

## A Geriatrics Curriculum Needs Assessment for Dermatology Residents

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THESIS

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“No one ever tells you what it’s like to get old.” – Sanaye Okamura (elementary science teacher in the Pocatello, ID school district and my great aunt)

This thesis is dedicated to my wife Sachiko and children, Andy and Anna, who sacrificed and persevered through my 5-year journey; and to my grandfather, Kazuo Takechi, who inspired my passion for improving geriatric care and pursuing a career in medicine.

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## LIST OF ABBREVIATIONS

ABD	American Board of Dermatology
ACGME	American Council for Graduate Medical Education
EPA	Entrustable professional activities
GRECC	Geriatrics Research Education and Clinical Center
ICS	Interpersonal and communication skills
MK	Medical knowledge
OSCE	Objective structure clinical examinations
PBLI	Practice-based learning and improvement
PC	Patient care
PD	Program director
PIF	Program information form
PROF	Professionalism
QI	Quality improvement
RA	Research assistant
RRC	Residency review committee
VA	Veterans Affairs

## SUMMARY

Geriatric patients comprise a large proportion of general dermatologic visits, and this number is expected to grow with the aging “Baby Boomer” generation. They have different medical and psychosocial needs compared to younger adults. Failing to address these unique needs could result in patient safety issues or inappropriate care.

There is great variability in geriatrics training across medical schools. Furthermore, there are no standardized geriatrics requirements for dermatology residency programs. This needs assessment investigated what dermatology programs are currently teaching about geriatrics, which topics are considered important to teach and could potentially be expanded, and barriers and solutions to implementing geriatrics curriculum.

The study design was cross-sectional. Data were triangulated across a variety of sources: content analysis of standardized curricular artifacts and proprietary teaching materials from several institutions, semistructured interviews of residents, faculty, program directors, and associate program directors, and surveys of faculty and residents about which topics are taught or could be expanded. We recruited 14 participants from five institutions using purposive sampling. Program size, presence of affiliated Veterans Affairs (VA) hospital, presence of institutional geriatrics fellowship program, and geographic location did not seem to be associated with the amount of geriatrics education. No program has performed a needs assessment about geriatrics.

## SUMMARY (continued)

The informal geriatrics curricula varied among the five programs. Within standardized and proprietary formal curricular artifacts, geriatrics content was covered variably and sporadically. Most geriatrics content emphasized medical knowledge compared to other Accreditation Council on Graduate Medical Education (ACGME) core competencies. Only one program had proprietary curricular materials that covered several geriatrics topics and multiple types of ACGME core competencies.

The broad topics that were felt to be important to teach largely overlapped with what was currently taught: diagnosing and treating skin pathology in older adults, treating older adults holistically, cosmetic dermatology and benign findings in older adults. However, cosmetic dermatology was overrepresented in curricular artifacts compared to other geriatrics topics. There was not a trend of consensus among or between residents and program directors about which topics and subtopics were felt to be more important, although most participants did not feel that geriatric dermatology was covered more than they wanted. Several participants felt that geriatrics education overall could be formalized and expanded.

Several barriers for expanding geriatric dermatology were identified. These included a lack of interest or experience in geriatrics, the assumption that geriatrics is already sufficiently taught, an imbalance of geriatrics teaching content, and negative societal views about aging.

Participants described several resources that should be considered in planning and implementing geriatrics curriculum. These were considering local patient population and program factors, having consistency and integration of geriatrics content within existing curricula, creating faculty development and teaching resources, and encouraging further research to guide the evidence-based practice and teaching of geriatrics.

## SUMMARY (continued)

Two additional factors were identified that might enhance or impede buy-in and foster sustainability of geriatrics curricula: clinical productivity and financial pressures that compete with teaching and curriculum development and curricular emphasis on board examination preparation that does not cover geriatrics care principles.

The triangulated results improve trustworthiness about potential educational gaps within existing curricula. In turn, this information can help residency programs and specialty organizations create benchmarks of what should be taught about geriatrics and guide the development of teaching materials. In order to promote geriatric dermatology education, the perceived benefits and importance of implementing such curriculum must outweigh opportunity costs. This study might also inform broader curriculum evaluation, rebalance, and renewal for other potentially unmet societal and patient population needs that could be addressed.

## I. INTRODUCTION

### A. Background

According to the 2009 National Ambulatory Medical Care Survey, nearly one-third of United States (US) dermatology clinic visits were from patients aged 65 years or older, with the highest rate of visits from those 75 years or older(1). This number is likely to increase, since Americans are living longer than previous generations and because of the aging “Baby Boomer” cohort(2, 3). There are not enough geriatrics practitioners to provide specialty care to all older adults. Therefore, an expert panel of geriatricians published a list of basic geriatrics competencies that all graduating medical students should achieve, regardless of their eventual specialty(4). However, only about 10% of medical schools in the US reported having geriatrics clerkships (unpublished result from American Association of Medical Colleges survey and personal communication, Marcus Escobedo, John A. Hartford Foundation)(5, 6). While students and residents will invariably encounter older adult patients, exposing trainees to older adults without targeted geriatrics training is inadequate for preventing ageism and ensuring that they have sufficient medical knowledge to manage the nuances of geriatric patients(6).

What are the consequences if physicians are inadequately trained to care for older adults? The needs of older adult patients are not the same as younger adults. For example, older adults tend to have more comorbidities, take more medications, and are more prone to developing medication adverse events than younger adults due to physiologic changes in medication metabolism(7, 8). Older adults might have different psychosocial needs that can affect illness and treatment, such as retirement-related financial factors, physical isolation, or dependence on care providers. These unique needs might impact how health care providers communicate with the patient, family members, and care givers, particularly with respect to treatment decision-making and adherence(9). Failing to address the medical and psychosocial needs of geriatric patients can create patient safety events and incur unnecessary

costs. For instance, prescribing inappropriate medicines or doses in older patients leads to adverse events and hospitalizations that cost the US health care system \$20 billion(10). Although this statistic is not exclusive to dermatology, it highlights the potential for patient safety consequences.

Training future physicians about geriatrics is a systemic challenge, and it will take time for medical schools to bolster their curricula. Of note, the Institute of Medicine recommended that geriatrics training should be included in specialty training to address older adult patient safety and quality concerns(11, 12). Several specialties, including anesthesiology, emergency medicine, neurology, obstetrics and gynecology, orthopedic surgery, psychiatry, surgery, and urology have already proposed geriatrics residency curriculum requirements(13). Dermatology might have specialty-specific geriatrics topics that differ from the general fund of knowledge that ideally should be taught in medical school or even internship.

How does dermatology fare compared to other specialties? No specific geriatric requirements exist in the dermatology residency review committee (RRC) requirements or the recently published Accreditation Council on Graduate Medical Education (ACGME) Dermatology Milestones<sup>1</sup>. Furthermore, the quality and quantity of geriatrics training during internship or transitional year before starting dermatology residency is unknown. Therefore, most dermatology residents will rely on dermatology residency programs to obtain geriatrics training, since they usually get little to no such training in medical school or internship.

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<sup>1</sup> The European Union of Medical Specialties is beginning to develop geriatrics requirements for dermatology residencies, although no specific learning objectives or competencies have been planned yet (personal correspondence, Prof. Magdalena Czarnecka-Operacz, European Board of Dermato-Venereology).

## **B. Knowledge Gaps**

It is unknown how many US dermatology residency programs include geriatrics as part of existing curricula or the quality and quantity of the specific topics being taught (personal communication, Dr. Erik Stratman, American Board of Dermatology and former Chair of the Council on Education for the American Academy of Dermatology). If there are minimal or no curricula other than happenstance encounters with older adult patients, dermatology residents might not have consistent training in geriatrics to prepare them for practice.

## **C. Thesis Questions**

An important first step in curriculum inquiry is performing a needs assessment to survey the status quo(14). My thesis characterizes the state of geriatric dermatology curricula in a sample of accredited US allopathic (MD) dermatology residency programs from the perspectives of chief residents, program directors (PDs), core faculty, and associate PDs. I explored both curriculum content and existing processes(15). My research questions included the following:

- 1) What are the intentional written (formal) geriatric dermatology curricula?
- 2) If there are little or no formal geriatric dermatology curricula, what are the informally taught curricula (i.e., ad hoc teaching in non-didactic clinical settings)?
- 3) What geriatric dermatology topics are perceived as important and ideal to include in curricula?
- 4) What are perceived barriers and potential solutions if geriatric dermatology could be integrated into existing curricula?



## II. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORKS

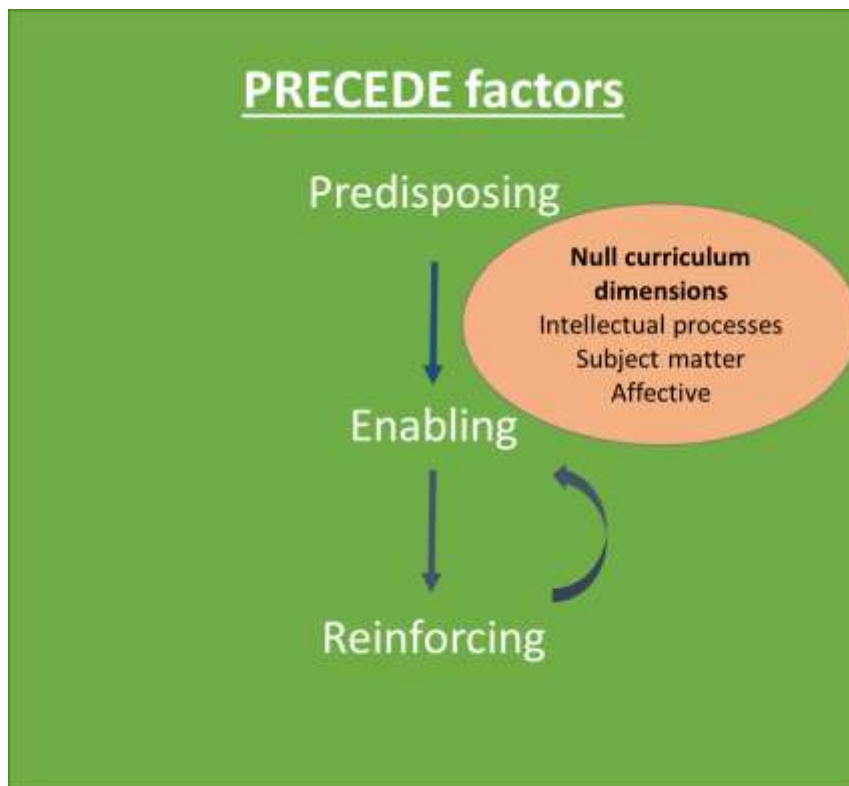
### A. Literature Review

I reviewed PUBMED, CINAHL PLUS, ERIC, Professional Development Collection, PsycINFO, Google Scholar, and Web of Science databases for geriatrics education in dermatology residency but did not find relevant search hits (Appendix A lists the literature search terms). I then searched more broadly for literature about the teaching of geriatrics concepts to non-geriatricians. Many articles were learner level- or specialty-specific and not directly applicable to my thesis. However, some of these search hits were broadly applicable to many learners, including dermatology residents(13, 16). For example, proposed emergency medicine geriatrics competencies include determining capacity to give an accurate history and to provide informed consent(17). I synthesized these potential geriatrics topics and created additional ones with the input of a convenience sample of dermatology faculty at the University of Utah and geriatric fellowship directors at the Duke University Graduate Medical Education Mini-fellowship retreat in 2010 (4, 13, 16-19). The methods are described elsewhere(20). These previously proposed topics were used as a starting point for what might be taught, because I anticipated that few residency programs had formal geriatrics curriculum or conducted a geriatrics needs assessment.

### B. Conceptual Frameworks

I used two conceptual frameworks to explore what is not taught within the curriculum, why geriatrics might not be covered, and the potential barriers and solutions for implementing geriatric dermatology curriculum (Figure 1).

**Figure 1: Conceptual frameworks.** Green's PRECEDE model was used to identify predisposing factors such as skills and attitudes that explain the status quo, enabling factors that are necessary resources or skills to implement curricular change, and reinforcing factors that are systems-based influences that could create curricular sustainability(21). The null curriculum explores what is not taught and why. The three dimensions of null curriculum are intellectual processes that are emphasized, perceived hierarchy or scope of subject matter, and the affective responses that the curriculum fosters(22, 23).



I anticipated that most programs would have few proprietary curricular materials about geriatrics and that standardized dermatology textbooks would mention geriatric care tangentially (e.g., diagnosing conditions that are more common in older adults as opposed to teaching how management approaches might differ in older adults). In contrast, I expected most programs to report that geriatrics is taught in the informal curriculum – what is intermittently taught ad hoc during clinical encounters (e.g., chalk talks, Socratic teaching)(24).

I used the null curriculum framework to study the content that is not covered in the existing curriculum and potential reasons why it might not be taught. Eisner originally described the null curriculum as “that what schools do not teach (which) may be as important as what they do teach.”(22) While he acknowledged practical limitations of what can be taught, he goes on to clarify that “...We ought to examine school programs to locate those areas of thought and those perspectives that are now absent in order to reassure ourselves that these omissions were not a result of ignorance but a product of choice.”(22) Analyzing the null curriculum creates an opportunity to (re)establish dialectic between content and goals by considering potential alternatives to what is taught and what could be included (23). Conversely, this process helps re-examine the goals of curriculum and selection of the status quo “in light of content.” Finally, null curriculum analysis encourages analysis of resources, policies and infrastructure that could be limitations or opportunities for curriculum implementation.

Eisner originally described two dimensions that constitute the null curriculum(22). *Intellectual processes* are visual, auditory, and abstract modes of thinking. For instance, geriatric dermatology curricula might emphasize visual and concrete concepts. I hypothesized that medical knowledge (MK) recall might be emphasized, particularly the anti-aging aspects of cosmetic dermatology, basic science of skin aging, and diagnosing and treating dermatologic conditions that are common in older adults (e.g., skin cancer). I did not expect to see as much coverage of abstract, knowledge application (non-MK)

concepts, such as avoiding polypharmacy, discussing end-of-life issues, or communicating with older adults and their caregivers.

*Subject matter* refers to why certain topics within a certain educational level, subfields within a discipline, or specific facts are omitted within curriculum. Examples might include why calculus is not taught to kindergartners, the history of medicine might not be covered in a history of science course, and one-sided presentations of potentially controversial topics(22). Perhaps geriatric dermatology is viewed as unimportant or as a subspecialty that falls outside the body of knowledge of general dermatology. Or it might have simply been unintentionally omitted.

Flinders et al. proposed a third *affective* dimension, which includes values, attitudes, and emotions that are promoted or avoided (23). I was unsure whether I would discover negative attitudes of faculty and residents toward caring for older adults.

Rather than defining the null curriculum as an exhaustive list of all subjects that have been omitted in existing curriculum, Flinders et al. emphasized the importance of providing a frame-of-reference of what can be perceived as “educationally significant”(23). While they do not explicitly define “educationally significant” or who should judge this benchmark, they suggest having a meta-level dialogue between those who have implemented the existing curriculum and those who are questioning its adequacy and relevance to prevent arbitrary and exhortative changes.

I also considered Green’s PRECEDE phase three model to explore potential barriers for creating or expanding geriatric dermatology curricula and processes for overcoming inertia(21). This model has been used to plan and evaluate education programs by exploring barriers and potential solutions to change: “predisposing factors” of individuals’ attitudes or existing skills that explain the status quo, “enabling factors” such as additional resources or skills that are necessary to realize change, and “reinforcing factors” of systems-based rewards and disincentives that sustain change or impede it (21,

25-27). I expected that the main barriers to implementing geriatrics curricula are the lack of time and interest among faculty more so than residents, a relative lack of curricular materials, and lack of content experts at most programs. I also hypothesized that programs affiliated with Veterans Administration (VAs) or geriatric fellowship programs might potentially have more resources to advance geriatric dermatology education. However, it is also possible that these programs might assume that residents already have sufficient exposure to older adults(6).

### III. METHODS

#### A. Design

Since there is a paucity of literature about geriatric dermatology curriculum, I chose a predominantly qualitative design using grounded theory with a constructivist paradigm(28). This cross sectional needs assessment is a mostly descriptive analysis, so I gathered data from multiple sources to obtain rich descriptions and triangulate my findings to improve trustworthiness(15). I will report my qualitative analysis using the standards for reporting qualitative research (29).

I used Kern's systems-based six-step approach to curriculum development to conduct a general needs assessment(25). Kern recommends asking what is currently being done to address the identified problem and what should ideally be taught. In anticipation of dermatology programs not teaching geriatric dermatology, I also used Harden's "Ten questions to ask when planning a course or curriculum" approach to guide the actual content and process of conducting the needs assessment. One of Harden's first "questions" is "What are the needs in relation to the product of the training programme?" He suggests using a "the wisemen approach" of analyzing textbooks and contacting content experts, surveying recent graduates, and approaching several stakeholders(30). I analyzed several commonly used dermatology textbooks and board review materials, examined proprietary curricula at dermatology programs, and interviewed and surveyed residents, faculty and program directors.

I used Abrahamson's "Diseases of the Curriculum" to anticipate interview responses about barriers for implementing geriatric dermatology curriculum(31). The "diseases" are a list of reasons why curriculum can become dysfunctional or difficult to change. They include political rivalry between departments, fragmentation and poor communication among specialties teaching about the same topic, disproportionate growth or importance of one segment of the curriculum at the expense of other topics,

a generalized sense of discontent with the curriculum, incessant tinkering without sufficient time to evaluate curricular changes, cramming more content without thoughtful prioritization or updating, poor instructional methods or instructors, curricular goals not being aligned with societal needs, and the perceived burden of changing the curriculum(31). While these “diseases” originally described medical school curriculum, many could apply to residency curriculum. I hypothesized that the most likely reasons for not including geriatrics would be the perceived burden of reviewing and updating curricula as well as the pressure for residency programs to include a growing body of medical knowledge and accreditation requirements. I suspected that most programs had not considered whether their curricular goals aligned with societal needs of the aging patient demographic rather than intentionally omitting geriatrics.

## **B. Interviews**

I designed a semi-structured interview to understand the informal curricula, potential learning gaps of what should be taught about geriatrics, and barriers and solutions to implement or expand geriatric dermatology within curricula. The interview included 11 main questions, additional follow-up probing questions based on responses, and one open-ended question eliciting general comments and thoughts about geriatric dermatology (Appendix B). The interviews were designed to last approximately 20-30 minutes. At the end of the interviews, subjects were given the option to either complete a follow up survey on the phone or receive the survey via email.

Purposive sampling improves trustworthiness, transferability, and likelihood of identifying programs that served sizable geriatric patient populations. I selected established U.S. allopathic dermatology residency programs in good accreditation standing to ensure rich sources of information(32). My goal was to sample a variety of programs with respect to program size, faculty experience, proportion of geriatric patients in continuity clinics, community-based versus academic

center programs, and the presence or absence of affiliated VA hospital and geriatrics fellowship programs.

Table I summarizes program characteristics of the five institutions and interviewee demographics of the 14 interviewed participants. I was able to sample at least one resident and faculty or PD at each program except for program C, where the chief resident did not reply to my invitations. The practice specialties of interviewed core faculty and PDs included general dermatology, dermatopathology, pediatric dermatology, and complex medical dermatology. Program E had a few teaching faculty with specific interest in geriatrics.



**TABLE I: PROGRAM CHARACTERISTICS AND INTERVIEWEE DEMOGRAPHICS**

Characteristic	Program A	Program B	Program C	Program D	Program E
Region	Midwest	Mountain	Midwest	East	West
Program size <sup>a</sup>	Medium	Medium	Small	Medium	Large
Affiliated with Veterans Affairs (VA)	Yes	Yes	No	No	Yes
% time residents spend at VA	25	30	n/a	n/a	20
Individuals interviewed	Program director, faculty, resident	Program director, faculty, resident	Program director, faculty	Program director, associate program director, resident	Program director, faculty, resident
Median years of clinical practice of interviewed faculty	23	8	9	5	22
% continuity clinic patients >=65 years	20-25	30-80 (depending whether resident had a VA continuity clinic)	40	>50	<25
Curricular materials reviewed	Last PIF <sup>b</sup> , PowerPoint didactics	Last PIF <sup>b</sup>	Problem-based learning cases	Conference schedule	Online repository of journal articles, resident rotation guide

<sup>a</sup>Program size was arbitrarily defined as the number of categorical residents compared to the average national dermatology program size based on 2016 NRMP match statistics: small <=9, medium 10-15, large > 15.

<sup>b</sup>PIF = program information form.

I hypothesized that there might be more geriatrics education at programs located in geographic locations where older adults often retire, such as the southern or southwestern US(33). However, I was unable to recruit a program there. I contacted five institutions in this region that met my sampling criteria, of which four institutional review board (IRB) offices responded. Of these four institutions, two departments declined to participate or help me identify surrogate representatives, citing lack of interest or time. The other two programs did not respond to my requests. Other than geographic location, the characteristics of these programs that did not respond or agree to participate were similar to the programs that I successfully sampled.

I notified PDs that I planned to contact program coordinators and chief residents at their programs to request copies of their curricular materials and recruit residents and core faculty for interviews. I identified perspective subjects by snowball sampling as well as reviewing each program's website to sample faculty with varying subspecialty interests (e.g., pediatric, cosmetic, general, dermatopathology) and a wide range of clinical and teaching experience. I recruited potential subjects by sending three total emails and/or phone calls. My goal was to recruit at least two subjects in different roles at each institution to understand the program from different perspectives.

I conducted the interviews in-person, on the phone, or via Skype teleconference (Microsoft, Redmond, WA) at a time and location of the participant's choosing to allow privacy. The following applications were used to record interviews: Call and Voice Recorder for Android (Viktor Degtyarev) for phone, TalkHelper Call Recorder for Skype for videoconference, Voice Recorder for Samsung Galaxy S6 (Suwon, South Korea) for in-person interviews. Audio files were cropped using Audacity v2.1.2 for Windows (Open Source). One to three minute audio excerpts were used as training samples for Dragon Professional v 14 for Windows (Nuance, Burlington, MA). The Dragon Professional transcribe recording feature was used to convert the recorded interview audio files into Rich Text Format (RTF) transcriptions. The research assistant (RA) or I reviewed recordings to correct and edit the

files in. When possible, utterances or speech tone was also noted by the transcriber. I randomly audited about 20% of the recordings to ensure transcription accuracy.

### C. Surveys

After participants completed the interviews, I also invited them to complete a survey. There were two purposes of the survey. First, I wanted to measure the current curricular coverage of geriatrics learning topics from my aforementioned literature search. Second, I sought to gauge the level of interest among key stakeholders and obtain feedback about these geriatrics topics through a deliberative inquiry process(34, 35).

The survey items were single best response choice format. One open-ended question asked about other proposed geriatric dermatology suggestions or comments. To maximize validity evidence of the survey, Messick's criteria were used in design and testing(36). To optimize content validity, I performed a literature search and also vetted my geriatrics topics through dermatology and geriatrics content experts (see Literature Search section). To maximize response process, feedback was sought from survey experts (MHPE survey design course instructor and classmates). The survey was piloted twice to maximize navigability, instruction and item clarity, and to reduce question order bias.

The surveys for faculty (Appendix C) and residents (Appendix D) were the same except that the faculty survey included a screening question whether they were a core faculty member, program director (PD) or associate program director (APD), or instructor. Except in cases where subjects preferred completing a paper survey, the survey was delivered via SurveyMonkey (San Mateo, CA). Up to two email reminders were sent every 1-2 weeks requesting survey completion. The survey was administered after the interview to avoid anchoring bias but to also provide a reference point in case the interviewees did not have suggestions for specific geriatrics topics.

#### **D. Standardized Textbooks and Study Materials**

To sample the formal curricula, I analyzed published textbooks and study materials that are widely used by US dermatology programs, including the programs where I conducted interviews. These standardized materials included two general dermatology textbooks edited by Bologna (37) and James (38) that were both accessed electronically through the University of Wisconsin Ebling Health Sciences Library e-book collection and a major dermatology board review book by Jain accessed electronically as the Kindle version (39). I also analyzed a commonly used free online dermatology board review question bank and supplemental study guide from the ETAS Derm In-Review website (funded by an educational grant from Merz Pharma, Raleigh, NC)(40).

Bologna and Andrews electronic textbooks were searched using the publisher's online search feature to screen for relevant chapter search hits. Individual chapters were then downloaded as PDFs for analysis, since the entire textbook could not be downloaded *en masse*. The ETAS study textbook was downloaded in its entirety as a PDF. These PDFs were searched for keywords using Acrobat XI (Adobe, San Jose, CA). For the Jain review textbook, the built-in Kindle search feature was used. For the ETAS Derm-in-review question bank and web-based problem-based learning case discussions, relevant content was copied and pasted into Word files (Microsoft, Redmond, WA) to facilitate electronic search.

#### **E. Proprietary Curricular Materials**

Most dermatology residency programs use proprietary didactic materials, conferences, and journal clubs as part of the formal curricula to supplement standardized texts. I requested electronic copies in PDF (Adobe, San Jose, CA), PowerPoint, Word (Microsoft, Redmond, WA), or Outlook (Microsoft, Redmond, WA) calendar format by using scripted emails that were sent to chief residents or after verbal approval from the PD. PDF files were searched using Adobe Acrobat XI for Windows.

PowerPoint files were searched using PowerSearch for Windows (Accent Technologies, Melbourne, FL). Search hits were manually reviewed by me or the RA to verify relevance and unique instances that were not within the same paragraph.

The availability and format of proprietary curricular materials varied at each program and included PowerPoint slide decks, conference schedules, repositories of case-based discussions or journal articles, and most recent program information forms (PIFs). All but program D had primarily resident-led didactics. Only institutions B and D reported having isolated, but not recurring, journal club or conference discussions that focused on geriatrics.

My RA and I used an iterative approach to choose key words for the computer-assisted searches of the above curricular artifacts(41). First, I identified phrases that were synonymous with geriatrics and aging or related to my previously proposed geriatric competencies that were published elsewhere(4, 13, 16-18). Next, my RA and I electronically searched instances of these terms as we gathered data from each of our data sources to verify their relevance within the context of the sentence and paragraph in which the key words appeared. We iteratively identified additional search terms until we agreed that theme saturation of relevant search terms was reached (see Appendix E).

#### **F. Ethics and Data Security**

The Institutional Review Boards (IRBs) at the University of Wisconsin (study # 2016-0050) and University of Illinois Chicago (protocol # 2016-0308) both approved this study as minimal risk and exempt, with the former serving as the primary IRB of oversight. There was a small risk that individuals' responses might negatively reflect a program's reputation or respondents might feel uncomfortable answering some of the questions. To mitigate this risk, I allowed interviewees to opt out of any

question that they felt uncomfortable answering. I also described the institutional characteristics by region (e.g., Pacific/West Coast) rather than individual program name or state.

I contacted the IRB offices of every institution that I planned to enroll subjects to ensure that my study was not considered multi-site (i.e., would require full IRB review at these sites). Only one site refused to respond without submitting a full review with a faculty sponsor at that institution. I chose not to pursue full review, since I did not have a faculty sponsor there. All other IRBs that I contacted did not consider my study multi-site and granted written confirmation to allow me to contact faculty and residents. One institution required written permission to conduct the study from their department Chair, which I obtained.

I emailed or called PDs at each institution to assess potential study participation interest using scripted recruitment email and telephone scripts that were approved by my IRBs. After prospective study candidates replied to my recruitment message, I emailed a study information sheet that summarized the study aims, potential risks and benefits to the participant, and nature of participation. At the beginning of the scheduled interview, I read a scripted executive summary of the study information sheet and obtained verbal consent for study participation and permission to record the interviews.

All interview data were immediately stripped of identifiers of individuals and institutions and assigned a subject and institution code. The key file was stored separately and only accessible to study personnel. All data were stored and backed up on secured, encrypted hard drives and not shared outside of the research team.

After recruitment, one randomly chosen person across all the sites was awarded a \$50 Amazon gift card for their participation. Although participants who withdrew consent were eligible for this drawing, none did so.

## **G. Data Analysis**

### **1. Textbooks and proprietary didactic curricular materials**

I used a summative approach with latent content analysis. This method involves not only counting search hit frequency (manifest analysis) but also interpreting the implied meanings within their contexts (latent analysis)(42). My RA and I used the search key word list to electronically search and screen for passages that might pertain to geriatric dermatology (Appendix E). We then reviewed the search hits to confirm that the search terms within contexts of sentences or passages actually related to geriatrics concepts. Duplicate or synonymous terms (e.g., age, old) were not counted more than once within the same incident paragraph, problem-based learning case, or PowerPoint slide.

We performed latent content analysis using constant comparative method associated with grounded theory. We started with open coding about the geriatrics topic that was associated with each search hit(43). After reviewing the first few textbook chapters and board review questions, we also decided to also categorize geriatrics content by the six Accreditation Council for Graduate Medical Education (ACGME) core competencies: medical knowledge (MK), patient care (PC), interpersonal and communication skills (ICS), professionalism (PROF), and practice-based learning and improvement (PBLI)(44). More than one theme was coded per passage, when appropriate. We noted any positive or derogatory undertone within each key word instance, when relevant. Dr. Reddy or the RA reviewed approximately 20% of each of these source materials to audit my coding. We refined the themes and coding through discussion until we reached agreement.



## **2. Interviews**

We used constant comparative method associated with grounded theory to identify major themes and subthemes(43). The RA and I independently used open coding to review approximately 30% of the interviews. We discussed and refined the themes and coding, then discussed the relationships among the themes until we reached agreement.

## **3. Surveys**

Free text comments from the open-ended questions were independently reviewed by me and Dr. Reddy and discussed until we reached coding agreement.

## **4. Final synthesis of themes across all data sources**

After all data were coded by the RA and me, Dr. Reddy blindly audited curricular artifacts or interview passages that represented each theme. After comparing and discussing our findings, we reached theme agreement without major coding revisions, although we collapsed and combined several subthemes.

## **5. Reflexivity**

A summary of the researchers' reflexivity statements are in Appendix F.

#### IV. RESULTS

No program has conducted a geriatrics specific curriculum needs assessment. The self-reported informal curriculum about geriatrics topics varied significantly by program (Table II). Several programs covered skin tumors, patient adherence, safe prescribing and drug reactions, communication, common conditions and skin eruptions in geriatrics. The less commonly covered informal curricular topics were elder abuse, cosmetic dermatology, and pruritus.

Based on the number of key word search hits, there was variability of quantity and topics about geriatrics within the formal curricular artifacts (Appendix G). Textbooks generally contained more geriatrics content than proprietary curricular materials and board review test questions. The major exception was institution C's online problem-based learning curriculum, which contained several geriatrics concepts.

Terms such as elderly, elder, older or geriatric were typically used to refer to older adults. Occasionally the adjective "senile" was used to describe certain conditions of older adults, but they implied older age rather than a connotation of dementia. None of the interviews reflected an overtly derogatory tone towards older adults, although a few passages seemed to imply slightly negative views about older adults or aging skin.

Within textbooks and board preparatory materials, there was a relatively low proportion of total pages compared to total chapters that contained geriatrics content. In other words, geriatrics topics seem to be spread relatively thinly across many chapters. Most of the ACGME competencies covered were MK and PC (Appendices H and I), and the most frequent topics were cosmetic dermatology, basic science of aging, skin cancers and rashes (Table III).

Table II: INFORMAL CURRICULUM TOPICS BY INSTITUTION AS REPORTED IN INTERVIEWS WITH RESIDENTS AND FACULTY.

Geriatrics topic	Institution A	Institution B	Institution C	Institution D	Institution E
Abuse	X				
Adherence	X		X	X	X
Basic science/pathophysiology		X		X	X
Benign findings		X	X	X	
Consent			X	X	
Coordinating care with other providers	X		X		
Cosmetics				X	
Dementia	X		X	X	
Diseases of geriatrics	X	X		X	X
End of life ethics decisions		X	X	X	X
Eruptions	X	X	X	X	X
Patient and care giver communication	X		X	X	X
Pruritus					X
Safe prescribing/drug reactions	X	X	X	X	X
Skin tumors	X	X	X	X	X
Wound healing/ulcers			X		X

**Table III: GERIATRICS TOPICS WITHIN CURRICULAR ARTIFACTS.** The topics are listed in descending order of frequency (total number of search hits among all curricular artifacts). Some passages had more than one topic and were therefore coded more than once.

- Cosmetics (255)
- Basic science, aging physiology, procedural anatomy (177)
- Skin tumors (172)
- Cutaneous eruptions, excluding drug rashes (132)
- Benign skin findings (114)
- Adverse drug reactions/safe prescribing (76)
- Infectious diseases (61)
- Dermatopathology (22)
- Elder abuse (16)
- Pruritus and xerosis (16)
- End-of-life and palliative care (11)
- Billing/coding (10)
- Care coordination with other specialists (10)
- Communicating with family and care providers (4)
- Ulcers and wound healing (9)
- Health care power of attorney and consent (1)
- Self neglect (1)

## A. Survey Results

Three PDs, two associate PDs, two teaching faculty, and four residents completed the surveys. The sample size was too small to conduct meaningful inferential statistical analysis, therefore we will speak in terms of general trends.

None of the PDs or faculty felt that geriatrics topics were covered more than they wanted, although some reported the following topics as not covered without any plan to expand: older adult abuse, facilitating transitions of care of older adults, geriatrics quality improvement projects, and basic science of skin aging. Most topics were identified by PDs and faculty as not covered (or inadequately so) with a desire to expand, particularly improving communication with older adults and their care providers as well as identifying specific resources to help geriatric patients overcome systems-based challenges.

No residents reported that geriatrics topic should not be covered at all, and only one resident felt that ethical issues of geriatric care were covered more than they wanted. Most residents indicated an interest in specific resources to help geriatrics patients overcome systems-based challenges and teaching about safely prescribing medications to older adults.

Only faculty and PDs responded to the open-ended question asking about other suggestions or comments about geriatric dermatology. They were positive: "Great ideas!" One comment suggested that procedural dermatology fellowships should offer similar competencies, which was beyond the scope of my thesis.

## **B. Qualitative Analysis Combining Curricular Artifacts, Surveys, and Interviews**

Subjects agreed that geriatric dermatology is an important and distinct topic that requires further curricular evaluation. These two examples from different institutions demonstrate the importance of geriatrics in dermatology.

*“I would be interested to know, nationwide in derm training programs, what the experience of others are with their exposure to geriatrics. I certainly agree that, if we expect residents to take care of elderly patients, we need to be teaching them how to take care of elderly patients, how to recognize the diseases, how to recognize the challenges.” (Program director, Institution C)*

*“Thinking about how we frame pediatric dermatology, we consider that separate and distinct because the diseases of children and the way they respond and the way we manage them is different in a way that’s important to think about...So I think that carries over to geriatric dermatology, because as we age our body don’t respond the same way to the same drugs, and pathophysiology is different because of the way our bodies are different...and the diseases that affect them, the ethics that apply to them...the surgeries, and how we...plan those...” (Program director, Institution D)*

### **1. Existing curricula and what should be taught**

After reviewing all data sources in an iterative, constant comparative fashion, we discovered overlap of themes across thesis questions 1-3. That is, the informal curricular topics were largely a subset of the formal curricula, and there was generally not disagreement between interview responses and curricular artifact analysis about what is taught and what should be taught. Therefore, we decided to group these three thesis questions together and identified four common themes: diagnosing and treating skin pathology in older adults, treating older adults holistically, cosmetic dermatology and benign findings of older adults, and the basic science of skin aging.

#### **a. Diagnosing and treating skin pathology in older adults**

Many curricular artifacts emphasized a traditional biomedical model(45). Subthemes included the medical and surgical aspects of skin cancers, inflammatory skin eruptions (e.g., autoimmune,

paraneoplastic, nutritional), itch, wound healing, thermal-related skin disorders, elder abuse, and psychocutaneous dermatology.

#### **b. Treating older adults holistically**

Another theme that spanned interviews, survey results and curricular artifacts was the importance of thinking beyond diagnosing and managing a patient's skin problems. That is, geriatric dermatologic care is thought to be a nuanced and highly patient-centered approach that involves many layers of complexity.

*"...Is it more important to save money or more important to take care of this all at once or manage it by tele-medicine because they don't drive, or call the power of attorney because the patient is demented and can't sit still for a surgery...?" (Program Director, Institution C)*

*"I think what's challenging that, for better or worse right now, the learning that's happening is a bit more situational. And, I think that's, in a lot of ways, correct. Because you could have a really old 65-year-old person and the really young centenarian, and I think making it very patient-centered is so important because it's all in the details – in the nuances and the patient's expectations for what they want their care to be and their life to look like." (Program Director, Institution E)*

*"...It's very possible to have other more pressing medical problems and that despite the fact...they came to dermatology to help solve a skin problem, they may be overwhelmed and dermatology will be peripheralized compared to making sure that their bypass surgery has been successful." (Faculty, Institution A)*

In some cases, dermatologists play a potentially overlooked role in the early diagnosis of non-dermatologic conditions.

*"Looking for signs of dementia...sometimes I have to communicate back to attending physicians when I have concerns about what I see in my longitudinal care...If I start to see changes, sometimes I see it before other [providers] do...In dermatology we develop relationships with people..." (Program Director, Institution A)*

Safely prescribing medications to older adults and considering other medical conditions was another example.

*"I think our comfort with systemic medications could be improved in general...Something that requires more thought is elderly patients or patients with comorbidities." (Faculty, Institution B)*

Subjects identified several ethical issues that geriatric patients face, which differ from younger adults. Subthemes included end-of-life treatment decisions, medical decision-making and informed consent when health care proxies are involved in care, and the potential vulnerability of older adults.

*"How to direct conversation in that regard when the patient doesn't want a biopsy, but...the family does and wants it treated – and how to respect the older individual." (Resident, Institution D)*

*"There's plenty of articles published [that]...patients don't die if you do Mohs surgery over 90. Nobody's asked the question 'Should you be doing Mohs surgery on people over 90?' We know it doesn't kill them...I think that's the ethics of spending an exorbitant amount of money treating likely non-lethal skin cancers above a certain age." (Program Director, Institution C)*

*"We're dealing with a vulnerable population...Elder abuse: you probably should be looking for signs [and] what the next [management] step is." (Program Director, Institution A)*

Communicating with geriatric patients and their care providers was another important subtheme. Beyond my proposed learning objective of overcoming communication barriers of hearing or visual impairments of older adults, one faculty survey response suggested emphasizing the "intergenerational differences in decision-making [and] communication."

Another subtheme about treating patients holistically was accommodating the needs, preferences and circumstances that vary among older adults.

*"...If you're doing a full body exam, there's a lot of moving around on a table...that's not very comfortable. So just accommodating our older patients...do a standing exam if they can stand up or lean up against a walker or table instead of having them lie on a table which often hurts their backs..." (Resident, Institution E)*

*"...What is [sic] the social, cultural dynamics and limitations of the patient...? Are they able to reach areas of their back to apply medications you're prescribing them due to arthritis or impaired mobility? ...Do they have assistance at home? ...Do they have somebody to care for their wound at home?..." (Resident, Institution B)*



Care coordination and overcoming systems-based challenges to ensure patient safety and management plan execution was another subtheme.

*"...I think one of the things that...we don't have a good feel of is the interface between the hospitals and the nursing home and assisted living facility....There's always a bit of a handoff when they go from one facility to another and we're not quite...I don't think we're really adept at knowing how to ensure that things aren't getting dropped." (Faculty, Institution C)*

*"...I feel like a lot of us don't know who to contact...Whenever you have to communicate with the nursing home you just hit a brick wall...I send letters and I have no idea who to write to and I think they aren't doing anything...I feel like nursing homes have some basic structure and just maybe having someone come and say 'Hey, this is the head nurse.' ...How do we communicate besides just writing that on a piece of paper and giving it back to the nursing home...?" (Resident, Institution D)*

### **c. Cosmetic dermatology and benign findings in older adults**

Patients and society seem to expect dermatologists to be adept at addressing cosmetic skin concerns related to aging.

*"Our society's increasing emphasis on a youthful image and aesthetic appearance has resulted in an explosion in public demand for commercial skin care products, professional assistance from physicians and non-physicians to assure proper medical and cosmeceutical skin therapy, and procedural intervention by physicians." -Bologna textbook*

Current resident education might be skewed toward rare dermatologic diseases but should include common benign conditions, too.

*"It would just be really nice to have more structured – a nice dedicated lecture on the normal things you're going to see in the skin as it matures and ages and they are totally normal. I think so many programs overlook this.... We spend so much time talking about scleredema [relatively uncommon condition] and spend no time seeing it... 'Oh those are what the bumps on the ears of old guys are?'" (Associate program director, Institution D)*

#### d. Basic science of aging

The basic science of the skin aging process was another common theme in curricular artifacts. Subthemes included certain genodermatoses (rare genetic conditions) that lead to premature skin aging as well as anatomic, physiologic, and histologic changes with aging. Several search hits also included anatomic considerations in skin cancer surgeries and cosmetic procedures.

### 2. Barriers and potential solutions for expanding geriatrics curriculum

Subjects identified challenges and suggested solutions of accommodating geriatrics in existing curricula. The themes of barriers and potential solutions generally fit into Green's PRECEDE model of predisposing, enabling, and reinforcing factors. Green's factors are not mutually exclusive, and some themes spanned multiple categories. I attempted to categorize by the dominant factor.

#### a. Predisposing factors

Four barriers were identified: a potential lack of interest or experience in geriatrics, the assumption that geriatrics is already sufficiently taught, an imbalance of geriatrics teaching content, and potentially negative societal views about aging skin and older adults.

#### i. Lack of interest or experience

Dermatology residents come to training programs with variable degrees of geriatrics experience and knowledge from medical school and internship.

*"...When our residents come to us, their general medical knowledge about the geriatric population is highly variable...They may have been at an internship where there was a big VA piece. They may have been at a university where that wasn't so emphasized. So we find that there is inconsistency in the comfort they have...thinking about and managing the geriatric patient....There's...a need to just have this basic lecture on 'When you see a patient who is older, what are the [things] that you have to think of...that are different?'" (Faculty, Institution E)*

One PD anticipated potential pushback from residents about teaching geriatric dermatology because the topics might be too nuanced or perceived as important.

*"...Attitudes on the part of the residents...some of the discussions are a little complicated and there can be push back on residents not seeing the value. Ultimately, they see the value with the patient in front of them. They may not see it in a simulated setting, or discussion-based setting..." (Program Director, Institution A)*

However, no residents reported witnessing negative attitudes toward geriatric dermatology or older adults. To the contrary, one resident described generally positive resident attitudes.

*"There's some really sweet interactions that happened between elderly patients and residents. And, oftentimes after one of the interactions, the resident will come in the chart room and say...'I just got a hug from a super sweet elderly patient,' or, 'You should hear what this patient said to me. It was really funny.'" (Faculty, Institution B)*

Many other faculty, PDs and residents cited unintentional error of omission rather than overt disinterest as the main obstacle to formalizing geriatrics curriculum.

*"I don't know if you could call it low resident interest versus not even thinking about it...it's just not getting mentioned at all." (Faculty, Institution B)*

*"In dermatology we deal with geriatric populations a lot – the majority of the time, actually...It is interesting that we don't really explicitly talk about the fact that we deal with the geriatric population as part of the curriculum." (Resident, Institution E)*

*"I guess, because we don't have it, I don't know what we're missing. So, I don't know what we need." (Resident, Institution A)*

Nonetheless, faculty, PDs, and residents at several programs described the practical constraints of existing programmatic requirements and currently "full" curriculum, which implied that geriatrics might not currently be viewed as a priority.

*"I think that all these things you want to cover compete for the time the resident is given...Time in training is very finite. We want them to be competent in the things we want them to be competent in. And, every time you add something formal to the curriculum, that is added at the*

*expense of something else. What are we doing that you could live without... and is what you're replacing it with of greater value than what is being taken away? ...I think most programs are mostly set with what they have...It's not like they're holding out. It's that they're giving what they can give, and you only have so much time in three years..." (Program director, Institution C)*

One outlier, from a program that had mostly faculty- rather than resident-led didactics, disagreed.

*"...I don't see time, or [resident] interest as a problem. I think that our residents know that so much of dermatology is...practiced with older people because of the epidemic of skin cancer and I think that they recognize that the management of older people is different and I think they want to be well prepared...We have the time in our curriculum, or we would make the time because it's important. So it's really just, as the program director, me saying this is something that needs to be done. The chief resident enacts that. We just have to find a faculty member to teach it." (Program director, Institution D)*

## ii. Assumption that geriatrics is already sufficiently taught

While geriatrics was considered worthwhile to teach, some faculty and residents believed that it was already being taught within existing curricula.

*"[Geriatric dermatology is] just kind of folded into the general curriculum..." (Resident, Institution A)*

*"I'm satisfied with how we model [geriatric education]. So when it's happening... it's more just modeling it case-by-case. We don't make [it] an explicit thing. So residents may walk away saying they don't get geriatric education at all." (Program director, Institution A)*

*"[Residents] really do see a lot of geriatric-age individuals and again most of that is going to be at the VA..." (Program director, Institution B)*

Several faculty, PDs and residents, including those who felt geriatrics was already covered in curricula, acknowledged that there are probably inconsistencies, deficiencies or potential blind spots, particularly if it is presumed to be currently taught in the informal curriculum.

*"I think that it's possible geriatrics is even more orphaned than your average topics, and that there's room for improvement, and I think heightened awareness as much as anything else about the special circumstance of the geriatric patient." (Faculty, Institution A)*

*"I think our comfort with systemic medications could be improved in general, and I think that's something that requires more thought in elderly patients or patients with comorbidities." (Faculty, Institution B)*

One subject described how existing curricula emphasized esoteric topics. This interviewee likened geriatric dermatology to psoriasis, a common skin condition that is probably overlooked unless a program deliberately renews and reviews their curriculum.

*"I really think that nationally our curriculum is focused on the esoteric. For example, we were doing a self-review and we realized that we didn't have any lectures on psoriasis. Zero psoriasis lectures. So we fixed that, but I think it was an issue that 'Yeah, psoriasis everybody knows that.' But that's not the case....it's hiding in plain sight and we see it every day so you kind of just learn to assume that everybody knows it. It's hard to force us to sit down and think is the curriculum really covering everything a dermatologist should know and that just doesn't included the segregating board questions, but it should include that our residents are well equipped to handle these every day." (Associate program director, Institution D)*

Moreover, the VA, which is where much geriatrics education through direct patient care presumably occurs, has inherent limitations such as formulary restrictions. These might limit complex medical decision making opportunities compared to other venues.

*"...When I think of the geriatric population...[and] medications like...immunosuppressive medications – the ones that were more likely to get into trouble with – I would like to know about [that] at the VA. Sure, we see those. But we're limited by what we can actually prescribe there, so we use methotrexate..." (Resident, Institution A)*

### iii. Imbalance of geriatrics teaching content

There is a paucity of teaching materials, which is due to a lack of evidence-based practices and expert consensus guidelines to manage older adults patients and inherent nuances of care.

*"We don't have a textbook on geriatric dermatology like we do for pediatric dermatology."  
(Resident, Institution B)*

*"...It is tricky especially when there's not a lot of evidence..." (Program director, Institution E)*

Existing curricular artifacts had a large quantity of cosmetic dermatology compared to other geriatrics topics in the content analysis. This finding suggests that some geriatrics topics might be disproportionately represented.

### iv. Negative societal views about aging skin

Some curricular artifacts alluded to negative societal attitudes toward skin aging as something that was necessary to be medicalized or corrected.

*"The sheer number of patients **demanding** medical therapy or procedural **intervention** to rejuvenate their skin **mandates** that dermatologists be well versed in this area." – Bologna textbook (boldface added by me for emphasis)*

*"Voluma is indicated for cheek augmentation or to **correct** age-related volume loss in the midface. " – Andrews textbook (boldface added by me for emphasis)*

A few stereotypes emerged about aging. In a Derm-in-Review board question, one case scenario described a 67-year-old man with classic new-onset herpes simplex. The patient became angry when told the correct diagnosis. One of the foils is that he might have early-onset Alzheimer's disease. This passages implies that "older adults" are demented.

**b. Enabling factors**

I identified four factors that are important to establish or expand geriatric dermatology curricula: consideration of local patient population and program needs, consistency and integration of geriatrics competencies, faculty development and teaching resources, and a need for further clinical research to guide evidence-based geriatric dermatology practice and teaching.

**i. Consideration of local program and population needs and resources**

The planning and implementation of geriatrics curricula must consider the individual residency program and patient population.

*“Our [residents] are seeing a lot more elderly patients so it’s much more likely to make it into my standard curriculum that I deliver...But if I were at a program that were primarily balancing patients a little more differently on the age spectrum...I don’t think their priorities would be the same as my priorities...” (Program director, Institution C)*

A few programs had local experts who championed geriatrics, which seemed to correlate with the PD’s level of enthusiasm for expanding geriatric dermatology.

*“I think because we do have amazing local resources [researchers, faculty] I would love for it [geriatric dermatology teaching] to be more.” (Program director, Institution E)*

However, the majority of programs did not have geriatric dermatology experts. Some subjects felt that general dermatologists or faculty specialists outside of dermatology could be sought instead.

*“I’m not sure if we have somebody who would be identified as an expert...that’s our immunobullous person, or that’s our geriatrics person...but I do think we have providers who have enough experience to provide a lecture like that...” (Resident, Institution B)*

*“So I can think of how there were a couple of key rheumatologists who really were very well respected and we really leaned heavily on them for clarity when it came to some complex connective tissue issue. The same thing came with some of the oncology guys, and some of the onc surgeons. Some of them were very good about taking the residents in and giving feedback and time.” (Faculty, Institution C)*

## ii. Consistency and integration of geriatrics

There needs to be a deliberate effort to ensure that geriatrics is consistently covered in the curriculum, rather than episodically.

*“I think our exposure to geriatric patients is sprinkled throughout multiple clinics and multiple sites, whereas in pediatrics, I think that exposure is a little bit more concrete and defined through our Children's Hospital.” (Faculty, Institution B)*

*“I think back to my medical school training and there was a lot of formal emphasis on geriatric population, managing the geriatric patients, and I don't get that sort of emphasis...with dermatology and maybe that's because it's not as direct as medical school training was...” (Resident, Institution B)*

*“I think a dedicated journal club to caring for elderly patients would be interesting and well received...Doing skin conditions that are more commonly seen in elderly patients or skin conditions that the management you would think of differently in elderly patients. I think those could be lectures that are repeated annually as opposed to a Grand Round format that you don't know when that topic, if ever, would come back again.” (Faculty, Institution B)*

Some faculty suggested having an introductory geriatrics principles topic to improve baseline knowledge of learners beginning dermatology residency that should be part of the formal rather than informal curriculum.

*“[Lectures] that would bring everybody up to speed...What is elderly skin, what about polypharmacy...end-of-life...just the sort of general concepts of geriatric care that I think internists get but I don't think that interns get because interns spend most of their time in the hospital then internists, when they are more advanced years [and] spend more time with outpatient care and that kind of generates more of these issues...[such as] home care...and I think we have some residents come really skilled in that and others that come not so skilled. And bringing everybody up to snuff [would be good].” (Faculty, Institution E)*

*“Treating the demented patient is very important, and I would like it to be more of a formal part of our curriculum rather than our clinical curriculum that they get along the way based on what patients they are seeing.” (Program director, Institution C)*

However, isolated geriatrics lectures will be inadequate. Several subjects emphasized that geriatrics concepts should be integrated into disease-based topics and bedside teaching, whenever possible.



*"I think it has to be woven into the clinical and didactic curriculum. It needs to be discussion-based because there are many nuances and oftentimes that's the whole point – that there just isn't one answer.... You can't just think that you're going to give a one-hour geriatric dermatology lecture and cover everything." (Program director, Institution C)*

*"And so it makes much more sense to integrate it around the diagnosis because, in the end, the treatments are going to be along the same spectrum it's just the way you think about doing them...I'll give you an example, so 5-fluorouracil (5-FU) for actinic keratosis versus using photodynamic therapy (PDT)...Once you understand what the treatment options are then you say 'Okay, now let's take this geriatrics setting and apply those and see what makes most sense,' and I think that if you had that basis of...the axes along which you have to treat the geriatric patient – hyperirritability of the skin, cognitive impairment, neurologic impairment, mobility issues, vision issues – once you integrate that...then picking the right treatment is more straightforward... because if you're disconnected you end up having to teach the information twice and nobody has that much time in their curriculum." (Faculty, Institution E)*

Explicitly making geriatrics part of the formal curriculum might help highlight its importance to trainees.

*"I think one of the pitfalls with that is if we don't have any emphasis on it in our curriculum or in a structured teaching then it seems unimportant perhaps a resident. So, when a patient comes in and they may have a disproportionate amount of concern about [benign or common skin conditions in older adults], it may lead to the provider to have this bias that makes them believe that this is not a significant issue and brush it off more than the patient would want." (Associate program director, Institution D)*

There must be a sense of relevance and practicality about the dermatologist's role in caring for geriatric patients and how this patient population enhances a dermatologist's skills. Active, discussion-based learning will be necessary to capture the nuances of care.

*"We are essentially geriatric doctors in many ways. We may not be prescribing all their 20 lists of medications but we're part of the whole scene. And sometimes we're a huge part, because they have to see us every 3 months..." (Resident, Institution E)*

*"Well, the big way to get people over is to contextualize it and make a...real case scenario so...any of the scenarios you build. Just say, 'This is something I've experienced'...Give it some weight as to why you're talking about it. Certainly make sure that you have residents in positions where they have to make difficult decisions so they can, over the course of their residency... experience some of the struggles." (Program director, Institution A)*

*"...This group [older adult patients] is a rich group of teachers – because they're not going to sugarcoat anything and tell us straight up...If you're in training, what you'd like is for your*

*patients to give you structured feedback...These people are grandparents. They're at the age where they're kind but they're teachers...So choosing to step into this area gives you the opportunity to improve yourself really a lot. I've become a much better dermatologist because of my geriatric patients." (Faculty, Institution E)*

*"It's hard to think from the standpoint of a learner who's seeing this all for the first time. I think it is important to remember they're hungry for practical knowledge at the start, and that you should deliver on that. I think geriatric dermatology is an important part of practical knowledge." (Associate program director, Institution D)*

Residents should have longitudinal continuity of care, autonomy and responsibility to ensure adequate geriatrics education.

*"I think without the continuity clinics it would be harder to get that [geriatrics] experience especially longitudinally but we do get it...Especially as a resident where you're in an attending clinic you may or may not catch those [medically complex older adult patients needing immunosuppressants]." (Resident, Institution A)*

*"I would say that in our program, residents don't spend enough time really owning the patients. There's so much attending backup, it's easy not to follow through, and that patient will follow up in an attending clinic and then you don't know: were there any iatrogenic issues, was that dose of prednisone too low or too high, did the home health company get to the patient's house and help with the dressing changes? I would say that if we had more continuity with complex medical patients and especially with elderly patients, I think that would serve our residents better." (Faculty, Institution B)*

### iii. Faculty development and teaching resources

PDs and faculty suggested a variety of instructional methods, depending on the clinical context.

However, faculty must seize each teaching opportunity within practical time constraints. Potential instructional methods that could be used included flipped classroom and mock discussions.

*"I would say take advantage of where ever the teaching points come up. Obviously, there is more time on the inpatient service for the resident, but that doesn't always translate to more time for the faculty member." (Program director, Institution A)*

*"...It depends on a lot on the attending in a busy clinic recognizing the opportunity to do...one minute precepting, or just learning through experience that there are ways to communicate with older people that are different than...a typical adult or even a child – so different in those two populations, thinking about the issues of comorbidities... I think that there's a lot of opportunities to teach about geriatrics, and I think that your project is great because I think many of us do that*

*informally and that sometimes both we as attendings and the residents don't recognize those informal opportunities.” (Program director, Institution D)*

Positive faculty role models might engender positive resident attitudes toward caring for geriatric patients.

*“One of our residents said, ‘I wish I could just take care of the older people in dermatology.’ ‘You can do that, you can do a practice in anything you want. If you want to do geriatric dermatology that’s a thing. So I think...you can foster interest. You can teach residents to be better equipped to handle questions that elderly patients might have particularly.” (Associate program director, Institution D)*

Creating teaching materials with a facilitator’s guide might overcome some of the inertia of implementing geriatrics curriculum, particularly faculty apprehension about the subject matter.

*“...Having [a small number of] pre-made modules would certainly take us forward a lot further than having to make them on our own... I think the only barrier beyond that...[is] just getting the person teaching it comfortable with it...So having a module where there's some... faculty...orientation background where you can read and say ‘In case you forgot, somehow older people are different, and this is how surgery could be thought of in older people.’ Just to set the foundation to orient them to the teaching, rather than...making the assumption that every general dermatologist has the same knowledge going forward...I also think there would need to be some faculty development.” (Program director, Institution D)*

*“It's hard knowing how best to teach [geriatric dermatology]. I’m not sure it's the kind of thing you just get up in front of the room and talk about. I think it’s more like facilitating discussion or something like that because there isn’t that much evidence...you can’t just say ‘Here are the guidelines, here are the criteria, and here’s the book chapters to read’...” (Program director, Institution E)*

#### **iv. Clinical research to guide evidence-based practice and teaching**

There is a need for further evidence-based or expert opinion best practices to teach geriatrics principles while balancing the need of taking a patient-centered approach.

*“As some of our treatments get more complex for general medicine stuff and these transplant patients are living longer we’re going to have to have better understanding of treatments -- the impact on skin care in the elderly...And also the guy who gets the heart transplant who’s 65 and*

*he's on voriconazole. What we do with that now? Should we be having all these transplant patients in clinic for ongoing skin maintenance?" (Faculty, Institution C)*

*"...The approach to the patient with an eruption that may or may not be due to a drug. You're not certain that it's not a classic drug rash that may have been reported with a particular drug the patient is on. The practical approach to communicate with primary care... 'Could you give this patient a hiatus of medication until their eruption gets better?'.... I think that would be a helpful formal piece of the curriculum...an algorithmic approach to that circumstance." (Program director, Institution C)*

*"I do think that geriatric medicine in general has been driven by trials and treatments, but the science of geriatric immunology and other [geriatric dermatology topics] lags way behind." (Faculty, Institution E)*

*"...Especially at an academic institution it's very easy to take...[an] academic, rigorous approach to these things [managing geriatric patients], but I don't know that's necessarily the right thing. In terms of making them a fall risk, it's not as easy as, 'Oh, put a plastic bag over it [topical medications] in the shower.' You're creating really a very slippery slope for that patient... those kind of nuanced considerations." (Program director, Institution E)*

### c. Reinforcing factors

We found two factors that could potentially incentivize or hinder geriatrics curriculum sustainability: competing clinical productivity and financial pressures that might take precedence over curriculum renewal efforts as well as existing accreditation and certification requirements.

First, there is little support for faculty to renew curriculum or do additional teaching.

*"...Is there time allotted for the attendings to develop the curriculum? As dollars have gotten tighter I think there's less ancillary support to...work on curriculum. There's certainly less salary support to devote time to curriculum development. You're being encouraged to see more patients. Well, you have to use time for that so then you spend less time reviewing the curriculum or working on materials for the curriculum." (Faculty, Institution C)*

*"We have a lot of faculty members who are busy with other things and I don't think a lot of engagement occurs on the teaching level in terms of formal didactics..." (Resident, Institution B)*

The realities or perceptions of low reimbursements and administrative burdens associated with caring for geriatric patients might counteract efforts to improve curricula and reinforce positive attitudes.

*"Many procedure codes are bundled together and if those bundled code combinations are billed together, generally Medicare will only reimburse one of the codes, typically the one with the lower value." - Jain board review*

*"...[There could be] disinterest and almost a frustration because...they come with additional [nursing home] forms to fill out. The reimbursement – once they're out in practice – may not be as good because it's Medicare and not the full pay ...." (Faculty, Institution A)*

Board examination preparation is a priority for several dermatology residency programs, but the exam content might not emphasize geriatrics, especially the principles and context of how care for this population is delivered.

*"I don't remember any specific questions that the stem really focused on [geriatrics], but the answer choice, how do I want to phrase this? You were supposed to think in the context of the elderly patient, minus the Kodachrome. I think that if you're picking out a Merkel cell [skin*

*cancer]... or identifying neoplasms that are maybe more specific to elderly patients that maybe there's the thought 'This patient is elderly and that will help me get the right answer', but I don't know that there was a question about identifying morphology that makes you think of elder abuse, or nutritional deficiency...I don't know if there's anything targeted in that way on our board exam." (Faculty, Institution B)*

### **C. Member Checking**

I sent an email summarizing the aggregated interview themes to participants. Five of the 14 subjects responded. All agreed with the findings and were supportive of this project. One person elaborated further about specific concepts that could be taught.

*"There are some basic 'geriatric medicine' principles that could be taught as they apply in derm as well as other specialties: 1. Multiple conditions are common. 2. Aging affects the skin and the associated immune system in predictable and known ways that are not well understood by dermatologists. 3. Data is available on the use of certain medications in the elderly [e.g., methotrexate] which could be shared. 4. Beer's criteria and their application to dermatology." (Faculty, Institution E)*

## V. DISCUSSION

### A. How My Findings Relate to My Hypotheses

#### 1. What are the intentional written and informally taught curricula?

I was unable to prove that southern states had more geriatrics curricula, since none could be recruited. Counter to my hypothesis, the presence of an affiliated VA or geriatrics division did not change whether programs had more geriatrics education. In fact, the two programs that were not affiliated with a VA but took care of an equal or larger proportion of older adults compared to those affiliated with VAs.

As I expected, only some programs had sporadic proprietary formal curricula (e.g., didactics, grand rounds, journal clubs) that focused on geriatrics. The exception was institution C, which had a robust case-based curriculum that included several geriatrics topics. This ran counter to what I expected, since I posited that smaller programs would have less resources to create such curricula. As I hypothesized, MK was emphasized over non-MK competencies, particularly in the formal curricular artifacts that were heavily represented by standardized textbooks and board review materials. The most common topics were cosmetic dermatology, basic science of aging, and skin cancers. The other geriatrics topics were generally scattered throughout curricular artifacts and represented a relatively small amount of the rather than being focused in specific sections or chapters.

Similar to what I expected, several subjects described inconsistent teaching of many non-MK geriatrics competencies – similar to an apprenticeship model. The consistency, frequency and quality of this education were difficult to quantify through interviews. The non-MK competencies were heavily represented in the informal curriculum, probably because geriatric dermatology is felt to be context-

specific and patient-centered but lacking strong evidence or consensus for ideal approaches. However, I did not anticipate that residents seemed to feel less confident than faculty that they were getting adequate or consistent geriatrics training. One possible reason is that residents might not recall the informal teaching that happens. Another potential reason is that faculty might not identify and seize the teachable moments in busy clinics.

## 2. What geriatric topics are perceived as important and ideal to include in the curricula?

As I hypothesized, none of the six programs performed a geriatrics needs assessment. However, interviewees unanimously felt that geriatric dermatology was important to teach. The subjects generally expressed interest through surveys and interviews about most of my proposed learning topics, and many subjects felt that geriatrics could be improved and expanded in several areas. However, there was not a trend of agreement about which topics should be the highest priority. Possible explanations might include the small sample but also the variability of existing resources and curricula at the sampled programs.

There was some discordance between survey data and content analysis of curricular artifacts about the most needed geriatrics topics, which I did not expect. Perhaps this was because preferred instructional methods need to capture the nuances of geriatric care. While traditional lectures and reading assignments have obvious limitations for these types of competencies, existing informal curriculum might be inadequate. More deliberate and interactive instructional methods, such as discussion-based approaches, might improve upon the status quo. Alternatively, the informal and sporadic nature of how geriatrics is currently taught might cause learners to perceive the topic as insignificant or perhaps not reinforce the content enough to facilitate retention.



Ironically, many of the surveyed residents and faculty expressed interest in adding or expanding basic science of aging teaching. However, it was the second most common topic in content analysis of curricular artifacts. There might be several explanations for this apparent discrepancy. Several faculty described a paucity of geriatric dermatology evidence and research, which points to an evidence gap rather than educational shortcoming. There might also be recall bias. Because geriatrics content is scattered in most curricular artifacts, perhaps learners do not perceive that they are getting as much basic science as they actually are. It is also possible that material is not being reviewed or reinforced. Anecdotally, some programs have a general sense that they do not cover enough basic science in general, which could create a halo effect about the basic science of aging. Rather than expanding basic science of aging content, perhaps integrating and refining its delivery might suffice.

A larger than expected proportion of faculty did not cover or want to add curricular about the assessment and management of cutaneous signs of older adult abuse. Unfortunately, these respondents did not specify why. None of the resident survey respondents felt that this topic was covered more than they wanted or should not be covered at all. The difference of opinions might be explained by faculty and residents valuing this topic differently. Alternatively, faculty might be assuming that residents have a basic level of competency that exceeds resident self-efficacy or actual ability.

As I hypothesized, cosmetic dermatology was one of the most common geriatrics topics in curricular artifacts. However, it was not identified as an important area of geriatrics in interviews or survey comments. Cosmetic dermatology is part of general dermatology practice and an accreditation requirement, but it is possible that this topic is dominating over other important geriatrics topics. Alternatively, it is possible that respondents did not associate geriatric dermatology with the “anti-aging” aspects of cosmetic dermatology. In other words, subjects might have felt that these were completely separate topics. Another possible explanation is that the survey did not specifically ask about cosmetic dermatology, which could have resulted in anchoring bias. Perhaps the large presence

of cosmetic dermatology is self-evident and subjects believed it was appropriately covered at the current level. However, programs might consider evaluating the proportion of time and content they spend covering cosmetic dermatology if they are interested in expanding other topics.

### **3. What are the perceived barriers and potential solutions for integrating geriatrics into dermatology curricula?**

The findings did not support my hypothesis that smaller programs might be at a disadvantage for implementing or expanding geriatrics. Institution C already had a comprehensive formal curriculum that included many geriatrics topics, and they seemed less interested compared to other programs in expanding most topics. Subjects from Institution C also vocalized a lack of institutional and departmental support for further curricular development. Institution D expressed great interest and seemed to have more flexibility in expanding geriatrics within their curriculum but lacked faculty experts or teaching materials. Most of the larger programs except for Institution E did not have dermatology faculty with specific clinical or research interests in geriatric dermatology per se. The presence of a geriatrics division at these institutions did not seem to be associated with having geriatric dermatology curricula. Furthermore, none of these programs reported collaborating with geriatricians. Perhaps this might stem from a lack of meta-knowledge about what geriatric dermatology should encompass and what resources or skills dermatologists might need that geriatricians could offer.

A few faculty and PDs hinted that there might be potentially negative attitudes from residents about learning geriatrics. However, no residents described witnessing such negative behaviors among their peers. Interestingly, the surveys suggested that some faculty and PDs might be less receptive than residents in expanding some geriatrics topics. This ran counter to my hypothesis (as well as one interviewed PD) who expected residents to lack interest in geriatrics.

## **B. How My Findings Relate to Previous Studies**

There is a dearth of literature about the educational aspects of geriatric dermatology curriculum compared to publications about the clinical care aspects of conditions in older patients. Thus, my study serves as an important first step in planning and formalizing a future geriatric dermatology curriculum for dermatology residents.

As I anticipated, several interviewees initially stated that geriatrics was already taught in their curricula, mostly informally like an apprenticeship. However, this educational approach runs counter to the current ACGME paradigm of competency-based and behaviorally anchored education(46). The attitude of many faculty and residents in the current study mirrors other studies of US and Canadian medical students and faculty, in which geriatrics is viewed as an elective that does not necessitate dedicated training(6). However, dedicated geriatrics training, rather than merely exposing trainees to geriatric patient encounters, can be more effective at improving knowledge and mitigating negative attitudes toward older adults – at least in undergraduate medical education(6).

Is it too late to wait until dermatology residency to teach geriatrics concepts? A review article by Cheng and Davis demonstrated that geriatrics curricula for residents, at least in primary care, can have a significant effect size on knowledge and attitudes(47). Examples of effective instructional methods included workshops, conferences, and simulations. Assessments ranged from knowledge tests to Objective Structured Clinical Examinations (OSCEs), but most had relatively low Kirkpatrick learning outcomes levels 1-2. Although many of the instructional methods or teaching contexts used for primary care residents do not apply to dermatologists (e.g., home or assisted-living visits, acute care for elder inpatient units), my interviewed subjects largely agreed that active learning methods would be ideal.

Many interviewed faculty and residents, when probed further, agreed that geriatrics could be more consistently taught as part of the formal curriculum. However, the ideal frequency varied by

institution. Some programs felt that just a few didactics might be adequate. Others suggested that geriatrics would be best integrated into existing curricula, even if just a few practical management pearls within relevant didactics. Based on best available education evidence, an ideal balance would be regularly scheduled didactics and more frequent knowledge application or review to prevent learning decay(48). This might be, as some interviewees suggested, a geriatrics boot camp for dermatology residents, regularly spaced geriatrics topics such as journal clubs, and faculty development activities to train faculty to identify geriatrics learning opportunities and to efficiently teach them during clinical encounters.

A potential danger of inconsistently or inadequately teaching geriatrics is the so-called Dunning-Krueger effect: when trainees lack experience and metacognition and potentially overestimate their abilities (49). While no interviewed subjects expressed concerns of overconfidence stemming from overt incompetence, there was slight divergence of survey results – with more residents than faculty reporting that the topics of assessing and managing elder abuse and determining decision-making capacity were already covered. Ironically, my study showed that some surveyed faculty had no desire to add or expand certain geriatrics topics. It is difficult to presume whether PDs and faculty had better insight into what residents actually know and already do, whether they have a clearer view of the curriculum as a whole and what geriatrics concepts should be prioritized, or whether residents might actually underestimate their abilities and skills – contrary to the Dunning-Krueger effect. In any case, it is contingent upon academic dermatologists to ensure that geriatrics training is consistently provided.

None of the interviewed or surveyed subjects explicitly mentioned that cosmetic dermatology should be part of the geriatrics curricula. Other studies have shown that many academic dermatologists agree that cosmetic dermatology is overemphasized in training (50, 51). Residency programs have a societal and ethical obligation to ensure that their graduates are adequately trained to meet the medical

needs of patient populations – rather than giving preferential elective treatment to patients with cosmetic concerns and “medicalizing” aging by emphasizing “anti-aging” treatments.

There are only a handful of published needs assessments or recommended geriatrics curricula for physician assistants, medical students, and primary care residents to use as a frame of reference for geriatric dermatology education. Those needs assessments have some topics that overlap with my thesis findings, such as avoiding polypharmacy, assessing decision-making capacity, understanding advanced directives, and discussing end-of-life care(52). However, there were several topics that were not recapitulated in the current study findings, such as arthritis, incontinence, delirium, pain management, atypical disease presentations in geriatric patients, and incontinence(17, 52). Furthermore, my findings demonstrated unique topics that are specialty-specific, such as the basic science of aging skin, cosmetic dermatology, and management of skin disorders more common in geriatric patients. The discrepancies between my findings and previously published needs assessment highlight the importance of customizing geriatrics curriculum for dermatology residents rather than assuming that existing geriatrics curricula from other contexts will be wholly transferrable.

The relative paucity of geriatrics within dermatology seems to follow a larger trend within medical education. My findings are similar to a previous study, which described several academic geriatrics programs as being relatively unsupported(53). Some of my subjects alluded to the variable degree that geriatrics is taught in medical schools and even during the internship or transitional year before beginning dermatology. One interviewee stated that their institution had no geriatricians. When academic institutions do not have strong geriatrics programs, it is more difficult to ensure consistent geriatrics training for medical students and residents(6). However, my findings suggest that having geriatricians or geriatric dermatologists is not the *sine qua non* for dermatology programs to teach dermatology residents.

I encountered glimpses into the hidden curriculum, which are the educational contexts and processes that drive the policies, resource allocation, and culture of education(24, 54). While my study did not reveal faculty and residents having blatantly negative attitudes toward older adults, a few textbook passages hinted at somewhat negative Western societal views about aging. Previous studies suggest that physicians might have neutral to negative attitudes about caring for older adults. A small, single-center study of an academic dermatology program showed that residents had self-reported geriatrics attitude scores that were near neutral(20). However, another study surveying physicians (not dermatology-specific) suggested that a substantial proportion might be either ambivalent or opposed to geriatric care. In that study, over 25% agreed that health care resources should be diverted away from caring for older adults and over 33% responded “it depends”(55). One study suggested that physicians might be more likely to have positive attitudes about geriatric patients if they have more and positive personal experiences(56). However, it is unknown whether dermatology residents might get a negatively skewed view of aging, since dermatologists spend a significant amount of time seeing age-related pathology such as skin cancers(50) rather than “healthy and successful” aging(57).

Financial factors might influence the coverage of some geriatrics topics in curricula. For example, cosmetic dermatology is heavily represented. Such procedures provide higher reimbursements that are generally out-of-pocket expenses compared to preventive dermatologic care or discussing end-of-life ethical issues with patients and their care providers. Furthermore, there are limited resources at many programs to update or change their curricula, which further reinforces the status quo. Despite the hidden curriculum elements that were found, many subjects in my study seemed to have an epiphany of metacognition when discussing what seemed to be an unintentional oversight of covering geriatrics.

### C. How My Findings Relate to My Conceptual Frameworks

In order to obtain buy-in from faculty, residents and PDs to adopt geriatric dermatology curricula, it is necessary to understand the factors that explain the status quo, which, in turn, might affect change.

The three dimensions of null curriculum provided some insight into the predisposing factors and hidden curriculum. The affective dimension might explain why geriatrics is not currently covered at most programs. Within curricular artifacts, there were a few passages that implied slightly negative views about older adults, lower reimbursements for care, or the necessity of “anti-aging” cosmetic treatments, which “medicalizes” skin aging as something that requires intervention. Another example of the affective dimension was an interviewed PD believing that some residents might feel uncomfortable with or not value the ambiguity of complex ethical and end-of-life decisions in geriatric care.

The intellectual processes dimension might also explain some of my findings. Some subjects implied that dermatology training emphasizes concrete or visual modes of thinking such as pattern recognition and test-taking skills for passing board examinations. Abstract thinking beyond MK recall, such as the nuanced approaches to geriatric patients, is difficult to teach and assess in the highly visual specialty of dermatology. Many programs have historically emphasized traditional didactics over active learning. One way to adapt geriatrics topics to existing intellectual processes is to use teaching materials that leverage data visualization and diagrams to engage learners and convey concepts. Also, the practical aspects of geriatrics should be emphasized to highlight the relevance to learners.

The subject matter dimension provided limited insight into my findings. There was variability in currently covered topics and those considered to be areas of greater need. This discordance probably reflects both a lack of consensus and lack of previous consideration of what should be taught.

Green's PRECEDE model and some of Abrahamson's "Diseases of the Curriculum" were helpful in categorizing barriers, necessary resources, and practical solutions to implement or expand geriatrics curricula. Geriatrics is probably taught sporadically for several reasons. Some residents and faculty presumed that geriatrics was already taught in the curriculum, particularly through clinical encounters with older adult patients (e.g., geriatric patients at the VA). However, there probably is overestimation of how much geriatrics specific teaching actually occurs (e.g., avoiding polypharmacy, specific strategies for improving communication with older adults), particularly in high-volume and fast-paced dermatology clinics. Faculty might not have the time, training, or incentive to explicitly teach geriatrics concepts. Depending on the curricular materials used, there could be significant variability of the quantity and quality of geriatrics topics. Certain topics might be emphasized over others, and some published study materials might unintentionally suggest slightly negative views about aging skin or caring for geriatric patients.

My triangulated data support subjects' consensus that geriatric dermatology is valued and intended to be part of the curriculum. However, the variability of survey responses suggests that geriatrics might be a potential blind spot at some programs. That is, faculty, PDs and residents might be unable to weigh the relative worth of geriatric dermatology until they explore the context of their existing curricula. This process can only begin when programs initiate self-study and reflection about what they intend or presume to be teaching and what is actually taught. Perhaps PDs might consider geriatrics to be a higher priority if they realized from this study that residents might want more education in this area compared to what PDs assumed. Alternatively, learners might not be "seeing" the geriatric care that faculty are trying to model during busy clinical encounters, which result in lost teaching opportunities. An introductory basic geriatrics principles teaching session would bring the subject to the forefront and could serve as a scaffold from which additional clinical learning could occur in a more purposeful manner.



The most formidable challenge for expanding geriatrics is overcoming the perceived burden of reviewing and updating the existing curriculum – that is, overcoming the predisposing factors by maximizing enabling factors and anticipating the reinforcing factors. To justify the importance of implementing or expanding geriatric dermatology into the curriculum, the potential benefits and perceived importance must outweigh the perceived burden or resource costs. Abrahamson reminds us that programs must periodically review their curricula, prioritize content and review how it is taught(31). If content is indiscriminately added, there is a higher risk for learner cognitive overload. One of the guiding principles of medical education is to consider what is taught with respect to changing societal needs. Perhaps programs with a long-established curriculum created it before the anticipated needs of aging “Baby Boomers” and the Institute of Medicine’s recommendation of including geriatrics in specialty training. Many faculty, PDs, and residents pointed out the limited time that residents and faculty have to expand geriatrics. However, this begs the question of what is currently being taught and to what degree as it pertains to the needs of the patient population.

The programs that appear most likely to expand geriatrics curricula have the greatest number of existing geriatric dermatology materials, resident and faculty champions, as well as flexibility and motivation to review and change curricula. Such programs would be ideal collaborators to share teaching materials or content expertise to create enduring materials that could be distributed to other programs through peer-reviewed medical education portals such as MedEdPORTAL or Portal of Geriatrics Online Education (POGOe). By formalizing and publishing geriatrics teaching materials, the scarce resources of faculty time and geriatric dermatology content experts can be captured and disseminated to standardize what is taught to residents. Authors of such enduring teaching materials would benefit by obtaining scholarly publications, which are the currency for academic promotion and tenure. Programs with fewer resources would be more likely to implement such curricula as long as they were evidence-based, practical, interactive and came with instructor guides.

Changes in accreditation and certification requirements about geriatrics would be another powerful way to motivate programs to cover geriatrics topics. For example, if the American Board of Dermatology (ABD) or ACGME had geriatrics requirements or exam blueprinting, residents and PDs would have an incentive to evaluate their geriatrics curricula and ensure a basic level of instruction and assessment of competency. Unfortunately, existing blueprints are not publically available based on review of the ABD website or through personal communications with a board member of the ABD. However, to my knowledge, geriatrics is not an explicitly covered topic.

Another strategy to reduce opportunity cost is to train faculty to identify teachable moments within existing clinical experiences and provide focused instruction and assessment. One interviewed PD suggested faculty development to encourage faculty to use the one-minute preceptor instructional methods when seeing older adult patients(58, 59). Even in clinical settings where older adult patients are not seen faculty can create hypothetical case discussions based on the clinical presentation or problem. For example, if a healthy adolescent patient presented with new onset eczema, the attending could create a learning opportunity by asking something like: “What will you do if this patient were instead 70 years old and....” This might be particularly useful in programs where fewer geriatric patients are seen or when it is illustrative to contrast the presentation and management of a younger versus older patient.

Several survey responses suggested that quality improvement (QI) projects might be another method of educating and assessing residents about improving geriatric care while also fulfilling existing ACGME requirements. Residents and faculty could be engaged to identify care processes, patient needs, patient safety issues, or geriatrics best practices that they feel are most important to their program and patient population. Such projects could advance the understanding and delivery of geriatrics care and demonstrate the value to residents, faculty, administrators and insurers. QI projects could provide objective data about patient outcomes and provider behaviors that, in turn, might promote awareness

about geriatric patient safety issues and help academicians more specifically target practice gaps, educational needs and research questions. A QI paradigm might help faculty and residents overcome uncertainty and potential discomfort about not having content expertise by focusing instead on identifying and exploring practice gaps as well as questioning the status quo(60). For example, the existing harms of dermatologists' prescribing patterns in older adults, patient falls risk in phototherapy booths, screening rates for vulvar lichen sclerosus in older women, and completeness of patient handoffs with nursing homes are unknown. However, gathering baseline data, designing interventions, and collecting post-intervention data might avoid morbidity, mortality, and unnecessary health care costs.

The largest need, due to lack of best practices and medical evidence, appears to be the non-MK geriatrics competencies. Faculty and residents believed that several topics might not be sufficiently covered in the formal and informal curricula. The latter is where most geriatric teaching occurs. One challenge in teaching and assessing geriatric dermatology is the patient-centered nuances that vary among individual patients, situations and clinical contexts. The instruction and assessment methods need to be commensal with the nature of learning objectives, which is why many geriatrics topics cannot merely be reading assignments or other passive didactics that might be acceptable for MK recall. Several interviewees suggested active learning modalities such as case discussion-based vignettes that highlight the nuances and importance of patient context in geriatrics.

#### **D. Strengths**

This study explored the state-of-the art of geriatric dermatology education at a wide variety of programs and sampled several key stakeholders. I triangulated qualitative analyses of several data sources, enlisted two other researchers to audit my coding, and used member checking to improve trustworthiness. Theme saturation was reached in the analyses of interviews and curricular artifacts.

These results demonstrate that geriatrics is assumed to be largely taught in the informal curriculum, but many believe that the current teaching is inadequate or inconsistent. The surveys and interviews helped prioritize which geriatrics topics might be higher yield and likelier to be adopted. The needs assessment process and interviews raised awareness about geriatrics at these programs, and several participants seemed receptive about expanding geriatrics education. By obtaining broad stakeholder input, adapting proposed geriatric dermatology topics from the literature, and using Green's model, there is a higher likelihood that programs will improve their geriatrics curricula.

#### **E. Limitations**

The qualitative study design does not allow me to prove causation or perform inferential statistical analysis, but it provided rich insight into the state-of-the-art of geriatrics education and potential learning gaps.

The relatively small sample size might limit study transferability. Although no eligible southern or southeastern programs agreed to participate, we believe that theme saturation was still reached because we triangulated several data sources and used purposive sampling of programs that included some faculty with geriatric dermatology clinical expertise. Two of the sampled institutions also served largely geriatric patient populations, which disproved my assumption that southern and southwestern programs would need to be sampled to find geriatrics curricular artifacts. Furthermore, one program had some geriatrics in its existing formal proprietary curriculum.

My findings might not be completely generalizable to osteopathic (DO) dermatology programs. There is a separate board examination for osteopathic residents and, only until recently, each had separate accreditation bodies. There are also far fewer DO programs. However, since MD and DO dermatologists are both likely to care for older adults, the geriatrics topics that ought to be taught are likely similar.

The availability of proprietary curricular materials varied by institution. The analyzed materials were incomplete and probably underestimated what is actually taught. Most programs did not routinely archive didactic materials, particularly conference titles, journal club topics, or faculty-led lectures. However, triangulation of other data sources helped mitigate the sampling error of proprietary curricular materials. Curricular materials might also vary year-to-year, which might affect the quality and quantity of geriatrics teaching. Many residents anecdotally update the most recent version of PowerPoint lectures, so I analyzed the most recently time-stamped PowerPoint file to increase the likelihood that I was examining the most up-to-date materials.

There is not a standardized way to perform content analysis of Kindle books. It is impossible to have a page number for this media, due to the variability of software platform, font size, and viewable reading area on various devices. However, I used the Kindle location number as a best available surrogate for page number in calculating total content. Regardless, there were very few relevant search hits in the one Kindle book source that was analyzed.

Electronic-assisted search for content analysis might not have been exhaustive for all geriatric-related material in electronic textbooks. To minimize the likelihood that I was overlooking potential search terms, I used multiple key words and an iterative approach with my co-researchers to analyze search hits and identify additional search terms. Boolean searches were not available in many of the eBook (non-Kindle) platforms, but non-whole word search options were used, when possible, to minimize the likelihood of missing relevant hits (e.g., different verb conjugations, plural words).

The absolute number of relevant search hits does not necessarily indicate the perceived importance of content. Furthermore, it is plausible that residents might not read all pages that contained geriatrics topics. They might not spend an equal amount of reading effort or didactic time for each page in a textbook. It was impossible to measure how much total time in the formal and informal

curricula was actually spent teaching about geriatrics. It is plausible that the frequency of certain concepts could lead to availability bias as being a surrogate for what is perceived as important or likely to be recalled during patient care. This study cannot compare whether the hidden curriculum (e.g., role modeling) might influence residents more than the formal and informal curricula. Finally, this study cannot suggest a “minimum” amount of geriatric content or pages that should be covered.

The anonymous surveys make it impossible to correlate interview and survey results or detect trends by institution. Given the relatively small survey response rate, it is possible that the resident and faculty might not have been from the same institutions, which limits triangulation and generalizability. However, I wanted to maximize the likelihood that people giving survey results would feel comfortable candidly responding about which topics they felt were lower priorities to minimize social desirability bias. Also, I felt it was important to minimize anchoring bias of interview responses by offering the survey afterward.

It is difficult to identify and characterize potentially negative attitudes toward geriatrics or deficits in geriatric education due to social desirability or recall bias. Even with other methods such as direct observation of clinical interactions or didactic sessions, the Hawthorne effect potentially exists(61, 62). However, my findings provided a glimpse into the hidden curriculum about why geriatrics might not be emphasized compared to other topics.

#### **F. Implications for Educational Policy**

Geriatrics is a growing part of medical practices across almost all specialties, including dermatology. This study suggests that trainees have variable amounts and types of geriatrics experiences before and during dermatology residency. Even if learners received geriatrics training in medical school, they might forget this knowledge by the time they become dermatology residents. Furthermore, from an andragogy theory perspective, geriatrics should be included during residency(63).

The dermatology resident's role in clinical care as active manager rather than passive reporter as well as the context of a specialty practice might require somewhat different knowledge and skill sets than what might be taught in medical school.

My study points to a larger systemic challenge of geriatrics education that spans the undergraduate and graduate medical education levels. It also raises the political question of which level of medical education should take "ownership" of geriatrics education. Do dermatology and internship programs need to reassess the learning goals and purposes of the intern year for a specialty that is predominantly outpatient based? Are "boot camps" necessary to ensure a floor threshold of geriatrics knowledge before beginning dermatology residency? Who would bear the costs and efforts to improve geriatrics education?

My data also suggest the need for dermatology programs, ABD and ACGME to periodically review curricula and Milestones requirements to ensure alignment with societal and patient population needs. The findings suggest that residents are not consistently taught or comfortable with managing the dermatologic needs of the aging patient population. Unless academic dermatologists, the ACGME and the ABD acknowledge what should be taught about geriatrics, it is likely that programs will prioritize only what is explicitly stated in the Milestones. The ABD is already planning "The Exam of the Future" that will replace the current in-training, certifying and recertification tests. The aims of this initiative are to assess knowledge application over recall of obscure facts. This new exam format might create momentum for programs to redesign their curricula and could also create an opportunity to include geriatric dermatology.

By the same token, programs should guard against conflating curriculum planning with board exam preparation. While programs have a fiduciary role for ensuring that graduating residents are board-eligible, a potential unintended consequence of overemphasizing board preparation at the

expense of teaching geriatrics is the implication that if a topic is not covered, it must not be important to learn or consider in clinical practice.

The relatively high proportion of cosmetic dermatology in curricular artifacts might have potentially unintended consequences or propagate misconceptions about dermatologists. A study comparing dermatology appointment wait times for cosmetic botulinum toxin injections were noticeably shorter than being seen for a concerning and changing mole(64). Residency programs must carefully consider whether existing curricula are reinforcing such practice patterns. Another random telephone survey study also showed that the public overestimated the amount of time dermatologists spend doing cosmetic work by over two-fold(50). While the public arguably expects dermatologists to be competent in cosmetic procedures, academic dermatologists must also guard against inadvertently reinforcing stereotypes about dermatology.

It is also possible that other topics might be inadvertently part of the null curriculum. While not intended to serve as an exhortative list, examples might include patient care considerations and contextual differences for minority or underserved populations such as Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, mentoring and training residents to be effective teachers, or leadership training. Broad curricular inquiry might guide future revisions of dermatology Milestones and certification requirements in other areas beyond geriatrics. The conceptual frameworks in my thesis could serve as a template for curricular needs assessment in other null curriculum subjects.

#### **G. Future Directions**

While this study focused on what is currently taught about geriatrics, further research is needed to understand the actual knowledge and skills that residents have. Knowledge tests could objectively identify some potential weaknesses. However, many of the non-MK geriatrics topics that were identified in this study would require other modes of assessments such as direct observation or chart



review. Entrustable Professional Activities (EPAs) might be an innovative method of defining and assessing resident performance, since geriatric dermatology care concepts might require the integration of several different workplace-based competencies, particularly in medically complex older patients with unique situations or psychosocial needs(65). Another potential area to investigate is the comfort level, knowledge, and skills that faculty have, which might help tailor faculty development materials.

Further qualitative studies, perhaps from direct observations or focus groups, might shed further light on the hidden curriculum that influences medical education. For example, potential political and monetary influences might shape existing curricula.

Epidemiologic, clinical, ethical, and basic science research in geriatric dermatology is also needed. Such information is critical not only for education but also health policy. For instance, Dr. Eleni Linos at the University of California at San Francisco is studying whether indolent skin cancers should be treated in older adult patients. Another potentially important question is whether older adults are allocating money away from other healthcare or personal budget items to spend on cosmetic procedures.

Although not specifically addressed in interviews or curricular artifacts, the role of health literacy and numeracy (ability to estimate and understand risks or basic health numerical information) might be another area of further study. It is controversial whether older age might be associated with poorer understanding of health care information and counseling(66, 67).

One of the surveyed faculty suggested that Micrographic Surgery and Dermatologic Oncology (formerly known as procedural dermatology or Mohs micrographic surgery) post-residency fellowships should also consider implementing geriatric dermatology competencies to address issues such as end-of-life ethical decisions about whether Mohs surgery is appropriate to treat all indolent skin cancers.

While it is important that fellows have geriatrics education, the implementation and adoption of geriatrics competencies during dermatology residency training might largely address such needs.

Finally, I could raise awareness of geriatric dermatology education and practice needs by speaking about geriatric dermatology and share the results of this thesis at national specialty meetings. Ideally, I could pilot and implement some of the teaching materials that cover topics of greatest perceived need, measure learning outcomes, and share these experiences as case studies of how geriatrics can be successfully implemented.

#### **H. Conclusions**

This needs assessment is a seminal study about the state-of-the-art of geriatric dermatology education, topics of perceived importance, potential challenges for curricular implementation and expansion, and practical solutions for how they can be overcome. We used a qualitative design to analyze several data sources across multiple institutions using purposive sampling to improve trustworthiness.

No programs have performed their own geriatrics needs assessment, but most appeared receptive to expanding geriatrics education. Geriatric dermatology was variably taught within the formal and informal curricula at the sampled institutions, and certain topics appeared to be emphasized over others. Faculty and residents generally felt that geriatrics is important to include in curricula, although there was not a trend of agreement as to which topics are considered more important. Furthermore, there might be an overestimation of what is actually taught about geriatrics.

Our findings identified topics of greatest perceived need that can help inform curricular design. For programs to implement geriatrics curriculum, the perceived importance and need must be maximized while reducing the burden and opportunity costs of such change. An important first step in overcoming this inertia is creating educational materials that are evidence-based, easily disseminated,

and include faculty development. Such teaching materials must be practical and use active learning strategies. Additionally, programs will be more likely to adopt geriatrics education if there are explicit requirements from accreditation and certification bodies explicitly address geriatrics to teach and assess it.

## APPENDICES

### APPENDIX A: Literature search terms and results

First, I tried searching specifically for geriatrics education for dermatology residents using the following strategies and databases:

Search terms: (age\* OR geriatric\* OR elder\* OR old\* OR aging) AND (skin OR cutaneous OR dermatolog\*) AND (curricul\* OR educat\*) (\* indicates wildcard or stemming for search)

PUBMED (3242 hits), Google Scholar (138 hits), Web of Science (2066 hits). No hits directly addressed the question about the state-of-the-art of geriatrics education among dermatology residents. No relevant hits were found in EBSCO, CINAHL PLUS, ERIC, Professional Development Collection, or PsycINFO databases.

I also reviewed the literature on geriatrics education for non-geriatricians using the same databases:

Search terms: (age\* OR geriatric\* OR elder\* OR old\* OR aging) AND (graduate medical education OR residen\* OR curricul\*) (\* indicates wildcard or stemming for search).

PUBMED (74500 hits), Google Scholar (1.39 million but I only reviewed first 10 pages of hits with no filters and maximum number of hits per page), Web of Science (72354 hits), EBSCO (7667 hits). Many articles were specific to level of learner (e.g., medical student) or specialty, which limited generalizability to my thesis question. No relevant hits were found in CINAHL PLUS, ERIC, Professional Development Collection, or PsycINFO databases.

## APPENDIX B: Semi-structured interview questions

I'll ask some generic questions about your thoughts about what is taught about geriatrics to your dermatology residents?

- 1) Briefly tell me about your role in planning/designing resident curriculum? (does this person seem knowledgeable about program's stated curriculum) [demographic]
- 2) (If there are questions about curricular materials that I reviewed in advance, I will ask them here. If I find no written learning objectives specifically about teaching residents how to care for older adult patients, I will verify if there are any other materials that might.) [thesis question #1]
- 3) Has your program, to your knowledge, performed a needs assessment about what residents need to know about caring for older adults? [thesis question #1]

**(If existing geriatric curricula exists based on review of curricular artifacts of the program I will ask the following subset of questions)**

- a. What methods do you use to assess resident competency of the learning objectives and instruction about caring for older adults? For instance, in-training exam, quizzes, OSCE, chart audit, or geriatric-specific quality improvement project?
- b. What instruction methods do you use to teach residents about caring for older adults?
- c. It can be challenging to measure the effectiveness and improve curricula. How does your program evaluate the impact of your geriatrics curriculum? What lessons can you share from this process?
- 4) There is content which you formally teach residents, but of course there are things the residents learn informally. Do you think your residents learn informally about caring for older adult patients? (May need to give examples: Observing, reading, talking to others.)
  - a. **Follow-up probe:** What attitudes about older adults do you think they learn informally from attendings, staff and peers? [thesis question #4]

**(If "location" (e.g., VA hospital), "they see old patients" or "they read about skin conditions that are more common in older adults" are main description of existing geriatric curricula, ask about other types of examples. E.g., some older adults have end of life ethical issues that affect management of their skin cancers. How are residents taught about this? When we prescribe medications to older patients, some might be at higher risk for medication interactions or having side effects that exacerbate their chronic conditions. How specifically do you teach your residents about that?)**

- 5) What do you think is NOT in the curriculum that they should be learning about to care for older adult patients? [thesis question #4]
- 6) What barriers exist in implementing or expanding geriatric dermatology training in your residency program? [thesis question #2] [only if person asks for clarification, give examples of Insufficient educational material and resources in the subject, Insufficient faculty with specific experience or interest in teaching the subject, insufficient resident interest, insufficient time or space in curriculum, insufficient volume of older patients]
- 7) What practical suggestions do you have for how these barriers might be overcome? [thesis question #2] [ask for proposed solutions for each identified barrier identified in Q6]
- 8) In what ways are you satisfied with the amount and quality of geriatric-specific training in your curriculum to prepare residents to manage the needs of older adult patients? [thesis question #3]

## APPENDIX B (continued)

- 9) In follow-up to my previous question, in what ways are you not satisfied with the amount & quality of geriatric-specific training? [thesis question #3]
- 10) Do you think geriatric dermatology is important to teach? (Yes, no or unsure?) Why or why not? [thesis question #2]
- 11) Demographics questions:
  - a. How many total dermatology residents do you currently have? (excluding research/Mohs/pediatric dermatology/Mohs fellows). [verify if program has combined track medicine-dermatology residents.] [demographic]
  - b. [If program associated with VA] What percentage of resident training time over 3 years is spent at a VA clinic/dermatology consult service compared to other training sites? [demographic]
  - c. What percent of resident continuity clinic patients in an average week are 65 years and older? [demographic]
  - d. Next, I'd like to ask about your residents' didactics schedules. Excluding patient encounters in clinics or for inpatient consults, how many total hours in the last academic year do you estimate your residents had geriatrics-specific didactics? [thesis question #2]
  - e. How many years have you been practicing as a dermatologist?
- 12) Finally, I drafted a list of 10 possible geriatrics topics for dermatology residents, based on a literature review and discussion with geriatricians. I'd appreciate your input. May I read the list to you now to get your verbal feedback, or would it be better to email you the list and have you take 5-7 minutes to review and reply with comments? [read survey to person or verify which email to send survey link to and ask that they complete in the next 2 weeks] [thesis question #3]
- 13) Are there any other comments that you have about curriculum for training dermatology residents how to care for older adult patients?

Thanks for your time. Your comments were very informative and helpful. Do you have any other questions for me? [Thank person for their time before hanging up.]

## APPENDIX C: Faculty Survey

Welcome!

The purpose of this survey is to understand how dermatology residency programs teach about caring for older adult patients (Medicare definition  $\geq 65$  years old). My eventual goal is to create a geriatric dermatology residency curriculum that programs can use to teach and assess geriatrics competencies, which would fulfill several of the new Milestones requirements. Your expert input as academic faculty is essential. Survey participation is voluntary and will take 5-7 minutes to complete.

Confidentiality will be maintained to the degree permitted by the technology used.

This project has been approved by the University of Wisconsin - Madison (IRB #2016-0050).

By clicking NEXT button, you agree to participate in this study and have reviewed the above information.

\* Which of the following best describes your current role? (SKIP LOGIC DISQUALIFIES NON US and NON PDs/APDs)

- Assistant or associate program director of a U.S. dermatology program
- Program director of U.S. dermatology program
- Teaching faculty of a U.S. dermatology program
- None of the above

## APPENDIX C (continued)

Current geriatric dermatology curriculum content					
For each of the following content areas, please select the degree of coverage within your current curriculum for dermatology residents and your interest in expanding it.					
	Not covered & NO plan to expand	Not covered, like to add	Covered, would like to expand	Covered about right	Covered more than I want
Assessing & managing suspected cutaneous signs of older adult abuse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitating transitions of care (patient hand offs to other providers) for medically complex older patients with multiple comorbidities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involving residents in quality improvement projects that impact older adult patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Managing chronic ulcers and wound care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Managing ethical issues in older adult patients (e.g., balancing standard of care for skin cancer with patient comorbidities or stated preferences, understanding local laws on health proxy activation and advanced directives)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determining decision-making capacity of older adult patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overcoming communication barriers with older adult patients and care providers who might have hearing or visual impairments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helping older adult patients identify appropriate resources and overcoming systems-based care challenges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prescribing safely for older adult patients (e.g., what medicines to avoid or dose adjust)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding basic science of aging and how it impacts skin disease presentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please describe any other learning content that your program has or you would like to add about managing older adult patients.					



**APPENDIX D: Resident Survey****Geriatric dermatology resident curriculum**

Welcome!

**The purpose of this survey to is to understand how dermatology residency programs teach about caring for older adult patients (Medicare definition  $\geq 65$  years old). My eventual goal is to create a geriatric dermatology residency curriculum that programs can use to teach and assess geriatrics competencies, which would fulfill several of the new Milestones requirements. Your expert input as a chief resident is essential. Survey participation is voluntary and will take 5-7 minutes to complete.**

**Confidentiality will be maintained to the degree permitted by the technology used.**

**This project has been approved by the University of Wisconsin - Madison (IRB #2016-0050).**

**By clicking NEXT button, you agree to participate in this study and have reviewed the above information.**

## APPENDIX D (continued)

Geriatric dermatology resident curriculum					
Current geriatric dermatology curriculum content					
For each of the following content areas, please select the degree of coverage within your current curriculum for dermatology residents and your interest in expanding it.					
	Not covered & NO plan to expand	Not covered, like to add	Covered, would like to expand	Covered about right	Covered more than I want
Assessing & managing suspected cutaneous signs of older adult abuse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitating transitions of care (patient hand offs to other providers) for medically complex older patients with multiple comorbidities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involving residents in quality improvement projects that impact older adult patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Managing chronic ulcers and wound care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Managing ethical issues in older adult patients (e.g., balancing standard of care for skin cancer with patient comorbidities or stated preferences, understanding local laws on health proxy activation and advanced directives)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determining decision-making capacity of older adult patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overcoming communication barriers with older adult patients and care providers who might have hearing or visual impairments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helping older adult patients identify appropriate resources and overcoming systems-based care challenges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prescribing safely for older adult patients (e.g., what medicines to avoid or dose adjust)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding basic science of aging and how it impacts skin disease presentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please describe any other learning content that your program has or you would like to add about managing older adult patients.					
<input type="text"/>					

2

**APPENDIX E: Content analysis search key words**

- age
- aging
- dying
- elder\*
- end of life
- generational
- geriatric\*
- medicare
- old\*
- palliat\*
- polypharmacy
- rejuvenat\*
- retir\*
- rhytide\*
- senesc\*
- senil\*
- senior
- specific age instances  $\geq 65$  or 6-9 decade
- wrinkl\*

## APPENDIX F: Reflexivity of researchers

Justin Endo

I have an interest in geriatrics based on my previous positive clinical and research experiences in the field that began as a first year medical student. Based on my background as being board certification in internal medicine and dermatology, I believe that geriatrics is often overlooked in dermatology. Older adults have much to offer to society as well as dermatology residents, but I think that many trainees assume negative stereotypes about older adults as being frail or taking too much time. I think that geriatric care is challenging because many older adults have comorbidities or end-of-life concerns that make medical decision-making more challenging and nebulous. I fear that geriatric patients might not be getting the best possible care, due to the high-volume nature of dermatology and lack of consistent training. I hope to leverage my training as an internist and dermatologist to advance geriatric dermatology. I received funding from the John A. Hartford Foundation and the American Federation for Aging Research to support curriculum development for teaching dermatology residents about geriatrics.

Adam Awe (RA)

I initially decided to join Dr. Endo's thesis project because I was interested in examining didactics and how education goals are created and implemented in the field of medicine. Although I do not have a particular interest in geriatrics, I thought I would benefit from taking time to think critically about how older adults are cared for and how potential ageism in resident curriculum influences their health. I am always actively uncovering my own biases and trying to address them. I did not originally think I had any biases toward elderly individuals, but the more time I spent working on this project I came to realize that I thought of them as frail, senile, and almost child-like even though I had no basis for thinking this way. Working with Dr. Endo on this project has made me aware of my own biases and I believe that these have been reduced through critical thinking of ageism in resident curriculum.

Dr. Reddy

The majority of my patients are over the age of 50 with a substantial portion of them over the age of 65. The majority have significant multi-morbidities that often take precedence over their dermatologic conditions. After reading the comments I definitely felt much more inclined towards taking their skin concerns more seriously. I love taking care of geriatric patients...

**APPENDIX G: Key word frequencies within curricular artifacts.** \* indicates a truncation wildcard, indicating that relevant hits containing part of this search string were counted to account for verb conjugations, plural versus singular forms, compound words, etc.

	Bologna (n=720)	Andrews (n=55)	Derm-In- Review Questions (n=19)	Derm-in- Review study guide (n=66)	Jain (n=13)	Institution A (n=50)	Institution B (n=0)	Institution C (n=62)	Institution D (n=1)	Institution E (n=0)
<b>&gt;=65 or &gt;=6 (decade)</b> (n=130)	96	4	16	2	1	0	0	11	0	0
<b>Ag*</b> (n=217)	179	6	0	18	3	6	0	4	1	0
<b>Elder*</b> (n=239)	173	6	1	21	1	29	0	8	0	0
<b>End-of-life</b> (n=0)	0	0	0	0	0	0	0	0	0	0
<b>Generation*</b> (n=0)	0	0	0	0	0	0	0	0	0	0
<b>Geriatric*</b> (n=3)	2	0	0	0	0	1	0	0	0	0
<b>Medicare</b> (n=16)	0	0	0	0	3	0	0	13	0	0
<b>Old*</b> (n=122)	85	11	2	10	0	9	0	5	0	0
<b>Palliat*</b> (n=20)	17	1	0	2	0	0	0	0	0	0
<b>Polypharmacy</b> (n=6)	5	0	0	0	0	1	0	0	0	0
<b>Rejuven*</b> (n=46)	37	4	0	5	0	0	0	0	0	0
<b>Retir*</b> (n=11)	0	0	0	0	0	0	0	11	0	0
<b>Senil*</b> (n=14)	10	1	0	1	0	2	0	0	0	0
<b>Senescen*</b> (n=6)	6	0	0	0	0	0	0	0	0	0
<b>Senior</b> (n=0)	0	0	0	0	0	0	0	0	0	0
<b>Wrinkl*/Rhytid*</b> (n=156)	110	22	0	7	5	2	0	10	0	0

**APPENDIX H: Geriatrics content and ACGME core competency within curricular artifacts of standardized textbooks and study materials.** To estimate the relative amount of geriatrics content, I divided the total number of unique and relevant keyword search hits within each source document by the following denominators that are demarcated in parentheses: Board preparation question bank (total number of test questions), Kindle electronic board review book (location number, which is the standardized analog of page number that removes viewing platform variables such as screen and font size), PowerPoint didactic materials (total number of slides), problem-based learning materials (total number of cases), non-Kindle electronic textbooks (total number of chapters and total number of pages, excluding table of content, indices, copyright, forward material, and electronic supplemental material pages). Values with parentheses within the table indicate % of total content that was related to geriatrics. Some passages had more than one core competency and were coded more than once. Grey indicates not applicable or not available. Note that all institutions used one or more of the standardized textbooks or review guides as part of their resident reading schedule. Abbreviations of ACGME core competencies: MK=medical knowledge, PC=patient care, ICS=interpersonal and communication skills, SBP=systems-based practice, PBLI=practice-based learning and improvement, PROF=professionalism.

Curricular artifact	Pages	Chapters	Cases or questions	MK	PC	ICS	SBP	PBLI	PROF
Bologna textbook	458 (18)	120 (75)		636	256	12	1	0	0
Andrews textbook	25 (2)	19 (48)		22	1	0	0	0	0
Derm-in-Review review questions			30 (<1)	28	13	1	0	0	0
Derm-in Review study guide	58 (9)	13 (76)		69	19	0	0	0	0
Jain review guide	12 <sup>a</sup> (<1)	5 (45)		10	4	0	3	0	0

<sup>a</sup> Kindle locations.

**APPENDIX I: Geriatrics content and core competency within proprietary institutional materials.** Values in parentheses indicate % of total content that was related to geriatrics. Some passages had more than one core competency and were coded more than once. Grey indicates not applicable or not available. Abbreviations of ACGME core competencies: MK=medical knowledge, PC=patient care, ICS=interpersonal and communication skills, SBP=systems-based practice, PBLI=practice-based learning and improvement, PROF=professionalism.

Institution	PowerPoint slides	Cases	Documents, online document repositories, conference schedules, program information forms	MK	PC	ICS	SBP	PBLI	PROF
A	49 (<1)		0	50	15	0	0	0	0
B			0						
C		11 (18)		28	23	13	15	5	2
D			1 (<1)	1	1	0	0	0	0
E			0						

**APPENDIX J: Faculty survey results.** Each table cell represents the number of survey responses for each geriatric dermatology topic.

Geriatric dermatology topic	Not covered & NO plan to expand	Not covered, like to add	Covered, would like to expand	Covered about right	Covered more than I want
Assessing & managing suspected cutaneous signs of older adult abuse	2	4	0	0	0
Facilitating transitions of care (patient hand offs to other providers) for medically complex older patients with multiple comorbidities	1	2	1	2	0
Involving residents in quality improvement projects that impact older adult patients	1	2	2	1	0
Managing chronic ulcers and wound care	0	1	2	3	0
Managing ethical issues in older adult patients (e.g., balancing standard of care for skin cancer with patient comorbidities or stated preferences, understanding local laws on health proxy activation and advanced directives)	0	1	4	1	0
Determining decision-making capacity of older adult patients	0	2	4	0	0
Overcoming communication barriers with older adult patients and care providers who might have hearing or visual impairments	0	5	1	0	0
Helping older adult patients identify appropriate resources and overcoming systems-based care challenges	0	4	2	0	0
Prescribing safely for older adult patients (e.g., what medicines to avoid or dose adjust)	0	1	2	3	0
Understanding basic science of aging and how it impacts skin disease presentation	1	1	2	2	0



**APPENDIX K: Resident survey results.** Each table cell represents the number of survey responses for each geriatric dermatology topic.

Geriatric dermatology topic	Not covered & NO plan to expand	Not covered, like to add	Covered, would like to expand	Covered about right	Covered more than I want
Assessing & managing suspected cutaneous signs of older adult abuse	0	1	2	1	0
Facilitating transitions of care (patient hand offs to other providers) for medically complex older patients with multiple comorbidities	0	1	1	2	0
Involving residents in quality improvement projects that impact older adult patients	0	2	1	1	0
Managing chronic ulcers and wound care	0	1	1	2	0
Managing ethical issues in older adult patients (e.g., balancing standard of care for skin cancer with patient comorbidities or stated preferences, understanding local laws on health proxy activation and advanced directives)	0	0	2	1	1
Determining decision-making capacity of older adult patients	0	0	2	2	0
Overcoming communication barriers with older adult patients and care providers who might have hearing or visual impairments	0	1	2	1	0
Helping older adult patients identify appropriate resources and overcoming systems-based care challenges	0	3	1	0	0
Prescribing safely for older adult patients (e.g., what medicines to avoid or dose adjust)	0	1	3	0	0
Understanding basic science of aging and how it impacts skin disease presentation	0	1	2	1	0

## APPENDIX L: IRB approval



**Education and Social/Behavioral Science IRB**  
4/8/2016

**Submission ID number:** [2016-0050](#)

**Title:** A needs assessment for geriatric curriculum for dermatology residents

**Principal Investigator:** LADAN MOSTAGHIMI

**Point-of-contact:** JUSTIN O ENDO, DIANE M BOCK

**IRB Staff Reviewer:** KAMIE LECLAIR

A designated ED/SBS IRB member conducted an expedited review of the above-referenced initial application. The study was approved by the IRB member for the period of 12 months with the expiration date of 2/23/2017. The study qualified for expedited review pursuant to 45 CFR 46.110 and, if applicable, 21 CFR 56.110 and 38 CFR 16.110 in that the study presents no more than minimal risk and involves:

To access the materials approved by the IRB, including any stamped consent forms, recruitment materials and the approved protocol, if applicable, please log in to your ARROW account and view the documents tab in the submission's workspace.

If you requested a HIPAA waiver of authorization, altered authorization and/or partial authorization, please log in to your ARROW account and view the history tab in the submission's workspace for approval details.

Prior to starting research activities, please review the Investigator Responsibilities guidance (<http://go.wisc.edu/m0lovn>) which includes a description of IRB requirements for submitting continuing review progress reports, changes of protocol and reportable events.

Please contact the appropriate IRB office with general questions: Health Sciences IRBs at 608-263-2362 or Education and Social/Behavioral Science IRB at 608-263-2320. For questions related to this submission, contact the assigned staff reviewer.

UNIVERSITY OF ILLINOIS  
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)  
Office of the Vice Chancellor for Research (MC 672)  
203 Administrative Office Building  
1737 West Polk Street  
Chicago, Illinois 60612-7227

**Exemption Granted**

March 31, 2016

Justin Endo, MD  
Medical Education  
1South Park St.  
7th Fl  
Madison, WI 53715  
Phone: (608) 287-2620

**RE: Research Protocol # 2016-0308  
"A needs assessment for geriatric curriculum for dermatology residents"**

Dear Dr. Endo:

Your Claim of Exemption was reviewed on March 31, 2016 and it was determined that your research protocol meets the criteria for exemption as defined in the U. S. Department of Health and Human Services Regulations for the Protection of Human Subjects [(45 CFR 46.101(b))]. You may now begin your research.

Please note the following about your protocol:

<b><u>Exemption Period:</u></b>	<b>March 31, 2016 – March 31, 2019</b>
<b><u>Performance Sites:</u></b>	UIC; University of Wisconsin  (Note: The University of Wisconsin is the lead performance site; subject recruitment and enrollment should be conducted in accordance with that site's IRB approval.)
<b><u>Sponsor:</u></b>	None

The specific exemption category under 45 CFR 46.101(b) is:

- (1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and UIC policy. Please be aware of the following UIC policies and responsibilities for investigators:

1. Amendments You are responsible for reporting any amendments to your research protocol that may affect the determination of the exemption and may result in your research no longer being eligible for the exemption that has been granted.
2. Record Keeping You are responsible for maintaining a copy all research related records in a secure location in the event future verification is necessary, at a minimum these documents

include: the research protocol, the claim of exemption application, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to subjects, or any other pertinent documents.

3. Final Report When you have completed work on your research protocol, you should submit a final report to the Office for Protection of Research Subjects (OPRS).
4. Information for Human Subjects UIC Policy requires investigators to provide information about the research protocol to subjects and to obtain their permission prior to their participating in the research. The information about the research protocol should be presented to subjects in writing or orally from a written script. When appropriate, the following information must be provided to all research subjects participating in exempt studies:
  - a. The researchers affiliation; UIC, JBVMAC or other institutions,
  - b. The purpose of the research,
  - c. The extent of the subject's involvement and an explanation of the procedures to be followed,
  - d. Whether the information being collected will be used for any purposes other than the proposed research,
  - e. A description of the procedures to protect the privacy of subjects and the confidentiality of the research information and data,
  - f. Description of any reasonable foreseeable risks,
  - g. Description of anticipated benefit,
  - h. A statement that participation is voluntary and subjects can refuse to participate or can stop at any time,
  - i. A statement that the researcher is available to answer any questions that the subject may have and which includes the name and phone number of the investigator(s).
  - j. A statement that the UIC IRB/OPRS or JBVMAC Patient Advocate Office is available if there are questions about subject's rights, which includes the appropriate phone numbers.

Please be sure to:

→ Use your research protocol number (#2016-0308) on any documents or correspondence with the IRB concerning your research protocol.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact me at (312) 413-3202 or the OPRS office at (312) 996-1711. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Teresa D. Johnston, B.S., C.I.P.  
Assistant Director

Office for the Protection of Research Subjects

cc: Ilene B. Harris, Medical Education, M/C 591

Matthew Lineberry, Faculty Sponsor, Medical Education, M/C 591

UNIVERSITY OF ILLINOIS  
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)  
Office of the Vice Chancellor for Research (MC 672)  
203 Administrative Office Building  
1737 West Polk Street  
Chicago, Illinois 60612-7227

**Exemption Determination**

**Amendment to Research Protocol – Exempt Review**

**UIC Amendment #2**

June 7, 2016

Justin Endo, MD  
Medical Education  
1 South Park St., 7th Fl  
Madison, WI 53715  
Phone: (608) 287-2620

**RE: Protocol # 2016-0308**  
**“A needs assessment for geriatric curriculum for dermatology residents”**

**Please be reminded of the need for Shalini Reddy, MD to address institutional approval requirements – if any – at the University of Chicago.** It appears Dr. Reddy’s limited role in the conduct of this research does not engage the University of Chicago. UIC, however, is not authorized to make an engagement determination for the University of Chicago.

Dear Dr. Endo:

The OPRS staff/members of Institutional Review Board (IRB) #7 have reviewed and approved this amendment to your research, and have determined that your amended research protocol continues to meet the criteria for exemption as defined in the U. S. Department of Health and Human Services Regulations for the Protection of Human Subjects [(45 CFR 46.101(b)].

**The specific exemption categories under 45 CFR 46.101(b) are:**

(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods; and

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

You may now implement the amendment in your research.

Please note the following information about your approved amendment:

**UIC Exemption Period:** June 6, 2016 – June 6, 2019

**Amendment Approval Date:** June 6, 2016

**Amendment:**

Summary: UIC Amendment #2 involves the addition of UIC classmate Shalini Reddy, MD as key research personnel to help with data analysis.

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and UIC policy. Please be aware of the following UIC policies and responsibilities for investigators:

1. **Amendments** You are responsible for reporting any amendments to your research protocol that may affect the determination of the exemption and may result in your research no longer being eligible for the exemption that has been granted.
2. **Record Keeping** You are responsible for maintaining a copy all research related records in a secure location in the event future verification is necessary, at a minimum these documents include: the research protocol, the claim of exemption application, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to subjects, or any other pertinent documents.
3. **Final Report** When you have completed work on your research protocol, you should submit a final report to the Office for Protection of Research Subjects (OPRS).



4. Information for Human Subjects UIC Policy requires investigators to provide information about the research protocol to subjects and to obtain their permission prior to their participating in the research. The information about the research protocol should be presented to subjects as detailed in the research protocol and application utilizing the approved recruitment and consent process and documents only.

Please be sure to use your research protocol number (2016-0308) on any documents or correspondence with the IRB concerning your research protocol.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact me at (312) 355-2908 or the OPRS office at (312) 996-1711. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Charles W. Hoehne, B.S., C.I.P.  
Assistant Director, IRB #7

Office for the Protection of Research Subjects

cc: Ilene B. Harris, Medical Education, M/C 591  
Carol Kamin, Medical Education, M/C 591

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## VITA

### Education

#### Undergraduate

- 1995-1999, University of Minnesota, College of Biological Sciences, Minneapolis, MN. B.S., Biochemistry with minors in Psychology and Chemistry.

#### Graduate/Medical School

- 2012-current, University of Illinois at Chicago, College of Education, Chicago, IL. Master of Health Professions Education (MHPE, anticipated graduation 2016).
- 2000-2005, University of Nebraska Medical Center (UNMC) College of Medicine, Omaha, NE. M.D., honors with high distinction (with thesis).

#### Residencies

- 2008-2011, University of Utah, Salt Lake City, UT. Department of Dermatology.
- 2005-2008, University of Wisconsin Hospital & Clinics, Madison, WI. Department of Medicine.

#### Other

- Nov-Dec 2011, University of Pennsylvania, Philadelphia, PA. Medical Dermatologic Society Mentorship Award to have individualized medical-educator mini-fellowship with Dr. William James; and observership of medically complex inpatients and outpatients in nail, hair, connective tissue disorder, cutaneous lymphoproliferative, infectious disease, sarcoid, psoriasis, immunobullous disease, and graft-versus-host clinics.
- Sept 2010, Duke University, Durham, NC. Donald W. Reynolds Mini-fellowship in Graduate Medical Education in Geriatrics Scholar.
- Summer 2004, National Institute on Aging (NIA) Summer Research Pre-doctoral Fellowship Program, Laboratory of Epidemiology, Demography, and Biometry.

### Certification and Licensure

#### Specialty/Subspecialty Certification

- 2011-present, American Board of Dermatology, Diplomate
- 2008-present, American Board of Internal Medicine, Diplomate

#### Medical or Other Professional Licensure

- 2008-2013, State of Utah, Inactive License 6916231-1205, 6916231-8905
- 2006-present, State of Wisconsin, Full Licensure #49751-020
- 1999-present, Basic Life Support Certification, American Heart Association

### Present Appointment/Position



- 2011-present, Assistant Professor, CHS Track, Department of Dermatology, University of Wisconsin
- 2012-present, Director, Adult Complex Medical Dermatology Clinic, Department of Dermatology, University of Wisconsin

### **Past Appointments/Positions**

- 2010-2011, University of Utah, Salt Lake City, UT. Department of Dermatology. Co-chief Resident.
- 2003, eMedicine, internet advertising coordinator. Coordinated internet advertising for major pharmaceutical sponsors. Acted as liaison between programming and sales teams and troubleshoot technical and logistic issues for advertising campaigns.
- 1999-2000, eMedicine, copy editor (World Wide Web medical reference project). Edited article submissions for Neurology, Ophthalmology, Medicine & Surgery, Physical Medicine & Rehabilitation, and Sports Medicine texts.

### **Professional Society Memberships**

- 2015-present, American Medical Association
- 2011-present, Wisconsin Dermatological Society
- 2011-present, Wisconsin Medical Society
- 2011-present, Rheumatologic Dermatology Society
- 2011-present, Association of Professors of Dermatology
- 2011-present, Dermatology Teachers Exchange Group
- 2010-2012, Pacific Dermatologic Association
- 2008-present, Utah Medical Association
- 2008-present, Medical Dermatology Society
- 2008-present, American Academy of Dermatology
- 2005-present, Alpha Omega Alpha
- 2002-2016, American College of Physicians
- 1999-present, American Geriatrics Society

### **Honors and Awards**

- 2015, American Academy of Dermatology World Congress of Dermatology Scholarship
- 2012, American Federation for Aging Research/John A. Hartford Centers of Excellence in Geriatric Medicine Scholar
- Jan 2010, Dermatology Foundation Travel Grant
- May 2005, Alpha Omega Alpha Senior Thesis Award
- Nov 2004, American Society of Hematology Travel Award
- June 2003, Boston University Geriatrics Summer Institute Scholar
- July 2001, John A. Hartford/American Federation on Aging Research (AFAR) Medical Student Geriatric Scholars Program

## Grant Support

### Major Past Awards

John A. Hartford/American Federation on Aging Research Scholar

7/2012-6/2013

\$2,000

**PI: Justin Endo**

Grant writer, curriculum development: Justin Endo, MD

Career development award to pursue a Master's in Health Professions Education to create a scholarly niche in medical education by developing geriatric dermatology curriculum for dermatology residents.

Donald W. Reynolds Foundation, pilot grant

7/2010-6/2011

\$15,000

PI: Laurence Meyer, MD, PhD

**Co-PI, grant and IRB writer, data collection and analysis, curriculum development: Justin Endo, MD**

Evaluation of needs assessment, curriculum development, and implementation of geriatric core competencies at University of Utah Department of Dermatology residency program to identify educational needs, to explore attitudes toward geriatric patients, to develop geriatric dermatology core concepts, and to develop targeted teaching materials based upon a needs-assessment survey.

## Publications

### Refereed Articles

1. Craddock LN, Cooley M, **Endo JO**, Longley BJ, Caldera F. TNF inhibitor induced alopecia: an unusual form of psoriasiform alopecia that breaks the Renbök mold. Dermatol Online J. 2017 Mar 15;23(3).
2. Endo J, Strickland N, Grewal S, Vandergriff T, Keenan T, Longley BJ, Jacobe H.

- Correspondence: The association between morphea profunda and monoclonal gammopathy: A case series. *Dermatol Online J.* 2016 Mar 16;22(3).
3. Reddy SR, **Endo J**, Gupta S, Tekian A, Park Y-S. A Case for Caution: Chart-Stimulated Recall. *J Grad Med Educ Dec* 2015; 7(4): 531-5.
  4. Monfre J, **Endo J**. Treatment of Pressure Ulcers. *Ann Intern Med.* 2015 Oct 20;163(8):647-8.
  5. Gertz R, Longley BJ, Bennett D, Ranheim E, Rajamanickam V, Kawahara T, **Endo J**. Integrating virtual dermatopathology as part of formative and summative assessment of residents: A feasibility pilot study. *J Cut Pathol.* 2015 Oct;42(10):779-81.
  6. Harris K, Calder S, Larsen B, Duffy K, Bowen G, Tristani-Firouzi P, Hadley M, **Endo J**. Opioid prescribing patterns after Mohs micrographic surgery and standard excision: a survey of American Society for Dermatologic Surgery members and a chart review at a single institution. *Dermatol Surg.* 2014 Aug;40(8):906-11.
  7. Chang AL, Wong JW, **Endo JO**, Norman RA. Geriatric dermatology review: Major changes in skin function in older patients and their contribution to common clinical challenges. *J Am Med Dir Assoc.* 2013 Oct;14(10):724-30.
  8. **Endo JO**, Wong JW, Norman RA, Chang ALS. Geriatric dermatology Part I. Geriatric pharmacology for the dermatologist. *J Am Acad Dermatol.* 2013 Apr;68(4):521.e1-10.
  9. Chang ALS, Wong JW, **Endo JO**, Norman RA. Geriatric dermatology Part II. Risk factors and cutaneous signs of elder mistreatment for the dermatologist. *J Am Acad Dermatol.* 2013 Apr;68(4):533.e1-10.
  10. Kleker B, **Endo J**, Bennett D, Snow S. Mohs micrographic surgery for the treatment of localized cutaneous alternariosis. *J Am Acad Dermatol.* 2013 Feb;68(2):e55-6
  11. **Endo JO**, Myers D, Stratman E. Conflict of interest and disclosure: analysis of American Academy of Dermatology Annual Meetings. *J Am Acad Dermatol.* 2012 Jan;66(1):e20-1.
  12. **Endo JO**, Davis C, Powell D. The potential utility of patch testing in identifying the causative agent for morbilliform drug eruptions. *Dermatitis.* 2011;22(2):114-5.
  13. **Endo JO**, Klein SZ, Pirozzi M, Pirozzi C, Hull C. Generalized *Cryptococcus albidus* in an immunosuppressed patient with palmopustular psoriasis. *Cutis.* 2011; 88:129-132.
  14. **Endo JO**, Rocken C, Lamb S, Harris RM, Bowen AR. Nodular amyloid in a diabetic patient repeatedly injecting insulin. *J Am Acad Dermatol.* 2010 Dec; 63(6):e113-4.
  15. Mikuls TR, **Endo JO**, Puumala SE, Aoun PA, et al. Prospective study of survival outcomes in

Non-Hodgkin's lymphoma patients with rheumatoid arthritis. *J Clin Oncol*. 2006 Apr 1;24(10):1597-602.

16. Moore AA, **Endo JO**, Carter MK. Is there a relationship between excessive drinking and functional impairment in older persons? *J Am Geriatr Soc*. 2003 Jan;51(1):44-9.
17. **Endo J**, Jacobsen K. Medication Reconciliation in Wisconsin: Insights from a local initiative. *Wis Med J* 2006;105(8):42-44.
18. **Endo JO**, Chen S, Potter JF, Ranno AJ, Asadullah S, Lahiri P. Vitamin B12 Deficiency and Incontinence: Is There an Association? *J Gerontol A Biol Sci Med Sci*. 2002 Sep;57(9):M583-7.

#### Non-Refereed Articles:

1. **Endo J**. In response to 'Clinical pearls: Getting the most from your dermatoscope.' *J Am Acad Dermatol*. 2015 May: 72(5): e125.
2. **Endo J**. The greatest gift. *J Am Med Dir Assoc*. 2001 Nov-Dec; 2(6): 331-2.

#### Chapters in Books:

1. Lai O, **Endo J**. Dermato-pharmacology in Older Patients. In: *Advances in geriatric dermatology*. Cham Heidelberg New York Dordrecht London Springer; 2015. Over 180 chapter downloads.
2. **Endo JO**, Norman RA. Skin problems. In: *Primary care geriatrics: A case-based approach*. Flaherty E, 6<sup>th</sup> ed. Philadelphia: Elsevier-Saunders; 2013.

#### Monographs or Books:

3. Norman RA, **Endo J**. *Clinical Cases in Geriatric Dermatology (Clinical Cases in Dermatology)*. London: Springer-Verlag; 2013. Over 17,000 downloads of 2015 (top 50% of most downloaded books in the relevant Springer eBook collection in 2015)

#### Technical Reports/Other Publications:

1. Endo, J. Invited test question writer for geriatric dermatology. In: Medina-Walpole A, Pacala JT, Potter JF, eds. *Geriatrics Review Syllabus: A Core Curriculum in Geriatric Medicine*, 9th ed. New York, NY: American Geriatrics Society 2016.

#### Abstracts

1. Nault A, Tarpley J, Saha S, Zhang C, Kim K, **Endo J**, McGetrick J, Bennett D, Xu X. A Retrospective Review on the Number of Skin Biopsies Needed per Malignancy. *American*

Academy of Dermatology Annual Meeting, San Francisco, CA, 2015; University of Wisconsin Shapiro Student Research Forum, Madison, WI, October 2013; and Wisconsin Dermatology Society, Madison, WI, May 2014.

2. Gertz R, Longley BJ, Bennett D, Ranheim E, Kawahara T, Rajamanickam V, **Endo J**. Feasibility of virtual dermatopathology as a self-study and interactive, formative self-assessment. American Society of Dermatopathology 50th Annual Meeting, Washington, DC, 2013.
3. **Endo J**, Stratman E. A proposed evidence-based medicine competency assessment tool. Dermatology Teachers Exchange Group Meeting, Oct 2010.
4. **Endo J**, Florell S, Meyer L. Needs-assessment for geriatric dermatology core concepts. Dermatology Teachers Exchange Group Meeting, Oct 2010.

#### Invited Research Presentations

##### Local:

1. **Justin Endo**. Dermatology e-Consults. Invited oral presentation at the inaugural University of Wisconsin Teledermatology Conference (Madison, WI). June 2016

##### National/International:

1. **Endo Justin O**, Ooi Melissa G.M., Black Natalie A., Aoun Patricia, Habermann Thomas M., Stoner Julie A., Armitage James O., Mikuls Ted R. Non-Hodgkin's Lymphoma in the Context of Antecedent Rheumatoid Arthritis: A Case Series from the Mayo Clinic and the Nebraska Lymphoma Study Group. Poster presented at American Society of Hematology meeting (San Diego, CA). Dec 2005
2. **Endo Justin O.**, Ooi Melissa, Black Natalie A., Bast Martin, Boilesen Eugene C., Stoner Julie A., Bergman Debra, Ristow Kay, Habermann Thomas, Armitage James O., Mikuls Ted R.. Lymphoma Characteristics in the Context of Rheumatoid Arthritis: Case Series from the Nebraska Lymphoma Study Group Registry. Poster presented at American College of Rheumatology meeting (San Antonio, TX). Oct 2004
3. **Endo JO**, Moore AA, Carter MK. Is There a Relationship between Excessive Drinking and Functional Impairment in Older Persons? Poster presentation at American Geriatrics Society meeting / American Federation on Aging Research (AFAR) Medical Student Poster Session (Washington, DC). June 2002
4. **J Endo**, S Chen, P Lahiri, S Asadullah, J Potter. Vitamin B12 Deficiency and Incontinence: Is There an Association? Poster presented at 2001 Gerontological Society of America meeting (Chicago, IL).

#### Educational Activities & Presentations

## Classroom Teaching

- Sept 2016, “How to save patients from skin cancer.” Department of Medicine, Division of Gastroenterology and Hepatology, University of Wisconsin.  
*Audience: Gastroenterology clinical staff, nurse manager, Advanced Practice Providers (APPs)*
- June-July 2016, “Chief resident board preparation Kodachrome series.” Department of Dermatology, University of Wisconsin  
*Audience: Dermatology chief residents*
- May 2015, “Everything you wanted to know about lupus and the skin but were afraid to ask!” Department of Dermatology, University of Wisconsin resident didactic series.  
*Audience: Dermatology residents*
- Sept 2014, “When a Blister or Sore...Might be an Internal Problem or More!” Department of Dermatology Advanced Practice Providers lecture series  
*Audience: APPs and Dermatology Vice Chair*
- Spring 2012 and 2013, Medical student (M1) Integrated Dermatology Course #622-724. Facilitated small group discussions.  
*Audience: First year medical students*
- Feb 2012-current, Veterans Affairs (VA) Hospital morning report, Department of Medicine, University of Wisconsin. Invited to lead case-based discussions of medical dermatology topics using team-based learning and best practices in audience response technology to enhance learner interaction.  
*Audience: Internal medicine residents, medical students*
- Oct 2011, Clinical-pathologic correlation unknowns session. Department of Dermatology, University of Wisconsin resident didactic series.  
*Audience: Dermatology residents, medical students*
- Sep 2011-current (at least annually), Kodachrome unknowns sessions. University of Wisconsin Dermatology resident didactic series.  
*Audience: Dermatology residents, medical students*
- May 2011, “Dermatitis and infectious diseases of the skin.” Invited guest speaker for University of Utah Physician Assistant program board review course series  
*Audience: Physician assistant students.*
- May 2011, “Oral Dermatoses.” Invited guest speaker for University of Utah dental resident didactic series  
*Audience: Dental residents*
- May 2011 & Apr 2010, “Hair, nail, infections, infestations, exogenous insults, and other oddities.” Presented at University of Utah Pharmacy Pathophysiology 5121 course.  
*Audience: Pharmacology students*
- Nov 2010, Aging skin. Presented at University of Utah Basic Science lecture series.  
*Audience: Faculty, residents, medical students*

- Sep 2010, “Rash Decisions” lecture about dermatologic morphologies and common conditions. Presented at University of Utah Dermatology lecture series.  
*Audience: Medical students, visiting non-dermatology residents*
- Aug 2010, “Dermatology for the podiatrist” presentation on diagnosis and management of skin diseases on the lower extremities, University of Utah.  
*Audience: Podiatry residents*
- Feb 2010 Justin Endo. “Dermatologic emergencies.” Presented at University of Utah Dermatology lecture series.  
*Audience: Medical students and visiting residents*
- Nov 2009 Justin Endo. “Neurophysiology of pruritus.” Presented at University of Utah Dermatology basic science lecture series.  
*Audience: Faculty, residents, medical students*
- Feb 2009 Justin Endo. “The Filaggrin Story: From Atopic Dermatitis to Teleological Survival Advantages and Beyond.” Presented at University of Utah Basic Science lecture series.  
*Audience: Faculty, residents, medical students*

#### CME Presentations

##### Departmental

- March 2011, “Thiazolidinediones: Panacea for diabetes and dermatologic diseases?” Department of Dermatology Grand Rounds
- Oct 2010, Quality improvement and systems-based practice in dermatology. Presented at University of Utah Dermatology grand rounds.
- May 2008, “Pressure Ulcers: How to Save Your Skin and That of Your Patients.” Presented at University of Wisconsin Department of Medicine “Advances” resident seminar series.
- May 2007, “Cultural Competency: Healthcare of Women Who Have Sex with Women.” Presented at University of Wisconsin Department of Medicine “Advances” resident seminar series.

##### State & Regional:

- April 2017, Pei S, Endo J, Longley BJ. Case presentation: Papule on the left leg. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
- May 2015, Endo J. “Everything you wanted to know about lupus and the skin \*but were afraid to ask (until now)!” Invited speaker, University of Nebraska Medical Center Division of Rheumatology, Omaha, NE.  
*Audience: Rheumatology faculty, fellows, medicine residents, medical students*
- April 2015, Craddock L, Endo J, Longley BJ. Case presentation: Lupus Erythematosus

- Profundus. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
- April 2015, Peebles JK, Endo J. Case presentation: TEN-like presentation of systemic lupus erythematosus. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
  - May 2014, McGetrick J, Hertel D, Endo J. Case presentation: Erythema induratum. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
  - May 2014, Bietz M, Endo J. Case presentation: Measles in an undervaccinated patient. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
  - May 2014, Craddock L, Longley BJ, Endo J. Case presentation: Anti-TNF-induced psoriasiform alopecia. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
  - Apr 2013, Kehoe MJ, Endo J. Case presentation: Blue rubber bleb nevus syndrome. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
  - Apr 2012, Kleker B, **Endo J**, Bennett D, Snow S. Case presentation: cutaneous alternariosis. Wisconsin Dermatological Society spring meeting, Madison, WI.  
*Audience: Dermatology physicians and midlevel providers, fellows, residents, medical students*
  - June 2011, **Endo J**, "10 Things You Always Wanted to Know about Geriatric Dermatology." Invited guest speaker for University of Utah Geriatrics Grand Rounds series, Salt Lake City, UT.  
*Audience: Geriatrics physicians, fellows, residents, medical students. Archived on web.*
  - Sep 2010, **Endo J**, LH Wilson, CM Hull. Verrucous extensor papules on a patient with hemoptysis. Presented at Pacific Dermatologic Association meeting, Pasadena, CA  
*Audience: General dermatologists*
  - May 2010, **Endo J**. A frequently hypoglycemic diabetic patient presenting with an abdominal tumor. Presented at Utah Dermatology Society meeting, Springdale, UT.  
*Audience: General dermatologists*
  - Oct 2008, **Endo J**. Generalized Plaques in a Palmar Pustular Psoriasis Patient on Efalizumab. Presented at Utah Dermatology Society meeting.  
*Audience: General dermatologists*



- Sep 2008, **Endo J.** White Glossal Lesions in an Ulcerative Colitis Patient. Presented at Intermountain Dermatology Society meeting, Sun Valley, ID.  
*Audience: General dermatologists*

#### National

- Sept 2011-2015 (every other year), **Endo J.** Geriatric Dermatology. Invited speaker at The Wisconsin Update in Geriatric Medicine and Board Review Course, Lake Geneva and Delavan, WI.  
*Audience: Geriatrics physicians, midlevels, nurses.*
- Mar 2009, **Endo J.** White Glossal Lesions in an Ulcerative Colitis Patient. Presented at American Academy of Dermatology Meeting, San Francisco, CA.  
*Audience: Dermatology physicians, midlevels, residents.*

#### International

- June 2015, Endo J, Venner M, Johnson S. WS 29 - Diabetes Mellitus and the Skin - from Scleredema to Foot Ulcers. Cutaneous complications of oral and injected diabetes treatment. Invited speaker at World Congress of Dermatology, Vancouver, BC, Canada.  
*Audience: Dermatologists.*
- Mar 2013, Chang ALS, Endo J. FOC U018 - Current Issues in Geriatric Dermatology. Invited speaker at the American Academy of Dermatology 71<sup>st</sup> annual meeting, Miami Beach, FL.  
*Audience: Dermatology physicians, midlevels, residents from United States, Europe, Asia.*

#### Clinical Teaching

- 2012-present, train new triage and clinical nurses, medical assistants, and physicians assistants, internal medicine and family practice primary care residents, medical students in Dermatology. Typically have learners other than dermatology residents present in 5/6 of clinical sessions.
- 2012-2014, Tuesday afternoon complex medical dermatology resident continuity clinic attending. Supervise the combined track medicine-dermatology residents and adult rheumatology fellows in managing autoimmune, immunoblistering, and other complex dermatologic referrals.
- 2012-present, Wednesday afternoon continuity clinic attending for categorical dermatology residents. Supervise a mix of general dermatology and autoimmune, immunoblistering, excisions, and complex dermatologic referrals.

#### Mentoring:

- Jan 2017-present, resident mentor for Dr. Noor Tazudeen.
- April 2017-present, resident mentor for Dr. Bridget Shields

#### Other

- Jan 2012-present, co-investigator. "A retrospective review on the number of skin

- biopsies needed per malignancy.” IRB submission ID number: 2013-0300. Accepted on 3/20/13. This is a retrospective medical records review on skin biopsies performed at the University of Wisconsin between 2010-2012, and were read by Dermatopathologists to collect data on the number of skin biopsies needed per malignancy. Benchmark data were collected and have been submitted for abstract presentation at the annual American Academy of Dermatology 2014 meeting. Funding: Department of Dermatology and Shapiro Grant (for medical student research assistant)
- 2012-2014, educational research project. “Virtual Dermatopathology in the Post-Graduate Trainee Curriculum.” IRB submission ID number: 2012-0466. Accepted by IRB 7/23/12. I am the PI on this educational research pilot project, which gathered data from both dermatology and pathology residents about dermatopathology education needs, barriers, and experiences with computerized, interactive “virtual” pathology software. Although the certifying exams for pathology and dermatology residents include virtual dermatopathology technology, specific use of this tool for resident teaching and formative assessment has not been adopted. The goal is to learn how such software might be best used to teach and assess dermatopathology knowledge in the context of existing study patterns, resources, and curriculum. I mentored a pathology resident, Dr. Ryan Gertz, for this project. No funding source.

## Service Activities

### Departmental

- 2015-present, Enhanced referral and e-consult task force Chair. Collaborating with primary care leadership to improve referral communication from primary care providers to dermatology to facilitate triage. Co-planning and providing e-consult tele dermatology services with Dr. Anne Rosin to improve dermatology access and decrease the need for unnecessary in-clinic referrals. Responsible for educating primary care providers about common conditions for which primary care providers can provide first-line care. Created treatment algorithms and referral checklists for the most common reasons for referral: acne, warts, atopic dermatitis, contact dermatitis, rashes, changing lesions of concern and onychomycosis.
- 2015, ICD 10 implementation task force Chair. Orchestrated efforts between coding team and Healthlink support to plan and implement ICD 10 changes. Planned training session for Department of Dermatology providers, acted as liaison between clinicians and coding and Epic.
- 2014-present, Skin cancer screening for inflammatory bowel disease task force member. Collaborating with gastroenterology (Dr. Freddy Caldera) to create guidelines and processes for identifying high-risk immunosuppressed patients for skin cancer education and screening.
- 2014-present, Transition of care committee member. Helped plan, pilot, improve and launch efforts to transition care from dermatology to primary care providers when stable with a plan to improve dermatology access.
- 2014-present, University of Wisconsin Hospital & Clinics, Department of Dermatology, Core Competency Committee member.
- 2012-2013, University of Wisconsin Hospital & Clinics, Department of Dermatology, Primary Care Agreement Task Force member.

- 2011-present, University of Wisconsin Hospital & Clinics, Department of Dermatology, Education Committee member. Assist program director in planning and implementing programmatic improvements.
- 2011-2013, University of Wisconsin Hospital & Clinics, Department of Dermatology, Compensation Plan Taskforce member.
- 2011-present, University of Wisconsin Hospital & Clinics, Department of Dermatology, Residency Selection Committee member. Assist program director in interviewing and ranking residency applicants.
- 2011-2013, University of Wisconsin Hospital & Clinics, Department of Dermatology, Departmental Operations Committee member.

#### UWSMPH/Hospital:

- 2017, UWHealth Pharmacy & Therapeutics, ad hoc committee reviewer for dermatologic indications of infliximab biosimilar.
- 2016, UWHealth Pharmacy & Therapeutics Intravenous Immune Globulin – Adult/Pediatric - Inpatient/Ambulatory Clinical Practice Guideline, ad hoc committee reviewer for dermatologic indications in immunoblasting skin diseases and severe drug reactions.

#### Community:

- April 2012-present, Volunteer Faculty, MEDiC Clinic. Supervise medical students at a community free clinic. Staff residents who refer patients from this free clinic to 1 South Park location who have more medically complex patients as pro bono community service.

#### Regional:

- 2017-present, Group Health Cooperative (GHC) therapeutics committee ad hoc consultant for dermatologic indications of biologics.

#### National/International:

- Dec 2016, invited ad hoc independent medical expert reviewer for veteran disability claim appeal about alleged association between Agent Orange and psoriasis.
- 2016-present, Reviewer, Advances in Medical Education and Practice.
- 2016-present, Reviewer, International Journal of Dermatology.
- 2016-present, Sulzberger Institute for Dermatologic Education Committee, American Academy of Dermatology.
- 2015-present, Editorial Board Member, Khon Kaen University (KKU) Research Journal (Thailand).
- July 2014-present, Reviewer, Clinical and Experimental Dermatology.
- Mar 2012-present, Reviewer, Archives of Dermatology.

### Other Activities:

- 2015-present, sub-investigator. Merck study #MK8931-019 “A Phase III, Randomized, Placebo-Controlled, Parallel-Group, Double-Blind Clinical Trial to Study the Efficacy and Safety of MK-8931 (SCH 900931) in Subjects with Amnesic Mild Cognitive Impairment Due to Alzheimer’s Disease (Prodromal AD).” Patient baseline and 6 month examinations for monitoring cutaneous side effects of experimental drug.
- 2014-2017, sub-investigator. Merck study #MK8931-017 “An Efficacy and Safety Trial of MK-8931 in Mild to Moderate Alzheimer Disease.” Patient baseline and 6 month examinations for monitoring cutaneous side effects of experimental drug.
- 2015-present, sub-investigator. “Development of Tissue Engineered Three-Dimensional Human Psoriatic Skin Equivalent Model System.” Recruit human subjects to obtain fresh skin tissue samples to develop a novel human skin model of psoriasis.
- 2012-2014, co-investigator. “A retrospective review on the number of skin biopsies needed per malignancy.” IRB submission ID number: 2013-0300. Accepted on 3/20/13. This is a retrospective medical records review on skin biopsies performed at the UW between 2010-2012, and were read by UW Dermatopathologists to collect data on the number of skin biopsies needed per malignancy. Benchmark data were collected and have been published. Funding: Department of Dermatology and Shapiro Grant (for medical student research assistant)
- Nov 2010, Association of American Medical Colleges 2010 Annual Meeting. Participated in the following workshops and sessions pertinent to my clinician-educator track:
  - Educational Value Units: Strategies to Apply Mission Based Budgeting to Educational Activities
  - Practical Steps to Design a Competency-Based Assessment System
  - Strategic Career Planning: Building an Educator Portfolio for Academic Success
- May 2010, Marshfield Clinics, Marshfield, WI.
  - Received support from University of Utah Department of Dermatology Chairman to observe Dr. Erik Stratman’s (Chair of the Council on Education for the American Academy of Dermatology) innovative curriculum that includes interactive technology integration, problem-based learning for residents, and novel implementation of the Vanderbilt University Matrix paradigm for dermatology mortality and morbidity conferences.