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How should medical students prepare for a clinical dermatology rotation?

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Abstract

Skin diseases are commonly encountered in medical practice, yet medical students often receive little dermatology training. There is little research on what self-study materials best prepare students. We aim to identify which resources dermatology residents have found to be most useful in preparing for clinical dermatology rotations and dermatology residency. Forty current dermatology residents and fellows responded to our REDCap-generated survey. Data was analyzed using descriptive statistics. Most respondents (N=36, 90%) reported using outside resources to prepare for clinical dermatology rotations and dermatology residency. American Academy of Dermatology (AAD) modules and other online resources were most used (N=31, 77.5%) and most recommended (N=32, 80%). However, 67.5% of all respondents also used printed textbooks in some capacity, but low-to-no cost, usefulness, and easy accessibility of online resources made them more favorable among study participants. Multiple clinical dermatology rotations were recommended for preparing for dermatology residency (N= 34, 85%), as were other rotations, including internal medicine (N=22, 55%) and rheumatology (N=17, 42.5%). Overall, the AAD modules and online resources are most useful when preparing for clinical dermatology rotations because of favorable cost and accessibility. Compared to clinical rotations in other specialties, multiple rotations in dermatology may be most helpful for dermatology residency.

Keywords: dermatology, residency, resources

Introduction

Learning to recognize common dermatoses would help physicians in any specialty to more quickly and accurately diagnose patients with these conditions. Skin diseases are frequently chief complaints among patients seen by primary care physicians and patients often present with at least one skin problem [1]. There is discrepancy in competence between primary care physicians and dermatologists when it comes to recognizing common dermatoses and differentiating between benign versus malignant skin lesions, such as melanoma [2,3]. Early detection of melanoma leads to expedient treatment initiation and may decrease mortality in those with malignant melanoma [2,4]. Improved training in dermatology in medical school may help equip all physicians with the skills needed to more accurately diagnose common skin conditions.

Clinical dermatology is often not emphasized in the medical school curriculum [5]. Most medical schools do not have a preclinical course dedicated solely to the subject of dermatology. Instead, most schools mingle skin and other organ systems into one course taught during the first and second years of medical school. Other specialties, such as otolaryngology and ophthalmology, have a similar preclinical underrepresentation but often receive greater focus later on, during the third clinical year [5]. For instance, only 1% of medical schools have a required dermatology rotation during the third clinical year, whereas 18% of medical schools require an

ophthalmology and 34% an otolaryngology rotation [5]. This lack of training in dermatology not only impacts future physicians who are interested in dermatology, but also those involved in other specialties, such as primary care.

Owing to the competitive nature of securing a dermatology residency position, students interested in dermatology are anxious to perform well on clinical dermatology rotations, thus emphasizing the importance of being prepared prior to participation in clinical dermatology rotations. These students likely put more time into studying to prepare for their clinical dermatology rotations and dermatology residency, when compared to clinical rotations in other specialties. Learning common dermatoses and being able to construct an accurate differential diagnosis and recommend treatment options is important to perform well on clinical dermatology rotations [6].

Because of the limited level of dermatology education during medical school, self-study may be valuable for getting the most out of clinical dermatology rotations. Self-study allows the student to be more educated, prepared, and confident in their knowledge during the rotation, thus impacting their performance. There are multiple resources available but little information about which resources would most benefit students for their dermatology rotations. Our survey aimed to identify what resources current dermatology residents most recommend to medical students to prepare for their clinical dermatology rotations.

Methods

Survey participants

We surveyed 40 current dermatology residents and fellows with access to the Association of Professors of Dermatology (APD) listserv (<https://www.dermatologyprofessors.org/listserv>).

The survey was generated using REDCap online designer. A link to the REDCap survey was published in a survey recruitment email posted in the Association of Professors of Dermatology listserv. Participants completed the survey without the researcher present and received no compensation

for completing the survey. The target population of the survey was current dermatology residents and fellows. All 40 participants met study inclusion criteria. No other demographics were collected. The institutional review board approved this study.

Survey variables

Participants were asked how extensively dermatology was covered during their preclinical years (years one and two) of medical school and if they used outside resources to help them prepare for their clinical dermatology rotation. The respondents were also asked to identify the resources they used from a provided list and rate the cost, ease of accessibility, and usefulness. They were also asked to recommend the resource using the 5-point Likert scale (1 = strongly unfavorable/recommend, 5 = strongly favorable/recommend). The provided list of resources included flash cards, online videos, other online resources (DermNet NZ, UptoDate, Academy of Dermatology [AAD] modules), electronic textbooks, printed textbooks, preclinical lectures, clinical lectures, journal articles, and other (which was free response). Participants then were able to choose up to three clinical rotations they concluded helped them to prepare for dermatology residency from a provided list. The provided list of clinical rotations included multiple clinical dermatology rotations, emergency medicine, family medicine, general surgery, hematology/oncology, intensive care unit, internal medicine, obstetrics and gynecology, ophthalmology, otolaryngology, pediatrics, plastic surgery, rheumatology, and other (which was free response). The "other" free response selection gave participants the opportunity to comment on any additional recommendations they may have to share with medical students preparing for their clinical dermatology rotations and dermatology residency.

Statistical analysis

Descriptive statistics were used to analyze the data. Each participant was asked to rate the favorability of the resource(s) they used to prepare for clinical dermatology rotations. All participants were then asked whether or not they personally used the resource and how they would rate—on a Likert scale—each resource in terms of cost, usefulness, accessibility, and overall satisfaction. Each resource's

cost was then analyzed by taking the average of participant's responses who used the resource by quantifying each response (1= strongly unfavorable, 2= slightly unfavorable, 3= neutral, 4= slightly favorable, 5= strongly favorable, 6= N/A or no cost). Averages of usefulness, accessibility, and likeliness of recommendation of each resource were calculated in a similar manner, excluding N/A or no cost associated.

Results

We obtained responses from 40 dermatology residents and fellows who are enrolled in ACGME-accredited dermatology residency programs and have access to the APD listserv. Of the 40 survey respondents, 20 (50%) are first-year residents, 9 (23%) second-year residents, ten (25%) third-year residents, and one (3%) pre-residency fellow. Most respondents (N=38, 95%) reported that dermatology was not extensively covered in their preclinical training, and 36 (90.0%) used resources outside of the preclinical education to prepare for clinical dermatology rotations. Of those who used outside resources to prepare for dermatology rotations, 31% (N=11) still felt slightly unprepared for their rotations, whereas 36% (N=13) felt slightly prepared.

Resources used to prepare for clinical dermatology rotations

Of the outside resources used, online resources such as Derm NetNZ, UpToDate, and AAD modules were used the most (N=31, 78%) to prepare for clinical dermatology rotations. Other online resources were also the most recommended resource (N=32, 80%) and had the highest recommendation average (4.77). Of the 31 respondents that used these online resources, 22 recommended AAD modules as the resource that best prepared them for their dermatology rotations. Some of the participants' comments were as follows: "AAD modules provided a practical, succinct overview of the most common topics encountered in clinic," "AAD presentations were very high yield," "AAD website modules were a great overview," "The AAD curriculum provided great breadth and details at an appropriate level for

my stage of training," and "The AAD modules were absolutely essential." Of those that utilized the AAD modules, 20 (65%) also consulted printed textbooks. In fact, 68% of all respondents used printed textbooks in some capacity to prepare. Comments from participants who used printed textbooks were as follows: "Textbook good for reference," "Fitzpatrick Atlas helped me the most—concise, lots of pictures," "Lookingbill was fantastic," "Used Lookingbill which was useful," and "I thought the Lookingbill and Marks' book were useful." Despite using both printed and online resources, the cost, usefulness, and easy accessibility of these online resources were considered more favorable compared to printed textbooks. Other strongly recommended resources included the following: clinical lectures (N=25, 63%), printed textbooks (N=19, 48%), electronic textbooks (N=13, 33%), preclinical lectures (N=10, 25%), online videos (N=9, 23%), journal articles (N=6, 15%), and flash cards (N=2, 5%).

Clinical rotations that were useful for dermatology residency

Study participants were also asked what clinical rotations they found most useful for preparing for dermatology residency. Along with self-study materials, some specific clinical rotations were reported to be helpful in preparing for dermatology residency. Of these rotations, multiple clinical dermatology rotations were the reported most useful clinical rotations for a student preparing for dermatology residency (N=34, 85%). Other useful clinical rotations included internal medicine (N=22, 55%), rheumatology (N=17, 43%), family medicine (N=9, 23%), plastic surgery (N=9, 23%), pediatrics (N=6, 15%), hematology/oncology (N=5, 13%), and emergency medicine (N=4, 10%). Some rotations, such as otolaryngology (N=1, 3%), intensive care unit (N=0), ophthalmology (N=0), and obstetrics and gynecology (N=0), were not considered useful for preparing for dermatology residency. Some respondents mentioned allergy, pathology, dermatopathology, and immunology as additional useful rotations for preparing for dermatology residency.

Discussion

Dermatologic diseases are often not emphasized in medical school curriculum, even though dermatologic conditions are seen by many specialties. Adequate training in how to recognize and treat common dermatoses is important for all medical students to learn during medical school—not just those pursuing dermatology. In our study, one-third of dermatology residents did not feel prepared for clinical dermatology rotations, often because medical schools did not adequately emphasize dermatology in the preclinical medical curriculum. Unsurprisingly, in this study, preclinical lectures were not strongly recommended for preparing for clinical dermatology rotations (**Table 1**). Extra preparation may be beneficial to students to learn to better identify and describe skin lesions as well as develop a broader differential diagnosis, all of which are critical aptitudes that would allow the student to perform well on clinical dermatology rotations. Because of limited formal dermatology education, medical students often seek outside resources for self-study prior to participation in clinical dermatology rotations.

Additionally, dermatology is an especially competitive specialty to pursue due to, in part, the

Table 1. Recommended resources to prepare for clinical dermatology rotations.

Resources	Total number responded	Recommend?
Flash cards	28	2.82
Online videos	34	3.68
Other online resources	30	4.77
Electronic textbooks	32	3.91
Printed textbooks	36	4.08
Preclinical lectures	28	3.54
Clinical lectures	35	4.49
Journal articles	34	3.15

^aAverages calculated from 5-point Likert scale (1= strongly unfavorable, 2= slightly unfavorable, 3= neutral, 4= slightly favorable, 5= strongly favorable).

^bRecommendation for resources was available to each participant, though not each participant rated the recommendation of each resource.

small number of residencies and residency positions available each year [7,8]. There are multiple factors that can set dermatology residency applicants apart, including performance on clinical rotations in the third and fourth years of medical school. Applicants with prior experience in dermatology, either through completion of home or away rotations, had a higher probability of matching than those without [7]. Performing well on these rotations may increase students' chances of matching at the dermatology residency program where they rotated [6]. Preparation prior to these dermatology rotations may improve performance and subsequently impact where or if applicants match into dermatology residency.

Medical students have an array of resources from which to choose when preparing for clinical rotations in general. Little has been examined into which resources best prepare medical students specifically for clinical dermatology rotations. Identifying which resources are most effective and helpful for preparing for clinical dermatology rotations may save students time and help them excel. Of all resources participants utilized, flash cards were utilized the least (N=1) and had an overall recommendation value of 2.82, relatively lower than 4.77 for the most recommended resource, online resources. Flash cards were little utilized and poorly recommended despite having a slightly-to-strongly favorable average of cost, usefulness, and accessibility (**Table 2**). Flashcards were mentioned by participants to be useful when preparing for dermatology residency but not for clinical dermatology rotations (**Box 1**). Furthermore, a total of 28 respondents slightly did not recommend or neutrally recommended using them for clinical dermatology rotations (**Table 2**). Resources that were highly utilized include online resources such as DermNetNZ, UptoDate, and AAD modules, along with printed textbooks. The participant's favorability averages for online modules' ease, accessibility, and usefulness were higher than printed textbooks, perhaps making them superior to printed textbooks, which had the lowest cost favorability average of all the resources. Online resources were also the most recommended resource, being slightly to strongly

Table 2. Averages of cost, usefulness, and accessibility of resources used to prepare for clinical dermatology rotations.

Resources used	Total number used	Cost	Usefulness	Accessibility
Flash cards	1	4.00	5.00	4.00
Online videos	9	4.78	4.33	4.22
Other online resources	31	5.13	4.33	4.37
Electronic textbooks	13	4.08	4.42	4.33
Printed textbooks	27	3.04	4.31	3.65
Preclinical lectures	7	4.71	4.14	4.00
Clinical lectures	11	4.82	4.55	3.64
Journal articles	4	5.00	4.75	3.50

^aAverages for cost calculated from modified 5-point Likert scale (1= strongly unfavorable, 2= slightly unfavorable, 3= neutral, 4= slightly favorable, 5= strongly favorable, 6= N/A or no cost).

^bAverages for usefulness and accessibility calculated from 5-point Likert scale (1= strongly unfavorable, 2= slightly unfavorable, 3= neutral, 4= slightly favorable, 5= strongly favorable).

^cResources were rated by participants who used each resource (total number used).

recommended by participants (**Table 2**). The most popular online resource, the AAD modules, is provided at no cost. It has the highest cost and accessibility favorability average amongst survey participants and is accessible to students on their personal computers through the AAD website. Many online resources share these desirable features and often make them more practical than printed textbooks. However, printed textbooks also have their merit and own benefits; some students might prefer or even learn better from them (**Table 3**). Of the printed textbooks, those specifically named by participants were Fitzpatrick's *Color Atlas and Synopsis of Clinical Dermatology* and Lookingbill and Marks' *Principles of Dermatology*. The listed printed textbooks may be useful for students who prefer to learn from printed textbooks as opposed to online modules (**Table 3**). The online AAD modules have also been used to teach medical students during two-week clinical dermatology rotations and have had high satisfaction rates among consumers, with most students reporting that these modules significantly improved their dermatology knowledge [9]. The AAD modules have also been used to teach primary care providers, with their dermatology knowledge significantly improved after use, as measured by a pretest and posttest. These providers also reported they preferred learning from these online modules over textbooks and lectures [10]. The

widespread use of the AAD modules coincides with participants' comments about the modules being "absolutely essential," "most comprehensive introduction," "great overview," "very high yield," and "very thorough" (**Table 3**). Besides using these resources to prepare for clinical dermatology rotations, other recommendations for preparation include "talking to other students who did the rotation before you," "ask the department of interest which reference they would recommend you use to prepare for their rotation," "focus on being attentive and teachable," and "ask the clinicians that you're rotating with what their expectations of a medical student are (e.g., form great descriptions, take concise history, form differential diagnoses)" (**Box 1**).

Medical students rotate through multiple areas of medicine during their clinical third year of medical school. For those interested in pursuing the specialty of dermatology, some clinical rotations are likely more useful than others in preparing for dermatology residency. Students pursuing dermatology residency would likely benefit from clinical rotations in family medicine, internal medicine, rheumatology, and plastic surgery, all of which provide substantial exposure to dermatologic pathology. Furthermore, participants identified allergy, immunology, pathology, and dermatopathology rotations as providing useful experiences for dermatology residency. Less useful clinical rotations include otolaryngology, intensive

Table 3. Participants' comments regarding resources.

Resource used	Comments regarding resource
Other online resources (DermNetz, AAD modules, UptoDate)	I heavily used AAD and UpToDate to get the fundamentals and then to see what the initial steps for management would be for many disorders. Of course, I think I needed an electronic/printed textbook as a base
	AAD modules provided a practical, succinct overview of the most common topics encountered in clinic
	AAD presentations very high yield
	AAD website modules were a great overview
	The AAD curriculum provided great breadth and details at an appropriate level for my stage of training
	AAD was most comprehensive introduction
	The AAD modules were absolutely essential
	The AAD medical student lectures were perfect
	AAD modules were very thorough and focused towards medical students
	AAD modules- it was recommended by an M4 going into dermatology
Electronic textbooks	Used Lookingbill, which was useful
Printed textbooks	I heavily used AAD and UpToDate to get the fundamentals and then to see what the initial steps for management would be for many disorders. Of course, I think I needed an electronic/printed textbook as a base. Lookingbill was fantastic
	Easy to use, easy to access, easy to track progress
	Fitzpatrick Atlas helped me the most - concise, lots of pictures
	Lookingbill was fantastic
	I thought the lookingbill and marks book was useful
	Usually the most comprehensive with regards to pathophysiology, diagnosis, and treatment
	It gave a useful overview of dermatology without going too much into specifics
Textbook good for reference	
Clinical lectures	I learned the most on my clinical rotations- not before the rotation

care unit, ophthalmology, and obstetrics and gynecology. Other recommendations for preparing for dermatology residency include reviewing flashcards to forge a base knowledge, obtaining publications, and completing a research year (Box 1). However, preparing for dermatology application varies by student and greatly depends on the composite of students' activities and accomplishments as well as attention to areas of weakness in their application [8].

Our study limitations include a small sample size (N=40). A larger sample size may have yielded more

recommendations from sampled dermatology residents and fellows. The survey was also published on the APD listserv, which was available to a specific subset of dermatology residents and fellows; this recruitment modality thereby could have introduced selection bias. Half of the survey participants are first-year residents who do not have extensive dermatology training or experience in the field when compared to second and third-year dermatology residents and fellows. Recommendations to medical students might change based on residency year and level of clinical experience and exposure.

Box 1. *Additional recommendations to medical students preparing for clinical dermatology rotations and dermatology residency.*

Preparing for clinical dermatology rotations

Talk to other students who did the rotation before you.

I would recommend being very solid on morphology and descriptions before starting the rotation. Also on basic procedural skills like biopsies and simple interrupted sutures.

Ask the department that you will be rotating in which reference they would recommend you use to prepare for their rotation. Each department usually has 1 textbook they like to follow that can be accessed through a medical library online.

Stay focused on the absolute basics. Attempting to learn rare diagnoses at this stage is a waste of effort.

AAD modules, basic intro textbooks (Lookingbills, Derm Secrets)

Talk with other medical students and residents to see what to expect, how to present, etc.

Focus on being attentive and teachable - this will pay off!

If available to the med student, ask upperclassmen what they did and how it worked.

Relax!

Ask the clinicians (residents or attendings) that you're rotating with what their expectations of a medical student are (i.e., form great descriptions, take concise history, form ddx, etc.). Write things down that you see while rotating and look them up after clinic. It is always easier learning something once you've seen it in person.

Preparing for dermatology residency

I would recommend reading "Baby Bolognia" during intern year in conjunction with ANKI flash cards to build a base knowledge.

Lots of publications.

Year of research.

Conclusion

Among all resources used, online resources, particularly the AAD modules, were deemed most useful in preparing for clinical dermatology rotations. Because of their utility, AAD modules may be a tool which medical students could incorporate into their curriculum in order to enhance preclinical education in dermatology. Increasing dermatology exposure and education in the preclinical medical school curriculum could lessen the self-study burden placed on students interested in dermatology residency and free up time for them to then channel into other experiences, such as research and shadowing, to further explore their interest in, and enhance their candidacy for dermatology and dermatology residency.

Potential conflicts of interest

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