Integrating Structured Learning and Scholarly Activities into Clerkship Rotations: A Win-Win for Students and Preceptors

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Objective: To merge scholarly activity into the curriculum developed for medical students electing a rotation in wound care and/or dermatology.

Approach: The authors adapted the unique wound care curriculum developed for medical student rotators and residents to incorporate structured scholarly projects, opportunities for mentorship, and feedback for continued improvement.

Results: Benefits have been observed to both students and to the clinic, as reflected by online survey results, increased productivity in the form of posters and manuscripts, and opportunities for professional networking.

Discussion: Rotations and clerkships can be transformed from haphazard, bystander observational experiences to active participation that enhances comprehension and retention, while also providing benefits to preceptors.

Innovation: Integration between research, education, and clinical activities in a structured way can provide opportunity for enhanced learning experiences and promote the concept of evidence-based practice.

Conclusion: With observed benefits to students, researchers, and staff in this clinical setting, other clerkship rotation settings should consider an integrated and structured approach to learning, which includes scholarly activities. Further rigorous program evaluation is necessary to further quantify preliminary positive feedback regarding this approach.

INTRODUCTION

WITH EXPECTATIONS to utilize evidence-based practices and residency program requirements for academic projects, exposure to clinically integrated research during medical training is valuable. Research during clerkships is important in meeting the challenges of medical training and can benefit preceptors through increased productivity. We describe a structured curriculum integrating research and scholarly activity into an outpatient wound clinic.

The authors believe that examination and generation of case re-

ports, literature reviews, quality assurance projects, journal clubs, or participation in the research process teaches critical thinking and academic consumerism. Such activities, when integrated into clinical clerkships, enhance learning by increasing relevance to daily practice demands. These activities provide opportunities to promote students' motivation to actively learn, reflect, take ownership, and become more responsible professionally.¹ Beyond intrinsic motivators, extrinsic motivators for engagement in scholarly activities include obtainment of

letters of recommendation and improved admissions into desired training programs.

Most residency programs require some form of scholarly activity to understand basic research principles and their application to patient care. A multidisciplinary approach, which aligns with the goals and objectives of residency training, has been cited as beneficial to patient care for medical students.² In addition, previous studies have reported benefits from mentor–mentee relationships, an outcome fostered through this process within the clinical setting.³ These students are more likely to seek careers that incorporate research or scholarly activities, and may become more comfortable with the implementation of evidence-based medical practice.⁴

Studies utilizing students to further research agendas have shown gains in productivity, including substantial increases in publications and involvement of ancillary staff in scholarly pursuits.⁵ One program integrating undergraduates into emergency medicine research secured multiple institutional, federal, and private grants with student assistance.⁶ As funding becomes increasingly difficult, quality research publications are highly valued, and students can contribute in meaningful ways.

With the belief that a structured and integrated program is mutually beneficial, this approach was adopted to facilitate the education of rotators coming through our wound center; the concepts and preliminary outcomes are presented here.

CLINICAL PROBLEM ADDRESSED

Our outpatient wound center, which integrates clinical practice and research activities, has worked to merge a scholarly component into the curriculum developed for medical students' rotations in wound care. We briefly describe the curriculum designed to enhance active learning and promote achievement of specific competencies/learning objectives, as well as expansion of the program to include scholarly projects.

MATERIALS AND METHODS

Core curriculum

Our core curriculum for dermatology has been published elsewhere;⁷ however, the structure has been adapted for wound care education. The text guides and documents learning experiences and integrates online resources to provide introductions to wound healing pathophysiology and care of chronic wounds. In accordance with current graduate medical education guidelines, examples

delineate how to meet core competency requirements.

Birdwatching list and travel guide

The curriculum includes a birdwatching list and travel guide. The birdwatching portion is a list of wounds and conditions categorized by "must see," "good to see," and "bonus" diagnoses and treatments, with space to check items and take notes, just as a birdwatcher may use a list to document species identified. The travel guide prioritizes objectives according to the amount of time a rotator is able to spend in the clinic, just as one might say "if you only have one day in Paris, don't miss..."

Supplementary materials and experiences

Questions are included to stimulate discussions with preceptors regarding public health, prevention, and ethics. An outline of important treatment products and their indications is provided. To enhance the experience, we encourage field trips to ancillary services (*e.g.*, pedorthists, rehabilitation facilities, hyperbaric oxygen). Evaluations are also integrated into the curriculum booklet. The curriculum is continuously modified from student input and the faculty review.

Integrating research into the curriculum

Integration of research into the clinic permits the curriculum to include a scholarly project. Recognizing benefits to students and staff, projects are identified to engage students participating in longer rotations. Smaller projects include literature searches, assisting in presentations, quality improvement projects, and portions of long-term projects. Such activities help students to engage with material that is current and relevant to practice.

Stemming from the successful integration of scholarly projects into the curriculum, a standardized approach was developed for students electing more time in the clinic, or students opting to complete a separate wound research rotation. Thus, the research travelogue permitted student engagement in every portion of the research process. Research steps are listed and described within the travelogue for students to better understand the process and how to engage in each step. Research steps include human subject research training; literature searches; generate research questions and hypotheses; consider how to test the hypotheses; write proposals with background, justification, experimental plan, method and analysis plan; understand the peer review process; navigate regulatory policies and committees; conduct the project and collect data; analyze

data; and disseminate findings through presentation, poster, or publication.

Utilizing the travel guide model, the research travelogue is prioritized according to students' time constraints. For example, if a student has only 1–5 days to dedicate to a scholarly project, they are encouraged to participate in a literature review or case report to reinforce patient-based learning. If 2–4 weeks are available, the student can experience the steps of a research project through participation in various parts of on-going projects. If six or more weeks are available, some research projects can be conducted from start to finish.

Preliminary assessment

Recognizing the importance of feedback to developing a meaningful educational experience, a 26-item survey was distributed to students through email after their rotation was complete; responses could be submitted anonymously. Questions mixed closed and open response items pertaining to rotation satisfaction, comfort in diagnosis and treatment, whether or not they felt their knowledge increased, and what could have improved their experience.

RESULTS

Students have responded positively to incorporation of scholarly activities into the elective curriculum, as reflected by preliminary survey results. Whereas to date only five students have completed the recently developed survey, feedback will accumulate as students continue to rotate. Three survey respondents were medical students, while two were summer undergraduate premedical students. Most respondents identified a mentor (60%) or exceptional teacher (80%) during their experience, and most (80%) rated their experience as “high” or “very high” on a 1–5 scale.

In addition, wound center research productivity has increased, and students' professional networks have expanded. Four manuscripts and three posters are being submitted for publication or have been presented based largely on student contributions in 2013. Students have referred peers to the wound center for research experience, and an online professional networking group has been established to allow students continued scholarly exchange.

One student summarized the integrated experience as follows: “My first endeavor into research has been a very valuable experience in my journey to becoming a physician. One thing I liked about the experience was that I felt like I was actually an involved member in the team as opposed to being

KEY FINDINGS

- Research experiences during clinical clerkship rotations can facilitate learning and provide value to preceptors.
- In recognition of the value added by a research experience, a clerkship curriculum unique to wound care/dermatology was modified to include a structured scholarly activity component based on rotation length.
- The integrated curriculum has been positive to students, reflected by survey results and testimonials, and to preceptors, reflected by increased productivity.

just a bystander...The wound clinic has a lot of different research projects..., so I was able to learn a little about each of them...The ability to work with the interdisciplinary team allowed me to witness how the roles coalesced to drive the improvement of patient care.”

DISCUSSION

We recommend integrated rotations as a standard part of undergraduate medical training based on our experiences and positive survey responses. Whereas more rigorous program evaluation methods may quantify outcomes, the integrated research experience appears meaningful; we feel the program promotes critical thinking, active participation for comprehension, and the practice of evidence-based medicine. Students become part of a team rather than bystanders soaking up new knowledge, and the travelogue concept permits a focus for the traveler who may have limited time, while also providing additional resources (hopefully whetting the intellectual appetite).

Finally, integrated wound rotations help to fill a gap in wound education. Although chronic wounds are considered a global “silent epidemic,”⁸ very little time is spent in educating medical professionals in the complexity of wound care. A study to examine the amount of time dedicated to wound training found that medical schools in the United States and Canada spend only 9.2 h over the entire 4 years.⁹ Considering that wound care touches most medical specialties, an integrated curriculum in wound pathophysiology, treatment, and research is sorely needed.

CONCLUSION

The implementation of an integrated curriculum in this outpatient wound care clinic demonstrates initial positive findings; other clerkship rotation settings should consider the development of an integrated and structured approach, with methods for evaluation and continued refinement. Whereas

an initial investment in resources is necessary, we believe that the benefits to students and clinical sites far outweigh any costs.

INNOVATION

This relatively simple curriculum, developed around core competencies and specific learning objectives, serves to provide a structure in clinical settings. Whereas many clinical settings accepting student rotators already have a curriculum in place, we believe that an integrated scholarly activity component promotes collaboration, a better understanding of evidence-based practice, and facilitates successful outcomes for rotators, researchers, and staff.

AUTHOR DISCLOSURE AND GHOSTWRITING

This work was not written by any writer other than the authors. S.M. has no conflicts of interest. J.F. has no conflicts of interest directly related to this manuscript. Other potential conflicts of interest include: collaborator on a grant from the Ohio Department of Development (tissue engineering); principal investigator on contracts with Silvergreen Ltd. (silver wound dressing) and Sterionics, Inc. (non-thermal plasma) for animal trials; sub-investigator on sponsored clinical trial with Healthpoint (spray on cells); co-investigator on NIH R15 grant in collaboration with the University of Akron (oxygen-releasing polymer)—all funds paid to the Akron General Medical Center; lecturer at the Symposium for Advanced Wound Care on Interdisciplinary Wound Care Teams (travel, accommodations, and honorarium); advisory board for Sterionics, Inc.—no pay; patent pending on “Autologous *In Situ* Tissue Engineering”—no roy-

alties. She is also a member of the Education Committee of the Wound Healing Society. E.M. has no conflicts of interest directly related to this manuscript. He is principal investigator on a sponsored clinical trial with Healthpoint (spray on cells). He is on the Speaker's Bureau for Healthpoint and Medline and has received honoraria. He is on the Editorial Board for Ostomy Wound Care and Archives of Dermatology. Previous Presentations: although the “birdwatching list” and “travel guide” concept was developed originally for dermatology and has been published, the adaptation to wound care and the incorporation of the “research travelogue”/scholarly activity concept is new; this concept has not been previously published and this manuscript is not being considered for publication elsewhere.

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Stephannie Miller, BA, is a research assistant in the Wound Center at Akron General Medical Center. She works closely with students and residents, and is currently pursuing her MPH at Kent State University. **Eliot Mostow, MD, MPH**, is a practicing dermatologist and coleads research efforts in the Wound Center at Akron General Medical Center. He is also professor and chair of the Dermatology Section and chair of the Master Teacher Guild at the Northeast Ohio Medical University and professor of clinical dermatology at the Case Western Reserve University. Eliot works closely with **Judith Fulton, PhD**, Director of Wound Research at the Akron General Wound Center. Judy coordinates bench to bedside research, including basic science, preclinical and clinical trials, as well as education opportunities for residents and students.

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