Advantages of a Virtual Collaborative Research Dermatology Laboratory

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Abstract

Dermatology is a highly competitive and less diverse medical field, making it one of the hardest specialties to match into for residency. Residency program directors have recently increased their focus on medical students' research experience, recommendation letters, and interviews due to changes in USMLE Step I grading. In response to this shift, the Dunnick Dellavalle Dermato-Epidemiology Lab has emerged as a dual-campus collaboration between the University of Colorado and the University of Minnesota. This innovative lab offers medical students unique opportunities to engage in dermatological research and develop professional networks across two leading institutions. The lab's model promotes equity and inclusivity, ensuring valuable research experiences regardless of institutional changes or exam formats. By embracing a virtual collaborative approach, the lab enhances the training of future dermatologists and contributes to significant advancements in dermatological science. Through its commitment to diverse student perspectives and interdisciplinary cooperation, the Dunnick Dellavalle Lab sets a new standard for research and mentorship in dermatology, supporting students as they navigate the competitive residency matching process.

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Original Manuscript

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Introduction

The Dunnick Dellavalle Dermato-Epidemiology Lab is a two-campus collaboration between the University of Colorado (CU) and the University of Minnesota (UMN). This innovative lab is designed to enhance students' research credentials and professional networks and foster a culture of curiosity and knowledge expansion in dermatology. By providing medical students access to high-impact research opportunities and mentorship, the lab aims to drive advancements in dermatological science and encourage the exploration of novel research questions. The importance of such opportunities is underscored by the fact that many dermatology applicants secure positions at their mentors' institutions or home programs—26.2% and 24.4%, respectively [1]. Through this collaborative approach, the lab addresses the competitive nature of dermatology residency matches while contributing to the broader goal of expanding dermatological knowledge.

Curiosity is a fundamental driver of scientific discovery and critical for advancing medical knowledge. Embracing diverse student perspectives within the lab enriches the research process and helps uncover novel insights that might be overlooked in a more homogeneous setting. This collaborative approach mirrors the "hidden curriculum" in medical education, where the informal and often unspoken training elements significantly shape future practitioners [2]. By actively engaging students in meaningful research experiences, the lab addresses this hidden curriculum, preparing them to navigate and contribute to the evolving landscape of dermatology [3]. The lab's innovative model demonstrates how fostering curiosity and leveraging diverse perspectives can profoundly impact the development of new knowledge and the training of future physician-scientists.

The dermatology residency match is highly competitive, as demonstrated by the National Resident Matching Program (NRMP) Results and Data: 2024 Main Residency Match [4]. Historically, key factors for a successful dermatology match have included interviews, recommendation letters, USMLE Step I scores, medical school transcripts, and rotations at the institution [5]. However, with the USMLE Step I exam being switched to a pass/fail system in the spring of 2022, there is now even more pressure on research to distinguish candidates. Approximately 50% of program directors agree that medical students will face greater difficulty matching into dermatology under this new system [6]. Additionally, in a study involving program directors from vascular, thoracic, and integrated plastic surgery, around 64% of respondents agreed that the reputation of the medical schools attended would become increasingly important after Step I switched to pass/fail [7].

Logistics of the Lab

The Dunnick Dellavalle Dermato-Epidemiology Lab has always operated as a virtual collaboration, using Zoom to conduct meetings and facilitate research activities. The lab was created in 20 at CU. This model enables participation from students not only at CU and UMN but also from various other institutions nationwide. During the 20 years that the lab principal investigators were at CU, medical students from over 30 medical schools joined the lab meetings. These students have significantly contributed to numerous projects and publications, exemplifying the power of cross-institutional collaboration.

When Dr. Dellavalle assumed his role at UMN, the future of the CU Dellavalle/Dunnick Dermato-Epidemiology Lab was uncertain. However, instead of dissolving the lab, the weekly Zoom meetings continued, welcoming UMN medical students and residents. The lab's persistence and strong foundation within two leading medical schools have resulted in numerous publications and the successful continuation of many ongoing projects. This inclusive approach has allowed students from institutions such as Rocky Vista University College of Osteopathic Medicine, Case Western Reserve University, Kansas City University, Texas Tech El Pas, A.T. Still University, SUNY Upstate University, LSU New Orleans, Texas A&M, Kansas City University, The Ohio State University, Florida Atlantic University, The College of Osteopathic Medicine of the Pacific Northwest, Touro University, Loma Linda University, and Nova Southeastern University to join the lab meetings and contribute to research efforts.

For students at allopathic and osteopathic medical schools without dedicated dermatology departments, the lab offers invaluable benefits beyond enhancing their residency applications. By participating in the lab’s virtual research environment, these students gain access to leading dermatology researchers and innovative projects often unavailable at home institutions. This exposure enriches their understanding of dermatological science and allows them to contribute to significant research advancements. Engaging with top experts in the field provides the students with unique learning opportunities and helps them build a competitive edge for future dermatology residency matches. The lab’s inclusive model thus supports the student's academic growth and the broader goal of advancing dermatological knowledge.

Dr. Robert Dellavalle, M.D., Ph.D., M.S.P.H., serves as the Chair of the Department of Dermatology at the University of Minnesota and the U.S. Department of Veterans Affairs National Dermatology Executive Program Director. He began his tenure as department chair at UMN in April 2024, after a long career at CU, where he started his dermatology residency in 1997. Dr. Dellavalle has an h-index of 69 and 123,900 citations. Dr. Cory Dunnick, M.D., is the Director of the Dermatitis and Contact Allergy Clinic at the University of Colorado and has been with the institution since 2003. Dr. Dunnick has an h-index of 32 and 3,164 citations.

In the past year alone, the lab has published papers in prestigious journals such as the Journal of the American Academy of Dermatology, the Journal of Medical Internet Research Dermatology, and the Journal of the American Medical Association Dermatology. The Dunnick Dellavalle Lab stands as a testament to the potential of virtual collaboration in advancing dermatological research and supporting the next generation of dermatologists.

Medical School Specifics

Colorado

The CU School of Medicine highly encourages medical students to engage in research throughout their four-year M.D. program. The university supports 16 to 20 MD/PhD students in each

class. For medical students who are research-focused but not pursuing another doctorate, CU offers a research track distinction. This track includes funding to two national conferences, a substantial stipend for 12 weeks of dedicated research time, and the requirement of a submitted first-author paper by graduation.

The University of Colorado Anschutz Medical Campus has a strong research infrastructure that greatly benefits the field of dermatology. CU Anschutz investigators were awarded more than $70 million in grants and gifts supporting cancer research during the 2022-23 fiscal year, including $4.1 million from the National Cancer Institute [8]. Dr. Dellavalle was a member of the CU Cancer Center during his time in Colorado. Overall, faculty at all University of Colorado campuses were awarded a total of $1.6 billion in 2022-23, with $867 million specifically awarded to those at CU Anschutz [8]. CU Anschutz faculty received 563 grants amounting to $222,837,827 from the NIH [9]. In the 2024 Best Medical Schools: Research rankings, U.S. News & World Report awarded CU the prestigious Tier 1 distinction, an honor bestowed upon only 16 medical schools in the United States [10].

The University of Colorado Anschutz Medical Campus's Department of Dermatology has 75 faculty and staff members, plus 20 residents and fellows in training [11]. The training is comprehensive, offering residency training at the University of Colorado Hospital, Children’s Hospital Colorado, Rocky Mountain Regional VA Medical Center, and Denver Health. The department offers three fellowships (Pediatric Dermatology, Micrographic Surgery Dermatology Oncology, and Postdoctoral), as well as four courses for CU medical students. The main dermatology clinic handles 25,000 outpatient visits per year, focusing on general adult dermatology, cutaneous oncology, and procedural dermatology.

The University of Colorado's dermatology research and clinical programs are leaders in the field. The faculty's extensive expertise and robust support for medical students make their presence in this collaborative lab highly impactful. The University of Colorado Anschutz Medical Center's Skin Diseases Research Center (UCAMC-SDRC) is a leading hub for studying the molecular mechanisms behind autoimmune, inflammatory, developmental, metabolic, and genetic skin diseases [12]. Funded by the National Institute of Arthritis and Musculoskeletal and Skin Diseases, the center aims to develop and refine models of skin diseases for innovative treatments. Researchers, spanning various fields such as inflammation, immunology, regenerative medicine, and genetics, collaborate within and beyond the Department of Dermatology. This interdisciplinary approach is supported by strong ties with other prominent research teams and centers, including the University of Colorado Comprehensive Cancer Center.

Medical students joining this lab benefit from the respected Department of Dermatology at CU, even if they are not enrolled. Many projects at CU, such as writing grants to install free sunscreen SPF dispensers throughout campus, have been collaborative efforts involving medical students from various institutions. These students have played vital roles in writing and data analysis for research projects based at CU Anschutz Medical Campus, demonstrating the inclusive and collaborative nature of the lab's work. This approach enhances the quality of research and provides valuable experience and networking opportunities for all participants.

Minnesota

The University of Minnesota Medical School is also renowned for its extensive research initiatives and contributions to medical science. In 2023, it ranked 21st among all US Medical schools in NIH funding and 8th among public medical schools. UMN Medical School received over $340 million in NIH funding supporting 554 awards across various disciplines [13].

In the field of dermatology, the University of Minnesota's Department of Dermatology is engaged in pioneering research with most of its faculty working in some basic science, clinical, and/or translational research. This is achieved by collaborating with the Clinical and Translational Science Institute (CTSI) and the Masonic Cancer Center. Since 1965, UMN's Department of Dermatology has been active in medicinal discovery, publishing 968 articles, 136 review articles, and 103 letters [14]. The UMN's dermatology department covers various areas of dermatology notably atopic dermatitis, dermatomyositis, hair diseases, hidradenitis supurativa, neurodermatology, melanoma, and other skin cancers.

The UMN's Dermatology Department's breadth of research is equally paralleled by its devotion to patient care and training the next generation of dermatologists. The department is supported by its 61 faculty members, 23 residents, and three training hospitals and centers (M Health, Minneapolis VA Healthcare System, and Hennepin Healthcare). The training is robust, offering two residencies (Dermatology and Medicine-Dermatology), two fellowships (Pediatric Dermatology and Micrographic Surgery and Dermatology Oncology), and three courses for UMN medical students [15].

With its extensive work in research, patient care, and medical training, the addition of UMN resources to the lab enhances opportunities for students and expands knowledge, regardless of their enrollment status. With Dr. Robert Dellavalle taking over for Dr. Maria Hordinsky, M.D. in April 2024, this dual lab campus offers a unique opportunity to take two highly robust public research universities and create a tremendous collaboration for both student and scientific benefit.

Osteopathic Medicine (DO)

From 2017-2019, following the Graduate Medical Education unification, Doctor of Osteopathic Medicine (DO) graduates only comprised 4.4% of dermatology residency positions [16]. On average, osteopathic dermatology applicants have fewer research accomplishments and experiences than allopathic applicants [17]. Residency programs prioritize applicants with strong research backgrounds, clinical experience in dermatology, and connections within the field. Without a home dermatology department, DO students often struggle to access these critical resources. For DO students, finding opportunities in remote and hybrid labs at outside institutions provides a crucial avenue for gaining research experience and building professional networks.

The Dunnick Dellavalle Dermato-Epidemiology Lab is helping to bridge this gap by offering students, regardless of their institution, opportunities to collaborate on dermatological studies, garner publications, and participate in professional conferences. These experiences enhance a DO student's resume and provide valuable mentorship from established academic dermatologists, fostering professional growth. A 2023 survey study of dermatology program directors found that 54.5% of respondents ranked letters of recommendation within the top three most important factors when deciding who to invite for interviews, highlighting the importance of mentorship and networking for students. [7].

The Dunnick Dellavalle Dermato-Epidemiology Lab offers students valuable opportunities and promotes collaboration between MD and DO students, fostering camaraderie and building connections with future colleagues early in their careers.

Medical Schools Without Home Programs

An often-overlooked factor in pursuing a career in dermatology is the value of mentorship. Experienced mentors can offer critical insights into what residency programs seek and provide

invaluable guidance throughout the application process. While mentor-mentee relationships frequently develop within institutions that have established dermatology departments, students from schools without dedicated dermatology programs may find it challenging to establish these connections and receive proper guidance.

For these medical students, research offers a vital pathway to forming these important relationships. By collaborating on research projects with dermatology faculty, students can build professional networks and gain mentorship. To discover such opportunities, medical students might reach out to residents or attendings at neighboring institutions with whom they have previously worked, or contact dermatology experts and conference presenters directly, especially given the rise of virtual conferences during the COVID-19 pandemic [18]. Even when both principal investigators were at CU, students from other medical schools were always welcome to join the research.

Collaborative Lab Benefits to Medical Students/Conclusion

Dermatology is recognized as one of the most competitive, yet least diverse fields in medicine, second only to orthopedic surgery [19]. With Step I and many medical curricula moving to pass-fail, the available “objective” metrics for residency matching have been reduced with more emphasis on research, recommendation letters, and interviews than ever before. It has become imperative for schools and laboratories to offer options for students to engage with dermatological research and faculty.

The Dunnick Dellavalle Dermato-Epidemiology Lab stands as a pioneering dual-campus collaboration between CU and UMN. As one of the first of its kind nationally, this innovative lab offers a unique platform for medical students to participate in cutting-edge dermatological research and foster professional connections across two prestigious institutions. Drs. Dunnick and Dellavalle have established a forward-thinking model that guarantees equitable and enriching research experiences, irrespective of institutional affiliations or exam formats. This approach sets a new benchmark for laboratory design and interdisciplinary collaboration, supporting medical students in their pursuit of dermatology residency positions.

By integrating diverse student perspectives and maintaining an inclusive virtual research environment, the Dunnick Dellavalle Lab advances dermatological science and enriches the training of future physician-scientists. Through its commitment to curiosity-driven research and professional development, the lab exemplifies how innovative collaboration can bridge gaps in dermatology education and provide aspiring dermatologists with the tools necessary to excel in an increasingly competitive match process.

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