of Wisconsin School of Medicine and Public Health (Fig. 1). Following beta testing, the web-based survey link was emailed to all 174 emails in the APD list serve in November 2007. This list serve represents all 109 American dermatology residency programs. Two weeks later, a reminder containing the survey link was emailed to the group a second time.

In order to account for non-response bias, the analysis was performed with post-stratification correction. This weighs the data from each region differently to better reflect the distribution of all programs. The correction weights were obtained by taking the percentage of total programs in a region divided by the percentage of programs in a region that responded to our survey (Table 1). These data were also controlled for program size, where appropriate.

These data were analyzed with linear regression and the chi-squared test. Many of the answer choices on the survey were intervals rather than discrete numbers. In these cases, the median values of intervals were used in the analysis.

Results

Fifty-two of 109 programs responded, resulting in a 48% response rate (Table 2). About half of programs were located in communities with greater than one million people. Most programs (88.5%) included training at university hospitals and clinics, while 69.2% included training at veteran's hospitals. Only 10% of programs offered training through student health services. The majority of programs had more than nine residents in total. Ninety-two per cent had two or more faculty members teaching DP. Ninety-two per cent of programs reported having DP educational faculty who spend more than 50% of their time in academic medicine. Over 90% of programs reported having a dermatology-trained dermatopathologist teaching DP, while 75% have a pathology-trained dermatopathologist teaching DP.

Approximately 30% per cent of the total hours dedicated each month to resident education time is spent teaching DP. The median number of hours per month spent in DP education is seven. However, the southern region reported spends nearly double this at 13 h per month ($p < 0.01$) (Fig. 2).

When programs were asked to list their primary textbook for DP instruction, Lever and Weedon were the texts most frequently used. (Fig. 3). However, programs reported using a variety of supplemental texts (Fig. 4). Further analysis revealed that there were no significant differences in textbook preferences between different regions ($p < 0.05$).

Programs varied significantly on the availability and duration of DP service rotations. Approximately 53% and 71% of programs have a DP service rotation for first and third year residents, respectively. Six programs did not offer DP rotations at any point during residency. Linear regression analysis reveals that the greater the number of residents in a program, the more weeks of DP rotation are scheduled in a program. Indeed, for every additional resident in a program, the number of weeks on the DP service increases by 0.79 (Fig. 5).

A variety of other methods and resources were used for DP education. About 40.3% of programs stated they use problem-based learning, while 53.8% integrate journal review into the DP curriculum. Only 19.2% of programs reported utilizing computer-based learning. Ninety per cent of programs have a teaching glass slide set and in 67% of programs, that slide set is maintained by the faculty. In 71.2% of programs, residents review slides of the specimens they submit. Of the programs where residents review their own slides, 65.4% of them review these slides with faculty. About 28.2% of programs encouraged attendance at a DP board review program, and 25% financially supported residents to attend those programs.

We also looked at how different variables correlated with residents choosing to apply for DP fellowship. One notable relationship was found. When a dermatology-trained dermatopathologist teaches DP, residents are more likely to apply for DP fellowship. Specifically, when using linear regression analysis and controlling for program size, the number of residents

Dermatopathology Education Survey

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Dermatopathology Education Survey

Dear Dermatology Program Director,

We thank you in advance for your participation in this anonymous survey of all Dermatology Residency Programs to determine how programs are facilitating the learning of dermatopathology by dermatology residents. While dermatopathology education is a requirement in dermatology training programs, individual programs use a variety of methods to accomplish this task. Our goal is to characterize and quantify dermatopathology education in dermatology residencies.

Nationwide, dermatopathology services are rendered by a variety of providers including pathologists, dermatopathologists, and dermatologists. Dermatopathology education is occuring in all dermatology residencies and the sharing of individual programmatic approaches should enhance the training of our residents. By using a survey of current dermatopathology education strategies, we plan to identify common and unique training approaches, determine what most programs offer and outline any challenges in training.

The goal of this survey is to:

1. Characterize and quantify dermatopathology education in dermatology residencies in the United States of America.
2. Determine what innovative and novel teaching methods are employed in dermatology residency programs.
3. Foster knowledge sharing among dermatology programs with the common goal of sustaining and improving dermatopathology education in dermatology training programs.
4. Develop educational tools based on survey data for the purpose of facilitating continued outstanding derrmatopathology education in residency.

Thank you for your participation.

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Note: You are currently in preview mode and your responses are being saved. You should be sure to delete your entries before collecting real responses and analyzing your data.

1. In what region is your program located? * required
   - ☐ West (CA, OR, WA)
   - ☐ Southwest (AZ, CO,NM, UT)
   - ☐ South (AL, AR, LA, TX)
   - ☐ Midwest (IL, IN, IA, KS, MI, MN, MO, OH, OK, WI)
   - ☐ Northeast (CT, DC, KY, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WV)
   - ☐ Southeast (FL, GA, NC, PR, SC, TN)

2. What is the population size of the community in which your program is located? * required
   (Please choose one.)
   - ○ Less than 100,000
   - ○ 100,000 - 500,000
   - ○ 500,001-1,000,000
   - ○ Greater than 1,000,000

Fig. 1. First two pages of the on-line survey.

3. Does your program include training at any of the following? * required
(Check all that apply.)

- ☐ a Veterans Hospital
- ☐ a Community Hospital
- ☐ a University Hospital and/or Clinic
- ☐ a Student Health Service
- ☐ None of the above
- ☐ Other, please specify

4. Number of residents in your program. * required
(Please enter a number.)

- ☐ 0-3
- ☐ 4-8
- ☐ 9-12
- ☐ >12

5. Number of faculty who teach dermatopathology in your program. * required
(Please enter a number.) Select at least 1 response and no more than 1 response.

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ >4

6. Of the faculty who teach dermatopathology, how many are board certified in: * required
(Please enter a number.)

	0	1	2	3	>3
Dermatology	☐	☐	☐	☐	☐
Pathology	☐	☐	☐	☐	☐
Dermatopathology and Dermatology	☐	☐	☐	☐	☐
Dermatopathology and Pathology	☐	☐	☐	☐	☐

7. Of the faculty who teach dermatopathology, how many spend more than 50% of their time in the following: * required
(Please enter numbers.)

	1	2	3	>3
Academic Medicine	☐	☐	☐	☐
Solo Private Practice	☐	☐	☐	☐
Multi- or single-specialty practice	☐	☐	☐	☐
Private Pathology laboratory	☐	☐	☐	☐

Fig. 1. Continued.

Table 1. Percentage of programs in each region in both survey sample and reality population and calculation of correction weights for non-response bias

Region	Percentage of total in reality	Percentage of total in our survey	Correction weight
West	11	10	1.1
South	11	6	1.8
Midwest	26	35	0.7
Northeast	38	35	1.1
Southeast	13	15	0.9

who apply for DP fellowship is directly correlated with the number of DP instructors who are boarded in both dermatology and DP. This is true regardless of whether they are academic faculty or not. It is also true whether these same residents spent time on the DP service during residency and was independent of the duration of that rotation. Because we asked programs to choose from a range of numerical answers, we do not know the exact number of dermatology residents who applied for or obtained a DP fellowship. However, we do know that programs reported at least 60 dermatology residents applied for DP fellowship and that at least 58 obtained DP fellowship within the past 3 years.

Fourteen programs listed specific barriers to DP education (Table 3).

In the present study, we also looked at relationships that were found to be insignificant. Specifically, the number of DP education hours is not correlated with whether that program recommends attendance at a DP review course. The presence or absence of a rotation on the DP service is not correlated with whether that program recommends attendance at review courses.

Discussion

Advances in dermatologic therapy, technology and surgery result in a greater number of topics encountered in dermatology residency. Residency programs seek to broadly train residents for varied career paths. As the number of new topics increases, it is likely that each topic receives less focused study in residency. Previous studies have shown that approximately 25% of the overall educational hours are spent in DP education.[4] We found this number to be slightly higher at 30%. It is unclear why programs from the South spent significantly more time on DP. Although only three programs in the Southern region responded, our statistical analysis controlled for under-representation in this region and the difference remained statistically significant. Given that this study sought to identify the composition of DP curricula, we did not specifically query programs regarding rationale for curriculum content and structure, but future studies could further explore these topics.

Our study illustrates the persistent, if not increased, emphasis that dermatology residency programs place on DP education despite increasing demands on educational time. Previous studies have shown DP to be one of the programs that both chief residents and program directors consider to be best implemented in residency training.[5]

DP curricula are developed by individual programs. The American Academy of Dermatology is actively working to develop core competencies for continuing medical education. Part of this initiative is the development of references for what are key diagnoses and topics for the practice of dermatology. A similar construct would serve DP resident education well. Specifically, a consensus on a list of DP topics that are important for the practice of dermatology could help guide programs DP education.

The large majority of our residents are being trained by board-certified dermatopathologists. We did not specifically ask if programs utilized non-board-certified dermatopathologists for DP education, but this could be explored in future studies. Dermatopathologists who teach DP use a wide variety of teaching methods and resources to accomplish their goals. In addition to didactics and microscope sessions, about 70% of programs have residents reviewing their own biopsy specimens, and about 65% of these programs have residents reviewing these slides with faculty. About half of programs included journal review as part of the DP curriculum. Very few programs utilize computer-based learning, which remains highly underutilized but with high potential. Programs offer progressively more time on the DP service with each year in residency. Interestingly, this is the opposite practice of what has been proposed by some distinguished educators.[3] Programs choose when to offer DP service rotations. Whether the timing of these rotations leads to varied outcomes in resident performance is a question that has yet to be answered.

While Lever and Weedon are used the most as primary texts, Rapini and McKee rank high as secondary texts. One barrier noted by a program director was 'lack of a Weedon-lite'. The program that made this comment went on to describe the need for a text as comprehensive as Weedon but with less detail per diagnosis. Preference for textbooks does not vary by geographic region.

Programs reported other teaching tools they use for DP education. A number of programs use DP examinations and self-assessments in their curricula either annually or semiannually. Some recommend that residents learn DP at outside institutions or attend DP review courses. Other DP educators teach DP diagnostic pitfalls and emphasize ways to avoid those pitfalls.

Table 2. Summary statistics of the DP survey data

Variable		Frequency	Percentage (%)
Number of programs in sample by region	West	5	9.6
	Southwest	0	0
	South	3	5.8
	Midwest	18	34.6
	Northeast	18	34.6
	Southeast	8	15.4
Population size of community	< 100,000	8	15.4
	100,000–500,000	8	15.4
	500,001–1,000,000	10	19.2
	> 1,000,000	26	50
Programs training at different hospitals	Community Hospital	21	40.4
	Veterans Hospital	36	69.2
	Student Health Services	10	19.2
	University Hospital and/or Clinic	46	88.5
Number of residents	0–3	1	1.9
	4–8	14	26.9
	9–12	20	38.5
	≥ 13	17	32.7
Number of faculty who teach DP	1	4	7.7
	2	14	26.9
	3	13	25
	4	5	9.6
	> 4	16	30.8
Number of faculty who teach DP are board certified in DP and pathology	0	13	25
	1	15	28.8
	2	16	30.8
	3	2	3.8
	> 3	6	11.5
Number of faculty who teach DP are board certified in DP and dermatology	0	5	9.6
	1	16	30.8
	2	15	28.8
	3	7	13.5
	> 3	9	17.3
Number of faculty who spend > 50% in academic medicine	0	4	7.7
	1	17	32.7
	2	11	21.2
	3	9	17.3
	> 3	11	21.2
Non-clinical hours/month for overall resident education	1–10	3	5.8
	11–19	8	15.4
	> 19	41	78.8
Non-clinical hours/month for DP education	1–3	6	11.5
	4–6	20	38.5
	7–9	8	15.4
	10–12	9	17.3
	> 12	9	17.3
Weeks in DP rotation by PGY year			
PGY1	0	49	94.2
	1–2	1	1.9
PGY2	0	25	48.1
	1–2	5	9.6
	3–4	13	25
	> 4	7	13.5
PGY3	0	13	25
	1–2	6	11.5
	3–4	13	25
	> 4	18	34.6
PGY4	0	12	23.1
	1–2	2	3.8
	3–4	18	34.6
	> 4	18	34.6
PGY5	0	49	96.2
	> 4	1	1.9
Microscope time in hours led by each type of teacher			
By board-certified dermatopathologist	1–2	7	13.5
	3–4	12	23.1
	> 4	33	63.5
By board-certified dermatologist	0	41	78.8
	1–2	1	1.9
	3–4	3	5.8
	> 4	7	13.5

Table 2. *Continued*

Variable		Frequency	Percentage (%)
By board-certified pathologist	0	43	82.7
	1–2	3	5.8
	3–4	1	1.9
	> 4	5	9.6
By DP fellow	0	38	73.1
	1–2	6	11.5
	3–4	4	7.7
	> 4	4	7.7
By residents	0	42	80.8
	1–2	4	7.7
	3–4	3	5.8
	> 4	3	5.8
Programs using problem-based learning curriculum	Yes	21	40.4
	No	31	59.6
Programs using journal review	Yes	28	53.8
	No	24	46.2
Programs using computer-based learning	Yes	10	19.2
	No	42	80.8
Programs that have residents review their own slides that they obtained from patients in clinic	Yes	37	71.2
	No	15	28.8
If residents review their own slides that they obtained from patients in clinic, do they review the slides with faculty?	Yes	34	65.4
	No	18	34.6
Programs that promote attendance at DP board review program	Yes	15	28.8
	No	37	71.2
Financially supported by DP program	Yes	13	25
	No	39	75
Set of teaching slide available for residents to review	Yes	47	90.4
	No	5	9.6

DP, dermatopathology; PGY, post graduate year.

Once we began analyzing the data, we sought to identify whether different training approaches resulted in different outcomes. We chose to look at the dependent variable of application for DP fellowship. Our study shows that residents who are exposed to DP rotations and are taught by dermatology-trained dermatopathologists are more likely to choose a DP fellowship. Our analysis showed that time on the DP service regardless of duration as well as having greater numbers of dermatology-trained dermatopathologist educators correlated with increased rates of applying for fellowship. Interestingly, it did not matter whether the dermatology-trained dermatopathologists on staff were academic or community-based physicians. One could conclude that having a similarly trained

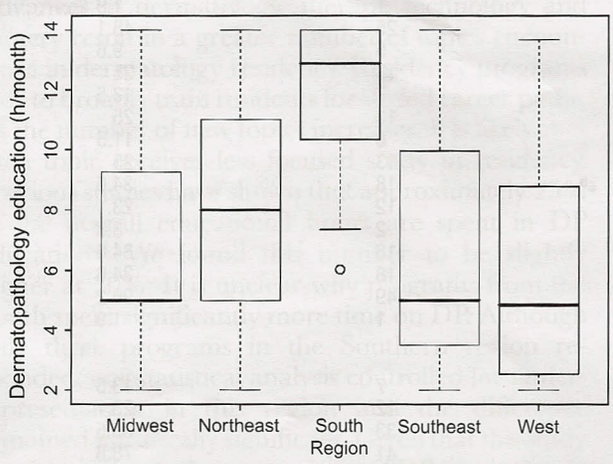

Fig. 2. Regional differences in the number of hours spent in DP education, $p < 0.01$. On average, programs spend about 6–7 h a month on DP. The South spends considerably more time on DP, a mean 12 h a month ($p < 0.01$).

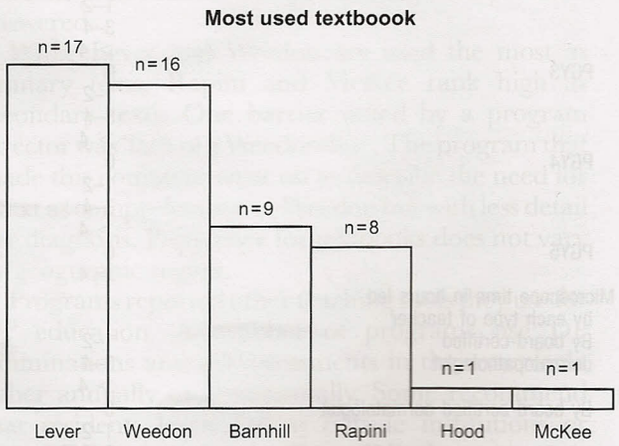

Fig. 3. Lever and Weedon are the top two preferred primary textbooks, $p < 0.01$. The programs were asked to list the textbook they used most for dermatopathology instruction.

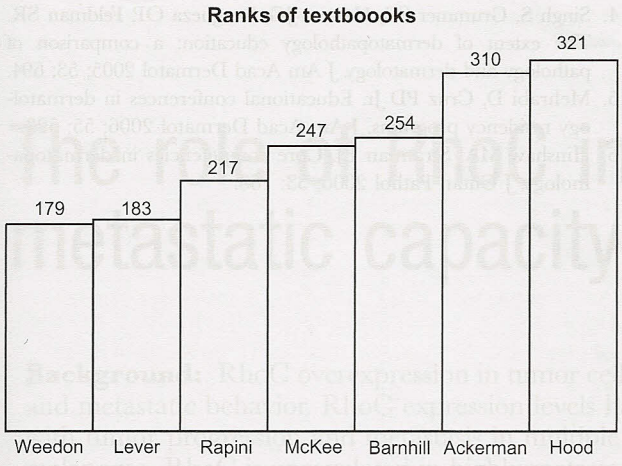

Fig. 4. Cumulative textbook rank. Programs were asked to rank textbooks in order of preference. For instance, one point was assigned if the book was used as their primary textbook. Therefore, the lower the number, the more the book was utilized in the program. Here, we see that Rapini and McKee, while not often used as primary texts, are often used as supplemental texts.

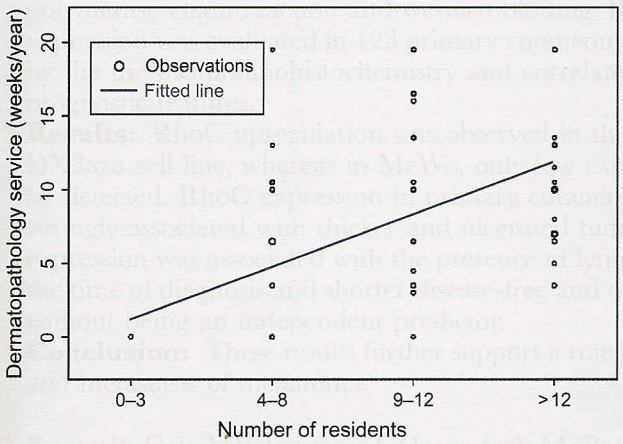

Fig. 5. The number of weeks on DP service is statistically greater for larger programs ($p < 0.01$). In this regression analysis, every additional resident added to a program was correlated with an increase in 0.79 weeks/year of dermatopathology rotation.

Table 3. Barriers to DP education in dermatology residencies

DP specific
Faculty left university to work for private laboratory
Hospital contract for DP specimens was given to private lab
Teaching slide sets lost
Lack of text that includes most diagnoses while not being overly detailed
DP in Department of Pathology makes getting education difficult
Laboratory is remote to where residents are located
Low volume of specimens limited teaching material
Limited space and microscopes for teaching
DP nonspecific
Overall limited time of educators
Overregulation by regulators such as ACGME makes teaching unappealing
Limited time to teach all aspects of dermatology
Financial i.e. time out of clinic is loss of revenue
Overemphasis on teaching to pass the board examination

ACGME, Accreditation Council on Graduate Medical Education; DP, dermatopathology.

individual as an educator and seeing that person work inspires residents to apply for fellowship.

It should be noted that six programs reported that residents did not spend time on the DP service at any time during residency. These tended to be smaller programs. Multiple factors likely play a role including barriers listed below (Table 3).

Future studies should correlate DP curricula and other outcomes such as dermatology board examination scores or the frequency with which residents go on to read their own slides. Our study focused on individual program approaches and barriers, and we did not query residents or practicing dermatologists.

Access to specimens and slide sets was reported to be another obstacle to DP education. Surprisingly, 9.6% of programs did not have set of teaching slides for residents. Programs noted 'disappearing slide sets' and 'low volume of specimens' as obstacles to DP education. The development of computer or CD-based slide sets could help alleviate this programmatic need. While lectures on http://www.mdlive.com/ and virtual slides on http://www.derm101.com/ already exist, the responses provided her indicate that they have not been incorporated into curricula of programs. The reasons for this are unclear, but perhaps a comprehensive, on-line DP curricula would be of more use to programs that report barriers to education.

Some programs listed challenges in utilizing DP faculty. These programs stated that dermatopathologists lack sufficient time to teach, that some are leaving academics and that some are located off-site. Resident time constraints and the need to balance clinic duties and teaching were also noted.

Programs spend significant amounts of time developing their curricula with the goal of providing residents a current, varied and thorough educational experience. An understanding of the overall goals in teaching a topic like DP helps guide curricula. At our institutions, we teach DP with the goal that residents develop competency to the level that they improve the care of patients they serve. This is difficult to measure, and we continue to work on objective methods to document competency.[6]

Acknowledgement

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