

A Roadmap to Research Opportunities for Dermatology Residents



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RESIDENT PEARLS

- Establishing a strong relationship with a research mentor is crucial for success in resident research. If your program lacks the necessary infrastructure, take the initiative to network at society meetings or apply for formal mentorship programs.
- For residents facing limited access to patient cohorts and large datasets or those without access to a robust research infrastructure, conducting a systematic review is a valuable and feasible research option, allowing for meaningful contributions to the medical literature.

In the increasingly competitive field of residency and fellowship training, research productivity has become a key differentiator for applicants. This heightened emphasis on scholarly activity has led some to describe the process as a “research arms race,” with residents feeling pressured to boost their research output to stand out. This article explores the challenges dermatology residents face in conducting meaningful research across diverse program environments, emphasizing the crucial role of mentorship. It also highlights systematic reviews as a valuable and feasible option for residents seeking to contribute to the medical literature. A streamlined framework for conducting these reviews also is provided, offering a practical pathway to meaningful scholarly activity amid the demands of residency training and the competitive nature of specialty matching.

Dermatology remains one of the most competitive specialties in the residency match, with successful applicants demonstrating a well-rounded

application reflecting not only their academic excellence but also their dedication to research, community service, and hands-on clinical experience.¹ A growing emphasis on scholarly activities has made it crucial for applicants to stand out, with an increasing number opting to take gap years to engage in focused research endeavors.² In highly competitive specialties such as dermatology, successful applicants now report more than 20 research items on average.^{3,4} This trend also is evident in primary care specialties, which have seen a 2- to 3-fold increase in reported research activities. The average unmatched applicant today lists more research items than the average matched applicant did a decade ago, underscoring the growing emphasis on scholarly activity.³

Ideally, graduate medical education should foster an environment of inquiry and scholarship, where residents develop new knowledge, evaluate research findings, and cultivate lifelong habits of inquiry. The Accreditation Council for Graduate Medical Education requires residents to engage in scholarship, such as case reports, research reviews, and original research.⁵ Research during residency has been linked to several benefits, including enhanced patient care through improved critical appraisal skills, clinical reasoning, and lifelong learning.^{6,7} Additionally, students and residents who publish research are more likely to achieve higher rank during residency and pursue careers in academic medicine, potentially helping to address the decline in clinician investigators.^{8,9} Publishing and presenting research also can enhance a residency program’s reputation, making it more attractive to competitive applicants, and may be beneficial for residents seeking jobs or fellowships.⁶

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Dermatology residency programs vary in their structure and support for resident research. One survey revealed that many programs lack the necessary support, structure, and resources to effectively promote and maintain research training.¹ Additionally, residents have less exposure to researchers who could serve as mentors due to the growing demands placed on attending physicians in teaching hospitals.¹⁰

The Research Arms Race

The growing emphasis on scholarly activity for residency and fellowship applicants coupled with the use of research productivity to differentiate candidates has led some to declare a “research arms race” in residency selection.³ As one author stated, “We need less research, better research, and research done for the right reasons.”¹¹ Indeed, most articles authored by medical students are short reviews or case reports, with the majority (59% [207/350]) being cited zero times, according to one analysis.¹² Given the variable research infrastructure between programs and the decreasing availability of research mentors despite the growing emphasis on scholarly activity, applicants face an unfortunate dilemma. Until the system changes, those who protest this research arms race by not engaging in substantial scholarly activity are less likely to match into competitive specialties. Thus, the race continues.

The Value of Mentorship

Resident research success is impacted by having an effective faculty research mentor.¹³ Although all medical research at the student or resident levels should be conducted with a faculty mentor to oversee it, finding a mentor can be challenging. If a resident’s program boasts a strong research infrastructure or prolific faculty, building relationships with potential mentors is a logical first step for residents wishing to engage in research; however, if suitable mentors are lacking, efforts should be made by residents to establish these connections elsewhere, such as attending society meetings to network with potential mentors and applying to formal mentorship programs (eg, the American Society for Dermatologic Surgery’s Preceptor Program, the Women’s Dermatologic Society’s Mentorship Award). Unsolicited email inquiries asking, “Hi Dr. X, my name is Y, and I was wondering if you have any research projects I could help with?” often go unanswered. Instead, consider emailing or approaching potential mentors with a more developed proposition, such as the following example:

Hello Dr. X, my name is Y. I have enjoyed reading your publications on A, which inspired me to think about B. I reviewed the literature and noticed a potential to enhance our current understanding on the topic. My team and I conducted a systematic review of the available literature and drafted a manuscript summarizing our findings. Given your expertise in this field, would you be willing

to collaborate on this paper? We would be grateful for your critical eye, suggestions for improvement, and overall thoughts.

This approach demonstrates initiative, provides a clear plan, and shows respect for the mentor’s expertise, increasing the likelihood of a positive response and fruitful collaboration. Assuming the resident’s working draft meets the potential mentor’s basic expectations, such a display of initiative is likely to impress them, and they may then offer opportunities to engage in meaningful research projects in the future. Everyone benefits! These efforts to establish connections with mentors can pave the way to further collaboration and meaningful research opportunities for dermatology residents.

The Systematic Review: An Attractive Option For Residents

There are several potential avenues for students or residents interested in pursuing research. Case reports and case series are relatively easy to compile, can be completed quickly, and often require minimal guidance from a faculty mentor; however, case reports rank low in the research hierarchy. Conversely, prospective blinded clinical trials provide some of the highest-quality evidence available but are challenging to conduct without a practicing faculty member to provide a patient cohort, often require extensive funding, and may involve complex statistical analyses beyond the expertise of most students or residents. Additionally, they may take years to complete, often extending beyond residency or fellowship application deadlines.

Most medical applicants likely hold at least some hesitation in churning out vast amounts of low-quality research merely to boost their publication count for the match process. Ideally, those who pursue scholarly activity should be driven by a genuine desire to contribute meaningfully to the medical literature. One particularly valuable avenue for trainees wishing to engage in research is the systematic review, which aims to identify, evaluate, and summarize the findings of all relevant individual studies regarding a research topic and answer a focused question. If performed thoughtfully, a systematic review can meaningfully contribute to the medical literature without requiring access to a prospectively followed cohort of patients or the constant supervision of a faculty mentor. Sure, systematic reviews may not be as robust as prospective cohort clinical trials, but they often provide comprehensive insights and are considered valuable contributions to evidence-based medicine. With the help of co-residents or medical students, a medical reference librarian, and a statistician—along with a working understanding of universally accepted quality measures—a resident physician and their team can produce a systematic review that ultimately may merit publication in a top-tier medical journal.

The remainder of this column will outline a streamlined approach to the systematic review writing process,

specifically tailored for medical residents who may not have affiliations to a prolific research department or established relationships with faculty mentors in their field of interest. The aim is to offer a basic framework to help residents navigate the complexities of conducting and writing a high-quality, impactful systematic review. It is important to emphasize that resident research should always be conducted under the guidance of a faculty mentor, and this approach is not intended to encourage independent research and publication by residents. Instead, it provides steps that can be undertaken with a foundational understanding of accepted principles, allowing residents to compile a working draft of a manuscript in collaboration with a trusted faculty mentor.

The Systematic Review: A Simple Approach

Step 1: Choose a Topic—Once a resident has decided to embark on conducting a systematic review, the first step is to choose a topic, which requires consideration of several factors to ensure relevance, feasibility, and impact. Begin by identifying areas of clinical uncertainty or controversy in which a comprehensive synthesis of the literature could provide valuable insights. Often, such a topic can be gleaned from the conclusion section of other primary studies; statements such as “further study is needed to determine the efficacy of X” or “systematic reviews would be beneficial to ascertaining the impact of Y” may be a great place to start.

Next, ensure that sufficient primary studies exist to support a robust review or meta-analysis by conducting a preliminary literature search, which will confirm that the chosen topic is both researchable and relevant. A narrow, focused, well-defined topic likely will prove more feasible to review than a broad, ill-defined one. Once a topic is selected, it is advisable to discuss it with a faculty mentor before starting the literature search to ensure the topic’s feasibility and clinical relevance, helping to guide your research in a meaningful direction.

When deciding between a systematic review and a meta-analysis, the nature of the research question is an influential factor. A systematic review is particularly suitable for addressing broad questions or topics when the aim is to summarize and synthesize all relevant research studies; for example, a systematic review may investigate the various treatment options for atopic dermatitis and their efficacy, which allows for a comprehensive overview of the available treatments—both the interventions and the outcomes. In contrast, a meta-analysis is ideal for collecting and statistically combining quantitative data from multiple primary studies, provided there are enough relevant studies available in the literature.

Step 2: Build a Team—Recruiting a skilled librarian to assist with Medical Subject Headings (MeSH) terms and retrieving relevant papers is crucial for conducting a high-quality systematic review or meta-analysis. Medical librarians specializing in health sciences enhance the efficiency, comprehensiveness, and reliability of your

literature search, substantially boosting your work’s credibility. These librarians are well versed in medical databases such as PubMed and Embase. Begin by contacting your institution’s library services, as there often are valuable resources and personnel available to assist you. Personally, I was surprised to find a librarian at my institution specifically dedicated to helping medical residents with such projects! These professionals are eager to help, and if provided with the scope and goal of your project, they can deliver literature search results in a digestible format. Similarly, seeking the expertise of a medical statistician is crucial to the accuracy and legitimacy of your study. In your final paper, it is important to recognize the contributions of the librarian and statistician, either as co-authors or in the acknowledgments section.

In addition, recruiting colleagues or medical students can be an effective strategy to make the project more feasible and offer collaborative benefits for all parties involved. Given the growing emphasis on research for residency and fellowship admissions, there usually is no shortage of motivated volunteers.

Next, identify the software tool you will use for your systematic review. Options range from simple spreadsheets such as Microsoft Excel to reference managers such as EndNote or Mendeley or dedicated systematic review tools. Academic institutions may subscribe to paid services such as Covidence (<https://www.covidence.org>), or you can utilize free alternatives such as Rayyan (<https://www.rayyan.ai>). Investing time in learning to navigate dedicated systematic review software can greatly enhance efficiency and reduce frustrations compared to more basic methods. Ultimately, staying organized, thorough, and committed is key.

Step 3: Conduct the Literature Review—At this point, your research topic has been decided, a medical reference librarian has provided the results of a comprehensive literature search, and a software tool has been chosen. The next task is to read hundreds or thousands of papers—easy, right? With your dedicated team assembled, the workload can be divided and conquered. The first step involves screening out duplicate and irrelevant studies based on titles and abstracts. Next, review the remaining papers in more detail. Those that pass this preliminary screen should be read in their entirety, and only the papers relevant to the research topic should be included in the final synthesis. If there are uncertainties about a study’s relevance, consulting a faculty mentor is advisable. To ensure the systematic review is as thorough as possible, pay special attention to the references section of each paper, as cited references can reveal relevant studies that may have been missed in the literature search.

Once all relevant papers are compiled and read, the relevant data points should be extracted and imputed into a data sheet. Collaborating with a medical statistician is crucial at this stage, as they can provide guidance on the most effective ways to structure and input data. After all

studies are included, the relevant statistical analyses on the resultant dataset can be run.

Step 4: Write the Paper—In 2020, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement was developed to ensure transparent and complete reporting of systematic reviews. A full discussion of PRISMA guidelines is beyond the scope of this paper; Page et al¹⁴ provided a summary, checklist, and flow diagram that is available online (<https://www.prisma-statement.org>). Following the PRISMA checklist and guidelines ensures a high-quality, transparent, and reliable systematic review. These guidelines not only help streamline and simplify the writing process but also enhance its efficiency and effectiveness. Discovering the PRISMA checklist can be transformative, providing a valuable roadmap that guides the author through each step of the reporting process, helping to avoid common pitfalls. This structured approach ultimately leads to a more comprehensive and trustworthy review.

Step 5: Make Finishing Touches—At this stage in the systematic review process, the studies have been compiled and thoroughly analyzed and the statistical analysis has been conducted. The results have been organized within a structured framework following the PRISMA checklist. With these steps completed, the next task is to finalize the manuscript and seek a final review from the senior author or faculty mentor. To streamline this process, it is beneficial to adhere to the formatting guidelines of the specific medical journal you intend to submit to. Check the author guidelines on the journal's website and review recent systematic reviews published there as a reference. Even if you have not chosen a journal yet, formatting your manuscript according to a prestigious journal's general style provides a strong foundation that can be easily adapted to fit another journal's requirements if necessary.

Final Thoughts

Designing and conducting a systematic review is no easy task, but it can be a valuable skill for dermatology residents aiming to contribute meaningfully to the medical literature. The process of compiling a systematic review offers an opportunity for developing critical research skills, from formulating a research question to synthesizing evidence and presenting findings in a clear methodical way. Engaging in systematic review writing not only enhances the resident's understanding of a particular topic but also demonstrates a commitment to scholarly activity—a key factor in an increasingly competitive residency and fellowship application environment.

The basic steps outlined in this article are just one way in which residents can begin to navigate the complexities of medical research, specifically the systematic review process. By assembling a supportive team, utilizing available resources, and adhering to established guidelines such as PRISMA, one can produce a high-quality, impactful review. Ultimately, the systematic review process is not just about publication—it is about fostering a habit of inquiry, improving patient care, and contributing to the ever-evolving field of medicine. With dedication and collaboration, even the most challenging aspects of research can be tackled, paving the way for future opportunities and professional growth. In this way, perhaps one day the spirit of the “research race” can shift from a frantic sprint to a graceful marathon, where each mile is run with heart and every step is filled with purpose.

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