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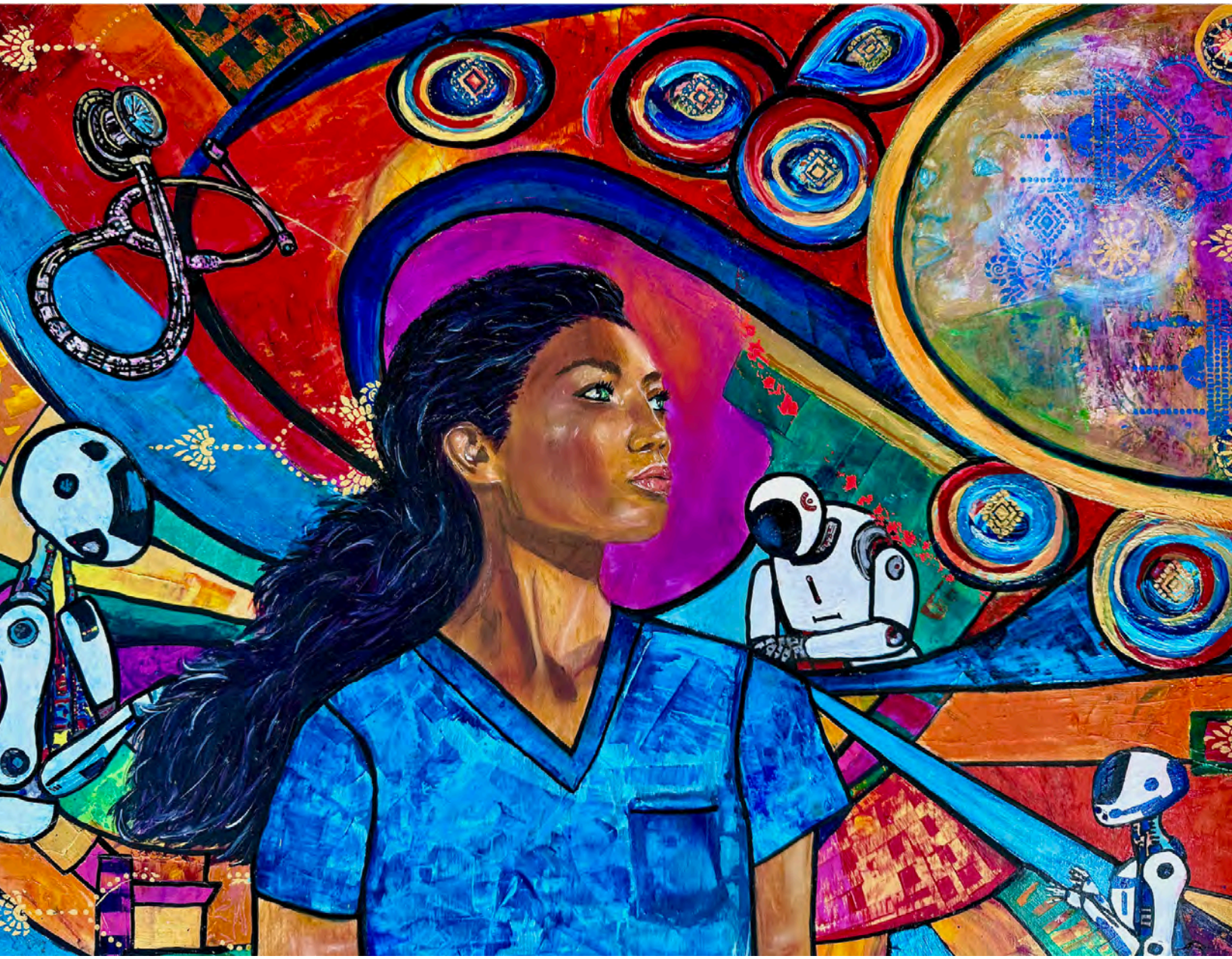

Medical Education

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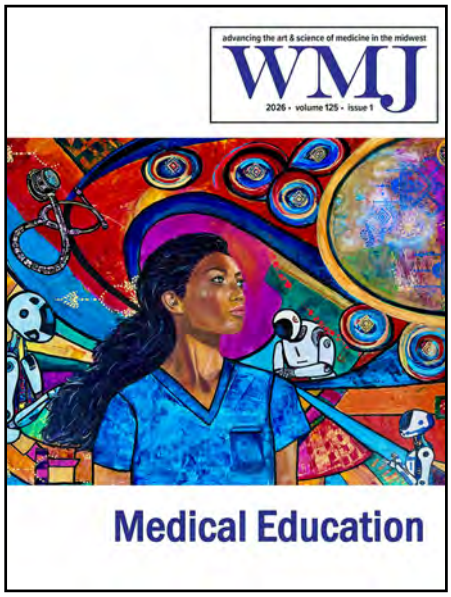

COVER ART

Deep Learning

Ryan McAdams, MD

Acrylic and soft pastels

Artist Statement:

"Deep Learning" reflects on a future where clinicians learn and practice alongside intelligent machines. The piece invites viewers to consider how technology will shape medical education, identity, and care.

• • •

The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues. *WMJ* is published through a partnership between the Medical College of Wisconsin and the University of Wisconsin School of Medicine and Public Health.

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EDITORIAL

TEACHING AND LEARNING INNVOVATIONS

The *WMJ* (ISSN 1098-1861) is published by the Medical College of Wisconsin and the University of Wisconsin School of Medicine and Public Health and is devoted to the interests of the medical profession and health care in the Midwest. The managing editor is responsible for overseeing the production, business operation and contents of the *WMJ.* The editorial board, chaired by the medical editor, solicits and peer reviews all scientific articles; it does not screen public health, socio-economic, or organizational articles. All articles and artwork published herein, including commentaries, letters to the editor, and editorials represent the views of the authors, for which neither *WMJ* nor the publisher take responsibility, unless clearly stated. Advertising content is the responsibility of the advertiser and does not imply an endorsement or sponsorship by *WMJ* or the publsiher and its affiliates unless specified. *WMJ* is indexed in Index Medicus, Hospital Literature Index, and Cambridge Scientific Abstracts.

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Thank you!

to the following artists who contributed their work to this special issue

Vincent Cryns, MD
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"Reverse Transcriptase"
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Inside back cover

Educating the Healers of Tomorrow: Lessons From Innovation, Empathy, and Equity

Fahad Aziz, MD; Leila Famouri, MD, MPH; Bipin Thapa, MD, MS; Tripti Singh, MD; Corlin Jewell, MD; Alisa Hayes, MD; Anna Gaddy, MD; David Rebedew, MD; Andrew Coyle, MD

Medical education stands at a pivotal crossroads. As our profession redefines competence beyond clinical knowledge – to include empathy, equity, and systems thinking – educators are reimagining how we prepare the next generation of healers. This issue reflects that transformation through four interconnected themes. The first explores teaching and learning innovations, where educators harness technology, simulation, and creative curricula to make learning active, adaptive, and outcome based. The second examines professional identity and well-being, reminding us that empathy, mentorship, and psychological safety are essential to the formation of compassionate physicians. The third focuses on health equity and pathways, showcasing programs that expand access, address systemic bias, and prepare learners to serve historically marginalized communities. Finally, the fourth highlights faculty development and lifelong learning, recognizing that the evolution of medical education depends as much on nurturing educators as it does on training students. Let's explore these four themes – each a vital reflection of where medical education stands today and where it must go next.

• • •

Author Affiliations: Dr Aziz is *WMJ* editor in chief; Drs Famouri, Thapa, Singh, Jewell, Hayes, Gaddy, Rebedew, and Coyle are members of the Advisory Board for this special issue.

Teaching and Learning Innovations

The first theme in this issue highlights innovation at the frontlines of medical education – where creativity meets curriculum. Across Wisconsin and beyond, educators are moving beyond traditional lectures toward immersive, learner-centered approaches that make learning more engaging and meaningful.

> Ultimately, the future of medicine will be shaped not only by new discoveries, but by how we teach those who will carry them forward.

Efforts to strengthen core clinical training form the foundation of this transformation. A structured orthopedic surgery rotation supported by video lectures improved knowledge and confidence among medical students,[1] while mock oral competency exams for surgical interns demonstrated how simulation can bridge theory and practice in a safe environment for skill development.[2]

Technology is also reshaping medical learning. A case-based podcast curriculum in obstetrics and gynecology (OB-GYN) transformed brief preclinic moments into engaging discussions,[3] and AI-powered tools such as ChatClinic enabled pharmacy students to practice diagnostic reasoning through virtual renal cases.[4]

Simulation remains central to modern medical education. A mixed-methods study of OB-GYN residents and faculty highlighted strong support for a structured and standardized simulation curriculum.[5] Complementing this work, a comprehensive review traces the evolution of simulation – from early models to emerging technologies such as virtual reality and artificial intelligence – demonstrating its growing role in developing clinical reasoning, technical skills, and teamwork.[6]

Innovation is also evident in everyday learning environments. Standardized documentation templates improved the clarity and efficiency of clinical notes,[7] while patient-based discussions strengthened clinical reasoning by linking foundational science to real patient scenarios.[8] Peer mentorship programs pairing junior and senior medical students further enhanced understanding of competencies and scholarly work.[9]

Learner feedback also informs curricular improvement. A survey of graduating physician assistant students found positive perceptions of a geriatrics curriculum while identifying gaps in the 4M's (What Matters, Medication, Mentation, and Mobility) framework, dementia care, and geriatric pharmacology.[10]

Educational innovation extends to clinical

training. Academic hospitalists reported that bedside rounds enhance communication and shared decision-making, though barriers such as duty-hour limits highlight the need for new rounding models.[11]

Finally, learners themselves are shaping the future of education. Medical students reported that scholarly work increasingly influences residency interviews and match success.[12] Resident-led quality review initiatives strengthened patient safety education,[13] while student–faculty co-creation programs improved curricular design.[14] Similarly, a student-designed communication training program enhanced preclinical students' confidence in navigating difficult clinical conversations.[15]

Together, these studies demonstrate that innovation in medical education emerges through collaboration between educators and learners. By transforming how knowledge is applied and experienced, these efforts move trainees from information toward clinical mastery while preserving the human connection at the heart of medicine.

Professional Identity and Well-Being

The second theme underscores a profound truth: before physicians can care for others, they must first learn to care for themselves and one another. Professional identity is not a checklist of competencies – it is a journey of becoming, shaped by uncertainty, reflection, and mentorship. This issue reminds us that well-being, empathy, and mentorship are not optional in medical education – they are its foundation.

Several studies highlight the human dimensions of training that often go unspoken. A study on gender-based differences in medical student well-being revealed higher stress among women and underscored the impact of the "hidden curriculum" – the subtle messages about hierarchy, belonging, and self-worth.[16] The SPIRiT framework for resident remediation reimagines remediation as a supportive process rooted in compassion and psychological safety, shifting the culture from discipline to dialogue.[17]

Mentorship also emerges as a powerful theme. In "Are You My Mentor?," pediatric residents described a gap between having advisors and experiencing genuine mentorship – emphasizing that true guidance is relational, built on trust and authenticity.[18] Similarly, research on clinical empathy shows that while students value empathy, it often declines during clinical training; yet exposure to compassionate faculty and meaningful patient interactions can sustain it.[19]

Together, these studies affirm that the development of professional identity is inseparable from the culture in which physicians are trained. The next generation of clinicians must be not only skilled diagnosticians but also resilient, reflective, and grounded in purpose. Creating environments where vulnerability is strength and connection is the currency of learning ensures that the healing of the healer remains intertwined with the healing of the patient.

Equity and Pathways

The third theme – Equity and Pathways – reflects the moral foundation of medical education: ensuring that the path to becoming a physician is inclusive and responsive to the communities medicine serves. Education is not only the transfer of knowledge but also a commitment to social responsibility. The studies in this issue remind us that who we train, how we train them, and where they ultimately practice shape the future of health care.

Several contributions highlight how educational pathways can expand access to underserved communities. The Wisconsin Academy for Rural Medicine (WARM) program continues to address rural workforce shortages, with graduates significantly more likely to practice in underserved areas.[20] Similarly, the Rural and Urban Community Health Scholars (RUSCH) pathway demonstrates how early mentorship and mission-driven training can guide students toward careers rooted in service and equity.[21] These initiatives show that educational pathways are not merely pipelines but commitments to communities often left behind.

Other studies examine inequities that may arise earlier in the educational journey. An analysis of gender and racial differences in residency personal statements highlights subtle disparities that may influence opportunity in residency selection.[22] At the same time, programs integrating didactics, clinical experience, and reflection – such as a transgender health curriculum in obstetrics and gynecology – illustrate how empathy and clinical competence can grow together when equity is embedded throughout training.[23]

The humanities offer another lens for cultivating compassion and justice in medicine. Educational initiatives exploring suffering, social justice, and patient narratives encourage deeper reflection on the moral dimensions of health care.[24] At the same time, emerging scholarship highlights the ethical challenges posed by new technologies. One study examining AI-generated images found that portrayals of "medical students" disproportionately represented White and female individuals, raising concerns about bias within artificial intelligence systems.[25] In contrast, a medical humanities course addressing suffering and social justice strengthened students' commitment to compassionate, patient-centered care.[26]

Together, these studies move us toward a vision of medical education that reflects the diversity and humanity of the patients we serve. Equity in education is not a destination but an ongoing process of reflection and reform – beginning with the courage to reimagine who belongs in the story of healing.

Faculty Development and Lifelong Learning

The fourth theme – Faculty Development and Lifelong Learning – reminds us that the future of medical education depends not only on how we train students, but also on how we support those who teach them. Faculty balance clinical care, research, and education in systems that often undervalue teaching, making mentorship and institutional support essential.

Several studies highlight challenges faced by clinician educators. Promotion pathways remain unclear, emphasizing the need for mentorship and transparency in advancement.[27] Similarly, early-career faculty show strong enthusiasm for teaching but face barriers such as limited protected time and rec-

ognition.[28] During curriculum redesign, faculty also expressed concerns about workload and unclear roles, underscoring the need for targeted faculty development.[29] Interest in new clinical training tools is also growing, with residents and faculty reporting strong interest in point-of-care ultrasound education.[30]

Innovative programs are helping address these needs. Flexible faculty development initiatives, such as the Education Essentials asynchronous curriculum and the curriculum for planners of accredited interprofessional continuing education, provide accessible training for educators across disciplines.[31,32] The Fellow as Medical Educator (FAME) program further demonstrates how structured mentorship can help fellows develop confidence and identity as educators early in training.[33]

Other initiatives focus on strengthening clinical education. Training programs addressing behavioral and psychological symptoms of dementia highlight gaps in clinician knowledge and resources,[34] while community-based education for birth workers improved confidence in managing maternal hypertension and addressing maternal health disparities.[35]

Together, these studies emphasize that supporting educators through mentorship, training, and institutional commitment is essential to sustaining innovation and advancing the future of medical education.

Conclusions

Taken together, the research and commentaries in this issue portray a profession in motion – one that is questioning its traditions, refining its purpose, and reimagining how future physicians are prepared. Across classrooms, simulation centers, rural clinics, and digital learning spaces, educators are redefining what it means to teach, to learn, and ultimately to heal. These contributions remind us that medical education is not merely about transmitting knowledge; it is about shaping character, cultivating empathy, and nurturing the resilience required to serve patients and communities.

Many of these studies reveal measurable outcomes – improvements in knowledge, confidence, and educational structure – while others illuminate more subtle transformations in perspective, culture, and identity. Together they reflect a broader paradigm shift: education must do more than maintain the status quo. It must challenge it, inspiring change at the personal, professional, and population levels. In this way, medical education becomes not only a pathway to competence, but a catalyst for a more compassionate and equitable health care system.

In the end, the true curriculum of medicine is not written in textbooks or lecture slides, but in the values we pass from teacher to learner and from healer to patient. As Sir William Osler famously reminded generations of physicians, "Listen to your patient; he is telling you the diagnosis." In that spirit, this issue serves as both reflection and renewal – a reminder that every innovation in education ultimately returns to the human being at the center of medicine.

We are deeply grateful to the members of the *WMJ* Medical Education Issue Advisory Board for their insight and partnership, to our authors and reviewers for their scholarship and dedication, to the contributing artists for their unique expression of this topic, and to the *WMJ* Publishing Board for their continued guidance. Their contributions represent the work of more than 225 individuals. We extend special appreciation to Managing Editor Kendi Neff-Parvin, whose vision, care, and tireless commitment brought this issue to life. Most importantly, we are profoundly thankful to our readers – educators, clinicians, and learners – whose curiosity, reflection, and commitment to growth sustain the ongoing evolution of medical education.

Ultimately, the future of medicine will be shaped not only by new discoveries, but by how we teach those who will carry them forward. Supporting learners, empowering educators, and remaining faithful to the humanity at the heart of medicine will ensure that the next generation of physicians is not only skilled, but wise.

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The Evolution of Medical Education Into a Robust Academic Discipline

Corlin Jewell, MD; Alisa Hayes, MD

"Just write it up!" It is a phrase any educator has heard many times when describing their latest lecture series or simulation case. Those who say it mean well; these senior leaders hope to see their colleagues or mentees "double dip" and get extra scholarly credit for the work they've done. It sounds simple, right? The "hard" part—creating the content—is already finished. Just create a quick post hoc evaluation survey, send it out, and submit the report to a journal.

However, it is easy to imagine the questions journal reviewers might raise. Why was this the appropriate context in which to study this intervention? Who designed the survey? How do you know whether knowledge was effectively transferred to your learners? You might think reviewers are being overly harsh, but the reality is that the answers to these questions matter. These considerations require forethought and planning at the earliest stages of medical education research. Without such deliberate planning, educators may limit the impact of their innovation—or worse, hinder learners' understanding of the very concepts being addressed. Overlooking these considerations also disregards the remarkable conceptual work that now exists in the health professions education (HPE) literature.

What was once a field characterized by anecdotal evidence and "teaching tips" has matured into a rigorous discipline with robust methodologies and clear expectations for study design.

A few decades ago, simpler strategies may have been sufficient. However, this does not account for the progress in our field. It is no longer acceptable to disseminate work without sufficient evidence supporting the validity and appropriateness of the methods used. Advancing the field requires more than self-reported learner gains in understanding or confidence after a didactic session. We must set our sights toward higher-level outcomes that drive meaningful change. We should not settle for simply repeating what has already been done when, in many cases, best practices are well-established.

This realization underscores something remarkable. What was once a field characterized by anecdotal evidence and "teaching tips" has matured into a rigorous discipline with robust methodologies and clear expectations for study design. The field is now at a point where not every educational intervention needs to be published; often, more robust work on the subject already exists. Those engaged in HPE research no longer have to fight for institutional recognition of their scholarly work. Educational research is now routinely considered in annual evaluations and promotion decisions on par with more "traditional" research. HPE has earned its place as a legitimate form of academic inquiry.

As academic physicians, we have the responsibility of cultivating and sustaining this culture of inquiry. For the benefit of the future health care leaders we train, we must be more than effective bedside educators, clinicians, and classroom teachers—we must continue moving the field forward. Yet, despite expectations for scholarly productivity, training opportunities and grant support for medical education have not always kept the same robust pace.

Many emerging scholars in medical education, and even entire departments, lack the resources, support, and networks to study and evaluate their educational interventions. Regional and national professional societies focused on research and education are often a great source of support for and serve as a venue for dissemination. However, given recent

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uncertainties, external support may not always be available. Local education experts must therefore be prepared to mentor junior faculty, develop them as investigators, and support the pursuit of their research goals. Mentors should not simply tell their mentees to "write it up;" they should teach mentees how to investigate a research question appropriately, select appropriate methodologies, and employ rigorous means of data analysis. Better yet, they can bring together local educational scholars across experience levels to offer mutual support and share ideas. In doing so, it is possible to drive projects from local didactics to national curricula.

Of course, the growth of scholarship in medical education relies on effective channels to disseminate these latest innovations. Recent years have seen the emergence of a plethora of peer-reviewed publications dedicated to elevating HPE research, ranging from outlets publishing general medical education curricula to those focused on individual medical specialties.

These publications play an essential role in bringing awareness to the research that informs best practices in health care education around the world. The Wisconsin Medical Journal is proud to contribute to these efforts with this special issue. It showcases work dozens of HPE experts across the region and addresses a wide range of emerging topics. We are excited to share this collection of innovations with the educational community in Wisconsin and beyond.

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Educating the Healers of Tomorrow: Lessons From Innovation, Empathy, and Equity

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The Mythology of Competence in Medical Education

Bryan Johnston, MD;* Jahanvi Kothari, DO*

The Competent Educator

"See one, do one, teach one." We have all heard it, uttered it. The message is enticing to a medical learner – both daunting and empowering. Are medical knowledge and skill so tangible and easily transferred? The idea defies personal experiences of hard-won knowledge, and yet there is something to it. Even as learners, there are valuable things to share with one's peers or patients. This "teaching" becomes part of a developing sense of competence. Competent clinicians have seen things, can do things, and can teach them to others. But for the medical educator, competence can represent both aspiration and anchor.

This special issue of *WMJ* presents novel health professions educational approaches and innovations. We offer the frameworks below to readers as lenses through which to consider the issue and its potential to fuel their growth as educators.

The Competency-Based Educator

The competency-based medical education (CBME) movement has recently produced a variety of frameworks, such as Accreditation Council for Graduate Medical Education (ACGME) Milestones[1] and entrustable professional activities (EPAs),[2] which identify professional activities and their expected developmental path. CBME views development as continuing over time, compared to the finite mastery of "see one, do one, teach one." Mahan et al[3] developed the Clinical Educator Milestones (CEMs), a competency-based framework for medical educators. CEMs highlight continuous development with this universal pillar: "Demonstrate the commitment to lifelong learning and enhancing one's own behaviors as a clinician educator."

Unfortunately, many health professionals have limited opportunities to develop substantially as medical educators. Health professions education institutions dedicate far less resources to developing the learner's capacity to "teach," rather than to "see" and "do" medicine.[4] While medical learners are often placed in teaching roles, they are less frequently provided with formal training in teaching methods or theories.[4-6] What is offered ranges widely, lacks consensus on content or approach, and is often optional.[6] Medical learners largely enjoy teaching and are motivated to improve their teaching skills, often seeking informal development opportunities such as feedback from learners and mentors or by observing others' approaches.[7] However, without robust formal training, they may rely on their own experiences as students to guide them. The resulting teaching can vary widely in approach and effectiveness. Faculty expect this teaching to be sufficient to help junior learners prepare for rounds, to identify and share new information, to provide feedback, to assist in evaluations, and to fulfill other critical roles.[6,8] While longitudinal teaching development programs for medical students exist,[6] support in the continual development of teaching skills is inconsistent. Unfortunately, this "competent" teaching is vulnerable to breaking down when the dynamic context of medical education shifts, as it often does, from one learner, circumstance, format, or generation to the next.

> The evolving educator embraces transformation as a continuous state and remains responsive to changing contexts, technologies, and learner needs, ultimately taking on the identity of a co-learning collaborator rather than a content expert.

Practicing clinicians – no matter their credentials, specialty, or practice environment – are highly sought after to educate all manner of medical learners. While many enjoy teaching, there are persistent challenges with time constraints, lack of appropriate com-

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pensation or recognition, and inadequate support.[9] In short, these individuals are very busy. Academic institutions seek to support volunteer preceptors in many ways, including providing continuing medical education (CME) around teaching skills and direct mentorship and support to help develop preceptor skill and efficiency. Anecdotally, community preceptors who engage more in teaching skill development activities experience more fulfillment from teaching and less burden from time constraints. Given the irreplaceable value these clinical teachers provide, it is critical to support their continued development as educators.

Those who enter academic roles are more likely to center teaching in their professional identity. In addition to being clinical teachers, they are expected to occupy roles such as advisor, mentor, didactic instructor, small group facilitator, and education scholar. To address this diversity of skills, academic clinicians are more likely to encounter training in teaching methods through faculty development programs, membership in education-focused professional societies, CME, and mentorship. But the mythology of competence acts here as well. There is a focus on ensuring new faculty are able to fulfill the common teaching roles expected of those joining the roster of academic clinicians. After they achieve this reputation and a place on the schedule, continued development in teaching skills is variable. After all, they must also focus on their evolving clinical, research, community engagement, and/or leadership roles. Teaching skills may therefore be suspended in a moderately developed state, vulnerable to the evolving needs of learners.

The Evolving Educator

Modern medical education demands a transformation in the educator's role. The image of a traditional educator has long been that of an authoritative figure delivering knowledge to passive recipients, a teaching style familiar to many academic physicians.[10] This model emerged from an era when expertise was scarce and information was centralized, with educators at the core of the learning process serving primarily to relay information to students. In medicine, this structure aligned with the apprenticeship model of clinical training, where an experienced clinician transmitted knowledge to the novice.[11] While this conventional approach develops technical competence and has long been used, it leaves minimal space for critical inquiry, creative exploration, and reflective growth in the learner – all essential elements in modern medical practice.

An evolving educator is crucial in current medical training. With rapidly evolving health care systems, clinicians today must not only master established protocols but also adapt to new technologies and patient-centered approaches to care. The evolving educator embraces transformation as a continuous state and remains responsive to changing contexts, technologies, and learner needs, ultimately taking on the identity of a co-learning collaborator rather than a content expert.[12] Active learning, problem-based approaches, outcome-based education, and simulation have emerged as central tools with the evolution of medical education.[10] These methods allow learners to engage directly with uncertainty, test and refine their reasoning, and bridge gaps between abstract knowledge and lived experiences. In modern medical learning environments, the educator must design conditions for deep learning while modeling curiosity, humility, and adaptability.[10]

In today's learning environment, student wellness is emphasized, and learners no longer rely on the educator solely for information.[10] Instead, they come with access to digital resources, artificial intelligence tools, and open platforms for knowledge exchange.[13] The educator's role has shifted from content delivery expert to mentor, guiding learners through flexible opportunities to synthesize, apply, and contextualize information in authentic and adaptive ways.[10,14] The evolving educator is now a facilitator for change, helping learners build frameworks for lifelong learning and navigating the ethical and human dimensions of practice.

The Technological Educator

Humans are naturally attracted to novelty. With technological advancements, the contemporary educator must keep up. Technology integration into medical education has expanded the possibilities for education delivery methods. Artificial intelligence, virtual health care, mobile and wearable technologies, and adaptive learning platforms have redefined what is possible in medicine and medical education.[12] These powerful tools minimize administrative burden, allow for personalized learning plans, and generate data-driven insights on how learning occurs and where it can improve.[13,15] For the educator, this new ground involving the use of chatbots and simulation-based learning offers the capacity to design individualized and interactive learning experiences that were once unimaginable.

Yet with this opportunity comes the responsibility to preserve the humanistic values that define medicine. Compassion, professionalism, and patient-centered care remain at the heart of what we hope to model and instill in students.[10] The technological educator must balance innovation with intention, ensuring technology serves not as a substitute for human connection, but rather as a means of enhancing it.[13] Inclusion is central to this balance, and the integration of these tools without diminishing empathy and ethical reasoning is vital.[16] Technology should not only expand access but also promote equity in how learning occurs, how success is measured, and how institutional culture evolves. Creating inclusive curricula, fair assessments, and supportive learning environments requires deliberate design and ongoing reflection.[13] Mentorship plays an important role here, functioning as a professional framework that develops future educators who can themselves navigate the balance between technological advancement and humanistic medicine.[17]

In this new educational era, the technological educator must resist implementing innovation without a proper foundation and ensure that educational practice stays anchored in theory, scholarship, and rigorous quality improvement. Even though technology transforms teaching methods, effective learning should remain rooted in human connection, reflection, and guided discovery.[14]

Conclusions

The potential of a medical educator need not be defined by mastery alone, but by movement between knowledge and curiosity, between tradition and transformation, and between the enduring human connection of teaching and the expanding horizon of technological possibility. Competence anchors a medical educator, while evolution and innovation permit them to reach the sky.

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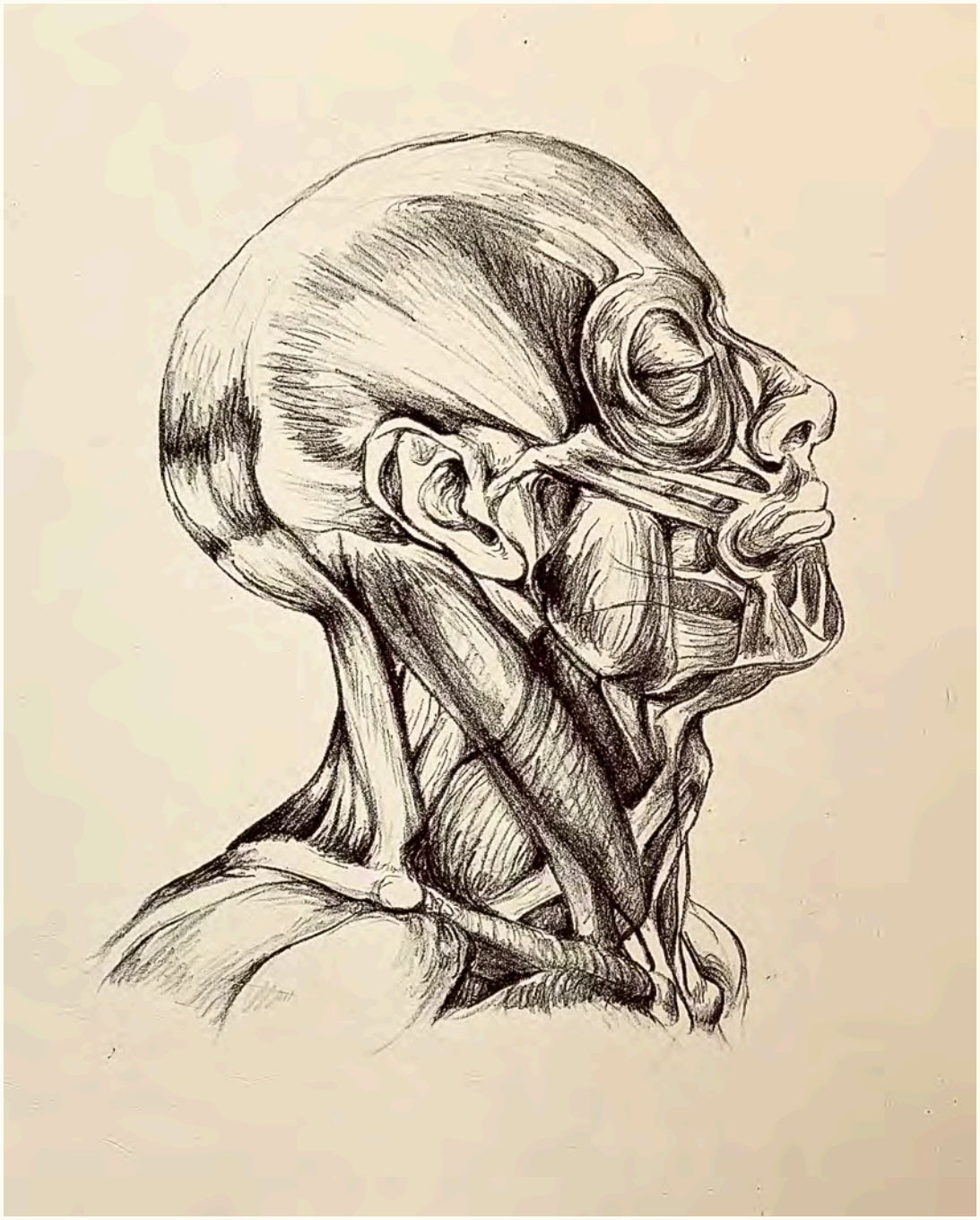

Contours of the Mind

Charu Jain

Lithograph

About the Artist:

Charu Jain is an artist and first-year medical student dedicated to uniting the craftsmanship, creativity, and precision of art with the innovation and detail of medicine. Passionate about holistic care, she explores the intersection of the two to foster a thoughtful and compassionate approach to healing. Their work reflects a commitment to understanding the human experience, blending art's emotional depth with medicine's scientific rigor.

Standardizing the Educational Experience of Medical Students Rotating With the Orthopedic Department Regardless of Subspecialty Assignment

Quinn Steiner, MD; Alex Lasinski, BS; Pamela Lang, MD; Lindsey Boyke, MD

ABSTRACT

Introduction: Musculoskeletal (MSK) conditions are frequently encountered by physicians in emergency and primary care settings. An orthopedic surgery elective provides an opportunity for medical students to develop knowledge and skills in evaluating and managing these conditions; however, increasing subspecialization and limited curricular time may restrict exposure to the breadth of MSK pathology.

Methods: A standardized video lecture series covering common orthopedic conditions was developed for use during 2-week orthopedic surgery elective for third-year medical students at a single academic institution. Students completing the elective during May 2023 to April 2024 completed a 50-question pre-rotation knowledge assessment and were instructed to complete the video curriculum during the rotation. The same 50 question assessment was administered at the end of the rotation. Students also completed a 4-item qualitative survey evaluating the perceived educational value of the lecture series.

Results: All 24 students (100%) completed the pre- and post-rotation assessments. Post-rotation scores were 4.96 points higher (9.9%) than pre-rotation scores ($P = .0052$). Nineteen students (79%) completed the post-rotation survey; 89.5% agreed or strongly agreed that the lectures improved their general knowledge of orthopedic topics, and 52.6% agreed or strongly agreed that the lectures adequately prepared them for the post-rotation assessment.

Conclusions: Students demonstrated significant improvement in MSK knowledge after completing a 2-week orthopedic surgery rotation that incorporated a standardized video curriculum. Survey findings suggest the curriculum enhanced students' confidence in understanding MSK pathology and may help address educational gaps resulting from subspecialty based clinical assignments.

INTRODUCTION

Musculoskeletal (MSK) conditions are a common reason for patients to seek medical care, with studies in the United States (US) and Canada estimating that approximately 27% of ambulatory physician visits, 9% to 20% of all emergency department visits, and 21% of urgent care visits involve MSK concerns.[1,2] Despite this high prevalence, many graduating medical students lack the basic competencies necessary to diagnose and treat MSK conditions.[3-7] In a survey at one US medical school, only 24.7% of fourth-year students achieved a passing score on a validated MSK competency assessment.[8] At another allopathic US medical school, just 26.8% of second-, third-, and fourth-year medical students reported that their MSK curriculum was adequate.[9]

An elective rotation in orthopedic surgery provides a critical opportunity to develop MSK diagnostic skills, particularly for students not pursuing residency in orthopedic surgery, who receive limited MSK-focused training. In previous studies, completion of a MSK elective or orthopedic rotation resulted in a 12% to 24% increase in competency scores related to MSK conditions.[1,3-6] At our institution, only 28% of the 120 students who completed a third-year orthopedic surgery rotation in the past 6 years pursued an orthopedic surgery residency, indicating that most students enter other specialties and must gain baseline MSK knowledge during a brief rotation. Given these findings—along with the high prevalence of MSK complaints and the relatively small number of orthopedic specialists—there is a clear need for

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an orthopedic rotation curriculum that provides broadly applicable MSK training across clinical settings.

Prior to clinical rotations, medical students at our institution are exposed to orthopedic topics for a total of a few weeks within a several-month, lecture-based block that covers neurologic and musculoskeletal anatomy and pathophysiology. During the third-year rotation, students are assigned to one orthopedic subspecialty for the duration of their 2-week experience. Subspecialty options for students completing this rotation are arthroplasty, foot and ankle, hand, oncology, pediatrics, spine, sports, and trauma. Because of logistical constraints in coordinating multiple students across services, most institutions, including ours, limit students to a single subspecialty. Although subspecialty assignment should not hinder learning basic orthopedic principles—such as focused history-taking and MSK examination—it does limit exposure to the range of conditions typically tested on standardized medical exams. Consequently, students may not encounter either common or less frequent MSK conditions during their rotation.

The primary aim of this study was to develop a standardized curriculum focused on a variety of commonly tested MSK topics in the United States Medical Licensing Examination (USMLE) content outline and to evaluate the curriculum's effect on student knowledge through pre- and post-rotational assessments. A secondary aim was to assess students' self-perceived confidence in their orthopedic knowledge after completing the standardized curriculum.

Table 1. Utilization of Kern's 6-step Framework for Curriculum Development to Create Video Curriculum

Kern's 6-Step Framework	Online Video Curriculum
1. Problem identification and general needs assessment	• Multiple studies have shown the inadequacy of musculoskeletal education within medical education • This is despite MSK conditions comprising a large percentage of outpatient visits across multiple specialties
2. Targeted needs assessment	• There is limited pre-clinical musculoskeletal experience in medical school • For students who do rotate, there are minimal MSK didactics including lectures, clinical skills, and anatomic dissection • Students' rotations are limited to 1 subspeciality within the field of orthopedics, decreasing exposure to a variety of common MSK conditions
3. Goals and objectives	• Increase medical student knowledge within USMLE MSK system content outline (Table 3)
4. Educational strategies	• Online video curriculum to be utilized in adjunct to the formal clinical rotation
5. Implementation	• Precurriculum assessment to assess baseline MSK knowledge • Students will review the 2-part video curriculum at their own pace during their 2-week rotation
6. Evaluating the effectiveness of the curriculum	• Evaluation of the immediate effect on MSK knowledge will occur with a postcurriculum knowledge assessment • Evaluation of student's perception of the curriculum will occur with a postcurriculum feedback survey

Abbreviations: MSK, musculoskeletal; USMLE, United States Medical Licensing Exam.

Box. Clinical Learning Objectives for the Two-Week Orthopedic Surgery Rotation

- Gain exposure to a focused area of orthopedics surgical practice, yet understanding the wide scope of practice of the field
- Participate in obtaining an orthopedic-focused history and communicating verbally and in writing the findings from that focused history
- Demonstrate the ability to perform basic and independent musculoskeletal XR/CT/MRI review
- Participate in the care of patients requiring emergent orthopedic care
- Perform musculoskeletal physical exam skills for the upper and lower extremity
- Participate in an informed consent discussion with an orthopedic surgical patient
- Demonstrate proper technique for skin closure of surgical wounds
- Understand when common orthopedic problems can be managed by primary care physicians and when referral to orthopedic surgery is indicated
- Understand the role of members of the interdisciplinary team, particularly regarding rehabilitation and therapy for orthopedic surgery patients

METHODS

Curricular Context

At the University of Wisconsin School of Medicine and Public Health, all third-year medical students complete a 12-week surgical and procedural care block, which can include a rotation in orthopedic surgery. Of the 174 third-year medical students each year, approximately 20 complete the 2-week orthopedic elective. This elective is assigned as part of a rank list and lottery system. Those participating in the rotation are asked to rank their preference for the seven orthopedic surgical subspecialties (listed above). Students are assigned to one service for the entire rotation, with most rotating on the sports (n = 11) and arthroplasty (n = 4) services. The curriculum—including the video content and the pre- and post-rotation assessments—was integrated into required online learning modules.

Development of Standardized Didactic Curriculum

Curriculum development was informed by Kern's 6-step framework (Table 1). Existing orthopedic rotation learning objectives at this institution were clinically focused without specific knowledge-based objectives (Box). The USMLE MSK topic outline[10] was evaluated to ensure alignment with commonly encountered MSK pathology across orthopedics and other specialties, such as primary care, internal medicine, and rheumatology. Using these learning objectives, 2 approximately 30-minute video presentations were created. The decision to incorporate video presentations into the curriculum was informed by the recent shift toward online learning and mounting evidence supporting the effectiveness of educational videos.[11-13] Additionally, the multimodal education model has proven effective, as evidenced by Noetel et al's

Table 2. The United States Medical Licensing Exam (USMLE) Musculoskeletal Content Outline and Curriculum Content

USMLE Content	Curriculum Content
Infectious disorders Gangrene, dry and wet, clostridial myonecrosis (*Clostridium perfringens*); discitis; myositis, infective; necrotizing fasciitis; osteomyelitis; septic arthritis; spondylitis, tuberculous	5 minutes of video discussion on gangrene, necrotizing fasciitis, osteomyelitis, and septic arthritis
Immunologic disorders Ankylosing spondylitis; dermatomyositis/polymyositis; juvenile idiopathic arthritis; rheumatoid arthritis, Felty syndrome; psoriatic arthropathy	5 minutes of video discussion on ankylosing spondylitis, dermatomyositis/polymyositis, juvenile idiopathic arthritis, rheumatoid arthritis
Inflammatory disorders Adhesive capsulitis of shoulder (frozen shoulder syndrome); ankylosis/spondylopathy (inflammatory); bursitis; fasciitis; osteochondritis, osteochondritis dissecans; tendinitis, supraspinatus syndrome, enthesopathy of spine, elbow, ankle; temporomandibular joint disorders; fibrositis, myofascial pain syndrome; synovitis; tenosynovitis; myositis	7 minutes of video discussion on bursitis, tendonitis, synovitis, tenosynovitis, myositis, adhesive capsulitis, rotator cuff arthropathy, epicondylitis
Neoplasms Benign neoplasms (eg, ganglion cyst); malignant neoplasms of bone (eg, osteosarcoma, sarcoma, leiomyosarcoma, rhabdosarcoma); metastases to bone, secondary malignant neoplasm of bone	5 minutes of video discussion on giant cell tumor, osteochondroma, enchondroma, chondrosarcoma, Ewing sarcoma, osteosarcoma
Degenerative and metabolic disorders • Degenerative/metabolic disorders of bone, tendon, and cartilage: chondromalacia; disc degeneration, herniated disc; Legg-Calvé-Perthes disease; Osgood Schlatter disease; osteodystrophy; osteomalacia; osteonecrosis (avascular), bone infarct; osteoporosis; osteopenia; osteitis deformans (Paget disease of bone); pathologic fracture; radiculopathies; spondylolisthesis/spondylosis (degenerative) • Degenerative/metabolic disorders of joints: gout, gouty arthritis, pseudogout; joint effusion; osteoarthritis • Degenerative/metabolic disorders of muscles, ligaments, fascia: Dupuytren contracture; muscle calcification and ossification; muscle wasting and diffuse atrophy; rhabdomyolysis	17 minutes of video discussion on osteoporosis, Paget disease, Legg-Calvé Perthes disease, osteodystrophy, osteomalacia, carpal tunnel syndrome, ganglion cysts, avascular necrosis, spondylolisthesis, radiculopathy/cauda equina syndrome, femoracetabular impingement, Achilles tendinopathy/rupture, plantar fasciitis, Morton's neuroma, gout, osteoarthritis, rhabdomyolysis
Traumatic and mechanical disorders Amputation and care of amputees; backache, including low back pain; blast injuries; compartment syndrome; hospital-acquired contractures; contusions; dislocations; fractures; sprains, strains; kyphoscoliosis, scoliosis; rotator cuff syndrome; slipped capital femoral epiphysis; dislocation of hip	8 minutes of video discussion on compartment syndrome, shoulder dislocations, hip dislocations, knee dislocations/ligamentous injuries, acromioclavicular injury, common upper extremity fractures (supracondylar humerus, distal radius, scaphoid), slipped capital femoral epiphysis, lower extremity fractures (Lisfranc, Jones, stress fractures)
Congenital disorders Achondroplasia/dwarfism; disorders of limb development (*HOX* gene mutation, phocomelia); developmental dysplasia of the hip; dislocation of hip in infantile spinal muscular atrophy; genu valgum or varum; foot deformities (flat foot, valgus/varus deformities); osteogenesis imperfecta; McArdle disease; mitochondrial myopathies	5 minutes of video discussion on developmental dysplasia of hip, genu valgum or varum, foot deformities, achondroplasia, osteogenesis imperfecta
N/A	5 minutes of video discussion on clinically significant upper and lower extremity anatomy (osteology, neurovasculature)

systematic review of 105 studies, which showed that incorporating video modules into existing teaching methods resulted in strong learning benefits.[14]

The videos were designed according to principles of the cognitive theory of multimedia learning, emphasizing segmentation, highlighting of key points, and utilization of both auditory and visual channels to deliver complementary content.[15-17] Video content was compiled by the primary and senior authors, with the creation of the videos completed by the primary author. Videos consisted of slide sets with both written and visual information. Audio lecture associated with the slide sets was then recorded by the primary author. The USMLE topic outline and video content are shown in Table 2. After production, the videos were reviewed by three authors – a faculty orthopedic surgeon, a nonoperative orthopedic fellow physician, and a medical student – and revised for content organization and clarity based on reviewer feedback.

Curriculum Implementation and Knowledge Assessments

Students completing the 2-week orthopedic rotation during May 2023-April 2024 were asked to complete a 50-question pre-rotation knowledge assessment and confidence survey prior to their rotation. Assessment questions were written by content experts consisting of faculty from all orthopedic subspecialties at our institution and aligned with the curriculum's learning objectives. Students did not receive scores or the answers to the questions after the pre-assessment.

During the rotation, students were required to complete the video curriculum at their own pace. At the end of the rotation, they completed an identical 50-question post-rotation assessment

to allow direct comparison of pre- and post-rotation performance. These assessments were designed to evaluate levels 1 and 2 of Kirkpatrick's model of training evaluation.[18]

Post-Rotation Attitude Assessment

A 4-item qualitative questionnaire was created and administered at the end of the rotation to assess students' perceptions of the curriculum and their confidence in understanding common MSK pathology. Items were designed to elicit feedback on the standardized curriculum video series and included:

1. The provided lectures improved my overall knowledge of general orthopedic topics.
2. The lectures provided a foundation of orthopedic knowledge that was useful for my clinical rotation.
3. The provided lectures prepared me well for the post-rotation assessment.
4. The lectures provided a foundation of orthopedic knowledge that will be useful when preparing for my required standardized exams.

Responses used a 5-point Likert scale (strongly agree, agree, neutral, disagree, and strongly disagree).

Statistical Analysis

A 2-tailed paired *t* test was performed to compare mean scores on the pre- and post-rotation assessments within groups. Statistical significance was defined as $P < .05$, and the statistical analyses were conducted in R (R Foundation for Statistical Computing).

RESULTS

Pre- and Post-Rotation Knowledge Assessment Scores

All 24 rotating medical students completed both the pre- and post-rotation assessments (100%). The mean score on the pre-rotation score was 31.75 out of 50 (63.5%; SD, 8.35). The post-rotation score increased to 36.7 (73.4%; SD, 5.86). The mean change in correctly answered questions was + 4.96 ($P = .0052$), with a 95% CI of 1.63–8.28. Individual scores and changes are shown in Table 3. Overall, 18 students (75%) demonstrated improved scores.

Table 3. Pre- and Post-rotation Knowledge Assessment Scores for Each Student (n = 24)

	Pre-rotation	Post-rotation
Student 1	39	45
Student 2	37	40
Student 3	37	31
Student 4	35	32
Student 5	27	40
Student 6	8	37
Student 7	26	32
Student 8	26	30
Student 9	39	38
Student 10	31	32
Student 11	32	36
Student 12	32	39
Student 13	40	42
Student 14	17	31
Student 15	42	38
Student 16	37	41
Student 17	34	38
Student 18	32	43
Student 19	25	19
Student 20	31	34
Student 21	31	38
Student 22	43	46
Student 23	21	39
Student 24	40	40

Post-Rotation Attitude Assessment

Nineteen students completed the post-rotation survey (79%). Seventeen (89.5%) agreed or strongly agreed that the lectures improved their overall orthopedic knowledge, and 14 (73.7%) agreed or strongly agreed that the lectures provided a useful knowledge foundation for the clinical rotation. A graphical summary is presented in the Figure. Fifteen students (78.9%) agreed or strongly agreed that the lectures were useful for standardized exams, and 10 (52.6%) agreed or strongly agreed that the lectures prepared them well for the post-rotation assessment.

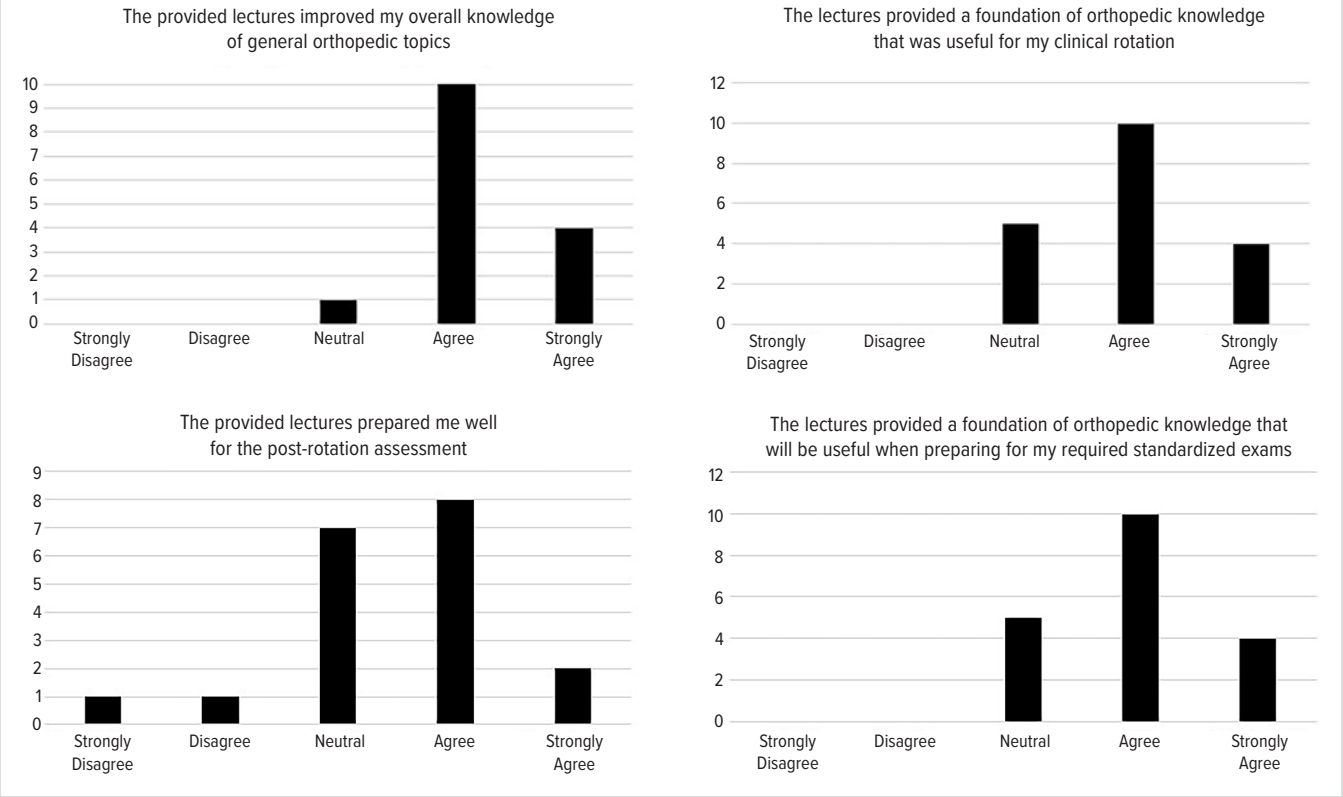
DISCUSSION

In this study, third-year medical students demonstrated a 10-percentage-point improvement on USMLE content-based MSK assessments after completing a standardized online video curriculum in addition to a 2-week orthopedic rotation. These findings are encouraging given the long-standing gaps in MSK education in medical schools,[3-7,8,9] which have prompted efforts to enhance MSK training nationwide.[19]

This curriculum was developed after identifying that short elective rotations, coupled with assignment to a single orthopedic subspecialty, limited students' exposure to common MSK conditions. Broader exposure through a general orthopedics rotation is difficult in academic centers where subspecialization dominates; rotating through all subspecialities would allow only brief experiences and compromise continuity and assessment. Standardized web-based learning offers a practical strategy to ensure consistent exposure to core MSK topics. Prior studies support online modules as effective tools for orthopedic education.[20-22] For example, Back et al found that medical students showed significantly greater knowledge gains and higher satisfaction when learning through narrated PowerPoint podcasts compared to textbook reading.[23] Our findings similarly support online, pre-recorded lectures as beneficial supplements to MSK education during clinical rotations.

A secondary finding was that most students – nearly 90% of survey respondents – indicated that the video lectures improved their overall orthopedic knowledge, and approximately 75%

Figure. Bar Graphs Representing the Distribution of Responses to the Four Items Included in the Post-rotation Survey



found them useful for both clinical practice and exam preparation. This suggests the curriculum provided meaningful educational value. Fewer students (52.6%) indicated that the video lectures adequately prepared them for the post-rotation assessment, yet scores still improved, indicating that the curriculum enhanced knowledge without simply teaching to the test. Future curriculum revisions should explore why some students felt underprepared despite scoring better overall.

A standardized curriculum may also benefit other medical specialties with extensive subspecialization, providing a mechanism to deliver core, broadly relevant content despite variable clinical experiences. Future work could evaluate such curricula across additional specialties.

Limitations

This study has several limitations. Generalizability is limited due to the single-institution design; MSK exposure and clinical structure differ widely among medical schools. A nationally available web-based orthopedic curriculum could help evaluate broader applicability. Another limitation is the sample size. The study population was relatively small, limited by both student interest and elective capacity. Additionally, knowledge was assessed only immediately following the rotation. Because identical pre- and post-rotation assessment were used, score improvements may partially reflect short-term recall of test material versus an increase in overall knowledge. Longer-term assessments would help determine durability of knowledge gains; Kelly et al showed sustained MSK knowledge retention 1 year after a 1-week instructional course consisting of brief didactic talks and case-based small group.[24]

Finally, it is not possible to isolate the effect of the video curriculum from clinical learning, as all students completed both experiences. However, given the narrow scope of individual subspecialty assignments, clinical experience alone is unlikely to provide comprehensive MSK education. Future studies could include a control group completing the 2-week clinical rotation without supplemental videos or could explore additional dissemination approaches. Selection bias is also possible, as students choosing an orthopedic elective may be more motivated or have greater baseline MSK knowledge, potentially influencing learning outcomes.

CONCLUSIONS

Medical students' post-rotation knowledge assessment scores significantly improved following a 2-week orthopedic surgery elective that included the standardized video curriculum. Given the increasing subspecialization within orthopedic surgery, implementing a standardized curriculum may be a beneficial addition to medical student rotations, providing exposure to a broader range

of common MSK conditions. While this study has limitations, it highlights an important opportunity to enhance MSK education and demonstrates a feasible approach to supplement learning for students completing an orthopedic surgery elective.

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Assessment of the Educational Value of Mock Oral Competency Exams for Surgical Interns

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ABSTRACT

Introduction: Limited data exist regarding mock oral competency exams (MOCEs) and their impact on junior surgery residents, who are commonly assessed with written posttest exams. The COVID-19 pandemic also affected surgical education. Therefore, we evaluated interns' perceived impact of MOCEs, including satisfaction compared with written posttest exams and the potential impact of the COVID-19 pandemic.

Methods: From 2017 through 2022, surgery interns participated in MOCEs consisting of two clinical scenarios per intern. Participants completed surveys evaluating the perceived impact of MCOEs using 5-point ordinal scales and yes/no responses. A positive response was defined as good, slightly better, excellent, significantly better, or yes.

Results: Fifty-nine of 73 interns (80.8%) completed the survey; 54 (91.5%) reported that MOCEs provided an improved review of material compared with written posttest exams. This correlated with average positive ratings indicating MOCEs were a valued educational activity (98.3%), a personal challenge (89.8%), a dynamic quality teaching method (93.2%), beneficial through observation of colleagues' examinations (94.9%), and an improvement in knowledge and application of didactic material (84.7%) (Spearman $\rho = 0.44$, $P < .001$). The postpandemic cohort (N = 23) rated MOCEs as more valuable than the prepandemic cohort (n = 36) (mean 4.7 ± 0.4 vs mean 4.3 ± 0.5, $P = .004$, Cohen d = 0.80).

Conclusions: MOCEs may serve as an effective tool for applying knowledge during the formative years of surgical training. Interns affected by COVID-19 reported higher perceived benefits, potentially reflecting increased importance of competency-based and in-person education. MOCEs warrant further study and may be valuable to incorporate early in residency training.

INTRODUCTION

Standardized mock oral competency exams (MOCEs) have been established as a valuable educational tool for training general surgery residents. They have been used not only to identify areas for improvement in a program's curriculum and rotation schedule but also to recognize gaps in clinical knowledge.[1] Traditionally, senior surgery residents have also subjectively reported that MOCEs are beneficial to their education and preparation for certifying oral examinations.[2,3] Importantly, multiple studies have shown that MOCEs taken by senior surgery residents improve certifying oral examination pass rates.[2,4-7]

However, junior surgery residents and their performance gains are most commonly assessed by written posttest exams. Additionally, most residency programs rely on external assessment tools, such as the American Board of Surgery In-Training Exam (ABSITE), as a summative approach for gauging knowledge and creating formalized education plans for junior residents. Limited data describe the influence of MOCEs on junior surgery residents, particularly in comparison with written posttest exams. In 1 study surveying general surgery residency program directors, only a minority of programs offered MOCEs to postgraduate year 2 (PGY-2) and PGY-1 surgery residents—23% and 15%, respectively.[8] The benefits noted for senior surgery residents may also apply to junior residents in both clinical and educational settings.

The COVID-19 pandemic affected surgical education methodologies and prompted widespread adoption of virtual platforms

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at the end of medical school and the beginning of residency for many junior surgery residents. Literature on the efficacy of virtual surgical education has been mixed. While flexibility and improved work-life integration were reported as benefits,[9] junior residents also described increased distractions and a decline in protected educational time.[10] Now that surgical education has transitioned back to in-person formats, evaluating the perception and efficacy of in-person sessions among trainees who experienced substantial virtual learning is warranted—particularly regarding interactive-based sessions such as MOCEs.

Therefore, the aim of this study was to evaluate the perceived impact of MOCEs administered to surgery interns on overall satisfaction compared with written posttest exams. We also assessed the perceived value and quality of MOCEs as an educational tool and their impact on confidence in clinical performance. Furthermore, we performed a subanalysis to evaluate the impact of the COVID-19 pandemic on a prepandemic versus postpandemic cohort to identify any notable differences in the perceived impact of MOCEs.

METHODS

Study Population and Mock Oral Competency Exams

This single-institution study was conducted at a major academic program with an associated general surgery training program. General surgery interns participated in MOCEs as an in-person educational exercise during didactic curriculum from the 2017-2019 and 2020-2022 academic years. No MOCE sessions were conducted virtually. MOCEs were administered by surgical education faculty and consisted of 2 clinical scenarios per intern, presented in front of peers, that covered topics taught during didactic sessions. There were five MOCE sessions; therefore, each intern participated in 10 unique clinical scenarios throughout the academic year.

The MOCEs were conducted in a standardized fashion, with each scenario lasting 9 minutes. Time was allocated for individualized verbal feedback from faculty and peers. Feedback addressed the content of the clinical scenario as well as additional elements, such as communication style, mannerisms, and facial expressions.

At the end of the academic year, participating residents completed a 9-item questionnaire evaluating the perceived impact of MOCEs (Box). No identifying information was collected, and participation was optional. Surveys were administered at year end to capture the cumulative perceived impact of all of the MOCEs. Interns were selected to participate rather than all junior surgery residents (eg, first- and second-year residents) to assess the effect of MOCEs at the earliest stage of training in a focused manner and due to resource limitations. No surveys were administered during the 2019-2020 academic year because of the COVID-19 pandemic.

The survey consisted of 5-point ordinal scale and yes/no responses. A positive MOCE response was defined as a reply of good, excellent, slightly better, or significantly better for 5-point scale questions and yes for binary questions. To assess the effect of the COVID-19 pandemic on the perceived impact of MOCEs, survey responses for a prepandemic cohort (2017-2019) were compared to a postpandemic cohort (2020-2022). The Institutional Review Board approved this study as an exempt education project.

Box. Mock Oral Competency Exam Survey

1. Do you feel the mock oral competency exams improved review of materials better than a written posttest exam[a]?
   a. Significantly better
   b. Slightly better
   c. Neutral
   d. Slightly worse
   e. Significantly worse

For Questions 2-6, please use the following ordinal scale: 1 = poor, 2 = unsatisfactory, 3 = satisfactory, 4 = good, 5 = excellent

2. Please rate the value of the oral competency as an educational curriculum activity.
3. Please rate the value of your personal challenge during this activity as the examinee.
4. Please rate the dynamic quality of teaching while being orally examined during the mock oral competency exams.
5. Please rate the educational benefit while observing your colleagues being examined.
6. How do you rate the improvement of your knowledge and application of the didactic materials covered during each respective block component by undergoing the mock oral competency exams?
7. Do you feel the mock oral competency exams improved your clinical performance involving routine patient care scenarios?
   a. Yes
   b. No
8. Do you feel the mock oral competency exams improved your clinical performance involving complex patient care scenarios?
   a. Yes
   b. No
9. Choose all the aspects of surgical care that were helped by undergoing the mock oral competency exams (circle all that apply).
   a. Surgical indications
   b. Postoperative care
   c. Postoperative complications
   d. Alternative surgical options
   e. Preoperative workup

[a]Written posttest exams primarily included multiple-choice question exams.

Statistical Analysis

Each survey question was analyzed independently. Additionally, responses to 5 questions within 1 grouped section (Questions 2-6, Box) assessed the specific impact of MOCEs as (1) a valued educational activity, (2) a personal challenge, (3) a a dynamic quality teaching method, (4) beneficial through observation of colleagues' examinations, and (5) an improvement in knowledge and application of didactic material. Responses to these questions were averaged for selected analyses.

Spearman ρ correlations (r_S) were used to establish bivariate strength across measures. Independent *t* tests, Mann-Whitney U tests, and Cohen d effect sizes assessed the impact of COVID-

Table 1. Descriptive Statistics for the Mock Oral Competency Exam Survey

Mock Oral Competency Exam Survey Questions	Survey Responses, N (%)				
	Significantly Better[a]	Slightly Better[a]	Neutral	Slightly Worse	Significantly Worse
1. Do you feel the MOCE improved review of materials better than a written posttest exam? [b]	45 (76.3)	9 (15.3)	4 (6.8)	1 (1.7)	0 (0.0)
	Excellent[a]	**Good[a]**	**Satisfactory**	**Unsatisfactory**	**Poor**
2. Please rate the value of the oral competency as an educational curriculum activity.[b]	44 (74.6)	14 (23.7)	1 (1.7)	0 (0.0)	0 (0.0)
3. Please rate the value of your personal challenge during this activity as the examinee. [b]	32 (54.2)	21 (35.6)	6 (10.2)	0 (0.0)	0 (0.0)
4. Please rate the dynamic quality of teaching while being orally examined during the MOCEs.[b]	36 (61.0)	19 (32.2)	3 (5.1)	1 (1.7)	0 (0/0)
5. Please rate the educational benefit while observing your colleagues being examined.[b]	36 (61.0)	20 (33.9)	3 (5.1)	0 (0.0)	0 (0.0)
6. How do you rate the improvement of your knowledge and application of the didactic materials covered during each respective block component by undergoing the MOCEs?[b]	24 (40.7)	26 (44.1)	6 (10.2)	3 (5.1)	0 (0.0)
		Yes[a]		**No**	
7. Do you feel the MOCEs improved your clinical performance involving routine patient care scenarios? [b]		55 (93.2)		4 (6.8)	
8. Do you feel the MOCEs improved your clinical performance involving complex patient care scenarios? (N = 58)		49 (84.5)		9 (15.5)	

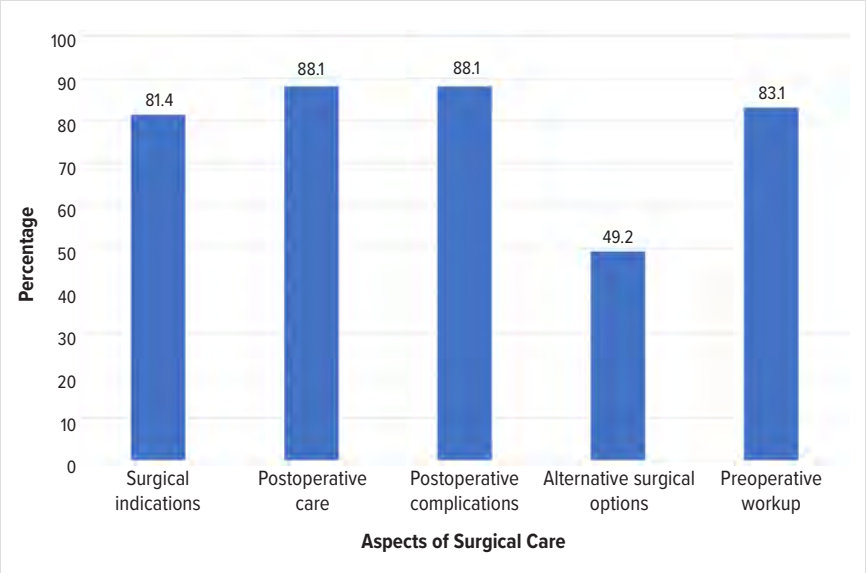
Abbreviations: MOCEs, mock oral competency exams.

[a]Answers of "significantly better," "slightly better," "excellent," "good," or "yes" indicated a positive response.

[b]N = 59, except where specified.

19 on perceived MOCE benefit between prepandemic and postpandemic cohorts. Inter-item reliability of the 5 grouped questions was measured with Cronbach α.[11] Statistical significance was set at $P \leq .050$. Analyses were performed using IBM SPSS, version 24.0 (IBM Corporation).

Figure. Surgery Interns Who Perceived Their Understanding Was Helped by Mock Oral Competency Exams (N = 59)



RESULTS

Mock Oral Competency Exams

Of 73 surgery interns, 59 (80.8%) completed the MOCE survey; 54 (91.5%) rated MOCEs positively in relation to improved review of didactic material (Table 1). More specifically, across 5 survey questions, interns indicated that MOCEs were positive as a valued educational activity (58/59, 98.3%), a personal challenge (53/59, 89.8%), a dynamic quality teaching method (55/59, 93.2%), beneficial due to observing the examination of colleagues (56/59, 94.9%), and an improvement in knowledge and application of didactic material (50/59, 84.7%). The average positive ratings for these 5 questions (α=0.78) correlated with the positive rating that MOCEs provided an improved review of didactic material compared with written posttest exams ($\rho = 0.44$, $P < .001$).

Regarding patient scenarios, responses were positive that MOCEs improved clinical performance for both routine (55/59, 93.2%) and complex (49/58, 84.5%) cases (Table 1). For specific aspects of surgical care, most respondents reported improved knowledge of surgical indications (81.4%), postoperative care (88.1%), postoperative complications (88.1%), and preoperative workup (83.1%) (Figure). However, only 49.2% of respondents indicated that their perceived knowledge of alternative surgical options improved through MOCE participation.

Evaluation of Prepandemic and Postpandemic Cohorts

To evaluate the impact of the COVID-19 pandemic, 36 interns (61.0%) were in the prepandemic cohort and 23 (39.0%) were in the postpandemic cohort. The postpandemic cohort perceived MOCEs as significantly more valuable than the prepandemic cohort (mean, 4.7; standard deviation [SD], 0.4 vs mean, 4.3;

Table 2. Mann-Whitney U Tests Comparing Perceived Impact of Mock Oral Competency Exams Between Prepandemic and Postpandemic Cohorts

	Prepandemic[a] Mean Rank	Postpandemic[a] Mean Rank	Mann-Whitney U	*P* value
1. Do you feel the Mock Oral Competency Exams improved review of materials better than a written posttest exam?	28.89	31.74	374.0	.403
2. Please rate the value of the oral competency as an educational curriculum activity.	26.82	34.98	299.5	.019
3. Please rate the value of your personal challenge during this activity as the examinee.	29.11	31.39	382.0	.577
4. Please rate the dynamic quality of teaching while being orally examined during the MOCEs.	27.24	34.33	314.5	.072
5. Please rate the educational benefit while observing your colleagues being examined.	25.76	36.63	261.5	.006
6. How do you rate the improvement of your knowledge and application of the didactic materials covered during each respective block component by undergoing the MOCEs?	25.51	37.02	252.5	.006

Abbreviation: MOCEs. Mock Oral Competency Exams.
[a]Prepandemic cohort N = 36, postpandemic cohort N = 23.

SD, 0.5, respectively; $P = .004$), with a Cohen d effect size of 0.80.

Mann-Whitney U tests showed significant differences between cohorts for several survey items (Table 2). Compared with the prepandemic cohort, interns in the postpandemic cohort reported that MOCEs were more of a valued educational activity (Mann-Whitney U = 299.5, $P = .019$), more beneficial due to observing colleagues' examinations (Mann-Whitney U = 261.5, $P = .006$), and more effective in improving knowledge and application of didactic material (Mann-Whitney U = 252.5, $P = .006$). There was no significant difference between cohorts regarding the perception that MOCEs provided a better review of didactic material than written posttest exams.

DISCUSSION

Our study demonstrated that surgery interns perceived MOCEs positively in relation to their educational and training experience in a variety of ways. They not only indicated that MOCEs provided an improved review of didactic material compared with written posttest exams, but they also rated them highly as a valuable, quality educational tool. Clinical performance involving overall patient scenarios, as well as understanding of specific aspects of surgical care, were also reported as improved through participation in MOCEs. Lastly, the perceived value of MOCEs as an educational tool was greater in the postpandemic cohort than in the prepandemic cohort.

Although MOCEs can result in multiple benefits to a resident's overall education, implementation and evaluation of their impact have largely focused on senior surgery residents in their third to fifth clinical years.[6,7,12,13] Junior surgery residents, however, frequently undergo more traditional assessments, such as written posttest exams. Therefore, our finding that surgery interns perceived MOCEs as a more useful review of didactic information than written posttest exams is important and highlights the relevance of interactive, dynamic learning and application of knowledge. Prior education research has demonstrated that written posttest exams and summative assessments may impede critical thinking skills, while active learning approaches can enhance critical thinking, problem-solving abilities, communication skills, a sense of community with peers, and learning.[14–18] These outcomes of active learning represent important characteristics for junior surgery residents to develop early in training.

Many studies have identified that senior surgery residents' participation in MOCEs correlates with higher certifying oral examination pass rates.[2,4-7] However, additional clinical and educational benefits of MOCEs may positively influence resident development. Prior studies show that MOCEs are effective tools for assessing and improving medical knowledge, patient care, communication skills, confidence, and professionalism.[12,13] For example, Lu et al reported that when faculty utilized Accreditation Council for Graduate Medical Education (ACGME) competency standards to rate a resident's medical knowledge, higher rates of medical knowledge correlated with a stronger MOCE performance.[13] MOCEs also provide structured review of clinically relevant topics, encourage ongoing studying, and offer opportunities to strengthen clinical reasoning skills.[4,6]

Delivery of feedback after MOCE administration is essential for maximizing their educational benefit. Through participation and individualized feedback, residents can learn how to increase confidence, address knowledge gaps, and improve communication and professionalism.[4,6,12] This is notable because deficits in areas such as communication and professionalism may negatively affect oral certifying examination pass rates.[19,20] Additionally, a multiinstitutional study by Fingeret et al found that lower ABSITE percentiles were significantly associated with certifying oral examination failure.[5] Thus, personalized approaches to education and feedback—such as those provided through MOCEs—may be valuable early in surgical training.

To our knowledge, the perceived influence of MOCEs among surgery interns has not been investigated previously. Incorporating MOCEs at the start of residency may have a positive impact on junior residents. Early use of this educational tool has the potential to identify deficits in medical knowledge, communication skills, professionalism, and confidence, allowing the development of individualized learning plans as early as possible. Additional ben-

efits to MOCEs also warrant further study. For example, objective and longitudinal assessment of early MOCE implementation and its associations with knowledge retention, clinical performance, ABSITE performance, ACGME milestone completion, and certifying oral examination pass rates may be worthwhile.

The COVID-19 pandemic inevitably altered the educational landscape, with components of curriculum transitioning to virtual platforms for didactic teaching. As noted, the literature has been mixed regarding the efficacy and utility of virtual learning. Wise et al reported that residents, including junior-level residents, favored web-based lectures over traditional lectures and found them easier to integrate into busy schedules.[9] However, other studies focusing on junior residents found that virtual education increased distractions, reduced protected educational time, and resulted in residents feeling less comfortable with online lectures than senior residents.[9,21] In a study of otolaryngology residents, Goodman et al found that 61% of residents and 54% of faculty disagreed or were undecided that virtual MOCE sessions should replace in-person sessions.[22] However, much of the prior literature has focused on virtual didactic lectures rather than interactive formats such as MOCEs.

We found that postpandemic surgery interns participating in in-person MOCEs perceived them as more valuable, higher-quality educational tools compared with prepandemic interns. Overall, the COVID-19 pandemic highlighted the evolving nature of surgical education. Our findings may reflect the growing importance of competency-based education, which is more dynamic than traditional didactic formats and incorporates interactive, personalized teaching.[23,24] These findings may also suggest that postpandemic interns place particular value on in-person sessions after experiencing substantial virtual learning. In-person education offers advantages such as personalized interaction, more nuanced communication, and relaying body language.[25] Assessing resident perspectives and the potential advantages of in-person educational sessions—especially now that current cohorts have experienced both virtual and in-person learning—is important for ensuring that education curricula are aligned with learners' needs and implemented in the most effective manner.

Limitations

There were several limitations to our study. Although the MOCE process was standardized, there may have been inherent variability in the sessions based on the specific faculty administering the scenarios and the subject matter, which could have affected the perceived impact of the experience. Additionally, because this was a self-completed survey, self-report bias may have influenced responses, and perceptions of the impact of MOCEs may not fully reflect their true educational effect. Interns also may have felt pressured to respond more favorably because the study and survey were designed by faculty, creating a potential power dynamic. However, surveys were completed anonymously without identifying information, and participation was optional.

Approximately 20% of interns did not complete the survey, which could have skewed the data if their perceptions differed meaningfully from those who responded. Among respondents, recall bias may also have been present because the survey was administered at the end of the academic year, after all MOCE sessions had taken place. Furthermore, our study assessed perceptions of MOCE impact rather than objective, measurable outcomes. Therefore, definitive conclusions about MOCEs being better than written posttest exams cannot be drawn, particularly because this was not a comparative study between MOCEs and written posttest exams. Nonetheless, the high perceived beneficial impact of MOCEs relative to written posttest exams, along with reported improvements in confidence across aspects of clinical care, underscores the importance of future work aimed at objectively evaluating the long-term educational value of MOCEs for junior surgery residents.

CONCLUSIONS

Overall, MOCEs have the potential to serve as an effective tool for applying knowledge during the formative years of surgical training, including as early as the intern year. The high perceived benefit of MOCEs highlights the importance of dynamic, interactive teaching methodologies. Additionally, surgery interns affected by COVID-19 reported greater value in MOCEs, potentially reflecting increased importance of competency-based education and the benefits of in-person examination. Participation in MOCEs was perceived as beneficial to both clinical performance and educational development. Implementation of MOCEs early in residency should be considered, and future studies are warranted to evaluate the objective impact of this educational tool on junior surgery residents.

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Perspectives of OB-GYN Residents and Faculty on Resident Simulation Curricula: A Mixed-Methods Study

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ABSTRACT

Introduction: Simulation training facilitates skill development in low-risk environments and is increasingly widespread in residency programs. Recent simulation models have been developed for obstetrics and gynecology (OB-GYN). Simulation curricula can include a wide range of training methods. To optimize the effectiveness and acceptability of simulation curriculum, key stakeholders' (ie, residents and faculty) perspectives should be obtained before implementation.

Methods: This study used convergent-parallel mixed methods. Electronic surveys were completed by 19 of 32 OB-GYN residents (59%) and 18 of 53 OB-GYN faculty (34%). Two focus groups were conducted, one with residents (n = 12/32, 38%) and one with faculty (n = 6/53, 11%). Focus group transcripts were inductively coded independently and then collaboratively by 3 coders. Codes were categorically analyzed to elicit themes.

Results: Focus group themes included (1) important simulation topics and content, (2) optimal timing of simulation activities, (3) ideal simulation curriculum structure, (4) barriers to education, (5) factors that shape participants' perspectives, and (6) using simulation to improve resident education. Survey responses supported these themes.

Conclusions: This study elucidates resident and faculty perspectives on simulation training. Both groups endorsed key ideas, including the need for a structured and standardized curriculum. Currently, no simulation curriculum standards exist. Findings demonstrate the importance of communication between residents and faculty to create an effective training curriculum that addresses the unique needs and barriers of both trainers and trainees.

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INTRODUCTION

Simulation training facilitates skill development in a low-risk environment and is increasingly widespread in residency programs. Simulation-based learning in residency training is supported by growing evidence in the surgical education literature.

Literature demonstrates that obstetrics and gynecology (OB-GYN) and surgery simulation training improves resident knowledge, technical skills, comfort levels, and self-evaluation of competence.[1-5] Residents not only develop fundamental surgical skills, but these skills translate to specific procedures in the operating room (OR).[6,7] A primary reason simulation models are so effective is that they adhere to basic educational principles: (1) contiguity or step-by-step instruction, (2) repetition, (3) a low-stress environment, and (4) opportunities for formative feedback.[6] Furthermore, research demonstrates that residents and surgical educators support simulation-based assessment of technical skills in surgery.[8] These findings support the need for and feasibility of widespread implementation of simulation curricula within resident training.

Although simulation training is increasingly supported and prevalent, no comprehensive, standardized simulation curriculum has been widely adopted. Simulation curricula can include a wide range of training models, which can make effective curriculum development challenging.[8] Furthermore, different specialties have different needs regarding simulation curricula. Although most simulation models and curricula have been developed for general surgery trainees, several more recent models specifically target

OB-GYN residents.[1,3,4,9,10] For example, the Council on Resident Education in Obstetrics and Gynecology (CREOG) Surgical Skills Task Force developed resources for surgical simulation education that can be included in a curriculum. To optimize the effectiveness and acceptability of a simulation curriculum, key stakeholders' (ie, residents and faculty) perspectives should be obtained prior to implementation.[8] One way to acquire these data is through qualitative and mixed-methods studies. To date, few qualitative studies exist in the surgical education literature.[11]

This study aims to obtain OB-GYN resident and faculty perspectives via qualitative and quantitative methods to inform the development of a comprehensive OB-GYN resident simulation curriculum.

METHODS

Grounded theory qualitative research tradition within a constructivist paradigm was used to design the project.

Setting and Participants

This study was a single-specialty, single-site needs assessment for OB-GYN residents in 2023. Participants were OB-GYN residents and faculty at the Medical College of Wisconsin, an academic, tertiary-care training program in Milwaukee, Wisconsin.

Study Recruitment and Data Collection

Survey development was informed by literature on simulation in medical education.[2,12] Electronic surveys were created using a secure online survey tool (Qualtrics) and sent via email to all OB-GYN residents (n = 32) and faculty (n = 53). Qualtrics does not collect identifying data, including respondent IP addresses or other personal information. Qualtrics also uses Secure Sockets Layer (SSL)/Transport Layer Security (TLS) encryption technology, ensuring data security and access only to intended personnel. The survey investigated participants' perspectives on simulation education in residency and asked residents to rate the necessity of simulation activities for 31 different OB-GYN skills.

Two focus groups were conducted: one with residents (n = 12) and one with faculty (n = 6) (Appendix). During a didactic learning session, all OB-GYN residents were invited to participate in a focus group. All OB-GYN faculty were invited via email. The resident focus group was held during protected education time and led by a resident research team member (ML). The faculty focus group was led by a faculty research team member (MB). Focus groups were semistructured, using a list of questions about useful simulation activities for OB-GYN residents, benefits of different activities for various postgraduate year levels, and barriers to simulation education (Appendix). Sessions were audio recorded and manually transcribed by the research team using Microsoft Word (Microsoft Corp). Participants were deidentified during the transcription process, and the recordings were stored in password-protected devices.

Table 1. Resident Study Participants by Postgraduate Year Level

Postgraduate Year Level	Survey Respondents N = 19	Focus Group Participants N = 12
PGY-1	7	7
PGY-2	6	3
PGY-3	4	2
PGY-4	2	0

Abbreviation: PGY, postgraduate level.

Table 2. Faculty Study Participants by Specialty

Specialty	Survey Respondents N = 18	Focus Group Participants N = 6
General obstetrics-gynecology	6	3
Maternal fetal medicine	5	3 (subspecialists)
Gynecology oncology	2	
Minimally invasive gynecology	1	
Reproductive endocrinology/infertility	1	
Adolescent gynecology	1	
Family planning	1	
Urogynecology	1	

Data Analysis

This study used convergent-parallel mixed methods. Survey responses were analyzed using descriptive statistics for multiple-choice questions and content analysis of open-ended questions to elicit themes. Focus group transcripts were inductively coded independently and then collaboratively by three coders. The focus group coding team consisted of two OB-GYN residents (ML, CP) and one OB-GYN faculty member with prior qualitative analysis experience (MB). A fourth research team member (KK), who holds a PhD in education and has significant qualitative analysis experience, provided mentorship during the analysis. Codes were categorically analyzed collaboratively (ML, CP, MB) to elicit themes. Excel (Microsoft Corp) was used for organization.

The study was approved by the Medical College of Wisconsin Institutional Review Board (Reference ID# PRO00046633). To limit the Hawthorne effect of using an investigator as a focus group leader – which could have affected participants' perception of their ability to speak freely – each focus group was led by a peer. The team included a clinical educator (MB) and two resident learners and educators (ML, CP).

RESULTS

Surveys were completed by 19 of 32 residents (59%) and 18 of 53 faculty members (34%). Survey respondents included residents from all postgraduate years and faculty from general OB-GYN as well as subspecialties: minimally invasive gynecology, maternal fetal medicine, urogynecology, gynecologic oncology, reproductive endocrinology, pediatric and adolescent gynecology, and family planning. Focus groups were attended by 12 of 32 residents (38%;

Table 3. Convergent and Divergent Perspectives of Residents and Faculty Across Six Themes

Convergent Ideas	Different Ideas	
	Residents	**Faculty**
Theme: Important simulation topics and content		
• Low and high frequency skills • Fundamental skills and knowledge • Procedural steps • Consent • Clinical decision-making	• Difficult conversations • Hospital processes	• High risk/emergency skills
Theme: Optimal timing of simulation activities		
• Simulation activities tailored to postgraduate year level • High risk/low frequency skills/situations should be simulated more frequently • Practice before patient care	• High frequency skills do not need to be simulated repeatedly	• Simulating all activities/skills before patient care is difficult due to the nature of residency program scheduling
Theme: Ideal simulation curriculum structure		
• Desire for a standardized curriculum	• Realistic simulation activities • Accessible simulation sessions, access to guideance	• Multimodal learning • Graduated resident responsibility • Resident-driven learning
Theme: Barriers to education		
• Time	• Not asking for help	• Multiple training sites • Trust between faculty and residents • Financial costs and resources • Lack of knowledge about resources and how to access resources
Theme: Factors that shape participants' perspectives		
• Previous experiences • Perceived expectations of others		• Interactions with residents • Negative emotions
Theme: Using simulation to improve resident education		
		• Simulation can be used to improve education

postgraduate years 1-3) and 6 of 53 faculty (11%; 3 generalists, 3 subspecialists) (Tables 1 and 2).

Six main themes emerged from the focus groups: (1) important simulation topics and content, (2) optimal timing of simulation activities, (3) ideal simulation curriculum structure, (4) barriers to education, (5) factors that shape participants' perspectives, and (6) using simulation to improve resident education (Table 3).

Important Simulation Topics and Content

Residents and faculty agreed that simulation topics should focus on the low- and high-frequency skills expected of OB-GYN residents, as well as fundamental skills and knowledge, procedural steps, the consenting process, and clinical decision-making.

When asked in focus groups which simulation session topics would be useful, residents and faculty cited examples of low- and high-frequency skills, including third- and fourth-degree perineal laceration repairs, operative vaginal deliveries, laparoscopy, and cystoscopy.

On surveys, residents and faculty were asked which simulation activities would be most useful; responses were grouped into categories. The most common categories reported by residents were OB skills (50%, n = 6), laparoscopic skills (50%, n = 6), and perineal laceration repairs (25%, n = 3). The most common categories reported by faculty were emergency skills (63%, n = 10), laparoscopic skills (56%, n = 9), and OB skills (38%, n = 7).

On the survey, a wide range of simulation activities were reported as "absolutely necessary" by more than 50% of residents. The activities they most frequently deemed absolutely necessary by residents were: (1) operative vaginal delivery, (2) third- and fourth-degree perineal laceration repair, and (3) shoulder dystocia (Figure).

In addition to low- and high-frequency skills, fundamental skills and knowledge were highlighted as important simulation topics by both faculty and residents in focus groups: *"Having someone teach you how to turn all the [colposcope] knobs and how to focus, that would be really helpful." –Resident*

Furthermore, residents and faculty agreed that obtaining informed consent from patients should be part of standard simulation education:

> *"I think something that could be useful [for] simulations is … things to definitely say during your consent process. It can be useful for interns and second years who haven't really consented people for certain things and … don't know what to talk about." –Resident*

Residents and faculty also agreed that clinical decision-making should be emphasized in simulations:

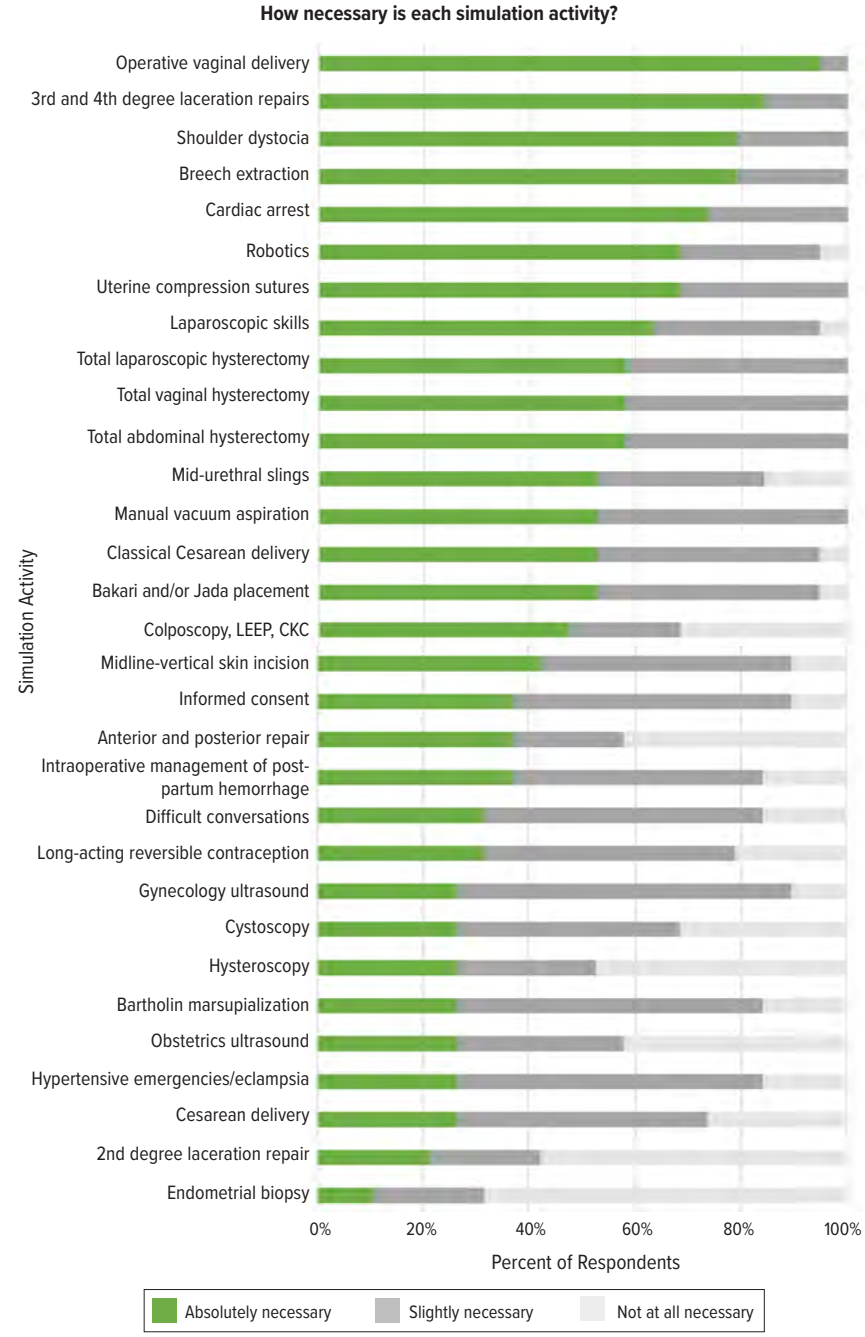
> *"Why you would pick what type of entry in each different situation I think could be part of … a second year SIM [simulation]. People still ask me, what do you want to do? I'm like 'OptiView' because that's what the last attending wanted to do. I don't really know why I'm thinking one versus the other." –Resident*

Not all simulation topics were emphasized by both groups. In the faculty focus group, participants highlighted the importance of simulating emergency and high-acuity scenarios and skills: *"Cesarean hysterectomy simulations – some people graduate never having done one and then when it's you, it's … a pickle." –Faculty member*

Similarly, on the survey, 63% of faculty reported emergency-type activities as useful to simulate, including hemorrhage, hypertension, and "emergency scenarios."

In contrast, residents highlighted "difficult conversations" as important to simulate: *"…learning end-of-life discussions, like getting more comfortable with that. When I was on oncology, I had that quite a bit and I had no idea what to do." –Resident*

Figure. Resident Survey Responses



Abbreviations: LEEP, loop electrosurgical excision procedure; CKC, cold knife conization.

Optimal Timing of Simulation Activities

Residents and faculty agreed that simulation activities should be tailored to postgraduate year level. They also agreed that high-risk and low-frequency skills should be simulated more often and that residents should generally simulate skills before performing them on patients.

Specifically, residents and faculty agreed that first-year residents would benefit from simulation of basic skills (eg, amniotomy, cervical ripening balloon placement, cesarean delivery), whereas more complex procedures and scenarios would be more appropriate for upper-level residents:

> *"Having the specific [postgraduate year] schools is a really good idea. Because, for some of us, you do a D&E SIM [dilation and evacuation simulation] at the beginning of your intern year and you're not going to remember that by the time you're actually doing it… I think it needs to be more specific to your year."*

Both residents and faculty stated that low-frequency and high-acuity skills were more important to simulate repeatedly: *"For emergency (skills), it doesn't matter where you are in your career, you just have to keep simulating so you can keep your skills." –Faculty member*

Both groups remarked on the importance of repeating simulations to maintain basic skills and procedures:

> *"The fourth years need to practice hysteroscopy… because that's your bread and butter, so there needs to be a way for even those*

seniors to circle back and get some of those basics." –Faculty member

"Even the laparoscopy course, it's great that we have it. But it's a couple of random days in August and then we like forget everything. I feel like repetition of these skills is what might make the biggest difference." –Resident

Lastly, both groups agreed that skills should typically be simulated prior to performing them on a patient. One resident noted how uncomfortable it was to place internal fetal monitors for the first time in a real clinical situation: *"I was just getting called to rooms and the nurse was like, would you like to... place this? And I had never done that before, so I just said, sure, here we go." –Resident*

Faculty reported a desire for residents to simulate laparoscopic entry as interns, prior to performing the skill on patients:

"Have, like, simulation for c-section [cesarean delivery] or laparoscopic entry ... early in the process, because you're going to need those skills." –Faculty member

"I see a lot of residents trying to learn or practice on real cases and it should really be the time to be fine tuning." –Faculty member

However, when discussing implementing simulation training prior to patient care, faculty commented on the potential consequences for residents' clinical volume: *"I guess ... the counter argument to that is, like you have to be careful not to delay their access to clinical care so much." – Faculty member*

Ideal Simulation Curriculum Structure

Residents and faculty expressed a desire for a standardized simulation curriculum, with each group highlighting different preferences and suggestions: *"I think having like a systematic thing for each year would probably be the best. Because like right now, it's based on the education chief and what they think is important." –Resident*

When asked about their ideal curriculum structure, residents emphasized realistic simulations that are accessible and convenient. They also noted the importance of appropriate guidance and instruction during simulations:

"They need to be scheduled during work hours."–Resident

"We have our [laparoscopic] trainers, but it's hard to problem solve when you don't know anything about laparoscopy without any guidance." –Resident

In contrast, faculty highlighted multimodal learning and graduated resident responsibility as important elements of a simulation curriculum:

"Right now, I really get the sense a lot of them think that their time in the OR [operating room] is worthless if they're not actively doing the procedure...There needs to be this recognition that they can learn things just from watching." –Faculty member

"I would probably never let an intern do a primary entry... You're going to do a bunch of side ports and watch and get a feel for... the trocar going through the tissue before [you] do one that's blind... Coming up with a more organized way to do that would be super helpful because then everybody's having the same experience." –Faculty member

Faculty also emphasized resident-driven learning as an important structural component: *"[Residents] who have more self-awareness, it's great because they can tell you... 'I need to get better at suturing'... Then you know to save time for that during the case." –Faculty member*

Barriers to Education

Both residents and faculty identified inadequate time as the primary barrier to education. Faculty noted additional barriers, including multiple resident training sites, variable levels of trust between faculty and residents, limited resources (especially financial), and lack of faculty knowledge about educational resources available to residents and how to access them. Residents reported reluctance to ask for help as an additional barrier. Faculty also commented that training at multiple sites can decrease their trust in residents:

"And I think one of our biggest personal barriers has been that we don't see people for 6 months. We have no idea what they've done, what they've learned, if they've operated, what their experience has been." – Faculty member

Factors That Shape Participant Perspectives

Another theme that emerged was factors shaping faculty and resident perspectives on education. Both groups reported that their perspectives are influenced by prior experiences and perceived expectations of others. Faculty specifically described how experiences working with residents in the OR – and resulting negative emotions – shape their desire for simulation: *"I think just simple laparoscopic entry [should be simulated] for the interns. That's like probably the scariest moment... letting them do their first few entries." – Faculty member*

Faculty also reflected on their own experiences as trainees and how these shape their perspectives as educators: *"I remember learning more when I was assisting because I wasn't... stressed out [that] I was gonna [sic] cut the wrong thing... I was just like watching so I learned a lot." – Faculty member*

Finally, faculty described their perception of resident expectations of simulation training:

"There's that process [of stepwise learning] ... So, coming up with a more organized way to do that would be super helpful because then everybody's having the same experience. And I think that's [the residents'] biggest concern is this idea that their experience is not going to be equitable depending on who's on vacation, on what worked, and all those things." –Faculty member

Using Simulation to Improve Resident Education

Faculty noted multiple ways simulation can improve resident education, including (1) allowing residents to practice skills prior to

performing on patients, (2) assessing residents' competency and providing feedback, (3) maintaining a supportive culture while ensuring accountability, and (4) establishing clear expectations:

> *"So, it would be amazing if there were... this curriculum you have to complete and you have to know all of this and there's like an assessment of competency for this knowing." –Faculty member*

> *"I think SIM is an opportunity to help us shift the culture... It's like if you're coming to a breech delivery, you should know... how to do it. And so, there's a curriculum that they have to...review ahead of time. Then I'm having a resident show up prepared even if they haven't done one before, they can at least walk me through it." –Faculty member*

DISCUSSION

In this mixed-methods study, we analyzed OB-GYN resident and faculty perspectives on simulation training in residency and identified major themes important for simulation curriculum development. Across themes, residents and faculty expressed both convergent and divergent perspectives. By examining these priorities and perspectives in detail, this study demonstrates the need for shared expectations, which could help align both toward the common goal of improving training and overcoming educational barriers. This study also identifies the unique needs of each stakeholder group and highlights ways simulation education can meet those needs.

Important convergent perspectives emerged regarding simulation curriculum content and structure. Both groups expressed a desire for a standardized simulation curriculum to help overcome the inherent challenges of residency training. Currently, no comprehensive, standardized curriculum exists for OB-GYN residency programs. Although resources for individual simulation activities are available, including the CREOG surgical curriculum,[10] many academic programs have implemented their own curricula. However, each program must rely on its own educational and financial resources to develop and implement such a program. This study provides insight into what faculty and residents desire in a simulation curriculum. Drawing from these convergent perspectives, a standardized curriculum should include fundamental skills and procedures (both rare and common) as well as clinical reasoning and communication skills (Table 3). Robust literature supports the utility and safety of simulation training in surgical fields, reinforcing the need and feasibility of widespread implementation of simulation curricula within residency training.

Another predominant idea shared by residents and faculty was that simulation can be used to develop not only surgical and procedural skills but also skills related to communication, such as informed consent and "difficult conversations." This builds on existing literature demonstrating that OB-GYN residents desire more training in communication skills and informed consent and have responded positively to simulation-based communication training.[12-14]

By comparing resident and faculty perspectives across themes, this study demonstrates that trainer and trainee expectations for education are not always aligned. This dissonance can lead to decreased trust and negative emotions. Previous research has demonstrated the importance of trust between medical trainers and trainees in postgraduate medical education. Shared expectations have been highlighted as essential for building this trust. Furthermore, mutual trust between educators and learners has been identified as critical for an effective learning environment and patient safety.[15,16]

This study supports and informs the development of a comprehensive standardized OB-GYN simulation curriculum. Increasing communication between faculty and residents during curriculum development can foster shared educational expectations, bolster trust, and create a higher-quality training environment.

Limitations

This study is limited by a small sample size and a single site. Because the surveys and focus groups were optional, participation bias is possible. Participation bias among residents was mitigated by holding the resident focus group during protected education time; similar mitigation strategies for the faculty were not feasible. Additional research is needed to obtain perspectives from faculty and residents at other OB-GYN training sites and determine whether these themes are consistent across programs. Next steps would be development, implementation, and evaluation of a standardized OB-GYN simulation curriculum.

CONCLUSIONS

This study elucidates resident and faculty perspectives on simulation training. Both groups endorsed key ideas, including the desire for a structured and standardized curriculum, the utility of simulation for developing job-specific communication skills, and the importance of simulating skills and procedures before performing them on patients. Currently, simulation curriculum standards do not exist. This study demonstrates that OB-GYN residents and faculty desire more comprehensive and systematic simulation training, which could be achieved through a standardized curriculum. It also highlights differing expectations between residents and faculty, particularly regarding ideal curriculum structure and barriers to education. These findings underscore the importance of communication between residents and faculty to create shared expectations in an effective training curriculum that addresses the unique needs and barriers of both trainees and trainers.

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Confidence and Efficiency Improvements in Medical Student Notes After Implementation of a Standardized Note Template

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ABSTRACT

Introduction: Writing a clinical note is an essential skill that students learn during clinical rotations, but the skill is highly stylized and can be difficult to teach.

Methods: We developed standardized note templates with embedded help text for students to use when writing inpatient admission and daily progress notes. The templates were designed to provide guidance on key features of a note and to build students' self-perceived confidence and efficiency in note-writing. Pre- and post-intervention surveys and note length measurements were used to evaluate the intervention.

Results: Students' self-rated confidence in writing an assessment and plan increased from 17.4% before the intervention to 83.3% after. Their self-rated ability to write admission and progress notes described as "efficient or very efficient" increased from 23.9% to 58.3% and 67.3% to 91.7%, respectively. A substantial majority of students used the templates and found them very or somewhat helpful in organizing an assessment and plan and for distinguishing important from unnecessary information. During this intervention, average progress note length decreased by 13.8% (95% CI, 5792.8 – 4882.65, $P < .001$), while average admission note length increased by 19.3%.

Conclusions: Implementing a standardized note template was well received by medical students and improved their confidence and perceived efficiency. Template use reduced progress note length but increased admission note length.

INTRODUCTION

Teaching students to write succinct and efficient notes in the electronic health record is challenging. The Association of American Medical Colleges (AAMC) states that the ability to "document a clinical encounter in the patient record" is a Core Entrustable Professional Activity for Entering Residency. When composing well-written notes, students learn how to think like physicians and, according to the AAMC, "understand the evolution of the patient's problems, diagnostic work-up, and impact of therapeutic interventions."[1] When students learn note-writing skills from residents and attending physicians during clinical rotations, the feedback they receive is often limited and highly subjective; making it difficult to apply more broadly.[2] Third-year medical students on our inpatient general medicine service historically have not used a standard, customized note template; instead they either copy a template from a resident or start from scratch. Both options are suboptimal, as they may provide either too much or too little detail and do not teach learners how to write a concise and individualized note. We believe that faculty who teach clinical skills can benefit from having a common, shared model that defines a succinct and efficient note written by a medical student.

Medical students also frequently use large amounts of copy-and-paste text in their inpatient progress notes, contributing to redundant documentation and reducing the educational value of their notes. Monahan et al found that during the medicine clerkship, the assessment and plan section of student notes became more redundant over a patient's hospital course and as students gained clinical experience.[3] In another study, 86% of surveyed medical students observed most residents and attending physicians copying data from other providers' notes; 22% reported copying from residents themselves, and only 10% indicated that copying from other providers was acceptable.[4]

An electronic medical record (EMR) workshop for senior

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medical students at one medical school was well received and increased students' confidence in EMR skills, such as data gathering, documentation, and handling unsolicited information.[5] McRae et al showed that implementing and orienting students to a standardized note template can improve medical student note length and quality in pediatric inpatient rotations, as graded by attending physicians.[6] However, similar research has not evaluated students' perceptions of their own notes or been conducted in inpatient internal medicine settings.

Partnering with an informatics department to create note templates that model good note-writing habits – by providing prompts as well as rationale for content and format – may help develop a shared approach. Our goal was to determine whether using standardized note templates could improve students' confidence in organizing an assessment and plan for presentations, improve self-perceived note-writing efficiency, help students focus on documenting only important and necessary information, and reduce the use of copying and pasting from other notes.

METHODS

This single-site intervention was performed at a large, Midwest academic institution that houses both a medical school and internal medicine residency program. As part of their clinical education, all medical students rotate on the general medicine service in their third year for 2 to 4 weeks. One of their daily responsibilities is evaluating patients and writing notes alongside internal medicine residents, who usually provide informal feedback.

We partnered with our inpatient medicine informatics team to modify standard note templates previously created for hospitalists and medical residents. We created standardized admission and progress note templates for students and embedded help text to guide them in standard note-writing techniques and clinical decision-making. These templates were generated within the EMR and automatically populated when students began writing a note.

For the admission note template (Appendix A), the help text (which is deleted upon signing the note) guided students to include a detailed history of present illness, pertinent review of systems, a brief emergency department (ED) course, and pertinent past medical history. Students were instructed not to simply copy all laboratory and imaging data from the ED, but instead to include only pertinent information with interpretation. The assessment and plan section emphasized developing an impression paragraph that concisely describes the patient's history, reason for hospitalization, differential diagnosis, and plan of care. Students were then guided to outline their plan in a detailed, prioritized, problem-based format.

For the progress note templates (Appendix B), the help text instructed students to only include history, physical examination findings, and laboratory or imaging results pertinent to the prior 24 hours. Recommendations for the assessment and plan were similar to the admission note template. For the impression paragraph, students were strongly encouraged to narrow the differential diagnosis and succinctly summarize the plan for that day.

We developed a survey aligned with our aims: to assess students' self-perceived (1) note-writing efficiency, (2) confidence in organizing an assessment and plan for daily rounds presentations, (3) focus on important and necessary information, and (4) reduction in copying and pasting from other notes. Anonymous surveys were

Table. Results From Surveys Completed by Medical Students Before and After implementation of the Standardized Note Template

Variable	Pre (N=46) n (%)	Post (N=24) n (%)	*P* value
What is your confidence level in organizing an assessment and plan for presentations?			
Confident	8 (17.4)	20 (83.3)	<.001[a]
Neutral	32 (69.6)	4 (16.7)	
Not confident	6 (13.0)	0 (0)	
Rate your efficiency in writing an admission note			
Very efficient	0 (0)	3 (12.5)	<.001[a]
Efficient	11 (23.9)	11 (45.8)	
Neutral	15 (32.6)	8 (33.3)	
Inefficient	20 943.5)	1 (4.2)	
Very inefficient	0 (0)	1 (4.2)	
Rate your efficiency in writing a daily progress note			
Very efficient	2 (4.3)	9 (37.5)	.001[a]
Efficient	29 (63.0)	13 (54.2)	
Neutral	11 (23.9)	2 (8.3)	
Inefficient	4 (8.7)	0 (0)	
Very Inefficient	0 (0)	0 (0)	
Estimate the percent of your notes that contains unnecessary information			
<25%	12 (26.1)	16 (66.7)	.007[a]
25% – 49%	29 (63.0)	8 (33.3)	
50% – 75%	2 (4.3)	0 (0)	
>75%	2 (4.3)	0 (0)	
How often do you use or refer to parts of someone else's note to help organize the assessment and plan in your note?			
Always	14 (30.4)	2 (8.3)	.002[a]
Often	27 (58.7)	10 (41.7)	
Sometimes	5 (10.9)	11 (45.8)	
Rarely	0 (0)	1 (4.2)	
How often did you use the general medicine medical student note template for admission and daily progress notes while on your inpatient general medicine rotation?			
Always		23 (95.8)	–
Often		1 (4.2)	
Do you feel the note template was helpful in organizing an assessment and plan for presentations?			
Very helpful		18 (75.0)	–
Somewhat helpful		5 (20.8)	
Neutral		1 (4.2)	
Do you feel the note template was helpful in distinguishing between important and unnecessary information in your notes?			
Very helpful		7 (29.2)	
Somewhat helpful		12 (50.0)	
Neutral		5 (20.8)	

[a]Statistically significant at $P \leq .05$.

created with input from rotation leadership to meet project goals and protect student privacy.

Before beginning the inpatient general medicine service, all students were oriented to the note templates. These learners had previously received instruction on how to write SOAP (Subjective, Objective, Assessment, and Plan) notes and had prior inpatient clinical experience but had no prior exposure to writing notes specifically for inpatients on a general medicine rotation. At the orientation session and before writing any notes, students completed an anonymous pre-intervention survey. After the rotation, they received an anonymous post-intervention survey. Survey data were summarized as counts and frequencies; pre- and post-intervention comparisons were made using Fisher exact tests.

We additionally obtained discrete data using Epic's Workbench Review (Epic Systems), a data exploration and reporting tool within the EMR that allows for analysis of patient data based on specified criteria. We analyzed all notes written by medical students on the general medicine service during two 3-month time intervals: one period before implementation of the standardized note templates (n = 335) and one period after (n = 314). These intervals were selected during consistent times of the year to control for student expertise. Reviewing each medical student note allowed us to evaluate overall template uptake, serving as a proxy for implementation success. We also obtained the average character count for admission and progress notes as a surrogate measure of note-writing efficiency and the presence of unnecessary information.

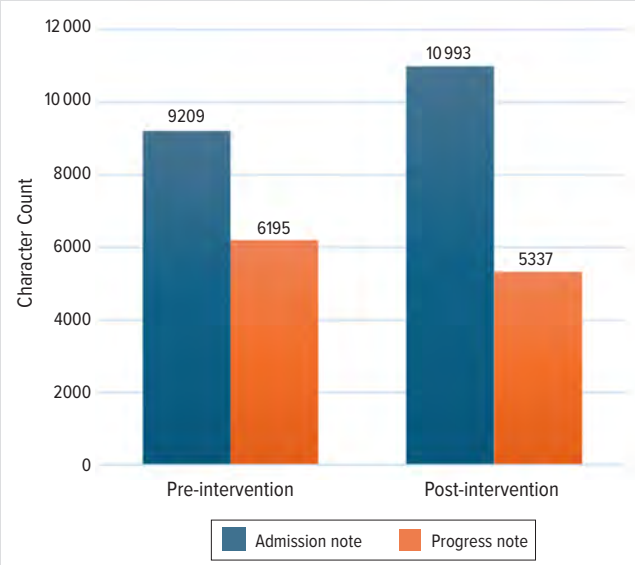
All pre- and post-comparisons were made using paired *t* tests. All *P* values ≤.05 were considered statistically significant. All analyses were conducted using STATA version 17 (StataCorp). This study was exempt from institutional review board approval under the quality improvement and program evaluation exemption.

RESULTS

Survey results are shown in the Table. Forty-six students completed the pre-intervention survey and 26 completed the post-intervention survey. After the intervention, the percentage of students who rated their ability to organize an assessment and plan as "confident" increased from 17.4% (8/46) to 83.3% (20/24). Similarly, the percentage of students who rated their ability to write admission and progress notes as "efficient or very efficient" increased from 23.94% (11/46) to 58.3% (14/24) for admission notes and from 67.3% (31/46) to 91.7% (22/24) for progress notes. The percentage of students who included less than 25% unnecessary information increased from 26.1% (12/46) to 66.7% (16/24). Self-reported use of copying and pasting another provider's note to organize the assessment and plan also decreased, with those selecting "always" decreasing from 30.4% (14/46) to 8.3% (2/24).

In Epic Workbench Review (Figure), the average progress note length decreased from 6195.39 characters pre-intervention to 5337.13 characters post-intervention, a 13.8% reduction (95% CI, 5792.8 – 4882.65; *P* < .001). Average admission note length increased from 9208.50 characters pre-intervention to 10 992.87 post-intervention, a 19.3% increase (95% CI, 10 512.97 – 11471.50; *P* < .001). These templates were used in 97% of all student notes during the implementation period. While 72% of student notes used the standardized templates correctly, 25% used the copy-forward function rather than starting the template de novo. Prior to implementation, 35% of student notes used the copy-forward function.

Figure. Epic Workbench Review of Average Note Length



Average total character count for all medical student notes completed in a 3-month period before standard note template implementation (n = 335) and after standard note template implementation (n = 314).

DISCUSSION

Our survey data showed that after implementation of a standardized note template, students reported a significant increase in their self-perceived confidence level in organizing an assessment and plan for presentations, an increase in subjective note-writing efficiency, and a reduction in unnecessary information included in notes. These findings suggest that standardized note templates can help orient learners to effective note writing and enhance their confidence in this skill.

There are several limitations to this project. First, our survey evaluated only students' subjective perceptions and did not include feedback from evaluators (ie, residents, attending physicians) regarding whether the intervention improved confidence or efficiency in practice. In addition, we used a pre-post cohort design rather than a randomized controlled trial, which could have strengthened the conclusions. Because the surveys were anonymous, we were unable to control for individual student

factors that may influence note-writing efficiency. Students may also experience increased confidence and efficiency over the course of any clinical rotation, independent of template use; however, we aimed to focus their reflections primarily on the templates. Another limitation is the decreased response rate for the post-intervention survey. Pre-intervention surveys were completed anonymously at an in-person orientation, whereas post-intervention surveys were anonymous but completed via email, likely contributing to the lower response rate. Although this may introduce bias, the magnitude and consistency of observed changes support our hypotheses. Finally, because this project was conducted at a single academic center, generalizability may be limited; however, we believe this intervention is easily adaptable at other sites.

Although students' self-perception reflected clear improvements in confidence and efficiency with use of a note template, objective metrics from our Epic database review demonstrated a significant increase in admission note length and a significant decrease in progress note length. We believe the increase in admission note character count is likely attributable to automatic inclusion of nonessential information within the template (eg, past medical history, medications, and problem list). We are currently revising the admission template to remove auto-generated content to support more concise notes.

While we cannot draw conclusions regarding the correlation between self-perceived efficiency and character count, the findings suggest that students have reduced the length of their documentation overall, given that most notes written were progress notes. Some debate exists regarding whether note length is an appropriate surrogate for efficiency in medical student notes, and further study on correlations between character count and efficiency is warranted.

Our evaluation also indicated strong adoption of the standardized note template, with 97% of all post-intervention notes using the template. However, approximately 25% of students used this function incorrectly—copying forward from the previous day's note, which may lead to copy-and-paste errors, as auto-templated values such as vital signs would not be updated for the current day. Notably, this is less than the number of students (35%) who used the copy forward function before template implementation. We believe this reduction reflects the effectiveness of the orientation session. Nonetheless, we have re-engaged students to reinforce proper template use and minimize potential documentation errors.

CONCLUSIONS

This intervention demonstrated that implementing a standardized note template for medical students can be beneficial in orienting students to proper note writing, improving their efficiency, and enhancing their confidence. Incorporating these templates as a standard component of our medical student curriculum created a common, shared model for what constitutes a succinct and efficient student note, which in turn could help reduce note length and better orient students to effective documentation practices.

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Appendices: Available at www.wmjonline.org.

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Integrating Behavioral Health Into Cancer Education: Learner Perspectives From a Cancer Education Pathway Program

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ABSTRACT

Introduction: Comprehensive cancer care requires providers to address significant psychological and social challenges, yet behavioral health is often underemphasized in early medical education. The Student-centered Pipeline to Advance Research in Cancer Careers (SPARCC) program provided a setting to enhance learners' understanding of the psychosocial aspects of cancer by integrating behavioral health-focused sessions.

Methods: We evaluated 2 behavioral health sessions implemented as part of the SPARCC curriculum: one addressing the psychological impact of a cancer diagnosis and the other exploring the intersection of cancer and fertility. Learners completed session-specific workshop evaluations and pre- and post-program surveys assessing knowledge, attitudes, and practices. Quantitative data were analyzed using paired *t* tests, and qualitative responses were thematically examined to explore learner perceptions.

Results: From 2019 through 2023, 71 learners participated in the program, the majority identifying as members of groups underrepresented in medicine. Session evaluations (N = 111) showed consistently high ratings across all categories, with mean scores above 4.25 on a 5-point Likert scale and average overall session ratings above 9.0 on a 10-point scale. Thematic analysis highlighted the value of patient narratives, informal discussion formats, and attention to often-overlooked topics such as infertility and financial burden. Significant improvements were observed in learners' knowledge of cancer diagnosis and treatment and awareness of medical mistrust in underserved populations ($P < .05$).

Conclusions: High learner satisfaction, improved understanding of psychosocial aspects of care, and increased awareness of health disparities suggest that integrating behavioral health and patient perspectives into early cancer education can meaningfully support learner development.

INTRODUCTION

Health care professionals play a critical role in recognizing and managing the psychological burden of cancer. Integrating behavioral health topics into medical education programs, including early health care pathway programs, can enhance clinical knowledge important for patient care.

Pathway enrichment programs are designed to expand access and entry into biomedical research and medical careers, particularly for students from historically underrepresented and marginalized backgrounds. These programs engage learners across the educational continuum – from elementary and high school through undergraduate levels – providing early exposure to health care fields. Common elements include hands-on experiences, academic enrichment, and mentorship, which prepare students for future careers as clinicians, researchers, and other health professionals.

Behavioral health knowledge is important for health care professionals due to the role psychological and social factors play in the onset and course of medical conditions. In oncology, studies suggest that when emotional and mental health support is integrated into cancer care, quality of life, adherence to treatment, and overall health improve.[1] A deeper understanding of behavioral health within medical education encourages learners to think holistically and across disciplines, integrating the mental, social, and physical aspects of care.[2] One strategy to integrate clinical and psychosocial care is to incorporate patient perspectives into medical curricula. Incorporating patient experiences – specifically the

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Table 1. Learner Evaluations for Behavioral Health Sessions, 2019–2023 (N = 111)

Session (Years)	Positive Attitude Toward Teaching[a] Mean (SD)	Used Teaching Materials Effectively[a] Mean (SD)	Communicated Learning Goals Clearly[a] Mean (SD)	Encouraged Active Engagement[a] Mean (SD)	Advanced Understanding of Topic[a] Mean (SD)	Overall Rating[b] Mean (SD)
Patient panel (2019)	4.56 (0.53) (Min 4; Max 5)	4.25 (0.46) (Min 4; Max 5)	4.44 (0.50) (Min 4; Max 5)	4.67 (0.62) (Min 3; Max 5)	4.73 (0.45) (Min 4; Max 5)	9.5 (0.74) (Min 8; Max 10)
Intersection of infertility and cancer (2020-2023)	4.56 (0.63) (Min 1; Max 5)	4.60 (0.54) (Min 3; Max 5)	4.58 (0.57) (Min 3; Max: 5)	4.60 (0.55) (Min 3; Max: 5)	4.72 (0.45) (Min 4; Max: 5)	9.19 (1.32) (Min 4; Max 10)
Psychological impact of cancer diagnosis and treatment (2020-2023)	4.70 (0.43) (Min 3; Max 5)	4.50 (0.59) (Min 3; Max 5)	4.60 (0.49) (Min 3; Max 5)	4.71 (0.46) (Min 3; Max 5)	4.58 (0.52) (Min 3; Max 5)	9.06 (1.08) (Min 6; Max 10)

[a]Rating based on 5-point Likert scale (1 = poor; 5 = outstanding).
[b]Rating based on 10-point Likert scale (1 = poor; 10 = excellent).

impact of their diagnosis and their interactions with the health care system—into medical education programs has demonstrated benefits on patient-provider communication and patient satisfaction.[3] Instilling future health care professionals with core behavioral health knowledge is necessary for whole-patient care.[3]

Despite the demonstrated success of pathway programs advancing educational and career outcomes, limited research has examined how learner perceptions and experiences are influenced when behavioral health topics are integrated into medical education.[4,5] This study aimed to explore the impact of integrating the Student-centered Pipeline to Advance Research in Cancer Careers (SPARCC) behavioral health curriculum into in a cancer education pathway program, with a focus on how this affects learners' perceived benefits from behavioral health-focused educational sessions and their understanding of the psychosocial dimensions of cancer care. The objectives were to increase awareness of the psychological and emotional challenges faced by individuals with a cancer diagnosis, highlight the importance of integrating behavioral health into cancer care, and foster empathy and reflective thinking among future health care professionals.

METHODS

Overview

Established in 2018, SPARCC was an 8-week summer research program funded by the National Cancer Institute (NCI) (National Institutes of Health [NIH]/NCI R25 CA 221715) designed to strengthen the pathway for underrepresented minority (URM) students to pursue careers as clinical research professionals or advanced degrees in clinical cancer research.[6] PARCC's programmatic design included hands-on research experience, clinical practicums, mentorship, and professional development within a robust cancer research environment. The curriculum was structured around the Joint Task Force Clinical Trials Competency Domains, with emphasis on social determinants of health and principles of culturally responsive care.[7] Daily workshops addressed key topics, including the design and management of clinical cancer trials, cancer prevention and care, and academic and career guidance, with the intent to prepare learners for future health care and research careers. The specific goals of the behavioral health sessions were to highlight the patient-centered impact of a cancer diagnosis and foster understanding of the psychological and social aspects of patient care.

Eligibility criteria for SPARCC were intentionally broad to ensure access and inclusion. Students were eligible if they were rising juniors and seniors enrolled in 4-year undergraduate programs, enrolled in 2-year associate degree programs, or were recent college graduates. While applications were open to all students, URM students were strongly encouraged to apply, consistent with the NIH/NCI priorities at the time.

To support recruitment, SPARCC established partnerships with 7 higher education institutions across Wisconsin, including 2 designated as Hispanic-serving and women-only universities. Recruitment sessions were held both in-person and virtually to ensure access. These sessions provided an overview of the program's structure, expectations, benefits, guidance for preparing a competitive application, and strategies for securing robust letters of support. To expand recruitment efforts beyond the Midwest, SPARCC was advertised nationally through postings on Handshake (an online career network) and the Association of American Medical Colleges Medical Pathways and Enrichment Opportunities website.

Intervention

Two educational sessions focused on behavioral health were implemented as part of the SPARCC curriculum. The first session, "Psychological Impact of a Cancer Diagnosis," was an instructor-led didactic session exploring the emotional effects of receiving a diagnosis. Active learning strategies were used to engage learners through small- and large-group discussions. In addition to the didactic session, a patient panel featuring survivors who shared personal narratives highlighting the emotional and psychological challenges of diagnosis and treatment was offered 1 year. This session aimed to help learners understand the human experience of cancer and the role of behavioral health in cancer care. The fre-

quency of patient panels was limited due to the COVID-19 pandemic.

The second didactic session, "Intersection of Cancer and Fertility," focused on oncofertility and the reproductive health implications of cancer treatment. The session highlighted the psychological sequelae of a fertility-related diagnosis and the impact on family planning and psychosocial well-being in the context of cancer care. Real-world case examples and facilitated group discussions emphasized psychological, social, and ethical considerations related to fertility preservation and treatment.

Table 2. SPARCC Knowledge, Attitudes, and Practices

Survey Item	Pre-Program Mean (SD)	Post-Program Mean (SD)	*P* value
I am knowledgeable about cancer diagnosis and treatments	5.17 (1.51)	5.84 (1.54)	.01
I am aware of issues relating to medical mistrust among underserved populations	6.13 (1.10)	6.50 (0.76)	.01
I can list the social determinants of health	5.26 (1.60)	5.71 (1.60)	.12
I am familiar with culturally responsive strategies used with patients and patient families	5.28 (1.64)	5.75 (1.77)	0.17
I feel empowered to advocate for historically underrepresented /marginalized groups	4.67 (0.49)	4.75 (0.62)	.67
I feel a sense of belonging in medicine/research	5.83 (1.56)	6.00 (1.50)	.51

Abbreviation: SPARCC, Student-centered Pipeline to Advance Research in Cancer Careers.
Survey used a 7-point Liker scale: 1=strongly disagree; 4=neutral; 7=strongly agree.

Data Collection

To assess the impact of SPARCC's behavioral health curriculum, we conducted a program evaluation using pre- and post-surveys with quantitative scales and qualitative open-ended questions.[7] The Knowledge, Attitudes, and Practices (KAP) framework, commonly used in public health research, was adapted to evaluate changes in learners' knowledge and attitudes related to clinical cancer research. Learners completed the standardized SPARCC KAP evaluation at the start of the program and 6 months after completion (Appendix 2 – SPARCC KAP). Quantitative items assessed changes in knowledge and attitudes, while open-ended responses provided deeper insight into learner experiences.[8] For this analysis, we selected 6 items from the 17-item SPARCC evaluation based on their relevance to behavioral health, defined as the integration of psychological, social, cultural, and structural factors that influence health outcomes. These items were selected because they address multiple dimensions of behavioral health competence: awareness of health inequities and disease contexts (eg, cancer and social determinants of health), understanding of social and cultural barriers to care (eg, medical mistrust and responsiveness), and development of professional attitudes that foster advocacy, inclusion, and belonging.

In addition to the SPARCC KAP, learners completed session-specific workshop evaluations immediately following each workshop (Appendix 1 – SPARCC Workshop Evaluation). All data were collected via Research Electronic Data Capture (REDCap), a secure web-based application that stores and links participant data longitudinally.[9]

Data Analysis

Changes in KAP responses were analyzed using comparison of means, standard deviations, paired *t* tests, and *P* values to assess changes over time. Open-ended responses from session-specific evaluations were analyzed using thematic analysis to better understand learner experiences and perceptions.[10] Two members of the research team (NT, ZA) collaboratively reviewed and coded free-text survey responses in a shared Excel spreadsheet, assigning initial codes that reflected specific ideas or sentiments (eg, "patient perspective," "psychosocial impact," "informality of session," "financial burden"). Researchers met to compare code lists, resolve discrepancies, and develop a shared code list. Related codes were then grouped into broader themes based on recurrent ideas and pattens. The remaining research team members reviewed the final themes and representative quotations to ensure consensus. This educational activity evaluation was exempt from institutional review board review as it was part of the approved programmatic evaluation for the SPARCC program (May 24, 20218, PRO31976.)

RESULTS

The comprehensive SPARCC pathway program was offered from 2019 to 2023 with a total of 71 learners. The majority of participants were women (73% [52/71]); 67% (48/71) self-identified as a member of a group underrepresented in medicine or biomedical research (eg, Black/African American, American Indian or Alaska Native, Native Hawaiian/other Pacific Islander, Hispanic/Latino). Learners represented 4 major regions of the United States (East, West, South, and Midwest), with the majority from the Midwest (86% [61/71]). Almost all learners were close to graduating or already graduated from a 4-year undergraduate degree program (96% [68/71]), and most intended to pursue a career in research (86% [61/71]) upon completion of their degree. From 2019 to 2023, SPARCC KAP pre- and post-program evaluation data were collected from all 71 learners (100% completion rate). Behavioral health session-specific evaluation data (N=111) were also collected during this time. Across all 5 years, the workshop evaluation completion rate was 61% (43/71). Results did not demonstrate differences in learner evaluations across virtual and in-person formats.

Table 1 presents aggregated learner evaluations of the behavioral health sessions. Across all sessions and years, mean ratings in each category remained above 4.25 out of 5, indicating that learn-

ers consistently perceived the sessions as effective, relevant, and enriching. Learners provided an overall rating of session facilitation on a 10-point Likert scale (1 = poor; 10 = excellent) and rated facilitator qualities (eg, attitude, efficacy, skill) on a 5-point Likert scale (1 = poor; 5 = outstanding). Higher mean scores reflected greater learner satisfaction, perceived facilitator effectiveness, and learning impact. Learners also had the opportunity to provide free-text responses with additional comments or reflections on the session content.

In addition to high quantitative ratings, thematic analysis of 82 free-text responses revealed key insights into learners' perceptions of the subject matter. Representative themes and exemplar quotes are summarized below.

1. Patient Narratives Informing Practice

Learners described how hearing directly from cancer patients and caregivers deepened their awareness and understanding of cancer's psychosocial impact.

> *"I found it so amazing to hear more people talk about themselves. The group was very dynamic, and I think that was needed. The attitude made a huge difference, which was an important takeaway." (Cohort 1, 2019)*

2. Bridging the Gap

Learners noted that the sessions filled gaps in a traditional science-based education by connecting emotional and mental health with cancer care.

> *"I really enjoyed discussing the psychological impacts of cancer diagnosis, treatment, and remission; it is probably one of my favorite topics so far. This topic is pretty different from what we've been discussing so far, but mental health is just as important to someone's well-being as their physical health. I thought the facilitator did a wonderful job of putting these thoughts and feelings into perspective." (Cohort 2, 2019)*

> *"I loved how engaging [the facilitator's] presentation was. It was nice to gain insight into her field and what she does without being bombarded with statistics and technical facts. It was nice to have a more abstract look into what patients facing a cancer diagnosis may experience emotionally and how different people may cope with that." (Cohort 3, 2021)*

3. Naming the Overlooked

Learners recognized the importance of acknowledging the often-unaddressed aspects of cancer care, including emotional toll and reproductive implications of treatment. Learners particularly appreciated the discussion of infertility and receiving a cancer diagnosis, especially for women of lower socioeconomic status (SES).

> *"Cancer and infertility are so common but not talked about enough. I am happy we could discuss this and I am happy we could see the costs, scenarios and we could be emphatic (sic) about a condition we do not know." (Cohort 1, 2019)*

> *"Cancer alone is a very hard issue to discuss with patients, I can't even imagine the added stress patients endure when also discussing infertility. The price of fertility preservation is also another huge issue that disproportionately affects lower and middle-class patients. I am curious as to how many people decide to go through with infertility services despite the cost versus how many people don't even consider it due to their finances and how these numbers vary across SES." (Cohort 2, 2020)*

4. Authentic Conversations for Learning

Learners appreciated the interactive, less formal, and more conversational structure of the sessions, which afforded more comfortable engagement with sensitive topics.

> *"I really liked the layout of this talk. It was short, quite informal, yet very effective. I liked how it was just kind of a conversation and after continuous workshops with heavy content. I liked how [the presenter] didn't have a PowerPoint and it was more of a casual conversation where she asked a lot of questions." (Cohort 2, 2020).*

> *"Loved how it was not formal. We were literally talking with one another instead of her talking at us." (Cohort 3, 2021)*

5. Emerging Advocacy

Learners increasingly became aware of and frustrated by the financial barriers associated with cancer treatment and its impact on fertility. They appreciated learning how these barriers contribute to distress in patients, especially as it related to fertility preservation. This observation tied strongly to students' motivation for advocacy.

> *"This was an important conversation to have. Patients with cancer face so many difficulties that I almost forget that infertility compounds these challenges. I'll reiterate what [another student] said about how frustrating it was to learn about the financial burdens to fertility preservation." (Cohort 2, 2020)*

Learners also completed pre- and 6-month post-program surveys using a 7-point Likert scale (1 = strongly disagree; 4 = neutral; 7 = strongly agree). Two of the 6 selected survey items demonstrated statistically significant changes. A paired samples *t* test showed that knowledge of cancer diagnosis and treatment increased from pre-program (mean, 5.17; SD, 1.51) to post-program (mean, 5.84; SD, 1.54; $t(69) = -2.52$; $P < .05$; $d = 0.30$). Awareness of issues relating to medical mistrust among underserved populations also significantly improved, increasing from pre-program (mean, 6.13; SD, 1.10) to post-program (mean, 6.50; SD, 0.76; $t(69) = -2.28$; $P < .05$; $d = 0.27$). Although the remaining 4 items did not reach statistical significance, all demonstrated positive directional change, with learners reporting greater familiarity with social determinants of health and culturally responsive strategies and modest gains in advocacy and belonging. Full results are shown in Table 2.

DISCUSSION

Findings from 5 years of the SPARCC program demonstrate the benefits of integrating behavioral health-focused sessions into a cancer education pathway program. Learners consistently evalu-

ated the sessions highly across all criteria, suggesting strong satisfaction and educational value. Qualitative feedback reinforced these results, indicating a meaningful influence on how learners understood the subject matter.

Learners emphasized the profound impact of hearing directly from cancer patients and caregivers and exploring the emotional, relational, and reproductive consequences of a cancer diagnosis. This firsthand perspective deepened their understanding of the psychosocial challenges associated with cancer. Many described the sessions as a significant departure from traditional science-focused training, offering essential insight into the human experience of cancer. Learners particularly valued discussions related to oncofertility, the financial burden of fertility treatment, and its impact on mental health – topics they identified as underrepresented in their formal education. These themes resonated strongly with participants, who expressed frustration and heightened motivation for advocacy.

These findings align with existing literature demonstrating the value of incorporating patient perspectives into health professions education.[11-14] Prior studies show that engagement with patient narratives enhances empathy, strengthens communication skills, and improves understanding of complex psychosocial issues.[11,12,14] By embedding these experiences within a structured, early-stage pipeline program, SPARCC provides a model for cultivating emotionally attuned and equity-minded future health professionals.

Learners also appreciated the interactive, conversational format of the sessions. This approach facilitated emotional engagement and supported a more meaningful exchange of ideas, particularly around sensitive topics such as infertility and cancer – especially for women from marginalized groups.

Beyond satisfaction, survey data showed improvements in 2 key areas: knowledge of cancer diagnosis and treatment and awareness of medical mistrust among underserved populations. These findings suggest that the sessions were not only well received but also had a measurable impact on understanding both clinical and psychosocial dimensions of cancer care. Although other items did not reach statistical significance, all demonstrated upward trends in mean scores, indicating potential benefits that may require larger samples or more targeted interventions to assess fully. Not all sessions were designed to directly influence broader program goals, which may have similarly influenced the degree of measurable change.

Many SPARCC learners identify as members of historically underrepresented groups in medicine. Integrating behavioral health education within culturally responsive medical education programs may validate learners' lived experiences and support professional identity formation. Learners also reported that the sessions encouraged advocacy and reinforced their motivation to address health disparities and the emotional and mental health needs of patients in their future careers.

Challenges and Recommendations

This study has limitations. Transitioning from in-person to virtual formats during the COVID-19 pandemic restricted direct patient participation for panel discussions, limited learner engagement, and reduced available evaluation data. Future implementation of behavioral health content in medical education or pathway programs should explore hybrid models or prerecorded patient narratives to preserve the depth of patient interaction and reduce barriers. Additionally, learner feedback favored informal, discussion-based formats over traditional lectures, suggesting that emotionally resonant content may be best delivered through interactive, learner-centered approaches. Finally, there were limited survey items aimed at assessing questions of interest, and only a small number of learners provided free-text responses, further limiting available data.

CONCLUSIONS

Integrating behavioral health and patient perspectives into cancer education may enhance learner understanding of the psychosocial dimensions of care. SPARCC demonstrates the importance of and benefit of embedding such content into early pathway programs, particularly those focused on equity and diversity in the health professions. Additionally, this content can be incorporated in a feasible and effective manner. Health care educators should consider the value of integrating behavioral health into their curricula. Expanding these efforts may support the development of future health care professionals who are not only scientifically competent but also attuned to the emotional and social needs of their patients.

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An Initial Evaluation of a Peer Mentorship Program in a Medical School Clinician Educator Scholarly Concentration

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ABSTRACT

Introduction: Traditional faculty mentorship in medical education is limited by availability and specificity of advice. Peer mentorship may complement this model by supporting mentees' transition into medical school while promoting mentors' teaching and leadership skills. We implemented a peer mentorship program within an experiential learning course at a private Midwestern medical school to enhance students' understanding of core course components.

Methods: First-year mentees were randomly assigned second- and third-year mentors. Six required sessions were embedded into course meetings across the academic year. A pre-implementation survey (pre-1, N = 65) and 2 post-surveys at the end of each semester (post-1, N = 31; post-2, N = 11) assessed students' understanding of course components and perceptions of the program. Survey outcomes were compiled as a total understanding score (TUS).

Results: Comparing pre-1 to post-1 and post-2, understanding ($P = .0026$; $P = .001$, respectively) and development ($P = .0037$; $P = .0019$, respectively) of course competencies improved significantly. Scholarly project understanding and TUS improved significantly from pre-1 to post-1 ($P = .0001$; $P = .0005$, respectively) but not from pre-1 to post-2 ($P = .0739$; $P = .0665$, respectively). Understanding and development of individualized learning plans did not significantly improve across either interval. Consistent mentor groupings and integration into required sessions were rated most favorably among design components.

Conclusions: Participation positively affected students' self-assessed success in competency-based learning. Structured peer mentorship embedded in existing curricula may address limitations of hierarchical models by providing scalable support for students in longitudinal medical education settings.

INTRODUCTION

Mentorship plays a foundational role in undergraduate medical education, supporting both academic growth and professional identity formation.[1] According to Kram's dual function model, effective mentorship provides both psychosocial support and career development, offering unique benefits depending on whether the relationship is hierarchical (eg, faculty-student) or peer-based (eg, senior-junior student).[2,3] Faculty mentorship remains the dominant model in most academic settings, often embedded within research, specialty guidance, or formal advising structures.[1,4]

Hierarchical mentorship models are limited by faculty availability, competing clinical responsibilities, and inconsistent access, which may prevent students from building meaningful longitudinal relationships.[5,6] These limitations are particularly impactful as students face increasing pressure to distinguish themselves on residency applications through scholarly activities and leadership roles—especially since the transition of the United States Medical Licensing Examination (USMLE) Step 1 and many preclinical curricula to pass/fail grading.[7] Differences in curricular models and evaluation systems further limit the specificity of advice faculty can offer students navigating a rapidly evolving academic environment. This trend has heightened the need for effective support systems that guide students through self-directed and extracurricular academic work.

To address these challenges, many medical schools have

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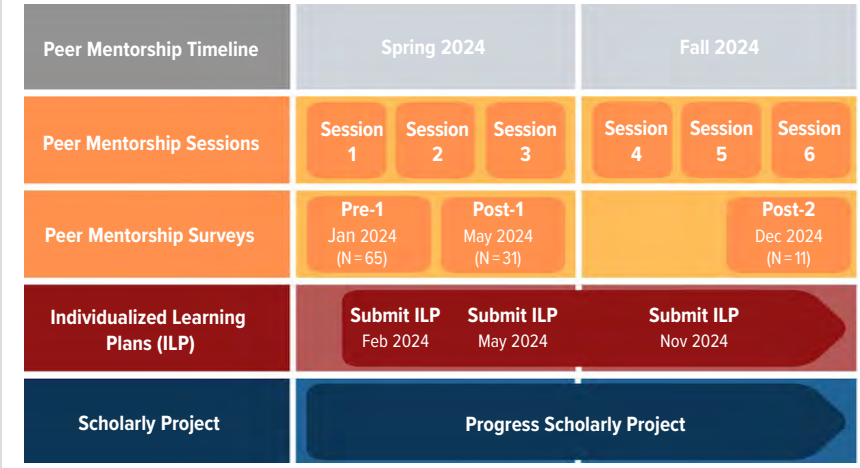
implemented scholarly concentrations (SCONs)—structured longitudinal programs that connect students with faculty mentors to develop individualized learning plans (ILPs), complete scholarly projects, and pursue focused competency development in fields of interest.[8] While these programs offer structure and opportunities for faculty engagement, they face the same limitations as hierarchical mentorship models and often lack formal peer support systems to help students manage timelines for self-directed learning activities.

Peer mentorship offers a promising complement to traditional faculty-led models.[2] Compared with hierarchical relationships, peer mentors may provide increased accessibility, psychological safety, and similarity of perspectives and identities, leading to higher perceived mentor credibility and mentee receptiveness to advice.[3,9] Mentors themselves benefit through the development of teaching skills, leadership confidence, and a stronger professional identity.[3,10] Despite these advantages, few peer mentorship programs have been formally evaluated in undergraduate medical education.[3,5,11-13]

To address this gap, we implemented a structured peer mentorship program within the clinician educator (CE) SCON at the Medical College of Wisconsin (MCW) and sought to understand students' perceptions of its impact. The program was designed to foster shared learning, support mentees in navigating this customized curricular thread, and promote professional development among both mentors and mentees. We hypothesized that participation would positively affect students' understanding of and confidence in the required components for successful completion of this longitudinal course, which emphasizes competency development and scholarly output across preclinical and clinical years of medical school.

Figure 1. Timeline of Peer Mentorship Program and Clinician Educator Scholarly Concentration Components



METHODS

Setting and Program Design

All medical students at MCW self-select into 1 of 8 SCONs, each a 2- to 3-year longitudinal experiential learning course. Students select a faculty scholarly advisor and design ILPs to structure their extracurricular time around completion of a scholarly project and competency-based skill development. Scholarly projects are a required, longitudinal, self-directed component of the curriculum intended to encourage exploration and advancement in a field of interest within medicine. Project opportunities are diverse, encompassing international work, peer-reviewed research, community engagement, program development, and formal quality improvement initiatives within academic and clinical settings. To graduate, projects must satisfy Glassick's criteria for scholarship and culminate in both a written manuscript and an oral presentation.

Within the CE SCON, we implemented a student-led peer mentor program during the 2024 academic year. This launch coincided with a major curricular transition in the medical school curriculum, including a shift to systems-based course organization and a shortened preclinical phase (from 2 to 1.5 years) to allow more time for clinical electives. As a result, incoming students entered the CE SCON under a different curricular model than their continuing peers. Notably, the SCON curriculum and scholarly project requirements did not change.

Because mentorship is a core CE SCON competency, program participation was mandatory for all students, which precluded assessment of a contemporaneous control group. New students to the CE SCON were considered "student mentees" (N = 44) and were randomly paired by course administrative staff with student mentors who had at least 1 year of CE SCON experience (N = 27). CE SCON cohort size varies annually based on student self-selection. Although rare, students may switch between SCONs after 1 year; therefore, only students with more than 1 year of enrollment in CE SCON were eligible to serve as mentors. Those with less than 1 year enrollment were mentees. To account for differences in cohort size, some mentors were assigned 2 mentees.

To minimize burden and maximize engagement, 6 peer mentorship sessions were embedded into existing monthly CE SCON meetings. Each session included a 10-minute didactic presentation followed by a 20-minute small-group discussion. Sessions were designed and facilitated by CE SCON student leaders with at least 1 year of prior program experience. Faculty course directors' involvement was limited to reviewing and providing feedback on student-prepared didactic presentations before each session,

analogous to reviewing slides for guest faculty presenters. Didactic content addressed mentorship dynamics, and discussion prompts focused on completion of SCON course requirements and development of 10 core CE competencies.[14] Although general prompts were provided, peer mentor groups were encouraged to individualize each discussion to mentees' goals.

Survey Development and Implementation

Assessment of the peer mentorship program through student self-assessment surveys was approved by the MCW Institutional Review Board (PRO00050710). Informed consent was collected at the start of the survey, emphasizing that program participation was required but survey participation was voluntary. Surveys were adapted from an existing clinician educator (CE) SCON survey used for educational quality improvement by faculty and student authors (Box). Additional items assessed perceived helpfulness of program components and overall strengths and weaknesses. The survey was piloted with subject experts and students to collect evidence of content and response process validity per Messick's framework.[15]

All CE SCON students received an electronic invitation to complete a pre-survey (pre-1) prior to program launch, a post-survey (post-1) after the first semester, and a second post-survey (post-2) after a full year of participation (Figure 1). Surveys were administered via Qualtrics (Qualtrics, LLC, 2024) and closed 2 weeks after the initial invitation. One follow-up email reminder was sent 1 week before the survey closed. All responses were deidentified.

The pre-survey and post-surveys collected demographic information, including duration of CE SCON participation. Respondents used a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) to rate their understanding of 5 CE SCON domains: ILP purpose, ILP development and maintenance, CE competencies, competency development, and scholarly project requirements. To inform future program iterations, post-surveys included additional 5-point Likert items (1 = very unhelpful, 5 = very helpful) assessing perceived usefulness of pilot design components: random assignment, consistent groups across each semester, discussion prompts, session length, and student-led facilitation. Respondents also answered free-response questions soliciting feedback on helpful and unhelpful elements of the program and suggestions for improvement. Survey text is shown in the Box.

Data Analysis

Statistical analysis compared survey responses before and after program participation. Only responses with all quantitative questions completed were included. Quantitative analyses were performed using Stata, version 19 (StataCorp LLC). Cronbach's alpha was used to evaluate inter-item reliability of pre- and post-surveys to demonstrate evidence of internal structure validity. Composite total understanding scores (TUS) were calculated by summing Likert scale items assessing understanding of CE SCON domains and were compared using Wilcoxon rank-sum testing (Mann-Whitney U). Student mentorship scoring was assessed using descriptive statistics. Pre- to post-item score comparisons were performed using Wilcoxon rank-sum testing with a significance level of 0.05. Differences in pre-survey baseline scores were analyzed against time spent in the course. Analysis was then conducted between mentee students (<1 year in the course) and mentor students (>1 year in the course) using Wilcoxon rank-sum testing, which served as a proxy for mentee versus mentor role. The research team reviewed free-text responses to inform potential future program changes but were not thematically coded in this analysis.

Box. Peer Mentorship Program Survey Evaluation

Select your current academic year in medical school.

How long have you been in the CE SCON?

Rate your level of agreement with the following statements:[a]

- I understand the purpose of an ILP.
- I understand how to create and maintain an ILP.
- I understand the CE SCON competencies.
- I understand how to seek out activities to develop CE SCON competencies.
- I understand how to meet the scholarly project requirement.

Rate the helpfulness of these components of the peer mentorship program:[b]

- Peer mentorship groups assigned at random.
- Using dedicated time during core sessions for peer mentorship conversations.
- Suggested prompts provided for peer mentorship discussion.
- Student leadership of peer mentorship program.
- Consistent peer mentorship group assignment throughout the semester.

Did the dedicated core session time for peer mentorship conversation feel appropriate in duration?

How likely is it that you would recommend a SCON peer mentorship program to a friend or colleague?

What 2 to 3 components of the peer mentorship experience were not helpful to your development?

Please share with us any additional thoughts related to the SCON peer mentorship program.

Abbreviations: CE, clinican educator; SCON, scholarly concentration; ILP, individualized learning plan.

[a]5-point Likert scale: 1 = strongly disagree, 5 = strongly agree.

[b]5-point Likert scale: 1 = very unhelpful, 5 = very helpful.

Table 1. Comparison of Student Pre-survey Responses by Duration of Time in Clinician Educator Scholarly Concentration

Primary Outcomes	*P* value	Direction of Difference
Understanding of CE core competencies	.018[a]	(>1 year) > (<1 year)
Developing CE core competencies	<.001[a]	(>1 year) > (<1 year)
Understanding the purpose of an ILP	.058	No difference
Maintaining an ILP	.002[a]	(>1 year) > (<1 year)
Understanding of scholarly project requirements	0.002[a]	(>1 year) > (<1 year)

Abbreviations: CE, clinican educator; ILP, individualized learning plan.

>1 year = mentors; <1 year = mentees.

Statistically significant: $P < .05$.

RESULTS

Overall Survey Demographics

In the first-semester cohort, 43 students had been enrolled in the CE SCON for less than 1 year and 22 students for more than 1 year. Of 70 total students, 65 completed the pre-1 survey and 31 completed the post-1 survey. Within pre-1, 43 students had less than 1 year CE SCON experience and 22 students had more than 1 year. Within post-1, 26 students had less than 1 year of experience and 5 had more than 1 year. In the second-semester cohort, 25 had less than 1 year of CE SCON experience and 48 had more than 1 year. Of 73 total students, 11 completed the post-2 survey, all of whom had more than 1 year of CE SCON experience. Overall survey response rates were 93% for pre-1, 44% for post-1, and 15% for post-2.

Survey Validity and Baseline Differences by SCON Experience

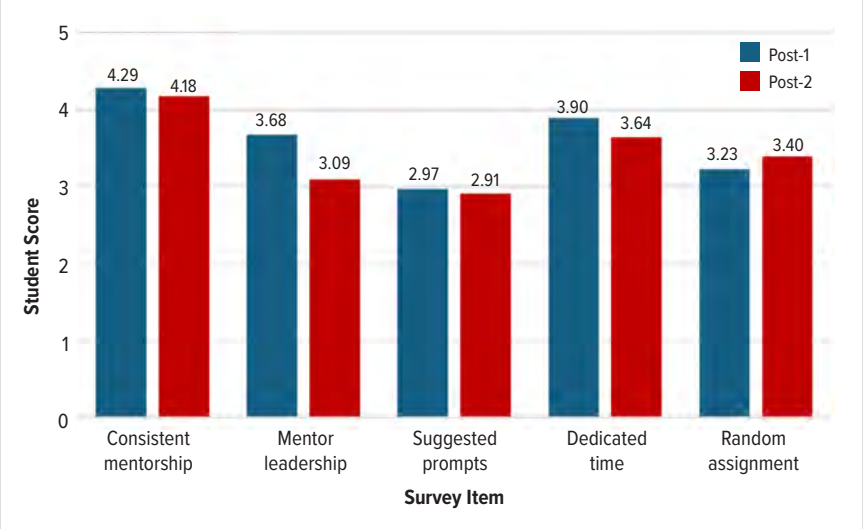
Cronbach's α values were .8809 for the pre-survey and .8003 for the post-survey, indicating appropriate and credible measures for survey items. Pre-1 results for students with and without prior CE SCON experience were compared to assess knowledge as a metric for subject "expertise" or understanding. Students with more than 1 year of CE SCON experience had significantly higher baseline scores for understanding CE competencies ($P = .018$), development of those competencies ($P < .001$), development and maintenance of an ILP ($P = .002$), and scholarly project requirements ($P = .002$). These results are shown in Table 1.

Table 2. Comparison of Student Responses and Composite Total Understanding Scores Across Pre-survey and Two Post-surveys

Primary Outcome	Rank Sum Pre-survey	Rank Sum Post-survey	*P* value	Direction of Difference
Pre-1 (N = 65) to Post-1 (N = 31) Item Comparison				
Understanding of CE competencies	2782.5	1873.5	.0026[a]	Post > Pre
Developing CE competencies	2715.5	1844.5	.0037[a]	Post > Pre
Understanding the purpose of an ILP	2911	1745	.0491[a]	Post > Pre
ILP development and maintenance	2875.5	1780.5	.0248[a]	Post > Pre
Understanding of scholarly project requirements	2455.5	1915.5	.0001[a]	Post > Pre
Total understanding score	2711.5	1944.5	.0005[a]	Post > Pre
Pre-1 (N = 65) to Post-2 (N = 11) Item Comparison				
Understanding of CE competencies	2296.5	629.5	.001[a]	Post > Pre
Developing CE competencies	2237	613	.002[a]	Post > Pre
Understanding the purpose of an ILP	2499.5	426.5	1.0	Not Significant
ILP development and maintenance	2497	429	.9405	Not Significant
Understanding of scholarly project requirements	2181.5	519.5	.0739	Not Significant
Total understanding score	2378.5	547.5	.0665	Not Significant

Abbreviations: Pre-1, baseline pre-participation survey; Post-1, end of first semester post-participation survey; Post-2; end of second semester post-participation survey; CE, clinican educator; SCON, scholarly concentration; ILP, individualized learning plan.
[a]Statistically significant: $P < .05$.

Figure 2. Average Student Ratings of Peer Mentorship Program Design Components



Abbreviations: Post-1, end of first semester post-participation survey; Post-2, end of second semester post-participation survey.

Impact of Peer Mentorship on Primary Outcomes

Comparison of student understanding and confidence in course components across the intervention is shown in Table 2. When comparing pre-1 to post-1, significant increases were observed in understanding CE competencies ($P = .0026$), development of CE competencies ($P = .0037$), and scholarly project requirements ($P = .0001$). TUS also increased significantly ($P = .0005$). Conversely, understanding of the purpose of an ILP ($P = .0491$) and ILP development and maintenance ($P = .0248$) decreased significantly.

When comparing pre-1 with post-2, statistically significant increases were observed in understanding CE competencies ($P = .001$) and development of CE competencies ($P = .0019$). However, changes in understanding scholarly project requirements ($P = .0739$) and TUS ($P = .0665$) were not significant. No significant changes were observed in understanding the purpose of an ILP ($P = .9634$) or ILP development and maintenance ($P = .9405$).

Subjective Value and Appreciation of Peer Mentorship Components

Figure 2 displays participant ratings of various peer mentorship program components. For both post-1 and post-2, highest appre-

ciation scores were for consistent mentor groupings (4.29 and 4.18, respectively) and sessions scheduled during dedicated course time (3.9 and 3.64, respectively).

DISCUSSION

These findings suggest that integrating a structured, student-led peer mentorship program within existing longitudinal curricula is feasible and may positively affect medical student confidence in achieving course objectives. They reinforce existing literature highlighting the potential of peer mentorship to enhance learner development and foster a community of mutual support.[2,3] SCON programs, such as the one in which this peer mentorship model was embedded, are often structured to increase student engagement in scholarly work by pairing students with faculty advisors.[8] While faculty mentorship remains an important component of student development, peer mentorship may address gaps that traditional hierarchical models cannot. Hierarchical faculty-student relationships often involve a power imbalance, which can create barriers to professional development—particularly for students.[1] Our results suggest that students view peer mentorship—alongside faculty mentorship—positively when adapting to a new longitudinal curriculum. This aligns with broader evaluations of ILP usage and efficacy in undergraduate medical education, which emphasize that structured, self-regulated learning initiatives are most effective when guided by mentorship.[16-19]

This study did not find significant improvement in students' understanding of the purpose of an ILP or confidence in ILP development and maintenance after integration of the peer mentorship program. To address this, future iterations could incorporate more discussion prompts focused on learning goals and explore coordination of assignment due dates with mentorship sessions.

Of note, differences in TUS and understanding of scholarly project requirements were not statistically significant in pre-1 to post-1 and pre-1 to post-2 comparisons (Figure 3). This may be attributable to the low response rate for post-2 surveys (15%). However, the primary limitation of this analysis is the absence of a control group (ie, students enrolled in CE SCON without peer mentorship), which prevents distinguishing the impact of peer mentorship from natural student growth during a 2-year longitudinal curriculum. We hypothesize that uncertainty is greatest early in the CE SCON course, when students must rapidly identify which developmental experiences are most valuable to them, establish ILPs, and learn how to engage faculty mentors in project design. Peer mentorship may therefore feel most impactful early in self-directed development.

We also asked respondents to rate perceptions of program design components to inform future refinement. Consistency of peer mentorship groupings receive the highest ratings, suggesting that stable peer relationships may be key to building trust and fostering meaningful dialogue. In contrast, random group assignments received lower ratings, likely due to misalignment of personality, goals, or expertise. In response, a competency-based assignment process has been implemented to improve rapport and specificity of advice. Scheduling was another strength, with students rating highly the integration of mentorship sessions into existing coursework. This reinforces that embedding mentorship within required sessions can reduce barriers to engagement. Participation was mandatory for all CE SCON students, and this structure may have promoted mentorship as a course expectation rather than an extracurricular burden.

Limitations

This study faced several limitations that can inform future iterations of this model. First, the absence of a control group limits our ability to account for potential confounders, such as concurrent faculty mentorship or improvements attributable to participation in the CE SCON itself. Second, the post-2 survey response rate was low (15%), limiting statistical power and generalizability. Surveys were distributed immediately following the final session of the semester and closed after 2 weeks; however, this coincided with the start of winter vacation, likely reducing engagement. Future studies should consider survey timing and employ strategies to optimize response rates. Third, the program was launched during a major curricular transition. Compared with mentors, mentees were enrolled in an accelerated preclinical curriculum with a more systems-based structure. This mismatch may have limited the specificity of mentor guidance related to academic success and scholarly project timelines. To address this, peer mentor discussions emphasized broader competency development and explored curricular differences through the lens of a course director. While this barrier is expected to resolve with curriculum alignment in future cohorts, peer mentorship implementations should consider strategies that encourage individualization and adaptability of mentee-mentor dynamics.[20,21] Fourth, survey respondents did not disclose mentor or mentee roles, and responses were deidentified to promote confidentiality, preventing matched pre- and post-survey comparisons. Although duration of SCON participation as a proxy for role, this approach is imprecise. Finally, reliance on self-assessed survey responses allowed exploration of effects on student confidence but not objective outcomes. Future evaluations may benefit from incorporating measures such as research output or educational development experiences.

CONCLUSIONS

These findings demonstrate that a structured peer mentorship model can feasibly support student engagement in competency-based training in medical education. While participation was mandatory, the program was well received, with students particularly appreciating integration into existing coursework and consistent mentor groupings. Future studies should evaluate role-specific outcomes and explore adaptation of this model to other curricular settings.

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Ready for the Aging Population? A Student Perspective Needs Assessment of Geriatric Education Among Graduating Physician Assistant Students

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ABSTRACT

Introduction: Physician assistants/associates (PAs) play a key role in caring for the aging adult population, but PA education in geriatrics is highly variable. We performed a student-perspective needs assessment to better understand the geriatrics curriculum in the University of Wisconsin School of Medicine and Public Health Master of Physician Assistant Studies program prior to curricular redesign.

Methods: We conducted a cross-sectional survey of graduating PA students to assess their opinions on a 2-week preclinical geriatrics module. Using 5-point Likert-scale questions, students rated the module's overall value, applicability, and their confidence in key geriatric knowledge and skills. Responses were analyzed using descriptive statistics.

Results: All 60 students completed the survey; 73% provided a positive rating (mean, 3.87/5). Relevance to future careers had the highest mean (4.27). Confidence in specific geriatric skills varied: students reported feeling most confident in primary care for older adults (mean 4.10) and eliciting patient priorities (mean 4.02). They felt least confident in applying the 4Ms (What Matters, Medication, Mentation, and Mobility) Framework (mean, 2.52), which was not included in the curriculum. Although dementia care and geriatric pharmacology had mean scores above 3, they were the most frequently selected topics for additional education (78% and 67%, respectively). No significant differences were observed across cohorts.

Conclusions: Student opinion on the preclinical geriatric curriculum was positive overall. While topics such as older adult primary care and eliciting patient priorities appear to be strengths, opportunities for curricular enhancement include incorporating the 4Ms Framework and strengthening instruction in dementia care and geriatric pharmacology. These learner-centered insights will help inform curricular redesign and support broader efforts to evaluate and enhance geriatrics education in PA programs locally and nationally.

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INTRODUCTION

Physician assistants/associates (PAs) are seeing increasing numbers of older adult patients as the population ages.[1] This demographic shift – driven largely by Baby Boomers reaching age 65 by 2030 – has long been anticipated by clinicians and educators. At the same time, the health care workforce faces a growing shortage to care for older adults. PAs have long been identified as playing an important role in meeting the health care needs of this population in Wisconsin and beyond, given their emphasis on generalist training and collaborative practice.[2-6]

Based on 2023 data from the National Commission on Certification of Physician Assistants (NCCPA), an estimated 943 certified PAs nationwide reported geriatrics as their principal clinical practice area, accounting for approximately 0.7% of the certified PA workforce. In Wisconsin, 1.1% of PAs identified their primary specialty as geriatrics or geriatric medicine.[1,7] Of PAs nationally who practice specifically in geriatrics, 2.9% have completed dedicated postgraduate training in this specialty, compared with 5.7% of all certified PAs – across all specialties – having completed some form of dedicated postgraduate training. From 2019 to 2023, although the absolute number of PAs practicing in geriatrics increased, the proportion entering the field declined slightly, reflecting stagnant growth relative to the overall PA workforce. It is important to note that while fewer than 1% of PAs in the United States indicate geriatrics as their primary practice area, the vast majority – over 90% – provide care

to older adults in their practice.[1] This trend is expected to intensify as the US population continues to age.

With such a large percentage of PAs seeing geriatric patients, strong educational curricula in geriatric medicine for all PAs are essential. The Accreditation Standards for Physician Assistant Education mandates that PA programs deliver didactic instruction spanning the entire lifespan, with specific inclusion of older adults, and that supervised clinical practice experiences provide students with direct exposure to the care of older patients.[8] The way in which PA programs meet this compliance requirement is varied and difficult to study given the lack of available data, particularly regarding didactic curricula. Similarly, little is known about how PA programs incorporate standards that align with the American Geriatrics Society (AGS) minimum competencies for graduating medical students.[9]

Regarding PA clinical curriculum, according to the Physician Assistant Education Association (PAEA) 2018 Clinical Curriculum Report, PA programs reported that, on average, 25% of clinical exposure for their most recent graduates involved older adult patients (>60 years old). The mean minimum contact time with geriatric patients is 159 hours. Of 223 programs, 23 require a geriatrics rotation.[10] At the University of Wisconsin School of Medicine and Public Health (UW SMPH) Master of Physician Assistant Studies program, the geriatrics curriculum includes a 2-week module during the didactic year, comprising 19 hours of lectures, 1 hour of active learning, and 3 hours of case-based review. This module is supported by faculty from a large Division of Geriatric Medicine. Didactic instruction is followed by a clinical-year goal of logging at least 150 geriatric patient encounters, but a geriatric medicine rotation is not required.

In light of the increasing need for PAs to have strong training to care for the aging population, we initiated a first step toward curricular redesign at our institution by performing a needs assessment driven by student perspectives. The most recent broad-level needs assessment in PA geriatric curriculum was published more than 20 years ago—in 2003—and was assessed from the perspective of PA program directors, practicing PAs, and geriatricians.[11] In more recent literature, needs assessments have focused on targeted skills or knowledge within geriatric medicine.[12] Thus, we identified an opportunity for an updated, broad needs assessment. To our knowledge, this is one of the first learner-centered needs assessments of its kind in PA education and may serve as a foundation for curricular updates that better prepare graduates to care for older adults and help ensure alignment with updated best practices and educational standards published by the AGS.[9]

The needs assessment aimed to explore graduating PA student perspectives on the strengths and gaps in their geriatrics didactic education. These insights were informed by their clinical experiences and anticipation of entering practice, rather than by surveying students shortly after completion of the didactic geriatric module. Surveying this group also allowed comparison of student opinions with AGS graduating medical student competencies and provided a rarely described but essential perspective for curricular reform.[9] Graduating students offer a valuable viewpoint, having completed both didactic and clinical training and preparing to enter clinical practice.[13] Capturing their insights at this transitional point is critical for informing curricular improvements. By surveying graduating PA students at our institution, we aimed to leverage their experiences to guide future curriculum redesign.

METHODS

We conducted a cross-sectional survey of 60 clinical-year students in the UW SMPH PA program. Students in the sample represented all available curricular tracks: full-time at the main campus in Madison, full-time at the Platteville and Wausau distant campuses, and part-time asynchronous distance education. Full-time students complete didactic training in 1 year, and part-time students in 2 years. All students, regardless of curricular track, complete their clinical education on a full-time basis over 12 months after didactic training.

All clinical-year students are required to complete 4 core rotations (family medicine, internal medicine, emergency medicine, surgery) and 1 elective rotation. All students return to campus for an end-of-rotation testing week after each rotation, including a summative evaluation week after the 4 core rotations. Survey participants were approached during the summative evaluation week, prior to their elective rotation approximately 2 months before graduation. This timing allowed us to survey students with the greatest exposure to both didactic and clinical training. The setting and timing were selected to maximize survey participation, as this was a mandatory in-person curricular session. All participants were in good academic standing and had completed the standard didactic sequence, including the geriatrics module.

The survey was administered via the Qualtrics platform (Qualtrics, LLC) and included 22 questions beginning with demographic data collection. The bulk of the survey consisted of 5-point Likert-scale questions, with response options ranging from strongly disagree (1) to strongly agree (5). Questions were written based on the Kirkpatrick Model Framework to assess student reactions, perceived knowledge and skills acquisition, and application in clinical settings.[14,15] Finally, students selected from a list of 19 core geriatric medicine topics those for which they desired more instruction. Survey content was informed by the existing curriculum and AGS competencies.[9] The survey was designed collaboratively by both authors and reviewed for appropriateness by PA program curricular staff. Participation was voluntary and did not affect academic standing. Informed consent was provided, and the study was deemed exempt from institutional review board oversight.

Table 1. Graduating Physician Assistant Student Demographics, N = 60

Characteristics	N (%)
Age (years) Range, 20 – 41	Mean, 23.8; SD, 3.5
Gender	
Female	49 (82)
Male	11 (18)
Nonbinary/other	0
Race	
White	54 (90)
Asian	2 (3)
American Indian or Alaska Native	4 (7)
Ethnicity	
Not Hispanic or Latino	59 (98)
Hispanic or Latino	1 (2)
State of residence	
Wisconsin	41 (68)
Minnesota	9 (15)
Illinois	2 (3)
Michigan	4 (7)
Other	4 (7)
From a Health Professions Shortage Area	
No	39 (65)
Yes	21 (35)
Cohorts by campus location	
Madison main campus full-time track	36 (60.0)
Platteville and Wausau distant campuses full-time track	12 (20.0)
Asynchronous part-time distance education track	12 (20.0)

Table 2. Graduating Physician Assistant Student Geriatric Career Plans and Prior Experience, N = 60

Career Plans and Prior Experience	N (%)
Plans to enter primary care	
Yes	27 (45.0)
No	21 (35.0)
Unknown	12 (20.0)
Prior clinical experience in geriatrics	
Yes	48 (80.0)
No	12 (20.0)
Personal/family experience in geriatrics	
Yes	44 (73.3)
No	16 (26.7)

Table 3. Frequencies of Student-Selected Topics for Additional Education in Geriatrics

Topic	% Who Selected Topic
Geriatric pharmacology	78.3
Dementia diagnosis and treatment	66.7
Decision-making capacity evaluation	56.7
Urinary incontinence evaluation and management	56.7
Delirium diagnosis and treatment	53.3
Palliative care	53.3
BPSD and agitation management	50.0
Normal aging physiology	50.0
Advance care planning	46.7
Geriatric depression	43.3
Osteoporosis evaluation and management	43.3
Fall evaluation and management	41.7
Pressure injury evaluation and management	40.0
Geriatric nutrition	38.3
Frailty diagnosis and management	25.0
Transitions between care settings	20.0
Prognostication skills	13.3
Eliciting patient priorities and values	13.3
Levels of care settings	11.7

Abbreviation: BPSD, Behavioral and Psychologic Symptoms of Dementia.

Descriptive statistics and frequencies were used to characterize participant demographics, Likert responses, and student-selected topics from the list of 19 core topics. To assess differences in Likert responses among student cohorts at different instructional sites, a Kruskal-Wallis test was conducted for each question. This nonparametric test was chosen because of its appropriateness for ordinal data with smaller cohort sample sizes. *P* values <.05 were considered statistically significant. Statistical analysis was performed using Python version 3.12 (Python Software Foundation) with OpenAI's GPT-4 (OpenAI) used only to guide data organization and analysis under direct author oversight.

RESULTS

All 60 graduating PA students invited to complete the survey did so. Table 1 shows participants' demographic information, and Table 2 shows participants' career plans and prior experience related to geriatric medicine. The average time to complete the survey was 6.8 minutes (range, 2.8–48.4 minutes).

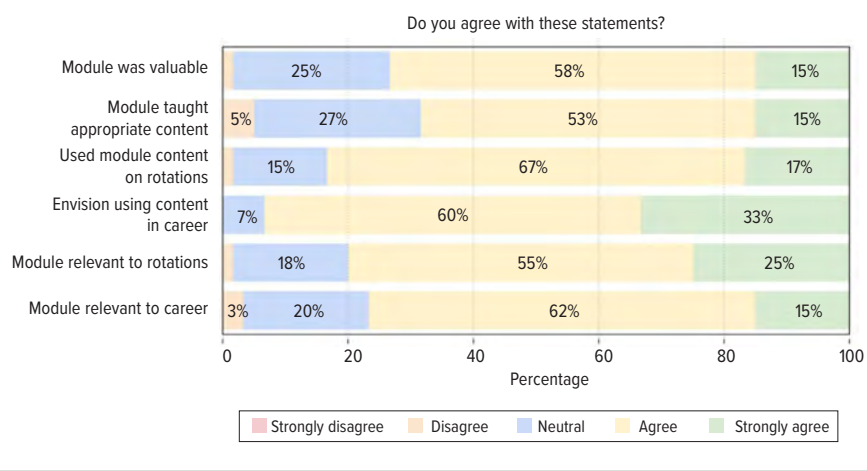
The majority of responses to Likert questions assessing reaction to the curriculum and its applicability to clinical settings were positive, with at least 60% of students reporting agree (4) or strongly agree (5). We considered agree (4) and strongly agree (5) as positive responses and disagree (2) and strongly disagree (1) as negative responses. Figure 1 displays the frequency of all student responses to these questions. Means were above 3, with medians of 4 for all items, indicating generally positive views of the module's value and applicability. "Envisioning use of the module content in future career" had the highest mean (4.27), while "module teaching appropriate content" had the lowest mean (3.78). When comparing responses among the 3 student cohorts, there were no statistically significant differences in median scores using the Kruskal-Wallis test ($P > .36$).

Likert questions assessing student confidence in specific geriatric clinical skills yielded more mixed responses. Figure 2 displays the frequency of all student responses to these questions. Four of 8 skills (primary care, hospital care, mobility, and patient priorities) had greater than 50% positive responses (means, 3.83–4.10). Notably, 1 skill – applying the 4Ms (What Matters,

Medication, Mentation, and Mobility) Framework—had more than 40% negative responses (mean, 2.52). This was the only skill with a mean less than 3. Means for dementia care, assessing capacity, and appropriate prescribing ranged from 3.00 to 3.50. Again, the Kruskal-Wallis test indicated no statistically significant differences in median responses among the 3 cohorts ($P > .39$).

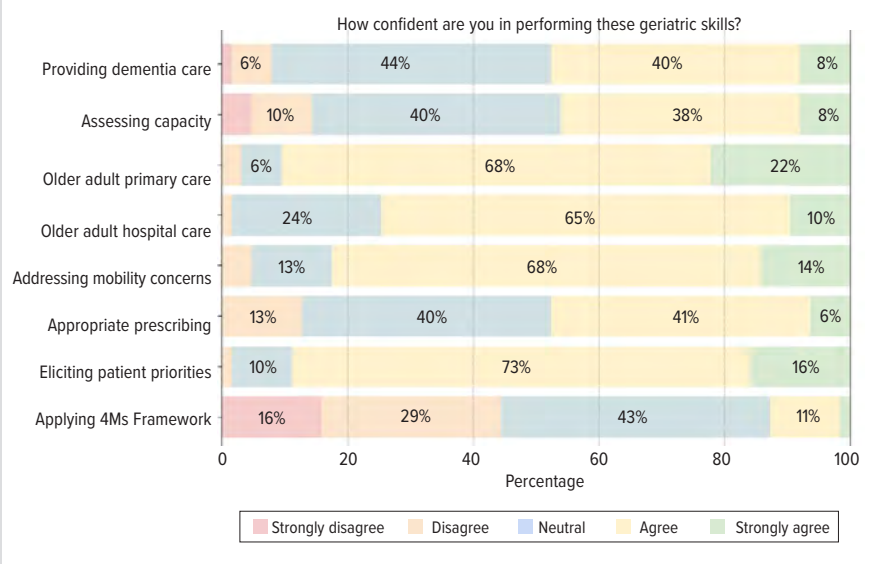
When selecting core content topics for which students desired more education (Table 3), the majority chose geriatric pharmacology (78%) and dementia diagnosis and treatment (67%). Decision-making capacity evaluation, urinary incontinence evaluation and management, delirium diagnosis and treatment, and palliative care were selected by 50% to 60% of students. Behavioral and psychological symptoms of dementia/agitation management and normal aging physiology were selected by half the sample. Fewer than 25% selected frailty evaluation and management, transitions in care settings, prognostication, eliciting patient values, and levels of care settings. Table 3 displays the full frequency of selections for all 19 topics.

Figure 1. Graduating Physician Assistant Student Opinions on Value and Applicability of Didactic Geriatric Medicine Curriculum



Horizontal stacked bar chart displays the frequency of responses to the 5-point Likert questions.

Figure 2. Graduating Physician Assistant Student Responses About Confidence in Using Core Geriatric Knowledge and Skills



Horizontal stacked bar chart displays the frequency of responses to the 5-point Likert questions.
Abbreviation: 4Ms, What Matters, Medication, Mentation, and Mobility.

DISCUSSION

We sought to better understand the perspectives of students graduating from our PA program on the dedicated geriatric curriculum during their preclinical education. Students had an overwhelmingly positive initial reaction to the curriculum, with most appreciating its value. When assessing opinions related to clinical applicability and future use, the majority also responded positively, suggesting they connected the content to their clinical-year experiences and anticipated career goals. Although we did not collect data on actual use of this knowledge during clinical rotations of in future practice, student perception of its relevance is encouraging. As mentioned previously, PAs across all specialties increasingly care for older adults and encounter geriatric syndromes; thus, early recognition of the curriculum's value by graduating students is noteworthy. It was also encouraging to see that students across all cohorts—including those in the part-time asynchronous track—reported similar experiences.

Student perspectives on specific curriculum topics revealed several insights pointing to perceived strengths, weaknesses, and opportunities for change. Topics such as older adult primary and hospital care, evaluating mobility concerns, and eliciting patient priorities were clear strengths, with most students reporting comfort employing these skills. Interestingly, eliciting patient priorities was among the least frequently selected topics for additional education, suggesting it is already well taught and may represent an area where instruction could be streamlined.

In contrast, students indicated a desire for more education in dementia care, appropriate prescribing, and assessing decisional

capacity—despite these areas having mean ratings above 3. These topics may therefore be important targets for curricular enhancement.

Although the curriculum already devotes substantial time to dementia care and prescribing, future redesign efforts may benefit from incorporating more active learning strategies or updated approaches to content delivery and engagement. Assessing decisional capacity is not formally addressed in the current curriculum, making it notable that its mean score was comparable to other topics currently taught.

The study did not capture the variable, unstructured geriatric learning that occurs during clinical rotations. Assessing decisional capacity may be encountered informally during these experiences without explicit instruction. The strong negative response to applying the 4Ms Framework is unsurprising, as it is not currently part of the curriculum.[15] This finding also supports the survey's validity. The 4Ms is an evidence-based framework increasingly relevant in clinical practice, particularly since the Centers for Medicare and Medicaid Services recently adopted it as a quality metric for health systems.[16]

Students infrequently selected frailty, prognostication, care transitions, or levels of care for additional education, though it is unclear whether this reflects sufficient coverage or lower perceived value. Through continued collaboration between the PA program and the Division of Geriatrics and Gerontology, curricular redesign will prioritize areas most in need of enhancement based on these findings.

Though our survey design limits the depth of conclusions that can be drawn in connection to curricular change, it provides a valuable starting point for incorporating student perspectives. Strengths include the collaborative and multidisciplinary approach to survey development, guided by the Kirkpatrick Framework and national graduating medical student standards.[9,14] However, cognitive interviewing of students was not conducted during survey design. The 100% response rate and time spent completing the survey likely reflect the availability of class time for participation and contribute to confidence that the perspectives captured are representative of the graduating cohort.

When considering curricular improvement in geriatric medicine for PA students, the lack of national comparative data is a challenge. Limited information currently exists that allows comparison or reporting across PA programs nationwide. Given the increasing need for providers in all specialties to have a strong foundation in geriatric care, it would be beneficial for standard PA program reporting tools, such as the PAEA curriculum reports, to incorporate geriatric-specific content. Additionally, the current Accreditation Review Commission on Education for the Physician Assistant standards are broad and lack specificity in geriatric medicine. These systems-level limitations complicate curricular change and necessitate reliance on local institutional data to guide redesign.

CONCLUSIONS

PAs are increasingly filling essential care gaps for older adults and therefore require a modern, guideline-based foundation to care for this vulnerable and complex population. This cross-sectional survey provides the perspectives of students graduating from the UW SMPH PA program on geriatric medicine education within an institution that benefits from strong partnership with a large Division of Geriatric Medicine and a dedicated 2-week preclinical curriculum. Published needs assessments for PA education in geriatrics over the past 20 years are sparse. This study is among the first to center on learner perspectives—an increasingly important consideration when planning curricular change.

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‘In Our Era…’: Feedback Perceptions Across Generational Cohorts

Maria Skorey, MD; Kelsey Ryan, MD; David Lambert, MD; Kris Saudek, MD

ABSTRACT

Introduction: Generational differences in medical education remain unclear. In today’s multigenerational workforce, identifying whether generational differences exist in feedback practices may inform more individualized, learner-centered education. This study explored whether generational differences exist regarding feedback practices and preferences.

Methods: This qualitative study was informed by Generational Cohort Theory and Social Cognitive Theory. We interviewed third- and fourth-year medical students, house officers, and attending physicians in pediatrics, internal medicine, and surgery at the Medical College of Wisconsin between October 2020 and March 2022. A constructivist grounded theory approach was used to analyze interview transcripts and develop themes. Questions explored characteristics of helpful and unhelpful feedback, preferences for giving and receiving feedback, and opinions regarding the role of age in the feedback process. Themes were compared across generational cohorts.

Results: Thirty-eight individuals participated, with birth years spanning 1949 to 1994 (8 Baby Boomers, 9 Generation X participants, and 21 Millennials). Both generationally unique perspectives and common themes shared across cohorts were identified. Overarching themes included the influence of medical hierarchy and the importance of the relationship between the feedback giver and receiver. Most interviewees did not believe that age explicitly influences feedback practices, although perceptions of generational differences were present.

Conclusions: Different generational cohorts expressed distinct practices and preferences regarding feedback. Importantly, shared themes across generations aligned with established hallmarks of effective feedback in medical education literature. Acknowledging and thoughtfully addressing generational differences – with attention to medical hierarchy and relationships may improve feedback effectiveness and satisfaction.

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INTRODUCTION

Feedback is an important aspect of medical education and has been shown to decrease remediation, improve trainee performance, and directly affect patient care.[1-4] Despite these benefits, both medical learners and teachers report suboptimal feedback experiences.[5-9] Themes in feedback studies suggest that learners want feedback, are careful in how they seek feedback, and care about the attitudes of the feedback provider.[4,8,10] Understanding individual variation in perceptions of feedback is therefore critical to improving feedback practices.

It is not uncommon for a medical team to consist of multiple generations, with as many as 5 generations represented in the current workplace. It is widely assumed that there are distinct differences in the workplace across generations. Baby Boomers are typically caricatured as competitive, achievement oriented, and more dedicated to their work than younger generations. Generation X (Gen X) is often described as independent, skeptical of authority, and more concerned with work-life balance. Millennials are often characterized as tech-savvy and placing high value on leisure. However, little empirical data exist to support these beliefs, and the effects of generation on the workplace may be overestimated.[11,12] In medicine, a growing body of literature questions whether or how generational differences inform interactions between teachers and learners.[13-17]

Social Cognitive Theory proposes that learning is influenced by a dynamic and reciprocal interaction between a person’s behavior,

Box. Interview Questions

1. Provide an example of a time in your medical education when you received feedback from an instructor or supervisor that was helpful for you.
2. Provide an example of a time in your medical education when you received feedback from an instructor or supervisor that was not helpful for you.
3. How do you like to give feedback? Please provide an example.
4. How do you like to receive feedback? Please provide an example.
5. Describe a time you found it easy to give honest constructive feedback.
6. Describe a time you found it difficult to give honest constructive feedback.
7. Are there any differences in the feedback you receive from peers, attendings, or students that are close to your age versus those from an older generation? If so, what are these differences? How about from a younger generation?
8. What characteristics of the receiver do you consider when giving feedback?
9. In your opinion, what is the purpose of feedback?

personal characteristics, and social environment.[18] More specifically, Generational Cohort Theory posits that collective life experiences – including societal, cultural, and economic changes – shape each generation and inform its value system.[19-21] These experiences also occur in the workplace and shape distinct generational values.[22] Generational Cohort Theory has been proposed as a tool for fostering understanding and collaboration among workers of varying ages.[16] Thus, if different generational cohorts exposed to different environments during their upbringing exhibit different perspectives and preferences, the question arises whether they also have different opinions and expectations regarding feedback in medical education.

Ultimately, there is a gap in generational literature using robust research methods and empirical evidence to draw conclusions that could inform best feedback practices in a multigenerational workforce.[23] To address this gap, our study utilized qualitative research methodology to investigate whether differences in feedback practices and preferences exist among different generational cohorts and, if so, to define potentially unique generational themes. Improved understanding of generational differences in attitudes toward feedback may help inform more effective feedback practices.

METHODS

Study Design and Setting

This single-center study was conducted at the Medical College of Wisconsin (MCW), an academic medical center with an associated 4-year medical school and more than 100 residency and fellowship training programs. A novel set of interview questions was created through iterative review by medical education experts at several American medical colleges to establish content and face validity (Box). The questions explored participants' opinions on effective and ineffective feedback practices and the potential role of age or generation in feedback experiences.

One-on-one semistructured interviews were conducted using a Constructivist Grounded Theory (CGT) approach to support inductive data analysis rather than impose a specific a prior theory.[24-28] As the legitimacy of Generational Cohort Theory remains debated in the psychological and social academic spheres, use of de novo analysis through CGT was considered most appropriate when researching values and perceptions among participants.[23] The data then underwent thematic analysis.

Table 1. Participant Demographics Including All Generational Cohorts

Variable	Frequency (%)
Gender	
Male	15 (39)
Female	23 (61)
Other	0 (0)
Ethnicity	
White	32 (82)
Hispanic/Latino	2 (5)
American Indian/Alaskan Native	0 (0)
Black/African-American	1 (3)
Asian	1 (3)
Native Hawaiian/other Pacific Islander	0 (0)
South Asian	3 (8)
Middle Eastern/North African	0 (0)
Other	0 (0)
Generational cohort	
Baby Boomer	8 (21)
Generation X	9 (24)
Millennial	21 (55)
Stage in training	
Medical student	3 (8)
House officer	7 (18)
Completed training (attending physician)	28 (74)
Specialty	
Pediatrics	26 (74)
Internal medicine	7 (20)
Surgery	2 (6)

Ethical approval for this study was granted by the Medical College of Wisconsin Institutional Review Board (Protocol ID PRO00036787; August 24, 2020).

Participant Sampling

Inclusion criteria included house officers (residents and fellows) and attending physicians in pediatrics, internal medicine, and surgery as well as medical students in their third or fourth year who had completed at least 2 clinical rotations. Persons not proficient in English and international medical graduates were excluded. International medical graduates were excluded to preserve the study's theoretical framework, in which environment, including geographic location, shapes ideas and values.

Email invitations linked to a secure online survey platform (Qualtrics) were used to confirm eligibility to participate. Eligible participants then completed a demographics survey (Qualtrics) that collected information including birth year, year in training, specialty, years out of training, ethnicity, and gender (see Appendix). Generational cohorts were defined as Baby Boomers or Boomers (born 1946-1964), Generation X or Gen X (born

1965-1980), and Millennials (born 1981-1996).[29] Demographic data are shown in Tables 1 and 2.

Data Collection

Interviews of eligible participants were conducted by authors MS, DL, and KS between October 2020 and March 2022 via a secure videoconferencing platform (Zoom Video Communications, Inc). Participants and interviewers were intentionally paired to avoid evaluative relationships. Interviews were audio-recorded and transcribed verbatim, and interviewers took field notes. Demographic survey results were linked to the corresponding interview data and deidentified by assigning a study number.

The first 6 participants were sent their respective transcriptions to assess data authenticity; no revisions or additions were suggested. Data collection continued until the authors agreed that thematic saturation had been achieved.

Data Analysis

Three authors (MS, DL, and KS) manually coded data on a secure online database (REDCap Version 11.1.9, Vanderbilt University, Nashville, Tennessee). The coding team met to collaboratively complete first-round coding using the first 3 interviews to refine definitions, coding procedures, and coding schemes. The team used the constant comparative method to iteratively analyze transcripts.[30,31] At least 2 authors independently reviewed the remaining transcripts to develop first-round codes. Two authors (MS and KS) collaboratively developed second-round codes and themes. This collaborative approach was intended to strengthen intercoder reliability and incorporate diverse perspectives.[31,32]

Because each participant shared unique opinions and experiences, responses varied across questions. Consistent with the study's objective of identifying generational commonality, themes were considered significant within a generational cohort if they were present in at least one-third of participants in that cohort. This threshold aligns with qualitative research guidance suggesting that codes and themes present in one-fourth of participants may warrant consideration as potentially significant.[31] Themes were compared by generational cohort, with identification of both common themes (across all 3 generations) and unique themes (specific to a single generation). Themes shared by only 2 generations were not reported. Three research team members confirmed consensus on data interpretation.

Reflexivity was considered throughout the process, acknowledging our backgrounds and biases as Millennials (MS and DL) and as a Generation Xer (KS). The coding team repeatedly returned to the raw data to ensure accurate representation of participants' perspectives rather than researcher assumptions. In addition, regular input from the full research team (Millennials, Generation X, and Boomers), focused on accurate representation of the data.

Table 2. Participant Demographics per Generational Cohort

Variable	Boomer	Gen X	Millennial
Birth year range (mean)	1949-1964 (1959)	1971-1980 (1976)	1982-1994 (1987)
	Frequency (%)	Frequency (%)	Frequency (%)
Gender			
Male	5 (63)	6 (67)	4 (19)
Female	3 (37)	3 (33)	17 (81)
Other	0 (0)	0 (0)	0 (0)
Ethnicity			
White	8 (100)	8 (89)	16 (76)
Hispanic or Latino	0 (0)	0 (0)	1 (5)
American Indian/Alaskan Native	0 (0)	0 (0)	0 (0)
Black/African-American	0 (0)	0 (0)	1 (5)
Asian	0 (0)	0 (0)	1 (5)
Native Hawaiian/other Pacific Islander	0 (0)	0 (0)	0 (0)
South Asian	0 (0)	1 (11)	2 (10)
Middle Eastern/North African	0 (0)	0 (0)	0 (0)
Other	0 (0)	0 (0)	0 (0)
Stage in training			
Medical student	0 (0)	0 (0)	3 (14)
House officer	0 (0)	0 (0)	7 (33)
Completed training (attending physician)	8 (100)	9 (100)	11 (52)
Years in practice (*attending physicians only*)			
21+ years	7 (88)	0 (0)	0 (0)
11–20 years	1 (12)	5 (56)	0 (0)
5–10 years	0 (0)	3 (33)	6 (29)
3–4 years	0 (0)	1 (11)	3 (14)
1–2 years	0 (0)	0 (0)	1 (5)
<1 year	0 (0)	0 (0)	1 (5)
Specialty			
Pediatrics	6 (75)	8 (89)	12 (57)
Internal medicine	2 (25)	1 (11)	4 (19)
Surgery	0 (0)	0	2 (10)

RESULTS

Thirty-eight individuals participated in this study, with birth years spanning from 1949 to 1994, including 8 Baby Boomers (23%), 9 Generation Xers (24%), and 21 Millennials (55%). Most participants were pediatricians and attending physicians, although multiple specialties and training levels were represented (Table 1). Attending physicians' years in practice ranged from less than 1 year to more than 21 years. Years in practice trended as expected with generational cohort; there were no Baby Boomers with fewer than 11 years in practice and no Millennials with more than 10 years in practice (Table 2).

There was intragenerational variation in opinions on feedback. Our results also showed that each generational cohort had unique themes that emerged for each interview question. Additionally, there were themes that were universal to all generational cohorts. Findings for unique and shared themes, along with supporting quotes, are presented in Table 3.

Table 3A. Themes per Generational Cohort, Questions 1–3

Unique to Baby Boomers (N = 8)	Unique to Gen X (N = 9)	Unique to Millenals (N = 21)	Shared by All Generations
Question 1: Characteristics of helpful feedback			
• Boomers didn't get feedback as trainees • Abuse is caring • Split on public vs private "Typically, I wouldn't get feedback. There wasn't any structured feedback… In those days, there was not nearly as much of an attempt to label feedback as we have now." "I don't think it'd be tolerated in 21st century… it might be borderline harassment. In our era, it was kind of you know, get your tough skin."	• Frequent • Personalized • Experienced with feedback • Direct "There were 2 particular attendings I think that were very good at it … [One was] very senior, had been doing this and won all the teaching awards for, you know, decades. One of these people that's just master of his craft."	• Observed • Follow-up provided "… we had talked about one of the things that I was concerned about. And so she gave really tangible tips to that point. So, it was helpful getting targeted feedback."	• Safe • Useful • Specific • Relationship • Timely "… the attending came from the position of 'I think you're a great intern. You're going to be a great pediatrician. I want to help you be better.'… It came from the standpoint of somebody who really did seem very interested in me and interested in my being successful." – Baby Boomer "… my favorite feedback was from my main mentor who had such a good way of positively and quickly calling out what needed to be called out" — Generation X "She's someone who I actually got to know as a first-year medical student… I continue to mentor with this individual even now that I am here."— Millennial
Question 2: Characteristics of unhelpful feedback			
• Unexpected • Only critical "I prefer it not on the fly… I do not appreciate kind of being ambushed."	• Lack of feedback • Content: Personality • No relationship/poor relationship "It was attacking kind of who I am, not what I do, and so I think that kind of feedback, you have to be pretty careful about. And it was not a trusted relationship."	• Unidirectional • No guidance/tips for improvement • Written "We never had a dialogue, and I think that was the hardest part about that feedback. It was just totally one-sided of 'do this' and you know I could never like say, 'Did I improve? Did I not improve?'"	• Vague/generic • Not actionable • Disagree with feedback giver • Punitive • Impractical • Humiliating "The time that the vascular surgeon called me useless in the OR… that was pretty useless feedback… yelling at somebody when you are not in control is very, very detrimental… It's just not helpful." – Baby Boomer "In medical school I was told that my voice was too high and so no one would take me seriously. That was not helpful… There was no context… I think without context feedback is pretty meaningless… It was also provided in front of a lot of other people, which was unfortunate." — Generation X "If it's a one-off thing that somebody harps on, it's good to be aware of but it's probably not going to change anything that way."— Millennial
Question 3: Preferences for giving feedback			
• Public = immediate • Relationship • Uncomfortable giving critical feedback • Prefers positive feedback • Individualized based on training level • Did not mention technology "Nowadays they're [students] off for protected time for this, and they've got this, and I've got that… so I might not see them but twice in the first week,… I'm supposed to give them feedback based on those two observations and it seems kind of crazy."	• Consider personal circumstances outside of work "I think it did open a little bit about some of the personal concerns he was having. He was able to share that a little bit later, 'I really haven't been sleeping well.' And this was several months into residency. He's like, 'My bed just arrived today. I now have a mattress to sleep on.' And I was like, 'oh my gosh, you poor thing.' Like not even sleeping on a bed, right?"	• Goal-oriented • Expected • Scheduled • Actionable • Focused • Written can be OK • Provide opportunity for improvement "There's a structured way that we go through the form with the attending that you're working with, and I thought that was a really good way to kind of make sure I was getting the quality feedback that I was really seeking."	• Framework with self-assessment • Timely • Specific • Although many acknowledged there are circumstances public feedback is OK, most prefer private "I often start and say 'I'm a sounding board for you. I know you've had lots of summative evaluation throughout your career and are probably working on different things, if you want to share those with me, I'd be happy to react to see what my impression is about where you are.'" – Baby Boomer "That sort of thing is… handled better privately. Because no one wants to be shamed in front their peers and some people realize when they screwed up and already feel bad enough. Some people will have no clue and having it brought up in front of everyone, I think is demeaning to a certain degree and not overall helpful." — Generation X "I think it's inappropriate to give feedback in front of others." – Millennial

Table 3B. Themes per Generational Cohort, Questions 4–6

Unique to Baby Boomers (N = 8)	Unique to Gen X (N = 9)	Unique to Millenals (N = 21)	Shared by All Generations
Question 4: Preferences for receiving feedback			
• Prefer positive • Private vs public, depending on circumstance "I like to receive it privately if it's bad. If it's good, I'll take it any way I can get it."	• Actionable • Framework with self-assessment • Fair feedback "I like things that are actionable that I can be working on… in a closed-door space that I can kind of reflect and think and share freely like, 'Oh, I totally get that. It's something I've been working on.' Or 'That wasn't on my radar, thank you for bringing that up'."	• Opportunity for improvement • Relationship • Safe • Expected "I definitely like to receive it privately… otherwise it's just awkward for everybody involved. And then I like the mid-rotation feedback… because then that gives me a chance to improve."	• Want more feedback • Face-to face • Specific • Timely "Nobody gives me feedback… probably haven't gotten feedback for 20 years… it could be that I'm missing out on some very valuable feedback." – Baby Boomer "It's sort of hard to come by as faculty to get like good honest evaluative feedback." – Generation X "I think at this point just getting it at all would be a win." – Millennial
Question 5: Factors that facilitate constructive feedback			
• Actionable • Appreciative recipient "I think she knew she wasn't doing well and so she appreciated that someone was going to… sit down and talk about how to make things better."	• Recipient-initiated • Framework with self-assessment • Successful "This is what I encourage students to do when I talk with them: preface it with your self-assessment of where you think your weaknesses lie."	• Prepared/scripted • Expected • Good insight "In many respects, it has to do with how the feedback is delivered, how well you set up the feedback. So, did you prepare your environment? Did you carefully… choose the words you're going to use?"	• Receptive recipient • Safe environment: low stakes, nonpunitive • Relationship "Those are really fun because the expectation of the mentorship role is you [are] scheduled to do this and then you know you need to get together and on a regular basis. So they bought into it. I bought into it. It's all good." – Baby Boomer "It's always hard to know how someone's going to take feedback and then again kind of, how do you help them grow? And how do you help them… further amplify their strengths? And then, how do you help them further modify their challenge areas? And so I think you can do that, not knowing someone very well, but I think it has a much greater risk that you're not going to be as helpful long term." – Generation X "So receptive and then also they just want to do better; they want to be better. I think they have to have that internal motivation to be better. I feel like sometimes if they're just content with where they are that's also challenging." – Millennial
Question 6: Barriers to providing constructive feedback			
• Unsuccessful • Repeat offender • Having a relationship "And so it was hard, because he was someone that I knew for a long time and someone that I wanted to be successful… you want everybody to be successful, but he was like… it's like your kid."	• Really struggling/extremes of performance • No relationship • Strained relationship in the future "I think it's hard without context … and so I think it's a lot easier to give feedback within the context of who someone is and what their kind of inherent strengths and weaknesses are, and… make sure that you're… giving them the opportunity to grow versus doing really long-standing damage."	• History of taking feedback poorly • Overwhelming recipient "I kind of knew that she was already very overwhelmed, and I didn't want to add on."	• Defensive recipient • Content: Personality • Hurting feelings • To superior in hierarchy due to fear of retribution "I worry that I'm going to say stuff that's going to really not help them at all and it's going to make them feel bad. And worse, it's going to make them feel like I'm a jerk." – Baby Boomer "The problem there is… I'm a senior professor, he's an associate professor. I'm his division chief … I think people struggle a little bit with that: 'How can I give my division chief negative feedback, even though they're working on my unit?'" – Baby Boomer "He felt very persecuted, and it was hard for me not to empathize … it felt very like everyone's against him, and… the emotional component was really hard to separate out too." – Generation X "I wanted to give feedback to people who are older than me and have not done it because I fear that they would not take it well and because they are honestly… in more positions of power, I would worry about my job. And not just getting fired… but I would worry about some of the things that I've worked really hard to attain in my career." – Millennial

Table 3C. Themes per Generational Cohort, Questions 7–9

Unique to Baby Boomers (N = 8)	Unique to Gen X (N = 9)	Unique to Millenals (N = 21)	Shared by All Generations
Question 7: Generational differences in giving feedback			
• Older: abuse is caring, no complaining because it's your job • Younger: complain, prefer providing written feedback • Value peer's opinions most • Baby Boomers don't give a lot of feedback, didn't get feedback as trainees, only received critical feedback "These [older] people were born in the 20s, and you know in that environment it was kind of like, 'Look, we're all lucky to be doctors. Nobody's going to pat you on the back. You do a job.' So basically, all the news was bad news."	• Older: casual, value their experience more Younger: give gentler feedback • Conflicted regarding peers: empathetic but too busy and equal experience "There's not that much peer-to-peer feedback, at least in our, our area. Everyone is so pushed to the limit clinically and so stressed with so many other things, it's like the last thing that a person wants to do is like, 'I'm going to add your stress level by pointing out hey on this patient here, guess what, you totally missed their this or that'."	• Older: Don't give feedback, unidirectional, formal, defensive • Younger: need to be asked to provide feedback, give casual feedback • Conflicted regarding peers: empathetic but relationship can hinder honesty "When we're close in age I feel like it's easier for people to kind of think back to when they were in your position and compare."	• Younger generations only provide positive feedback • Although they differ, perceptions of generational differences exist "Just give it to me blunt, and don't beat around the bush … I'm not looking for feedback all the time. I think the younger generation is looking for constant feedback, but they want it in a kinder, gentler way and they want it more specific."— Baby Boomer "I don't get to always directly see the feedback from kind of the younger generation to me … if it's an evaluation … they'll say Dr X is great, and like there's nothing super helpful in that comment. But they don't sit down and give me direct feedback." – Generation X "Younger generations, like people that I'd be training with in their 20s to 30s, I feel that they are more casual with how they give feedback, are more willing to weave in their sense of humor … and are understanding that if an example of their own experience is given it needs to be concise and it cannot be like a 30-minute story about what school was like for you." – Millennial
Question 8: Factors that facilitate constructive feedback			
• Conflicted whether age matters • Recipient's cultural background "It's a pretty broad range of places where cultural differences make me cognizant of the fact that I may be inflicting my biases on somebody rather than giving them broadly applicable feedback."	• Age doesn't matter • Learners complain more "And I think you can have young physicians that are toxic, and I think you can have old physicians that are toxic, but I don't know if that's dependent on age."	• Conflicted whether age matters "I really don't think age makes a difference." "I think it just really has to do more with probably age. And then where their level of experience is, I think comes with age. But I think it's more age."	• Hierarchy • Experience in the field • Relationship • Recipient's personality "And so, sometimes I think having a title inhibits feedback sometimes … And people alter their behavior because of the hierarchy" – Baby Boomer. "Definitely thinking about junior people … you just have to think about not age, but power." – Gen X "I struggle to give feedback to people who are older, because 1, they're in a position of power and I'm worried about how that would be taken, and 2, I've seen just from … small examples of other people giving them feedback that it hasn't gone well." – Millennial
Question 9: The purpose of feedback			
• To have a successful career "So they can be successful in their careers and feel good about it."	• To grow and develop • To provide critique and point our the positives • Part of the education process "I think if anything we're harder on ourselves than anyone else ever is by and large, and I think, having somebody come in and say 'no, you're actually doing okay and you're actually doing a good job' can go a long way to just relieving your own internal anxieties."	• To provide new insight "I can't see how people are perceiving me, and so the only way I'll know is if someone tells me."	• To improve "The purpose is to get us to the right place. So you know in development, some of the faculty development and other courses we've had, I've always kind of liked the analogy you're looking at a map and you want to go from one place to the other and if you're going the wrong way, it's pretty nice to get tapped on the back and said 'you got to re-correct and get there.'" – Baby Boomer "The simple answer to me is because we all want to be better … the point is we're trying to take care of patients and we're trying to take care of families and the point of this is to make ourselves as optimally suited to do that job as we can." – Generation X "To make you a better physician … To build and create great physicians who then pass it down to the next generation … because it's like an apprenticeship." – Millennial

DISCUSSION

In this qualitative study examining potential generational differences in feedback practices and preferences, we found themes unique to each generation. Different generational cohorts also demonstrated differing perspectives on what older or younger colleagues perceive as effective feedback practices, suggesting that subconscious consideration of one's age may play a role in the feedback process. Importantly, all generations emphasized certain characteristics of effective feedback, highlighted the importance of relationships, and alluded to the influence of hierarchy.

Shared themes about effective feedback practices across generational groups reinforce that effective feedback is specific, timely, and growth oriented.[1] Each generation also shared unique experiences of ineffective feedback. For example, participants agreed that feedback should never be humiliating or punitive but differed on whether public feedback was appropriate. Interestingly, our results supported some previously held assumptions about generational cohorts in the workplace, but not all. For instance, Baby Boomers have been described as achievement oriented, correlating with a shared theme that they believe the purpose of feedback is to promote a successful career. However, although they are often described as competitive, the Baby Boomer cohort in this study shared a theme of discomfort with giving critical feedback.

Similarly, Generation X participants shared a theme of considering personal circumstances when giving feedback, which parallels their previously described concern with work-life balance. We did not find that Millennials were unique in their use of technology; rather, the Baby Boomer cohort was unique in not mentioning technology as a tool for providing feedback. This finding contributes to the literature acknowledging the potential utility of Generational Cohort Theory while also questioning its dogmatic application.[11,23]

Although the relationship between the feedback giver and recipient was not originally described as a hallmark of effective feedback practice, it is now recognized as an important component of the feedback process, and our results confirm this.[1,33,34] Each cohort recognized that relationships between the giver and receiver affected how feedback was internalized and perceived as valid. The potential negative impact of relationships—such as impeding honesty in ways that may impair the relationship—was universally recognized. Methods that support an alliance between the feedback giver and recipient should be strongly considered by medical educators to strengthen relationships and, consequently, improve feedback effectiveness.[4,35]

The influence of hierarchy on feedback was a theme that, while not surprising, is not well delineated in current literature.[36] It was recognized by all participants that providing honest, critical feedback to someone higher in the hierarchy is difficult. Hierarchical power differentials also contributed to unhelpful feedback practices. For example, the use of anonymous written feedback was described as safe but often resulted in feedback with undesirable characteristics, such as being vague, lacking face-to-face interaction, and precluding dialogue).

Known limitations of Generational Cohort Theory also emerged and were not unique to our analysis. Inherent to generational cohort research, we found that career stage and age closely parallel one another.[23] Older individuals typically hold more advanced/senior roles in the workplace. Participants often referred to "younger" persons and "learners" synonymously, as well as "older" individuals and "senior attending physicians" interchangeably. Although this makes absolute distinction between generational characteristics and career seniority difficult, each generational cohort in our study included attending physicians with varied years of practice, allowing unique generational feedback practices and preferences to emerge. In real-world settings, encountering outliers—such as a Baby Boomer medical student or Millennial senior attending—is exceedingly rare, making such distinctions esoteric.

Limitations

Our study has several limitations. As with any Constructivist Grounded Theory approach, findings may be influenced by author assumptions and biases. Although standard interview questions were used, interviewers employed variable follow-up prompts, which may have influenced responses. Despite efforts to avoid evaluative relationships between participants and interviewers, author leadership roles, prior working relationships, or fear of loss of anonymity when commenting on potential colleagues may have affected participants' responses.

Because the study focused on generational differences, thematic analysis was limited to comparisons across generational cohorts. Although further analysis by stage of training, career stage, or demographic factors such as gender would be valuable, a larger sample would be necessary to support such comparisons.

Although all generational cohorts were represented, the Millennial cohort was over-represented, responding more quickly to invitations to participate. This may reflect a greater recent emphasis on the importance of feedback and medical education, or greater availability of time earlier in training or career. The predominance of pediatricians may reflect the authors' specialties or the unprecedented clinical workload placed on adult-focused physicians during the COVID-19 pandemic. Second- and third-round recruitment efforts improved participation from adult-focused physicians but did not fully mitigate this imbalance. Interviews were conducted over 17 months to allow recruitment across generations and in response to pandemic-related disruptions to clinical duties and interpersonal interactions.

The higher proportion of females and self-identified ethnic minority participants in the Millennial cohort may reflect ongoing efforts to increase diversity in medicine or hesitancy among other generations to self-identify graphic characteristics (Table 2). Finally, although this was a single-institution study, participants' feedback occurred across multiple institutions.

Implications

Our findings suggest actionable next steps to improve feedback practices at both individual and systems levels. Efforts to foster relationships between evaluators and learners may improve feedback effectiveness and potentially mitigate the negative impact of hierarchy. Facilitating longitudinal relationships throughout medical training that include clear expectations for evaluation may be optimal but would require changes to clinical scheduling practices and increased support for mentorship programs. Identifying strategies to de-emphasize feedback requirements or align expectations during short-term learners-educator interactions may also help address differing preferences. Finally, ongoing faculty development that emphasizes the hallmarks of effective and ineffective feedback, while acknowledging generational differences as a component of relationship-building, may further strengthen feedback practices.

CONCLUSIONS

Generational cohorts report distinct perceptions and preferences regarding feedback in medical education, while important commonalities exist across all generations. Relationships and one's position within the medical hierarchy play a significant role in how individuals accept and provide feedback. Medical educators may use these findings to more effectively navigate the current multigenerational educational environment.

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Building Research Foundations in Medical Students: Impact of a Scholarly Concentration Program on Longitudinal Research Development at the University of Wisconsin School of Medicine and Public Health

Vera Tsenkova, PhD; Elizabeth Petty, MD

ABSTRACT

Introduction: The declining number of physician-scientists, due in part to limited early research exposure and a lack of institutional support, may slow discoveries that improve population health. Prior studies suggest that early research experiences promote interest in academic medicine careers, yet disparities in research participation may emerge early.

Objectives: This study evaluated research participation among medical students at the University of Wisconsin School of Medicine and Public Health, focusing on potential disparities and the impact of a funded, mentored summer scholarly concentration program on completing a Path of Distinction in Research (POD-R), a track for longitudinal research training and productivity.

Methods: We analyzed data from 794 students who graduated between 2020 and 2024. Key variables included participation in the scholarly concentration program, POD-R completion, and sociodemographic factors. Logistic regression models assessed sociodemographic and academic predictors of participation in each program.

Results: Among the cohort, 75% (N = 592) participated in the scholarly concentration program and 19% (N = 153) completed POD-R. No significant differences were found by gender, underrepresented in medicine status, or Wisconsin residency. Participation in the scholarly concentration program was strongly associated with POD-R completion (OR, 3.75; 95% CI, 2.14–6.58).

Conclusions: Participation in an early, inclusive, funded scholarly concentration program increased the likelihood of students from different backgrounds taking the next step in their research development. Such programs may play a critical role in strengthening the development of physician-scientists and promoting equity in academic medicine.

INTRODUCTION

Advancing scientific knowledge is a cornerstone of academic medicine and underpins the delivery of high-quality patient care. Physician-scientists uniquely bridge clinical practice and scientific inquiry, yet there is persistent concern about their dwindling numbers. Between 2011 and 2020, the number of US physicians who reported research as their major professional activity declined from 13 557 to 12 289—a decrease of approximately 9.4%.[1,2] Early research immersion fosters critical thinking, deepens engagement with evidence-based medicine, and inspires future clinician-investigators.[3-5] Recent shifts in medical school curriculum and the change of the United States Medical Licensing Examination Step 1 to pass/fail have further amplified the importance of research exposure for demonstrating strengths important for residency competitiveness.[6] Early research experiences significantly boost students' scholarly output and long-term interest in research,[7] reinforcing the pipeline of future physician-scientists.[8]

Many medical schools have developed scholarly concentration programs—longitudinal, mentored research tracks embedded in the curriculum—to foster early student engagement in scientific inquiry, spark interest in research careers, and ultimately help rebuild the physician-scientist pipeline. Such programs typically provide stipends, help students develop specific research skills, and often incorporate these opportunities without lengthening overall training time.[9] Participants frequently report heightened interest in research, enhanced scholarly productivity, and successful match-

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ing into more competitive residencies.[3,4,10] However, evidence suggests disparities emerge early in these pathways. A cohort study of 31 474 medical graduates showed that women and Black/Hispanic students had lower publication rates than men and White peers.[11] At Yale University, a 13-year review found women authored 50.9% of theses but received only 30.9% of top awards.[12]

In early 2000, the University of Wisconsin School of Medicine and Public Health (UW SMPH) developed a mentored scholarly concentration program for medical students not enrolled in an MD/PhD dual-degree program during the summer between the first 2 years of medical school. UW SMPH has dedicated significant resources and developed processes to support equitable access to research opportunities for all students: (1) all students who wish to participate are guaranteed a mentored research placement; (2) students receive a summer stipend and travel funding support to present research findings; (3) faculty provide one-on-one mentorship and conduct writing workshops tailored to beginners, guiding them through research planning and proposal development; (4) research opportunities are introduced early and often in the medical school curriculum; and (5) faculty from statewide academic campuses are eligible to serve as mentors, ensuring that rural and urban health track students can engage in research. These efforts to eliminate barriers to research opportunities have been highly effective: program records show participation in the elective program rose from 17% of UW SMPH medical students in 2002 to 75% in 2024.

Table 1. University of Wisconsin School of Medicine and Public Health Student Research Overview: Scholarly Concentration Program and Path of Distinction in Research

	Summer Scholarly Concentration (Tier 1)[a]	Path of Distinction in Research (Tier 2)[a]
Description	Mentored summer research for M1–M2 students, introducing basic research skills and scholarship through a single research project	Advanced, integrated research track throughout MD training, culminating in a formal graduation distinction; can include 1 or more projects
Mentors	1 primary mentor, co-mentors optional	1 or more primary mentors who could be the summer scholarly concentration program mentor or another research mentor
Mentor letter of support	Yes	Yes (provided by the summer scholarly concentration program mentor or other mentor)
Time	8–10 full-time weeks during summer	Minimum of 16 full-time weeks; summer research through the summer scholarly concentration program can count but is not a prerequisite
Curricular requirements	Includes structured research skills workshops	Completion of ≥7 research-learning modules and ≥6 research-related activities
Abstract	Required	Required
Research proposal	Required	Required
Manuscript authorship	Encouraged but not required	Required
Local presentation	Required	Required
Regional/national presentation	Encouraged but not required	Required

Abbreviations: M1, medical student year 1; M2, medical student year 2.
[a]Tier 1 = introductory research development; Tier 2 = longitudinal research development.

Our overarching objective was to examine early research participation and longitudinal engagement in research during medical school among UW SMPH students. Given evidence of early disparities,[11-13] a key focus of our study was evaluating whether students across all sociodemographic groups were equally likely to participate in research opportunities, with a focus on gender and underrepresented in medicine (URiM) status. We also examined participation in the summer scholarly concentration program and its association with completing a next tier opportunity, such as the Path of Distinction in Research (POD-R).

METHODS

Setting

UW SMPH is a public medical school in Wisconsin that includes a primary academic medical center located in Madison; statewide academic campuses with regional hubs in Green Bay, La Crosse, Marshfield, and Milwaukee; and teaching sites throughout the state. As a leading research institution, it plays an important role in providing early opportunities for UW SMPH medical students to engage in research with a faculty mentor. Central funding from multiple sources (including intramural funds from UW SMPH and UW–Madison, federal extramural grants, foundation grants, and industry-sponsored contracts) is available to support all medical students who wish to participate in a scholarly/research project.

Student Research Opportunities

Scholarly concentration program: The Shapiro Summer Research Program, named for a key donor, is UW SMPH's cornerstone summer scholarly concentration program. It provides a summer stipend for all students interested and eligible to conduct research in the summer between their first and second years. Eligibility requires good academic standing and enrollment in the single degree MD program (ie, not an MD/PhD student). In recent cohorts, an average of 75% of eligible students elected to participate. Early in their medical education, first-year students are introduced to research opportunities at the Annual Medical Student Research Forum, where second-year students present their work to showcase the range of available projects. In

spring of the first year, students select a project from an interactive online database of faculty mentors and write a research proposal related to the faculty mentor's research, with support from scientific writing workshops and dedicated faculty mentor input. All proposals are subject to review and approval by departmental faculty and the Office of Student Research. Proposals are scored using a standardized rubric that assesses the scientific project (ie, background and significance, hypothesis, research design, and methods) and the student-mentor match (ie, student role and motivation, student learning objectives, and mentoring plan). Mentors submit a letter detailing the research project, their mentoring experience, mentoring commitment over the summer, and relevant compliance and enrichment activities planned for the mentee. During the summer program, students are encouraged to participate in research skills training sessions, writing groups, book clubs, and clinical shadowing. Students must submit an abstract and present a poster or podium talk at the Annual Medical Student Research Forum.

Path of Distinction in Research (POD-R): POD-R is an elective, advanced option for longitudinal research development for UW SMPH medical students (see Table 1 for an overview of key scholarly concentration program and POD-R requirements). POD-R confers honors at graduation for students who go beyond the required curriculum to gain research skills and build a portfolio that contributes to the advancement of science and medical practice. Requirements include a minimum of 16 full-time weeks of research, significant authorship contribution to at least 1 manuscript, presentation of research at local and regional or national meetings, and completion of research-related learning and leadership activities. Activities completed during the scholarly concentration program (eg, manuscript writing) may count toward POD-R requirements. Approved in 2016, POD-R succeeded the Research Honors program, which graduated its first class in 2004 and its last in 2019, and is comparable in rigor to other PODs at UW SMPH.

Data

Participants and Measures: The analytic sample included all UW SMPH MD graduates from 2020 to 2024, excluding those enrolled in the MD/PhD dual degree program. Sociodemographic and academic data were obtained from institutional and departmental records.

- Sociodemographic variables were self-reported and included gender (male/female), Wisconsin residency status (yes/no), and age (continuous). In accordance with the UW SMPH definition, students were classified as URiM if they identified as Hispanic, Black, American Indian, Native Hawaiian, Cambodian, Laotian, and/or Vietnamese. This classification was based on self-reported race/ethnicity and coded as a binary variable (yes/no).
- Academic variables included participation in the scholarly concentration program (yes/no) and completion of POD-R (yes/no).

Table 2. Descriptive Statistics (N = 794)

Variables	N (%) or Mean (SD)
Sociodemographic Characteristics	
Gender	
Female	400 (50.4%)
Male	394 (49.6%)
Underrepresented in medicine	
Yes	188 (23.7%)
No	605 (76.2%)
Missing	1 (0.1%)
Wisconsin resident	
Yes	599 (75.4%)
No	195 (24.6%)
Age at matriculation (in years)	23.8 (2.3)
Academic Characteristics	
Scholarly concentration program	
Yes	592 (74.6%)
No	202 (25.4%)
Path of Distinction in Research	
Yes	153 (19.3%)
No	641 (80.7%)
Graduation class	
2020	155 (19.5%)
2021	160 (20.2%)
2022	165 (20.8%)
2023	149 (18.8%)
2024	165 (20.8%)

Data Analysis: All statistical analyses were conducted using IBM SPSS Statistics for Windows, Version 30.0 (IBM Corp). Binary logistic regression models were used to predict participation in scholarly concentration program and completion of POD-R. All models were multivariate adjusted for relevant covariates. Additional analyses examined whether the effect of scholarly concentration program participation on POD-R completion varied by gender, URiM status, Wisconsin residency, or age by including interaction terms (eg, scholarly concentration program participation × gender).

The Institutional Review Board (IRB) quality improvement tool determined IRB review was not required because, in accordance with federal regulations, the project does not constitute research as defined under 45 CFR 46.102(d).

RESULTS

Descriptive statistics are presented in Table 2. The final analytic sample included 794 students (50.4% female; mean age, 23.8 ± 2.3 years at matriculation). Nearly one-quarter identified as URiM (23.7%) and three-quarters (75.4%) were Wisconsin residents.

Who participated in the scholarly concentration program? Substantial interest in research was evident: 74.6% of first-year stu-

dents participated in the scholarly concentration program (Table 2). A multivariate binary logistic regression examined predictors of participation (Table 3). No significant differences were found by gender, URiM status, or Wisconsin residency. Older students had lower odds of participation (OR, 0.904; 95% CI, 0.85–0.97; $P < .01$), indicating that for each additional year of age, the odds of participation decreased by approximately 10%.

Who completed POD-R? Since its first graduating class in 2020, 153 medical students (19%) successfully fulfilled the requirements and graduated with POD-R (Table 2). A series of multivariate binary logistic regression models examined the impact of sociodemographic characteristics (Model 1) and academic factors (Model 2) on POD-R completion (Table 4). No statistically significant associations were found between gender, URiM status, being a Wisconsin resident, or age and POD-R completion (Model 1). Incorporating academic predictors in Model 2 (Table 4) revealed a strong, statistically significant association between scholarly concentration program participation and POD-R completion. Students who participated in the program had 3.75 times higher odds of completing POD-R than those who did not (OR, 3.75; 95% CI, 2.14–6.58; $P < .001$).

Follow-up analyses investigated whether the effect of scholarly concentration program participation on POD-R completion depended on gender, URiM status, Wisconsin residency, or age. None of these interactions reached statistical significance (all $P > .05$), indicating no evidence that the effect differed across sociodemographic groups.

Table 3. Logistic Regression Models Predicting Participation in Scholarly Concentration Program

	OR (95% CI)
Age	**0.904 (0.85 – 0.97)[a]**
Gender	1.37 (0.99 – 1.89)
Underrepresented in medicine	1.34 (0.85 – 2.10)
Wisconsin resident	1.12 (0.73 – 1.73)

[a]$P < .01$.

Table 4. Logistic Regression Models Predicting Path of Distinction in Research at Graduation

	Model 1: Sociodemographic Predictors OR (95% CI)	Model 2: Model 1 + Scholarly Concentration Program OR (95% CI)
Gender	1.03 (0.72 – 1.47)	0.97 (0.68 – 1.39)
Underrepresented in medicine	1.02 (0.63 – 1.65)	0.97 (0.59 – 1.58)
Wisconsin resident	0.90 (0.56 – 1.44)	0.88 (0.54 – 1.42)
Age	0.97 (0.89 – 1.05)	0.99 (0.90 – 1.08)
Scholarly concentration program		3.75 (2.14 – 6.58)[a]

[a]$P < .001$.

DISCUSSION

Internal UW SMPH surveys and tracking, consistent with Association of American Medical Colleges data, show rising rates of medical student research participation during medical training.[14] Building on prior work examining the role of faculty mentorship on student scholarly output,[15] we evaluated the continuum of student research programs at UW SMPH – from a short-term, intensive summer research immersion at the outset of medical school to a comprehensive, longitudinal distinction track (POD-R) requiring sustained commitment and research productivity. By providing mentorship and allowing students to pursue research topics aligned with their interests, scholarly concentration programs may strengthen medical students' confidence and self-efficacy in research.[16]

Informed by prior research suggesting that disparities in the physician-scientist workforce may emerge early in training,[11] a central aim of this study was to assess whether students from diverse sociodemographic backgrounds were equally likely to participate in the scholarly concentration program and to pursue next-tier opportunities such as the POD-R. Our findings indicate that participation rates in both programs were comparable across sociodemographic groups. Importantly, we found no evidence of gender, URiM status, or Wisconsin residency disparities at either stage of research training, suggesting that these programs effectively support equitable access and retention throughout the research development continuum. While this appears true for the primary factors under investigation, we observed an age disparity in participation in the scholarly concentration program. Although we cannot test this empirically, older students may have other jobs or family commitments that preclude participation. No age difference was evident at the next stage (POD-R), suggesting older students might have engaged in other research opportunities outside UW SMPH.

Limitations

This study has recognized limitations. First, sociodemographic data – including gender, race/ethnicity, age, and residency status – were self-reported. Gender reporting was limited to binary options, which excluded representation of transgender and nonbinary individuals. Second, we lacked detailed information on students' prior research experience, limiting our ability to assess whether students with stronger backgrounds or interest were more likely to self-select into the programs. Third, we did not have individual-level data to isolate which program components (eg, stipends, individualized mentorship) contributed most to equitable access and retention. Lastly, due to the observational design, causal inferences cannot be drawn. Future work should integrate more robust metrics, including scholarly productivity (eg, abstracts, manuscripts, presentations) and residency outcomes, to provide a fuller picture of long-term impact and a more nuanced understanding of student trajectories in academic medicine. Finally, although these findings reflect a single institution, other medical

schools could adapt the program's building blocks to align with their resources and curricular schedules.

CONCLUSIONS

We found strong evidence that a scholarly concentration program that provides funding support, research training tailored to beginners, and early cohort-wide engagement can promote equitable access to student research opportunities that progress from basic to longitudinal and sustained development. Importantly, consistency across stages of research development suggests that structured, institutionally supported programs—characterized by dedicated mentorship and financial support—foster more equitable entry and advancement in medical student research and may contribute to a more diverse physician-scientist workforce.

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The Impact and Description of a Training Program With a Novel Landmark Device for Needle Thoracostomy

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ABSTRACT

Background: Needle thoracostomy (NT) is a lifesaving procedure for patients with tension pneumothorax but requires correct anatomical placement to ensure effectiveness and minimize complications. We describe a novel emergency medical services (EMS) training using a lateral NT landmark device, the SAM ThoraSite, and report provider feedback on the training.

Methods: A 90-minute training was delivered to EMS providers. Providers completed pre- and post-training surveys regarding confidence in procedural performance, concerns about complications, and overall educational experience.

Results: The response rate was 79.4%. Post-training confidence in correctly performing NT increased significantly (7.1 vs 9.0, $P < .001$). Participants also reported higher satisfaction with this training compared with prior needle thoracostomy education (6.9 vs 9.3, $P < .001$).

Discussion: A novel EMS educational session incorporating the ThoraSite landmark device improved provider confidence in NT performance and increased satisfaction with training.

BACKGROUND

In patients with tension pneumothorax, needle thoracostomy (NT) is a potentially lifesaving prehospital procedure. However, this procedure is not without risk. Major iatrogenic complications can occur when NT is placed in an incorrect anatomical location, leading to procedural failure and visceral injury.[1] Advanced Trauma Life Support and Tactical Combat Casualty Care guidelines have begun adopting a lateral chest wall approach – in addition to the traditional anterior approach – for NT, primarily due to military data demonstrating increased procedural efficacy.[2] Thus, the lateral approach is relatively new in civilian emergency medical services (EMS) education and is being utilized with increased frequency, though complication rates remain similar.[1]

Less familiarity with the lateral approach may contribute to complications. The SAM ThoraSite landmark device can assist EMS providers in identifying the correct anatomical location for a lateral NT.[3] This device is a template card placed inferior to a patient's axilla with a window approximating the correct lateral NT site, namely the third to fifth intercostal spaces between the anterior axillary and midaxillary lines.[3] Before instituting a new device, EMS medical directors are responsible for ensuring skills proficiency through the development of guidelines and educational curricula. The objectives of this study were to describe an initial NT landmark device training program developed by EMS medical directors and delivered by paramedic educators to EMS providers. We also assessed changes in EMS providers' perceptions of procedural confidence, potential complications or workflow issues, and educational experience for lateral NT following the training session.

METHODS

Study Design

This study compared self-reported confidence among EMS providers in performing a lateral NT before and after an initial training session using the ThoraSite landmark device (Model Number: TS200-5P-EN, SAM ThoraSite, Portland, Oregon). This was an Institutional Review Board-exempt quality improvement study approved by the Medical College of Wisconsin. SAM Medical Inc provided all ThoraSite devices for initial training and implementa-

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Table 1. Pre- and Post-training Survey Questions

Question Type	Pre-survey Question	Post-survey Question
11-point Likert scale (0 = "not at all confident"; 10 = "extremely confident")	How confident are you in correctly performing a lateral chest wall needle thoracostomy? How confident are you in identifying the correct rib space when performing a lateral chest wall needle thoracostomy? How confident are you in identifying the correct location based off the patient's axillary lines when performing a lateral chest wall needle thoracostomy?	Using the ThoraSite, how confident are you in correctly performing a lateral chest wall needle thoracostomy? Using the ThoraSite, how confident are you in identifying the correct rib space when performing a lateral chest wall needle thoracostomy? Using the ThoraSite, how confident are you in identifying the correct location based off the patient's axillary lines when performing a lateral chest wall needle thoracostomy?
Selectable concerns: 1. Placing the needle in the incorrect anatomic location 2. Not relieving the tension pneumothorax 3. Spending too long trying to identify the correct location 4. Injuring yourself 5. Injuring the patient	What are your concerns when performing a lateral chest wall needle thoracostomy? (check all that apply)	Using the ThoraSite, which procedural concerns are alleviated when performing a lateral chest wall needle thoracostomy? (check all that apply)
Yes/No with free response space for "Yes" selections	Do you currently have any workflow issues with the lateral chest wall needle thoracostomy procedure?	When using the ThoraSite, do you have any workflow issues with the lateral chest wall needle thoracostomy procedure?
11-point Likert scale (0 = "not helpful at all," 10 = "extremely helpful")	In the past, how helpful has your training on lateral chest wall needle thoracostomy been?	Today, how helpful has your training on lateral chest wall needle thoracostomy?

tion for the county-wide EMS system but was not involved in data collection, evaluation, or reporting of results.

Study Population and Protocol

The landmark device training and accompanying confidence surveys were administered to EMS providers in a large, urban, fire-based EMS system. The training involved 44 sessions across 13 fire departments, with variation in the number of providers per session. Authors TE and BW, emergency medicine-trained EMS medical directors, developed a 90-minute training program for EMS providers. SAM Medical Inc reviewed educational materials for accuracy, made minor edits based on their experience and best practices, and provided handouts and educational materials but did not directly participate in training delivery. Trained paramedic educators, under guidance from EMS medical directors, delivered the education to other EMS providers.

The instruction included 45 minutes of didactic teaching on the pathophysiology of tension pneumothorax, indications and contraindications for NT, and a step-by-step process for performing lateral NT using the landmark device as outlined by the developer. This included placement in the axilla with appropriate 45° external rotation of the arm and review of the device skills sheet with procedural steps.

Next, a 45-minute hands-on practical session with the landmark device and a full-sized simulation mannequin with NT capabilities was conducted. Participants were provided identical equipment to their prehospital environment, encouraged to utilize the skills sheet, and given the opportunity to perform the procedure in multiple realistic prehospital scenarios. Finally, participants received device certification by passing a skills test demonstrating correct NT placement on a model using the landmark device and following the steps outlined in the skills sheet.

Pre- and post-training surveys designed by authors TE and BW were administered via Qualtrics at the beginning of and immediately following the training session (Table 1). The surveys utilized an 11-point Likert scale for self-reported confidence regarding specific aspects of NT as well as the overall procedure (0 = "not at all confident," 10 = "extremely confident"). Multiple-choice selections were available regarding procedural concerns with NT (Table 1). Providers could report NT workflow concerns using a free-response space and rated their educational experience with the training. The surveys were pretested with paramedic educators to ensure question clarity, with minor adjustments based on feedback. No changes were made to the surveys during the educational sessions described in this report.

Data Analysis

Results from the pre- and post-training surveys were analyzed to identify changes in performance confidence and educational experience when using the ThoraSite versus without. Surveys were only included in the analysis only if participants completed both surveys. Pre- and post-training groups were compared using paired *t* tests for procedural confidence, with $P < .05$ considered statistically significant. The absolute difference in reported workflow concerns was calculated and broadly categorized.

RESULTS

Five hundred fifty-nine EMS providers were trained over 44 sessions, and 444 EMS providers submitted both surveys (response rate, 79.4% [calculated using the American Association for Public

Opinion Research Response Rate 2 formula]).[4] Results for reported confidence and selected procedural concerns are shown in Table 2. Statistically significant increases were found in all three confidence categories following ThoraSite training. Additionally, 40.1% of providers reported that the ThoraSite training helped alleviate concerns about incorrect NT placement, and 22.8% reported that it helped alleviate concerns about patient injury (Table 2).

Table 2. Providers' Self-Reported Confidences and Concerns Before and After ThoraSite Training

Reported Confidence or Concern	Baseline Without ThoraSite	After Training With ThoraSite	*P* value
Confidence in correctly performing NT	7.1 mean rating	9.0 mean rating	<.001
Confidence in accurately identifying rib space	6.9 mean rating	9.0 mean rating	<.001
Confidence in accurately identifying AP location	6.9 mean rating	9.0 mean rating	<.001
Patient injury concerns	31.3% reporting	22.8% reporting alleviated	
Self-injury concerns	9.1% reporting	8.3% reporting alleviated	
Incorrect placement concerns	52.6% reporting	40.1% reporting alleviated	
Ineffective procedure concerns	33.3% reporting	31.1% reporting alleviated	
Time spent identifying placement concerns	29.2% reporting	29.5% reporting alleviated	

Abbreviations: NT, needle thoracostomy; AP, anterior/posterior location.

Free-text responses described ThoraSite workflow concerns in 14 pre-training surveys and 6 post-training surveys. The most common concerns referenced increased procedure time (n = 2) and insufficient training (n = 2). Other concerns included provider disagreement, anatomical challenges with pediatric use, and device availability (n = 1 for each). Finally, EMS providers reported increased satisfaction ratings with this novel educational session compared with previous NT training (6.9 vs 9.3, $P < .001$).

DISCUSSION

This novel educational experience, created by EMS medical directors and delivered by paramedic educators, demonstrated the clinical potential of landmark devices for improving NT. Proper location identification has been at the forefront of quality improvement research involving NT. Several small studies have shown that providers at all levels often fail to correctly identify the traditional anterior NT site.[5,6] Specifically, patients receiving prehospital NT were at risk of or suffered potentially serious iatrogenic injury from NT placed too medially, thereby entering the mediastinum and its internal structures.[1,7] Lateral NTs can also cause visceral injury to the lung or abdominal organs if placed too inferiorly and may have marked reduced efficacy if placed too anteriorly or posteriorly.[1] A simple landmark device can alleviate provider concerns regarding improper NT placement and potentially reduce complications.

By increasing provider confidence and alleviating procedural concerns, this training session with a landmark device may increase provider willingness to perform NT in appropriate situations. As demonstrated by Lairet et al, NT is not always performed in patients with indications; up to 48% of combat zone casualties with indications for NT did not receive one.[8] While multiple factors contribute to this, Studer et al noted that lack of confidence with NT may play a role in this shortcoming.[9] This training session demonstrated increased confidence in NT placement and diminished concerns among EMS providers. Moreover, the statistical significance of findings is complemented by clinically meaningful significance, as the survey group was large and the increase in confidence substantial, rising from 7.1 to 9.0 on a 0-10 scale.

Previous studies demonstrate that robust paramedic training that is well received by participant positively affects confidence and procedural success. After conducting intensive paramedic airway education sessions, Walker et al reported significant long-term increases in confidence and medical knowledge from a well-received training session.[10] In a follow-up study, Carter et al noted sustained increases in successful procedural performance.[11] Similarly, our cohort demonstrated that a well-received educational session led to increased confidence in NT procedural performance. Pending follow-up studies of long-term retention and successful procedural performance, this study provides a model for EMS medical directors seeking to efficiently implement procedural education with NT landmark technologies.

Despite limited reports of the ThoraSite in the literature, to our knowledge, this product is being actively researched in the emergency medicine communities at the time of publication. Because the product is relatively new, there is little available clinical data. However, the ThoraSite's novelty emphasizes the importance of reporting on a novel training experience when introducing a potentially clinically significant product. Any training session on a particular skill is likely to result in a short-term increase in a provider's perceived confidence in that skill. While this was reflected in this study, the specific confidence elements in NT placement versus not using the device were notable. Additionally, providers indicated that the ThoraSite alleviated concerns regarding incorrect placement (40.1%) and patient injury (22.8%), which were the first and third most-reported concerns in the pre-survey (Table 2) and are major concerns in clinical NT literature.[1] This is particularly meaningful as these providers had all been trained previously on NT without landmark devices and were able to compare that knowledge base with the expanded knowledge and confidence provided by incorporating this device into training.

Importantly, self-reported confidence and one-time training do not necessarily reflect or lead to long-term skill improvement or knowledge acquisition. Additionally, our results do not directly correlate to real-world procedural accuracy. However, our purpose in this report was to describe the feasibility of ThoraSite training

given its potential as a clinically impactful tool. While we do not provide direct evidence for clinical efficacy, our training demonstrates good reception by EMS providers.

Limitations

In addition to those identified above, our study has several limitations, including those inherent to survey-based research. Specific questions had limited responses because only drop-down lists were available, and the length of time between this educational experience and previous NT education was unknown. Additionally, no comparison group received training without landmark devices.

CONCLUSIONS

This 90-minute training developed by EMS medical directors on a novel landmark device for lateral NT increased EMS providers' procedural confidence. The training also reduced provider concerns about patient injury and incorrect needle placement but did not affect concerns about self-injury or procedure effectiveness. Future research should examine long-term procedural confidence in NT, real-world landmark device use among EMS providers, and the landmark device's impact on NT efficacy and safety.

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Teaching Ambulatory Obstetrics and Gynecology With a Novel Case-Based Podcast Curriculum

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ABSTRACT

Background: Robust ambulatory clinic teaching can better prepare residents for ambulatory practice. The objective of this study was to implement a standardized ambulatory clinic curriculum in obstetrics and gynecology (OB-GYN) residency training and evaluate its feasibility and acceptability.

Methods: A curriculum consisting of weekly OB-GYN-focused podcasts on ambulatory topics, paired with 15-minute case-based discussions conducted before clinic, was implemented for 28 OB-GYN residents at a single institution.

Results: After curriculum implementation, residents reported increased frequency of structured ambulatory teaching and greater satisfaction with teaching, while faculty reported improved resident knowledge. Both residents and faculty spent less than 30 minutes per week preparing for didactic sessions.

Conclusions: A podcast-based, case-discussion ambulatory curriculum is a feasible and well-accepted approach to enhancing resident education in the ambulatory setting. This adaptable model may be applicable to other residency programs and specialties seeking to strengthen ambulatory training.

Discussion: This innovative curriculum is a feasible, satisfactory method to enhance education in the ambulatory setting and can be easily adapted to other specialties.

BACKGROUND

The vast majority of residency training occurs in the inpatient setting, especially in surgical subspecialties such as obstetrics and gynecology. This contrasts with post-training practice, during which more time is typically spent in the ambulatory setting. To address this deficit, ambulatory teaching should be expanded and strengthened to better prepare trainees for practice after residency.

Curricula have been created to meet this need in nonsurgical specialties that face similar inpatient-outpatient training imbalances.[1,2] Because development of an ambulatory curriculum is labor- and time-intensive, sharing curricula among medical educators across institutions—referred to as extramural curricula—is efficient and beneficial. Indeed, by 2012, almost half of all pediatric residency programs and three-quarters of internal medicine programs used extramural curricula to improve ambulatory care education.[1] A commonly used, standardized ambulatory curriculum in pediatrics addresses a weekly ambulatory care topic with an assigned reference article, case vignettes, and discussion questions completed before clinic. The curriculum was well-received by interns and faculty preceptors[2] and subsequently adapted in internal medicine.[3] Currently, more than 350 medical training programs subscribe to the Yale Office-Based Medicine Curriculum,[3] and more than 200 training programs subscribe to the Yale Primary Care Pediatrics Curriculum.[4] Cased-based learning is an effective and well-accepted approach for small-group medical education.[5] By contrast, similar longitudinal ambulatory education initiatives in surgical specialities are lacking.

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Figure 1. Frequency of Structured Teaching in Ambulatory Setting Before and After Curriculum Implementation

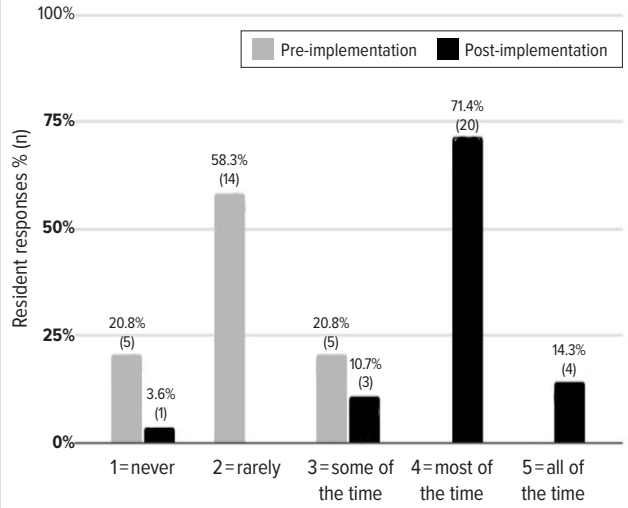
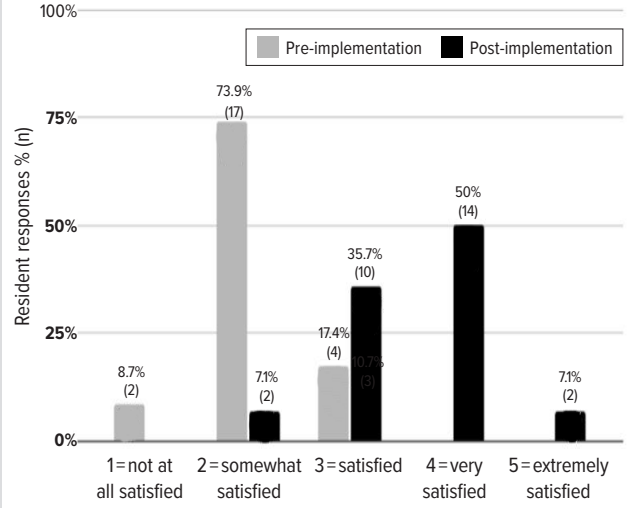


Figure 2. Resident Satisfaction With Teaching in Ambulatory Setting Before and After Curriculum Implementation



Medical education podcasts have become an increasingly popular learning modality[6,7] and represent a potential platform to address this educational gap. A randomized controlled trial demonstrated that medical learners gained more knowledge and reported greater satisfaction when learning from podcasts compared with textbooks.[8] Furthermore, podcasts are popular across specialties; a recent review of 19 specialties found neurosurgery to be the only specialty without an identifiable podcast.[6]

The aim of this study was to evaluate an innovative, standardized ambulatory curriculum using podcasts and case-based discussion in an obstetrics and gynecology (OB-GYN) residency program. We hypothesized that implementation of this curriculum would increase structured ambulatory teaching and trainee satisfaction without adding significant preparation time or burden for residents or faculty.

METHODS

Setting

Study participants included 28 OB-GYN residents and 3 core faculty preceptors at the University of Wisconsin School of Medicine and Public Health. This 4-year residency program, located in Madison, Wisconsin, has 7 residents per postgraduate year, with ambulatory clinic occurring throughout training. Three core faculty precept these clinics. Prior to this implementation of the new curriculum, ambulatory teaching was ad hoc and varied by preceptor discretion, with no dedicated clinic time for teaching.

Curriculum Design and Implementation

A standardized OB-GYN residency ambulatory curriculum modeled after the Yale internal medicine curriculum was developed. Case-based learning, with a faculty member facilitating discussion of a weekly topic, occurred 15 minutes before clinic start time. The weekly reference article was replaced with an OB-GYN podcast episode from the "CREOGs Over Coffee" series, a popular medical education podcast. Each episode is approximately 20 minutes and covers topics based on the Council on Resident Education in Obstetrics and Gynecology (CREOG) educational guidelines, which are the primary framework for OB-GYN resident curricula.[9] As of March 2025, the podcast had over 300 episodes, 5 million downloads, and a 4.9-star rating based on 535 reviews on Apple Podcasts.[10,11]

The repository of CREOGs over Coffee podcasts was reviewed, and ambulatory care topics were identified. From there, the 42 high-yield ambulatory care topics were selected, and a presentation with learning objectives case-based discussion prompts was created for each weekly topic. Residents and faculty developed the presentations; each required less than 1 hour to create and review.

Surveys

Surveys were used to assess resident and faculty acceptance of the curriculum. Residents were surveyed before implementation and 10 months after implementation. The pre-implementation anonymous survey consisted of 9 items, including multiple-choice, free-response and Likert-scale questions. Respondents were asked to indicate postgraduate year, but no additional demographic information was collected. The post-implementation survey was identical to the pre-implementation survey, with the addition of 2 curriculum-specific questions. The pre- and post-implementation surveys were not linked.

The 3 core faculty members were surveyed 3 times during the 10-month implementation period. The anonymous survey consisted of 6 items, including multiple-choice, free-response, and Likert-scale questions. No demographic information was collected.

Surveys are provided in Supplemental Content B-D (see Appendix). The surveys were developed for this study, and no validity evidence was collected.

We used Qualtrics, a cloud-based software, through the University of Wisconsin subscription for survey design and distribution, data collection, and storage (Qualtrics, LLC).

Analysis

Data were exported from Qualtrics and analyzed using Stata version 16 (StataCorp). Responses to resident and faculty pre- and post-implementation surveys were analyzed separately. Given the small sample sizes, continuous items were analyzed using the Wilcoxon rank-sum test, and categorical variables were compared using the Fisher exact test. A P value of <0.05 was considered statistically significant. Responses to free-text items were reviewed and grouped thematically for descriptive analysis. Some items had missing data due to skipped questions; results are reported for nonmissing responses.

Institutional Review Board exemption was obtained from the University of Wisconsin for research in education settings. Completion of the survey by residents and faculty implied consent to participate, as stated in the survey.

RESULTS

Twenty-five of 28 residents (89%) completed the pre-implementation survey, and 28 of 28 (100%) completed the post-implementation. After curriculum implementation, residents reported an increase in the frequency of structured ambulatory teaching ($P<.001$, Figure 1) and greater satisfaction with ambulatory teaching ($P<.001$, Figure 2). All residents spent less than 30 minutes preparing, including time spent listening to the podcast; 68% reported spending less than 20 minutes. Most residents (26 of 28 [93%]) agreed that podcasts were easy to listen to.

The faculty survey response rate was 78%. Specifically, the 3 faculty were surveyed on 3 occasions, yielding 7 of 9 possible responses. Respondents found the format feasible and effective, with all reporting less than 30 minutes of weekly preparation time and 57% (4 of 7 responses) spending less than 20 minutes. Faculty agreed that the allotted teaching time was sufficient (5 of 7 responses, 71%). Additionally, all faculty respondents reported that leading case-based discussion was easy and improved resident knowledge.

In resident free-text responses, time constraints were the most frequently cited barrier to ambulatory teaching. A small number of residents identified clinic volume as an additional barrier. Faculty similarly reported time as the primary barrier, specifically noting residents arriving late to clinic. This was reported to occur more commonly during afternoon clinic sessions.

DISCUSSION

Our curriculum provides a standardized ambulatory clinic curriculum for OB-GYN residency training that requires less than 30 minutes of weekly preparation and results in significantly increased satisfaction among both residents and faculty. These findings are consistent with evaluations of the Yale Primary Care Pediatrics Curriculum, in which pediatric interns reported improved satisfaction, participation in learning, and confidence in clinical skills following implementation of a structured, case-based ambulatory curriculum.[2]

There is a growing national consensus among educational leaders in OB-GYN residency training regarding the need for a standardized ambulatory curriculum. This podcast- and case-based approach offers a practical step toward addressing this need in the ambulatory setting. By leveraging established podcast resources, we developed a low-burden, high-impact educational intervention that aligns with increasing demands on resident and faculty time. The consistently positive feedback from both residents and faculty underscores the value of flexible, asynchronous learning modalities in clinical education.

In the current landscape of graduate medical education, time constraints and competing clinical responsibilities frequently limit opportunities for structured ambulatory teaching. Our curriculum addresses this challenge by offering a scalable, time-efficient solution that does not compromise educational quality. Podcasts, in particular, offer a distinct advantage by delivering consistent, evidence-based content that can be accessed on demand, allowing learners to engage with material at their own pace and in a variety of settings.

Importantly, the adaptability of this curriculum supports broader implementation. Other OB-GYN residency programs may tailor curriculum to fit their specific institutional needs and structure. Additionally, this framework may be applicable to other specialties in which ambulatory education is similarly challenged by time constraints.

Limitations

This study has several limitations. First, it was conducted at a single institution, which may limit generalizability. The sample size was small and constrained by the number of residents and core faculty in the program. Second, outcomes were assessed using surveys that were developed for this study and lacked validity evidence. Finally, the use of pre- and post-implementation self-reported surveys introduces the potential for response-shift bias, which may have contributed to inflated estimates of satisfaction or perceived benefit.

CONCLUSIONS

This study demonstrates that implementation of a standardized, podcast-based ambulatory curriculum was feasible, required minimal preparation time, and was associated with improved resident and faculty satisfaction with ambulatory teaching. As medical education continues to evolve amid increasing clinical demands, innovative approaches such as this curriculum may play an important role in maintaining high standards of residency training.

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Appendix: Available at www.wmjonline.org

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ChatClinic in Pharmacy Education: AI-Simulated Renal Cases for Enhanced Clinical Learning

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ABSTRACT

Background: Artificial intelligence (AI)-driven simulations can address limitations of traditional standardized patient programs in health care education.

Methods: We integrated ChatClinic, a large language model-based virtual patient platform, into a renal workshop for second-year pharmacy students. Students engaged in simulated clinical cases and completed surveys, and their interactions were analyzed for diagnostic accuracy and use patterns.

Results: Students completed 4 virtual patient encounters related to renal pathology. Of 39 students, 19 completed surveys, and all strongly agreed the tool enhanced their understanding and application of workshop content. In 82 analyzed interactions, 75.61% resulted in correct diagnoses. Common student actions included ordering laboratory tests and taking medical histories.

Discussion: Students found ChatClinic valuable and easy to use. Initial findings support AI simulations as effective, scalable additions to health education.

BACKGROUND

Advancements in artificial intelligence (AI) and natural language processing—particularly through large language models (LLMs)—are transforming health sciences education. These technologies enable innovative teaching methods, providing educators with tools to deliver realistic, personalized, and scalable educational experiences.[1] AI-based simulations are a particularly promising use case in health care education.[2] These simulations can help students develop critical skills such as taking medical history, diagnostic reasoning, and patient communication.[3] Early implementations have demonstrated beneficial results across medical and pharmacy education contexts.[3,4] Virtual patients address significant limitations of traditional standardized patient programs, which can be costly, resource-intensive, and difficult to scale. AI-driven platforms can offer improved accessibility, particularly in resource-limited or disrupted educational environments.[5]

Despite their potential, practical demonstrations of AI educational tools remain limited. Previous studies often highlight feasibility and theoretical benefits rather than reporting concrete use cases or outcomes, and evidence around benefits and deployment best practices is still evolving.[6,7] To address these gaps, the overarching objective of this study was to measure the feasibility and utility of an AI-based tool (ChatClinic) during an educational workshop for pharmacy students. This study provides important insights into student perspectives and offers a concrete example of how this technology can be effectively integrated into a health sciences curriculum.

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METHODS

ChatClinic

ChatClinic (www.chatclinic.ai) is a web-based tool for simulating standardized patient interactions developed by students at the Medical College of Wisconsin (MCW). The platform uses LLMs combined with realistic patient vignettes to provide on-demand access to high-quality simulated encounters via a chat interface.

Figure 1. ChatClinic Cases Overview

	Case 1. Pre-renal AKI Secondary to Septic Shock	Case 2. Pre-renal AKI Secondary to Crystalluria	Case 3. Acute Interstitial Nephritis Secondary to Beta-Lactam Antibiotic	Case 4. Pre-renal AKI on Chronic Kidney Disease Secondary to Viral GastroenteritisAntibiotic
Patient Details	47-year-old African American female (5'5, 175 lb) patient who is in the ED with complaints of 3 days of fever, cough, shortness of breath, and vomiting. Physicians started her on antibiotics in the clinic 2 days ago for pneumonia.	Patient presents to ED with severe flank pain	A patient is currently on day 16 of a 21-day course of amoxicillin/clavulanate. He presents to clinic today with complaints of a rash all over and fever.	JK, a 57-year-old female presents to the ED today with complaints of N/V/D for 4 days and fevers. PE: dry mucous membranes, pallor, diaphoretic, lethargic, low-grade temperature
Clinical Findings	Vitals: blood pressure 80/45 mm Hg, heart rate 95 beats/min, temp 39 °C Labs in clinic 2 days ago: Na 124 mEq/L, BUN 22 mg/dL, SCr 1.1 mg/dL Labs today: Na 137 mEq/L, BUN 59 mg/dL, SCr 2.6 mg/dL, FENa 0.4% U/A: pH 5.0, trace protein, few hyaline casts	SCr 2.6 mg/dL, BUN 30 mg/dL; baseline SCr 0.8 mg/dL, no history of renal disease, afebrile; U/A = crystalluria	Labs indicate he may have AKI	Current labs: SCr 2.9 mg/dL, BUN 67 mg/dL, Na 139 mEq/L, K 4.8 mEq/L, chloride 101 mEq/L, HCO_3 19 mEq/L, glucose 201 mg/dL, WBC 204; Hgb 10.5 g/dL, Hct, 30.3% Baseline labs: SCr 1.38 mg/dL, eCrCil ~42.1 mL/min, eGFR ~45 mL/min per clinic notes
Medications	Lisinopril, ibuoprofen as needed, atorvastatin, levothyroxine	Acyclovir, lisinopril, amlodipine, acetaminophen	Beta-lactam antibiotic	Metformin, lisinopril, empagliflozin, simvastatin, multivitamin

Abbreviations: AKI, acute kidney injury; Na, sodium; BUN, blood urea nitrogen, SCr, serum creatinine; FENa, fractional excretion of sodium; U/A, urinalysis; K, potassium; WBC, white blood cell count; HCO_3, bicarbonate; eCrCl, estimated creatinine clearance; eGFR, estimated glomerular filtration rate.

Within the platform, students take medical histories, order imaging and diagnostic labs with realistic results, and receive AI-generated feedback on their diagnoses and treatment plan.

Workshop

Second-year Doctor of Pharmacy students at MCW participated in a renal pathology and pharmacotherapy workshop as part of the Renal and Cardiovascular didactic course. The workshop and associated data collection were conducted under the oversight of MCW's Institutional Review Board (IRB# PRO00051112).

The workshop was carried out in 3 sessions: (1) lecture-based didactic content, (2) interactive case-based learning, (3) ChatClinic cases. ChatClinic was utilized individually or in small groups to perform simulated encounters with virtual patients to reinforce concepts surrounding the disease processes and treatment modalities taught throughout the workshop. Students received brief instructions on using ChatClinic and were told to interact with the program as they would with a real patient.

Four AI-generated patients were developed, each reflecting distinct types of acute kidney injury (AKI): pre-renal AKI caused by sepsis and dehydration; intrinsic AKI resulting from crystal-induced tubular obstruction associated with acyclovir; intrinsic AKI due to acute interstitial nephritis related to beta-lactam antibiotics; and acute-on-chronic kidney disease with a pre-renal AKI component (Figure 1).

Analysis

Data collection following workshop completion included post-workshop surveys and conversation transcripts generated during chat-based interactions using ChatClinic simulated clinical encounters. Surveys were administered to assess workshop satisfaction, perspectives on the use of AI-based educational tools, and self-reflection on performance. Conversation transcripts were anonymized prior to analysis, with some interactions excluded based on the following criteria:

1. Student experimentation with AI without asking clinical questions
2. Incomplete cases or no diagnosis given
3. System or user technical issues

Survey responses were analyzed using descriptive statistics to quantify participants' prior experience with AI tools, self-reported diagnostic performance, and Likert-scale ratings of the educational utility of ChatClinic.

To analyze conversation transcripts, user inputs were categorized into 15 possible interaction types: history of present illness, past medical history, lab orders, physical exam, surgical history, family history, past or baseline labs, medication review, allergy review, radiology order, immunization history, social/lifestyle history, general conversation, providing diagnosis and treatment plan, and other. AI-generated feedback—both positive and constructive—was coded into 6 categories: thoroughness of medical history taking, empa-

thy and communication, appropriateness of orders, appropriateness of treatment plan, diagnostic reasoning, and other. An LLM (ChatGPT-4o) was used to generate initial codes for each response, and each label was then manually verified by a human reviewer. Descriptive statistics (frequency distributions, percentages, and measures of central tendency) were used to summarize survey and transcript data.

RESULTS

A total of 39 pharmacy students participated in the workshop. Following completion, 19 students (48.72%) responded to the postworkshop survey. Survey results are summarized in the Table. Among the respondents, 11 (57.89%) reported never having used an AI-based education tool prior to the workshop. Responses regarding ChatClinic's utility were overwhelmingly positive. All respondents "strongly agreed" with representative statements such as: "The ChatClinic program enhanced my understanding of the concepts covered," "ChatClinic improved my ability to apply the concepts learned during the workshop," "The information provided by ChatClinic was appropriate and relevant for the workshop," and "ChatClinic helped me identify and address gaps in my knowledge or understanding."

Table. Survey Data

Use of Artificial Intelligence (AI)	n (% of class[a])	Yes, n (%)
Have you used an AI-based educational tool before?	19 (48.7)	8 (42)
Did you use the ChatClinic program during the Renal Workshop?	18 (46.2)	18 (100)
Usability of ChatClinic	**n (% of class[a])**	**Avg performance (scale 1-5[b])**
ChatClinic helped identify and address gaps in my knowledge or understanding.	17 (43.6)	5.00[c]
The ChatClinic program enhanced my understanding of the concepts covered during this course.	17 (43.6)	5.00[c]
The ChatClinic program improved my ability to apply the learned concepts in practical scenarios.	17 (43.6)	5.00[c]
The information provided by ChatClinic was appropriate and relevant for the question asked.	17 (43.6)	5.00[c]
It was easy to navigate/use the various features of the ChatClinic program.	17 (43.6)	4.94[d]
Overall, I felt the ChatClinic program performed well when answering my questions.	17 (43.6)	4.94[d]

Free-text responses to "What did you like most about using ChatClinic for educational purposes?"

- It was easy to use and descriptive with instant feedback.
- I absolutely loved this!! I was able to play "pharmacist," which was a helpful way to study.
- Working through patient cases.
- It simulated patient/provider encounters well.
- Let's use this for all our classes!
- It was nice getting instant feedback.
- Coming up with targeted questions to get clues.
- The answers to questions were very in-depth.
- It solidified concepts from class.

[a]Total number of enrolled students, N = 39.
[b]1 = strongly disagree, 5 = strongly agree.
[c]100% of respondents strongly agree.
[d]16 respondents = 5 (strongly agree); 1 respondent = 4.

For the performance self-assessment, students reported the number of cases they correctly diagnosed: 8 diagnosed all 4 cases, 7 diagnosed 3 cases, and 2 diagnosed 2 cases. No respondents reported diagnosing fewer than 2 cases.

A total of 109 interactions with AI patients were collected. (See Appendix for example.) After applying exclusion criteria, 82 remained for analysis. Of these, 62 (75.61%) resulted in a correct diagnosis, and 51 (62.20%) included correct treatment plans. Correct diagnosis and management suggestions did not vary significantly across the 4 cases. The average encounter length was 8.62 question-and-answer pairs (SD, 3.24; range, 3-19).

The most common student input was requesting orders (21.50% of all inputs); followed by medication review (17.43%); giving the patient's diagnosis or discussing treatment plan (15.96%); history of present illness (11.07%); and physical exam (10.42%) (Figure 2). The most frequently ordered labs were basic metabolic panel (20.37% of all orders), urinalysis (13.89%), and baseline creatinine (12.04%).

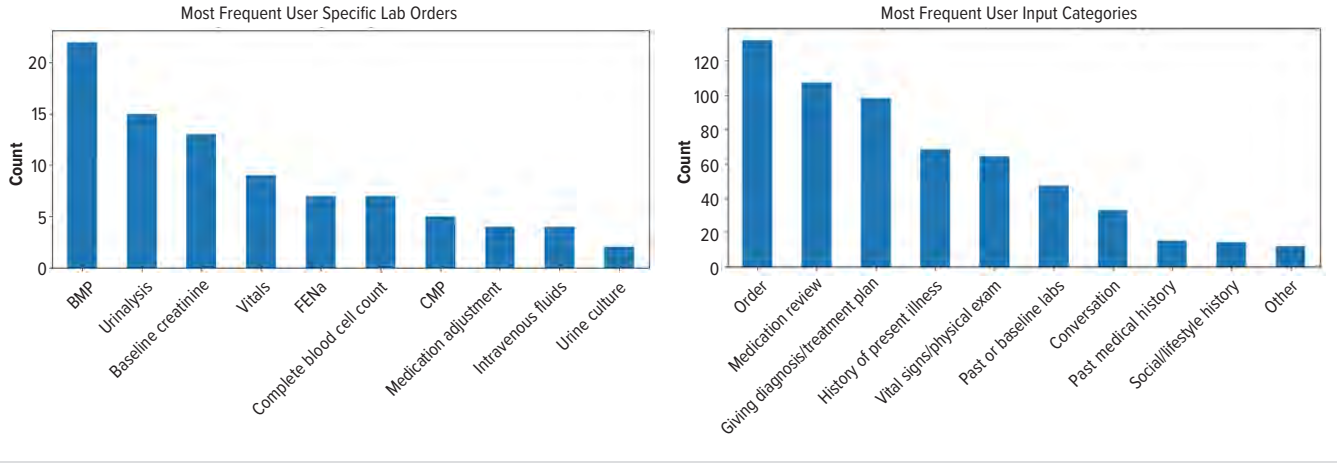
AI-generated feedback most commonly included positive feedback on students' diagnostic reasoning (89.23% of all conversations), suggested management (44.61%), and appropriate use of labs and imaging (15.38%). Constructive feedback was most frequently given on history-taking thoroughness (53.85% of all conversations), treatment recommendations (41.54%), and empathy/communication skills (20.00%).

DISCUSSION

This experience highlights several key findings regarding AI-based technologies in health sciences education. Despite most students lacking prior experience with AI tools, they reported high satisfaction with ChatClinic and quickly adopted the technology. Students found it valuable for reinforcing concepts and applying them to clinical scenarios, complementing lecture-based curricula. Most students arrived at correct diagnoses in 3 of 4 cases, with ordered labs and question types aligning well with case scenarios. Overall, students viewed ChatClinic as a beneficial and enjoyable addition to traditional teaching methods.

These results are consistent with existing works regarding student perceptions of AI tools in health care education.[8,9] However, this study contributes uniquely by providing practical insights into student engagement and interaction patterns within an applied educational context. Unlike predominantly theoretical discussions

Figure 2. Top 10 Lab Orders And Question Types Utilized by Students



Abbreviations: BMP, basic metabolic panel; FENa, fractional excretion of sodium; CMP, comprehensive metabolic panel.

in existing research, this analysis offers concrete data from real-world implementation.

Our results support the utility of AI-driven patient simulations to address common logistical challenges, such as standardized patient availability and resource constraints. Although this pilot involved pharmacy students, the educational advantages may extend to other health care professions, including medicine, nursing, physician assistant training, and allied health fields.

However, the integration of AI into medical education must be carried out in a careful, responsible way. Rollout challenges of LLM-based tools include retrospective and real-time validation by human experts, data security, and privacy considerations. Additionally, while AI tools offer significant advantages in terms of accessibility and flexibility, they must complement rather than replace essential hands-on training. Physical examination skills and direct patient interactions remain irreplaceable components of health care education.

This work also raises further questions regarding generative AI in patient simulation. Methods for validating patient presentations and recommended clinical treatments are crucial for safe adoption. Comparative studies assessing AI-based simulations versus traditional teaching methods, as well as larger-scale investigations into faculty and student perspectives, will help further define AI's role in health care education.

Limitations

This study describes an educational approach with a single student cohort, focusing on their experiences with AI-based patients. Therefore, generalizability of these findings is limited.

CONCLUSIONS

Generative AI shows substantial promise to enhance health care education, particularly as an adjunct to existing methods of teaching. This study demonstrates student acceptance and perceived educational value of integrating AI-simulated clinical interactions into a workshop format. Further investigation into AI's educational efficacy and long-term outcomes in health care training is warranted.

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Appendix: Available at www.wmjonline.org

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Perceptions of Academic Hospitalists Regarding Rounding Methods

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ABSTRACT

Background: Bedside rounding remains a cornerstone of medical education and patient care, yet there are concerns about its efficiency and feasibility. This study explored hospitalists' perspectives on rounding methods and strategies to balance education with effective patient care.

Methods: Academic hospitalists at a Midwest academic medical center completed a survey assessing preferred rounding methods and perceived benefits and barriers.

Results: Of 36 respondents, 33% preferred table rounds followed by bedside rounds, 24% favored bedside rounds, and 21% chose table rounds. Reported benefits of bedside rounds included improved communication, empathy, and shared decision-making. Common barriers included duty-hour restrictions (89%) and scheduled educational activities (86%).

Discussion: Hospitalists value bedside rounding for its educational and patient-centered benefits but also reported several barriers. Findings highlight the need for innovation in rounding methods to overcome these challenges.

BACKGROUND

Historically, bedside rounding has been regarded as a fundamental component of patient care and medical education. It provides physicians an opportunity to enhance direct patient contact while fostering a clinical teaching environment. These bedside interactions between patients and physicians have been shown to improve patient engagement, enhance communication, and increase satisfaction with care, while also benefiting medical trainees' education and contributing to better health outcomes.[1-3]

However, in recent years, there has been a shift away from traditional bedside rounding in favor of alternative methods. This transition has been driven by factors such as time constraints, increasing complexity of patient cases, and the widespread integration of electronic health records (EHRs). The adoption of EHRs, in particular, has placed a greater emphasis on documentation-related tasks, such as early discharge processes and clinical documentation, which often compete with clinical responsibilities during rounding. Patient-related barriers have also contributed to this transition. Specifically, concerns about patient privacy have led some clinicians to question the effectiveness of bedside rounding, particularly in certain clinical settings. Bedside rounding can also increase patient anxiety due to the medical jargon used when discussing clinical cases in front of patients and their families.[4]

Nonetheless, studies have demonstrated the effectiveness of bedside rounding in achieving key clinical metrics, such as improved patient satisfaction. Bedside rounding has also been shown to enhance trainees' clinical skills.[4] Furthermore, research suggests that targeted educational interventions can increase the frequency of bedside rounding without significantly prolonging rounding duration.[5]

Given ongoing challenges in medical education and patient care, this study aimed to explore hospitalists' perceptions of various rounding methods—specifically bedside rounding—and to identify strategies that balance the evolving health care landscape with the educational and clinical needs of trainees and patients.

METHODS

Participants were selected from the Division of General Internal Medicine at a large, tertiary-care academic medical center in the Midwest, known for its high patient acuity and diverse patient

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Box 1. Descriptions of Rounding Approaches

Bedside Rounds
This method involves the physician team conducting rounds at the patient's bedside, directly engaging with the patient to discuss their care. It fosters patient involvement in decision-making and provides trainees with the opportunity to observe clinical exams and practice communication skills.

Table Rounds
In this approach, discussions about patient care take place in a conference room or common area, away from the patient's bedside. It is often more time-efficient and allows for a more structured discussion but may limit patient engagement and the opportunity for hands-on training.

Geographic Rounds
These rounds are organized based on the geographic location of patients within the hospital, grouping patients by their unit or ward. This method aims to optimize time efficiency and minimize walking between patient rooms but may reduce opportunities for interdisciplinary collaboration or personalized care discussions.

Walking Rounds
Rounds in which the health care team discusses patient cases while walking between patient rooms or in hallways, without engaging patients directly in the conversation.

population. Rounding teams typically consisted of attending physicians, residents, medical students, and allied health care professionals, such as pharmacists and social workers.

Inclusion criteria were as follows: participants had to be academic hospitalists currently practicing within the institution. There were no specific exclusion criteria; however, hospitalists on leave or not actively involved in patient care during the survey period were ineligible. We aimed to include a diverse sample to capture a broad range of perspectives.

The survey sought to explore hospitalists' perceptions of rounding methods, including benefits and barriers. Quantitative data were analyzed using descriptive statistics, with all analyses conducted using R version 4.1.2 (R Core Team, 2021). Respondents were asked about their preferred rounding methods (descriptions of rounding approaches are included in Box 1) and their perceptions on suggested benefits and barriers of bedside rounding, using a 5-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). Percentages of respondents selecting "agree" and "strongly agree" were reported. The survey also included an open-ended section for free-text responses, which were reviewed and thematically coded to identify key patterns and insights.

RESULTS

Of the 86 hospitalists surveyed, 36 responded (response rate, 41%). Among respondents, 53% were male and 47% were female; nearly half (49%) had fewer than 5 years of experience as hospitalists. The most preferred rounding method was "table rounds followed by bedside rounds" (33%), then "bedside rounds" (24%) and "table rounds" (21%).

Key perceived benefits of bedside rounds included enhancing communication skills (94%), fostering empathy (92%), and greater patient involvement in shared decision-making (91%). Significant barriers included residents' duty-hour restrictions (89%) and scheduled educational activities (86%) (Table).

Respondents' free-text comments offered several suggestions for improving bedside rounding to better fit modern hospital workflows while maintaining educational value. These included standardizing the format and duration of bedside rounds, aligning patient location with portable computer access, and reinforcing the importance of bedside rounds (Box 2).

Box 2. Key Themes From Bedside Rounding Survey

Educational benefits
- Enhances communication, empathy, and clinical skills.
- Promotes hands-on learning and real-time feedback.
- Increases patient involvement in decision-making.

Barriers to implementation
- Time constraints due to duty hours and workflow demands.
- Geographical distance between patients.
- Technological challenges, such as limited computer access.
- Absence of residents and nonclinical responsibilities.

Preferred rounding models
- Hybrid approach: table rounds for stable patients, bedside rounds for complex or unstable ones.
- Support for walk rounds and interdisciplinary teams.

Recommendations for improvement
- Involve interdisciplinary teams at the bedside.
- Improve scheduling, including early rounds and localized patient grouping.
- Utilize technology effectively (eg, portable computers).
- Consistently reinforce the value of bedside rounds in training.

Institutional support and cultural change
- Need for institutional backing to overcome logistical barriers.
- Promote bedside rounds as a core practice in medical education and patient care.

Table. Hospitalists' Perceptions of Bedside Rounding

Preferred method of rounding (first choice)	
Table followed by bedside rounds	33.3%
Bedside rounds	24.2%
Table rounds	21.2%
Other innovative methods	12.1%
Hallway/walking rounds	9.1%
Benefits of bedside rounds (agree/strongly agree)	
Teaching communication skills	94.4%
Teaching empathy	91.7%
Keeping patient in decision-making	91.4%
Better time management/improved efficiency	40.0%
Sharing medical knowledge/clinical skills	91.4%
Improving patient satisfaction	57.1%
Improving communication with patients with challenging diagnosis	94.3%
Barriers to bedside rounds (agree/strongly agree)	
Time constraints due to resident duty hours	88.9%
Residents' educational activities/didactics	86.1%
The absence of residents (expected or unexpected)	64.9%
Other nonclinical responsibilities of hospitalists	33.3%
Not feeling comfortable/confident as an attending	5.6%

DISCUSSION

Bedside case presentations are recognized as a beneficial teaching tool in medical education while simultaneously improving the patient experience. Our study found that the benefits of bedside rounding included greater patient engagement, improved communication, and enhanced trainee education. These findings align with previous research emphasizing the patient-centered, collaborative environment fostered when patients are directly involved in care discussions.[1,3] This approach cultivates shared decision-making and trust.

We also found that bedside rounding provides opportunities for residents and medical students to develop essential skills—including physical examinations, professionalism, and empathy—critical to their growth as future physicians.[1]

One notable contrast is that while some studies have shown no significant impact on patient satisfaction or decision-making in certain settings, our findings suggest that bedside rounding still plays a crucial role in fostering shared decision-making and patient empathy. This underscores the variability in how bedside rounding is perceived and implemented across health care contexts.

Despite its importance, bedside rounding may not always be feasible. Participants noted that for critically ill patients or those unable to participate in discussions, bedside rounding may offer limited value or raise concerns regarding privacy and consent. Additionally, discussing complex cases using medical jargon can confuse both patients and their families—especially those with language barriers—potentially causing emotional discomfort and misinterpretation of medical information. Furthermore, resident duty-hour restrictions may limit the feasibility of bedside rounding for all patients, consistent with challenges described in prior studies.[4]

In such cases, table rounding offers a structured alternative that facilitates organized education and decision-making in a time-efficient manner. It minimizes time spent walking between different patient locations and discussing cases in busy hospital hallways. Table rounds also allow sensitive patient information to be shared without privacy concerns, which is critical in certain clinical scenarios. Additionally, table rounds can be used effectively for teaching and coordinating care by involving pharmacists, social workers, and case managers to facilitate collaborative care.[2] They also optimize completion of time-sensitive tasks, such as consultations, order entry, and discharges. However, table rounds can disengage patients from the decision-making and reduce opportunities for direct clinical observations.

A balanced approach incorporating both bedside and table rounds is likely the most effective for optimizing patient care and education. Bedside rounds are ideal for acutely ill or undifferentiated patients, whereas table rounds work best for those with clear plans or when minimizing disruption is necessary. By considering patient needs, preferences, and contextual factors—such as overcrowding or case complexity—health care teams can make informed decisions that prioritize high-quality, patient-centered care and effective learning. Our study emphasizes the need for structured hybrid rounding that is effective, efficient, and tailored to faculty experience, learner expectations, and the need to balance teaching, patient care, and resident work hour restrictions. Standardized guidelines and onboarding training for faculty are essential. Rounding methods should also be individualized based on patient lists and learner availability throughout the day.

Recommendations

We recommend implementing hybrid rounding models, developing standardized guidelines, providing faculty training, leveraging technology for efficient rounding, introducing scheduling flexibility, and enhancing patient and family involvement. These strategies can help balance educational needs and patient care while adapting to modern health care challenges.

Nonetheless, the study's mixed-methods approach allowed deeper exploration of qualitative insights, offering a comprehensive and foundational understanding of rounding practices. Survey respondents acknowledged the benefits of bedside rounding for education and patient care, along with significant challenges related to logistics and time management. Addressing these factors through research and institutional policy can refine rounding methods to achieve optimal patient care and medical education outcomes.

Limitations and Future Research

This study has several limitations. First, the sample size was relatively small (36 academic hospitalists), and data were collected from a single institution, limiting generalizability. Second, perspectives of residents and medical students were not included, which would provide a more holistic understanding of this topic. Future research should include longitudinal, multicenter studies or randomized controlled trials to examine logistical barriers—such as coordinating interdisciplinary schedules and securing necessary technology—as well as cultural barriers related to changing long-standing practices or faculty resistance.

Future iterations of this project will aim to collect quantitative data on metrics such as rounding duration, workflow efficiency, patient experience, and clinician/learner well-being. Specific measures include time spent per patient during bedside versus table rounds, patient satisfaction surveys, and assessments of trainee engagement and stress. Combining qualitative and quantitative data will provide a more balanced understanding of the impact of rounding methods, evaluate hybrid models, and explore integration into diverse hospital environments to optimize patient outcomes and education.

CONCLUSIONS

This study underscores the continued value of bedside rounding in medical education and highlights the need for standardized

guidelines, institutional support, and faculty training. Despite variations in experience, academic hospitalists generally view traditional bedside rounding as an essential educational tool. However, they also advocate for innovative structures—such as conducting table rounds before bedside rounds—along with efforts to improve efficiency and effectiveness.

Adjusting rounding methods based on patient needs and learner availability and addressing barriers such as duty-hour restrictions and logistical challenges can enhance both education and patient care. Further research is needed to refine these approaches and improve care quality and educational outcomes. Overcoming barriers to bedside rounding will provide insights into how this practice can evolve, ultimately enhancing patient care, medical education, and overall efficiency.

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Students' Perspectives on the Impact of Scholarly Projects on Residency Applications

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ABSTRACT

Background: With the transition of United States Medical Licensing Examination (USMLE) Step 1 to pass/fail scoring, medical students have increasingly turned to research to strengthen their residency applications. However, the variability in residency research expectations leaves the impact of scholarly work on match outcomes unclear.

Methods: We conducted a survey among fourth-year medical students at a large academic medical school in the Midwest to evaluate their perceptions of the role of scholarly work in residency applications and match outcomes.

Results: Of the 55 students who matched, the majority (53%) reported that more than half of their residency interviews included discussions about their scholarly projects. A substantial majority (78%) believed that presenting and/or publishing their scholarly work contributed to securing their residency positions.

Discussion: Our findings indicate that students generally view scholarly work as valuable for residency applications. However, there is a clear need for a consistent and objective standard for how residency programs evaluate scholarly work.

BACKGROUND

The National Board of Medical Examiners (NBME) introduced the 3-step United States Medical Licensing Examination (USMLE) in 1992, with Step 1 designed to assess foundational medical knowledge and competency before clinical rotations. However, as Step 1 scores became a crucial factor in residency selection, they were associated with increased student stress and well-being concerns. In response to these challenges and following recommendations from the Invitational Conference on USMLE Scoring, Step 1 scoring was changed from a numerical score to pass/fail in January 2022.[1]

The transition to pass/fail grading for USMLE Step 1 has sparked speculation regarding its impact on residency outcomes. Although Step 1 is now reported as pass/fail, Step 2 Clinical Knowledge (CK) scores remain a key objective performance metric. Nonetheless, Step 1 no longer holds the decisive weight it once did in the residency selection process. Other assessment criteria, such as research participation, have gained more importance. A study published in the *Journal of Graduate Medical Education* highlighted that residency program directors are increasingly using research involvement to differentiate applicants.[2] A separate survey also reported that 41% of program directors believe research will play a larger role following the pass/fail shift.[3] Consequently, medical students are increasingly engaging in research to bolster their competitiveness for residency.

While research has not traditionally been required for residency applications, national data from the Association of American Medical Colleges (AAMC) show that, even before the Step 1 transition, approximately 44% of US medical schools required students to complete a scholarly project.[4] These projects allow students to explore clinical interests and gain additional experience. At our academic medical center in the Midwest, medical students are required to complete 1 scholarly project before their final year, fostering independent learning. However, few studies have explored the impact of these scholarly projects on residency outcomes, a gap that this study sought to address by evaluating the perceived role of scholarly work in residency applications amidst the evolving assessment landscape.

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METHODS

Fourth-year (M4) medical students from a large academic medical school in the Midwest who participated in the 2024 residency match were invited to complete an anonymous online survey. Survey participation implied consent, with formal consent waived by the institutional review board. The survey explored scholarly engagement, application attributes, match outcomes, and perceived role of scholarly work, with an open-ended section for additional comments. Quantitative analyses were conducted using R version 4.1.2 (R Foundation for Statistical Computing). Qualitative data were thematically coded using Taguette (Rampin R, NYU Libraries), an open-source qualitative analysis software.

Although the response rate was 31%, institutional data from the registrar showed that the overall match rate for the full M4 class was slightly higher than the 93% match rate observed among survey respondents, indicating that the survey sample was broadly representative with respect to match outcomes.

RESULTS

Out of 187 eligible M4 students, 59 (31%) completed the questionnaire. Table 1 summarized survey respondents' demographics. The majority identified as female (54%). Regarding race/ethnicity, 59% identified as White/European, 22% Asian, 5% Middle Eastern/North African, 5% Black/African, and 7% Hispanic.

Every respondent reported participating in at least 1 scholarly project. Most participated in multiple types of scholarly projects, including research (95%), community engagement (47%), case reports (46%), quality improvement (37%), basic science (8%), and medical education (2%). Of the 59 students, 55 (93%) successfully matched into residency programs. Among the 4 students who did not match, all reported involvement in scholarly projects, and their level of research exposure was comparable to that of matched peers. In each case, personal circumstances—such as withdrawal from the match or other non-research-related factors—were likely contributors to their match outcome.

Table 2 presents survey responses from the students who matched into residency programs. Internal medicine was the most common matched specialty (22%), followed by anesthesiology (11%), psychiatry (11%), pediatrics (9%), general surgery (7%), family medicine (5%), and neurology (5%), among others. A significant majority (85%) had at least 1 publication, with most (55%) having 1 to 4 publications. Over half (53%) reported that more than 50% of their residency interviews included discussions about their scholarly projects, and 78% somewhat or strongly believed that presenting and/or publishing their scholarly work contributed to securing residency positions.

These findings highlight the broad engagement in scholarly activities and their perceived importance in residency matching, emphasizing the value students place on research as a critical component of their applications.

Table 1. Survey Responses From Medical Students Applying for Residency in 2024

Characteristics	Total (N = 59)
Gender	
Male	44%
Female	54%
Missing	2%
Race/ethnicity	
White or European origin	59%
Asian	22%
Hispanic	7%
Middle Eastern or North African	5%
Black or African origin	5%
Prefer not to answer	2%
Involvement in at least 1 scholarly project	100%
Types of scholarly projects[a]	
Research	95%
Community engagement	47%
Case report	46%
Quality improvement	37%
Basic science	8%
Medical education	2%
Matched	
Yes	93%
No	7%

[a]Total percentage is more than 100% because respondents could choose more than 1 option.

In addition to structured survey items, students provided open-ended responses reflecting on their scholarly experiences and advice for future applicants. Thematic analysis of these responses revealed 3 major themes. First, many students emphasized the importance of engaging in scholarly projects early in medical school, ideally before clinical clerkships. Early involvement was associated with greater access to mentorship, more time to produce meaningful work, and the ability to align projects with career interests. Second, while students generally favored quality over quantity, some acknowledged that a higher number of publications or presentations might be necessary to remain competitive—particularly in more selective specialties. Lastly, students described a range of motivations and perceived benefits of scholarly work—including improving residency prospects, developing professional skills, and pursuing personally meaningful topics. Several students noted that the value placed on scholarly output varied by specialty, with more competitive fields placing a greater emphasis on research credentials. To illustrate these themes in students' own words, selected quotes are included in the Supplemental Table (see Appendix).

DISCUSSION

A 2017-2018 AAMC survey found that 44% of medical schools require students to participate in research, and such requirements predate the USMLE Step 1 scoring change. However, residency program requirements for research involvement are not

standardized. A 2021 National Resident Matching Program survey showed that "interest in research" was ranked 13th in importance for interview selection.[5]

Despite this, a significant gap exists in the literature regarding the role of research involvement following the USMLE Step 1 pass/fail transition. To our knowledge, this is the first study to assess students' perspectives on the role of scholarly work in residency applications. Our study found that most students who matched into residency programs at our large Midwestern academic medical school reported being asked about their scholarly projects during the majority of their interviews. Additionally, a significant majority of matched students (78%) said they believed that presenting and/or publishing scholarly work contributed to securing their residency positions.

Qualitative assessments revealed varying perspectives on the relative importance of quality versus quantity in scholarly work. While some students viewed research primarily as a means to enhance residency applications, others were motivated by professional development, networking opportunities, or personal fulfillment. Many emphasized the importance of engaging in scholarly projects early in medical school and highlighted the value of mentorship in guiding successful research engagement. Students perceived the need to approach research strategically, selecting projects that aligned with long-term goals and specialty interests. These insights suggest that institutional efforts to support early, goal-directed research—particularly in collaboration with faculty mentors—may improve both student experience and scholarly outcomes. Students further perceived scholarly work as especially important for highly competitive specialties, such as general surgery and ophthalmology. Although this study highlights student perceptions, future research should incorporate residency program directors' perspectives to better understand how scholarly work is weighed during the selection process.

Despite widespread student perceptions that scholarly work is valuable for residency applications, there is no consistent or objective standard for how residency programs evaluate research involvement. Most programs lack uniform requirements, and the absence of program-specific guidelines makes it challenging to quantify the impact of scholarly work on match success or candidate ranking. Greater clarity may reduce uncertainty and alleviate pressure on students to overproduce research, which may adversely affect overall well-being. There is a need for more consistent and objective standards for evaluating scholarly work within the residency selection process. Understanding program-specific requirements and preferences can inform best practices for both students and residency programs, particularly as the holistic review process evolves.

Beyond student perceptions, systemic factors may also influence the impact of scholarly work on residency applications. Although all students surveyed engaged in some form of scholarly work during medical school, 15% of those who matched did not produce a publication, suggesting potential barriers—such as insufficient time or limited support—that hinder project completion or dissemination. Medical schools could consider implementing programs designed to better support students in navigating these challenges and successfully completing and publishing scholarly work.

Additionally, we observed low participation in basic science (8%) and medical education (2%) projects. Although the survey did not explore reasons for this pattern, further investigation is warranted to determine whether these findings reflect broader structural factors—such as access to mentorship, research infrastructure, or specialty-specific priorities. Future studies should aim to increase survey participation, examine differences between respondents and nonrespondents, adopt longitudinal designs to assess long-term impact of scholarly work on match outcomes

Table 2. Summary of Survey Responses from Medical Students Who Successfully Matched Into Residency Programs

Characteristics	Total[a] (N = 55)
Matched specialties	
Internal medicine	22%
Anesthesiology	11%
Psychiatry	11%
Pediatrics	9%
General surgery	7%
Family medicine	5%
Neurology	5%
Physical medicine and rehabilitation	4%
Orthopedic surgery	4%
Otolaryngology/ear, nose, throat	4%
Emergency medicine	4%
Transitional year/dermatology	2%
Radiation oncology	2%
Plastic surgery	2%
Obstetrics and gynecology	2%
Combined medicine–dermatology	2%
Diagnostic radiology	2%
Ophthalmology	2%
Missing	2%
Number of publications	
0	15%
1–4	55%
5–8	20%
9–13	9%
>13	2%
Asked about scholarly projects during residency interviews	
<25% of interviews	24%
25%–50% of interviews	24%
>50% of interviews	53%
Presenting/publishing scholarly work helped in securing residency spot	
Strongly agree	38%
Somewhat agree	40%
Neither agree nor disagree	15%
Somewhat disagree	5%
Strongly disagree	2%

[a]Totals may not equal 100% due to rounding.

(both overall and within individual specialties), and incorporate perspectives from residency programs and directors to provide a more comprehensive and informed understanding.

CONCLUSIONS

Assessing the impact of scholarly work on residency matching is challenging due to varying medical school requirements and residency program priorities. While students generally recognize the importance of research, there is significant variation in the types of research valued by programs – often based on informal information or assumptions rather than clear communication. Residency programs and students would benefit from more explicit research expectations to ensure better alignment between applicants and program values. This highlights a disconnect between residency program directors and medical students, underscoring the need for clearer, more consistent communication from residency programs.

Our study suggests that the focus of scholarly work should shift from quantity to quality, with students encouraged to pursue projects they are genuinely passionate about. However, we acknowledge that students may perceive that more competitive specialties prioritize the quantity of scholarly experiences rather than the quality of those endeavors. To mitigate the growing pressure of a "publication race," residency programs should establish clear guidelines that set expectations on the number of required research projects. Such guidelines should promote high-quality, specialty-specific research early in medical education and should be supported by mentorship and institutional opportunities.

Financial disclosures: None declared.

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Teaching Systems-Based Practice Through a Resident-Led Quality Review in the Department of Emergency Medicine

Elyse Hartleben, MD; Kathleen Williams, MD; Nancy Jacobson, MD

ABSTRACT

Background: Resident education in safety and quality has historically relied on didactics alone. To enhance alignment with the Accreditation Council for Graduate Medical Education (ACGME) milestones, a resident-led case review process was implemented.

Methods: Senior residents reviewed cases for a 1-month period and met quarterly for discussion. Meetings were supervised by emergency medicine faculty and attended by junior residents. Survey feedback and descriptive statistics were used to evaluate the intervention's impact.

Results: Most residents rated this intervention as "extremely adequate" in teaching ACGME milestones, most notably "participating in the analysis of patient safety events" (n = 13, 54.2%) and "discussing how individual practice effects the broader system" (n = 14, 56.0%) Most enjoyed participation (n = 18, 75.0%).

Discussion: Residents perceived this educational intervention as enjoyable and adequate for teaching ACGME milestones.

BACKGROUND

The Accreditation Council for Graduate Medical Education (ACGME) outlines 6 competencies: medical knowledge, patient care, interpersonal and communication skills, professionalism, systems-based practice (SBP), and practice-based learning and improvement.[1,2] In highlighting SBP, the ACGME recognizes the importance for residents' ability to navigate the health care system.[2-4]

Program directors recognize challenges to teaching SBP competencies, including limited faculty expertise and institutional support, residents' perceptions that this is a diversion from medicine, time constraints, financial limitations, and varying educational needs by postgraduate year.[5,6]

Despite these challenges, educators seek to develop robust, affordable, and fair teaching modalities for learning SBP competencies.[3,6] The literature recommends methods that promote active learning rather than lecture-based didactic sessions.[7] Emergency medicine (EM) program directors from the 2010 Council of Emergency Medicine Residency Directors (CORD) Academic Assembly Consensus Workgroup recommended SBP education methods, including expert modeling, informal small-group discussions, and formal small-group activities.[6] One Department of Ophthalmology recommended standardized and simulated examinations, qualitative reviews, evidence-based literature reviews, a resident portfolio, case presentations, chart review, and chart-stimulated recall as methods for teaching SBP skills. They emphasized that real-world patient cases can serve as a platform for discussion, reflection, and improvements in SBP.[3]

EM program directors report using expert modeling, formal small-group activities, formal lectures, self-directed learning projects, and facilitator-guided rotations.[6] However, little is published on the implementation or effectiveness of resident-led case reviews to teach SBP competencies. We describe an SBP education intervention that includes resident review of cases triggered by quality measures.

METHODS

A resident-led review of cases was implemented in our academic Department of Emergency Medicine with a 3-year residency program. The affiliated hospital is an urban tertiary care cen-

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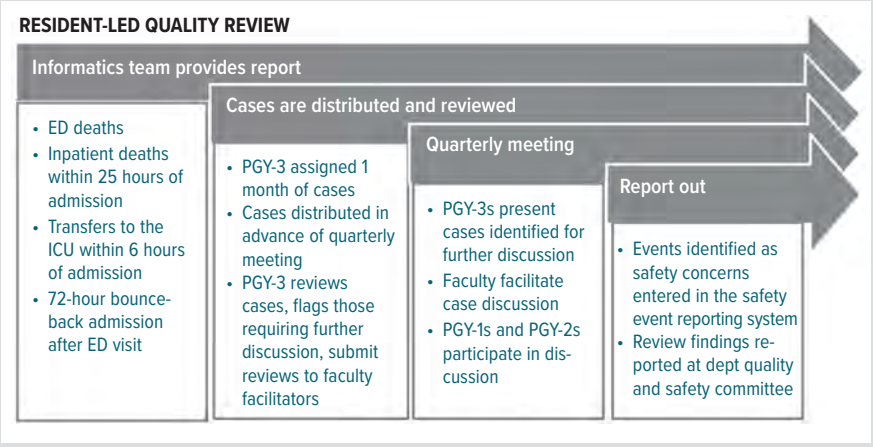
ter with an annual emergency department (ED) census of approximately 81 000. This educational quality improvement project was deemed exempt from review by the institutional review board.

Figure 1. Resident-led Quarterly Quality Review of Cases Implemented in the Department of Emergency Medicine



Abbreviations: ED, emergency department; ICU, intensive care unit; PGY, postgraduate year; dept, department.

Development

The intervention was designed, implemented, and facilitated by an EM faculty member serving as the patient safety and quality officer for house staff (EH); the EM director of quality, safety, and experience (NJ); and the EM program directors (KW). Facilitation required approximately 1 to 2 hours of faculty time outside the 1-hour quarterly meetings. No shift buy-down was used. This intervention expanded upon preexisting SBP teaching, including a quality improvement lecture series. It augmented but did not replace safety event and quality measure reviews by the Department of Emergency Medicine Division of Clinical Operations.

Case Selection

Cases were selected using quality measures, including ED and inpatient deaths within 24 hours of admission, unplanned intensive care unit transfers within 6 hours of admission, and bouncebacks within 72-hours of an ED visit with subsequent admission. These measures are used by hospitals across our system to identify cases that may require further review. In this ED, fewer than 1% of total cases meet each of these measures. The electronic health record was queried to generate a case list. This document was protected under Wisconsin Statutory Sections 146.37 and 146.38, making it nondiscoverable and peer-protected.

Case Distribution and Initial Review

Third-year residents (postgraduate year [PGY]-3, n = 12) were each assigned the case list for 1 month. They reviewed cases and populated a deidentified case log with relevant clinical information and potential recommendations for further review. They then returned completed case logs to the supervising faculty before the quarterly meeting.

Quarterly Case Discussion

PGY-3s presented and led discussions on cases they determined needed further review. Discussions were supervised by the authors and additional interested EM core faculty. First-year (PGY-1) residents and second-year (PGY-2) residents were required to attend 1 quarterly meeting per academic year. Meetings were held via Microsoft Teams (Microsoft Corporation) secure videoconferencing.

Reporting Outcomes

Presented cases with significant safety concerns were identified by either residents or faculty and were referred for formal departmental review. Trends, interesting cases, and lessons learned were presented at resident conferences by the resident presenting that quarter. Other quality improvement and patient safety didactics continued per departmental standards. The workflow for this intervention, from case identification through reporting of outcomes, is depicted in Figure 1.

Measuring Effectiveness

Twelve months after implementation, participating residents were surveyed. The survey was nonvalidated and nonpiloted and was developed de novo by the authors. Postgraduate year was recorded. Surveys asked residents to rate the adequacy of this intervention for supporting the SBP milestones, as well as their level of enjoyment and ability to objectively review cases of their peers and attending physicians. An opportunity for written feedback was provided.

Analysis

Descriptive statistics were used to analyze all quantitative data. A simple thematic analysis based on author consensus was used to evaluate written feedback. The response rate was calculated using the American Association for Public Opinion Research's (AAPOR) Response Rate 2 definition.[8]

RESULTS

There was an 88.88% response rate using the AAPOR RR2 definition (12/12 PGY-1s, 9/12 PGY-2s, and 11/12 PGY-3s at least partially responding). This educational intervention positively affected resident perceptions of support for achieving systems-based practice patient safety milestones. Most residents rated this intervention as somewhat or extremely adequate for demonstrating knowledge of common patient safety events (22/24,

91.67%), identifying system factors that lead to patient safety-events (21/23, 91.3%%), conducting analysis of patient safety events (21/24, 87.5%), participating in the analysis of patient safety events (22/24, 91.67%), engaging teams and processes to modify systems to prevent patient safety events (17/23, 73.91%), act as a role model and/or mentor for others in the disclosing of patient safety events (22/24, 91.67%).

This intervention also positively affected resident perceptions of support for achieving SBP quality improvement milestones. Most respondents rated the intervention somewhat or extremely adequate for participating in local quality improvement initiatives (22/25, 88.0%), discussing how individual practice affects the broader system (22/25, 88.0%), discussing how components of a complex health care system are interrelated and how these affect patient care (22/25, 88.0%), describing local quality improvement initiatives (21/24, 87.5%), and demonstrating knowledge of basic quality improvement methods and metrics (20/25, 80.0%). Figure 2 illustrates resident perceptions of this intervention's adequacy in supporting achievement of ACGME SBP and quality improvement milestones.

A subanalysis of PGY-3s and PGY-2s and PGY-2s was conducted. Third-year residents most frequently rated the intervention as extremely adequate to support "conducting analysis of patient safety events" (5/9, 55.6%). Meanwhile, PGY-1s and PGY-2s most frequently rated the intervention extremely adequate for "discussing how individual practice affects the broader system" (10/16, 62.5%). Figure 3 illustrates resident responses.

Most residents enjoyed participation (18/24, 75.0%). However, responses were mixed among PGY-3s, with 6 of 8 (75.0%) agreeing and 2 of 8 (25.5%) strongly disagreeing that they were able to objectively assess cases. Written feedback was mixed and offered insights for potential improvements. Positive feedback highlighted the interactive nature of the intervention and

Figure 2. Adequacy of Education Intervention for Milestone Alignment in the Accreditation Council for Graduate Medical Education Patient Safety and Quality Improvement Competencies

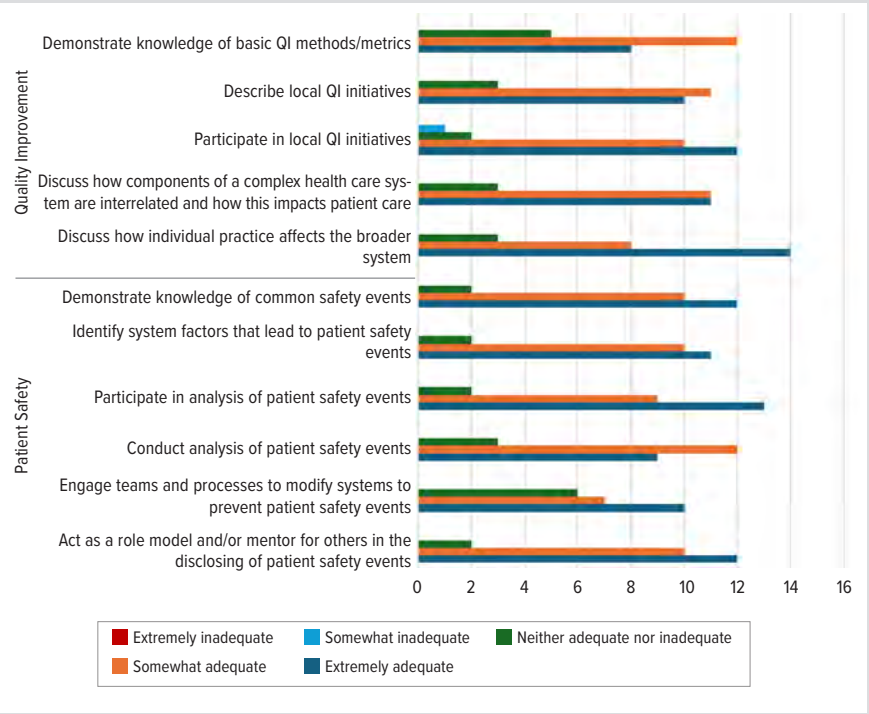
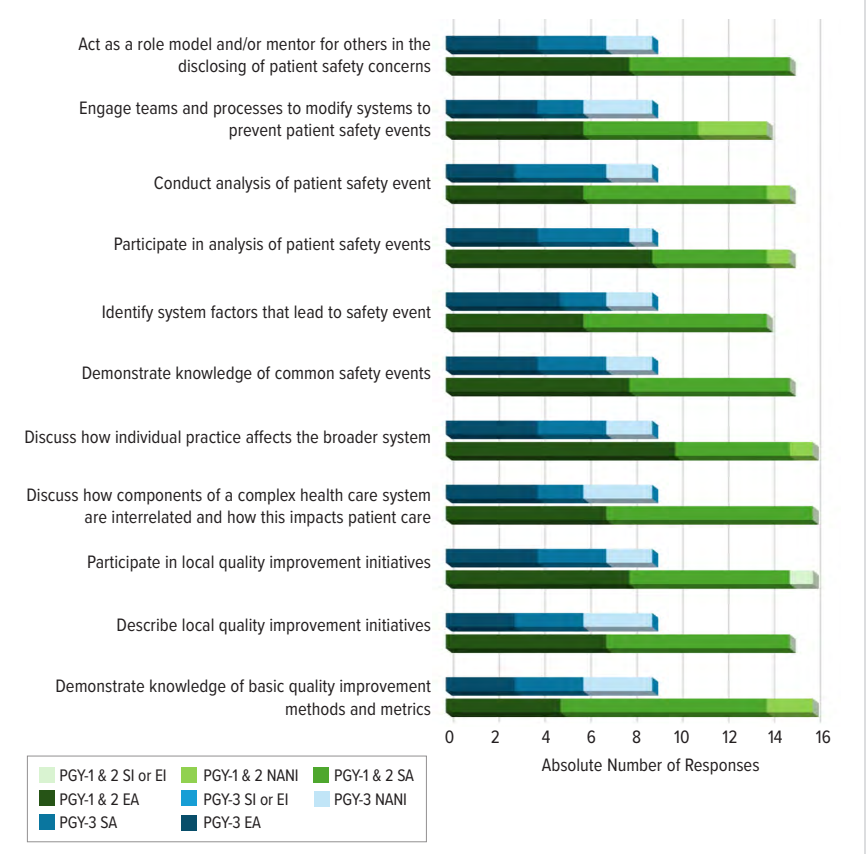


Figure 3. Subanalysis of PGY-3 and PGY-1 and PGY-2 Perceptions of Adequacy in Teaching the Accreditation Council for of Graduate Medical Education System-Based Practice Competencies



Abbreviations: PGY, postgraduate year; SI, somewhat inadequate; EI, extremely inadequate; NANI, neither adequate nor inadequate; SA, somewhat adequate; EA, extremely adequate.

insights into safety events. Negative feedback highlighted the work and time necessary to review cases.

DISCUSSION

We describe a resident-led review of cases, aligning resident experiences with the ACGME systems-based practice competencies. This intervention provides a platform for residents to discuss cases in small groups and an opportunity for expert modeling, as PGY-1s and PGY-2s observe PGY-3s presenting cases and PGY-3s observe faculty participating in discussions. While PGY-1s and PGY-2s discuss cases, PGY-3s conduct reviews and present cases, thus addressing different needs based on training level. Wray et al describe case-based learning, expert panels, and clinicopathologic cases as effective education modalities for residents.[7] This intervention incorporates similar approaches, as supervising faculty serve as content experts and discussions are case based.

This intervention overcomes commonly cited challenges to teaching SBP competencies.[6] It includes quarterly meetings, overcoming the time challenges of frequent meetings or on-shift teaching. It has no inherent cost. Most faculty supervisors have protected time for educational and/or operational work, increasing faculty availability for involvement. Given faculty expertise in education and administration, they have familiarity with ACGME milestones and systems of care. Written feedback highlighting the amount of time and effort necessary for reviews suggests that a mismatch between learner preferences and effective teaching methods for SBP milestones may persist in this intervention.

Limitations

Our intervention and assessment of impact have several limitations. We did not include outcomes data on resident performance in our analysis, focusing only on resident perspectives. The survey was developed de novo by the authors and was not validated or piloted. Further, this intervention was implemented at a single residency program and is therefore limited by a small sample size and may lack generalizability. Future work may include multiple residency programs, making validation and piloting of any future survey appropriate. While an 88% response rate is encouraging, results may be affected by nonresponse bias.

CONCLUSIONS

This resident-led quality review merged clinical operations and education to fill a gap in resident education. Residents who participated in the program reported that the intervention adequately addressed ACGME systems-based practice competencies and found the experience enjoyable. However, some residents found it difficult to objectively assess cases. Given the challenges of educating residents in this SBP, ongoing work is needed to determine best practices.

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Co-Creation: Piloting Student-Faculty Partnerships for Curriculum Innovation

Zack Gratz, BS; Alexa Kambol, MMP; Priscilla Vazquez, BS; Cameron Otto, BS; Hunter D'Acquisto, BS; Benjamin Bray, BS; Lauren Parsons, MD; Teresa Patitucci, PhD

ABSTRACT

Background: In recent years, there has been an increasing drive to meaningfully engage students as partners and co-creators in teaching and learning.

Methods: Student-faculty partnerships were formed to optimize student satisfaction with select learning activities in a medical school course during the 2023-2024 and 2024–2025 academic years.

Results: The first year of co-creation yielded 6 novel patient-based discussion activities, which scored 5.23/6 on required student evaluations, while the second year focused on end-of-week review sessions that demonstrated significant improved evaluation scores from 2023-2024 to 2024-2025.

Conclusions: Initial implementation of co-creation proved beneficial for both students and faculty involved in course design, as well as for learners. Developing an institution-wide, structured co-creation model may further support and sustain such collaborations.

BACKGROUND

Over the last decade, there has been an increasing drive in higher education to actively engage students as partners in educational design, with students and faculty working collaboratively in teaching and learning.[1-4] While students frequently contribute to course optimization through course evaluations, peer teaching, or serving on institutional committees, it is less common for students to be engaged directly in curriculum and course design.[1,3,5] However, students are key stakeholders in their learning and can contribute creative, innovative approaches to the design and implementation of educational initiatives.[6,7] Importantly, engaging students as partners in educational development has been shown to positively affect learning outcomes.[2]

Co-creation is a method within the students as partners pedagogical model in which students and faculty engage in joint decision-making that fosters mutual respect, shared learning, and collective ownership of educational innovation.[1,7,8] As described in the literature, co-creation benefits both student and faculty partners through skill development and professional growth.[1-3,7,8] Reported benefits include a better understanding of each other's perspective, a stronger sense of identity, and increased engagement with teaching and learning.[1]

In this pilot study, we describe the use of co-creation to design and optimize a new medical school course following a curriculum transition at the Medical College of Wisconsin (MCW), a private, Midwestern medical school, over 2 academic years. Year 1 focused on designing weekly patient-based discussions, while year 2 focused on refining weekly review activities. This model will be expanded in future years into a formal program, the Co-Creation Collaborative, to support student-faculty partnerships aimed at curriculum improvement across the institution.

METHODS

Educational Setting

In academic year (AY) 2023–2024, MCW launched the 3-phase MCWfusion curriculum. Phase 1 includes 10 integrated science courses (referred to as blocks), 4 early clinical courses, scholarly activities, and professional development. All integrated science blocks include weekly patient-based discussions combining basic, clinical, and social science content, as well as interactive Friday

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review sessions to reinforce weekly content. The first integrated science block, Foundations of Medicine (FOM), incorporates topics from all foundational science disciplines to prepare students for future systems-based units.

Table. Student Roles in Co-creation

Curricular Aspect	Student Deliverables	Goals of Deliverables
Session design and delivery	• Revise lecture slides • Emphasize key clinical concepts • Provide rationale for quiz answers	• Clarity and alignment of learning objectives • Connect concepts to board exams • Reinforce key session takeaways
Content integration	• Revise patient-based discussions • Revise Friday large-group supplemental activities • Create supplemental practice materials	• Ensure content aligns with learning objectives • Simulate clinical reasoning in patient-based discussions • Apply knowledge from weekly didactics • Formative assessments

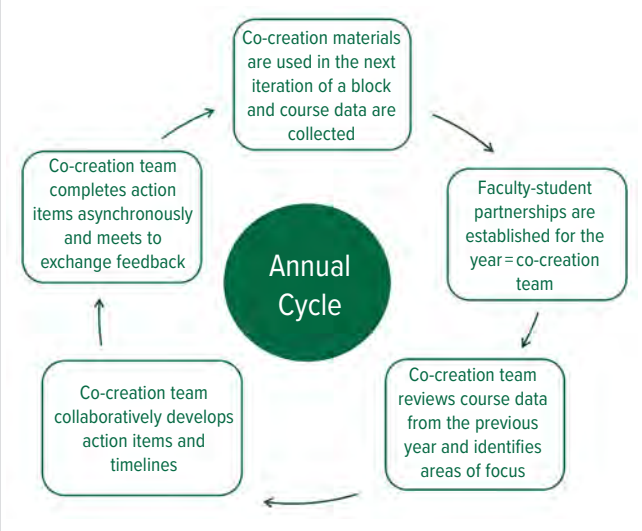
Foundations of Medicine Co-creation Pilot

One student partnered with FOM course directors each academic year. These partnerships were established organically when educationally minded students expressed interest in curriculum design and faculty sought a student perspective to optimize the course. Students were not formally trained but developed skills through one-on-one faculty mentorship, following previously described best practices for co-creation.[1]

For the first co-creation partnership during AY 2023-2024, a course director (author TNP) and a second-year medical student (author ZG) reviewed feedback from the previous curriculum, the structure of the new MCWfusion curriculum, and instructional methods to identify course goals. Co-creation efforts focused on developing 6 weekly patient-based discussions. In AY 2024-2025, both course directors (authors TNP, LNP) worked with a new student who had taken the initial iteration of FOM (author HD). The co-creators reviewed formal end-of-course evaluations from AY 2023-2024 and developed a plan to improve the course by creating supplemental activities for weekly Friday review sessions.

In both years, deliverables were created, reviewed, and modified independently, with meetings as needed to exchange feedback—averaging once per month—in addition to regular communication via email (see Figure 1). Co-creation extended to all course components except summative assessments to preserve exam integrity.

Figure 1. Flowchart Illustrating a 1-year Student-Faculty Co-creation Collaboration



Student Feedback

To receive a final grade, all medical students must complete formal end-of-course evaluations, which include the following questions: "Patient-based discussions enhanced my understanding of course content" and "Friday large-group sessions and summations enhanced my understanding of course content." Additionally, to gather feedback regarding co-created supplemental learning activities, students completing FOM were sent an optional survey in AY 2024-2025 that asked, "How would you rate the week [1-6] problem set?" on a 5-point scale (5 = extremely useful, 1 = not at all useful). This survey was created and administered by the course directors using the Qualtrics survey platform (Qualtrics, LLC).

Data were analyzed using Prism software (GraphPad) via a 1-way ANOVA or *t* test as appropriate (α=0.05).

This project was considered an institutional quality assurance/quality improvement study that does not constitute "human subjects research" by the MCW Institutional Review Board and was determined to be exempt.

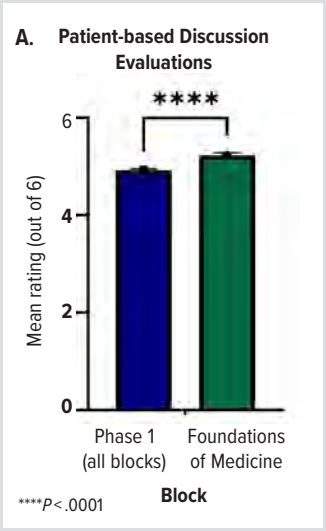
RESULTS

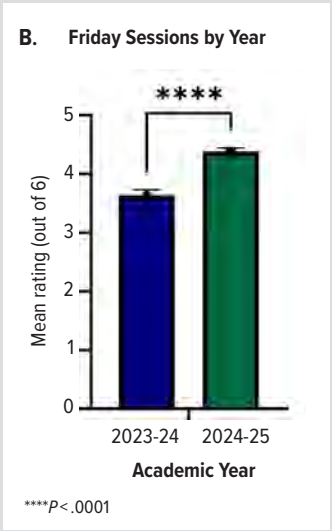
Over 2 years, student-faculty collaborations were instrumental in designing and improving the Foundations of Medicine course. Students provided a unique perspective given their knowledge of other courses, preparation for the United States Medical Licensing Examination (USMLE) Step 1, and clinical clerkships. They applied this learner perspective to revising lecture slide decks, generating practice questions, refining patient-based discussions, creating high-yield review activities, and identifying areas for integration with third-party resources (Table).

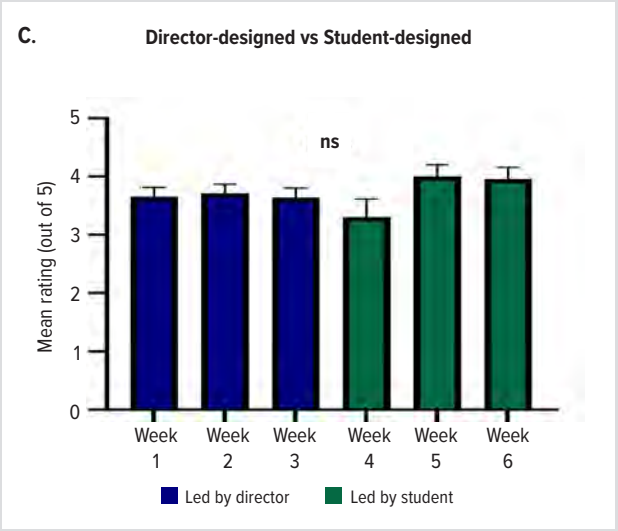
Co-Creation AY 2023-2024

For faculty directors, a major challenge in designing the FOM course was integrating content spanning the prior curriculum into a single cohesive course and introducing 6 new patient-based discussions aimed at incorporating early clinical concepts. The first co-creation student partner, who had completed the previous preclinical curriculum, worked with the course directors to

Figure 2. Student Evaluations of Patient-Based Discussions and Friday Review Sessions







A. Comparison of mean responses to the required evaluation question: "Patient-based discussions enhanced my understanding of course content" between Foundations of Medicine and all Phase 1 integrated science blocks in AY 2023-2024. Response scale: 6 = strongly agree; 1 = strongly disagree. Error bars represent mean ± SEM.

B. Comparison of mean responses to the required evaluation question: "Friday large group sessions and summations enhanced my understanding of block content" between AY 2023-2024 and AY 2024-2025. Response scale: 6 = strongly agree; 1 = strongly disagree. Error bars represent mean ± SEM.

C. Comparison of mean responses to the optional evaluation question: "How would you rate the week [1-6] in-class problem set?" Response scale: 5 = extremely useful; 1 = not at all useful; n = 50. Week 1: mean, 3.657; SD, 0.9375; week 2: mean, 3.714; SD, 0.810; week 3: mean, 3.640; SD, 0.8103; week 4: mean, 3.308; SD, 1.109; week 5: mean, 4.000; SD, 0.8819; week 6: mean, 3.960; SD, 0.9781. Error bars represent mean ± SEM.

Abbreviations: AY, academic year; SEM, standard error of the mean; ANOVA, analysis of variance; ns, not statistically significant.

sequence material, determine appropriate content depth, and develop patient-based discussions to reinforce basic science concepts through realistic patient care scenarios.

Patient-based discussions were well received, with a mean score of 5.23/6 in response to the question, "Patient-based discussions enhanced my understanding of course content" (mean, 5.23; SD, 0.96; n = 269; 95% CI, 5.12-5.35), which was significantly higher than ratings for this question across all integrated science blocks in Phase 1 (mean, 4.93; SD, 1.16; n = 2673; 95% CI, 4.89-4.97) (Figure 2A; $P = <.0001$ by t test).

Co-Creation AY 2024-2025

In AY 2023-2024, responses to the question "Friday large-group sessions and summations enhanced my understanding of course content" received the lowest student satisfaction ratings, making refinement of these sessions the primary focus of co-creation in AY 2024-2025. Initially, Friday sessions included a 1-hour review of that week's patient-based discussion followed by a 1-hour question-and-answer session with faculty experts. After co-creation revisions, students instead completed a high-yield problem set integrating weekly concepts before the question-and-answer session. Examples included a signaling pathway builder (week 2) and antibiotic graphical organizers (week 5). The question-and-answer session was reformatted, so each question was preceded by a summary slide to highlight areas of emphasis.

The course directors designed Friday activities for weeks 1-3, and the co-creation student designed activities for weeks 4-6, with weekly meetings to exchange feedback. Institutional content experts reviewed all activities for alignment with their instructional sessions.

In formal evaluations, student ratings of Friday sessions improved significantly from 3.64/6 (SD, 1.51; n = 269; 95% CI, 3.459-3.821) in AY 2023-2024 to 4.38/6 (SD, 1.07; n = 270; 95% CI, 4.252-4.508) in AY 2024-2025 ($P = <.0001$ by t test) (Figure 2B).

The optional survey evaluating individual Friday problem sets yielded 50 responses (18.5% response rate). All 6 AY 2024-2025 activities were rated as useful, with no significant difference between director- and student-designed materials by 1-way ANOVA (Figure 2C).

DISCUSSION

Throughout the FOM co-creation pilot, student roles varied from consultants to creators of new content depending on course needs, reflecting prior recommendations that emphasize adaptability as a cornerstone of sustainable co-creation.[4] These efforts were well-received, as evidenced by student evaluations showing no significant difference in ratings of student- versus faculty-developed materials. In alignment with previously published work, student-faculty partnerships provided opportunities for learners to prac-

tice curriculum development skills and strengthened student collaborators' interest in future medical education roles, while faculty benefitted from timely, insightful student perspectives.[1,2,5]

Implementations of co-creation at other institutions have often been brief, informal, and constrained by limited by faculty time, hindering long-term commitment.[9] Despite its benefits, co-creation can face barriers.[4,6,7] For example, inherent power dynamics may pressure students to maintain positive impressions with faculty who later evaluated them for residency.[7] Faculty also may be reticent to partner with a student due to past experiences with anonymous student feedback that may feel adversarial.[4,5,9] Establishing psychological safety through active listening and respectful communication can help both parties in navigating critical feedback, sharing solutions, and addressing conflicting perspectives.[1,7]

Limitations and Next Steps

This study is limited to a single site that lacks a control group because the intervention began with the launch of a new curriculum. Additionally, the optional survey used to evaluate Friday review sessions had an 18.5% response rate, introducing potential response bias if only students with strong opinions chose to participate. The low response rate may reflect survey fatigue or the timing of distribution. Finally, evaluation metrics were limited to learner satisfaction rather than objective measures of comprehension; however, prior literature suggests that partnering with students can positively influence learner outcomes.[2] Future work will incorporate objective student performance data to evaluate the effectiveness of co-creation on course design.

The success of this pilot has led to development of the Co-Creation Collaborative (CCC) to provide a structured approach to student-faculty partnerships. Moving forward, this CCC will support co-creation efforts across the 10 Phase 1 integrated science blocks. A student leadership team will facilitate creation, monitor progress, and provide support. To address barriers to co-creation, leadership will provide documents outlining best practices for effective collaboration.[1] A survey will be administered to all student and faculty co-creators after 1 year of participation to assess perceptions of the program.

CONCLUSIONS

Co-creation through student-faculty partnerships has the potential to support both students and faculty, promoting mutual professional growth and enhancing medical school curricula.

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By the Students, for the Students: Operation Conversation Enhances Preclinical Students' Confidence in Challenging Communication Skills

Anika Agrawal, BA; Allison Dentice, BA; April Zehm, MD

ABSTRACT

Background: Effective communication improves outcomes, yet communication skills training remains underrepresented in preclinical medical education. Operation Conversation, a student-designed and mentored program focused on difficult conversations, was integrated into the core curriculum to address this gap.

Methods: Preclinical medical students participated in small-group experiential learning sessions using personally selected, simulated scenarios. Each session included facilitator observation and feedback. Anonymous qualitative comments and quantitative feedback were collected to assess learner satisfaction and changes in self-confidence.

Results: Eighty-one percent of participants reported being "extremely satisfied" with the program and said they would recommend it to peers. Self-confidence increased across all program objectives, and participants said the exercises were realistic and timely.

Conclusions: This student-championed program builds communication confidence through experiential learning and feedback. Learners valued the program and appreciated its relevance. Future work will examine participants' longitudinal communication performance through standardized assessments.

BACKGROUND

Despite educational mandates and substantial evidence supporting its importance in patient outcomes, communication skills training (CST) remains undervalued and underrepresented in undergraduate medical education, particularly at the preclinical level.[1] Although observation and feedback make CST most effective, clinicians report rarely receiving feedback during their training.[2,3] Learners also struggle to transfer skills to real-world clinical practice and often feel unprepared for complex communication challenges.[4]

These challenges exist at our institution as well. In recent years, prior Medical College of Wisconsin (MCW) students recognized that CST was a low priority during their preclinical training. They surveyed 42 preclinical and clinical students to elicit topics and/or populations for which they felt unprepared when starting clinical rotations. The topics and populations identified were consistent with those reported internationally,[4] including obesity, sexual health, chronic pain, mental health, substance use disorders, goals of care, and delivering serious news.

MCW launched a new medical school curriculum (MCWFusion) in 2023, which includes 18 months of preclinical work, early integrated clinical experiences, and the start of clinical rotations halfway through the second year. Given that students inevitably encounter challenging conversation topics, populations, and communication tasks during these early clinical experiences, CST must be prioritized early; however, competing curricular demands and resource limitations make this challenging.

To address these gaps, former MCW students developed Operation Conversation (OC), a student-run, longitudinal, mentored CST program for preclinical medical students to prepare them for "difficult conversations – those involving diverse or potentially stigmatized populations and clinical scenarios that are sensitive, uncomfortable, or evoke strong emotion. OC first launched as an optional elective in 2021, and current OC student leaders have worked to integrate it into MCW's core Fusion curriculum. Here, we describe OC's first year of implementation in MCWFusion and a preliminary evaluation of its educational impact.

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METHODS

Objectives

OC's objectives are that learners will: (1) practice challenging communication skills in simulated settings with facilitator observation; (2) reflect on their role in patient-doctor communication; and (3) give and receive feedback about communication skills.

Educational Design

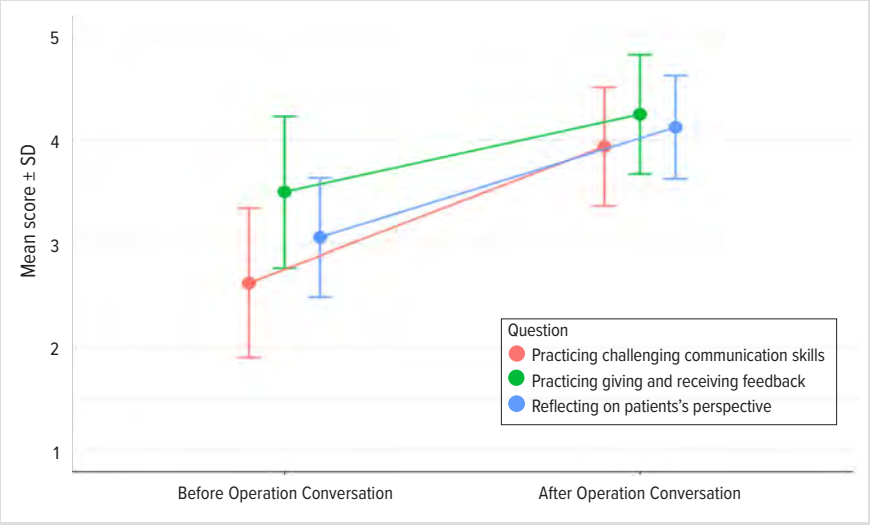
OC uses a self-directed approach in which learners select from simulated practice opportunities to support highly personalized learning. The prior needs assessment informed the development of 13 possible simulations, including discussing sexual health, mental health, delivering serious news, discussing goals of care, and counseling for behavior change. Several sources informed program content,[5,6] and scenarios were developed with input from local physician experts representing several disciplines. Multiple evidence-based strategies for CST and adult learning were incorporated into OC's design, including clearly delineating skills, active small-group learning, repeated practice, observation, and detailed feedback.[3,7] Peer role-play was used for skills practice because of its advantages in cost, psychological safety, and comparable efficacy with other simulation-based methods.[8] Learners were asked to critically evaluate their performance using a standardized, validated communication assessment tool, which also ensured best-practice, behaviorally anchored feedback.[9,10] Consistent small groups were maintained across workshops as much as possible, and scenario difficulty increased over the course of the program.

OC was offered as a selective "choice learning activity" for full-time, second-year medical students during the first month of the academic year. Student enrollment was capped at 30 because of facilitator recruitment constraints. Volunteer clinician facilitators (house staff, advanced practice providers, and faculty) were recruited via departmental emails and word of mouth.

Teaching Methods

The modified OC program for MCWFusion consisted of 2 weekly, 90-minute virtual sessions during the August "spiral weeks," the period between foundational science courses during which students attend scholarly concentration sessions and meet with peer learning communities. Each small group consisted of 2 medical students and 1 facilitator. After enrollment in OC, students pre-ranked preferred content areas and difficulty levels. OC program leaders assigned corresponding scenarios to participants via personalized Box folders before each workshop, which were not disclosed to participants until the workshop began.

Figure. Student Confidence in Program Goals and Learning Objectives Before and After Operation Conversation



During each session, learners accessed their assigned role-play scripts and a brief (8-minute) "Quick Slides" module containing relevant medical information and essential communication skills for their assigned clinical challenge. Facilitators received the "Quick Slides," both patient and physician roles and scripts, and a facilitator guide that included "case challenges" and guidance on areas for feedback. No additional facilitator training was provided. After reviewing materials, all participants moved to their preassigned breakout rooms for an unscripted, 12-minute role-play exercise while facilitators observed without interruption.

Immediately after each role-play, participants and their facilitator completed a validated, standardized communication rubric[9,10] to assess the student physician's communication skills. Learners then reflected on their performance and received verbal feedback from their conversation partner and facilitator. Roles were then reversed. After each session, participants received individualized feedback and rubric scores via email for ongoing self-improvement.

Evaluation Methods

Following program completion of both OC sessions, student participants received an optional 6-question Qualtrics evaluation consisting of 5-point Likert scale items about satisfaction, perceived value, and self-confidence before and after the program, as well as an open-ended question about overall experience. We used a retrospective pre-/post-program approach[11] to measure change in learners' self-efficacy related to difficult communication skills, perspective-taking, and giving and receiving feedback. A 2-sample paired *t* test was used to compare pre-intervention and post-intervention confidence scores. Data were analyzed in R, version 4.5.1 (R Foundation for Statistical Computing) and summarized as quantitative mean scores with accompanying *P* values and confidence intervals.

RESULTS

Twenty-four of 30 second-year medical students completed both Operation Conversation sessions in August 2024. Final program evaluations were completed by 16 of the 24 participants (response rate, 66.7%).

For learner reactions, 13 of 16 (81.2%) participants reported being "extremely satisfied" with the OC program, and the remaining three (18.8%) reported being "somewhat satisfied." Similarly, 13 of 16 (81.2%) participants said they were "extremely likely" to recommend OC to their peers, and three (18.8%) said they were "somewhat likely" to recommend it.

For self-efficacy, compared with baseline, participant self-confidence increased across all queried learning objectives, including practicing challenging communication skills (average increase, 1.3; 95% CI, 1.1-1.6; $P<.0001$), reflecting on the patient's perspective and the clinician's role in patient-clinician communication (average increase, 1.1; 95% CI, 0.7- 1.4; $P<.0001$), and giving and receiving feedback (average increase, 0.8; 95% CI, 0.4-1.1; $P=.0001$) (Figure).

Open-ended comments were overwhelmingly positive. Most participants reported enjoying their experience, and some expressed interested in repeating OC to further improve their communication skills. The program's facilitators also informally noted that the role-play scenarios closely resembled real-world interactions that students are bound to encounter during their clinical training. Participants echoed this sentiment, agreeing that the scenarios felt realistic and appropriately challenging for their level of training.

DISCUSSION

Preliminary analysis of Operation Conversation's integration into MCW's new Fusion curriculum is promising and has garnered increasing support from institutional leadership. Participants' self-reported confidence improved significantly across all learning objectives, and the program was highly rated. Most students viewed OC as value enough to recommend to peers, and some expressed a desire to participate again. These early data suggest that preclinical students benefit from engaging in advanced communication tasks early in their training. Building communication confidence during the preclinical years is essential as students transition into clerkships, where they will face high-stakes patient encounters and system pressures.

We believe OC's effectiveness is due in part to its educational design, which aligns with 2 established adult learning principles: the need-to-know and orientation-to-learning.[7] The program explicitly connects CST to students' imminent clinical responsibilities, enhancing engagement and perceived value. Additionally, OC's role-play scenarios provide contextually relevant practice that both participants and facilitators confirmed reflected real clinical situations. Finally, OC is strengthened by its peer-driven structure, which participants anecdotally reported created a psychologically safe environment in which they felt empowered to take risks without fear of negative consequences.

Limitations

This study has limitations. The small sample size and potential for selection bias—namely, that students who choose to participate may already recognize a need to improve their communication skills—limit generalizability. Additionally, although statistically significant, the practical significance of a 1-point gain on a 5-point Likert scale warrants cautious interpretation.

Next, we plan to assess students' communication skills during formal objective structured clinical examinations before and after OC participation and to compare participant and nonparticipant performance. These data, collected across multiple cohorts, will increase sample size and improve reliability, offering further insight into the program's educational impact.

CONCLUSIONS

It is crucial that medical graduates develop strong communication skills and the capacity for reflective practice. Operation Conversation provides preclinical medical students with structured, realistic opportunities to practice challenging communication tasks early in their training. Program participants demonstrated significant gains in self-efficacy, rated the experience highly, and expressed strong willingness to recommend it to peers. OC's intentional design, alignment with adult learning principles, and psychologically safe learning environment appear to support student growth in essential communication competencies. These findings suggest that OC is a feasible, valued, and educationally meaningful addition to the preclinical curriculum and may help better prepare students for the complex patient interactions they will encounter as they enter clinical training.

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Simulation in Medical Education: History, Applications, and Effectiveness

Jeffery Northway, MS; Emily Patula, BS; Kaydon Morgan, BS; Farzana Hoque, MD, MRCP

ABSTRACT

Introduction: Simulation-based training (SBT) has long played a role in health care education, evolving from rudimentary anatomical models to sophisticated digital platforms. Over time, simulation to include life-like mannequins, standardized patients, and immersive virtual environments, significantly enhancing the ability to teach clinical skills, communication, and decision-making in safe, controlled settings. As medical education continues to adapt to new challenges, simulation remains a cornerstone for preparing health care professionals through realistic and experiential learning.

Objectives: This review examines the evolution and current applications of simulation in medical education, highlighting its integration within military and civilian training environments. It describes major simulation modalities, reviews evidence supporting their effectiveness, and evaluates commonly used assessment tools. The review also outlines potential future directions for simulation-based education in response to the evolving needs of modern health care.

Methods: Relevant literature was identified through searches of PubMed and other academic databases. Articles were selected based on their relevance to the review objectives, including the historical development of simulation, its applications in diverse educational settings, and emerging technologies shaping the field.

Results: SBT has been widely adopted across all levels of health care education—from medical and nursing schools to residency programs and continuing professional development. It enhances technical skills, clinical reasoning, teamwork, and communication in structured environments. Civilian and military programs alike benefit from simulation's ability to replicate complex, high-stakes clinical scenarios. However, measuring its direct impact on clinical performance and patient outcomes remains challenging.

Conclusions: SBT is an essential component of modern medical education, enhancing clinical skills and helping bridging the gap between knowledge and practice. As technology advances, simulation offers new opportunities for personalized and scalable learning. Moving forward, educators must implement these innovations thoughtfully, maintaining a focus on empathy and patient-centered care.

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INTRODUCTION

Medical education has undergone significant evolution, driven by the increasing complexity of health care and the demand for highly skilled professionals. As required competencies broaden to include both technical procedures and essential nontechnical abilities such as communication, the need for effective, scalable, and resource-conscious training methods has never been greater. This demand is amplified by growing medical school class sizes, increasing physician workforce needs, and competition for limited clinical training spaces across health care disciplines.

Traditionally, medical training followed an apprenticeship model in which students learned by observing and participating in patient care under supervision. While valuable, this model is limited by inconsistent clinical exposure and inherent risk to patient safety.[1]

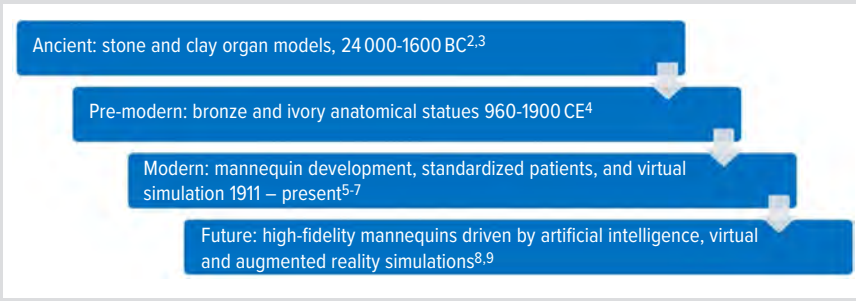
In response, simulation-based training (SBT) has emerged as a transformative tool in medical education. By providing realistic, immersive experiences in a controlled environment, simulation enables learners to develop and refine technical and nontechnical skills before applying them in high-stakes situations. It is far from ideal for a provider's first exposure to high-risk procedures—such as cricothyrotomy or pericardiocentesis—to occur on a critically ill patient. Through advanced modalities, including high-fidelity mannequins, virtual reality, and standardized patients, learners can safely build confidence, improve clinical competence, and

enhance preparedness for the demands of modern health care.

BACKGROUND AND HISTORY OF SIMULATION IN MEDICAL EDUCATION

SBT has ancient origins, with stone carvings of human forms dating back to 24 000–22 000 BC and Babylonian clay liver models (1900–1600 BC) likely used for medical interpretation. In 6th-century BC China, the philosophical founder of Taoism, Lau Tzu, described wooden and leather automation figures, suggesting early mechanical simulation. More than 2500 years ago, clay and leaf models were used in India to simulate nasal reconstruction, marking the first recorded surgical simulation.[2,3]

Figure. Evolution of Medical Simulation



During the Song Dynasty (960–1279 CE), life-sized bronze statues with anatomical features helped teach acupuncture and surface anatomy. Ivory female figurines used in the Ch'ing Dynasty (1644–1912 CE) enabled male physicians to study female anatomy as direct examinations of were prohibited.[4] In the 18th century, Giovanni Antonio Galli created a glass uterus model to train midwives, representing the first documented modern medical simulation. Around the same time, early attempts to simulate cardiovascular physiology emerged, reflecting increasing interest in realistic medical training tools.[3]

As illustrated in the Figure, the early 20th century brought major advances in medical simulation, particularly the widespread use of mannequins. Although Resusci Anne is widely recognized, modern mannequin-based simulation can be traced to Mrs Chase, created in 1911 by toymaker Martha Chase at the request of Harford Hospital Training School to train nursing staff to dress and move patients. An updated version, Arabella—created by Chase in 1914—incorporated features such as the ability to simulate arm injections, sparking growth in the practice of simulation.[5] The 1960s introduced more advanced models, including Resusci Anne with a compressible chest mechanics for the practice of CPR[6] and the SIM 1 mannequin, which provided real-time feedback to medications, adjustable pupils, palpable pulses, simulated respirations, and a jaw that opened.

Another pivotal development was the introduction of actors serving as standardized patients. Although not widely accepted initially, standardized patients are now integral to "hands-on" education and assessment. Beginning in 2004, the United States Medical Licensing Examination (USMLE) Step 2 Clinical Skills examination formally incorporated standardized patient encounters.[7]

Virtual simulation also emerged in the early 2000s. Second Life, a virtual simulation, enables learners to create avatars and interact with virtual patients, offering a low-stakes environment where to practice skills such as obtaining consent, treating patients, and managing complications.[8] Virtual simulation's flexibility reduces reliance on physical equipment and supports simultaneous use by multiple learners. The widespread use of virtual reality (VR) in today's environment could greatly impact medical education and will be discussed further.

The history of medical simulation demonstrates unique innovation and an intense desire to improve medical training for the benefit of patients. However, progress may reach a plateau. The traditional model of "see one, do one, teach one," long associated with medial training and popularized in reality medical TV—has become outdated. A key reason—particularly in surgical specialties—is the necessity for more repetition with less time and less coaching. Current trainees face new challenges, including competition with fellows, decreased duty time, and an ever-increasing focus on research. As training needs evolve, perhaps a more appropriate training model may be "prepare, simulate, provide."[9]

CURRENT USES OF SIMULATION IN MEDICAL AND HEALTH PROFESSIONS TRAINING

Simulation plays a significant role in current medical and health professions training by offering a controlled environment for trainees to engage with realistic clinical scenarios in a low-risk setting. SBT is utilized in medical school, residency, and fellowship, as well as in allied health and military training, to improve confidence, clinical reasoning, team efforts, and technical skills while bridging a gap between theory and direct patient care. Its use in medical training and continuing education has been associated with improved clinical outcomes and patient safety.

In 2011, the Association of American Medical Colleges reported that 68% of medical schools had incorporated simulation-based education into their curricula.[10] One of the earliest exposures for medical students often occurs during basic life support training, which uses low-fidelity manikins to teach students how to use an automated external defibrillator (AED), relieve an obstructed airway, and perform cardiopulmonary resuscitation (CPR). Additionally, SBT is integrated into preclinical years through standardized patients and high-fidelity mannequins to practice history taking, physical examination techniques, and

clinical reasoning. These early simulated experiences help reduce medical students' anxiety, enhance confidence, and improve communication and critical thinking skills.[11] Simulation-based learning also reinforces didactic material and improves performance on standardized examinations. In a 2020 study of an 8-week curriculum incorporating high-fidelity simulation scenarios, students improved by an average of 18% on postcurriculum examinations compared with precurriculum data.[12]

Beyond undergraduate training, the Accreditation Council for Graduate Medical Education (ACGME) recommends integration of simulation-based curricula into residency and fellowship programs. Procedural simulation is widely used in specialties including emergency medicine, general surgery, and internal medicine, where residents practice specialty-specific skills—including code management, endoscopy, and catheterization--using high-fidelity mannequins and task trainers.[13–15] Crisis resource management training enables the practice of nontechnical skills, such as communication, situational awareness, prioritization, and resource utilization. By simulating high-acuity, low-frequency events, these programs offer a controlled setting to refine these skills.[16]

The effectiveness of simulation in graduate medical education extends beyond skill rehearsal. One study found statistically significant gains in internal medicine residents' confidence performing procedures such as arterial and central line placement and thoracentesis after a simulation program.[17] Another study showed that a virtual case-based simulation improved residents' clinical decision-making and diabetes management skills—including insulin use, glucose interpretation, and lipid management.[18]

Simulation is similarly utilized in allied health training. In clinical nursing education, high-fidelity mannequins replicate patient conditions and responses to interventions such as medication administration or recognition of patient deterioration. Partial task simulators, such as isolated limbs, support repeated practice of technical skills including intravenous catheterization and CPR.[19] Pharmacy programs have also integrated simulation through software programs and virtual reality platforms, enabling students to practice dispensing skills and error prevention.[20] Together, these approaches underscore the essential role of SBT in preparing health professions learners for clinical practice.

Simulation is also used in the clinical workforce for continuing education and skills maintenance. Health care providers may experience skill decay—the loss of a previously acquired skill—after periods of nonuse due to leaves of absence, changes in specialty or the infrequency of certain procedures. Refresher training helps mitigate skill decay and its impact in the clinical environment.[21] This is particularly important for time-sensitive, life-saving skills. For example, high-quality CPR is critical in cardiac arrest, yet studies show that CPR skills deteriorate within 6 to 12 months after training.[22] The American Heart Association developed the Resuscitation Quality Improvement (RQI) program, which uses a mobile simulation station with real-time feedback on compression rate, depth, and fraction. RQI training is delivered quarterly to health care providers to foster retention and improvement of CPR skills.[23]

Simulation also plays a vital role in military medical education, preparing personnel for high-pressure, unpredictable scenarios that traditional methods—such as lectures, e-learning, live tissue training, and animal models—cannot fully replicate.[24] High-fidelity simulations provide realistic exposure that helps trainees develop technical skills, decision-making, and critical thinking under conditions that mirror battlefield medicine.

The US Army developed a game-based simulation to enhance Tactical Combat Casualty Care (TCCC) training, allowing soldiers assume the role of a combat medic operating in a deployed environment. Such interactive training methods are especially engaging for younger learners, who grew up with video games, thereby increasing their motivation to learn. Soldiers reported that they enjoyed the training and found it beneficial, and posttraining test scores were comparable to those who received traditional TCCC instruction.[25]

Simulation also strengthens teamwork, communication, and coordination—skills essential to effective care in deployment settings. Studies show improvements in trauma care protocols, emergency management, and response to chemical exposures. Repeated exposure to realistic scenarios reinforces muscle memory and acclerates decision-making, enabling military medical personnel to respond instinctively and effectively in real-world crises.

Overall, simulation-based training has become indispensable across the spectrum of health care education—from early medical and health professions instruction to specialized military preparation. By providing realistic, hands-on experiences in a safe and controlled setting, simulation enhances technical proficiency, critical thinking, communication, and teamwork while reducing risks associated with real-world practice. Its role in mitigating skill decay and maintaining clinical readiness ensures that health care providers—whether in civilian hospitals or on the battlefield—are equipped to deliver timely, effective, and life-saving care. As technology and educational methods continue to evolve, simulation will remain a cornerstone of training strategies aimed at improving provider competence and patient outcomes.

EVALUATING THE EFFECTIVENESS OF SIMULATION-BASED TRAINING

The evaluation of simulation use in education is critical to ensure that the intervention is beneficial for the learner and, ultimately, for patients. Evaluation also provides feedback and supports improvement of the intervention to maximize effectiveness and outcomes.

One commonly used model for evaluating educational interventions is the Kirkpatrick Model. This model been used across disciplines to assess training using measurable outcomes. In health

care, it serves as a valuable tool for determining training effectiveness and facilitating improvements that enhance learner satisfaction, confidence, and impact. The Kirkpatrick Model consists of 4 levels: reaction, learning, behavior, results.[26] Level 1 (reaction) assesses student engagement and satisfaction, typically via post-simulation surveys evaluating the quality of the intervention and learners' perceptions. Level 2 (learning) refers to the knowledge or skills gained during the simulation, and can be measured through pre- and post-assessments using knowledge-based questions or student teachbacks. Learner confidence is also measured at this level. Level 3 (behavior) evaluates the application of learned material in the clinical environment. At level 4, results are measured. This typically refers to the simulation's impact on patient outcomes systemically. In medical education, levels 1 and 2—and sometimes level 3—are targeted most frequently when developing simulation crurricula.

Another framework used to evaluate clinical competence is the Miller Pyramid, developed by George Miller to shift assessment away from knowledge-based examinations. This hierarchical model consists of 4 levels. The base level is knowledge, which assesses knowledge acquisition through traditional testing, similar to level 2 of the Kirkpatrick Model. The second tier is the application of knowledge. The third level represents clinical skill competency and is best measured through simulation and standardized patient encounters. The top tier reflects clinical performance assessed through direct observation of trainees in the clinical setting.[27] Simulation-based education aims to support progression toward the top tiers of Miller's pyramid, as the hands-on nature of simulation learning allows for the development of the trainee's clinical skillset and performance in the clinical setting.

Objective Structured Clinical Examinations (OSCEs) are widely used in health professions education to assess the third tier of Miller's pyramid: clinical competence.[27] During an OSCE, students interact with a standardized patient in simulated clinical setting and are evaluated on specific skills, often presented as a checklist.[28] These skills range from communication and professionalism to procedural skills and clinical reasoning. Students receive formative feedback after completing the examination.

Although simulation has proven useful in medical education, evaluating its effectiveness remains challenging. Most studies focus on Kirkpatrick's levels 1 and 2 for evaluation, because learner satisfaction and knowledge acquisition can be readily assessed using surveys and examinations. However, levels 3 and 4 are more difficult to evaluate, raising concerns about the transferability of skills to patient care.[6] Additionally, it is difficult to directly attribute improvements in patient outcomes to simulation-based interventions.

CURRENT AND FUTURE OPPORTUNITIES FOR SBT

The future of SBT in medical education is rapidly evolving, driven by emerging technologies such as artificial intelligence (AI), virtual reality (VR), and augmented reality (AR). These innovations enhance the realism, interactivity, and accessibility of training environments.

AI has demonstrated significant benefits in medical education. AI-powered problem-based learning platforms have been shown to improve students' comprehension of clinical diseases, promoting deeper understanding and retention. In an ophthalmology clerkship study, students taught about congenital cataracts via an AI diagnostic simulation reported overall satisfaction with the training and had significantly higher posttest scores than those taught with a traditional lecture-based format.[29] Additionally, integration of AI with surgical simulation systems has also resulted in advanced training tools that offer objective feedback on surgical techniques—allowing for personalized learning and skill refinement.[30]

Beyond skill acquisition, AI is transforming how institutions support student well-being. AI-based monitoring tools are now being used to track mental health and academic performance, providing educators with real-time insight and enabling timely interventions.[31] These capabilities suggest that AI will not only enhance SBT outcomes but also foster more supportive and adaptive learning environments.

VR continues to transform medical education by offering interactive, immersive platforms for clinical training. Using head-mounted displays, such as the Oculus Rift and HTC Vive, students can engage with virtual wards, patients, colleagues, and family members in realistic, case-based scenarios. These simulations allow learners to practice taking patient histories, performing physical examininations, making diagnoses, and delivering treatments—all within an emotionally dynamic and adaptable hospital environment.[32]

A systematic review by Mahmood et al analyzing 21 randomized controlled trials highlighted the effectiveness of VR-based simulation in endoscopy training. With improvements observed in technical skills, procedural advancement, nontechnical competencies, and patient comfort—particularly during early learning stages.[33] However, VR did not fully replace traditional teaching methods. Feedback remained a critical component of effective learning, underscoring the need for integrated instructional support.

Integrating VR training into medical curricula offers potential cost and time savings. Compared with simulation methods that require physical equipment, space, and personnel, VR delivers on-demand clinical experiences with fewer resources and at lower operational costs. Institutions benefit from scalable, repeatable simulations that can be conducted without the logistical demands of setting up physical labs or scheduling standardized patients. VR systems also allow students to engage in self-paced learning, making better use of limited training hours. With VR kits currently costing $2000 to $2500 and prices expected to decline as technology advances, VR is becoming an increasingly accessible option.[32]

AR is also emerging as a valuable tool in medical education, particularly in surgical training. In a randomized simulation trial involving final-year medical students applying to surgical residencies, AR technology was used to train participants in total hip arthroplasty. One group trained using an AR headset providing live holographic orientation feedback, while a control group received traditional one-on-one instruction from a hip arthroplasty surgeon. After 4 weekly sessions, both groups demonstrated comparable accuracy, suggesting that AR can effectively support the acquisition of motor skills in a self-directed setting.[34] These findings underscore AR's potential as a flexible and scalable supplement to expert instruction..

BARRIERS TO OVERCOME

While there are exciting developments in medical simulation, an important question demands answering: What is the cost? High-fidelity medical simulation programs may require substantial upfront investment, maintenance costs, and the opportunity cost of training staff to use equipment.[9] Smaller programs with limited resources may be unable to obtain cutting-edge simulation equipment, potentially exacerbating educational and patient outcome disparities. Additionally, due to the large initial cost, training requirements, and mass standardization of simulation education, large organizations may struggle to keep up with continuous changes in surgical and procedural techniques.

Another potential limitation is the risk of compromising students' psychological safety. Psychological safety refers to the learner's belief that the simulation environment is a safe space for risk-taking—such as asking questions, expressing uncertainty, and making mistakes—without fear of being humiliated or penalized. Maintaining psychological safety is important because it encourages learner engagement and improves learning outcomes. Facilitators can promote psychological safety by orienting learners to the environment and equipment, clearly stating learning objectives, establishing confidentiality agreements, and offering constructive feedback.[34,35] These safeguards should be upheld in simulation exercises to optimize learning.

Perhaps the most important consideration involves patient experience. Some may fear that increasing simulation will distance trainees emotionally from patients. Because simulations—whether virtual or through standardized patients—takes place in a low-stakes environment, it may remove most or all of the human elements central to the doctor-patient relationship.[36] Thus, as simulation in medical education continues to expand, systems should be in place to monitor whether patients are satisfied with the relationships that are formed with simulation-trained physicians.

CONCLUSIONS

Exciting opportunities lie ahead for physician education and training. Advances in simulation are changing the dated training model of "see one, do one, teach one" to "prepare, simulate, provide." SBT is a vital tool for medical education, fostering clinical competence, building learner confidence, and supporting skill development in a controlled, low-risk environment. Grounded in educational frameworks such as Miller's Pyramid and the Kirkpatrick Model, SBT helps bridge the gap between theoretical knowledge and clinical application. Emerging technologies—including artificial intelligence, virtual reality, and augmented reality—have expanded the reach and capability of simulation, offering scalable, cost-effective, and personalized learning opportunities. However, challenges persist in evaluating long-term outcomes, addressing financial barriers, and ensuring equitable access across institutions. As simulation continues to evolve, medical educators must balance technological innovation with the preservation the humanistic elements of patient care, ensuring that future physicians are both technically skilled and relationship-centered.

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Integrating Medicine and Public Health Through Health Professions Education at a School of Medicine and Public Health

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A longstanding and recognized need exists to address the schism between medicine and public health and for health professions education to promote the training of clinicians skilled at addressing population health.[1,2] One major effort within Wisconsin to address this call to better align public health and medical missions and improve health and health equity occurred two decades ago. On October 7, 2005, the Board of Regents of the University of Wisconsin (UW) System approved renaming UW-Madison "School of Medicine" to the "School of Medicine and Public Health" (SMPH).[3] This date marked a seminal moment in the long process of expanding the school's public health mission and better meeting the health needs of Wisconsinites.

With strong support and funding from the school and the Wisconsin Partnership Program endowment,[4] this change to become the nation's first school of medicine and public health has focused on integrating public health and medicine across the school's educational, research, and service missions. Aligning with the Wisconsin Idea, which holds that "education should influence people's lives beyond the boundaries of the classroom,"[5] the educational goals of the transformation emphasized cross-disciplinary education and ensuring that SMPH students would be knowledgeable and skilled in integrating biomedical, clinical, and population health sciences and that they would be trained in diverse community settings and prepared to promote population health and address social determinants of health inequities in their communities.[6] These goals created a culture shift for faculty across SMPH as they identified ways to integrate medicine and public health in work with learners, new partners, curriculum development, and augmenting existing programs.

> The transformation...catalyzed numerous innovations that have propelled two decades of learners to be better equipped to address the health needs of both individuals and populations.

In this commentary, we summarize collective progress made toward the transformation's educational goals and the integrated public health offerings across the five SMPH health professions degree programs, focusing on the history and growth of public health programming and considering strategies for the next decade.

Twenty Years Later

The transformation to a school of medicine and public health catalyzed numerous innovations that have propelled two decades of learners to be better equipped to address the health needs of both individuals and popu-

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Table. Baseline Public Health Content and Examples of Public Health Educational Opportunities Available for Students Through University of Wisconsin School of Medicine and Public Health Health Professions Degree Programs

Program	Baseline Public Health Content in Degree Program	Examples of Potential Public Health Opportunities for Students
Doctor of Medicine (MD)	Longitudinal 4-year public health thread, including 12-week community-based service-learning project and a 4-credit public health requirement following the required clinical curriculum	• Work with a local community center to develop and deliver nutrition and health education to senior citizens during a required service-learning project • Take the pre-internship "Dementia and Public Health" course offered through the Department of Psychiatry • Participate in the POD-PH program, including co-leading a session on social isolation and health for peers
Doctor of Physical Therapy (DPT)	Two 1-credit required public health-focused courses sequentially completed over the first 2 years ("Psychosocial Aspects of Health Care" and "Issues of Culture and Diversity in Health Care") and completion of at least 20 hours of community-service learning	• Engage in service learning with a community organization and support efforts to connect the environment and health • Participate in an annual global health trip through OGH focused on community development, while also providing clinical care
Master of Physician Assistant Studies (MPAS)	Two 1-credit required public health-focused courses sequentially completed during the first year ("Clinical Prevention and Community Practice I and II")	• Complete the POD in Rural Health by completing the "Overview of Rural Medicine" elective, rotating in a rural clinic, and conducting a capstone project that supports a rural community organization in addressing health promotion
Master of Genetic Counselor Studies (MGCS)	Series of public health lectures and seminars embedded throughout curriculum and required rotation with Wisconsin State Lab of Hygiene	• Complete the Wisconsin Leadership Education in Neurodevelopmental Disabilities and Related Disabilities program to improve systems of care • Participate in the Interprofessional Practice and Education (IPE) POD, including community placements and IPE scholarly work with focus on public health initiatives
Master of Public Health (MPH)	42 credits of public health course work, including 11 required didactic courses, a 240-hour applied practice experience, and a required integrated learning experience	• Work with a public health department to assess vaccination trends as part of the MPH applied practice experience • Complete the Global Health Certificate through the OGH, including a field experience to understand the prevalence of renal disease in rural communities in India

Abbreviations: POD, path of distinction; PH, public health; OGH, Office of Global Health.

lations. Opportunities for integrated public health training now span across the training continuum and SMPH's four clinical degree programs: the Doctor of Medicine (MD), Doctor of Physical Therapy (DPT), Master of Genetic Counselor Studies (MGCS), and Master of Physician Assistant Studies (MPAS). The school's fifth health professions degree program, the Master of Public Health (MPH), is the backbone of SMPH's public health educational mission, providing curricular guidance, learner opportunities, and schoolwide expertise in public health content. Additionally, SMPH offers a Master of Science (MS) and Doctor of Philosophy (PhD) graduate program in population health. The program was created in 1997 and set the stage for the school's subsequent transformation, with many of its content areas subsequently integrated into SMPH's health professions curricula.

Public Health and SMPH Health Professions Degree Programs

The MPH program, established shortly after the school's transformation, provides public health training both for students pursuing the MPH exclusively and for those completing it in combination with another UW–Madison degree.

In addition to offering dual-degree options to learners, each of the four SMPH clinical degree programs has interwoven public health concepts into the required coursework through public lectures, dedicated courses, or integrated curricula. Topics include social and structural determinants of health and health equity, advocacy, systems thinking, culture, and identity – each in ways that highlight their clinical relevance. Further, although structured slightly differently, each of these health professions degree programs provide opportunities for students to engage with community partners and address health and determinants of health outside clinical settings (Table).

Additional Public Health Training Opportunities

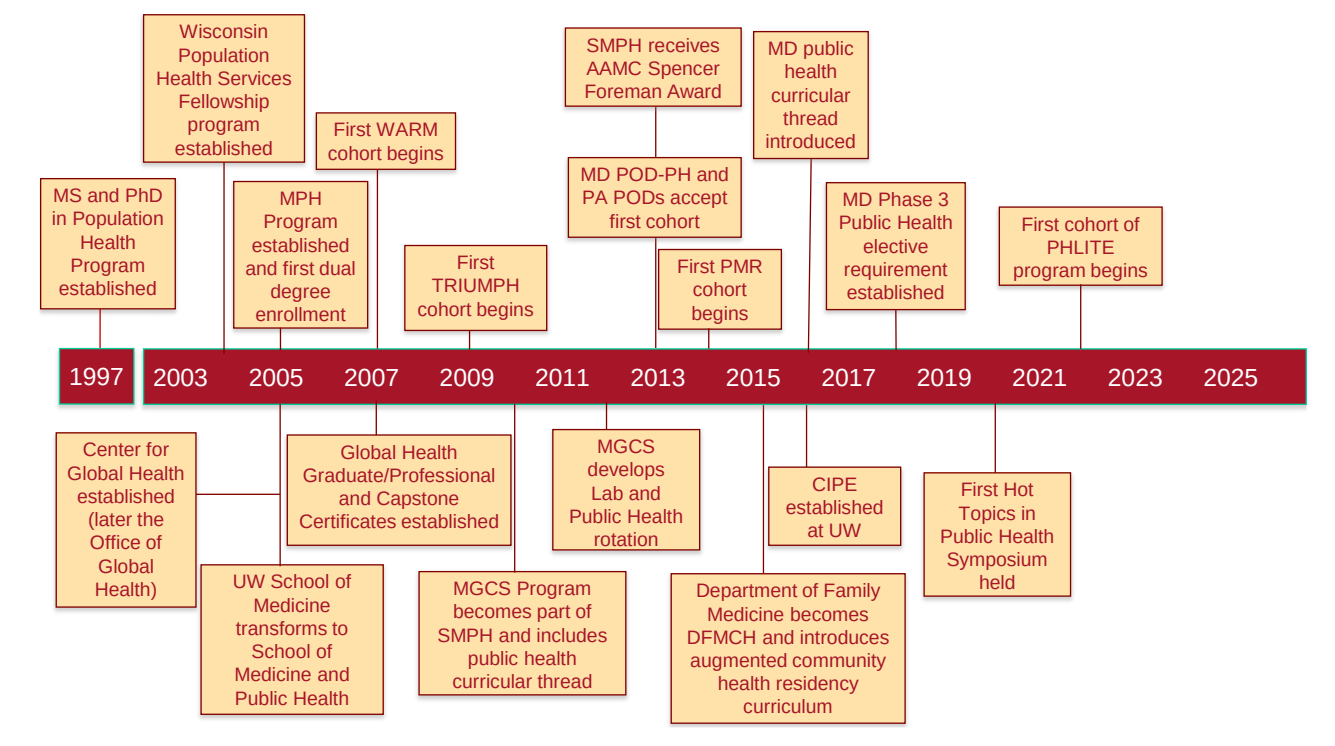
Beyond required coursework, SMPH students have numerous opportunities to engage in public health-related training. With appropriate planning, students can participate in multiple options simultaneously while pursuing their primary degree, essentially customizing their education to their own interests and career goals.

Students can participate in programming coordinated by the school's Office of Global Health, including the global health certificate program.[7] Programming meets many "glocal" objectives, meaning that lessons learned through caring for underserved patients and low-resourced communities in local settings can be applied globally and vice versa.

Students also may participate in one of several co-curricular "pathway programs" addressing key public health domains. The Interprofessional Practice and Education Path of Distinction[8] is one of many educational programs offered by the UW-Center for Interprofessional Practice and Education. Students from any UW-Madison health science program can pursue this path to advance knowledge and skills in interprofessional competencies. MPAS students can participate in one of several public health-oriented Paths of Distinction,[9] including population health, global health, rural health, tribal medicine, and addiction medicine. MD students can pursue the Path of Distinction in Public Health,[10] which offers training that focuses on health equity, leadership, and community engagement.

Two immersive, SMPH community-based programs are also available to MD students:

Figure. Timeline of Key Events in the Integration of Medicine and Public Health Through Health Professions Education at the University of Wisconsin School of Medicine and Public Health



Abbreviations: AAMC, Association of American Medical Colleges; CIPE, Center for Interprofessional Practice and Education; DFMCH, Department of Family Medicine and Community Health; MD, Doctor of Medicine; MGCS, Master of Genetic Counselor Studies; MS, Master of Science; MPH, Master of Public Health; PA, physician assistant; PhD, Doctor of Philosophy, PH, public health; PHLITE, Public Health Leadership in Teaching and Engagement; POD, path of distinction; PMR, preventive medicine residency; SMPH, School of Medicine and Public Health; TRIUMPH, Training in Urban Medicine and Public Health; UW, University of Wisconsin-Madison; WARM, Wisconsin Academy for Rural Medicine.

the Wisconsin Academy for Rural Medicine (WARM)[11] and Training in Urban Medicine and Public Health (TRIUMPH).[12] Both programs include 2.5 years of clinical training at a regional campus and require completion of a community health improvement project relevant to their community site. WARM is an admissions-based program, with enrolled students receiving training throughout medical school that emphasizes clinical and community care in rural settings, including the three regional WARM campuses. TRIUMPH students are selected in their first year and subsequently complete a curriculum in Milwaukee designed to prepare them to address health disparities in urban centers by integrating public health into their practices.

Postgraduate Training Opportunities

Beyond programs available through the SMPH degree programs, the transformation has fostered growth in postgraduate public health training. Established just before the school's restructuring, the Wisconsin Population Health Service Fellowship Program[13] is a 2-year service and training program for early career individuals in public health and allied sciences. Through applied experience in practice-based settings across Wisconsin and curriculum focused on health equity and collaborative leadership, graduates can apply a health equity lens to future practice and skills in public health programming, systems thinking, and management.

The transformation also has led to augmented public health curriculum across several SMPH-affiliated graduate medical education programs. Examples include the family medicine residency[14] housed in the Department of Family Medicine and Community Health and the preventive medicine residency (PMR)[15] housed in the Department of Population Health Sciences. In addition to clinical training, family medicine residents complete a community health curriculum that includes a longitudinal seminar series, which fosters an understanding of community health principles; a 3-week community health rotation that introduces community organizations, and a 2-year community health learning experience in which each resident works with a community partner to address community health priorities. The PMR is a graduate medical education program that focuses specifically on health promotion and disease prevention in communities and health systems. Residents complete MPH degree requirements, clinical rotations, and practice-based public health rotations, including work in governmental public health settings.

Professional development opportunities also exist for faculty. Public Health Leadership in Teaching and Engagement is a 7-month interprofessional training for faculty across SMPH clinical departments that provides continuing education on public health topics. Additionally, the biannual Hot Topics in Public Health symposium[16] addresses key public health issues and is open to learners, faculty, and staff across SMPH campus and beyond.

Conclusions and Future Directions

Since the transformation into a school of medicine and public health, SMPH has made sig-

nificant progress in establishing an integrated public health curriculum across educational programs (Figure). Moreover, programming has also expanded to support students who wish to extend their public health training beyond baseline degree requirements. In 2013, the school received the Association of American Medical College's annual "Spencer Foreman Award for Outstanding Community Engagement," due in large part to efforts stemming from this transformation.

These efforts have not been without challenges. A common challenge across programs is related to funding and sustainability, with public health-focused programming typically less resourced than clinically focused activities. While the public health programs established through the transformation have been maintained, they require dedicated resources and significant faculty and staff effort to sustain. Occasionally, programs require modification to better align with funding requirements. Moreover, many efforts associated with the transformation have occurred organically, and uniform measures of outcome were not tracked. Furthermore, time constraints – both in terms of weaving additional public health content into already dense health professions curricula and for students to fully engage in all available public health-related programming – have been a barrier.

Fortunately, opportunities remain to further the educational goals of the transformation. Shared program priorities include:

1. Improve coordination across programs to enhance interprofessional team-based learning that addresses foundational and emerging public health topics.
2. Facilitate community-service learning to better center community partners' priorities.
3. Establish an SMPH-level evaluation that measures improved educational outcomes of all programs with an emphasis on improved health outcomes across Wisconsin and beyond.

Despite the challenges and ongoing opportunities, 20 years after the start of the intentional integration of medicine and public health across SMPH educational programs, the process has led to more than just the development of novel public health curriculum and programs. Graduates of the SMPH degree programs can be expected to apply a social-ecological lens and address issues at the individual, community, and systems levels – through education and patient advocacy, community partnerships and engagement, and improvements in health care and public health systems or policy change. These educational changes have the potential to create ripple effects, influencing faculty, staff, and community partners, and demonstrating the benefits of integrating public health and clinical activities to better improve individual and population health outcomes.

Today, SMPH continues to advance these goals through intentional commitment of the institution, including faculty, staff, learners, and community partners – a key element in ensuring the shared vision of "Healthy People and Healthy Communities."[17] SMPH has established a strong foundation with robust curricula across degree programs and is well-positioned to remain an educational leader in addressing ongoing public health challenges.

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Considering 'Big Questions' About the Human Being in Medical Education

Victoria Toledo, BS; Raudah Yunus, DrPH; Lauren Nickel, PhD; Fabrice Jotterand, PhD, MA; Aasim I. Padela, MD, MSc

Understanding the nature and purpose of the human being has been a fundamental line of inquiry across the ages, with bioscience and religion both offering insights into the most pressing questions of human origin, essence, capacities, and uniqueness. In addressing these questions, the Abrahamic faiths (Judaism, Christianity, and Islam) discuss the genesis of humanity, the nature of the soul, agency, and human specialness in similar ways, while bioscience offers accounts grounded in concepts such as evolution, the mind, and biological determinism. Delving into these ideas provides insights into being human and into different accounts of human experience.

The art of medicine today requires understanding the human being in ways that lie beyond the domain of bioscience. While medicine relies on a naturalistic account of the human – appraising scientific evidence, understanding physiological processes that give rise to pathological conditions, and appreciating the effects of external and internal influences on health and well-being – the practice also recognizes that these aspects do not comprise the totality of human experience. Accordingly, recent decades have demonstrated a transition from the traditional biomedical model – which reduces disease to purely somatic causes – toward a biopsychosocial approach, which considers the influence of personal, social, temporal, and physical contexts on disease.[1,2] Even more recently, spirituality is increasingly incorporated, offering a biopsychosocial-spiritual outlook in which each aspect cannot be separated from the whole.[3] The development of these expansive medical models underscores the complexity of factors shaping health and the importance of social, psychological, and spiritual elements in determining well-being.

This evolving holistic approach to medicine benefits not only patients but also physicians, whether currently practicing or in training. The biopsychosocial-spiritual model is being implemented in medical education at a time when increasing use of technology is eroding reminders of humanity in patient encounters. The increasingly technology-driven medical environment has raised questions about what it means to be human through the datafication of patients, for example, which can create a divide between the patient and physician. While these technological enhancements can improve efficiency, they risk estranging a patient from medical professionals, with physicians already expressing concerns over the potential impact of artificial intelligence on the patient-physician relationship.[4] For future medical professionals, it is critical to develop insight into how technology is inadvertently estranging physicians from their patients and to emphasize the importance of understanding what it means to be human when the human touch has become a rarity. Understanding overarching concepts related to what it means to be human from different vantage points – including the biological and religious – can combat concerning trends in medicine that seem to divorce the person from the patient.

...it is critical to develop insight into how technology is inadvertently estranging physicians from their patients and to emphasize the importance of understanding what it means to be human when the human touch has become a rarity.

Indeed, medical schools across the US have begun implementing programs to help future physicians learn more about the ways in which spirituality and religion shape patients' self-understanding and experiences. For example, the "Sacred Sites of Houston" course at the McGovern Medical School at UTHealth Houston exposes students to different faith groups in the Houston metropolitan area, and in Georgia, another program assessed the value of personal faith beliefs for medical students.[5,6] UChicago Medicine evaluated a novel educational pro-

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gram focused on increasing resident knowledge of the interplay between spirituality, religion, and medicine through lecture, small-group discussions, and a panel of religious leaders and found that it improved trainee knowledge, attitudes, and skills in dealing with spirituality and religion in medicine. These programs at the undergraduate and graduate medical education levels demonstrate interest in addressing human beings through a fuller lens to engender more patient-centered and culturally competent care.[7] Adding to these efforts, our educational venture at the Medical College of Wisconsin (MCW) expanded beyond teaching the tenets of religion and the spiritual dimensions of health to exploring overarching questions about the human being through bioscientific and religious perspectives in an attempt to instill wisdom rooted in an appreciation for intellectual humility and sound epistemology.

More specifically, preclinical medical students at MCW elected to participate in a unique, innovative enrichment seminar series at the intersection of bioscience, theology, and philosophy to broaden their appreciation for the different ways in which fundamental questions about the human being are addressed. The pilot program, spanning four sessions across the school year, consisted of large-group didactic sessions followed by small-group dialogue and explored questions of human origin, nature, fatedness, future, and uniqueness through theological (particularly Abrahamic) and bioscientific accounts. Beyond increasing awareness of accounts regarding these fundamental questions, the program sought to increase interest in work at the bioscience-theology interface and shift attitudes away from the view that inherent conflict exists between religion and science. Accordingly, students completed pre- and post-surveys containing validated scales measuring (a) interest in further study at the intersection of bioscience and religion; (b) intention to pursue a career at this intersection; (c) preparedness to do so; and (d) attitudes concerning compatibility of religion and science. These outcomes were measured using modified items from the educational and career interest scale in science, technology and mathematics (5-point scale; 1=no interest at all, 5=extremely interested);[8] Career Intentions in Science scale (5-point scale; 1=no interest at all; 5=extremely interested) (Wyer M, Nassar-McMillan S, Schneider J, Oliver-Hoyo M, unpublished data, 2010), intention to pursue a high-tech career (5-point scale; 1=no intention at all, 5=definitely will do);[9] and two validated science-religion relationship scales (5-point scale; 1=strongly disagree, 5=strongly agree).[10,11] Statistical analysis included Wilcoxon signed-rank tests to assess changes after the curriculum.

Our modest evaluation of the curriculum demonstrated student receptivity to the program and its contents, highlighting the importance of bringing such conversations to medical education. Results were positive overall; 35 students across the various sessions demonstrated increased interest in studying epistemology (median score: 3 pre-session vs 4 post-session; $P=.02$) and the philosophy of bioscience (median: 3 vs 5; $P=.03$); obtaining further training at the intersection of bioscience and religion (median: 2 vs 3.5; $P=.048$); preparedness to pursue research (median: 1 vs 2; $P=.02$) and careers at the bioscience 2 – religion interface (median: 1 vs 3; $P=.03$; 1.5 vs 3; $P=.02$); and a decreased perception of irreconcilable conflict between bioscience and religion (median: 2 vs 1; $P=.04$). These data demonstrate that such sessions have the potential to influence how medical students approach their careers. Beyond this quantitative, albeit small-scale, evaluation, the informal feedback from students, educators, and staff was glowing. As one education specialist noted, "These sessions were a huge success! The information… presented made me incredibly uncomfortable – in a good way! Students question(ed) how religion plays into their role and posed questions on how they might move forward when there is tension between their professional and personal identities…Students were incredibly engaged and asking great questions!"

For medical students, these curricular interventions are invaluable for gaining a greater understanding of patients and their worldviews and developing a sense of professional identity. On a practical level, exploring diverse perspectives about the human being, as well as the rationale underlying these views, can assist future physicians in navigating areas of conflict in opinion with patients and identifying areas of overlap and synergy. Such skills are critical when encountering difficult situations regarding providing value-concordant health care and making health care-related decisions. Additionally, as medical education continues to emphasize ethnic and racial cultural competence, exploring views from different religious perspectives can enhance cultural competence when caring for patients from diverse faith backgrounds. Religion and spirituality are important coping mechanisms in times of illness; thus, knowing how different beliefs are leveraged during challenging times can help physicians connect to their patients more meaningfully.[12] Finally, for future physicians, these sessions can greatly influence professional identity formation, preparing students to face encounters and decisions that require medical skill, tact, and practical wisdom. In their academic careers, these physicians may continue to engage in inquiry in what it means to be human. As medicine becomes more dependent on technology, these innovative seminar series provide a safe space for students to foster collaborative dialogue and reflect on what it means to be human in the context of clinical care and the fact that the human – and humanity – is at the heart of medicine.

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When AI Scribes Join the Team: The Effects of Ambient and Generative Documentation in the Clinical Learning Environment

McKenna Knych, MD; Thaddeus Schmitt, MD; Michael Sobin, MD; Alisa Hayes, MD

As most physicians envisioned their careers, few imagined spending hours hunched over a computer. The patient is in a room down the hall while the physician stares at a dual monitor, clicking through boxes and pop-ups on their screen. A medical student sits nearby, eager to learn the art of medicine and experience the human side of health care, yet much of their day is spent watching others type rather than learning at the patient's bedside.

Scenes like this have become increasingly familiar in modern clinical practice, largely due to the growth of electronic medical records (EMRs). EMRs became more prevalent in the United States after the 2009 American Recovery and Reinvestment Act[1] incentivized their adoption; by the late 2010s, most large hospitals and outpatient practices had transitioned to them. EMRs have had many positive effects, improving the accessibility of medical records and enabling data collection and research. However, the administrative demands of EMRs have been linked to decreased face-to-face time with patients[2] and higher rates of physician burnout.[3]

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As documentation demands increased, many health care systems turned to human scribes. Studies across multiple specialties show that scribes generally improve productivity metrics,[4-6] physician satisfaction,[4,5] burnout,[6] and patient satisfaction.[5,6] However, human scribe programs carry financial and operational costs, including wages and administrative resources required to manage recruitment, training, and frequent turnover.

> AI scribes may offer an opportunity to help physicians step away from screens and recenter the human elements of medicine.

More recently, AI scribes have been incorporated into clinical practice. AI scribes are ambient, generative artificial intelligence tools that can listen to patient-clinician conversations and generate draft documentation nearly instantaneously. Promoted as tools that could replace human scribes, they may reduce the costs and variability associated with traditional human scribe programs. Thus far, most research has focused on the impact of AI scribes on clinical care and workflow – specifically documentation time, physician workload, and burnout. Studies show mixed results; while clinician experience and perceived burnout often improve, there is often minimal change in actual documentation time.[7,8] This may reflect the time required for editing, as AI-generated notes can be excessively long, redundant, or contain errors and hallucinations.[9] Even so, the promise of AI scribes may be less about time saved and more about changing how documentation occurs. AI scribes allow physicians to engage with patients without documentation becoming a separate, screen-based task. This recalls earlier eras when simpler documentation occurred less obtrusively at the bedside, often alongside patients, learners, nurses, and other members of the care team. AI scribes may offer an opportunity to help physicians step away from screens and recenter the human elements of medicine.

In many settings, however, the practice of medicine is intertwined with teaching and learning. Medical students and residents will inevitably interact with AI scribes in the clinical environment, yet far fewer studies have examined the educational impact of these tools. AI scribes introduce both opportunities and potential threats to medical education. For educators, understanding how these tools impact clinical learning is essential.

The educational impact of AI scribes may begin even before students enter medical school. If AI scribes replace human scribes, a common premedical experience may be lost. In 2020, Hewlett et al found that one-third of medical students at their institution had scribe experience before matriculation.[10] While this

experience is not a direct factor in medical school acceptance, schools value experiences that demonstrate an applicants' exposure to clinical care. Unlike shadowing, scribing is a paid, longitudinal role that integrates students into the care team and provides exposure to what physicians encounter daily. Scribing can be particularly valuable for premedical students who cannot afford to pursue unpaid experiences and might otherwise lack access to hands-on clinical experience or physician mentorship. Qualitative studies have shown that scribing can strengthen a student's commitment to medicine, spark specialty interest, and foster early clinical skills.[11,12]

Once aspiring physicians enter medical school, note writing is more than a clerical task. Writing makes a student's thought process visible to educators and allows for the identification of knowledge gaps. Documenting a patient's history, exam, assessment, and plan teaches students how to prioritize information, synthesize data, and develop clinical reasoning. If AI scribes reproduce a patient's words verbatim or, more concerningly, actively perform synthesis for students, learners may bypass the cognitive work that note writing can cultivate. When AI supplants the learner's role as reporter and interpreter, it raises questions about how the learner will develop the skills necessary to become an effective manager and educator.

These skills remain relevant as students transition to residency. In most academic centers, residents perform a large proportion of documentation. While residents are developing reporter and interpreter skills, a complex EMR can anchor them to administrative tasks. Reducing this burden could have meaningful benefits, allowing more time for face-to-face patient care. A recent study found that while residents using AI scribes reported a lower documentation burden, there was no reduction in actual time spent documenting.[13]

Much like their underlying algorithms, the mechanisms by which AI scribes reduce this documentation burden remain a "black box." Viewed through the lens of cognitive load theory, AI scribes likely change the timing and method of physician documentation. Clinicians in both hospital and ambulatory settings often face a trade-off between frequent task-switching and the limits of working memory. To avoid forgetting details, many try to document in real time, which increases task switching, fragments attention, and adds extraneous cognitive load. The alternative – deferred documentation – requires remembering a large amount of complex information later. By capturing the encounter in real time, AI scribes reduce the need to navigate this trade-off, and the time spent editing AI-generated notes post-shift may feel more manageable and cognitively less demanding.

Yet even if AI scribes eventually create real time savings for physicians, how will they use this extra time? They may face pressure to see more patients and increase clinical productivity. Alternatively, AI scribes could reduce after-hours documentation or lead to more "pockets" of downtime. Ideally, however, time gained would benefit patient care and enhance education. Evidence from traditional scribe programs supports this; in one academic emergency department, attending physicians – rather than residents – were assigned scribes, yet residents still reported improved educational experiences and more face-to-face teaching.[14]

AI tools also inevitably introduce new educational responsibilities. Educators must guide students and residents in using AI technologies effectively and responsibly. In a recent article, Abdulnour et al emphasized that educators must both teach and assess the use of AI in the clinical space while simultaneously developing these skills themselves.[15] The authors suggest using the DEFT-AI framework[16] centered on learner-centered supervision, in which learners (1) describe how they used AI, (2) evaluate the evidence supporting their approach, (3) receive feedback, (4) receive teaching points to deepen understanding, and (5) are given recommendations for responsible and effective AI use.

The use of AI in the clinical space, both for documentation and clinical reasoning, should be explicit and intentional. This is particularly important when clinicians utilize AI to generate differential diagnoses or draft assessments and plans. While these generative outputs can appear reasonable, they often oversimplify the complexity of clinical reasoning. For example, an AI scribe might generate the phrase, "the ECG does not show a heart attack," when the actual evaluation of the ECG for acute coronary syndrome is more nuanced. Educators must guide learners to question AI and realize its limitations while also appreciating its potential in the clinical space. AI tools can prompt alternative diagnoses, draw attention to important details, and help learners and clinicians manage the volume of data within the EMR. Learners who engage with, question, and expand upon AI outputs can develop critical appraisal skills and build a foundation for higher-order thinking.

AI scribes represent a promising innovation, yet their adoption introduces important educational trade-offs. The replacement of human scribes may lead to the loss of a formative entry point into medicine for premedical students. For medical students and residents, AI scribes could supplant the foundational skills of synthesizing a patient's story and developing clinical reasoning. For educators, these tools create the added responsibility of preparing learners to use AI effectively and responsibly. Yet even with these concerns, the task is not necessarily to resist technological advancement, but to carefully navigate its costs and benefits. Used intentionally, AI scribes could allow clinicians to spend less time in front of a computer screen and more time at the bedside, focusing more on patient care, clinical education, and the human relationships that drew them to medicine. With thoughtful integration, AI scribes could help create a new picture of medicine in which people return to the center, even as new technology becomes part of the team.

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Wisconsin Statewide General Surgery Residency Mock Oral Virtual Examinations

Jacqueline J. Blank, MD; Joshua C. Dilday, DO

Graduating general surgeons are required to pass a 2-part board certification exam: the first is the written exam—the American Board of Surgery (ABS) Qualifying Examination (QE). Upon successful completion of the QE, they must take the oral board exam—the ABS Certifying Examination (CE). While written exams and test-taking techniques have long been engrained in medical education, oral exams strategies are far less familiar.[1] Oral exams are not unique to general surgery; anesthesiology, otolaryngology, and ophthalmology are among the many other specialties that rely on them for board certification. Sequential participation in mock oral exams is associated with improved first-time pass rates among general surgery residents.[2] Due to the COVID-19 pandemic, many specialties transitioned to a virtual format for the oral examinations, including general surgery. Following suit, the Medical College of Wisconsin (MCW) general surgery residency annual mock oral exam transitioned from an in-person to a virtual format in 2020.

The four general surgery residency programs in Wisconsin (Gundersen Health System, Marshfield Clinic Health System, MCW, and the University of Wisconsin) all utilize annual or biannual mock oral exam events, held internally or with a single neighboring institution. This has proven worthwhile for residents, but there are several drawbacks. At MCW, familiarity between examiner and examinee has potential for bias regarding both test answers and nonverbal communication. Examinees desire more impartiality, and examiners have noted that residents inappropriately tailored their answers to the examiner's subspecialty.

In April 2025, the four institutions collaborated to offer the first Wisconsin statewide virtual mock oral exams. The 58 participating residents were divided into morning and afternoon sessions and were examined by 41 surgeons from around the state. Both community surgeons and academic surgeons volunteered as examiners (Figure). Each exam "room" was hosted by two examiners from different institutions, decreasing the risk of familiarity with the examinee. Residents rotated through three different exam rooms, with three separate scenarios per room.

Participant feedback was overwhelmingly positive. Residents from all institutions demonstrated poise, professionalism, and preparedness for the scenarios. Examinees received individual scores, written feedback, and a graphical representation of their performance relative to their peers. Faculty from all surgical subspecialties participated, and their feedback was invaluable. Several faculty expressed enthusiasm for participating in the 2026 virtual event. Suggestions for improvement included providing contact information for both examiners and examinees to facilitate discussion of performance and test-taking strategies, as well as implementing longitudinal measurement of examinee performance and correlation with oral CE scores. Additionally, the institutions hope to begin a similar event for fellows who may be taking the certifying exam shortly after beginning fellowship.

Oral board practice throughout residency is associated with improved first-time pass rates… Involving multiple institutions has the added benefit of replicating a testing situation in which examinees are unfamiliar with their examiners.

Oral board practice throughout residency is associated with improved first-time pass rates among general surgery residents. Involving multiple institutions has the added benefit of replicating a testing situation in which examinees are unfamiliar with their examiners. Multi-institutional mock oral examinations have been successful regarding examinee preparation,

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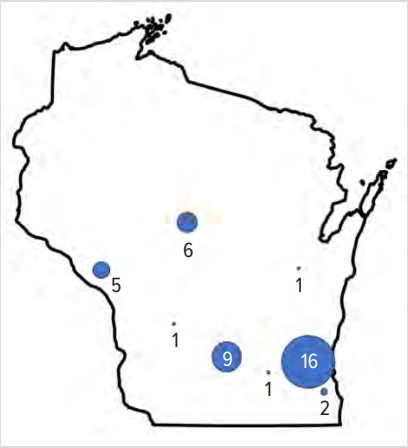
Figure. Examiners' Home Institutions



confidence, and certifying exam pass rates.[2-4] However, much of the literature regarding mock orals was published prior to COVID-19. In these papers, residents were required to travel to a central institution. This utilized space and resources, diverting the workforce away from the residents' home programs. Additionally, cost and safety concerns can impact travel.

To our knowledge, Wisconsin is the first to offer a virtual statewide mock oral exam. In addition to preparing trainees, the exam placed minimal burden on institutions; it was conducted virtually, required only 1.5 hours of absence per examinee, and did not significantly disrupt clinical duties. Furthermore, with the widespread adoption and accessibility of virtual platforms that emerged during the COVID-19 pandemic, exams will likely remain in a virtual format for the foreseeable future. Our virtual mock oral exam provided trainees with a format similar to the actual CE. Not only does this program benefit residents, but it may also positively impact the state: more than 52% of Wisconsin residents across all specialties remain in state for postresidency practice.[5]

We are excited to continue offering this educational event and remain committed to its ongoing contribution to Wisconsin trainees. We also believe it has the potential to be adapted for practice oral examinations across multiple specialties.

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Utilization of a Resident-as-Educator Model in Pathology: Unique Challenges, Opportunities, and Recommendations

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In contemporary medical education, the role of residents as educators has been increasingly recognized and formalized through the "resident-as-educator" (RAE) model, which incorporates resident-based teaching as an intentional element of medical education. Using near-peer learning principles, residents who are closely situated within the educational continuum are employed as teachers who can effectively facilitate the connection between theoretical knowledge and practical application for learners. Although the RAE model works well for many medical specialties, pathology presents distinct challenges and opportunities. This is due in part to limited and late medical student exposure to the field and the pathology resident learning curve paralleling that of their learners. This commentary examines the RAE model's application, associated challenges, and potential within the field of pathology.

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The Resident-as-Educator Model in Medical Education

In general, the RAE model is a structured approach to medical education that emphasizes the resident physician's often underrecognized role in educating medical students, junior residents, and other learners. Traditionally, residents have contributed to education in an informal manner, with instruction occurring naturally during procedural, bedside, and clinical discussions. The RAE model elevates this interaction to a deliberate pedagogical strategy, providing structure, recognition, and, increasingly, formal training to help residents develop as effective educators.[1] The model utilizes the resident's unique position as a near-peer to bridge the gap between learners and attending physicians. Near-peer teaching recognizes that someone just ahead in their training can guide those slightly behind by more effectively providing accessible, relatable, and level-appropriate teaching.[2] This framework is especially powerful in medical training, where hierarchical structures are well defined but learning is continuous and collaborative.

The RAE model offers numerous medical educational benefits. Near-peer teaching fosters a more supportive learning environment in which students often feel more comfortable asking questions and acknowledging areas of confusion.[2] Since residents have recently navigated similar learning challenges, they are often better equipped to explain complex concepts in ways that resonate with novices. Teaching also reinforces residents' own knowledge, promotes leadership development, and builds essential skills for future roles in academic or clinical education.[1,3-4]

> By engaging students in near-peer teaching, residents can demystify the specialty and directly counter stereotypes through relatable, first-hand examples of pathology's central role in interdisciplinary care.

Challenges and Advantages of a RAE Model for Pathology Learners

Pathology offers a unique context for implementing the RAE model. The primary challenges stem from curriculum timing and structure. Unlike fields such as internal medicine or surgery, pathology receives minimal emphasis in both preclinical studies and clinical clerkships.[5,6] This limited exposure compresses opportunities for students to appreciate the specialty's complexity into a short elective rotation. Consequently, many students begin their rotations with limited foundational knowledge, requiring resident educators to devote considerable time to basic concepts in histology

or laboratory medicine rather than exposing students to the day-to-day practice of the specialty.

Clinical skills learned in medical school are generally applicable to many patient-facing specialties, allowing students to participate even without prior exposure. In contrast, pathology requires different foundational skills, making it uniquely inaccessible to learners without direct instruction. Insufficient exposure to in vivo pathology practice can have detrimental effects on students and the specialty. For instance, persistent stereotype – such as the perception that pathology only entails autopsies or is disconnected from patient care – may not be corrected.[7] Additionally, survey studies indicate that experiential exposure is a key factor in attracting students to pathology,[8] an important consideration given the growing concern regarding workforce shortages.[9] The current timing and structure of pathology education may therefore reduce hands-on opportunities for learners and potentially affect future recruitment.

A RAE model can help alleviate some of these issues by strategically addressing both educational limitations and recruitment challenges. Given the compressed and often late exposure to pathology many medical students experience, residents are uniquely suited to bridge gaps in foundational knowledge while simultaneously showcasing the specialty's real-world relevance. Pathology residents possess valuable insight into the difficulties associated with learning fundamental histopathology, having recently navigated these challenges themselves. As near-peers, residents are well positioned to adapt their teaching methods to meet the distinct learning needs of their trainees.[10]

Additionally, the resident role is particularly valuable in combating misconceptions stemming from pathology's marginalization in medical training. By engaging students in near-peer teaching, residents can demystify the specialty and directly counter stereotypes through relatable, first-hand examples of pathology's central role in interdisciplinary care. The delivery of this information by a near-peer may enhance the effectiveness of this message.[11] Resident-led educational encounters also serve a critical recruitment function: approachable and enthusiastic residents often leave a stronger impression on students than more formal instruction, influencing specialty perceptions during a pivotal decision-making period for learners. Given current workforce shortages, leveraging the RAE model is a proactive strategy to increase visibility, correct misconceptions, and foster engagement with the field.

Challenges and Advantages of a RAE Model

For pathology residents, the RAE model presents additional advantages and challenges. fundamentally, such teaching supports competencies outlined by the Accreditation Council for Graduate Medical Education (ACGME), which emphasizes educational development as a key component of professionalism.[12] Teaching also reinforces essential pathology concepts. Preparing to instruct requires residents to structure information methodically, revisit essential topics, and address probing questions – processes that promote deeper learning for the educator.[13] Participation in structured teaching also enables pathology residents to acquire early mentorship experience, a key competency for future academic roles. This role enhances communication skills, nurtures confidence, and develops residents' capacity to convey complex information clearly skills vital not only in educational settings but also in interdisciplinary collaboration.

Nonetheless, unique challenges exist. In patient-facing specialties, medical students can learn from residents by observing direct patient-physician interactions, allowing residents to integrate teaching into their daily clinical workflow. In contrast, pathology residents are not required to articulate their reasoning in the absence of a learner. Pathology RAEs must therefore expend deliberate effort to integrate teaching into their daily routines. Furthermore, medical students often encounter pathology late in their training and for only a brief period, making resident-led teaching both influential and high stakes. Most pathology residents themselves begin their training with limited prior exposure, creating a steep learning curve mirroring that of their students. Unlike residents in surgical or internal medicine programs, who benefit from sustained clinical involvement in medical school, pathology residents must concurrently acquire new skills and fulfill teaching responsibilities. This parallel learning can enhance empathy but also may strain residents' cognitive resources.

Moreover, given the limited and often singular pathology exposure students have during medical school, the quality, accuracy, and impact of resident-led instruction carries heightened significance. For many students, a brief rotation may be their only direct experience with the specialty, making it a crucial opportunity to dispel persistent misconceptions and present a realistic, nuanced understanding of pathology's capabilities and limitations. Thus, this brief window is pivotal for shaping how future physicians perceive and engage with the specialty. Effective instruction can lay the groundwork for stronger interdisciplinary collaboration, more appropriate test utilization, and more informed clinical decision-making.[14]

Conversely, if residents deliver outdated, oversimplified, or inaccurate information, they risk reinforcing distorted views that persist into practice. This concern is especially pressing in pathology, where exposure is woefully scarce and misconceptions often go unchallenged. Consequently, pathology residents in a RAE model bear a dual responsibility: providing effective education and accurately representing the specialty. Given their limited exposure to pathology prior to residency, this may pose a significant challenge.

Qualities of a Successful Resident Educator in Pathology

A successful RAE in pathology must possess a unique blend of enthusiasm, humility, and communication. Passion is critical.[15] A resident who expresses genuine excitement for the intellectual rigor and diagnostic importance of pathology can spark curiosity and shift perceptions, even during a short rotation. First impressions matter, particularly in underrepresented specialties, and a passionate resident may be a student's first – and only – ambassador for pathology.

Humility is equally important. Acknowledging personal limitations and openly discussing knowledge gaps contributes to a culture of collaborative learning. Good RAEs understand

when to seek assistance. When residents model intellectual honesty and actively seek input from attending physicians or senior colleagues, they normalize the process of lifelong learning. This behavior enhances teaching quality and sets a powerful example for medical students regarding professional development and interdisciplinary learning.

Finally, strong pathology RAEs embrace the concept of a "united front." While they serve as teachers, they are also learners—just further along the path. Presenting the rotation as a collective learning experience fosters open communication, reduces student apprehension, and cultivates rapport. By emphasizing that mastering pathology is an ongoing process, residents help establish a supportive, inclusive, and growth-oriented environment.

Conclusions

The resident-as-educator model presents an invaluable strategy in pathology, particularly in addressing structural and perceptual barriers that may limit student engagement. Through near-peer teaching, resident educators can clarify the specialty's role, address misconceptions, and increase awareness of career opportunities; however, a thoughtful approach is essential given the model's unique challenges within pathology.

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Unwavering

Madison Seifer

Colored pencil on paper

About the Artist:

Madison Seifer is a third-year medical student at the University of Wisconsin School of Medicine and Public Health with a strong interest in reproductive health and justice. She has always enjoyed having a balance of creative outlets to supplement her pursuits in science and medicine, most recently taking up abstract drawing inspired by Surrealism and the bright hues of Cubism.

Assessment of Well-being Differences by Gender in Medical Students at a Midwest Public University-Based Medical School

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ABSTRACT

Introduction: Ensuring the well-being of medical students, including historically marginalized groups, is essential for individual success and the vitality of the medical field. Beyond considerations of equity, enhancing the well-being of women in medicine strengthens the effectiveness and diversity of the medical workforce. Existing research has identified distinct stressors faced by women medical students, prompting investigation into gender disparities in stress, the hidden curriculum, and the minority tax.

Methods: A survey was conducted among medical students enrolled at the University of Wisconsin School of Medicine and Public Health in August 2023. Questions assessed stress levels and experiences related to the hidden curriculum and minority tax.

Results: Findings revealed a significant gender-based stress gap, with women reporting higher stress levels than men. While not statistically significant, gender differences in the impact of the hidden curriculum trended towards statistical significance ($P = .09$). Perceptions of minority tax burden were similar between women and men.

Discussion: Recommendations to reduce the gender disparities include establishing student-led peer support groups, implementing preclinical workshops to demystify the hidden curriculum, offering regular stress management and resilience-building sessions, and providing faculty diversity training to foster an inclusive learning environment. Future directions include expanding the project's scope through focus groups and longitudinal, multisite studies to explore intersecting identities – such as race, parenthood, caregiving responsibilities, leadership roles, and lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ+) status – and their impact on well-being.

Conclusions: Gender parity in medical school matriculation has not eliminated disparities in student well-being. System-level interventions and targeted support for women medical students are needed to promote equity and foster an inclusive educational environment.

• • •

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INTRODUCTION

As future physicians, current medical students play a pivotal role in shaping the future of patient care and sustaining society by delivering high quality health care. Therefore, ensuring their engagement and well-being is essential. Well-being in the context of medical education encompasses the ability to effectively manage the demanding rigors of knowledge acquisition and clinical and communication skill development while maintaining quality of life to reduce the risk of burnout and related health challenges.[1,2] Studies consistently underscore the high prevalence of mental health issues among medical students, highlighting well-being as a critical concern during medical education.[3,4]

The number of women entering medical school in the United States has risen over the past 2 decades. In 2017, for the first time, women outnumbered men in medical school matriculation.[5] Even so, women continue to experience disparities in medicine. For example, although women now matriculate at rates equal to men, most leadership positions in academic medicine – such as dean or department chair – remain held by men.[6] Additionally, a gender-based pay gap persists among physicians.[7] As the number of women pursuing medical careers rises and disparities remain, it is imperative to examine the experiences of women throughout medical school, residency, and beyond. Recent research indicates that women physi-

cians may experience distinct stressors and higher rates of burnout, warranting closer examination.[3]

Although numerous studies have identified personal, institutional, and societal factors contributing to well-being challenges among women, few have specifically explored the experiences of women during medical school in recent years. A recent literature search revealed that published studies have not examined how gender affects women medical students' experiences of stress, the hidden curriculum, and the minority tax. In *The Hidden Curriculum in Higher Education*, Eric Margolis defines the hidden curriculum as "the norms, values, and belief systems embedded in the curriculum, the school, and classroom life, imparted to students through daily routines, curricular content, and social relationships."[8] The minority tax has been defined as "the burden of time and resources placed on minority persons to represent and advocate for their communities"[9] and refers to additional burdens placed on those who identify as underrepresented in medicine (URiM), often in the name of increasing diversity. More research is needed to determine how gender may influence medical student perceptions and experiences.

This quality improvement (QI) project sought to address this gap by investigating the effect of gender disparities on the well-being of women medical students at a single public university-based medical school. Specifically, the goal was to explore how gender informs medical students' experiences of stress, the hidden curriculum, and the minority tax to help prioritize efforts to create a more equitable experience for women medical students.

METHODS

Quality Improvement Project Design

During summer 2023, a QI project was developed to explore the well-being of medical students at a public university medical school in the Midwest (University of Wisconsin [UW] School of Medicine and Public Health). The survey included a total of 16 questions: multiple-choice items assessing student satisfaction, stress levels, and the impact of the hidden curriculum and minority tax on well-being, as well as optional open-ended questions soliciting feedback and recommendations for improving existing well-being support structures. Because of its QI design, the UW Madison QI/Program Evaluation Self-Certification tool determined that this project did not require institutional review board review or approval, as it did not meet the federal definition of research (certification date March 9, 2023). Informed consent was obtained at the beginning of the survey, which explained the voluntary nature of participation. To maximize anonymity, demographic questions were optional and limited to gender, URiM status, identification with a historically excluded group, first-generation status, and underresourced background.

Participant Recruitment

The online Qualtrics survey was emailed to all enrolled medical students at UW School of Medicine and Public Health in August 2023, excluding students who matriculated in academic year 2023-2024. A total of 146 medical students across 3 classes consented to participate (response rate: approximately 27%). Among respondents, 82% (119 students) answered optional demographic questions.

Table 1. Demographic Data of Survey Respondents

Demographic Information	Man (n = 42)	Woman (n = 74)
URiM (n = 46)	15 (33%)	29 (63%)
Historically excluded group (n = 42)	15 (36%)	25 (60%)
Underresourced background (n = 43)	18 (42%)	23 (53%)
First-generation medical student (n = 103)	37 (36%)	64 (62%)
First-generation college student (n = 33)	13 (39%)	19 (58%)

Abbreviation: URiM, underrepresented in medicine.

Data Analysis

The project employed a two-fold approach to examine stressors affecting medical students: analysis of primary stressors and quantification of adverse effects related to the hidden curriculum and minority tax. Most multiple-choice questions used a disagree/agree scale: "agree" and "strongly agree" responses were grouped to indicate agreement with stress-inducing factors. Two-sample *t* tests assuming unequal variance were conducted using Python to assess gender differences for each identified stressor. Additionally, qualitative analysis was performed on open-ended responses to identify themes and recommendations for improving equity in medical education. This analysis included manual topic modeling of responses from the Shapiro survey.

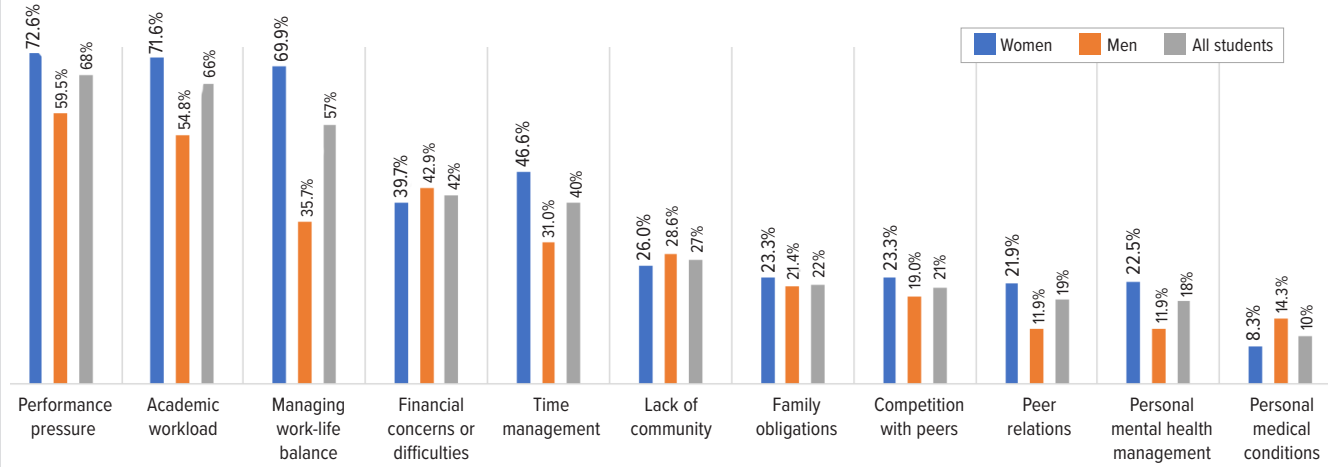
RESULTS

Table 1 presents demographic data for survey respondents. Among 146 respondents, 74 were women (subsequently referred to as women/an for clarity); 28 identified as URiM, 24 as belonging to a historically excluded group, and 22 as coming from an underresourced background. Sixty-three respondents identified as first-generation medical students, and 42 respondents were men (hereafter referred to as men/an for clarity).

Of the 74 women respondents, 62% reported their stress level as "significant, but manageable," compared with 45% of men ($P = .016$). Additionally, 15% of women characterized their stress as "severe, and debilitating," whereas only 7% of men selected this response. Figure 1 illustrates this difference: 34% more women than men reported experiencing "a great deal" or "a significant amount" of stress related to work-life balance ($P < .001$). Regarding reasons for stress, women selected performance pressure at statistically significant higher rates compared with men.

When asked about the effect of the hidden curriculum on their well-being, 53% of women and 36% of men reported a negative impact ($P = .09$). Additionally, 38% of women reported feeling burdened by a "minority tax," and only 36% of these students felt

Figure 1. Stressors for Medical Students Show Gender-based Differences in Multiple Areas



that the school provided adequate support to mitigate its negative impact. Similarly, 36% of men reported experiencing the minority tax burden.

Several recommendations for creating a more equitable environment for women medical students at our institution emerged from the survey. Forty percent (40%) of all respondents called for greater transparency, awareness, and communication to demystify the hidden curriculum (Figure 2). Students also expressed a desire for more time off for self-care, flexible scheduling for counseling appointments, increased peer networking opportunities, and greater diversity in school leadership.

Table 2. *P* values for *t* Tests Show Significant Differences in Gender in Three Areas: Overall Stress Level, Performance Pressure, and Managing Work-Life Balance

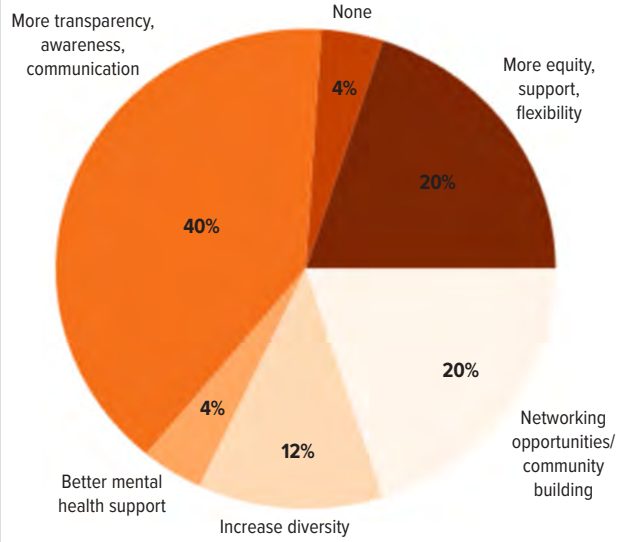
Metric	*P* value	Interpretation
Hidden curriculum	0.09	Not significant
Minority tax	0.78	Not significant
Overall stress level	0.02	Significant gender difference
Individual stressors		
Performance pressure	0.02	Significant gender difference
Academic workload	0.06	Not significant
Managing work-life balance	<.001	Significant gender difference
Financial concerns	0.65	Not significant
Time management	0.22	Not significant
Lack of community	0.88	Not significant
Family obligation	0.08	Not significant
Competition with peers	0.19	Not significant
Peer relations	0.23	Not significant
Mental health	0.15	Not significant
Medical conditions	0.48	Not significant

DISCUSSION

Although the survey was distributed to all medical students to assess stress levels and well-being, the findings revealed a clear gender disparity in experiences related to stress, performance pressure, and work-life balance. Women medical students reported higher stress levels than men. Moreover, women were more likely to describe their stress as severe and debilitating. In contrast, rates of feeling burdened by the minority tax were similar between groups.

The question arising from these data is why women medical students experience more stress than men peers despite equal or greater representation in medical schools. Prior studies have suggested increased burnout among women medical residents due to unconscious gender bias from patients, faculty, and colleagues.[10] It is reasonable to assume that similar gender bias may contribute to burnout at the medical school level. The increased stress observed among women in our study may be due to a perception that they must work harder than men to overcome unconscious

Figure 2. Student-Identified Areas of Improvement



bias. Notably, women selected performance pressure as a reason for stress at statistically significant higher rates than men.

Medical students undergo ongoing evaluations from attending physicians. In clinical settings that are often hierarchical, the additional identity of being a woman may amplify stress when those higher in the hierarchy are of a different gender. One student wrote: "as a woman, I have been lucky to have a female attending, resident, and older med student mentors. Having someone at every level is game changing. Even just one makes a difference… I have had to defend myself to many male colleagues, mostly ones who 'rank' higher than me…From my female mentors, I have gathered that gender differences are real and exist and can be overcome to some extent but with difficulty and a lot of extra energy and time investment, which detracts from other aspects of life."

At the UW School of Medicine and Public Health during the survey period, women in department chair positions reached their highest proportion. As of November 2024, 44% of department chairs were women. Even with increased representation in leadership, significant disparities in well-being among women medical students persist. This may be partly because the growth of women chairs has occurred gradually over the past 2 decades, only recently approaching parity. Two decades ago, there were no women chairs; in 2014, according to school records, women accounted for 30% of department chairs. This suggests that the lack of a longstanding history of women leaders as role models, combined with systemic, structural, and societal factors within and beyond the learning environment, continues to affect women's well-being. Recent societal factors—such as demonstrated gender bias in political leadership, highlighted by voter preferences in the November 2024 presidential election—underscore challenges women may face outside of school that could contribute to stress.[11]

Although not statistically significant, more women reported being negatively affected by the hidden curriculum, with a *P* value trending toward significance. One respondent wrote,

> *"People with exposure to this field through personal contacts have a giant leg up and are well connected and understand the process from day 1. They understand the system and don't have to waste their time learning it but rather can focus on how to thrive within it."*

The intersection of identities—such as being a woman and first-generation in medicine—may create additional barriers to navigating the hidden curriculum.

Comments suggest an unfamiliarity with the culture of medicine that is necessary to be successful. Another student wrote:

> *"I felt it the most at the beginning of rotations where there were all these cultural norms of being in a hospital that I just didn't know. It greatly impacted how I performed and how I was a part of the team. It took a long while to learn. And it changes per rotation. It is difficult to try to understand the new hidden curriculum in every rotation and get it right."*

Additionally, while 38% of women reported feeling burdened by the minority tax—defined as additional responsibilities placed on individuals underrepresented in medicine, often in the name of diversity—36% of men reported similar experiences. This suggests that the minority tax may not account for the increased stress observed among women medical students.

A study exploring medical students' experiences of imposter syndrome found that 65.4% had clinically significant imposter syndrome, with women scoring higher on the Clance Imposter Phenomenon Scale.[12] Although our project did not specifically assess imposter syndrome, it is likely a contributing factor to increased stress among women medical students.

While the precise causes of increased stress among women medical students remain unclear, these findings indicate that achieving parity in matriculation between men and women has not eliminated disparities in medical education experiences. System-level change is likely necessary to achieve equity across genders.

Interventions and Recommendations

Prior literature suggests one of the most powerful approaches to improving medical student wellness is multifactorial.[1,13] Several interventions identified in the literature focus on creating collaborative environments that foster camaraderie and reduce feelings of isolation among students.

Peer-mentoring programs are consistently cited as essential components of wellness, providing both psychosocial and academic benefit.[14] Although such programs exist at many institutions, including ours, they may be underutilized.[15] Intentional matching of students based on shared lived experiences may offer additional guidance and support in navigating the challenges of medical education.

The literature also highlights general strategies to reduce distress, such as maintaining hobbies, building social connections, cultivating a positive mindset, avoiding delayed gratification, developing resilience, and selecting a medical career aligned with personal interests.[1,13] Collectively, these findings emphasize the importance of implementing a combination of curricular changes and support systems to promote medical student well-being. However, wellness interventions specifically focused on women medical students are notably absent from the literature. Considering the findings of this project, several recommendations can be made to enhance the well-being of women medical students at the School of Medicine and Public Health and beyond. Implementation of these measures requires careful consideration of potential barriers to ensure equitable access for all women medical students. Collaborative efforts, institutional support, and a commitment to gender equity are essential for success.

To ensure effective implementation, a phased approach is proposed. First, establish student-led peer support groups or dedicated mentoring programs specifically designed for women medical students. These groups would serve as safe spaces for discussing

challenges, sharing experiences, and providing mutual emotional support—particularly during clinical rotations. They could also function as platforms for peer-led advocacy to raise awareness of gender disparities in medicine and promote policy-level change. Second, conduct workshops prior to clinical rotations to demystify the hidden curriculum, clarify institutional norms, and offer guidance on professional etiquette and expectations. Involving women faculty and senior women students as workshop leaders who can share their experiences and insights may be highly beneficial. Third, implement regular stress management and resilience-building workshops to help students cope with the pressures of medical education. These workshops should be responsive to needs across the gender spectrum. Finally, faculty should continue to receive comprehensive diversity training aimed at enhancing cultural competence, mitigating biases, and fostering a welcoming atmosphere for all students. This prioritization aims to address the most pressing needs first while providing a roadmap for sustained improvement.

There are existing programs for women faculty in academic medicine that provide a model for student-focused initiatives. For example, the American Academy of Medical Colleges (AAMC) offers early and mid-career women faculty leadership summits.[16,17] Similarly, the Executive Leadership in Academic Medicine (ELAM) at Drexel University College of Medicine is a yearlong fellowship for women faculty focused on the challenges faced by this community.[18] In addition, school-sponsored symposia and seminars sponsored by the Group on Women in Medicine and Science geared toward faculty over the past 5 years and the student-led group, Women in Medicine, have provided information, shared insights, and created community to help elevate and address the needs of women. These successful programs offer a blueprint for creating initiatives focused on women medical students. Intervening earlier in students' careers may facilitate the leadership development and advance gender equity in academic medicine. Specific women-only spaces and programs will likely remain necessary until gender disparities in well-being are reduced.

Limitations

Limitations of this project include the relatively small number of survey respondents which may limit generalizability. Additionally, not all respondents provided demographic data, which may have affected results. Selection bias is possible, as 62.2% of those who reported gender were women. Because comprehensive demographic data were not collected, the sample may not represent the broader medical student population. Institutional factors unique to the School of Medicine and Public Health may also contribute to stress but could not be identified given the quantitative nature of data collection. Future research should consider longitudinal studies and institutional comparisons to address these limitations and provide richer insights.

Future Directions

Future research methodologies could include mixed-methods approaches to capture quantitative and qualitative effects of gender disparities. Longitudinal students across multiple medical schools with larger sample sizes would improve generalizability and may identify institutions where gender disparities are less pronounced, offering opportunities to learn effective mitigation strategies. Conducting extensive focus groups with diverse cohorts of women medical students would help clarify underlying causes of stress in the learning environment. Specifically, investigating the intersection of identities—including race, parenthood, caregiving responsibilities, leadership roles, and lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ+) status—may reveal more nuanced insights that inform more precise recommendations and targeted interventions. Such findings could guide the development of programs that promote equity in medical education and, ultimately, faculty leadership positions. This project contributes to ongoing medical education reform aimed at creating a more inclusive and equitable environment for women in medicine.

CONCLUSIONS

To ensure equitable experiences for all medical students, it is critical to understand the unique challenges faced by women medical students. Findings from this quality improvement project indicate that women experience higher levels of stress than men. Oher identities, such as URiM status or being first generation in medicine—appear to intersect with gender and influence experiences related to the hidden curriculum and minority tax. These compounded identities may contribute to the increased stress observed by women respondents, although additional data are needed to further investigate these relationships. Ultimately, these findings underscore the need for medical education environments to critically examine existing practices and prioritize inclusivity, equity, and well-being as cornerstones.

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Are You My Mentor? Pediatric Residents' Conceptualization of Mentoring and Mentoring Relationships

Rory Bade, MD; Daniel Sklansky, MD; Megan Moreno, MD, MSEd, MPH; Jesse Boyett Anderson, MD, MS

ABSTRACT

Introduction: Mentorship involves a multidimensional relationship between junior and senior professionals and is integral to professional development. Pediatric residents are required by the Accreditation Council for Graduate Medical Education to identify at least 1 mentor. However, it remains unclear how residents conceptualize and use mentorship. This study sought to understand how pediatric residents identify and value mentorship and to assess a workshop designed to empower residents to develop mentoring relationships.

Methods: Pediatric residents were surveyed regarding their experiences with and perceptions of mentoring. An interactive workshop was designed to facilitate the identification and utilization of mentors in professional development for pediatric residents. Preworkshop and 8-month postworkshop surveys assessed resident professional growth priorities, sources of mentorship, other advisors, satisfaction with mentorship, and confidence in cultivating mentor-mentee relationships.

Results: Twenty-nine residents completed the preworkshop survey. Residents identified clinical skills, career development, work-life balance, leadership, and research as their top priorities for growth. Nearly all residents (97%) identified advisors, though only 65% reported having a mentor. Nine residents completed the postworkshop survey. Residents reported increased confidence in initiating mentoring relationships and mentoring junior trainees following the workshop.

Conclusions: Pediatric residents identified numerous areas of personal and professional growth amenable to mentoring. While nearly all residents identified advisors, many were unable to identify a mentor, suggesting a discordance between residents' conceptualization and actualization of mentorship. Resident responses suggest that a brief workshop intervention may durably increase resident confidence in initiating mentoring relationships.

INTRODUCTION

Mentorship is an integral component of physician professional development. It has been described as a multidimensional relationship between junior and senior professionals with the primary goal of assisting the growth and development of the junior professional.[1] Mentors influence career choices, research productivity, clinical skills, personal and professional development, and professional identify formation for clinician educators.[2-7] High-quality mentorship also has direct positive effects on resident performance milestones.[8]

Given the benefits of mentorship, the Accreditation Council for Graduate Medical Education (ACGME) requires all pediatric residents to identify a formal mentor.[9] This requirement has led residency programs to strengthen mentoring efforts, resulting in increased number of mentor per resident and greater perceived value of mentorship.[10,11] While programs can ensure this requirement is met by assigning each resident a specific mentor, self-selected mentorship relationships tend to yield stronger and more effective relationships than assigned ones.[11,12]

Programs have traditionally promoted dyadic mentee/mentor relationships.[11,13-17] Given the breadth of personal and professional development that can be supported through mentorship, however, a more comprehensive approach—in which mentees engage multiple mentors may yield greater benefit than traditional dyads. Establishing mentorship networks has become an increasingly recognized approach.[18,19] Employing a team of mentors allows train-

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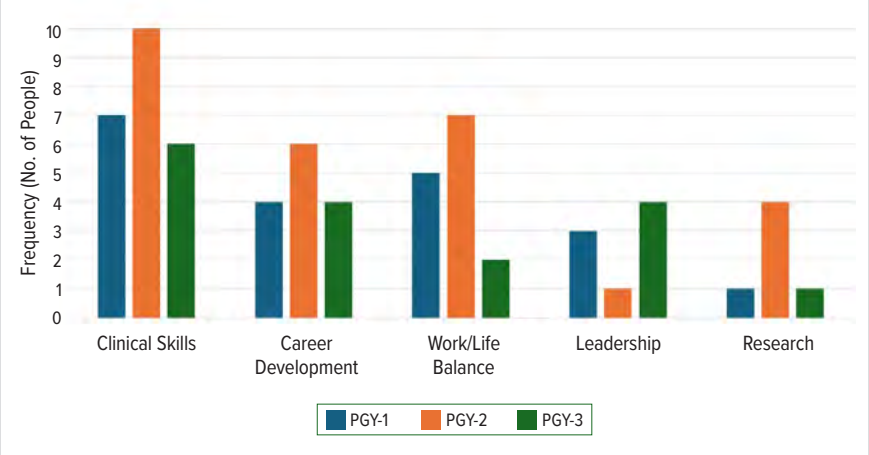
ees to benefit from a range of perspectives and skill sets to meet diverse mentorship needs.[18,19]

Despite the focus on mentoring initiatives and recognition that residents benefit from mentorship networks, there has been limited investigation into how pediatric residents conceptualize, identify, and leverage mentors. We sought to characterize pediatric residents' identification of mentorship relationships, the professional development domains they prioritize for mentoring support, and their satisfaction with existing mentorship. Additionally, we designed and evaluated a brief intervention focused on developing skills needed to identify mentors and initiate mentoring relationships.

Figure 1. Top 5 Most-identified Personal and Professional Areas of Growth



Residents ranked the top 3 most important areas of growth from a selection of 11 options: research, teaching, career development, leadership, interpersonal skills, clinical skills, time management, work/life balance, family, personal health, and other.

Abbreviation: PGY, postgraduate year.

METHODS

Participants

We recruited pediatric residents (postgraduate year [PGY]-1 through PGY-3) from a midsized program in the Midwest during the 2021-2022 and 2022-2023 academic years. Demographic information beyond training year was not collected to preserve resident anonymity. This study was determined to be exempt by the University of Wisconsin-Madison Institutional Review Board.

Assessment Tool

An electronic survey was delivered to all residents before and 8 months after participation in a 1-hour mentorship workshop. The preworkshop survey was administered prior to the workshop to obtain a baseline self-assessment of participants' mentoring relationships without introducing bias related to potentially unrecognized mentoring relationships.

The survey consisted of multiple-choice, free-response, and 5-point Likert scale questions. Residents were asked to prioritize professional growth domains including research, teaching, career development, leadership, interpersonal skills, clinical skills, time management, work-life balance, family demands, fitness/health, and a free response "other" option. Residents were also asked to identify current mentors and advisors, including their specific areas of expertise and contributions; their satisfaction with prior mentorship; and their confidence in cultivating mentoring relationships. Notably, the institution automatically assigns a faculty mentor to each resident at the start of residency.

Mentoring Workshop

A 1-hour mentorship workshop was delivered to all pediatric residents during regularly scheduled educational time. The workshop goals were to facilitate resident identification and use of mentors in medical professional development. Didactic, small-group, and self-reflection components were incorporated, reflecting a constructivist approach to social and experiential learning centered within a community of practice framework. Workshop topics included mentorship networks, self-reflective identification of mentoring needs, and practical strategies to engage mentors and build mentoring relationships.

Data Analysis

Study data were collected and managed using Qualtrics XM (Qualtrics, LLC). Responses were summarized using counts and percentages and categorized by respondent training year (PGY level). Data were analyzed using SPSS version 30.0.0.0 (IBM Corp). The Fisher exact test was used to detect differences between categorical responses in the preworkshop survey data. For paired preworkshop and postworkshop data, paired t tests were used for Likert-scale responses. A threshold of $P<.05$ was used to determine statistical significance.

RESULTS

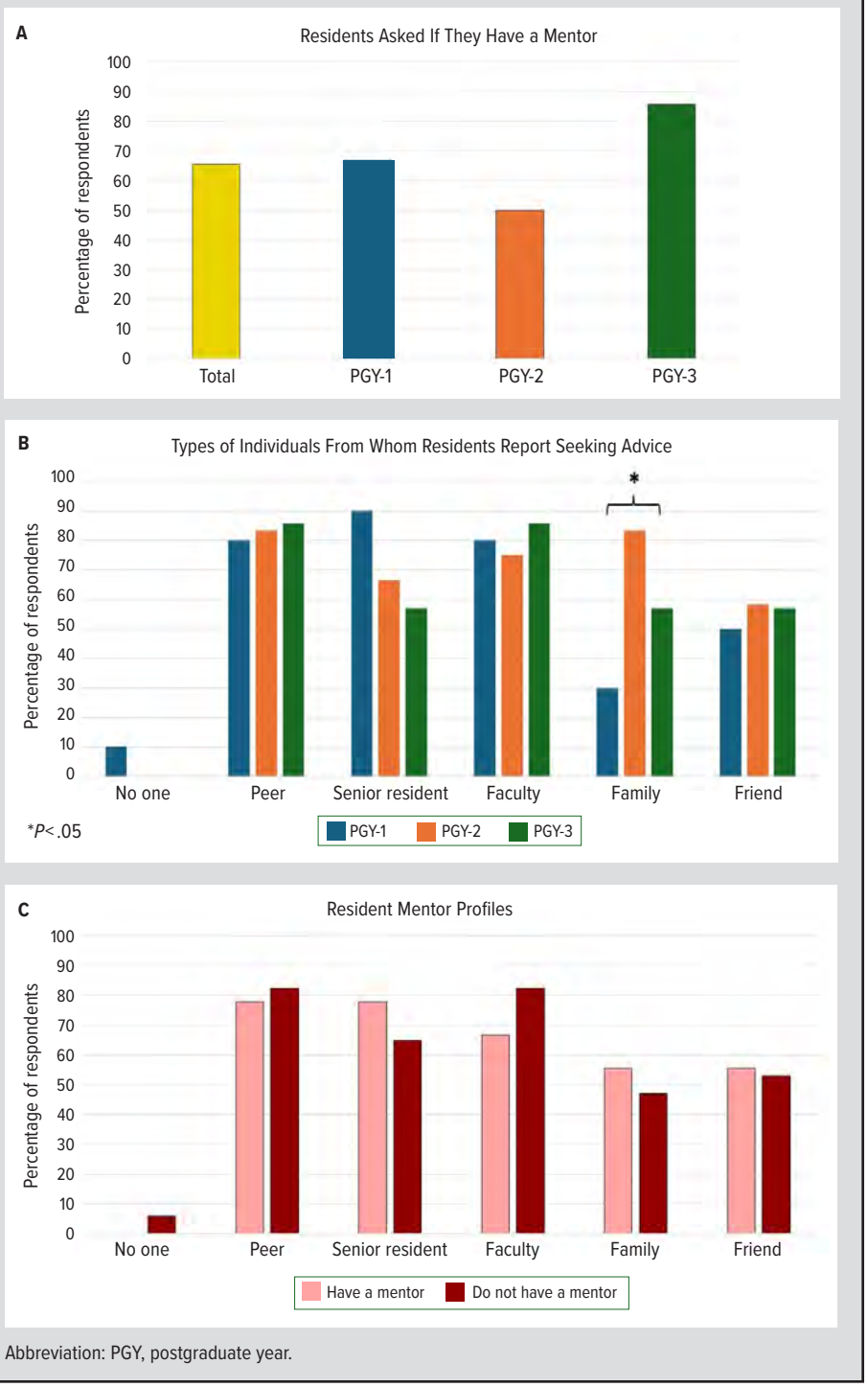
Twenty-nine residents completed the baseline survey (60% response rate): 10 PGY-1, 12 PGY-2, and 7 PGY-3. The top 5 areas of professional growth identified by residents were clinical skills, career development, work-life balance, leadership, and research (Figure 1). Interpersonal skills, personal health, teaching, time management, and family demands were prioritized lower. The highest-priority area for growth across all training years was development of clinical skills.

Despite all residents having a mentor assigned by the residency program, more than one-third (35%) reported not having a mentor, with no significant differences by training year (Figure 2A).

Nearly all residents (97%) identified advisors, most commonly citing peers (83%) and faculty members (79%) (Figure 2B). PGY-2 residents more frequently sought advice from family members ($P = .049$) than did residents in other training years. There were no significant differences in the types of individuals from whom residents sought advice based on mentor status (Figure 2C).

Nine of the 29 residents (31%) who completed the baseline survey also completed a postworkshop survey (Figure 3). Residents reported overall satisfaction with the workshop and demonstrated increased confidence in initiating mentoring relationships ($P = .048$) and mentoring other trainees ($P = .048$) at 8-month follow-up.

Figure 2. Residents' Mentor Profile



Abbreviation: PGY, postgraduate year.

DISCUSSION

This study evaluated how residents prioritize and conceptualize mentorship and assessed the efficacy of a workshop designed to educate and empower residents to form and benefit from mentoring relationships. Residents identified several shared areas of personal and professional growth that they perceived as amenable to mentorship.

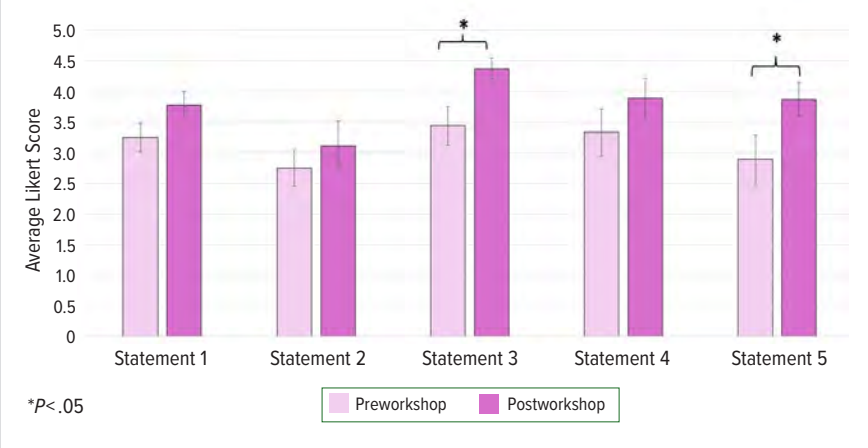
Although most residents could identify advisors across various domains, a substantial minority could not identify a mentor, despite all residents being assigned mentors by the program in accordance with ACGME requirements. This finding suggests a discordance between resident and program conceptualizations of mentorship. Several factors may contribute to this discrepancy. At this institution, all residents are assigned a mentor at the start of training and have regularly scheduled meetings with that mentor. However, faculty and resident expectations of mentorship may differ, resulting in a suboptimal mentorship. Such misalignment may lead residents to not perceive assigned faculty as mentors. As previously described, mentee-identified mentors are associated with stronger mentoring relationships.[11,17] It is also possible that program-assigned mentors do not meet residents' individual standards or needs for mentorship and therefore are not recognized as such.

Residents may also receive mentorship from peers, family members, or friends. The data suggest that these relationships are not perceived as mentorship by residents. This may be because residents do not view individuals with whom they have close personal relationships as mentors. Given that residents with and without identified mentors sought advice from similar groups of individuals, additional factors likely influence whom residents perceive as mentors. It also remains unclear whether self-identification of a mentor is necessary to achieve the documented benefits of mentorship.

Multiple barriers to effective resident mentorship have been described. Among these, resident buy-in has consistently been identified as necessary to successful mentorship.[20-23] Aligning mentoring relationships with resident-defined goals may improve buy-in. This study identified several common areas of personal and professional development that residents prioritized, consistent with prior survey data from medical trainees.[24] Although resident priorities may vary by program, these findings provide guidance for mentorship program development.

Prior initiatives have emphasized research as a core focus of mentorship programs.[11,15,16] While research was identified as important by residents in this study, other domains were prioritized more frequently, suggesting a potential mismatch between academic mentoring priorities and resident values. This misalignment may contribute to lower satisfaction with mentorship. By targeting areas of importance to residents, programs may more readily foster resident buy-in and have greater success with their mentorship programs.

Figure 3. Preworkshop and Postworkshop Assessment of Mentoring and Mentoring Relationships



Residents were asked to rate their satisfaction or confidence in 5 statements on 5-point Likert scale: "How satisfied are you with: (1) the mentoring you have received during residency, (2) the training you received about how to mentor/be mentored;" and "How confident do you feel about your ability to (3) initiate a mentoring relationship, (4) build a strong relationship with a mentor, (5) mentor other medical trainees."

Medical trainees face numerous demands, including clinical responsibilities, research expectations, and professional development. It is unlikely that a single mentor can adequately support all aspects of a trainee's development. Comprehensive support therefore requires multiple mentors, each contributing distinct expertise and perspectives.[18,19] Accordingly, residents must feel confident in establishing new mentoring relationships and expanding their mentorship networks to meet evolving developmental needs. This workshop may serve as a practical intervention to increase resident confidence in building such networks.

Limitations

This study has several limitations. The small sample size limits both generalizability and the ability to detect differences across training years. The small sample size in the longitudinal follow-up further limits the generalizability postworkshop findings. Shorter follow-up periods may improve response rates in future studies.

This study was conducted at a single institution, and mentorship strategies may vary between programs, potentially influencing resident's perception of mentorship. Additionally, the absence of an immediate postworkshop survey makes it unclear if the changes observed over time were due to the intervention or the natural evolution of mentoring relationships. The study also lacked a control group and did not use a validated measure of mentorship engagement. Inclusion of a control group in future studies would allow for more nuanced assessment of workshop efficacy, though this may be challenging due to cross-contamination between resident cohorts and concerns about equitable access to professional development.

Future studies can address these limitations through multisite designs and inclusion of control groups. Further investigation into the factors that influence how residents define and recognize mentors may provide additional insight into strategies for effectively aligning mentors and mentees.

CONCLUSIONS

Pediatric residents identified numerous areas of personal and professional growth amenable to mentorship. While many residents were unable to identify a mentor, nearly all identified advisors, suggesting a discordance between residents' conceptualization and actualization of mentorship. No significant differences were observed in the number of mentors or mentor characteristics before and after the workshop. However, residents demonstrated a significant increase in confidence to initiate mentoring relationships following participation in the workshop, suggesting that this intervention may provide value in supporting residents as they develop and expand mentorship networks. Future efforts should focus on strengthening mentoring connections and evaluating this intervention across multiple residency programs.

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Got SPIRiT?: Evaluating a Supportive Approach to Medical Resident Remediation

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ABSTRACT

Background: Up to 15% of family medicine residents undergo remediation. While frequently successful, remediation can be emotionally challenging.

Methods: We developed a remediation approach called SPIRiT: Support, Processing emotions, Individualized plan, Reducing stigma/scrutiny, "i" (minimizing ego), and Transparency. A multidisciplinary team implemented SPIRiT. Qualitative researchers analyzed participant interviews using an inductive approach.

Results: Five residents completed interviews. Three categories were identified: understanding remediation, having agency, and processing and integrating feedback. Some residents were surprised they needed remediation and were unclear about remediation duration. Residents appreciated confidentiality and the opportunity to provide input. Processing feedback was emotionally challenging. Support from the behavioral health faculty member and peers who had completed remediation was helpful.

Conclusions: The SPIRiT approach provides a helpful framework to improve resident remediation through multidisciplinary support, opportunities for emotional processing, and meaningful learner involvement.

BACKGROUND

Family medicine resident physicians must meet Accreditation Council of Graduate Medical Education competencies to successfully complete residency.[1] Up to 15% of family medicine residents may require remediation during residency.[2] Most residency programs have had at least 1 resident on remediation in the past 3 years, and while about 90% of residents on remediation are successful within a year, remediation can be a challenging process characterized by overwhelming emotions, negative stigma, and lack of transparency.[3,4] Best practices for remediation include supportive faculty; normalization of the process; creation of a culture of specific, behavior-based, timely feedback from diverse sources; and transparency in the process.[5,6] Despite these identified best practices, there remains no standard way to approach remediation.[3]

Our university-based family medicine residency program historically conducted remediation with the residency program director and an associate program director. Residents were often successful with remediation, but the process was anecdotally reported as difficult for everyone involved because of insufficient support, lack of transparency, and stigma.[3,4] Based on reflections on prior remediation experiences and a literature review, we sought to improve our program's process by developing an approach to remediation called SPIRiT: Support, Processing Emotions, Individualized plan, Reducing stigma and scrutiny, "i" (minimizing ego), and Transparency.[4-6] This remediation process is led by a multidisciplinary group called the SPIRiT team.

We conducted a pilot evaluation of the SPIRiT approach to determine its impact on support, destigmatization, and transparency of the remediation process for residents.

METHODS

Program Description

The SPIRiT approach to remediation involves a range of interventions related to each part of SPIRiT, including engaging a variety of support people, processing emotions with behavioral faculty,

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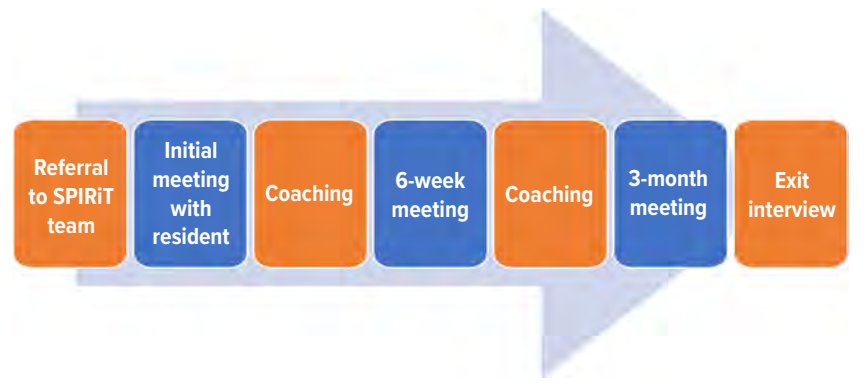
involving the resident in development of the remediation plan, connecting residents with peers who completed remediation, upholding confidentiality, teaching about feedback and the growth mindset, and maintaining process transparency (Figure 1).[7] The SPIRiT team comprises a program director who is responsible for residency promotion decisions, 2 associate program directors who lead remediation plans, a behavioral health faculty member who provides coaching and emotional support, a faculty learning specialist who provides nonevaluative coaching tailored to learning goals, and a residency program manager who provides administrative support. Coaching approaches include case discussions, direct clinical observations, and standardized patient sessions. The team works with residents on 3-month remediation plans, also known as learning plans, as well as residents who self-refer for learning support. In addition to meeting with residents, the team meets internally twice monthly to review resident progress, which is determined by written evaluations from faculty preceptors (Figure 2).

Figure 1. Components of the SPIRiT Approach to Resident Remediation

Abbreviation: SPIRiT: Support, Processing emotions, Individualized plan, Reducing stigma/scrutiny, "i" (minimizing ego), and Transparency.

Figure 2. The Remediation Process With the SPIRiT Team



Evaluation Participants and Protocol

Second- and third-year residents from a 16-resident-per-class, university-based family medicine residency program who completed a remediation plan between June 2023, and October 2024 participated. Participants completed a 15-question, structured, 30- to 60-minute exit interview with a staff member not directly involved in the remediation process to share their experiences with the 6 parts of the SPIRiT approach. Questions explored diverse aspects of experiences with remediation, from first hearing about needing remediation to reflections on the remediation process. Three interviews were recorded and transcribed verbatim; interviewer note-taking during the interviews generated the written data set for the remaining 2 participants. The study was exempt from review by the University of Wisconsin-Madison Institutional Review Board.

Data Analysis

Co-authors not involved in the implementation of the SPIRiT approach conducted an inductive content analysis of the exit interview data with open coding and iterative derivation of descriptive categories.[8] Dialogic engagement throughout the process between trained qualitative researchers and SPIRiT team members enhanced confirmability and ensured representativeness of the analytic findings across all participants, increasing the rigor of the analysis.[9]

RESULTS

Five residents (participants A-E; 2 postgraduate year [PGY]-2 and 3 PGY-3) completed remediation during the study period; all completed the exit interview. The primary reasons for remediation

Table 1. Actionable Ideas for SPIRiT

	Working Well	Ideas for Improvement
Understanding remediation	"[Program director] gave me a heads up before I had a learning plan saying, 'hey, there's some language in there that says…we could extend your residency' or failure or something like that. But she was like, that's standard language…She gave a warning about that, and I really appreciated that." *–Resident A* "I felt it was very transparent, and to receive the discussion points and what we were going to talk about beforehand emails…it would say 'hey we got this feedback,' and maybe some broad topics we might discuss during the plan, which was helpful for me freaking out before actually having the meetings, like I don't know what they are going to tell me." *–Resident C*	"I was told was [I was} going to be [in] this program, but there was not much afterwards. It was put on me to figure out what to do. Initially what could have helped better would be having that frequent follow-up and direct contact with people." *–Resident C* "Overall, my learning plan was pretty clear with goals we formulated together and delineated how these things would be measured. One with less clarity – figuring out the duration of this and how long would it go for and when to say you met xyz goals." *–Resident E*
Having agency	"Everyone was really helpful in seeing what could I…basically asking me and what would work best for me, and working with me throughout all of it." *–Resident B* "[SPIRiT team] were always asking my opinion, and they had offered suggestions, they didn't tell me what to do specifically…it like a felt very collaborative idea generating process, as opposed to you are going to do this, this, and this, which was appreciated." *–Resident C*	"The things that were….less helpful or maybe, like, we tried doing these… one-on-one talks with different people to discuss different topics like heart failure or…asthma and stuff, and I'd…meet…maybe once every other week with someone and talk about topics, I think that was maybe less helpful for me. I think just based on my learning style, I need to just do things and apply it instead of talking about it." *–Resident B* "I get that some residents maybe want to read the individual feedback by people at their clinic or whatever, they want to read this back itself, but it sucks…And so, I think people should have the option that they summarized, if that's something they're willing to do." *–Resident A*
Processing and integrating remediation	"The sandwich method of positive feedback, constructive feedback. Including both…I think is motivational." *–Resident C* "Talking about it with colleagues and normalization of the process… knowing others going through same experience and not something I felt like I was being singled out for or failing as a learner still able to succeed and meet goals of becoming a physician and graduate on time." *–Resident E*	"Especially in those beginning visits, or when it's first brought up, allowing more time for just like, okay, we don't have to do anything right off the bat, but just realize we may be contacting you in the near future about having more specific things that we want to work on with you and brainstorming ideas on how to improve those things and plenty of reassurance…allow space and time." *–Resident C* "I didn't know that I could have asked [behavioral health person] to join…I feel like that should be made clear up front like, hey, [behavioral health support person] can join any of your learning plan meetings." *–Resident A*

Abbreviation: SPIRiT: Support, Processing emotions, Individualized plan, Reducing stigma/scrutiny, "i" (minimizing ego), and Transparency.

were professionalism related to administrative task completion (2 residents), both clinical reasoning and medical knowledge (2 residents), and medical knowledge (1 resident).

Residents offered detailed reflections, describing their experiences with and emotional responses to each aspect of SPIRiT. We present evaluation findings in 3 categories, focusing on actionable insights for future process implementation (Table).

Understanding Remediation

Residents described their assessments of the transparency, confidentiality, and clarity of remediation at the beginning, middle, and end of their remediation plans. Some were surprised to learn they would need remediation and wished for more transparency around evaluation metrics within the residency program. Others noted that remediation was transparently introduced as "not like a punitive thing, but something that's like, how can we improve you?" (Resident B). As they began remediation plans, they said they appreciated that confidentiality was strictly respected, with, according to Resident C, an "only between the people who need to know" approach. Most residents indicated there was adequate clarity about both the plans themselves and the roles of SPIRiT team members in implementing them but insufficient clarity regarding how long the remediation process might last. Overall, they most clearly understood remediation in the plan's middle, with some noting a lack of clear transparency at the beginning and/or end.

Having Agency

Residents appreciated opportunities to flexibly personalize and provide input about design and implementation of their remediation plans. They considered feedback a particularly emotional part of remediation and valued having choices, such as receiving feedback in advance instead of on the day of a remediation meeting, which could make for "just a horrible, horrible, horrible day" according to Resident A.

Processing and Integrating Remediation

For many residents, being informed about remediation was upsetting, described by Resident B as a "confidence drop," stirring up imposter experiences. They often described the behavioral health faculty as a "safe and private space" (Resident D) for "helping [them] process, like first of all being on a learning plan and what that means" (Resident B). They also mentioned how check-ins felt supportive when they included sufficient time for processing emotions. Some described how support from other residents who had

recently been on remediation plans themselves—as well as reassuring personal disclosures from faculty to normalize the experience—helped them manage complex feelings and look ahead with optimism. Overall, the residents recognized that "professional development is a career-long thing we should be working on" (Resident C), describing how their plans helped them feel more comfortable asking for help, developing strategies for professional success, and anticipating teaching others in the future.

DISCUSSION

Professionalism and medical knowledge were the most common reasons for remediation, consistent with prior findings.[2] Residents who underwent remediation with the SPIRiT approach noted feeling well supported by the multidisciplinary team, especially through coaching and emotional processing with the behavioral health faculty member. Residents valued providing input in the design of the remediation plan and offering feedback about the process. They appreciated confidentiality and normalization of remediation, similar to finding from prior studies.[4,5] Meeting with a peer who had completed remediation was an effective way to normalize the process and decrease stigma. Processing feedback was challenging, and while transparency about faculty roles was clear, some residents wanted further transparency about the duration of remediation and noted that initiation of remediation was particularly surprising and emotionally difficult. Despite this, participants were thankful overall for the growth they experienced through the remediation process.

Implications

Struggling medical learners often have difficulty with self-assessment and lack insight into their deficits, which may contribute to strong emotional responses and surprise, especially at remediation initiation.[10] Nonetheless, this pilot evaluation highlights several areas of potential process improvement for SPIRiT that align with remediation best practices.[5,10] First, it is important to identify residents who need early intervention through residency learning intake interviews and objective structured clinical examinations. Additionally, cultivating a healthy feedback culture through professional development; providing timely, behavior-based feedback; and ensuring transparency around evaluation metrics and remediation processes are key. Finally, we can continue gathering data from residents to co-design best practices around communicating the need for remediation.

At its core, the SPIRiT approach aims to help residents learn and improve, and the qualitative methods used in this study capture this spirit for improvement by learning from the experience of residents undergoing remediation. Making an exit interview standard upon completion of remediation was an effective way to gather feedback about the SPIRiT approach, with a 100% participation rate, while engaging outside researchers to analyze the data provided an unbiased perspective.

Limitations

The sample size in this pilot evaluation is small but equates to about 10% of the studied residency program, which is similar to the percentage of residents expected to undergo remediation nationwide.[2] Not all data from the exit interviews are verbatim due to recording issues experienced during the interviews. One potential limitation to the transferability of these findings is that all participants interviewed successfully completed remediation. Future residents who are not successful with remediation may have different experiences and would be invited to complete an interview.

Next steps include revisiting the exit interview questions and structure to reflect learning from this pilot evaluation and formalizing an ongoing partnership between SPIRiT and outside researchers with qualitative skills and training.

CONCLUSIONS

Our pilot evaluation suggests that the SPIRiT approach offers a structured and supportive framework for resident remediation that aligns with identified best practices. By integrating multidisciplinary coaching, opportunities for emotional processing, and efforts to reduce stigma, the SPIRiT model helped residents to feel supported, better understand the remediation process, and engage more actively in their own professional development. Continued refinement of the SPIRiT approach will support efforts to improve remediation practices and enhance resident learning and growth.

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The Role of Clinical Empathy as Perceived by Medical Students

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ABSTRACT

Background: Clinical empathy is a pillar of medical practice, with evidence demonstrating improved clinical outcomes and patient resilience when physician empathy is employed effectively. Despite its well-established value, studies indicate that empathy declines significantly during the third year of medical school.

Objective: To examine how medical students perceive the importance of empathy in patient care and to identify preferred methods for teaching empathy within the medical curriculum.

Methods: A survey was distributed to 456 third- and fourth-year medical students at the Medical College of Wisconsin during August and September 2018. The response rate was 39%. Chi-square analyses compared perceptions between genders and between year groups. Students who declined to identify gender were excluded from gender-based analyses.

Results: Fourth-year students were significantly more likely than third-year students to report that working with attending physicians increased their empathy (50% vs. 34.3%, $P = .034$). Female students were more likely than male students to believe that empathy improved patient outcomes (100% vs 89.2%, $P = .003$). Educational preferences also differed by gender.

Conclusions: Medical students recognize empathy as an essential aspect of clinical care. Clinical experiences, particularly interactions with attending physicians, may enhance empathy training, and gender-based differences in educational preferences highlight the need for diversified, learner-responsive instructional methods.

BACKGROUND

In medical education, the terms empathy and compassion are often invoked as catchwords or rhetorical buzzwords, appearing frequently in medical school mission statements, program descriptions, and professional codes of conduct. While these words signal valued ideals, they are often applied vaguely, without consistent definitions, measurable competencies, or integration into formal curricula. In this sense, "empathy" and "compassion" function more as symbolic markers of what good physicians should embody rather than as clearly taught and assessed clinical skills.

By contrast, clinical empathy has been defined as a multidimensional construct that includes cognitive understanding of the patient's perspective, emotional resonance with their experience, and a behavioral component of communicating this understanding back to the patient. Genuine clinical empathy, therefore, is a teachable, sustainable skill set that requires intentional development throughout training. Prior research has demonstrated that empathy in clinical encounters enhances both patient outcomes and treatment adherence.[1] Despite this, multiple studies have documented a significant decline in empathy during the clinical years of medical school, most notably in the third year.[2,3] This decline has been attributed to factors such as heavy workload, time pressure, emotional fatigue, and a growing emphasis on technical competence over patient-centered care.[2] Such erosion of empathy is concerning, given its foundational role in fostering trust, improving patient satisfaction, and reducing physician burnout.

This study examines medical students' perspectives on empathy instruction at the Medical College of Wisconsin (MCW). Our primary objective was to evaluate third- and fourth-year students' reflections on how empathy was addressed in their preclinical curriculum.[3] Additionally, we sought to compare differences in attitudes toward empathy and preferred instructional

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strategies across class years and genders. By focusing on these comparative perspectives, this study adds nuance to existing literature and provides insight into how empathy training may be tailored to better support diverse learners across stages of medical education. The study also aimed to explore students' preferred instructional methods to better understand how empathy might be most effectively taught.

Table 1. Medical Students' Perceptions of Empathy and Instructional Preferences by Academic Year

Variable	M3 (n = 105) n (%)	M4 (n = 77) n (%)	*P* value[a]
What is your opinion about the role of empathy and compassion while providing patient care?			
It improves patient outcomes	97 (92.4)	73 (94.8)	.515
It increases the patient's satisfaction with the provider	101 (96.2)	75 (97.4)	.651
It detracts from the quality of care the patient receives	6 (5.7)	0 (0)	**.033**
It causes emotional exhaustion and compassion fatigue resulting in physician burnout	27 (25.7)	17 (22.1%)	0.571
How have your compassion and empathy for patients changed since entering medical school?			
Increased	47 (44.8)	43 (55.8)	.140
In your opinion, what are the most effective methods to learn empathy and compassion in medical school?			
Lectures on empathy in an auditorium	8 (7.6)	5 (6.5)	.771
Problem-based learning with a small-group discussion (workshop format)	46 (43.8)	32 (41.6)	.762
Narrative medicine training with reflective writing sessions on empathy	40 (38.1)	29 (37.7)	.993
During standardized patient encounters (eg, OSCE)	43 (41.0)	32 (41.6)	.935
During patient interaction (eg, rounding on patients)	99 (94.3)	72 (93.5)	.827
Self-directed learning (eg, review books, online modules, and/or case studies)	21 (20.0)	17 (22.1)	.733
Do you remember discussing empathy and compassion during a lecture in the first 2 years of medical school?			
Yes	59 (56.2)	61 (79.2)	**.001**
What are your thoughts about previous lectures on empathy and compassion at MCW?			
MCW has an excellent curriculum to teach empathy and compassion	13 (12.4)	12 (15.6)	.535
The information we were taught was not helpful in teaching empathy and compassion	36 (34.3)	24 (31.2)	.659
The information we were taught was difficult to apply in clinical practice	24 (22.9)	19 (24.7)	.775

Abbreviations: M3, third-year medical students, M4, fourth-year medical students; OSCE, Objective Structured Clinical Examination; MCW, Medical College of Wisconsin.

[a]*P* values were calculated using chi-square tests. Statistically significant values ($P < .05$) are shown in bold.

METHODS

An electronic survey was sent to all third-year (M3) and fourth-year (M4) medical students at MCW during August and September 2018. Survey items were developed iteratively based on prior literature and refined with faculty input. To ensure clarity and content validity, questions were pilot tested with a small group of pre-clinical students, and feedback was incorporated to adjust wording, structure, and response scales. The final instrument included Likert-scale items, multiple-choice questions, and open-ended responses addressing demographics, attitudes toward empathy, perceived personal changes in empathy, influences from clinical experiences, preferred instructional methods, and perceived barriers to empathy education. Open-ended items were included to allow students to elaborate on perspectives not captured by fixed-choice options, thereby providing additional qualitative insight.

The survey was distributed twice, 3 months apart, to maximize response rates. The survey instrument was developed specifically for this study and was not adapted from previously validated tools. No additional pilot testing was performed.

A total of 456 students received the survey, with a 39% response rate (105 male students, 77 female students). Two respondents declined to disclose gender and were excluded from gender-based analysis. Responses of "strongly agree," "agree," "strongly increased," and "increased" were categorized as positive; all others were coded as negative. Chi-square analyses were performed using IBM SPSS Statistics, version 24 (IBM Corp). The level of statistical significance was set at $P < .05$ for all analyses. This study was reviewed and approved by the MCW Institutional Review Board; participation was voluntary and anonymous.

There were no formal changes in the empathy curriculum between the M3 and M4 years. Students' perceptions therefore reflect their clinical experiences within each respective year rather than exposure to different content, teaching styles, or instructors.

RESULTS

A survey evaluating perceptions of empathy among third-year (n = 105) and fourth-year (n = 77) medical students revealed that M3 students were significantly more likely to agree that empathic care may detract from the quality of care ($P = .033$) (Table 1). There were no significant differences between M3 and M4 students regarding perceptions of empathy's impact on patient outcomes, patient satisfaction, or physician burnout. Additionally, 44.8% of M3 students and 55.8% of M4 students reported a change in their empathy toward patients since the beginning of medical school; however, this difference was not statistically significant.

Third- and fourth-year medical students were asked whether working with an attending physician had changed their beliefs about the role of empathy in patient care. At MCW, "working with an attending" reflects students' perceptions of how specific attending physicians model empathic behavior, rather than the mere fact of participating in clinical rotations. A statistically significant difference was observed, with 33.8% of third-year students and 50.0% of fourth-year students reporting a change in belief

($P = .034$) (Figure). This suggests that the quality of role modeling by attending physicians may shape students' evolving understanding of empathy during clinical training.

Preferred instructional methods were also assessed. M4 students most frequently endorsed lecture-based formats (7.6%), whereas M3 students preferred experiential learning methods, including standardized patient encounters and Objective Structured Clinical Examinations (OSCEs) (Table 1).

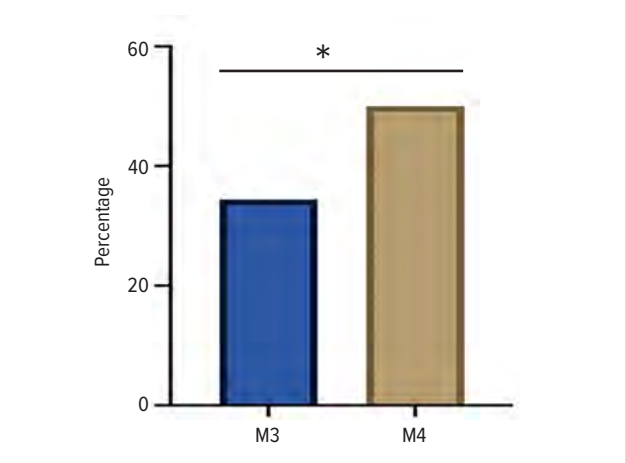
Gender-based comparisons revealed similar patterns: male students preferred lecture-based formats (10.8%), whereas female students preferred experiential learning methods (Table 2). These differences, however, were not statistically significant.

Table 2. Medical Students' Perceptions of Empathy and Instructional Preferences by Gender

Variable	Female (n = 78) n (%)	Male (n = 102) n (%)	*P* value
What is your opinion about the role of empathy and compassion while providing patient care?			
It improves patient outcomes	78 (100)	91 (89.2)	**.003**
It increases the patient's satisfaction with the provider	78 (100)	97 (95.1)	**.047**
It detracts from the quality of care the patient receives	1 (1.3)	5 (4.9)	.180
It causes emotional exhaustion and compassion fatigue resulting in physician burnout	12 (15.4)	30 (29.4)	**.027**
In your opinion, what are the most effective methods to learn empathy and compassion in medical school?			
Lectures on empathy in an auditorium	2 (2.6)	11 (10.8)	**.035**
Problem-based learning with a small group discussion (workshop format)	38 (48.7)	40 (39.2)	.202
Narrative medicine training with reflective writing sessions on empathy	33 (42.3)	36 (35.3)	.364
During standardized patient encounters (eg, OCSE)	42 (53.8)	33 (32.4)	**.004**
During patient interaction (ie, rounding on patients)	75 (96.2)	95 (93.1)	.381
Self-directed learning (ie, review books, online modules, and/or case studies)	12 (15.4)	26 (25.5)	.100

Abbreviation: OSCE, Objective Structured Clinical Examination.
P values were calculated using chi-square tests. Statistically significant values ($P < .05$) are shown in bold.

Figure. Percentage of Students Reporting That Working With Attendings Physicians Improved Their Perception of Empathy



Abbreviations: M3, third-year medical student; M4, fourth-year medical student.
*Significant difference, $P = .034$, chi-square test.

DISCUSSION

This study supports previous findings that empathy declines during the third year of medical training. Third-year students were significantly less likely than fourth-year students to report that working with attending physicians increased their empathy, suggesting that continued clinical exposure may mitigate empathy erosion.[3-5] Moreover, M3 students more frequently perceived empathy as distracting to patient care—an attitude not shared by M4 students—further supporting the notion that clinical experience positively shapes empathy perception.[6-8]

Gender differences were notable. Female students more often believed empathy improves patient outcomes and satisfaction, whereas male students were more likely to associate empathy with physician burnout. This suggests gender-based differences in how empathy's role is conceptualized. These findings also highlight gender-specific preferences that may inform curricular design. Because no baseline data from the first- and second-year students were collected, conclusions regarding the erosion of empathy are limited; alternatively, the data may indicate a modest increase in empathy with additional clinical experience.

Educational preferences also diverged. Males favored lecture-based formats, whereas females preferred experiential learning through standardized patient encounters such as OSCEs. These distinctions underscore the value of incorporating diverse teaching methods to support varying learning styles.[6]

In the future, curricula could incorporate targeted strategies to cultivate and sustain empathy. Structured role-modeling opportunities could pair students with attending physicians recognized for empathic communication, complemented by reflective exercises to reinforce observed behaviors.[9] Second, experiential learning modules, such as standardized patient encounters and OSCEs, should be expanded to allow students to practice empathic skills in a low-stakes environment.[10] Longitudinal reflection and feedback mechanisms, including periodic reflective assignments or small-group discussions across clinical years, may help maintain awareness and encourage the ongoing development of empathy throughout training. Implementing these approaches offers concrete pathways for curriculum designers to enhance both the teaching and practice of clinical empathy.

Despite these limitations, the study highlights important implications for medical education. Few students reported that the current curriculum effectively taught empathy and attending role

models appear to influence students' beliefs. Because the empathy curriculum remained unchanged between the M3 and M4 years, observed differences in student responses likely reflect variations in clinical experiences rather than differences in instructional content, teaching style, or faculty.

CONCLUSIONS

This study highlights the influence of clinical experiences and attending physicians' role modeling on medical students' perceptions of empathy, suggesting that observed differences between third- and fourth-year students reflect the cumulative effect of clinical exposure rather than formal curriculum changes. Gender differences in perceptions of empathy and preferred learning styles underscore the importance of considering learner diversity when designing educational interventions. While the current curriculum was perceived as insufficient for teaching empathy, structured role-modeling, structured role-modeling, experiential learning, and longitudinal reflection offer practical strategies to foster empathic skills. These findings provide actionable guidance for medical educators seeking to maintain and enhance empathy throughout medical training, ultimately supporting improved patient care and professional development.

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More Than a Diagnosis: What Hospice Taught Me As a Medical Student

Adileen Sii, BS

The shadow of the withered pink flowers lingered over the ghostly shape of a worn-out deck of cards on the cold windowsill. Unable to visit in person due to strict COVID-19 restrictions in hospice, her loved ones had her favorite flowers delivered to brighten the room in their absence. Now, as the petals curled inward and stems sagged, the flowers seemed to echo the weight of all that had been left unsaid.

Just four weeks earlier, my anxious first hospice visit was with the "cranky and argumentative patient." Nervously shaking her petite hands with my gloved, sweaty palms, she immediately stated we were to play "King's Corner." Afraid to admit I had never played, after a few rounds, we carried on like old friends, bonding over her bird-watching hobbies and our feisty competitive natures. Visits beginning with "I've been waiting all day to play cards with you" ended with her asking if I would return next week. She was indeed snarky to caregivers whenever dinner time interrupted. However, her "cranky and argumentative" demeanor was a misunderstood expression of her loneliness and longing for companionship. After our third visit together, I finally caught on and managed to win my first game. "It's about time," she had jokingly teased as we planned a rematch after Easter. I did not know it then, but that would be our last visit playing cards together.

"Will you sit with me?" "How long will you stay?" As I held her hand to reassure her of my presence, her body relaxed into a peaceful slumber. I then understood the beauty of "passing peacefully." While the spunky, free-spirited "card sharp" lay disoriented and mumbling incoherently, her hearty smile and twinkling eyes were hidden behind closed eyelids – clear indicators of the physical burden her body had endured since our last visit. The dreaded moment had come. Prior to volunteering in hospice, I thought death was something to be feared and avoided at all costs. But as I sat with her in her final moments, something shifted in me. I understood that death was not something to avoid, but rather, something to meet with compassion, dignity, and presence. It was not the end of the story, but a chapter deserving of care and respect.

In that quiet space, I came to understand the quiet complexities of human connection, especially when faced with the imminent end. I realized that connection is more than just having a conversation, it is built through simple acts such as listening without judgment, showing compassion, or simply being present for a game of cards. Throughout our four short weeks, her snarky comments and life reflections rarely masked her fatal cancer diagnosis. I had no idea how to talk about death, let alone grieve over a loved one. Suddenly, death ceased to be an abstract idea. I had to face the imminence of her passing straight-on.

She showed me…the kind of physician I want to be: one who meets patients where they are, with empathy, compassion, and the readiness to sit with them in their most vulnerable moments.

My time with her matters because it broadens my understanding of what medicine encompasses – not just saving lives, but also helping patients with the end of life, offering them a safe and compassionate space to embrace their journey. She showed me the true meaning of resilience and the kind of physician I want to be: one who meets patients where they are, with empathy, compassion, and the readiness to sit with them in their most vulnerable moments. This experience has not only deepened my understanding of medicine but has also helped shape the physician I strive to become – one who embraces the delicate balance between life and death with grace and respect.

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Humanly Possible

Vincent Cryns, MD
Digital painting on iPad using Brushes

Artist Statement:
As a physician and scientist, I use my scientist's eye to break down complex patterns into their fundamental components and then rebuild them using simple brushstrokes and bold colors. In addition to traditional painting in acrylic and watercolor media, I also paint digitally on my iPad, which goes everywhere with me and allows me to paint whenever and wherever inspiration strikes. Many of my paintings can be seen on Instagram @vincentspaintings

University of Wisconsin's Outcomes From the Wisconsin Academy for Rural Medicine Track: A Pathway to Rural Primary and Specialty Care

Zoe Stratman, BS; Kenneth MacMillan, BM; Elizabeth M. Petty, MD; Christine S. Seibert, MD; Paul Hunter, MD; Byron Crouse, MD; Kimberly Lansing, MD, PhD; Julie Foertsch PhD; Joseph Holt, MD

ABSTRACT

Introduction: The outcomes of the Wisconsin Academy for Rural Medicine (WARM) of the University of Wisconsin School of Medicine and Public Health (UWSMPH) were assessed. Measures included WARM graduates' practice locations, specialty outcomes, and the influence of program elements on commitment to work with rural populations.

Methods: A review of 106 WARM and 925 non-WARM graduates from 2011 through 2017 was conducted. Stratified chi-square tests of independence and corresponding odds ratios were calculated to examine associations between program type, practice location, and specialty. Exit survey data from graduating WARM students (2020-2023) were analyzed to identify activities perceived as most influential in preparing for rural practice.

Results: WARM graduates had significantly higher odds of practicing in rural areas, in Wisconsin, and in both primary and specialty care compared with non-WARM graduates. Among graduates practicing in Wisconsin, WARM alumni had increased odds of practicing rurally and in primary care. Survey respondents rated interaction with rural physicians and staff as the most important activity for increasing commitment to rural practice.

Conclusions: WARM graduates are substantially more likely than non-WARM graduates to practice in rural Wisconsin, regardless of specialty. Immersive rural experiences, particularly interaction with rural physicians and staff, appear critical in preparing students for rural practice. These findings highlight the effectiveness of rural-focused medical education in addressing physician shortages and improving access to care in underserved communities.

INTRODUCTION

Within the next 10 years, the United States is expected to experience a shortage of physicians across all specialties and subspecialties.[1] More than 60 million people—about 20% of the US population—live in rural areas. Almost 70% of these areas are designated health professional shortage areas, and this deficit is predicted to get worse as the current population of rural providers ages and retires.[2,3] Physician shortages limit rural patients' access to health care, often forcing them to travel far distances to receive services, which further exacerbates health disparities between rural and urban areas.[4]

The 21st century began with a charge to increase the number of physicians working in underserved rural and urban areas within Wisconsin, echoing the national forecast of future physician shortages.[5] In response, the Wisconsin Hospital Association launched the Wisconsin Task Force on Wisconsin's Future Physician Workforce, whose deliberations resulted in a 2004 statewide call-to-action report, "Who Will Care for Our Patients," highlighting issues and recommendations to respond to existing and predicted workforce shortages.[5] Recommendations included creating a "school within a school" to address Wisconsin's rural underserved populations through new admissions and curricular initiatives.[5] At the time of the task force report, fewer than 5% of graduates of the University of Wisconsin School of Medicine and Public Health (UWSMPH) reported an intention to practice in a rural location, with declining trends over several years. In response, UWSMPH created the

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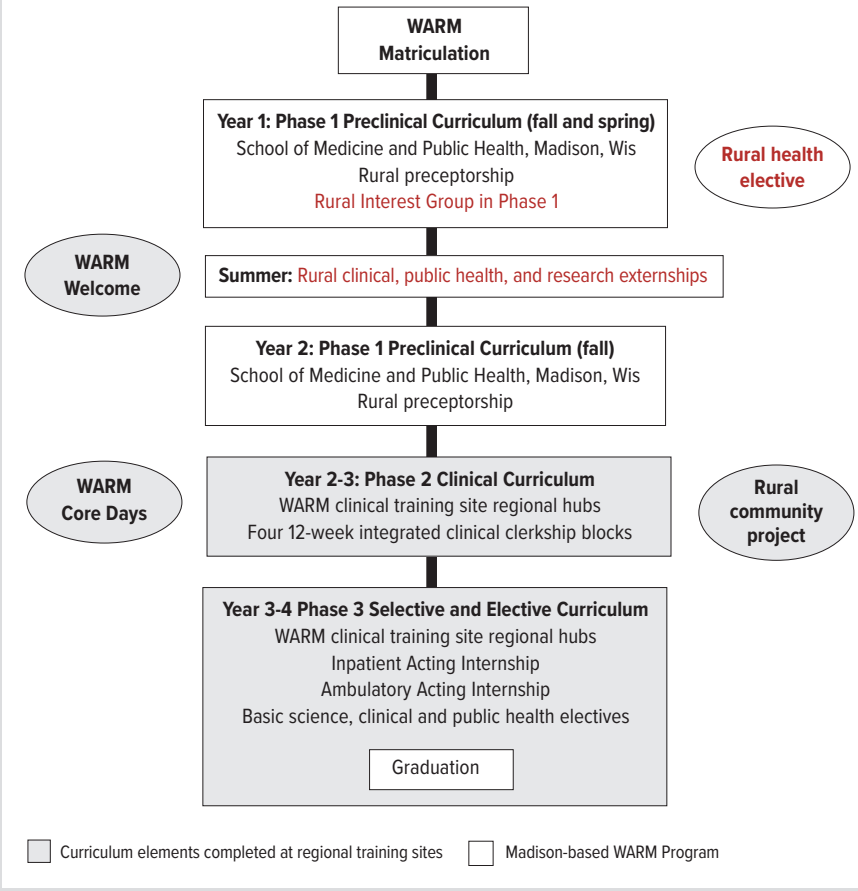
Wisconsin Academy for Rural Medicine (WARM) and matriculated its first cohort of students in 2007.

The goal of the WARM program is to increase the supply of physicians in rural Wisconsin and ultimately improve the health of rural communities. This begins with a selective admission process requiring all applicants to demonstrate dedication to rural medicine and prior immersive rural clinical experiences, while meeting all benchmarks and metrics of the traditional Medical Doctor program's admission criteria. Admission is limited to applicants who are Wisconsin residents or from bordering states (Illinois, Iowa, Minnesota, or Michigan) and can demonstrate a connection to Wisconsin. WARM cohort size has gradually increased and now typically has 26 students per year in each class. Importantly, recognizing shortages of specialists as well as primary care physicians in rural areas, the WARM program is not limited to students interested in primary care careers.

Figure. Wisconsin Academy for Rural Medicine (WARM) ForWard Curriculum Map



Red text indicates optional WARM activity.

The WARM curriculum follows and enhances UWSMPH's MD curriculum (Figure) and is divided into 3 specific phases. Phase 1 spans the first 18 months of medical school. During this phase, WARM students live and take classes at the UWSMPH campus in Madison, integrating into learning communities with non-WARM students to promote interaction within the school of medicine class and provide rural perspectives to peers. Students also participate in clinical preceptorships in rural communities surrounding Madison to gain rural health care experiences. WARM students may opt to participate in rural enrichment activities, such as the Rural Health Interest Group and the Overview of Rural Health Elective. While optional, almost all WARM students participate in both.

Beginning with Phase 2, all subsequent required clinical experiences occur at 1 of 3 regional clinical WARM sites affiliated with UWSMPH statewide campuses: Marshfield Clinic Health System/Northern Academic Campus in Marshfield, Gundersen Health System/Western Academic Campus in La Crosse, and Advocate Aurora Health/Eastern Academic Campus at Aurora BayCare in Green Bay. These health system hubs serve different rural regions across Wisconsin. WARM students are oriented to their assigned site and community during the summer before their second year in a 1-week program called WARM Welcome, which includes cultural competence education relevant to caring for unique rural populations, such as the Plain Community and Native American tribal communities. Rural physicians who serve as UWSMPH clinical adjunct faculty and public health professionals, in collaboration with these centers, provide highly relevant clinical training equivalent to that provided to non-WARM students in Madison. WARM students have the same core objectives, assessments, and academic standards as their non-WARM counterparts. As part of Phase 2, all UWSMPH students complete community projects, with WARM student projects focusing on the unique health needs of rural communities.

During the last 16 months of medical school (Phase 3), WARM students complete the required inpatient and ambulatory acting internships, working in clinical roles that mimic expectations of interns and prepare them for residency and rural practice. Most WARM students continue working on Phase 2 projects and/or develop new projects to improve the health of the communities in which they learn. Past projects have included naloxone distributions, Stop the Bleed training, and food pantry nutrition education. In addition, during Phases 2 and 3, WARM students participate in Core Days, which gather WARM students to learn new skills, such as wilderness medicine and rural disaster response.

Program evaluation occurs throughout the program using quantitative and qualitative measures to assess outcomes and foster quality improvement. WARM students complete standard evaluations after each clerkship and an end-of-year survey administered each spring. Surveys measure attitudes toward practicing in rural underserved areas and determine the impact and effectiveness of program components.

Extended experiences in a rural setting have been shown to nurture and sustain students' interest in rural practice.[6-8] The purpose of this study was to examine WARM program outcomes using 3 measures: (1) WARM graduates' practice locations, focusing on their tendency to practice in Wisconsin – overall and in rural locations – compared to non-WARM peers; (2) WARM graduates' practice specialty outcomes as compared to non-WARM peers; and (3) WARM student ratings of program elements that most influenced their commitment and readiness to work with rural populations.

METHODS

Design

A retrospective review of UWSMPH graduation statistics was conducted. Institutional Review Board (IRB) approval was not sought because this study was determined not to meet criteria for IRB oversight, as it involved quality improvement and program evaluation.

Subjects

To address purposes 1 and 2, we reviewed the verifiable practice location data of 106 of 123 WARM graduates (85.5%) and 925 of 987 non-WARM graduates (94.0%) from 2011 through 2017 who had completed residency training. To address purpose 3, data were collected from fourth-year medical student exit surveys completed from 2020 through 2023 (response rate: 85.3%, n = 81).

Variables

Location

Location of current practice as of June 2023 was collected for UWSMPH graduates who had completed all medical training. Data were categorized as practicing in Wisconsin or practicing outside of Wisconsin. ZIP code of current practice location was used to determine the Rural-Urban Commuting Area (RUCA) code. RUCA codes are census tract-based classifications based on population density, urbanization, and commuting patterns that characterize all US census tracts by rural/urban status.[9] Communities receive a RUCA code scored 1-10, with scores of 4-10 classified as rural. Based on ZIP code and RUCA code, each participant's practice location was categorized as rural or urban.

Specialty

Available graduate practice data included specialty choice, which was categorized as primary care (family medicine or general internal medicine and pediatrics) or specialty care (all other specialties). Subspecialties in internal medicine (eg, cardiology, pulmonology) and pediatrics (eg, pediatric emergency medicine) were not included in the primary care category.

WARM Exit Survey

The WARM program administers an exit survey to departing fourth-year students; responses from 2020-2023 were compiled for this study (85.3%, n = 81; separate sample from graduate location data). The class of 2020 was the first to experience the UWSMPH's ForWard curriculum, which placed students into clinical rotations statewide a full semester earlier – during their second year – than the previous curriculum. Perceived importance of WARM curricular activities for preparation to be a rural physician was measured with the question, "Rate the importance of the following WARM experiences in increasing your commitment to and readiness for being a rural physician." Graduates rated 4 activities – interacting with physicians and staff in rural areas, interactions with other WARM students, working on a community health improvement project, and living in a rural community – on a scale from 0 (not important) to 3 (very important). Data were also collected for the question, "Please rate the effectiveness of each of these fourth-year requirements in preparing you to work as a rural physician." Graduates rated 2 activities – Inpatient Acting Internship and Ambulatory Acting Internship – on a scale from 0 (not important) to 4 (exceptionally important).

Graduate Data Collection

Graduate records, including specialty, program involvement, and current practice location, are maintained by the Wisconsin Medical Alumni Association (WMAA). Each year, as part of UWSMPH's quality improvement efforts, alumni specialty, employer, and practice location (city and state) listed in the WMAA records for the UWSMPH class that graduated 6 years earlier are verified by the Medical Education Office via Google search so surveys can be sent. For this study, all graduate data from 2011-2017 were reverified and updated via Google search to confirm practice locations and gather ZIP code data.

Analysis

Descriptive statistics were used to compare practice location and specialty between WARM and non-WARM alumni. Stratified chi-square tests of independence and corresponding odds ratios were calculated to test associations between program (WARM vs non-WARM), practice location, rurality, and specialty. Analyses were conducted using SAS Version 9.4 (SAS Institute Inc). Descriptive statistics were also used to summarize perceived importance of WARM experiences in increasing commitment to and readiness for rural practice via self-report.

RESULTS

Descriptive Information

A total of 106 WARM graduates and 925 non-WARM graduates

from UWSMPH Classes of 2011-2017 were included in this study. Of the 106 WARM graduates who had completed all training, including residency, 73% (n = 77) were practicing in Wisconsin, and 47% (n = 36) of this group were practicing in rural Wisconsin (RUCA codes 4-10). In contrast, 39% (n=363) of non-WARM graduates were practicing in Wisconsin, and only 12% (n = 43) practiced in rural Wisconsin. Just under half of WARM graduates (46%, n = 49/106) were practicing primary care, while one-third of non-WARM graduates (31%, n = 289/925) were practicing primary care (Table 1). UWSMPH graduate specialties are listed in Tables 2 and 3. Although primary care specialties are the most common among WARM graduates in rural settings, other specialties are also represented in rural practice.

Findings

Graduates of the WARM program have 7.0 times the odds of practicing rurally ($P < .001$), 4.1 times the odds of practicing in Wisconsin ($P < .001$), and 1.9 times the odds of practicing primary care ($P = .002$) compared with non-WARM graduates.

Among the UWSMPH graduates practicing in Wisconsin, WARM graduates had 6.5 times the odds of practicing rurally ($P < .001$) and 2.0 times the odds of practicing primary care ($P = .004$). WARM graduates who practice primary care had 12.1 times the odds of practicing rurally ($P < .001$) and 6.3 times the odds of practicing in Wisconsin ($P < .001$) compared with non-WARM graduates. WARM graduates who practice specialty care had 3.3 times the odds of practicing rurally ($P < .001$) and 3.0 times the odds of practicing in Wisconsin compared with non-WARM graduates ($P < .001$).

WARM graduate survey responses from 2020-2023 were reviewed to assess the importance of WARM curricular activities. On average, graduates rated "Interacting with physicians and staff in rural areas" as the most important activity for increasing commitment to and readiness for rural practice (mean, 2.58; SD, 0.71). Graduates rated the Ambulatory Acting Internship (mean, 3.42; SD, 0.72) and the Inpatient Acting Internship (mean, 3.05; SD, 0.93) as very effective in preparing them for rural practice.

DISCUSSION

The goal of the WARM program is to increase the supply of physicians practicing in rural Wisconsin. Results indicate that WARM graduates are significantly more likely to practice rurally and in Wisconsin than non-WARM graduates, suggesting the program has achieved its goal. This is consistent with the application criteria for WARM students, who are selected based on a preexisting desire to work with rural populations and a connection to Wisconsin. These findings align with other rural medical programs, such as Jefferson Medical College Physician Shortage Area Program and University of Illinois Rockford Rural Medical Education Program, which report higher percentages of rural program graduates practicing in rural areas compared with nonrural counterparts.[10,11]

Table 1. WARM vs Non-WARM Demographics From UWSMPH Classes 2011-2017

	Primary Care	Specialty Care	Practicing in Wisconsin	Practicing in rural Wisconsin
WARM (n = 106)	49 (46%)	57 (54%)	77 (73%)	36 (47%)
Non-WARM (n = 925)	290 (31%)	635 (69%)	363 (39%)	43 (12%)

Abbreviations: WARM, Wisconsin Academy for Rural Medicine; UWSMPH, University of Wisconsin School of Medicine and Public Health.

Table 2. General vs Specialized Counts of Internal Medicine and Pediatrics for WARM Graduates vs Non-WARM graduates From UWSMPH Classes 2011-2017

	All Graduates	WARM Graduates	Non-WARM Graduates
Internal Medicine	182	14	168
General	106 (58%)	7 (50%)	99 (59%)
Subspecialty	76 (42%)	7 (50%)	69 (41%)
Pediatrics	108	4	104
General	68 (63%)	2 (50%)	66 (63%)
Subspeciality	40 (37%)	2 (50%)	38 (37%)

Abbreviations: WARM, Wisconsin Academy for Rural Medicine; UWSMPH, University of Wisconsin School of Medicine and Public Health.

A key outcome—independent of specialty choice—is that WARM graduates have higher odds of practicing in rural areas and in Wisconsin. While many rural programs emphasize primary care, WARM allows students to pursue any specialty.[12-14] This is important because specialized physicians are less likely to practice in a rural area.[15] We theorize that because WARM students do not need to declare a specialty before admission, their preference for rural practice outweighs the assumption that specialty care is limited to urban settings. As rural providers retire across all specialties, rural programs that do not restrict specialty choice may better meet community needs, which extend beyond primary care.

According to WARM students, one of the most important factors in preparing students for rural practice is experience with physicians and staff in rural settings. Research supports that rural clinical placements positively influence rural practice location.[16] These interactions with rural community members allow students to envision their future careers and foster longitudinal relationships. This likely explains why students rated the Ambulatory Acting Internship highly, along with other continuity-based experiences in rural training sites. Therefore, rural tracks should maximize rural immersion, so students graduate feeling prepared and connected to rural communities.

Limitations

This study has limitations. Rurality was determined by RUCA codes, which are based on commuting patterns; thus, small towns with a high percentage of people who commute to a urban centers for work may not have a rural classification, potentially underestimating rural status and the true breadth of UWSMPH

Table 3. Number and Percentage of WARM and Non-WARM Graduates From UWSMPH Classes 2011-2017 Practicing in Each Specialty

Specialty	WARM Total	WARM Wisconsin	WARM Rural WI	WARM Urban WI	Non-WARM Total	Non-WARM Wisconsin	Non-WARM Rural WI	Non-WARM Urban WI
Anesthesiology	5 (4.7%)	2 (2.6%)	0 (0%)	2 (100%)	68 (7.4%)	23 (6.3%)	2 (8.7%)	21 (91.3%)
Dermatology	1 (.9%)	1 (1.3%)	1 (100%)	0 (0%)	19 (2.1%)	9 (2.5%)	1 (11.1%)	8 (88.9%)
Diagnostic radiology	3 (2.8%)	2 (2.6%)	0 (0%)	2 (100%)	35 (3.8%)	18 (5.0%)	0 (0%)	18 (100%)
Emergency medicine	10 (9.4%)	5 (6.5%)	0 (0%)	5 (100%)	90 (9.7%)	32 (8.8%)	9 (28.1%)	23 (71.9%)
Family medicine	**40 (37.7%)**	**33 (42.9%)**	**22 (66.7%)**	**11 (33.3%)**	**125 (13.5%)**	**68 (18.7%)**	**13 (19.1%)**	**55 (80.9%)**
General surgery	9 (8.5%)	7 (9.1%)	4 (57.1%)	3 (42.9%)	64 (6.9%)	25 (6.9%)	1 (4.0%)	24 (96.0%)
Internal medicine	**14 (13.2%)**	**10 (13%)**	**4 (40%)**	**6 (60%)**	**168 (18.2%)**	**57 (15.7%)**	**3 (5.3%)**	**54 (94.7%)**
Neurology	2 (1.9%)	1 (1.3%)	0 (0%)	1 (100%)	8 (.9%)	2 (.6%)	0 (0%)	2 (100%)
Obstetrics/gynecology	3 (2.8%	3 (3.9%)	2 (66.7%)	1 (33.3%)	59 (6.4%)	20 (5.5%)	2 (10%)	18 (90.0%)
Ophthalmology	1 (.9%)	0 (0%)	0 (0%)	0 (0%)	13 (1.4%)	6 (1.7%)	1 (16.7%)	5 (83.3%)
Orthopedic surgery	3 (2.8%)	2 (2.6%)	0 (0%)	2 (100%)	44 (4.8%)	22 (6.1%)	5 (22.7%)	17 (77.3%)
Otolaryngology	1 (.9%)	1 (1.3%)	0 (0%)	1 (100%)	19 (2.1%)	9 (2.5%)	0 (0%)	9 (100%)
Pathology	0 (0%)	0 (0%)	0 (0%)	0 (0%)	11 (1.2%)	5 (1.4%)	1 (20%)	4 (80%)
Pediatrics	**4 (3.8%)**	**2 (2.6%)**	**1 (50%)**	**1 (50%)**	**104 (11.2%)**	**36 (9.9%)**	**2 (5.6%)**	**34 (94.4%)**
Physical medicine/rehabilitation	2 (1.9%)	2 (2.6%)	1 (50%)	1 (50%)	3 (.3%)	0 (0%)	0 (0%)	0 (0%)
Psychiatry	6 (5.7%)	4 (5.2%)	0 (0%)	4 (100%)	41 (4.4%)	14 (3.9%)	0 (0%)	14 (100%)
Urology	2 (1.9%)	2 (2.6%)	1 (50%)	1 (50%)	6 (.6%)	4 (1.1%)	1 (25%)	3 (75)%
Other	0 (0%)	0 (0%)	0 (0%)	0 (0%)	48 (5.2%)	13 (3.6%)	2 (15.4%)	11 (84.6%)
Total	106	77	36	41	925	363	43	333

Abbreviations: WARM, Wisconsin Academy for Rural Medicine

All subspecialties are included within the specialty (ie, cardiology is included in internal medicine total). Total and Wisconsin column percentage represents part of total amount, respectively. Rural and urban column percentages represent percent of Wisconsin total in rural and urban setting.

Rural = Rural-Urban Commuting Area (RUCA) code 4-10; urban = RUCA code 1-3.

Bold type indicates primary care specialties.

graduates in rural practice. Furthermore, this study could not assess outreach activities; for example, physicians based primarily in urban health system hubs may regularly serve rural satellite clinic(s). Therefore, the number of WARM graduates serving rural populations may be higher than this study demonstrates. Additionally, survey data did not coincide with the same time period as the graduate data, so WARM graduates currently in practice may feel that different program elements influenced their decision to practice rurally. Practice location was collected as of June of 2023, representing varying lengths of practice and not accounting for provider movement. Finally, although data were available for nearly all graduates (92.9%), results might differ if all graduates were included.

Despite these limitations, these findings have valuable implications. Including a rural program within a medical school is highly beneficial, as this study and others[12,17,18] demonstrate the impact of dedicated rural-focused education and mentorship. Proportionally, significantly more WARM graduates than non-WARM graduates practice rurally and in Wisconsin. At a time of increasing physician shortages widening health disparities, programs that successfully place providers within the state where they train are beneficial. Future research should explore WARM graduates' perceptions after entering practice and examine whether WARM graduates in urban settings provide more rural outreach than non-WARM graduates. Additionally, studies could assess whether WARM graduates have greater longevity in rural practice compared with physicians without dedicated rural medical education.

CONCLUSIONS

The Wisconsin Academy for Rural Medicine (WARM) program demonstrates significant success in addressing physician shortages in rural Wisconsin. WARM graduates are substantially more likely than non-WARM graduates to practice in rural areas and within the state, regardless of specialty choice. These findings underscore the value of rural-focused medical education and immersive experiences in fostering long-term commitment to rural practice. As physician shortages continue to threaten access to care, programs like WARM provide an effective model for increasing the rural physician workforce and improving health equity in underserved communities.

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Gender and Racial Differences in Thematic Content of Personal Statements of Family Medicine Residency Applicants

Milap Dubal, MD, MPH, MSCHI

ABSTRACT

Introduction: The subjective nature of medical student personal statements creates potential for bias during residency recruitment. This research examines how thematic content differs by applicant race and gender.

Methods: A textual analysis of personal statements submitted by applicants to a family medicine residency program was conducted using linguistic analysis software to evaluate the associations between demographic characteristics and thematic content.

Results: A total of 487 personal statements were analyzed. Identified themes included "My Achievements," "My Clinical Vignettes," "My Life," "My Traits and Values," "My Residency Program Fit," "My Future Practice," and "My Goals as a Doctor." Themes of "My Achievements" and "My Clinical Vignettes" were overrepresented in statements from female applicants ($\chi^2 = 9$, $P < .01$; $\chi^2 = 12$, $P < .01$, respectively). "My Life" was overrepresented in statements from male applicants ($\chi^2 = 5$, $P < .01$). "My Residency Fit" was overrepresented among White applicants ($\chi^2 = 7$, $P < .01$), and "My Achievements" was overrepresented among applicants identified as underrepresented in medicine ($\chi^2 = 20$, $P < .01$).

Discussion: These findings may assist applicants in writing personal statements and may help recruitment committees recognize areas of potential bias. Further research is warranted to assess how such biases affect admissions decisions.

INTRODUCTION

Every year, medical students apply to US residency programs by submitting a standardized application through the Electronic Residency Application Service (ERAS). In 2018-2019, 37 103 applicants participated in the Main Residency Match,[1] including 4402 family medicine applicants seeking 3692 available positions.[2] Elements of the ERAS application include letters of recommendation, transcripts, the Medical Student Performance Evaluation (MSPE), standardized test scores, research and extracurricular activities, and a personal statement.[3] While many components of an application can be evaluated objectively, others—particularly the personal statement—require subjective assessment.

Multiple parts of the ERAS application are subject to bias, and the personal statement is particularly vulnerable due to its nonstandardized format.[4-8] The personal statement is a free-form narrative similar to a cover letter in a job application. Applicants typically use it to describe career goals, rationale for selecting their chosen specialty, personality characteristics, past accomplishments, and perceived fit with a program. While this format provides recruitment committees with insight into applicants as individuals, its open-ended nature also increases opportunities for subjective interpretation.

Previous studies have demonstrated that subjectivity in application review can lead to bias and discrimination. A 2011 study of MSPEs showed that author-student gender differences influenced the verbiage used, with MSPEs of male applicants written by female authors including fewer "positive emotion" words than those of female applicants.[7] Similarly, a 2017 analysis found that female applicants were more often described as "caring," "compassionate," and "empathetic," than males, and White applicants were more likely to be described as "outstanding," "best," and "exceptional" than Black applicants, who were more frequently described as "competent."[9]

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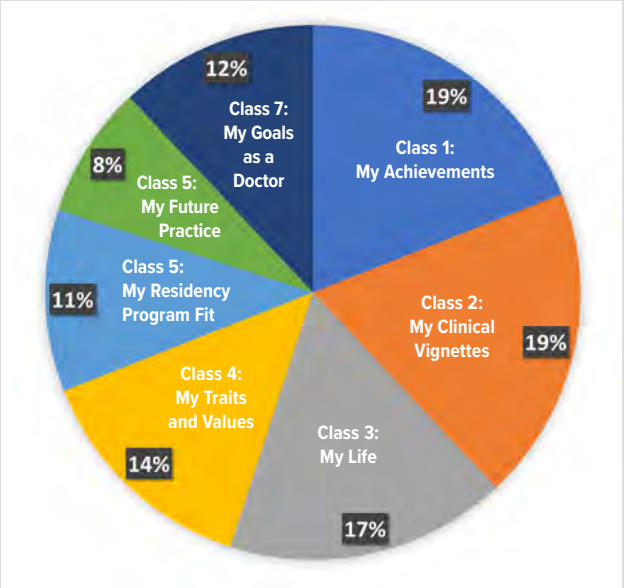
Table 1. Demographic Information

	n
Gender	
Female	254
Male	233
Race	
White	308
Asian	92
Hispanic, Latin, or Spanish origin	14
Black	20
Multirace	21
No race listed	22
Other	10
Other	
Underrepresented minority in medicine (URiM)	58

Figure. Proportion of Elementary Contextual Units That Fall Into Each Class



Because both MSPEs and personal statements are free-form textual documents, the patterns of bias observed in MSPEs raise concern that personal statements may be similarly affected. The inherent subjectivity of the personal statement, and its potential for bias and discrimination, has prompted debate about its role in applicant evaluation. There is ongoing disagreement on how personal statements should be assessed within the recruitment process.[8-11] Given the critical role of the ERAS application in shaping applicants' professional trajectories, it is important for them to understand how each component—including the personal statement—may influence their likelihood of matching into a desired residency program.

This study conducted a textual analysis of personal statements from medical students applying to a family medicine residency program to identify common themes and examine whether their prevalence varied by applicant demographics. Understanding these differences is an important aspect in working to minimize bias in the application process.

METHODS

Personal statements from US medical students who applied to the University of Wisconsin School of Medicine and Public Health Family Medicine Residency Program in 2018-2019 via ERAS were extracted. The statements were deidentified, tagged with self-reported race and gender, and combined into a single corpus. Statements without self-reported racial demographics were tagged as "no race listed" and included the full corpus for analysis. A few modifications were made to the corpus to improve analytic consistency, including adding demographic tags for underrepresented minorities in medicine (URiM) status,[12] postgraduate degrees, and leadership roles; replacing acronyms with full terms; removing individuals' full names; and converting symbols to their textual equivalents (eg,"$" replaced with "dollars"). A full list of tags and modifications is available from the author upon request. Analysis was conducted using Alceste 2018 Enterprise.[13]

Acleste analyzes vocabulary and word frequency, then segments the corpus into elementary contextual units (ECUs)—small fragments of text—that are grouped into classes. The software uses an algorithm to determine how often ECUs occur near one another and assigns classes based on these patterns and the location of their strongest oppositions. Classes are composed of ECUs most characteristic of each group.

The process of selecting ECUs that are significant and included in analysis involves excluding words that lack thematic meaning (eg, prepositions, articles, pronouns) or occur fewer than 4 times in the corpus and removing ECUs that do not fit into any class. Alceste has been used across a variety of disciplines, including analyses of personal statements from general surgery applicants[14] and internal medicine applicants.[15] In the 2015 study of internal medicine applicants by Osman et al, Alceste was validated against T-LAB, another linguistic analysis software.[15]

The initial analysis excluded demographic variables. After classes were generated, themes were assigned by reviewing representative words and ECUs within each class. The corpus was then reanalyzed with demographic information included. It was hypothesized that male applicants would be more likely to discuss clinical vignettes and that females would more often write about personal traits and values. For racial differences, it was hypothesized that applicants identifying as URiM or non-White would be more likely to write about past life experiences. Alceste produced chi-square values describing correlations between demographic groups and lexical classes. These values reflect whether ECUs from a demographic group appeared within a class more or less frequently than expected based on observed versus expected frequencies.

Table 2. Word Forms Associated With Each Class

Class 1 (My Achievements)

Form	χ^2
volunteer	364
underserved	306
public_health	250
project	230
organiz	199
school	193
health	191
student	184
research	183
university	175
advanced_degree[a]	169
leadership_role[a]	164

Class 2 (My Clinical Vignettes)

Form	χ^2
medication	252
pain	197
week	165
discuss	156
visit	153
room	152
explain	133
appointment	129
follow	111
question	110
woman	106
patient name[a]	104

Class 3 (My Life)

Form	χ^2
sibling	252
mother	222
up	177
father	174
remember	130
parent	129
young	121
tell	114
move	108
eye	99
night	99
grandparent	98

Class 4 (My Traits and Values)

Form	χ^2
others	145
trust	141
communic	103
physician	92
build	84
better	81
live	80
personal	73
role	72
relation	72
play	68
become	68

Class 5 (My Perfect "Fit")

Form	χ^2
resid	1319
program	1011
resident	370
train	366
hope	215
look	193
skill	174
fellow	136
knowledge	125
future	121
round	117
well	102

Class 6 (My Future Practice)

Form	χ^2
obstetric	522
scope	363
pediatric	304
wide	285
family_medicine	273
practice	258
range	242
breadth	220
full	193
broad	187
spectrum	182
variety	179

Class 7 (My Goals as a Doctor)

Form	χ^2
prevent	291
disease	183
address	169
acute	139
chronic	122
processes	113
family_medicine	105
condition	99
relation	96
whole	92
holistic	76
body	71

[a]Tag added by author.

This study was granted exemption status by the University of Wisconsin-Madison Institutional Review Board.

RESULTS

Personal statements from 487 medical students who applied to the University of Wisconsin School of Medicine and Public Health Family Medicine Residency Program during the 2018-2019 academic year were analyzed. All statements were included. Women comprised 254 applicants and men comprised 233. Three hundred eight applicants identified as White, 20 as Black, and 58 were tagged as URiM. Full demographic information is shown in Table 1.

Textual analysis of the corpus was conducted using an internal algorithm within the Alceste software. The software selected 78% of the ECUs as significant and grouped them into classes; the remaining 22% were excluded. The software produced 7 distinct classes. The Figure depicts the number of ECUs contained within each class. Class 1 contained the largest number (1114 ECUs). Examples of the representative words for each class are shown in Table 2. The final interpretations (themes) of each of the classes are summarized below:

1. *My Achievements*–Highlights achievements accomplished before applying for residency, with emphasis on leadership roles, service experiences, and advanced degrees.
2. *My Clinical Vignettes*–Describes patient encounters and/or clinical scenarios that influenced applicants' decisions to pursue family medicine.
3. *My Life*–Depicts important life experiences and people–such as family, friends, or mentors--who shaped applicants' choice of family medicine.
4. *My Traits and Values*–Represents applicants' descriptions of personal traits and values they perceive in themselves.
5. *My Residency Program Fit*–Describes characteristics applicants seek in a

Table 3. Associations Between Demographic Features and Lexical Classes

Demographic Feature (No. of ECUs in Corpus)	Lexical Class (No. of ECUs in Class)	Demographic Representation in Class	No. ECUs in Class w/ Demographic Feature	%[a]	%[b]	χ^2 Value
Female (2967)	Class 1 (1114)	Overrepresented[d]	634	21%	57%	9[d]
	Class 2 (1084)	Overrepresented[d]	626	21%	58%	12[d]
	Class 3 (1005)	Underrepresented[d]	501	17%	50%	-5[d]
	Class 4 (814)	Underrepresented	410	14%	50%	-3
	Class 5 (623)	As expected	319	11%	51%	0
	Class 6 (455)	Underrepresented	227	8%	50%	-2
	Class 7 (502)	Underrepresented	227	8%	45%	-2
Male (2630)	Class 1 (1114)	Underrepresented[d]	480	18%	43%	-9[d]
	Class 2 (1084)	Underrepresented[d]	458	17%	42%	-12[d]
	Class 3 (1005)	Overrepresented[d]	504	19%	50%	5[d]
	Class 4 (814)	Overrepresented	404	15%	50%	3
	Class 5 (623)	As expected	304	12%	49%	0
	Class 6 (455)	Overrepresented	228	9%	50%	2
	Class 7 (502)	Overrepresented	252	10%	50%	2
Underrepresented Minority in Medicine (685)	Class 1 (1114)	Overrepresented[d]	180	26%	16%	20[d]
	Class 2 (1084)	Underrepresented	117	17%	11%	-3
	Class 3 (1005)	As expected	128	19%	13%	0
	Class 4 (814)	As expected	103	15%	13%	0
	Class 5 (623)	Underrepresented[d]	57	8%	9%	-6[d]
	Class 6 (455)	Underrepresented	44	6%	10%	-3
	Class 7 (502)	As expected	56	8%	11%	0
Asian (1088)	Class 1 (1114)	Overrepresented	231	21%	21%	1
	Class 2 (1084)	Overrepresented[d]	242	22%	22%	7[d]
	Class 3 (1005)	Underrepresented	176	16%	18%	-3
	Class 4 (814)	Underrepresented	147	14%	18%	-1
	Class 5 (623)	Underrepresented[c]	102	9%	16%	-4[c]
	Class 6 (455)	Underrepresented[d]	70	6%	15%	-5[d]
	Class 7 (502)	Overrepresented[d]	120	11%	24%	7[d]
Black (234)	Class 1 (1114)	Overrepresented	53	23%	5%	1
	Class 2 (1084)	Overrepresented	55	24%	5%	3
	Class 3 (1005)	As expected	41	18%	4%	0
	Class 4 (814)	Underrepresented	28	12%	3%	-1
	Class 5 (623)	Underrepresented	21	9%	3%	-1
	Class 6 (455)	Underrepresented	14	6%	3%	-2
	Class 7 (502)	As expected	22	9%	4%	0
Hispanic, Latin, or Spanish origin (155)	Class 1 (1114)	Overrepresented[c]	41	26%	4%	4[c]
	Class 2 (1084)	Underrepresented[d]	14	9%	1%	-11[d]
	Class 3 (1005)	Overrepresented[d]	38	25%	4%	5[d]
	Class 4 (814)	Overrepresented[c]	31	20%	4%	4[c]
	Class 5 (623)	Underrepresented[d]	7	5%	1%	-7[d]
	Class 6 (455)	As expected	15	10%	3%	0
	Class 7 (502)	Underrepresented	9	6%	2%	-2
Multirace (242)	Class 1 (1114)	Overrepresented[d]	65	27%	6%	8[d]
	Class 2 (1084)	Underrepresented[d]	29	12%	3%	-9[d]
	Class 3 (1005)	As expected	42	17%	4%	0
	Class 4 (814)	Overrepresented	45	19%	6%	3
	Class 5 (623)	Overrepresented[c]	37	15%	6%	4[c]
	Class 6 (455)	Underrepresented[d]	10	4%	2%	-5[d]
	Class 7 (502)	Underrepresented	14	6%	3%	-3
Native American (37)	Class 1 (1114)	As expected	9	24%	1%	0
	Class 2 (1084)	Underrepresented[d]	1	3%	<1%	-7[d]
	Class 3 (1005)	Overrepresented[c]	10	27%	1%	2[c]
	Class 4 (814)	As expected	6	16%	1%	0
	Class 5 (623)	As expected	4	11%	1%	0
	Class 6 (455)	As expected	3	8%	1%	0
	Class 7 (502)	As expected	4	11%	%	0
White (3472)	Class 1 (1114)	Underrepresented[d]	648	19%	58%	-9[d]
	Class 2 (1084)	As Expected	678	20%	63%	0
	Class 3 (1005)	As Expected	623	18%	62%	0
	Class 4 (814)	As Expected	517	15%	64%	0
	Class 5 (623)	Overrepresented[d]	417	12%	67%	7[d]
	Class 6 (455)	Overrepresented	296	9%	65%	2
	Class 7 (502)	Underrepresented	293	8%	58%	-3
No race reported (271)	Class 1 (1114)	As expected	55	20%	5%	0
	Class 2 (1084)	As expected	53	20%	5%	0
	Class 3 (1005)	Underrepresented[c]	37	14%	4%	-4[c]
	Class 4 (814)	Underrepresented	31	11%	4%	-2
	Class 5 (623)	As expected	27	10%	4%	0
	Class 6 (455)	Overrepresented[d]	41	15%	9%	19[d]
	Class 7 (502)	As expected	27	10%	5%	0

[a]Number of ECUs within class with demographic feature / number of ECUs in corpus with demographic feature.
[b]Number of ECUs within class with demographic feature / number of ECUs in class.
[c]$P < .05$.
[d]$P < .01$.

residency program and the qualities they believe they would contribute to a residency program.

6. *My Future Practice*—Details applicants' envisioned future practice settings, including scope of practice (eg, procedures, inpatient, outpatient, pediatrics, obstetrics).
7. *My Goals as a Doctor*—Highlights what applicants value about family medicine, often focusing on relationships, holistic care, education, patient empowerment, and managing acute and chronic conditions.

Correlation between the thematic classes and applicant demographics were based on software-calculated chi-square values. Table 3 summarizes these results by demographic group. Within Class 1 (My Achievements) and Class 2 (My Clinical Vignettes), a significantly greater proportion of ECUs came from female applicants (634 ECUs, $\chi^2 = 9$, $P < .001$; 626 ECUs, $\chi^2 = 12$, $P < .001$). Males were significantly underrepresented in these 2 classes (480 ECUs, $\chi^2 = 9$, $P < .001$; 458 ECUs, $\chi^2 = 12$, $P < .001$) In Class 3 (My Life), male applicants were overrepresented (504 ECUs, $\chi^2 = 5$, $P = .025$).

Regarding racial differences, applicants identifying as Hispanic, Latin, or Spanish origin were overrepresented in Class 1, Class 3, and Class 4 (My Traits and Values) (41 ECUs, $\chi^2 = 4$, $P = .046$; 38 ECUs, $\chi^2 = 5$, $P = .025$; 31 ECUs, $\chi^2 = 4$, $P = .046$) and underrepresented in Class 5 (My Residency Program Fit) (14 ECUs, $\chi^2 = 7$, $P = .008$). The most notable finding was that URiM applicants were overrepresented in Class 1 (180 ECUs, $\chi^2 = 20$, $P < .001$). White applicants were overrepresented in Class 5 (417 ECUs, $\chi^2 = 7$, $P = .008$) and underrepresented in Class 1 (648 ECUs, $\chi^2 = 9$, $P < .001$).

Table 3 provides detailed results, including the number of ECUs per demographic feature and class, whether the group was overrepresented or underrepresented, the proportion of ECUs contributed by each group, and chi-square values indicating strength of association derived from the Alceste analysis.

DISCUSSION

Differences in thematic content of personal statements were observed across gender and racial groups. Female applicants more frequently wrote about achievements and clinical experiences, whereas male applicants more often wrote about life experiences. Applicants identifying as Hispanic, Latin, or Spanish origin more frequently discussed achievements, life experiences, and personal traits and values but wrote less often about their fit in a residency program. Although differences in class representation for Black applicants were anticipated, no statistically significant differences emerged.

It was notable that URiM applicants, female applicants, and applicants of Hispanic, Latin, or Spanish origin were all more likely to write about past achievements. This pattern may reflect the perceived need to prove qualifications and accomplishments when competing with historically advantaged groups, such as White and male applicants, and may also relate to how mentorship influences the thematic content of personal statements.[16-18]

Findings from similar studies in recent years provide context. A 2018 analysis of personal statements from general surgery applicants to Brigham and Women's Hospital in Boston, Massachusetts, found that men were more likely to describe personal surgical experiences, whereas women more often described surgery as a team endeavor.[14] Differences between that study and the present one may reflect the differences in specialty choice, applicant personality traits, career motivations, life and medical school experiences, and training environments. Geographic and institutional factors also likely shape both the applicant pool and the experiences applicants choose to write about. Comparative findings underscore how the personal statement can reveal information about applicants and suggest that applicants may tailor content based on the specialty or characteristics of the program to which they are applying.

The personal statement serves as one of the first glimpses recruitment committees have of applicants. Understanding how gender and racial differences influence written themes offers insight into the potential bias in the evaluation process. Awareness of these patterns may guide applicants, mentors, and reviewers toward more thoughtful approaches. Specifically, applicants may use this information to structure their statements to best reflect what they deem most important, and recruitment committees and program directors may use it to consider whether implicit biases are affecting their evaluation of personal statements.

Limitations

While this study provides insight into various themes present in personal statements, several limitations should be noted. First, generalizability is limited, as data were drawn from a single institution during a single application cycle. Second, the applicant pool was not demographically diverse: most applicants identified as White (63%), and aside from Asian applicants (19%), other racial groups each represented less than 5% of the sample. Third, the study only examined family medicine residency applicants.

A multiyear and multi-institutional study would strengthen future analysis, especially with a more diverse study population. Including a broader range of specialties would allow for comparison across disciplines. Longitudinal data could also reveal trends over time. Future research would also benefit from analyzing reviewer assessments against thematic differences in personal statements, and studies examining applicant–reviewer racial or gender concordance and its impact on ratings also would be valuable.

CONCLUSIONS

Overall, these findings contribute to the broader discussions on equity and fairness in the residency matching process and may inform future research aimed at mitigating disparities in applicant evaluation.

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Transformative Impact: Advancing Resident Competence and Confidence in Gender-Affirming Care Through a Multimodal Transgender Health Curriculum

Abbey Knickerbocker, MD; Nathan R. Jones, PhD; Kristina Kaljo, PhD; Laura Hanks, MD

ABSTRACT

Introduction: Transgender and gender-diverse individuals face well-documented health disparities, often due to limited provider knowledge and training. There is a growing body of evidence that emphasizes the importance of integrating transgender health content into medical education.

Objective: We sought to evaluate the impact of a longitudinal multimodal educational intervention on obstetrics and gynecology residents' knowledge, confidence, and comfort in providing gender-affirming care.

Methods: An educational transgender and gender-diverse curriculum incorporating didactics, clinical experiences, and surgical exposure was implemented within the obstetrics and gynecology residency program at a single academic medical center over 1 year. Residents (n=20) completed matched pre- and post-intervention surveys assessing self-reported knowledge, confidence, and comfort. Open-ended survey responses were analyzed using conventional content analysis.

Results: Residents demonstrated substantial improvements across multiple domains of transgender and gender-diverse care, including understanding of transgender care, confidence in counseling for gender-affirming surgery, comfort with hormone therapy management, and comfort describing hormone effects. Qualitative analysis identified themes of enhanced clinical awareness, shifts in professional identity through transformative learning, and awareness of systemic barriers that may impact provision of care.

Conclusions: A structured, longitudinal multimodal educational intervention significantly improved obstetrics and gynecology residents' preparedness to provide gender-affirming care. These findings support the integration of a formal transgender and gender-diverse health education curriculum into graduate medical education to enhance clinical competency and promote equitable health care.

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INTRODUCTION

Transgender and gender-diverse (TGD) individuals experience significant health disparities and barriers to care, in part due to widespread social and economic marginalization and limited provider knowledge regarding their unique health needs.[1] The American College of Obstetricians and Gynecologists (ACOG) has called for obstetrics and gynecology (OB-GYN) providers to deliver inclusive care and to educate themselves and their teams about the needs of TGD individuals. ACOG asserts the need for affirming, evidence-based care and identifies formal education in TGD health as essential to reducing inequities and improving outcomes.[2] This emphasis is echoed in the World Professional Association for Transgender Health's Standards of Care, Version 8, which underscores the importance of provider competence in gender-affirming care and calls for structured educational programs to address current knowledge gaps.[3]

TGD patients may require a range of services, including hormone therapy management, gender-affirming surgeries, fertility preservation counseling, and routine gynecologic care. It is essential that OB-GYN providers are equipped and comfortable providing this care. However, many providers feel underprepared to offer these services. A growing body of literature highlights that TGD patients often experience stigma, misgendering, and denial of care in health care settings.[4]

Despite growing consensus around the need for improved training, comprehensive residency-level TGD curricula remain

uncommon in the published literature. Educational interventions within residency training programs are needed to prepare future providers to meet the needs of this population. Surveys of OB-GYN residency program directors indicate that fewer than half of programs currently offer formal education on transgender health, though there is strong interest among both residents and faculty in expanding such training.[5] Insufficient curricular exposure contributes to discomfort and lack of preparedness among trainees, which may perpetuate disparities in access to competent care for TGD patients.

Recent interventions, including simulation-based and case-based curricula, have demonstrated that targeted educational programs can significantly improve resident knowledge, comfort, and confidence in providing care to TGD patients, with effects persisting beyond the immediate post-intervention period.[6,7] Systematic reviews further support that multicomponent training on lesbian, gay, bisexual, and transgender (LGBT) health—particularly when developed in collaboration with community members, leads to measurable improvements in provider knowledge, attitudes, and clinical skills.[8]

In response to these needs, the University of Wisconsin School of Medicine and Public Health Department of Obstetrics and Gynecology developed and implemented a structured TGD health curriculum within its residency program. We hypothesized that participation in this curriculum would lead to increased self-reported knowledge, confidence, and comfort among residents in delivering gender-affirming care. This study evaluates the first stage of this educational intervention in a small sample of OB-GYN residents, assessing its impact on residents' readiness to provide inclusive care.

METHODS

The study was conducted at a large academic medical center in Wisconsin. A structured transgender and gender-affirming health curriculum was integrated into the OB-GYN residency program during the 2024-2025 academic year. The year-long, longitudinal curriculum included didactics, surgical experiences, and a clinical rotation at the inaugural Gender Affirming Care Clinic (established August 2024) within the Department of Obstetrics and Gynecology. Didactic sessions included 2 additional 90-minute lectures during resident teaching, delivered by faculty members who regularly treat TGD patients. The lectures focused on general office care and surgical management. Surgical experiences included hysterectomies with and without oophorectomy performed with an attending physician. The residents' clinical rotation involved counseling patients on surgical and hormonal interventions, evaluating and staffing TGD patients with an attending physician, and learning to start and titrate gender-affirming hormone therapy. The aim of this pilot curriculum was to improve residents' knowledge, confidence, and comfort in providing care to TGD patients. The study was reviewed by University of Wisconsin Institutional Review Board and determined to be exempt.

OB-GYN residents who participated in the gender-affirming care curriculum during the 2024-2025 academic year were invited to complete pre- and post-intervention surveys assessing outcomes in 3 domains: knowledge, confidence, and comfort. An anonymous, web-based survey administered via Qualtrics (Qualtrics, LLC) was distributed to residents prior to and 1 year after curriculum implementation. The survey was designed to collect evaluative feedback for ongoing program improvement and to capture residents' reflections on the subject matter and its future application to clinical practice. Results from each resident were matched to their pre- and post-intervention responses. The survey included close-ended Likert-scale questions and open-ended questions to elicit insights into residents' knowledge, experiences, and goals related to gender-affirming care (Appendix 1). Survey responses were then grouped into 3 categories for analysis: positive (very good or excellent), neutral (good), and negative (fair or poor).

Quantitative survey data were exported from Qualtrics and analyzed using RStudio (Posit). The open-ended responses were imported into MaxQDA version 24.7.0 (VERBI Software GmbH) for qualitative analysis.

A conventional content analysis approach was applied. This inductive method draws codes and categories directly from participants' words rather than relying on a predefined framework. The process involved immersion in the data, systematic organization of preliminary codes, and iterative refinement of a codebook to identify emerging patterns (Appendix 2). Once the codebook was finalized, codes were grouped into categories to develop overarching themes. Transformative learning theory was applied to support interpretation. This theory describes how perspectives or assumptions may evolve through engagement with new knowledge, reflection on prior experiences, and navigating new or unfamiliar situations.[9-11] In this study, theory was used after coding to structure themes and to interpret how residents reflected on changes in confidence, knowledge, and professional identity. Inclusion of theory at this stage strengthened analytic rigor. Qualitative analysis was conducted by a research team member who is a health professions educator (KK).

RESULTS

In total, 20 residents were invited to participate, and all completed the survey in both 2024 and 2025, resulting in a 100% matched pre- and post-intervention response rate. Survey responses were categorized as positive, neutral, or negative to facilitate interpretation.

Quantitative Findings

Understanding of Transgender Care

Residents demonstrated increased understanding of transgender care following curriculum implementation (Figure 1). Negative responses decreased from 55% in 2024 to 45% in 2025, while

Figure 1. Rating Understanding of Transgender Care

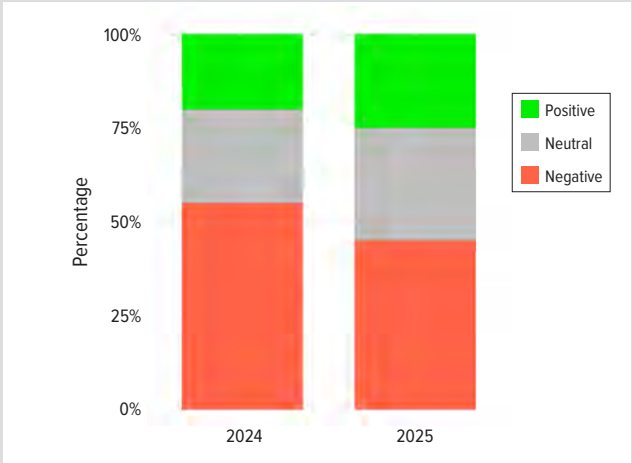


Figure 3. Confidence Counseling Patients for Gender-Affirming Oophorectomy

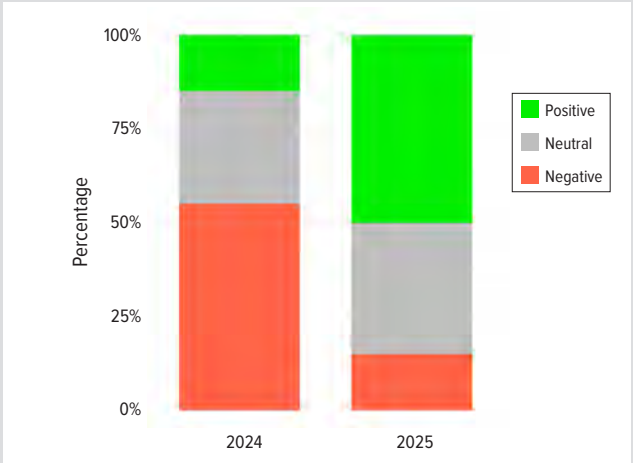


Figure 2. Confidence Counseling Patients for Gender-Affirming Hysterectomy

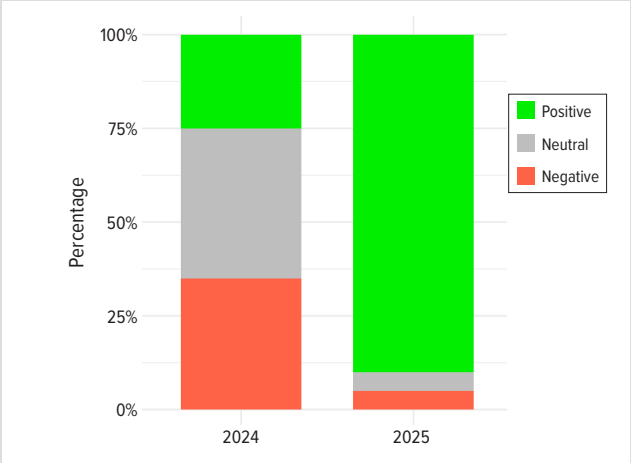
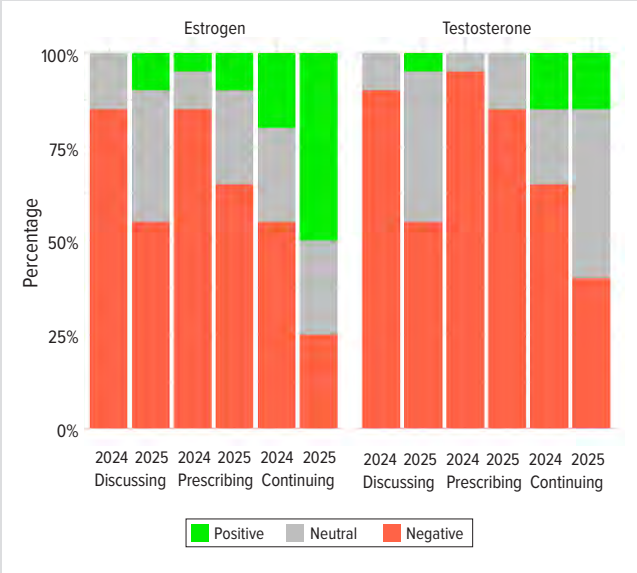


Figure 4. Comfort Discussing, Prescribing, Continuing Testosterone and Estrogen Therapy



positive responses increased from 20% to 25%, and neutral responses rose slightly from 25% to 30%. These results indicate a trend toward improved overall self-reported knowledge.

Confidence in Counseling for Gender-Affirming Surgery

Resident confidence in counseling patients for gender-affirming hysterectomy improved substantially after curriculum implementation (Figure 2). Negative responses decreased from 35% in 2024 to 5% in 2025, and neutral responses declined from 40% to 5%, while positive responses increased from 25% to 90%. Confidence in counseling patients for gender-affirming oophorectomy also improved (Figure 3). Negative responses decreased from 55% in 2024 to 15% in 2025, and positive responses more than tripled from 15% to 50%. These findings demonstrate a clear shift toward greater resident confidence and preparedness in counseling patients on gender-affirming surgery.

Comfort With Hormone Therapy Management

Resident comfort in discussing estrogen and testosterone therapy improved following curriculum implementation (Figure 4). For estrogen, negative responses decreased from 85% to 55%, while neutral responses increased from 15% to 35%, and positive responses emerged at 10% post-intervention. For testosterone, negative responses declined from 90% to 55%, with neutral responses rising from 10% to 40% and positive responses appearing at 5%.

Resident comfort with prescribing estrogen and testosterone therapy also improved (Figure 4). For estrogen, negative responses decreased from 85% to 65%, while neutral and positive responses increased from 10% to 25% and 5% to 10%, respectively. For testosterone, negative responses declined from 95% to 85%, and neutral responses increased from 5% to 15%.

Resident comfort with continuing estrogen and testosterone

therapy improved significantly post-intervention (Figure 4). For estrogen, negative responses decreased from 55% to 25%, while positive responses increased from 20% to 50%. For testosterone, negative responses declined from 65% to 40%, with neutral responses rising from 20% to 45%. Overall, these results suggest that residents gained confidence and comfort in discussing, prescribing, and continuing estrogen and testosterone therapy.

Comfort Describing Hormone Effects

Residents' ability to describe both the irreversible and potential adverse effects of hormone therapy improved following curriculum implementation (Figure 5). Understanding of the irreversible effects of estrogen and testosterone increased, demonstrated by 30% and 35% reductions, respectively, in negative responses and corresponding increases in neutral or positive perceptions. Knowledge of potential adverse side effects also improved. For estrogen, negative responses decreased from 65% to 35%, while neutral responses increased from 20% to 55%. For testosterone, negative responses declined from 85% to 50%, with neutral responses increasing from 15% to 45%. A small proportion of residents reported positive responses post-intervention. Collectively, these changes indicate enhanced resident knowledge and confidence in recognizing, discussing, and counseling patients on hormone-related effects and risks.

Qualitative Findings

Analysis of open-ended responses yielded 14 unique codes grouped into 4 overarching themes (Appendix 2).

Clinical Exposure and Applied Learning

Residents consistently cited clinical exposure--particularly hands-on learning in the Gender Affirming Care Clinic – as a valuable component of the curriculum. Key takeaways included improved knowledge in hormone replacement therapy management, patient counseling, and procedural understanding. Residents emphasized that learning through direct patient care, rather than passive instruction, strengthened their clinical confidence. Limited clinic time was a recurrent concern, with residents requesting more frequent and active participation to support skill development.

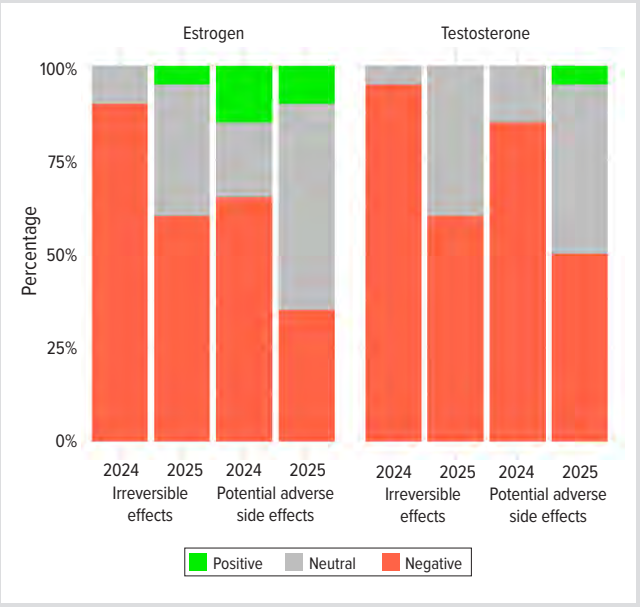
Barriers and Challenges to Practice

Residents noted several external and systemic barriers, including political climate, legal constraints, limited access to a small patient population, and perceived knowledge gaps among colleagues. Some expressed concern that these challenges may hinder their ability to continue providing gender-affirming care beyond residency.

Transformative Impact and Professional Identity

Residents described transformative shifts in how they viewed their role as future providers. Exposure to gender-affirming care challenged assumptions, increased confidence, and encouraged residents to envision themselves as advocates for TGD patients.

Figure 5. Comfort Describing Irreversible and Adverse Effects of Testosterone and Estrogen



These reflections align with transformative learning theory, which suggests that engaging with new content and reflecting critically on prior experiences can lead to meaningful shifts in identity and practice.

Recommendations for Curricular Improvement

Residents offered constructive feedback to enhance the curriculum. Suggestions included diversifying clinical vignettes, increasing the frequency of learning sessions, and incorporating "chunks of learning" to reinforce complex content. Additional follow-up sessions to strengthen applied skills were also recommended. These observations underscore the importance of continuous curricular refinement to address learner needs and deepen competency.

DISCUSSION

Implementation of a transgender and gender-diverse health curriculum within the OB-GYN residency program was associated with notable improvements in residents' knowledge, confidence, and comfort in providing gender-affirming care. These findings align with a growing body of evidence indicating that targeted, multimodal educational interventions can enhance trainee competencies in this area. Multiple systematic reviews and interventional studies have demonstrated increased understanding of transgender health concepts, improved confidence in counseling for gender-affirming surgery, and greater comfort with hormone therapy management.[7,12-15] These outcomes have important implications not only for OB-GYN training but also for internal medicine, pediatrics, and family medicine programs seeking to strengthen provider competence in gender-affirming care.

A key observation in this study was the marked improvement in the residents' comfort describing irreversible and adverse effects of hormone therapy for estrogen and testosterone. This aligns with consensus recommendations from the Endocrine Society and recent reviews emphasizing the need for clinicians to clearly communicate the benefits, risks, and timelines associated with hormone therapy.[16,17] The ability to discuss these effects is essential for informed consent and patient-centered care and is a core competency in transgender medicine. The improvement observed suggests that focused curricular content effectively addressed gaps and mirrors outcomes reported in other educational interventions.[16,17]

The qualitative findings enriched interpretation of the quantitative results, offering insight into residents' experiences, perceived curricular value, and desired enhancements. Content analysis is well established in medical education as a method for understanding learner perspectives and evaluating curricular impact beyond quantitative metrics.[9,10] Residents highlighted the value of integrated learning opportunities, such as participation in the Gender Affirming Care Clinic, and identified barriers consistent with those described in the literature, including the importance of institutional support and faculty development.[18,19]

Overall, this study supports the integration of structured, multimodal transgender care curricula to address critical gaps in resident education. Such interventions are essential for preparing clinicians to deliver affirming, evidence-based care TGD patients and for reducing disparities rooted in provider knowledge deficits and systemic bias.[16,18,20] The combined quantitative and qualitative findings offer a nuanced understanding of curricular impact and inform ongoing refinement of TGD health education.

Strengths and Limitations

Strengths of this study include its longitudinal, multimodal design incorporating didactic, clinical, and surgical components. The use of matched pre- and post-intervention surveys enabled within-subject comparison, providing a clear picture of individual-level change over time. Alignment between quantitative improvements and qualitative reflections added depth to understanding residents' experiences and highlighting elements contributing to transformative learning.

However, many observed changes did not reach statistical significance, likely due to the small sample size and limited statistical power. As a result, statistical analysis was not performed and is acknowledged as a limitation. Outcome measures were based on self-reporting, and several participants provided brief qualitative responses. Interpretation of qualitative findings may reflect analyst background; reflexivity and positionality were addressed to enhance transparency (See Appendix 2). Future studies with larger cohorts will be better positioned to detect statistically significant differences.

CONCLUSIONS

Implementation of a structured, multimodal transgender and gender-diverse health curriculum significantly improved OB-GYN residents' knowledge, confidence, and comfort in providing gender-affirming care. Quantitative improvements were observed in multiple domains, including hormone therapy management and surgical counseling, while qualitative findings highlighted transformative learning experiences and informed curricular refinement. These results support incorporation of longitudinal TGD education into graduate medical training and underscore the value of preparing future clinicians to deliver inclusive, affirming care.

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Appendices: Available at www.wmjonline.org

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Portrayal of Medical Students in Artificial Intelligence-Generated Images

Molinna Bui, BS; Paul H. Yi, MD; Ifeanyichukwu Onuh, BS; Ian Kuckelman, MD; Andrew B. Ross, MD, MPH

ABSTRACT

Introduction: The adoption of artificial intelligence (AI) in image generation raises concerns about potential bias, as these technologies may not accurately reflect the populations represented in the images they create. This study examined whether AI-generated images of medical students accurately represent the diversity of the current US medical student population.

Methods: Using the DALL-E (Open AI) image-generation algorithm, we created 300 images with the text prompt "medical student." Two researchers independently analyzed images for demographic indicators, including perceived sex, race/ethnicity, age group, setting, and attire. Descriptive statistics summarized the data, and subgroup analyses assessed differences in portrayals by sex and race/ethnicity. Demographic proportions in the virtual cohort were graphically compared with Association of American Medical Colleges enrollment data.

Results: Of the 300 generated images, 227 (76%) were females and 223 (74%) were White, indicating overrepresentation compared with actual medical school demographics. Black and Latino/Hispanic students were more commonly depicted in scrubs compared to White students, who were often portrayed in white coats or collared shirts ($P = .002$). No images represented Native American/Alaskan Native or Native Hawaiian/Pacific Islander students.

Conclusions: AI-generated images of medical students demonstrated significant demographic disparities, indicating potential bias in these technologies. Such biased portrayals may perpetuate stereotypes and hinder diversity efforts. Future research should identify and address these biases to promote more equitable and inclusive applications of AI tools.

INTRODUCTION

Advancements in artificial intelligence (AI) have revolutionized the generation of realistic images from simple text prompts. These AI applications rely on extensive datasets of preexisting images for training, a practice that could inadvertently propagate bias if the datasets fail to represent the diversity of the general population.[1] AI has had a transformative impact in the health care sector, fostering innovation in diverse fields such as radiology, pathology, gastroenterology, and ophthalmology.[2] However, adoption of AI in these domains has raised concerns about potential bias.[3]

Limited research has examined bias in AI-generated images for specific professions, although general studies found that images of people with lighter skin tones perceived as White are overrepresented.[4,5] A recent study in Australia demonstrated that DALL-E-generated images of medical students favored males with lighter skin tones; however, a more granular analysis of demographics and student depiction has not been conducted.[6]

AI image generation technology is so new that little attention has been given to its applications. With ever-increasing demand for visual content, these algorithms may be used to produce stock images for web content, presentations, and marketing materials, including those in medicine and medical education. Understanding and mitigating biases in AI-generated images is essential to ensure fair and inclusive use across different sectors.[7,8]

In this context, our study aimed to investigate whether AI-generated images of medical students accurately reflect the diversity of the US medical student population. We specifically examined whether

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these images displayed evidence of bias towards certain demographic groups. Investigating potential bias in AI-generated images is critical because perceptions of diversity in medicine can significantly influence inclusivity and equity within the profession.[9] Consequently, this study assessed the presence and extent of bias in AI image-generation algorithms by evaluating differences in portrayals of medical students by race/ethnicity and sex.

Figure 1. Representative Images Generated by Dall-E 2 With the Prompt "Medical Student"

Black students were more likely to be portrayed in scrubs than White students who were more frequently portrayed in a white coat ($P < .001$).

METHODS

The study was exempt from institutional review board review as it did not involve human subjects. We generated 300 images of medical students by entering the text prompt, "medical student" into the DALL-E (Open AI) image-generation algorithm between the dates February 1 and March 1, 2023. We selected 300 images to provide reasonable confidence intervals for proportions, ensure adequate cell counts in chi-square subgroup analysis, and maintain feasibility for independent double rating and manual data extraction.

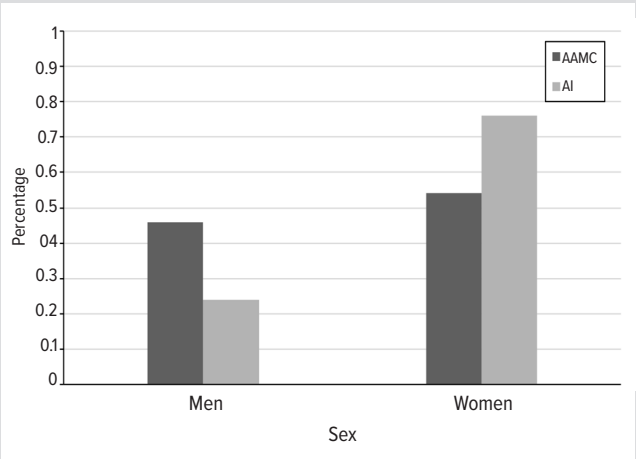
Two researchers independently analyzed each image for demographic indicators. Because artificially generated images of virtual people have no inherent biological sex or racial/ethnic identity, demographic indicators were based on researcher perception. Although "perceived sex" or "perceived race" may be more accurate, for brevity the terms are used without qualification throughout this manuscript.

Demographic variables included sex (male, female, nonbinary); race/ethnicity based on Association of American Medical Colleges (AAMC) categories (White, Black, Latino/Hispanic, Asian, Native American/Alaskan Native, and Native Hawaiian/Pacific Islander); and age group (20-25, 26-30, 31-35, 36-40, and 40+). Additional portrayal variables included attire (collared shirt, scrubs, or white coat) and setting (outdoors, hospital, classroom, or plain background).

We summarized data using descriptive statistics and calculated interobserver variability. To explore differences in how students were portrayed by sex and race, we conducted subgroup analyses using 2-way tabulations and chi-square tests to compare attire and setting across demographic groups.

Finally, we graphically compared the proportion of sex and racial/ethnic groups represented in the virtual cohort with those reported in the AAMC medical school enrollment data for academic years 2019-2020 through 2022-2023.[10] Statistical significance was set at $P < .05$, and all analyses were performed in Stata version 17 (StataCorp LLC).

Figure 2. Comparison of the Proportion of Men and Women in AI-generated Images of Medical Students and Actual Medical School Matriculants From AAMC Data for the Years 2019-2023



Abbreviations: AAMC, Association of American Medical Colleges; AI, artificial intelligence.

RESULTS

Of the 300 AI-generated images of medical students, 227 (76%) were female and 73 (24%) were male. The most common racial group was White (223 [74%]), followed by Asian (46 [15%]), Black (19 [6%]), and Latino/Hispanic (12 [4%]), There were no images assessed to be representative of Native American/Alaskan Native or Native Hawaiian/Pacific Islander students.

Most students fell into the age range 26-30 years (226 [75%]), followed by age 20-25 (42 [14%]), age 31-35 (28 [9%]), age 36-40 (4 [1%]); none were assessed as older than 40 years.

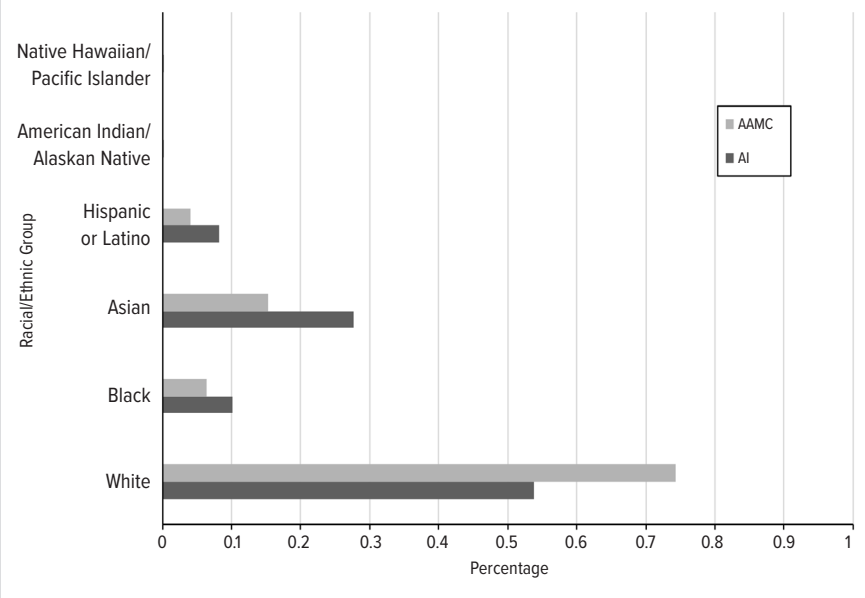
For setting, most students were depicted against a plain background (163 [54%]), followed by classroom (57 [19%]), hospital (51 [17%]), and outdoors (29 [10%]). Scrubs were the most

common attire (184 [61%]), followed by white coats (105 [35%]) and collared shirts (11 [4%]).

Black and Latino/Hispanic students were more commonly portrayed in scrubs (84% and 83%, respectively) compared with White students (61%; $P = .002$), who were more frequently depicted in white coats or collared shirts (39%) (Figure 1). Outfit and setting did not vary significantly by sex. White students (74%) and females (76%) were overrepresented compared with actual medical school matriculant demographics (53% and 54%, respectively) (Figures 2 and 3).

Interrater agreement was as follows: sex, $\kappa = 0.96$ (excellent); age, $\kappa = 0.28$ (fair); race/ethnicity, $\kappa = 0.83$ (excellent); outfit, $\kappa = 1.0$ (perfect); setting, $\kappa = 0.69$ (substantial).

Figure 3. Comparison of Proportion by Race/Ethnicity in AI-generated Images of Medical Students and Actual Medical School Matriculants From AAMC Data for the Years 2019-2023



Abbreviations: AAMC, Association of American Medical Colleges; AI, artificial intelligence.

DISCUSSION

Our study revealed significant disparities in the representation of demographic groups in AI-generated images of medical students, highlighting the potential for bias in these technologies. Female and White students were notably overrepresented compared with national medical school enrollment data. The source of this bias likely lies in the diversity – or lack thereof – within the algorithm's training set. As AI-generated images increasingly appear in online content, these discrepancies could perpetuate misrepresentations.

Beyond the demographic imbalances, we observed disparities in portrayal across racial and ethnic groups. White students were more frequently depicted in white coats, whereas Black and Latino students were predominantly shown in scrubs. These differences carry symbolic significance: the formal white coat often represents the physician role and professional authority, while scrubs are more commonly associated with other health care roles. Such portrayals may mirror real-world marginalization experienced by medical students of color, raising concerns about bias influencing perceptions of professional status.[11]

Although these biased portrayals occur in the digital realm, their impact may extend to real world perceptions. AI systems trained on large quantities of online content reflect the bias we encounter daily on the internet. Given the growing demand for online content, AI-generated images are likely to be used in a multitude of applications and platforms, including stock photography, social media, presentations, and marketing materials, including those for medical schools. Unaddressed, these biases could reinforce stereotypes and hinder efforts to promote diversity and inclusivity in medicine.

Our findings align with previous research showing that AI-generated images favor individuals with lighter skin tones perceived as White.[5] This bias may be especially pronounced for high-status roles such as physician or medical student.[12] AI systems trained on existing datasets can perpetuate or even amplify human biases.[13] While our study focused on AI-generated images of medical students, these findings are consistent with a growing body of evidence indicating the potential for bias across multiple AI technologies.[14-16]

Limitations

Our study has several limitations. We used only 1 image-generation application (DALL-E) during a specific time frame, so generalizability of other platforms or later versions is unknown. Given the rapid evolution of AI image generation, these findings are likely to change over time. Future studies should examine newer iterations of DALL-E and compare results to other AI image-generating programs to assess stability of these findings over time.

An additional limitation is that the demographic indicators (sex, race/ethnicity, age) were based on researcher perception. Because virtual humans lack biologic sex or racial identity, this approach was unavoidable. Other investigators have analyzed skin tones or features associated with gender or race quantitatively,[5,12] but it is unclear whether this approach is superior. Ultimately, perception matters because it influences how viewers interpret these images. Interrater agreement was high for most variables, suggesting reliable assessments; agreement was lower for age, although this was not central to our hypothesis.

CONCLUSIONS

This study provides evidence of bias in AI-generated images of medical students primarily related to race. The implications of these findings underscore the importance of addressing bias in AI-generated images used across applications, including medical education. Future research should further investigate the sources of bias to inform strategies that promote equitable and inclusive use of AI tools.

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Health Professional School Enrollment Following Participation in the Rural and Urban Community Health Scholars Pathway Program (RUSCH)

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ABSTRACT

Background: The University of Wisconsin's Rural and Urban Community Health Scholars (RUSCH) pathway program was developed to prepare undergraduate students interested in addressing health disparities in Wisconsin for successful medical school matriculation.

Methods: Post-completion enrollment outcomes and demographics of participants who completed RUSCH from 2010 through 2024 were analyzed to assess medical school and health professions school matriculation, with associations evaluated using chi-square tests.

Results: Seventy-four percent of participants enrolled in a health professions degree program, with 49% enrolling in medical school, most at institutions within Wisconsin. Men were more likely than women, and non-Hispanic participants were more likely than Hispanic participants, to enroll in medical school following RUSCH completion.

Discussion: RUSCH participation was associated with success in pursuing a health profession degree; however, demographic differences in enrollment outcomes need to be addressed.

BACKGROUND

There is a pressing need to address health disparities and inequities in underserved rural and urban Wisconsin communities. Developing a well-equipped workforce to improve health outcomes for underserved populations is one approach to addressing this issue.[1] Undergraduate training pathway programs that intentionally recruit, mentor, and engage potential future health professionals with diverse experiences and demographic backgrounds may help build a workforce prepared to optimize health across communities.[2-5] In 2009, the University of Wisconsin School of Medicine and Public Health (UWSMPH) launched the Rural and Urban Scholars in Community Health (RUSCH) undergraduate pathway program for students interested in pursuing and practicing medicine in Wisconsin's rural or urban underserved and health professional shortage areas.[6] RUSCH recruits applicants and supports students with academic potential from all backgrounds, including diverse and disadvantaged backgrounds, from the University of Wisconsin (UW)–Madison, UW–Milwaukee, UW–Parkside, UW–Platteville, and Spelman College (a historically Black, women's college in Georgia), as well as prehealth students affiliated with the UW Native American Center for Health Professions to meet this goal. Disadvantaged criteria include financial need based on federal poverty guidelines; educational barriers such as first-generation college status or being first in a family to pursue a health professions degree; social or cultural identity factors, personal hardships; and residence in rural, urban, tribal, or medically underserved areas.

The selection process closely mirrors the mission and values upheld by the UWSMPH MD admissions process. A rubric is used to evaluate eligibility and readiness for the RUSCH program. Applicants must meet the following baseline criteria: enrollment at a partner institution, US citizenship or residency status, and good academic performance (minimum "B" grades in introductory math, English, and science courses, as well as cumulative and science grade point averages of 3.0). Applicants are also evaluated on a 0-to-5 scale (0 = does not meet expectations; 5 = exceptional) in the following areas: experiences (academic reference, clinical activities, and leadership), motivation (commitment to medicine and underserved communities),

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and personal characteristics (maturity, empathy, and communication skills). Additionally, a video interview is scored based on applicant's demonstrated enthusiasm for public health and medicine. This rubric ensures a mission-aligned review that emphasizes both academic merit and personal commitment to serving underserved populations. The selection committee consists of leaders and coordinators of the RUSCH program, the Office of Multicultural Affairs for Health Professions Learners, the Wisconsin Area Health Education Centers (AHEC), and the Office of Health Professional Student Research. These faculty and staff provide diverse perspectives and expertise to ensure a mission-driven review process.

RUSCH provides participants with individualized advising services, community health internships in partnership with Wisconsin AHEC, UWSMPH faculty-mentored research experiences, public health and health disparities education, and individualized enrichment opportunities. Participants explore potential careers in medicine and other health care fields by building core knowledge, skills, and attitudes essential for acceptance into and success within medical school or other advanced health-profession degree programs. RUSCH consists of 3 longitudinal phases delivered over 2 years, each with specific learning activities and support services (see Table 1). Those who successfully complete RUSCH and meet the UWSMPH MD program's minimum application criteria are guaranteed interviews. Advising, support, and career guidance continue throughout the and after program completion to ensure participants remain supported in pursuing their long-term goals.

Ongoing analysis of participant and mentor feedback has guided continuous quality improvement of program processes and content. Thus, after 15 years of RUSCH, our aim was to answer 2 questions:

1. What percentage of RUSCH graduates attend medical school, and where do they matriculate?
2. Are RUSCH graduates across all sociodemographic groups equally likely to enroll in medical school and other advanced health-profession degree program?

Table 1. Components Included in Different Phases of the University of Wisconsin School of Medicine and Public Health (UWSMPH) Rural and Urban Community Health Scholars (RUSCH) Longitudinal Undergraduate Student Pathway Program to Medicine and Health Care Professions

RUSCH Phase Time, Length	Experience	Goals	Key Partners
Phase 1 First summer, 8 weeks	Immersive community health internship	• Community health internship with Wisconsin organizations • Develop public health skills • Build understanding of local health disparities • Personalized prehealth timeline planning	• Area Health Education Education Centers • Community partners throughout Wisconsin
Phase 2 Intervening academic year, fall/winter/ spring	Academic year enrichment	• Engage in virtual enrichment sessions throughout the academic year • Deepen understanding of health equity/ social determinants of health in Wisconsin • Prepare for MCAT/other health profession pathways	• Prehealth advisors at home institution • UWSMPH faculty/staff
Phase 3 Second summer, 8 weeks	Immersive research internship	• Research internship at UWSMPH with faculty mentor • Gain biomedical/public health research experience • Explore UWSMPH opportunities • Receive guidance on medical school applications • Expand mentorship and networking	• UWSMPH Office of Health Profession Student Research • UWSMPH faculty/staff

Table 2. Medical School Enrollment of Rural and Urban Scholars in Community Health (RUSCH) Participants,[a] 2010-2024

	N (%)
Medical school enrollment	
Yes – outside Wisconsin	26 (15.1)
Yes – inside Wisconsin (Medical College of Wisconsin)	14 (8.1)
Yes – inside Wisconsin (UWSMPH)	45 (26.2)
Not enrolled in medical school	87 (50.6)
Advanced health professions degree enrollment	
Yes	128 (74.4)
No	44 (25.6)
Totals	172

[a]Ten participants were lost to follow-up and are not included in these data.
Abbreviation: UWSMPH, University of Wisconsin School of Medicine and Public Health.

METHODS

The UW Madison Quality Improvement/Program Evaluation Self-Certification tool (accessed February 11, 2025) indicated that this program evaluation was exempt from institutional review board review. Participants' self-reported sociodemographic data, collected during the application process and updated throughout the program, were reviewed for all individuals who completed RUSCH from 2010 through 2024 and who graduated from college for whom follow-up data were available. For participants with incomplete outcome data, internet searches of professional profiles (eg, LinkedIn, employers' websites) were used to determine current profession or career status. Names, undergraduate institutions, and undergraduate attendance information were used to verify identities. Internet searches were considered reliable when online data had been updated within the past year and were consistent across at least 2 sources.

Descriptive statistics were used to summarize baseline demographics and participant outcomes. Associations between categorical sociodemographic variables and outcomes were assessed using chi-square tests conducted with SAS/STAT software, version 9.4

(SAS Institute Inc). *P* values ≤.05 were considered statistically significant.

RESULTS

Since 2009, 182 students have completed RUSCH and graduated with an undergraduate degree. Ten students were lost to follow-up.

Of the 172 participants for whom data permitted analysis, 74% (n=124/172) matriculated into an advanced health professions degree program. Almost half—49% (n = 85/172) matriculated into medical school (Table 2). Among those, 64% (n = 59/85) attended one of the 2 medical schools in Wisconsin, with most (n = 45/59) enrolling at the UWSMPH and the remainder at the Medical College of Wisconsin (MCW) (Table 2). Although medical school enrollment varied by RUSCH completion year, ranging from 67% in 1 year to 18% among 2024 graduates, no specific trends were observed.

Table 3 highlights associations between key sociodemographic factors (eg, race and ethnicity, disadvantaged status, undergraduate campus dichotomized as Wisconsin or Georgia) and enrollment in medical school or advanced health professions degree program. Participants from Wisconsin universities, non-Hispanic populations, and men were significantly more likely to enroll in medical school. Non-Hispanic individuals also had significantly higher rates of attending advanced health professions degree programs overall compared with Hispanic individuals. Although no other statistically significant differences based on self-identified sociodemographic variables were identified for medical school enrollment alone, significantly fewer self-identified disadvantaged participants enrolled in advanced health professions degree programs overall.

Table 3. Characteristics of Rural and Urban Scholars in Community Health (RUSCH) Participants[a] Based on Medical School or Advanced Health Degree Enrollment[b]

	Advanced Health Degree Enrollment[c]			Medical School Enrollment		
	No N (%)	Yes N (%)	Chi-square (*P* value)	No N (%)	Yes N (%)	Chi-square (*P* value)
Undergraduate campus						
UW–Madison	5 (31.3)	11 (68.8)		6 (37.5)	10 (62.5)	
UW–Milwaukee	9 (22.5)	31 (77.5)		19 (46.32)	22 (53.7)	
UW–Parkside	9 (20.5)	35 (79.6)		20 (46.5)	23 (53.5)	
UW–Platteville	10 (23.8)	32 (76.2)		20 (47.6)	22 (52.4)	
Spelman	11 (36.7)	19 (63.3)	3.1 (.54)	22 (73.3)	8 (26.7)	8.0 (.09)
Undergraduate campus						
Wisconsin	33 (23.2)	109 (76.8)		65 (45.8)	77 (54.2)	
Georgia	11 (36.7)	19 (63.3)	2.3 (.13)	22 (73.3)	8 (26.7)	7.5 (.006)
First generation student						
Yes	15 (30.0)	35 (70)		21 (43.8)	27 (56.3)	
No	28 (24.6)	86 (75.4)	0.5 (.47)	60 (51.7)	56 (48.3)	0.9 (.35)
Self-reported disadvantaged						
Yes	16 (43.2)	21 (56.8)		17 (48.6)	18 (51.4)	
No	16 (21.6)	58 (78.4)	5.6 (.02)	34 (45.3)	41 (54.7)	0.1 (.75)
Sex						
Female	34 (29.6)	81 (70.4)		69 (60.5)	45 (39.5)	
Male	10 (17.5)	47 (82.5)	2.9 (.09)	18 (31)	40 (69.0)	13.4 (.003)
Race and ethnicity						
White, non-Hispanic	15 (17.1)	73 (83)		39 (44.3)	49 (55.7)	
Black, non-Hispanic	14 (33.3)	28 (66.7)		27 (62.8)	16 (37.2)	
Hispanic, any race	12 (66.7)	6 (33.3)		11 (73.3)	4 (26.7)	
Other, non-Hispanic	3 (12.5)	21 (87.5)	22.8 (<.0001)	10 (38.5)	16 (61.5)	8.6 (.04)

[a]2010-2024 Rusch graduates.

[b]Several categories do not sum up to the total sample size due to missing data.

[c]Advanced health degree includes medical school and any postgraduate health-related programs, eg, physican assistant, pharmacy, dentistry, public health.

Abbreviation: UW, University of Wisconsin.

DISCUSSION

Over the past 15 years, RUSCH has successfully supported undergraduates from rural and urban backgrounds interested in becoming physicians. Underscoring the program's effectiveness, nearly half of all participants enrolled in medical school, most commonly at one of Wisconsin's 2 medical schools. Although RUSCH specifically focuses on medical school preparation, participants are also introduced to other health professions and are fully supported in pursuing other advanced health profession degrees aligned with their evolving interests. To meet this demand, RUSCH has expanded its health professions programming, including formal partnerships with the UWSMPH Master of Physician Assistant (PA) Studies program.

While only 18% of the 2024 RUSCH cohort who completed an undergraduate degree enrolled in medical school, this proportion will likely increase as some participants pursue gap-year experiences for personal and professional enrichment. This is consistent with national data from the 2024 AAMC Matriculating Student Questionnaire, which notes that approximately 74% of incoming matriculants take at least 1 gap year before entering medical school.[7]

RUSCH was established to expand a health care workforce capable of addressing health disparities in rural and urban underserved areas in Wisconsin.[6] As most RUSCH graduates have remained in Wisconsin to pursue advanced health profession degrees, the program is poised to meet this goal. Longitudinal tracking of participants into clinical practice will be needed to establish the program's long-term impact. Participants from the out-of-state partner institution were less likely to attend medical school than those from Wisconsin universities, likely due to multifactorial issues (eg, distance from support networks, out-of-

state tuition costs, cultural and environmental differences). Future program directions include expanding participation from more Wisconsin colleges and universities and prioritizing Wisconsin connections for out-of-state university applicants.

While some sociodemographic variables (eg, race, disadvantaged status) were not significantly associated with medical school enrollment, fewer women than men enrolled in medical school—an unexpected finding given national trends showing higher enrollment in medical school among women than men in recent years.[7] Participants who identified as Hispanic also exhibited a notably lower medical school enrollment rate (26% [n = 4/15]) compared with non-Hispanic White RUSCH graduates (56% [n=49/88]), non-Hispanic Black RUSCH graduates (36% [n = 16/43]) for, and other non-Hispanic graduates (62% [n = 16/26]). Current data do not permit further disaggregation of relevant variables to help determine underlying contributors. Potential barriers for underrepresented students include inadequate academic preparation, lack of exposure to health care, insufficient preparation for standardized examinations, and admissions committee compositions.[5] Future work, including participant focus groups and analyses of additional individual-level variables, is needed to elucidate the factors contributing to gender- and ethnic-based differences in medical school enrollment after RUSCH participation. Such insights will be important for program improvement to help ensure that all RUSCH participants interested in pursuing medical school or other advanced health professions degree programs are well-prepared and fully supported.

RUSCH outcome analysis provides insight into the design of effective undergraduate pathway programs aimed at diversifying the health professions workforce. The program's multiyear longitudinal design—incorporating both dedicated research-based and community engagement phases in addition to mentoring and medical school application preparation—is unique, limiting direct comparisons with similar programs. A 2023 review of 25 premedical pathway programs reported that while these programs helped prepare participants for medical school with development of relevant skills, long-term workforce outcomes were difficult to assess due to the lack of longitudinal or comparison data, underscoring the need for more transparency, data collection, and rigorous analyses.[3] In addition, both immersive community engagement and mentored research experiences have demonstrated productive pathways.[8-10] RUSCH's inclusion of both is a notable strength (Table 1). The overall success of RUSCH may suggest that longitudinal, individualized support extending beyond a summer program leads to a high proportion of graduates enrolling in advanced health professional degree programs. This approach aligns with current trends in health professions pathway programming, emphasizing long-term mentorship and academic preparation (eg, Medical College Admission Test preparation) to strengthen applications and support student success.[11-12] However, this study did not examine individual program components as determinants of success, limiting our ability to draw conclusions about program design.

Limitations and Future Directions

Given the observational nature of this report, we were unable to evaluate the impact of specific program components on enrollment outcomes. Despite program size and a 15-year follow-up period, sample sizes were insufficient for meaningful multivariate analysis across sociodemographic subgroups, limiting interpretability. Analyses were also limited by the use of binary gender and race/ethnicity social construct variables. Finally, outcomes were limited to enrollment in an advanced health professions degree programs, not academic success in that program or post-training service to underserved communities in Wisconsin

Future longitudinal studies that examine longer term career outcomes, incorporate additional cohort years, and include comparisons with non-RUSCH control groups will permit more comprehensive analysis of RUSCH programming relevant to meeting its goals and for guiding focused program improvements. In addition, expansion to include students from other Wisconsin universities and continued partnership with the UWSMPH PA program should further enhance the development of a workforce of providers serving underserved rural and urban communities across Wisconsin.

CONCLUSIONS

Analysis of RUSCH post-undergraduate health professional program enrollment outcomes suggests that a pathway program with longitudinal support, student-centric programming, and immersive community and research experiences paves the way for successful matriculation into medical school or other health professional degree programs. Future studies examining the impact of specific program components and processes will be essential to improve programming, address cost-effectiveness, and better understand factors associated with success—especially among groups such as women, Hispanic, and socioeconomically disadvantaged participants. Understanding specific elements critical for successful prehealth pathway programs that advance health equity and build a workforce reflective of the communities it serves is needed to deliver care in underserved areas.

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The Physician's Duty to Care for Others: Resistance Against Evidence-Based Gender-Affirming Care Among Physician Trainees

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ABSTRACT

Background: Gender-affirming care is an evidence-based form of medicine but is increasingly under threat across the country. We explored first-year resident physician attitudes toward gender-affirming care.

Methods: First-year residents in obstetrics and gynecology, urology, plastic surgery, family medicine, internal medicine, and pediatrics in the United States were invited to participate in a survey. Qualitative responses to an open-text question were analyzed inductively to identify themes.

Results: Among the 93 survey respondents, 14 (15%) responded to the open-ended question. Five respondents expressed negative attitudes toward transgender and gender-diverse people and toward gender-affirming care.

Conclusions: Some resident physicians oppose gender-affirming care. Further research is needed to elucidate the breadth and depth of these sentiments and their potential impact on patient care.

BACKGROUND

The 1948 Declaration of Geneva, a modern version of the Hippocratic Oath, is a pledge that graduating medical students may recite, committing to ethical principles as physicians. The pledge was most recently amended in 2017 by the 68th World Medical Association General Assembly. The Declaration includes the following statement: "I WILL NOT PERMIT considerations of age, disease or disability, creed, ethnic origin, gender, nationality, political affiliation, race, sexual orientation, social standing or any other factor to intervene between my duty and my patient."[1] This line demonstrates a commitment to provide care for all patients, regardless of personal bias related to identity and other factors, and specifically calls out considerations of gender and sexual orientation.

The transgender and gender diverse (TGD) community includes people whose gender identity and/or gender expression do not align with the sex assigned to them at birth.[2] TGD people face discrimination in multiple facets of life, including their health.[3,4] Gender-affirming care (GAC) is the evidence-based standard of care for TGD people and refers to the inclusive and holistic social, medical, and mental health care that supports their gender identity.[2]

Medical GAC has been provided for many years, with the first documented case of gender-affirming genital surgery reported in Germany in 1922.[5] Since that time, the field has expanded substantially, and a variety of cross-sectional and longitudinal studies have explored the impact of this care on TGD patients. In both adults and adolescents, GAC has been associated with improvements in mental health, body image, quality of life, and psychological functioning.[2] Despite growing evidence supporting the benefits of GAC,[2,6] governing bodies across the United States (US) have introduced policies that inhibit access to GAC, particularly for adolescents.[7] Many of these policies rely on misinformation and disinformation.[8] The American Medical Association has encouraged governors to oppose legislation that restricts access to GAC and to instead uphold evidence-based medicine.[9]

Quantitative analysis of a recent survey of first-year resident physicians in the US across pediatrics, internal medicine, family

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medicine, urology, plastic surgery, and obstetrics and gynecology revealed that (1) education on GAC during medical school is variable and often inadequate, and (2) state legislation related to GAC, as well as opportunities to learn about GAC, influenced how residents ranked programs for the National Resident Matching Program Main Residency Match (Jewell TI, Bharucha K, Hanks L, unpublished data, 2025). This report uses qualitative approaches to further investigate the attitudes of some of these first-year resident physicians regarding GAC.

METHODS

A brief anonymous survey was distributed across the US from January 13, 2025, through February 10, 2025. The survey was sent to all email addresses associated with residency programs in obstetrics and gynecology, urology, plastic surgery, family medicine, internal medicine, and pediatrics using public records from the Accreditation Council for Graduate Medical Education. Contacts were asked to distribute the survey to first-year residents in their program. This study was determined to be exempt by the University of Wisconsin-Madison Institutional Review Board under 45 CFR 146.104.

Participants provided electronic informed consent before beginning the survey. Eligibility criteria included: (a) current first-year resident in a US residency program in one of the listed specialties; (b) age 18 years or older; and (c) consent to participate. Full details regarding the methodology, demographics, and quantitative results are detailed elsewhere (Jewell TI, Bharucha K, Hanks L, unpublished data, 2025).

This brief report focuses on responses to the optional, open-ended final question: "Please share anything else you would like us to know." Compiled responses were analyzed using conventional content analysis to identify recurring concepts and perspectives.[10] All responses were independently reviewed, inductively coded, and organized into broad categories reflecting common sentiments and beliefs.

RESULTS

Of the 136 residents who started the survey, 119 met eligibility criteria, and 93 completed a sufficient proportion to be included. Of the 93 respondents, 14 (15%) completed the open-ended question. These written comments offered insight into a wide range of beliefs toward GAC and TGD patients. Three overarching categories emerged: (1) negative attitudes toward TGD people and GAC; (2) inclusive attitudes toward TGD people and GAC; and (3) other reflections.

Negative Attitudes Toward TGD People and GAC

Five respondents wrote comments conveying negative sentiments toward TGD people and disapproval of GAC. Participant 1 wrote, *"We don't all agree with this type of training and do not believe it is necessary or even appropriate."* Another respondent tied their disapproval of GAC to their religion:

> *"I believe the Bible is the inspire[d] word of God and that all of what was mentioned in this survey is a sin. I know that is not the views of my institution or most of my attendings and is most likely not the views of most of the people conducting this survey. I think it's important to remember that there are people in health care who do not support gender-affirming care." (Participant 2)*

Other respondents grounded their disapproval in a perceived lack of evidence supporting GAC. One noted how these beliefs influenced residency choices:

> *"There is very weak evidence that the benefits of 'gender-affirming care' in children outweigh the substantial potential harm. As such, I support legislation restricting irreversible gender-affirming practices in minors. I somewhat preferred matching in a state where these practices are restricted so I wouldn't be coerced into participating." (Participant 3)*

Two respondents tied their discussion of lack of evidence to broader objections to gender identity, with philosophical or ideological concerns. Participant 4 wrote:

> *"Gender theory… is largely a fake field predicated on neo-Marxist critical theory… We will one day look at gender-affirming care (hormone blockers, hormone therapy, surgeries, etc...) the same way that we look at lobotomies today... Which is to say, as non-evidence-based interventions that were taking advantage of a vulnerable population because of either monetary self-interest on the part of physicians, professional reputation investment on the part of physicians, or both."*

Participant 5 wrote:

> *"Transgenderism is a delusional disorder and should [be] treated with therapy and psychiatry. Any doctor that gives life-altering treatment for a psychiatric disease should be stripped of their medical license."*

Inclusive Attitudes Toward TGD people and GAC

Three respondents articulated inclusive approaches to GAC and caring for TGD people. Participant 6 wrote:

> *"Helping someone who has differing ideas about his/her gender or sexual orientation does not change the fact [that] they are a human person and that they will receive the same compassionate care I would give to any patient."*

Participant 7 similarly expressed:

> *"The education I received in helping to care for individuals who have different sexual and/or gender identities is the same education I received to care for all people, irrespective of their sexual/gender identity."*

Participant 8 described their clinical approach: *"I am more sensitive when taking medical history and PE [physical examination?] with [a] patient who identifies with being trans."*

One additional respondent implied support for GAC while expressing frustration with the political climate of their residency location:

"I chose to do my residency in [state] for personal reasons… However, I very much hate the fact that I have to live and practice medicine in [state], due to how conservative it is and how negligent its government and culture can be toward women's health and LGBTQ+ (lesbian, gay bisexual, transgender, queer and questioning) health." (Participant 9)

Other Reflections

A few respondents did not explicitly express support or opposition to GAC. Instead, they reflected on their educational exposure to GAC during training (n = 2) or on broader politicized areas of health that influenced residency decisions (n = 1). Two responses were unclear and could not be interpreted (n = 2).

DISCUSSION

This exploration of qualitative themes arising from an optional, open-ended survey item sheds light on polarized attitudes toward GAC and the TGD community among resident physicians.

While not broadly generalizable due to the small sample and the low response rate for the written item, these findings highlight an ethical concern that should be considered by all involved in physician training.

The Declaration of Geneva asserts that an individual's identity should not affect a physician's responsibility to each patient.[1] However, we found that some residents hold biases that could negatively impact the care provided to TGD patients. Some questioned the philosophical foundations of gender, others doubted the evidence base for GAC, and one disapproved based on religious beliefs. Prior research based on patient perspectives has demonstrated the need for clinician education on TGD health.[3] Our findings echo this need and build upon this literature by incorporating the perspectives of physicians in training. Taken together, both patients and clinicians identify TGD health as an essential educational topic.

Limitations

Limitations of this study include a small sample (N=93) that likely is not representative of all first-year residents in the surveyed specialties due to self-selection bias. The response rate is unknown because the survey was disseminated through residency program contacts, and the number of residents who received it is unclear. Although the open-ended question was optional (15% response rate), the sentiments expressed are meaningful and warrant attention. Due to the small number of qualitative responses, respondent descriptors were not included due to concern for preserving confidentiality.

CONCLUSIONS

This brief report highlights that some physician trainees oppose gender-affirming care for TGD people, despite evidence to support it. Further research is needed to understand the breadth and depth of these sentiments in residency programs nationwide and to examine how personal beliefs may affect patient care. Physician trainees need more education on this compassionate, ethical, and evidence-based care.

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Bearing Witness to Suffering and Social Justice: A Novel Multimodal Medical Humanities Course That Cultivates Compassionate Health Care

Jessica C. Babal, MD; Liana Eskola, DO; Elizabeth A. Fleming, MD; Rory Bade, MD; Meinkeng Acha-Morfaw, MD; Jens Eickhoff, PhD; Nicole Nelson, PhD

ABSTRACT

Background: Racism, sexism, ableism, addiction stigma, weight stigma, and imbalanced power structures in medicine threaten human health and well-being. Medical humanities education that addresses positionality and power in clinical care may enhance physicians' abilities to provide compassionate care.

Methods: Sixty medical students completed a medical humanities elective during the 2020-2021 through 2023-2024 academic years focus on suffering and social justice in medicine and completed pre- and post-course surveys.

Results: Post-course surveys showed increases in students' self-assessed knowledge about applying medical humanities practices to provide compassionate patient care ($P < .001$), plans to use medical humanities practices in their future career ($P < .001$), and intent to disseminate or share their medical humanities work ($P < .001$).

Discussion: This novel multimodal medical humanities curriculum exploring suffering and social justice fostered compassionate clinical care skills and intention to continually engage in humanities work.

BACKGROUND

In 2020, the Association of American Medical Colleges (AAMC) published The Fundamental Role of the Arts and Humanities in Medical Education,[1] a call to action to integrate medical humanities coursework as a foundational feature of medical education. Studies have shown that infusing arts and humanities pedagogy into medical training develops competencies such as relationship building, perspective taking, and personal insight that contribute to compassionate health care provision,[1-4] leading many medical schools to implement humanities curricula where none had existed previously.[1,5] Medical humanities teaching activities may include individual and group reading exercises, writing practices, art interpretation, or historical document analysis. These activities can improve comfort with ambiguity, interpersonal and communication skills, and social advocacy.[1]

At our institution, limited opportunities existed for medical students to engage in humanities education prior to 2020, when 2 students approached 2 authors of this paper – clinical faculty who at the time led grassroots medical humanities efforts – requesting introductory course options. The students expressed particular interest in a course centered on compassion, cultural humility, and social and health care justice – emerging yet relatively understudied areas in medical humanities education.[4] The faculty members agreed to build a small team to develop an introductory medical humanities course with 2 goals: (1) engage students in a wide array of medical humanities activities to provide robust introductory exposure to the field and (2) empower students to explore suffering and social justice in medicine through compassionate and humanistic lenses.

We compared students' pre-course and post-course survey responses for evidence of increased self-assessed knowledge about applying medical humanities practices to provide compassionate patient care, their plans to engage in medical humanities practices in their future careers, and their plans to share personal creative work.

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METHODS

Curricular Approach and Innovation

Over 4 academic years (2020-2021 through 2023-2024), we implemented and assessed a 2-week medical humanities elective for third- and fourth-year medical students, using medical humanities teaching strategies to enhance students' understanding of power hierarchies in medicine and how these hierarchies can endanger the patient-physician relationship. To develop and teach this course with minimal existing institutional infrastructure, the 2 faculty members from pediatrics and palliative medicine who were originally approached by students collaborated with 2 additional medical humanities educators from medical history and bioethics and family medicine, all of whom are coauthors on this paper. This multidisciplinary collaboration to allowed incorporation of health care topics across the lifespan relevant to course objectives.

Table 1. Pre-survey and Post-survey Comparison of Student Responses to Statements With 5-point Likert Scale Response Options Using Nonparametric Wilcoxon Test

Survey Statement	Pre-survey N	Pre-survey Mean (SD)	Post-survey N	Post-survey Mean (SD)	*P* value
I know how to apply medical humanities practices in providing compassionate patient care.	50	2.2 (0.8)	31	4.2 (0.7)	<.001
I plan to engage with medical humanities practices in my future medical career.	51	3.7 (1.0)	29	4.6 (0.6)	<.001
I plan to share my personal work in the medical humanities with the medical community or nonmedical community (eg, via publication, performance, public display, live, reading storytelling, etc	49	2.6 (1.2)	30	3.6 (0.9)	<.001

Table 2. Pre-survey and Post-survey Comparison of Dichotomized Outcomes (True vs Unlikely True) Using a Chi-square Test

Survey Statement	Pre-survey Total N	Pre-survey True/Very True[a] n (%)	Post-survey Total N	Post-survey True/Very True[a] n (%)	*P* value
I know how to apply medical humanities practices in providing compassionate patient care.	50	2 (4)	31	26 (84)	<.001
I plan to engage with medical humanities practices in my future medical career.	51	30 (59)	29	27 (93)	.002
I plan to share my personal work in the medical humanities with the medical community or non-medical community (eg. via publication, performance, public display, live reading, storytelling, etc)	49	11 (22)	30	16 (53)	.010

[a]Number of students answering extremely "true"or "very true."

The course required 90 hours of student engagement (20-25 hours in seminars, remainder in independent coursework). Students needed no prerequisite knowledge. Each course offering was capped at 15 students to promote meaningful seminar discussion and interpersonal connection. (Appendix A provides a course overview; Appendix B provides tips for success.)

The course included asynchronous and synchronous components: students completed pre-class readings and creative assignments (Appendix C) and participated in daily virtual 2.5-hour seminars. Instructors possessed group facilitation skills and at least basic skills in guiding analysis of essays, poetry, film, music, visual art, philosophy, or historical documents. An instructor guide was developed and iteratively updated based on student and instructor feedback (Appendices D and E).

Each course-day explored a different theme:

1. Introducing the medical humanities
2. Humanistic approaches to pain and suffering
3. Expressing the inexpressible through art
4. The trauma of not being seen
5. Suffering and structural violence
6. The violence of medicine
7. Accompanying suffering
8. When doctors suffer
9. Seeing past suffering
10. Bearing witness as a call to action

Students completed a project using their preferred humanities-based expression modality (Appendix F). They presented project drafts to classmates and were taught to provide reflective, growth-oriented peer feedback.

Psychological Safety

For successful implementation, both the literature and our experience suggest that psychological safety is crucial for medical students to engage with new learning modalities[6] such as the medical humanities. This may be particularly important at an institution where arts-based medical education has not been the norm. Psychological safety is also essential when discussing complex topics such as suffering, bias, and inequality in medicine.[7]

We used several approaches to cultivate psychological safety in working with difficult topics and engaging in the humanities, an area of study new to many students.[6] First, we discussed strategies such as acknowledging difficult emotions, taking breaks, and reaching out to instructors or university support systems if needed. We set the expectation that participants maintain a respectful, compassionate, nonjudgmental, and confidential environment. We also provided training in respectfully and responsibly representing others' stories when students wished to incorporate patient or colleague experiences.

Instructors redirected students' self-critical comments toward a more nonjudgmental, self-compassionate stance. We emphasized appreciating works for their creativity and their creators for their curiosity and vulnerability. Instructors also explicitly positioned themselves early and often as co-learners.

In addition, instructors observed class dynamics, including which students were prone to unintentionally dominating discussion and which required encouragement to participate. We found that having 2 or 3 co-instructors provided multiple teaching perspectives and supported balanced class dynamics. Instructors met frequently to discuss class dynamics, concerns, successes, and areas for growth.

Evaluation

We administered pre- and post-course surveys asking students to self-assess their (1) knowledge about how to translate medical humanities practices into compassionate patient care, (2) plans to engage with medical humanities practices in their future career, and (3) plans to disseminate or share medical humanities work. All surveys used a 5-point Likert scale (1 = not at all true, 5 = extremely true). Changes were evaluated using a nonparametric rank sum Wilcoxon test. Because surveys were anonymous, pre- and post-course assessments were treated as statistically independent groups. To further characterize responses, we dichotomized them as "true" (extremely true/very true) versus "unlikely true" (not at all true/somewhat true/moderately true). Comparisons between pre- and post-course assessments were conducted using a chi-square test. All *P* values were 2-sided, with $P < .05$ defining statistical significance.

Institutional Review Board

According to an institution-based institutional review board (IRB) quality improvement/program evaluation self-certification tool, this survey met program evaluation criteria and did not require IRB review. In alignment with best practices, students were informed that participation was optional, would not affect their grade and would remain nonidentifiable.

RESULTS

A total of 60 medical students completed the course during the study period. The pre-course response rate was 85% (n=51); the post-course response rate was 52% (n = 31). Analysis demonstrated significant improvements in (1) knowing how to apply medical humanities practices to compassionate patient care (2.2 vs 4.2, $P < .001$), (2) planning to engage with medical humanities practices in future medical careers (3.7 vs 4.6, $P < .001$), and (3) planning to disseminate or share medical humanities work (2.6 vs 3.6, $P < .001$) (Table 1). After dichotomizing responses, significant improvement remained for all 3 measures (4% vs 84%, $P < .001$; 59% vs 93%, $P = .002$; 22% vs 53%, $P = .010$, respectively) (Table 2).

DISCUSSION

These results demonstrated that a novel multimodal 2-week medical humanities elective exploring suffering and social justice may offer important benefits, including improved self-assessed knowledge of how to apply medical humanities skills to cultivate compassionate patient care and increased likelihood of future humanities engagement. These findings suggest the utility of implementing a medical humanities elective at a medical school with limited existing medical humanities infrastructure.

The course represented an innovative way to improve medical student compassionate care, which may be difficult to teach in traditional classrooms.[1] Compassionate care in the context of social injustice and health inequities requires the physician to identify others' emotions and sources of suffering, recognize power hierarchies in medicine and their effects, maintain desire and ability to comfort, and manage their own emotions.[8] This complex skillset involves observation, listening, perspective taking, growth mindset, social awareness, and emotional navigation.[1] Our findings suggest that this course, taught through the lens of suffering and social justice, helped students gain confidence in their ability to provide compassionate care.

Our results also suggest that students who took the course may continue to engage in humanities-based practices in their careers, which may support long-term development of skills that contribute to compassionate health care. Because the complex skills that medical humanities practices develop[1] require continuous practice, our findings suggest that students may now have practical strategies to continue developing compassionate and patient-centered competencies. This expands on the emerging but limited literature on medical humanities impact within institutions lacking robust humanities offerings.[4] Follow-up studies examining how students apply humanities-based skills in clinical practice would be beneficial.

This study has limitations. In addition to limited generalizability due to single-site data and a self-selecting group, our surveys did not allow individual linkage of pre- and post-course responses to assess changes for individual students. The response rate just over 50% and the use of aggregate post-course data may overstate changes when comparing mean scores. However, dichotomized analyses were conservative and still demonstrated significant improvement across all 3 measures. Larger multisite studies would be useful to assess generalizability.

CONCLUSIONS

This 2-week, single-site medical student course provided a novel approach to exploring complex social and emotional dimensions of medicine related to suffering and social justice and offered strategies for integrating humanities-based skills into clinical practice. Our study suggests that medical humanities curricula may be useful for teaching complex skills such as compassionate care provision and offer students practical strategies to continue to develop

these skills. Larger studies are needed to understand generalizability. Detailed course materials are provided to support adoption of these approaches at other institutions.

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Appendices: Available at www.wmjonline.org

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'The Play's the Thing' Among Other Innovations: The Establishment of the Medical College of Wisconsin's Medical Humanities Program and Its Incorporation of Medical Humanities Into Medical Education

Arthur R. Derse, MD, JD

ABSTRACT

Background: Leading organizations have recognized that medical schools need greater incorporation of the medical humanities to educate physicians. The Medical College of Wisconsin's (MCW) Medical Humanities Program, established in 2006, is dedicated to professionalism, communication, empathy, and reflection.

Objectives: This article describes the establishment of MCW's Medical Humanities Program and its incorporation of medical humanities into medical education.

Methods: Medical humanities are defined, with examples provided, and the history of their development at the MCW and their incorporation into the curriculum over 2 decades is chronicled.

Results: Medical humanities have been successfully incorporated into the curriculum, including 2 courses offered for more than 2 decades and 2 additional courses incorporated for more than 7 years. Longstanding extracurricular offerings further strengthen the medical humanities academic environment.

Conclusions: MCW's Medical Humanities Program—through its incorporated courses and extracurricular offerings—has established medical humanities as a pillar of the medical school curriculum and, after 2 decades, continues to flourish.

BACKGROUND

In April 2025, the Program in Bioethics at the University of Wisconsin School of Medicine and Public Health (UWSMPH) sponsored its Annual Bioethics Symposium, which featured a performance of UWSMPH faculty member Karola Kreitmair's play, *Homo Ex Machina*, a drama about the consequences—intended and unintended—of cranial implantation and deep brain stimulation.[1] After the performance, there were academic presentations about the philosophical and ethical issues raised by the play. This was the only time the play had been performed since its inaugural run in Palo Alto, California, in 2018.

However, in 2023, Dr Kreitmair and I used the video from the original production of her play with students enrolled in the Medical College of Wisconsin's (MCW) Scholarly Concentration in Bioethics and Medical Humanities to identify and discuss the ethical issues depicted in the play as part of the required academic activities.

In Shakespeare's *Hamlet*, the protagonist uses a play performed within the play as a device. He says, "The play's the thing / Wherein I'll catch the conscience of the king."[2] In a similar way, we used Kreitmair's play to "catch" the ethical and humanistic sensitivities of the students and asked them to identify ethical issues embedded in the play, including informed consent, coercion, unintended treatment outcomes, personhood and identity, and distinctions between innovative therapy and research. These are important concepts in bioethics and medical humanities, as well as in medical practice and research. The play engaged our students and supported their emerging ethical discernment and expertise in a way that didactic readings and lectures do not.

Several years ago, the Royal Society of Medicine published an article concluding that physicians could learn to empathize better with patients by studying William Shakespeare's insights into humanity.[3] This conclusion should not be surprising to those who have read or revisited many of Shakespeare's works. Drama is one of many didactic approaches that uses a broad range of humanities as applied to medical education, commonly known as the "medical humanities"[4] or "health humanities."

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These approaches can benefit students, trainees, physicians, and patients.[5]

The use of dramatic literature in medical education is not common. I used the final scene from the film *Wit*—based on Margaret Edson's Pulitzer Prize winning play—with MCW students in our medical ethics coures to show the dramatic transgression of an unwanted resuscitation attempt for the central character, a patient dying from metastatic cancer.[6]

The term "medical humanities" has been defined as "those disciplines that inquire into the human experience of illness, healing and doctoring with attention to meaning, values and the history of ideas." They better equip physicians to "relieve suffering, understand the experience of illness and disability, find deeper value in the practice of medicine, resolve ethical dilemmas, confront mystery, learn from history, address social determinants of disease, and monitor the biases and limitations of science."[7] Though philosophy is considered one of the humanities, the term "medical humanities," as used in medical education, generally does not include medical ethics.

The Journey of Medical Humanities in the MCW Curriculum

Some medical humanities approaches have a long and enduring presence in medicine. Anatomical illustration has been an artistic companion in medical education since the era of the printing press, beginning with Andreas Vesalius's masterwork *De Humani Corporis Fabrica*, published in 1543,[8] and continuing through the modern era with Frank Netter, MD, whose vivid depictions conveyed clinical stories alongside anatomical instruction.[9]

The field of medical history was incorporated formally into universities, first as a department at Johns Hopkins in 1929,[10] and next in 1950 at the University of Wisconsin Medical School. The latter would engender one of the earliest medical school programs in bioethics in 1973, led by Norman Fost, MD, MPH.[11]

The nonfiction essay has also been employed successfully by physicians such as William Osler, who wrote on many topics, including, in an address to new physicians, the importance of equanimity in medical practice.[12] The physician-scientist and essayist Lewis Thomas, MD, wrote a column "Notes of a Biology Watcher" in the *New England Journal of Medicine*, reflecting on a wide array of issues in science and medicine.[13]

Physician-storytellers have long enthralled general readers with fiction informed by medicine and science, including Anton Chekhov and Arthur Conan Doyle. More recent physician-writers, including Richard Selzer, Abraham Verghese, and Atul Gawande, and physician-poets such as William Carlos Williams and Rafael Campo, have shared important experiences of their lives as physicians through their writing for medical journals and general audiences. Their works have influenced the way society views the profession—and how the profession views itself.

The power of stories as a pedagogical tool was recognized by Robert Coles, MD, a psychiatrist who wrote about the use of stories in teaching the values in medicine, including ethics. These stories engaged what he termed "moral imagination."[14] Although every medical school had some instruction in medical ethics when he wrote these words more than a quarter century ago, medical humanities programs were uncommon, and the evidence base for their use in medical education was more aspirational than established.[15]

In response to his call to action, in 1996 I added nonfiction essays and poetry to MCW's second-year medical ethics course that I directed. Student feedback indicated that these works helped them better understand medical ethical issues, with a supermajority responding positively and the remainder either indifferent or, for a resistant few, irritated. One student wrote in the evaluation, "I didn't go to medical school to read poetry." Understood.

Nonfiction and even fictional narratives are more straightforward instructional techniques than poetry, though poems such as Raymond Carver's *What the Doctor Said*—in which a patient (Carver himself) receives a diagnosis of untreatable lung cancer—also have a place in medical education.[16]

After presenting data on student feedback about the course at a national meeting and receiving encouragement from fellow medical school faculty to continue these efforts, the time was right at MCW to expand the use of medical humanities in the curriculum.

Formal Humanities Program Launched With Four Cornerstone Courses

After receiving a grant with colleague Julia Uihlein, MA, to launch a formal program in medical humanities, I consulted with directors of 4 leading medical humanities programs based in medical schools: Rita Charon, MD, PhD, at Columbia University; Catherine Montgomery, PhD, at Northwestern University; Audrey Schaefer, MD, at Stanford University; and Anne Hudson Jones, PhD, at the University of Texas Medical Branch. These colleagues shared their distinct approaches to incorporating medical humanities into their medical schools' curricula.

We launched the MCW Medical Humanities Program in 2006, directed by me, with Ms Uihlein as associate director. The program was dedicated to the medical educational goals of professionalism, communication, empathy, and reflection. This was the first formal medical humanities program in a medical school—or any university—in Wisconsin. We planned both curricular and extracurricular offerings to advance these educational goals.

The cornerstones of the program are 4 medical humanities elective courses in the MCW curriculum. The first of these—the M4 (fourth-year) *Art of Medicine Through the Humanities* course—began in 2000 with enrollment of several students and 14 instructors.[17] Why introduce medical humanities at this point in the curriculum? The M4 year is a time when students may reflect on their medical education and clinical experience as they stand on the cusp of more intense and arduous residency training.

The course goals include examining the physician-patient relationship; increasing knowledge and skills in professionalism, communication, and empathy; reflecting on the profession of medicine and professional behavior, including teamwork; broadening cultural awareness and understanding of patients in their social context; and refining communication skills with colleagues and patients through reflection, practice, and self-assessment in small-group seminar discussions. The subjects of these discussions include challenges to professionalism, empathy, and communication in caring for patients in varied clinical settings, and they go beyond medical knowledge to address skills and attitudes central to the profession.

In the course, I began by using nonfiction essays and poems to teach insights into challenges in emergency medical practice and vexing issues in clinical ethics consultation. In 2004, I assumed leadership of the elective and, with Ms Uihlein's help, prepared the groundwork for an expanded course and a broader program of new medical humanities courses.

Seminars in the *Art of Medicine* elective have expanded to include discussions of physician and patient narratives, as well as innovative instructional methods using films, plays, literature, medical improvisation, music, and visual perception analyses involving artwork and photography. Along with case studies of clinical encounters, students engage in close reading of literature and poetry, medical improvisation exercises, careful visual examination, and painting. The seminars are led by 44 faculty presenters from MCW and other university and community partners.

Students also attend a guided tour of the Milwaukee Art Museum and performances by the Milwaukee Symphony Orchestra and Milwaukee Repertory Theater, followed by discussions with directors and performers. The course culminates in individual student creative final products for presentation and publication, with guidance from a writer and editor with experience in academic publishing.

Although enrollment in the early years of the *Art of Medicine* course was small (2-9 students), it has been as high as 20 students and is now capped at 16 to preserve opportunities for interactive discussion.

The second cornerstone course is the M1 *Healer's Art* course, initiated at MCW in 2007. Founded by Rachel Remen, MD, at University of California San Francisco, this nationally recognized elective advances wholeness, compassionate listening, self-care, and service.[18] Lucille Marchand, MD, who led the *Healer's Art* curriculum at UWSMPH, shared her experience as we began our course. Now in its 17th year, the MCW *Healer's Art* course is open to all first-year students, with enrollment ranging from 12 to 55 students.

The third and most substantial cornerstone of the program is the Scholarly Concentration in Bioethics and Medical Humanities. All MCW students must choose among 9 scholarly concentrations that extend from mid-first year to mid-third year. Students spend 1 afternoon each week in their chosen area, participating in core didactic sessions, supplementary academic activities, and work on a scholarly project intended for presentation and potential publication.[19]

The Scholarly Concentration in Bioethics was originally approved in 2013 to focus solely on bioethics, in part because educational leaders recognized its academic importance. Reviewers initially were skeptical about the academic value of medical humanities. After becoming course co-director in 2015, I advocated for incorporating medical humanities into the course. The case was supported by emerging scholarship in medical humanities, the adoption of similar concentrations at several leading medical schools (eg, Stanford, Johns Hopkins, Brown), and strong student interest. In 2019, medical humanities was added to the curricular objectives and the concentration's name.[20]

Along with advanced bioethics topics, the concentration includes medical humanities approaches such as narrative medicine (described below), visual thinking strategies (focused on perception and interpretation),[21] graphic medicine (narratives in cartoon form),[22] and medical improvisation (using improvisational theater techniques to improve communication and teamwork).[23] When medical humanities were added, enrollment began with 18 students; currently, 32 students are enrolled over 2 years.

The fourth cornerstone is our M4 elective course in narrative medicine. Dr Charon outlines 3 narrative medicine principles: (1) clinicians can be fully present with and listen attentively to patients' stories and know their own stories (attention); (2) clinicians can examine the meaning of patients' stories and how they construct meaning from their experiences (representation); and (3) clinicians can use the experience of telling and listening to stories of suffering to deepen empathy and compassion in their relationships with patients and colleagues (affiliation).[24,25]

With Ms Uihlein's retirement in 2019, Bruce Campbell, MD became the program's associate director. Having been trained in narrative medicine at Columbia University, he and I began a new M4 elective focused primarily on narrative medicine, now offered twice each year. Currently 12 students, the maximum, are enrolled.

These 4 courses—*Art of Medicine Through the Humanities, Healer's Art*, the 2-year Scholarly Concentration in Bioethics and Medical Humanities, and the narrative medicine elective—were re-accredited as the MCW-Milwaukee medical school curriculum transitioned into its new MCWfusion format, which includes Phase 1 (preclinical) over the first 3 semesters, Phase 2 (clinical) over the next 2 semesters, and Phase 3 over the final 3 semesters, with required and elective coursework. A more recent addition is a Phase 3 elective in graphic medicine.

Notably, the courses are taught primarily by clinicians with training or interest in the medical humanities rather than by doctoral-trained humanities scholars, because MCW does not have liberal arts or humanities departments to draw from, although a

handful of scholars from other universities participate intermittently.

As our Bioethics and Medical Humanities Concentration and other M4 cornerstone courses became available, enrollment in those courses increased, which may have reduced demand for the original M4 *Art of Medicine* elective. Its enrollment has returned to its earlier range (5-7 students over the past 5 years).

Although these cornerstone courses consistently have high satisfaction ratings, a challenge for us—as for others offering such courses—is determining whether students who take medical humanities courses become more empathetic, more professional, and better communicators than students who do not, and how they compare in medical knowledge and clinical performance to their peers. Whether these curricular innovations improve clinical practice, patient outcomes, or reduce burnout is undetermined.

Extracurricular Opportunities Support Educational Courses

When the MCW medical humanities program was launched in 2006, physician-author Abraham Verghese, MD, was the inaugural speaker. He cautioned us to keep the focus of medical humanities on the care of the patient by the physician rather than on theoretical concerns. We have heeded his advice.

Subsequent speakers have included Charles Bosk, PhD, author of *Forgive and Remember* (about surgical error); US Poet Laureate Ted Kooser; writer Ann Fadiman, author of *The Spirit Catches You and You Fall Down*; physician-poet Rafael Campo; physician-author Danielle Ofri; and Julliard-trained pianist and psychiatrist Richard Kogan. These speakers and others have shared their insights with our community of students, trainees, physicians, and other medical humanities-interested community members. Another annual lecture in medical humanities, geared toward students, is supported by a gift from the MCW-Marquette University MD Class of 1956. A third lecture series in bioethics and medical humanities was endowed by the family of program core faculty Carlyle Chan, MD.

Students in the Bioethics and Medical Humanities Scholarly Concentration may use reflections on these presentations to fulfill academic "noncore" (ie, outside formal didactic time) requirements of the scholarly concentration.

In addition, the medical humanities program provides staff and logistical support to *Auscult*, our student-led annual literary journal, as well as The Moving Pens, a creative medical writing group open to students, trainees, staff, and faculty. The program also supports Med Moth, an oral storytelling project with semiannual performances, and the MCW Common Read, a campus-wide book discussion. Our program also supports The Memory Art Project, in which students are paired with elders to create artwork together. The project was begun by students in 2010.[26] All these extracurricular activities may be used to fulfill academic requirements of the Bioethics and Medical Humanities Scholarly Concentration.

The MCW Orchestra, supported by the humanities program, regularly performs concerts on campus and in the community and includes faculty, staff, and students.

The MCW Medical Humanities Program also works with MCW President and CEO John R. Raymond, Sr, MD, to select and award the annual President's Prize in Creative Medical Writing, and partners with the MCW Library on selecting books and journals for MCW's Julia A. Uihlein Bioethics and Medical Humanities Collection. The collection supports the program's academic mission, with over 1200 volumes available for students and faculty.[27]

Increasing Recognition of the Importance of Medical Humanities in the Medical School Curriculum

Although US medical schools are required by the Liaison Committee on Medical Education to teach ethics and human values,[28] there is no similar requirement to teach medical humanities. Although most medical schools offer some opportunities in the arts and humanities,[29] a study of the top 31 ranked US medical schools found that only three required instruction in the arts and humanities, and comprehensive immersive experiences in medical humanities were present at only 29% of the schools.[30] The Association of American Medical Schools (AAMC) has recognized that medical schools need greater incorporation of the humanities to educate physicians who are empathetic and compassionate in their care of patients, who communicate well, and who can thrive in the profession.[31]

The AAMC, the American Association of Colleges of Osteopathic Medicine, and the Accreditation Council for Graduate Medical Education published a joint document detailing 6 foundational competencies for undergraduate medical education (aligned with the 6 core competencies for graduate medical education). In the foundational competency titled, "Medical Knowledge," one requirement is that the individual "demonstrates knowledge…of humanities needed for clinical practice."[32] Although the specifics of these humanities are not yet defined, their inclusion in core competencies is a welcome development.

The MCW Medical Humanities Program's Contribution to the MCW Curriculum Continues and Flourishes

When Arthur Kleinman, MD, director of the Harvard Medical Humanities Program, visited MCW for an annual lecture, he advised us to remember that medical humanities initiatives are easy to begin but difficult to sustain. We are fortunate that two of our cornerstone electives have withstood that test of time for 2 decades, and the two more recent electives have now reached their 7-year mark.

Not only have the initiatives been successfully incorporated into the MCW curriculum, but 2 former students have returned annually to teach in the *Art of Medicine* course they once took, as they advance medical humanities at their respective institu-

tions.[32] In addition, one of those former students – Elizabeth A. Fleming, MD – has cited her positive experiences in our courses as a motivating factor for her further training in narrative medicine and her work with others in launching the Collective for Humanism, Arts, and Storytelling in Medicine (CHASM)[34,35] at UWSMPH.

Our MCW Medical Humanities Program and its curricular innovations – the *Art of Medicine Through the Humanities* elective, the Scholarly Concentration in Bioethics and Medical Humanities, the *Healer's Art* course, and the narrative medicine courses – demonstrate what can be accomplished with clinically trained faculty members interested in the humanities, even in the absence of doctoral-trained humanities scholars. This model can be replicated through the incremental addition of electives over time.

Whether it is using a play "to catch the conscience," reading and creating narratives (nonfiction and fiction), or incorporating visual thinking strategies, medical improvisation, medical history, graphic medicine, art-making, or musical performance, these educational innovations can advance professionalism, communication, empathy, and reflection.

The MCW Medical Humanities Program – with its cornerstone courses and extracurricular offerings – has established medical humanities as an important pillar of the medical school curriculum, and with our many dedicated core faculty, faculty and community associates, and students help ensure that medical humanities will flourish for years to come.[36]

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Advancing Health Through the Medical Education of Black Physicians: Compelling Contributions From Alumni of a Midwest Medical School

Eden F. Charles, MD; Sarah Brown Rothschild, BA; Elizabeth M. Petty, MD

Black people in the United States experience significant health disparities compared with White people, including lower life expectancy, higher rates of chronic disease, and increased mortality rates, such as infant mortality and mortality from common and chronic conditions.[1] Despite these sobering statistics, Black physicians remain underrepresented in the health care workforce. According to the Association of American Medical Colleges, in 2022, 5.2% of physicians identified as Black, while about 13% of the general population identified as Black.[2] Studies have demonstrated that Black physicians are more likely to serve communities with higher populations of Black and other non-White residents and to address the health care needs of Black individuals.[3] Additionally, racial concordance between patient and provider can improve health outcomes.[4]

Wisconsin is no stranger to racial disparities, particularly in overall health outcomes and maternal and infant mortality. A Commonwealth Fund report released in 2024 found that, among all states, Wisconsin ranks 25th in health care performance, yet ranks 5th worst in performance for Black residents.[5] This same report stated that Black and American Indian and Alaska Native individuals "live fewer years, on average, than White and Hispanic people and are more likely to die from treatable conditions, more likely to die during or after pregnancy and suffer serious pregnancy-related complications, more likely to lose children in infancy, and are at higher risk for many chronic health conditions, from diabetes to hypertension."[5] In examining infant mortality, Black infants were 3 times more likely to die before their first birthday than White infants during 2019-2021.[6]

To help address these racial health disparities, many medical schools have developed pathway programs, implemented processes to identify highly qualified students who demonstrate a commitment to improving health in populations with increased disparities, and expanded student support programs to help recruit, retain, and support the development of a diverse student body. Medical schools have also increased their focus on educating learners to become physicians able to address public health issues and advance health equity.

To better understand how the University of Wisconsin School of Medicine and Public Health (SMPH) has helped to prepare physicians to address the health inequities faced by Black people in Wisconsin and beyond, we turned to our institution's history, tracing the journey of Black medical students to understand the impact of medical education on their success in becoming physicians, as well as their contributions to medicine.

Records indicate that Jose Escabi, MD, a Black man, graduated from the University of Wisconsin's early 2-year medical school program in 1919 before earning his medical degree from Harvard University. The school then transitioned to a 4-year medical degree program in 1925. The first Black graduate of the 4-year program was William Tardy, MD, in 1967, who went on to establish a successful psychiatry practice in New York. Since then, more than 270 Black medical graduates from the school have made significant contributions to advance medicine and health outcomes.

> Medical schools across the country have worked for more than half a century to diversify the physician workforce to help optimize health for underserved communities and advance health equity.

The first Black woman to graduate, Ada Fischer, MD, earned her medical degree in 1975 and built an illustrious career in both medicine and politics. Among many accomplishments, she became the first Black woman elected as a committee member for North Carolina at the Republican National Convention and co-drafted the Occupational Health Services Standards of

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Care for corporate America and the Veterans Affairs health system.

Dial Hewlett, MD, class of 1976, served as chief resident at Harlem Hospital before pursuing a fellowship in infectious disease. During the early HIV epidemic, he played a crucial role in expanding access to zidovudine treatment for vulnerable populations. He later became a leader in the pharmaceutical industry and remains a staunch patient advocate. Today, he serves at the Westchester County Department of Health in New York as the medical director, Division of Disease Control, and chief of tuberculosis services.

Daryl Knox, MD, class of 1978, became chief medical officer at one of the nation's largest community mental health centers. A dedicated community advocate, he provided mental health education as a weekly mental health contributor on a local ABC news station. He is a former president of both the Houston Psychiatric Society and the Texas Society for Psychiatric Physicians, and he served in the Assembly for the American Psychiatric Association (APA) as well as on national boards that guide the profession, including the American Association for Emergency Psychiatry.

Salahuddin Abdur-Rahman, MD, class of 1982, completed a residency in internal medicine and then pursued a career in private practice in New Bedford, Massachusetts. After a long career in private practice, he transitioned to correctional medicine at the Department of Corrections and Rehabilitation in California and now works part-time in correctional medicine at Bridgewater State Hospital. Although retired, he continues to serve the incarcerated community, providing empathetic care without judgement.

Another graduate, Chris Harris, MD, class of 1987, pursued a career in pediatrics. He currently serves as medical director of Enanta Pharmaceuticals. Throughout his career, he has been a leader and champion of pediatric health initiatives supporting individuals who identify as lesbian, gay, bisexual, transgender, queer or questioning, intersex, asexual, and other sexual and gender minority groups (LGBTQIA+). He is the immediate past chair of the Section on Lesbian, Gay, Bisexual, and Transgender Health and Wellness of the American Academy of Pediatrics. Additionally, he is a past chair and current member of GLMA: Health Professionals Advancing LGBTQ+ Equality.

Tito Izard, MD, class of 1996, has been an advocate for addressing health disparities at the local, regional, and national levels. He is president and chief executive officer of Milwaukee Health Services, Inc, a Federally Qualified Health Center in Milwaukee, Wisconsin. He has also served as chair of the National Advisory Council for the National Health Service Corps. He and Milwaukee Health Services collaborated with the Medical College of Wisconsin and Froedtert Hospital to develop Wisconsin's first Health Resources and Services Administration-funded Teaching Health Center to address the shortage of physicians of color in Milwaukee.

A more recent graduate, Jasmine Zapata, MD, class of 2013, is an SMPH faculty member who also serves as the chief medical officer and state epidemiologist for maternal child health and chronic diseases at the Wisconsin Department of Health Services. She is the first woman and first minority to serve in this role. She has served as a member of the Governor's Health Equity Council and as co-chair of the Wisconsin Maternal Mortality Review Team, and her research explores health disparities--particularly around Black maternal and infant mortality. She has also founded multiple mentorship programs to encourage young women and girls to pursue careers in medicine.

These are just a few of the many Black alumni from SMPH who have made an incredible impact on their patients, their communities, and the nation as notable leaders in health care.

Through conversations with Black alumni, we learned that as students they fostered a strong sense of community, ensuring each other's success through unwavering support. They spoke of their fellowship and shared commitment to uplifting one another. From forming study groups and passing down invaluable advice to sharing daily meals, they built a network of resilience and solidarity that sustained them through medical school. It is also important to recognize the barriers they overcame as early trailblazers in changing the face of medicine, as numerous alumni shared experiences of discrimination and prejudice.

Medical schools across the country have worked for more than half a century to diversify the physician workforce to help optimize health for underserved communities and advance health equity.

Since Dr Tardy's graduation in 1967, SMPH has made significant strides in recruiting talented students from all backgrounds. Over the past 58 years, Black medical students who graduated from SMPH have served—and continue to serve—the unique needs of communities in Wisconsin and nationwide in public health, scientific discovery, clinical care, community service, politics, academia, and beyond. Data from the 2024 medical school graduates nationwide shows that a higher percentage of students who identify as underrepresented in medicine (URiM) compared with those who do not identify as URiM express a desire to work in underserved communities and care for underserved patients.[7] By recruiting, educating, and supporting a medical student body ready to serve diverse patients and populations, we can accelerate progress toward eliminating racial, socioeconomic, and geographic health disparities and fostering more equitable health outcomes.

The dismantling of programs that existed prior to June 2023 and that promoted the inclusion and success of individuals from different backgrounds within health professions could have unintended consequences and adversely affect populations already facing increased health disparities and poorer health outcomes. Implementing learner-centric programs that comply with current federal and state laws, with the explicit intent of providing a future physician workforce well equipped and committed to caring for the underserved, is critical. By ensuring the success of highly qualified medical students from all backgrounds, we ensure a healthier future for all.

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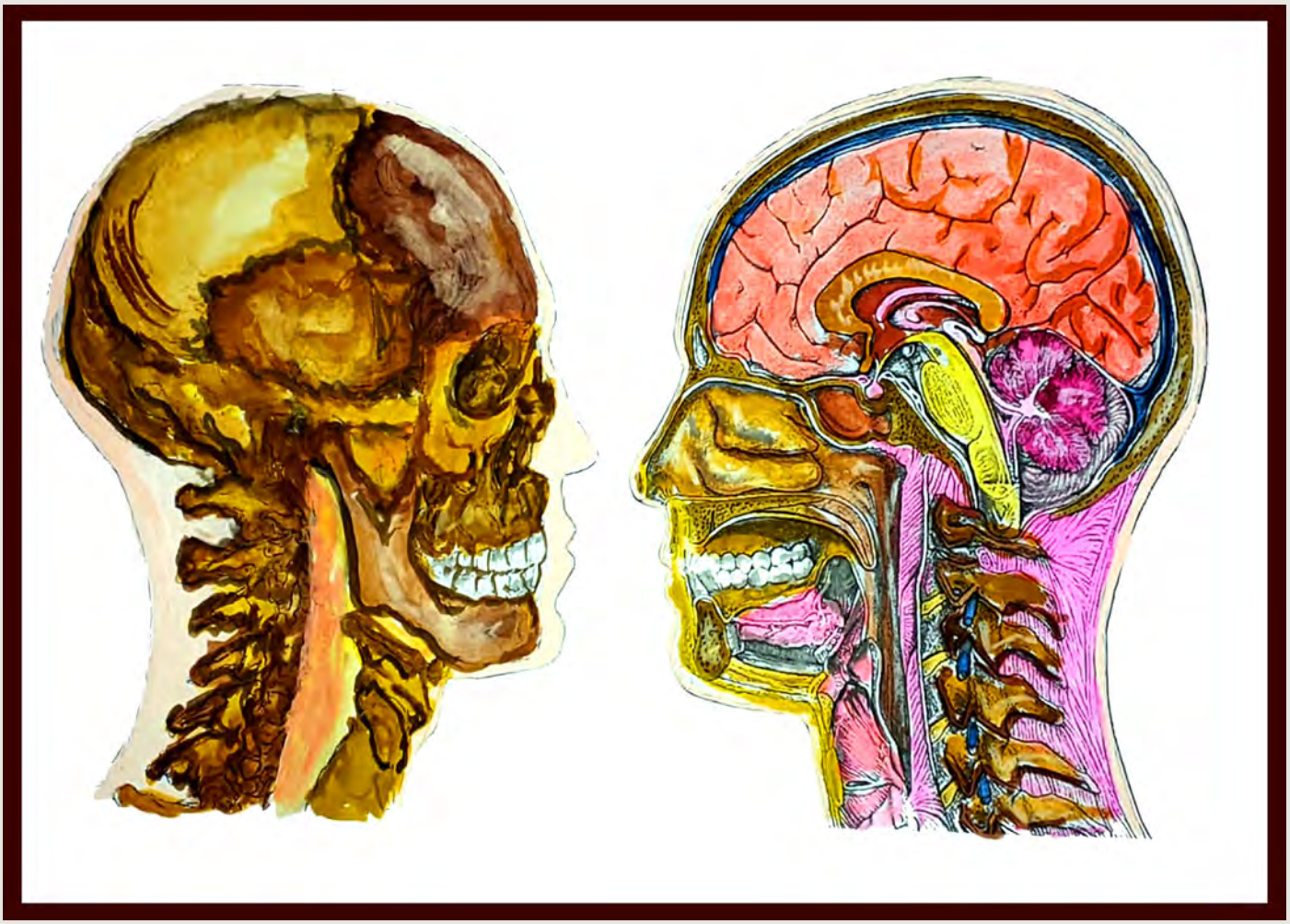

Beneath the Bone: A Portrait of Thought

Chaitali Umesh Hambire, MDS, DNB, PhD

About the Artist:

With 20 years of academic and clinical experience, Chaitali Umesh Hambire has made significant contributions to pediatric dentistry. Dr Hambire is a passionate artist. More than 30 of her paintings have been featured on the covers of esteemed PUBMED and SCOPUS-indexed journals, including the British Medical Journal (BMJ), Journal of Patient Experience, European Journal of Epilepsy, American Journal of Homeopathy.

‘How Do I Get There From Here?’ Discerning Pathways for Successful Faculty Promotion in Education at a Medical School

Laura J. Zakowski, MD; Amy Zelenski, PhD; Anne Stahr, PhD

ABSTRACT

Introduction: Promotion pathways for clinician educators (CEs) at academic institutions can be unclear, partially due to the specialization of faculty in education and the heterogeneity of their roles. Little specific guidance exists on promotion for CEs; therefore, we examined the lived experiences of recently promoted faculty to identify successful strategies that help early career CEs achieve promotion.

Methods: We conducted a qualitative study utilizing semistructured interviews of 19 associate and full professors to explore their successes, missteps, what they would have done differently, and advice to early-career faculty. Inductive analysis included individual review and group consensus. After generating codes and collapsing them into themes, we used the Social Cognitive Career Theory framework for higher-level analysis.

Results: Themes were organized into 2 categories: (1) advice for new CEs and (2) what institutions should offer. Individual strategies included finding mentors and sponsors, developing scholarship in education, and establishing career direction. Institutional strategies included providing formal or informal training, ensuring protected time, and minimizing nonmeaningful work for early-career faculty.

Discussion: Given the lack of specificity in promotion guidelines for CEs, these themes offer guidance from faculty who successfully navigated promotion. These can inform both early-career faculty and departments seeking to support CE advancement.

Conclusions: Successful promotion for CEs depends on mentorship and sponsorship, scholarship development, career direction, and institutional support. These findings provide actionable strategies for faculty and leadership to improve clarity and equity in promotion processes.

INTRODUCTION

Many clinician educators (CEs) wrestle with the question: “How can I get promoted?” Criteria for promotion seem clear for research- and clinically focused colleagues but are often opaque for CEs. This lack of clarity stems from variability in position descriptions and expectations for CEs across institutions, whereas the roles of clinician and researcher are better defined. Traditional expectations for promotion—eg, researchers obtaining grants and publishing in journals and clinicians demonstrating volume and quality care—do not apply well for CEs, whose roles are less clearly defined and can be more heterogenous.[1]

According to Sherbino et al,[1] a CE is “a clinician active in health professional practice who applies theory to education practice, engages in education scholarship, and serves as a consultant to other health professionals on education issues.” CEs have been promoted at a slower rate than those on traditional research tracks because of limited time for scholarly activities, fewer resources to support scholarship, and/or lower rank at the time of hire.[2-4] Additionally while considerable time is spent on training faculty for clinical roles, little time is spent preparing them for academic careers. Publications provide advice on how to succeed as a CE,[5,6] others define CE roles or identities,[2,7,8] and one study examined trainees interested in CE careers.[9] However, the literature does not describe specific steps to promotion, perhaps because academic medical centers provide only general guidance for CEs about this process. Our anecdotal evidence suggests that CEs approaching promotion are uncertain

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whether their educational accomplishments are sufficient for promotion at our research-intensive academic medical center. The aim of our qualitative study was to explore the lived experiences of CEs, identifying factors contributing to successful promotion, and compare these findings with existing literature on CE success.

METHODS

Participants and Setting

We conducted this study at a large research-intensive public university in a midsized Midwestern city. The school of medicine is 1 of 13 schools and colleges within the university and consists of 27 departments and more than 30 institutes and centers, with over 2000 faculty and 1700 students. The University of Wisconsin School of Medicine and Public Health has 6 promotion tracks; the primary CE track under study is the Clinical Health Sciences (CHS) track. Faculty on this track typically spend more than 50% of their time in clinical practice and must be promoted to associate professor by the end of their eighth year. The institution expects faculty to earn an external reputation for their work. Faculty on this track teach learners at all levels, pursue research, and provide service to their department, school, university, and the regional and national medical community.

We primarily studied faculty in the Department of Medicine, which includes approximately 800 faculty members, about 150 of whom are on the CHS track. In the most recent academic year, 8 CHS faculty were promoted to associate professor and 6 to professor. We recruited faculty in the Department of Medicine (n = 16) who were promoted to either associate professor or professor on the CHS track within the past 5 years, as well as 1 clinical adjunct faculty member. All participants had substantial roles in education (eg, medical school course director, associate residency or fellowship program director) and were promoted with education as one of their 2 required areas for promotion (the other being clinical care, research, or service). These faculty received a recruitment email describing the project and inviting them to participate in an interview. To validate our findings and explore CE experiences beyond our department, we recruited faculty (n = 3) with similar educational roles in the departments of dermatology, pediatrics, and psychiatry.

We did not collect demographic information directly and assumed binary gender identification for reporting purposes. This study was deemed exempt by the University of Wisconsin Institutional Review Board.

Data Collection

All three authors developed a semistructured interview guide from anecdotal discussions with faculty undergoing promotion review, published literature, and our internal expertise with faculty promotions. We structured interview questions to gain an understanding of CEs' successes and missteps throughout their academic careers. We refined questions in 5 areas of inquiry: (1) factors critical to success as a CE and promotion in an area of education, including additional training, mentorship or sponsorship, and career development; (2) the extent to which promotion was top of mind during their assistant professor years; (3) what they would have done differently; (4) what else would have been helpful; and (5) advice for current assistant professors. Authors individually interviewed one faculty member at a time. These semistructured virtual interviews lasted approximately 60 minutes each. We recorded and transcribed the interviews for qualitative analysis.

Table 1. Characteristics of Interviewees

Current rank	
Professor	5 (25%)
Associate professor	14 (70%)
Primary department	
Medicine	16 (84%)
Other (Pediatrics, Psychiatry, Dermatology)	3 (16%)
Years since promotion	
Professors, Department of Medicine, mean (SD)	3.3 (0.9)
Professors, external to the Department of Medicine, mean (SD)	8.7 (3.0)
All professors, mean (SD)	6 (4.0)
Associate professors, mean (SD)	2.7 (1.7)
Role of education in promotion	
Primary area of promotion	11 (58%)
Secondary area of promotion	8 (42%)
Gender	
Female	8 (42%)
Male	11 (58%)

Data Analysis

We used inductive thematic analysis to generate codes and then collapsed them into themes.[10] Our iterative process involved each author generating codes from their interviews and adding them to a shared document. We held several meetings to collapse codes through consensus. We compared our themes to the Social Cognitive Career Theory (SCCT) model, which addresses approaches to career decisions to assess how they aligned.[11] This model provides a framework for understanding career exploration and decisions from an individual's perspective, considering internal and external factors. We ceased interviewing when we reached conceptual depth, where participant responses started to closely reassemble one another, and then began our analysis.

RESULTS

We interviewed 19 faculty members (Table 1) between June 2021 and June 2022. All were on the CHS track, except the single clinical adjunct faculty member described above. Themes from this interview did not differ from those of CHS track faculty. Similarly, themes from the three interviews with faculty outside our department were consistent with those generated within the department. All faculty described themselves as clinical educators or clinician teachers. Most had started and remained on the CHS track through promotion, but three transferred from a clinical track and one from

a research track. At the time of the interviews, most participants (n = 14) were associate professors and had been promoted an average of 2.7 (SD, 1.7) years earlier. The remaining participants (n = 5) were professors. Department of Medicine professors had been promoted an average of 3.3 (SD, 0.9) years earlier, and those external to the department had been promoted an average of 8.7 years (SD, 3.0) earlier.

We categorized themes into 2 areas: (1) advice for individual actions CEs can take to secure success and (2) assistance institutions should provide for faculty beginning educational roles. These categories aligned with components of the SCCT model:[11] self-efficacy, outcome expectations, and goals. We present themes and associated explanations in Table 2. While we created columns for "what to advise new CEs to do" and "what institutions should offer," these areas are not mutually exclusive; all stakeholders invested in advancing the careers of CEs should consider all as potential strategies.

Table 2. Themes Related to Pathways for Successful Promotion as a Clinician Educator

What to Advise New Clinician Educators to Do	What Institutions Should Offer
Find mentors/sponsors/collaborators/role models/network with purposes of: • Keeping you accountable • Asking critical questions (How can you continue doing what you enjoy? What can you stop doing?) • Helping you think about direction • Advocating for you/recommending you for opportunities • Providing encouragement and support and advice and direction **Additional considerations:** • Utilize more than 1 mentor • Find both formal and informal mentors • Find mentors internal and external to institution • Consider gender alignment • Apprentice with an expert/follow their career path	**Encourage formal or informal training opportunities with purposes of:** • Validating faculty as educators • Formalizing ways to think about scholarship or education • Creating opportunities to develop a network • Providing resources about what to know or read • Developing teaching skills **Support a variety of training opportunities:** • Specialty organization conferences • Peer coaching or feedback • Formal education fellowships • Medical school resources • Short courses in education at institutions or through national organizations
Develop scholarship in education: • Publish on the everyday work you do • Begin a few projects with the goal of publishing • Develop a workshop/abstract in conjunction with a manuscript • Work in a group • Gather data from everything you do to develop scholarship	**Provide protected time:** • Be clear about the time needed and allotted for education • Allow time for career development/promotion so it can be accomplished during work hours
Develop direction: • Find what gives you joy • Take opportunities that arise to explore interests • Explore where there are gaps/needs; find a unique niche • Emulate your role models, including how they succeeded • Take small steps in the direction you want to go, if known	**Protect faculty from burdensome activities:** • Ensure that work being done in education fits with criteria for promotion • Leverage the requirements of the track for promotion to minimize nonmeaningful work

Themes related to promotion pathways coalesced into major areas: finding mentors, sponsors, collaborators, and role models; developing scholarship in education; and establishing career direction. Regarding mentorship, participants emphasized the crucial need for mentors who provide accountability, support, and guidance on career direction. Additional themes around sponsorship and role modeling emerged in participant quotes:

> Participant 1: *"…particularly for medical education that mentor is really critical. I found that medical education is a smaller community than the rest of medicine. Having a senior mentor who has you in mind for opportunities that they either hear about or may be asked to do themselves and getting you involved has really been the most important part that I've seen."*

> Participant 2: *"I had people who were really great in whatever they were doing, and they took me under their wing and kind of showed me the ropes."*

Another important theme concerned developing direction. Early-career meandering was common; participants described gaining direction by initially saying yes to opportunities, identifying gaps to fill, and discovering what they enjoyed. One participant described this as "meandering with purpose":

> Participant 3: "*I actually think there is strategic meandering… To not discount immediately, whether [potential opportunities or interactions] will be useful or helpful or not…That is information gathering, because some of those experiences or interactions end up being incredibly important."*

Participants also recalled the support provided by education leaders, mentors, and division chairs as particularly important. In addition to ensuring protected time and guidance about promotion in education, participants described how opportunities for informal or formal training from various sources contributed to their success. Common themes included learning how to think like an educator, developing teaching skills, identifying key resources, and building networks.

DISCUSSION

Our study offers additional perspectives beyond those reported in the literature, suggesting that promotion success should be considered alongside professional success when advising CEs. In the area of mentoring, participants uniquely noted that mentors can keep CEs accountable and ask critical questions. For CEs working towards promotion, these mentor characteristics are important additions to those previously cited in the literature.[12] When developing direction, participants emphasized the importance of mod-

eling their careers after CEs who have been successfully promoted. Triemstra et al[8] refers to identification of role models as important to CE success, and our participants confirmed this. Advice for CEs to take small steps toward growth also adds nuance to the general advice found in literature.

Participants contributed substantial insights regarding successful approaches to education scholarship. At our research-intensive academic medical center, promotion success includes motivation to publish. Participant advice on developing scholarship was more detailed than what is provided in the cited literature. While Castiglione et al[5] and Santhosh et al[6] noted the importance of gathering data on all projects, our participants added specific recommendations: develop workshops and abstracts alongside manuscripts, collaborate in groups, and to publish on everyday work.

We intentionally divided our themes into actions CEs should take and support institutions should offer. This perspective differs from other publications, which focus primarily on what CEs should do. Chang et al[3] is an exception; they describe in detail what chiefs and chairs should do to promote CE success, based on a literature review and their experiences. Our study of lived experiences confirms their recommendations and adds to them by suggesting that chairs and chiefs leverage the promotion requirements to minimize nonmeaningful work.

Our findings align with literature on CE roles and competencies[1] as well as the SCCT framework.[11] Themes regarding institutional support correlate well with recommendations for leadership actions.[3] Our study expands on prior work[2,5-8,12] by analyzing perspectives of those who have navigated promotion, rather than focusing solely on guidelines or institutional recommendations. Participants offered numerous impressions and useful advice, underscoring the need to incorporate these insights into promotion guidelines for CEs. While maintaining general guidelines allows for heterogeneity of career paths, it can create uncertainty about meeting promotion criteria. Nebulous guidelines may favor dominant groups and certain faculty activities, limiting equity in promotion—especially when mentorship is less accessible for CEs.[12,13]

Limitations

Our study had several limitations. We interviewed a small number of faculty from a limited number of departments at a single institution, and we selected individuals who were successfully promoted and remained at our institution after promotion. Retrospective interviews may introduce recall bias, as participants might remember only components that led to success or recall events inaccurately. We primarily interviewed faculty promoted recently to minimize recall bias for long-past occurrences. A few faculty changed promotion tracks, and we did not examine reasons for those changes, focusing instead on their successes after the transition; therefore, we may not have identified factors detrimental to success. Since this analysis, our promotion criteria have become more specific, and we did not study how that specificity may have influenced individual approaches to promotion or advice to junior faculty.

CONCLUSIONS

Our themes for successful promotion of CEs—mentorship and sponsorship, development of education scholarship, establishing career direction through strategic opportunities, and institutional support such as protected time and clear promotion guidance—add to the literature and can enhance conversations between early-career faculty and their mentors, leaders, and promotion committees. Insights from those who have navigated the path to a successful promotion can provide CEs with clearer expectations for career trajectories and strategies for achieving promotion.

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Incentives and Barriers for Early Career Faculty Participation in Medical Student Education: Perceptions of Clinical Faculty From a Midwestern Public Medical School

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ABSTRACT

Introduction: Physician faculty play key roles as medical student educators, often opting into these roles early in their careers. The incentives and barriers for early career faculty participation in medical student education have not been well elucidated.

Objectives: This quality improvement project examined the incentives and barriers perceived by early career faculty in 2 large clinical departments (Medicine and Surgery) at the University of Wisconsin School of Medicine and Public Health (UWSMPH) and identified potential improvements to support participation and satisfaction in medical student education.

Methods: We conducted a qualitative quality improvement project using semistructured interviews with 22 early career faculty from the Department of Medicine and the Department of Surgery at UWSPMH during June and July 2023. Interviews were analyzed using inductive thematic analysis.

Results: Among 22 early career faculty interviewed (11 from Medicine, 11 from Surgery), the top incentives for participation included personal fulfillment (72% Medicine, 81% Surgery) and promotion (45% Medicine, 36% Surgery). The main disincentive for both groups was lack of time (81%). Suggested improvements included increased protected time, financial incentives, enhanced faculty development, and clearer communication of teaching opportunities.

Conclusions: Participants from both departments agreed that key incentives for participation in medical student education include personal fulfillment and a clear path to promotion, whereas time constraints remain the major disincentive. Potential solutions include increased protected time and more organized communication of teaching opportunities.

INTRODUCTION

Physician faculty members are core teachers throughout medical student education (MSE) – as lecturers, small-group facilitators, and clinical instructors. Their value is especially pronounced when modeling clinical skills, reasoning, decision-making, and professionalism, which affects how students will ultimately relate to and teach patients as independent providers.[1] Faculty mentors also guide development from new student to independent physician by providing education in the "soft skills" not included in the formal curriculum, such as delivering bad news and developing confidence in making diagnoses and impactful medical decisions.[2] Students cannot reach their full potential as compassionate and confident physicians through textbooks alone; this process requires relationships with physicians willing to serve as educators.

The literature has well documented incentives and barriers to participation in MSE. Major incentives include appreciation for teaching efforts, sufficient time for teaching, paying it forward, supporting student development, interacting with student enthusiasm, maintaining up-to-date knowledge, viewing teaching as integral to the physician role, and finding the work personally energizing.[3-8] Barriers include difficulty balancing teaching with other duties, lack of recognition by leadership, insufficient faculty development programming, unmotivated students, lack of academic community, poor teaching facilities, and a lack of enjoyment of teaching.[4-6,9] Though studies have identified incentives and barriers for academic faculty in general,

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a gap remains regarding how these factors specifically influence early career faculty. While some physicians transition into education later in their careers, most opt in early, making early career perceptions of incentives and barriers an important and previously unexplored hinge point.[10]

Like many academic health centers, the University of Wisconsin School of Medicine and Public Health (UWSMPH) and its major integrated health system, UW Health, explicitly highlight the importance of education in mission, vision, and strategic planning documents. Despite this commitment, it remains unclear how early career faculty at UWSMPH perceive advancement through educational excellence, or whether educational contributions are viewed as being valued and supported to the same degree as research or clinical expertise. Some faculty have also implied to authors that involvement in MSE lacks sufficient financial compensation compared to other professional activities. With this in mind, we questioned whether faculty in higher-salary range specialties may be disincentivized to participate in MSE. Varying support and compensation structures across departments may influence participation in MSE by early career faculty and affect their satisfaction and desire to pursue medical education pathways. While UWSMPH will benefit directly from this quality improvement study conducted, the authors intended for the findings to be broadly applicable to public academic health centers, where a significant portion of undergraduate and graduate medical education is delivered.[11]

This quality improvement (QI) project had 2 primary goals. The first was to better understand the incentives and barriers perceived by early career faculty in 2 large clinical departments at a single institution – the UWSMPH departments of surgery and medicine – which include both procedural and cognitive physician services and research arms. The second goal was to help identify and prioritize opportunities at UWSMPH and beyond to improve early career faculty participation in MSE and enhance satisfaction with medical student teaching and leadership experiences.

METHODS

Project Design

This was a qualitative interview-based QI project. It was deemed "not research" and did not require Institutional Review Board review based on the University of Wisconsin-Madison QI/Program Evaluation Self-Certification tool accessed on May 26, 2023. Informed consent was obtained verbally before each 30-minute interview, with explicit clarification that participant identity would remain anonymous and responses would be used in this QI study.

A semistructured interview protocol was created by the author team (AR, AS, EMP) and included 8 questions with follow-up probes depending on participants' initial responses. The protocol was informed by literature review and discussions with 3 UWSMPH physician education leaders (the Department of Surgery vice chair of education, the associate dean of medical education, and the Department of Medicine vice chair of education; see Acknowledgements). The protocol was used with all participants, and questions were asked in the same order. The 8 questions explored participants' roles in MSE; involvement, compensation, and protected time; perceived incentives and disincentives; the influence of salary on pursuing academic medicine; potential improvements to support engagement; reasons colleagues may decline greater involvement; and initial motivations for participation.

Table 1. Participant Demographics

	Medicine % (Ratio)	Surgery % (Ratio)
Involvement in medical education		
Didactic education	82 (9/11)	91 (10/11)
Clinical education	100 (11/11)	100 (11/11)
Appointed medical education positions	9 (1/11)	36 (4/11)
Specific title for medical education beyond assistant professorship	9 (1/11)	55 (6/11)
Appointed full-time equivalent (FTE) for medical education		
> 0.1 FTE	9 (1/11)	0 (0/11)
≤ 0.1 FTE	9 (1/11)	18 (2/11)
0 FTE	64 (7/11)	82 (9/11)
Unsure	18 (2/11)	0 (0/11)
Time spent each week on medical education duties		
< 2 hours	30 (3/10)	18 (2/11)
2–4 hours	40 (4/10)	55 (6/11)
5–8 hours	10 (1/10)	9 (1/11)
>8 hours	20 (2/10)	18 (2/11)
Protected time for medical education duties		
Yes	33 (3/9)	43 (3/7)
No	67 (6/9)	57 (4/7)

Participant Recruitment

We recruited early career faculty members to participate in interviews from June 19 through July 20, 2023. Early career faculty were defined as those holding the title of "assistant professor," which at our institution is given to faculty directly out of residency or fellowship and is typically held for 5 to 7 years before promotion to associate professor. We extracted a subset of employed physician faculty with email addresses who met inclusion criteria from a public-facing health system website. Inclusion criteria included holding an assistant professor title, having MD/DO qualifications, and being employed in either the Department of Surgery or the Department of Medicine within the clinical teacher, clinical health sciences, or tenure tracks. Participants were not required to have formal education roles so that perspectives would include those engaged only in the basic educational responsibilities expected of all UWSMPH clinical faculty, such as teaching rotating clerkship students. A standard invitation was sent to all eligible candidates.

Participants were enrolled on a first-response basis. Forty-one

Table 2. Exemplary Responses to Interview Questions

Theme Identified	Illustrative Participant Quote
Question: What do you think, if any, are the current incentives to participate in medical student education? For you specifically and other ECF in your department?	
Personal fulfillment	"I don't know if there's any explicit incentive other than wanting to personally be involved in education and staying true to the academic mission." (S)
Promotion	"I think it, to a lesser role, it is sort of abstractly involved in promotion." (M)
Recognition	"... participating in the [formal education role] program where their benefit is very tangible, right? They have FTE buyout for it." (M)
Continuing education	"I feel that means that I stay up on kind of basic skills." (M)
Contribution to institution	"I don't know if there's any explicit incentive other than wanting to personally be involved in education and staying true to the academic mission." (S)
Salary	"If you're able to make a more compelling story that you are contributing this way, then maybe you'll get additional time that's compensated to do that for your academics." (M)
Question: What kinds of things discourage or disincentivize you or your colleagues from participating in medical student education?	
Time	"If you have a really busy service, it's harder to fit that [medical education] in. Or if you're going to fit it in, you're going to have to be sacrificing other things like time with patients, time on your other work obligations or your own time, your time with your family." (M)
No financial incentive	"But if I had set up to start my career and I said, 'I really would like to make the most money that I can,' for whatever reason, I wouldn't have chosen a path to medical education." (M)
Disorganized teaching opportunities	"It was a little challenging at first to sort of just understand what was needed. We get a lot of emails saying, 'can you do this? Can you do that?'"(S)
Do not understand medical school curriculum	"...no exposure to the med school and the med school curriculum here, or even the expectations of the students who rotate on the serices, sometimes it's hard to know...where to insert yourself." (S)
Question: What changes would enhance your experience or better support your role as a medical student educator?	
Protected time	"Maybe having a magical time clock that would give more time during the day." (S)
Financial incentive	"... if there was a way to standardize the education salary available for FTE involvement in med school that was somehow tiered or matched with your physician salary." (S)
Faculty development opportunities	"...maybe a formalized curricula that faculty can sign into on a yearly or twice a year..in terms of teaching styles, techniques, new concepts, something to continue to enhance our ability to teach, and some behaviors around that." (S)
Recognition of efforts	"... there were some systematized way to recognize the time that individuals are putting in. And either simply just recognize that – have your division head aware or your department chair aware of how much you're doing." (M)
Improved structure for promotion	"... there's a path to be promoted along medical education. The tricky thing with that path is it's not as well flushed out... I'm going along the medical education route for promotion... it's not just about putting in hours teaching, it's actually about doing something scholarly in that world, and nobody's ever really taught me how to do that so I'm sort of trying to figure it out on my own." (M)
More organized hub of sharing teaching opportunities	"I think perhaps having a central location for current opportunities and in a timeline. Because I feel like we often get emails about different opportunities that exist. But it's sort of haphazard." (M)

Abbreviations: ECF, early career faculty; M, medicine participant; S, surgery participant; FTE, full-time equivalent.

emails were sent to surgery faculty, yielding 21 responses (11 enrolled, 5 declined, 5 informed that enrollment was closed). Sixty-seven emails were sent to medicine faculty, yielding 18 responses (11 enrolled, 2 declined, 5 informed that enrollment was closed). Equal numbers of participants were enrolled from each department to achieve thematic saturation.[12]

Participants could choose in-person (2 of 22) or virtual (20 of 22) interviews. All interviews were conducted by 1 researcher (AR), who audio recorded, transcribed using a Google transcription program, and manually edited for accuracy. At the time of the interviews, the interviewer was a medical student, whose positionality and potential bias – particularly regarding specialty preferences – may have shaped some conversations.

Data Analysis

Inductive thematic analysis was used. After familiarizing themselves with the transcripts, 3 authors (AR, AS, EMP) developed a codebook based on frequently occurring and unique participant responses. Two independent coders (AR, LC) then reviewed each interview in depth and assigned existing or newly generated codes. Codes were compared across interviews, consolidated, and organized into themes. Discrepancies were resolved through discussion until consensus was reached, with each coder explaining their rationale. All authors (AR, AS, LC, EMP) reviewed, refined, and named the final themes to reflect recurring and unique participant experiences. Themes that appeared only once or twice were grouped in an "other" category.

RESULTS

Twenty-two early career faculty members completed interviews: 11 from the Department of Medicine and 11 from the Department of Surgery.

Most participants indicated that they did not receive salary support specifically for MSE duties (91% surgery participants, 80% medicine participants), and most reported that medical education did not affect their salary (86% surgery participants, 83% medicine participants). When asked whether salary considerations affected their decision to take on an MSE role, 9% of surgery participants and 0% of medicine participants said yes. When asked whether salary influenced their decision to work at an academic medical center, 27% of surgery participants and 64% of medicine participants responded yes.

Most participants (57% surgery participants, 67% medicine participants) reported that they did not have protected time for education duties. Of those who did, two-thirds agreed that the time allotted was sufficient to achieve their weekly medical education goals. When asked whether they had sufficient time to meet their MSE role expectations, participants from both departments were evenly divided: 50% indicated they had enough time, whereas 50% did not.

When asked whether the recent pandemic resulted in persistent barriers to teaching, 64% of medicine participants and 82% of surgery participants said yes.

Perceived incentives and disincentives for MSE participation among both departments are shown in Figures 1 and 2. Personal fulfillment was ranked highest as an incentive (>70% medicine participants, >80% surgery participants), whereas the main disincentive cited by both groups was lack of time.

Figure 1. Perceived Incentives for Participation in Medical Student Education

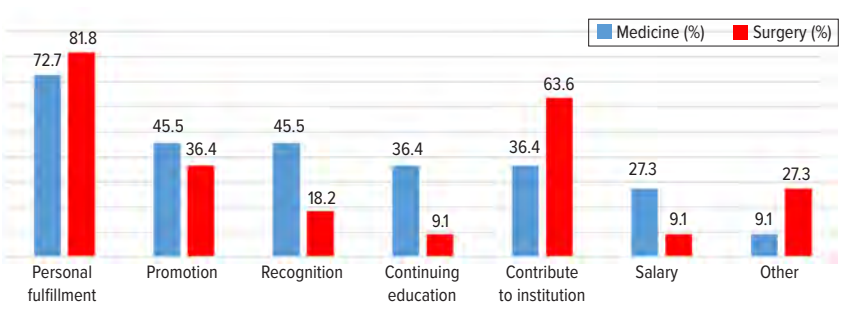


Figure 2. Perceived Disincentives for Participation in Medical Student Education

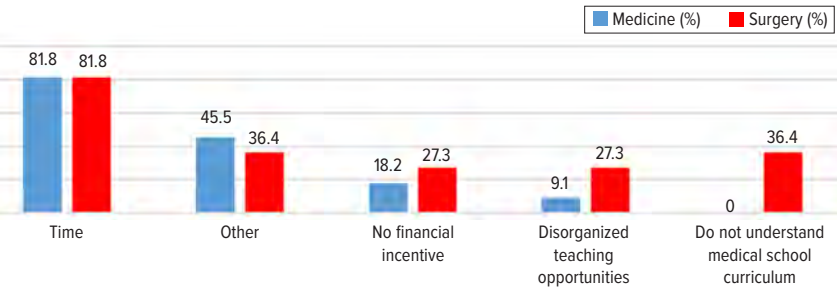
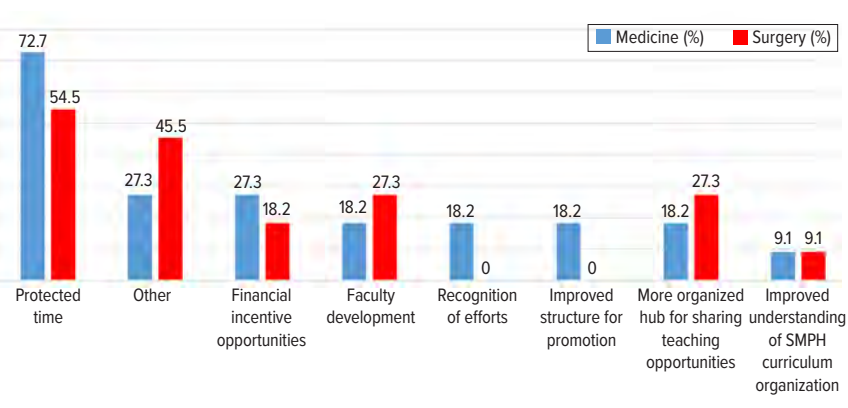


Figure 3. Changes That Would Enhance Experience or Better Support Role as a Medical Student Educator



Abbreviation: SMPH, School of Medicine and Public Health.

"Other" disincentives included limited flexibility in the types of material and methods of education, disengaged or unprepared learners, negative student evaluations, the visibility inherent in teaching roles, sporadic placement of learners making it difficult to foster meaningful relationships, and student "nitpicking" of politically correct language.

"Other" incentives included greater control over how material is conveyed to students, increased administrative support, more in-person teaching opportunities, better-prepared students, more longitudinal relationships with learners, and more robust feedback for educators (see Figure 3).

DISCUSSION

The most prominent incentives described by early career faculty in both the departments of medicine and surgery included personal fulfillment, opportunities for promotion, recognition of efforts, continuing education, contribution to institution, and salary. Both departments aligned on the importance of personal fulfillment and a clear path to promotion as key incentives. Of these, personal fulfillment, continuing education, and contribution to institution have been widely documented in previous literature.[3-8] Medicine and surgery participants differed, however, in their emphasis on certain incentives. Medicine participants

highlighted recognition of efforts, continuing education, and salary as important, whereas surgery participants emphasized contributing to the institution.

Unsurprisingly given clinical demands, a major barrier to MSE participation across both departments was time constraints, consistent with existing literature.[4-6] Faculty physicians in academic medical centers have responsibilities beyond clinical duties – often including teaching, nonclinical service, and research – yet the need to provide high-quality patient care and to support the fiscal stability of health systems often creates a real or perceived premium on clinical productivity over other mission areas. Physician shortages further amplify demand for a larger workforce to deliver high-quality medical care.[13] This study identified additional barriers to MSE participation among early career faculty that have not been reported previously, including disorganized teaching opportunities and limited understanding of the medical school curriculum. The latter barrier, reported exclusively by surgery participants, may reflect the unique 3-phase integrated curriculum at UWSMPH, which may differ from the curricular structures these faculty experienced as students. It may also reflect limited dissemination of curricular information by the school or limited engagement with materials already available to faculty.

Medical education is not a high revenue-generating activity; tuition alone often does not cover the cost of delivering medical education, which instead relies on financial contributions from donors, health system operating margins, intuitional resources, and state budget allocations.[14] Nonetheless, medical education remains central to the mission of academic health centers, ensuring future generations of well-trained, competent, compassionate physicians. Several participants indicated that additional protected time for education would not only incentivize their willingness to provide more teaching and contributions to education but would also promote more meaningful engagement. Notably, early career faculty in surgery described stronger salary-related barriers to MSE participation than their colleagues in medicine, which may reflect larger salary differentials between clinical and academic roles in surgical fields. It is possible that faculty in higher-earning specialties may be disincentivized from participating in MSE when educational activities reduce time available for more lucrative clinical or research endeavors.

As a QI study, a major goal of this project was to identify areas for improvement. Given that time constraints were the most significant barrier, collaboration among department and school education leaders to identify feasible solutions should be prioritized. However, providing additional protected time may be challenging given current patient and health system needs. One unique barrier identified was sporadic teaching offerings, suggesting an opportunity for improvement. A potential solution is the development of a central online portal where faculty can learn about and sign up for teaching opportunities. Participants described the current process – receiving occasional emails from the department – as difficult for integrating unpredictable teaching requests into clinical schedules. A centralized, annotated list of teaching opportunities could benefit faculty at all careers stages and improve transparency around teaching needs.

The identified barrier of limited understanding of the medical school curriculum may be specific to UWSMPH; however, other academic institutions may also benefit from addressing this challenge to help early career faculty tailor their teaching to student needs. Additional pre-course training modules are unlikely to be effective given faculty time constraints. Instead, concise, readily accessible online micro-learning resources tailored to institutional curricula – describing expected student competencies at each stage – could be available both prior to scheduled teaching encounters and via the teaching opportunity portal for just-in-time review. Such resources may reduce time spent preparing for MSE tasks, improve satisfaction and confidence among new teachers, and reduce miscommunication about expectations between students and faculty, which can occur despite the availability of syllabi and objectives.

Limitations

This study has 3 notable limitations. First, there is potential self-selection bias, as participants volunteered to be interviewed. Faculty already invested in MSE may have been more willing to participate than those who intentionally avoid MSE involvement. Second, all participants were physicians who had chosen to work at an academic medical center, where participation in MSE is often an implicit expectation; therefore, perspectives of physicians who chose nonacademic settings to avoid medical education involvement were not captured. Third, demographic data were not collected to ensure participant anonymity; thus, potential associations between participant characteristics and perceptions could not be explored.

Future Directions

This study included early career faculty at the primary UW Health location and did not reflect perspective from statewide sites. Understanding those viewpoints will be important for implementing improvements across the system. Second, while several strategies have been proposed to address barriers at the primary site, future research could examine how other academic centers have responded to similar barriers and whether their approaches could be piloted at UW Health. Third, early career faculty identified time constraints as a major barrier, but the amount of time needed to meaningfully engage in MSE has not been well characterized; future work could address this gap. Such information would help large academic centers allocate resources to balance patient care and educational needs. Fourth, future studies could include physicians who opted out of academic settings entirely to understand their perceptions of MSE. Lastly,

although demographic data were not collected in this study, future research could explore how race, gender, ethnicity, and other identifying factors intersect with early career faculty experiences in medical education.

CONCLUSIONS

Faculty involvement in MSE is critically important for knowledge acquisition, skill development, and the professional socialization of future physicians. The greatest incentives identified for early career faculty participation in MSE were personal fulfillment, contribution to the institution, and opportunities for promotion, whereas the greatest disincentives were real or perceived time constraints and lack of financial incentives. This study identifies key areas for improvement for UWSMPH faculty physicians, including optimizing protected time for education within broader organizational missions, developing an up-to-date portal of annotated teaching opportunities, and providing more just-in-time information about the school's curriculum, learning objectives, and student expectations. Future studies could further elucidate the perceptions of early career faculty more broadly – particularly those at other academic centers and health systems – and, importantly, those perspectives of physicians who actively choose not to participate in MSE.

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Identifying Faculty Development Needs of Basic Science and Clinical Faculty in Preparation for Curriculum Change

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ABSTRACT

Introduction: Curriculum design is an iterative process that medical schools undertake to assess, adapt, and improve existing curricula. Need assessments are a foundational component in this process because they help identify concerns requiring attention. However, needs assessments historically have focused on students, with minimal emphasis on faculty needs. During our institution's curricular design process, faculty participated in listening sessions that identified their concerns.

Methods: Participants were recruited to participate in semistructured interviews via Zoom. Inductive and deductive processes were used to identify key thematic codes based on interview responses. Codes were then stratified to identify representative quotations within each theme.

Results: Twenty-four faculty members participated – 8 basic science faculty and 16 clinical faculty. Most expressed excitement about the potential of the new curriculum but also shared concerns about implementation. Time was the most significant concern, with faculty citing current workloads as a primary challenge. Uncertainty regarding roles and the implementation timeline was another concern. Other frequently discussed themes included clinical reasoning, critical thinking skills, facilitator availability, and experience with new teaching techniques.

Conclusions: Semistructured interviews were effective for identifying faculty concerns that can inform future faculty development programs. Not surprisingly, concerns about time – particularly time for required faculty development – and uncertainty about roles were most prominent. These findings enabled the curricular leadership team to prioritize the development of efficient and targeted faculty development programs.

INTRODUCTION

Curriculum design is an iterative process that medical schools routinely undertake to assess, adapt, and improve existing curricula.[1] The traditional medical school model consists of two preclinical years of didactic courses and two clinical years of clerkships. Many medical schools have transitioned to a model that reduces time spent in didactic preclinical courses and instead emphasizes integrated content to maximize clinical learning.[2] Frequent adjustments and reorganization of courses or entire curricular blocks are common in order to keep pace with innovations in health care, teaching techniques, and technology.[3] Further, medical schools across the United States (US) generally share similar overarching goals for their new curricula when undergoing curricular change.[4,5] For instance, many have increased efforts to shift from primarily passive didactic sessions to offering more opportunities for self-directed learning.[6] Institutions have also implemented new models for how coursework is structured. Finally, some have suggested that additional integration could allow for reducing the total time spent in medical training, with a vision for combined undergraduate and graduate level medical education.[7]

Our medical school embarked on the challenging task of developing a new curriculum that better integrated content and maximized clinical experiences. In designing the curriculum, efforts were made to create a "clinically applicable, fully integrated basic science teaching"[3] using "active, small-group, and inquiry-based learning methods; patient care and health care team experiences; and individualized, differentiated training."[3]

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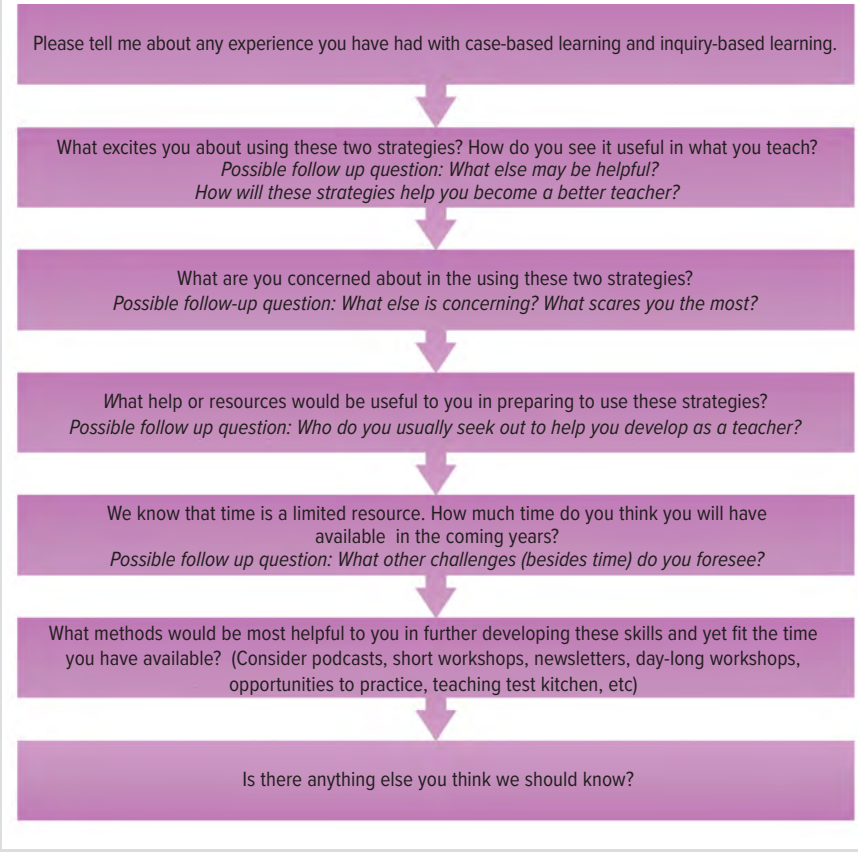
Stated goals included:

- To produce competent, well-rounded physicians who will be excellent clinicians in any specialty.
- To prepare graduates "to practice in the rapidly evolving future health care environment and to become lifelong learners."[3]
- To provide students with opportunities to develop skills for specific career goals.[3]

These goals highlight the curriculum development team's commitment to creating a student-centered curriculum that integrates concepts across all experiences.

Given the significant changes to content formatting as well as the need for faculty to employ active learning strategies, understanding faculty concerns and training needs is vital. Needs assessments are a foundational component of curriculum innovation because they help identify concerns that must be addressed. However, needs assessments have historically focused largely on students and their learning needs[8] with minimal emphasis on faculty needs. Faculty are often resistant to dramatic curricular changes,[9] particularly early in the process, due to a desire for stability and a belief in the current system.[10] Resistance to curricular change can be linked to faculty members' identities as educators.[11] This resistance can arise when expert teachers feel they are returning to a novice state in response to institutionally imposed changes.[11] Thus, including faculty throughout the design process is critical for overcoming such resistance.

Figure. Semistructured Interview Questions



In this vein, the Medical College of Wisconsin's new curriculum raised concerns among faculty. Curriculum developers partnered with human-centered design (HCD) experts in an educational research institute within the university to assist with identifying faculty concerns through a targeted needs assessment.[1] HCD facilitates educational innovation through design thinking, with a focus on empathy and curiosity.[12,13] It also takes a people-centered approach by engaging stakeholders and fostering creativity.[14] Applying this approach was critical in identifying faculty concerns and highlighting opportunities for improvement during curricular design. Because the success of the new curriculum relied heavily on faculty involvement and support, it was important that curricular designers created a product that faculty would be enthusiastic about delivering to students.

With these principles in mind, the HCD experts conducted a series of listening sessions to explore faculty perceptions of and concerns about the proposed curriculum. The listening sessions revealed that faculty were concerned about their ability to provide the necessary content within the new curricular format, how they would manage new expectations alongside existing responsibilities, and what types of preparation the new format would require. However, specific details of these concerns remained unclear. Therefore, this project was proposed to collect additional information to better inform the curriculum development team regarding faculty needs across educational settings and to gather information about potential strategies to mitigate concerns such as time constraints.

Furthermore, understanding faculty needs and constraints was necessary for the curriculum development team, instructional designers, and other faculty developers within our system to create faculty development offerings. Completing this needs assessment would help these groups craft efficient and effective interventions aligned with the institutional context and content. Prior experience at our institution and others has demonstrated that failing to identify such issues can challenge implementation of a new curriculum and may adversely influence both faculty well-being and student learning.[15,16]

This study aimed to gather in-depth needs assessment data through qualitative interviews with basic science and clinical fac-

Table 1A. Themes, Definitions, Frequencies, and Sample Quotations

Subtheme	Definition	No. Who Discussed Theme	Frequency of Code	Participant Quote
Theme: Preparation for the new curriculum				
Faculty development	Modalities (podcast, video with commentary, hands-on with expert support, coaching, guiding framework), timeline of faculty development, material preparation	23	146	"I think it might sort of depend on the topic a bit. Some of it might do well with asynchronous. So, something like how do you edit videos. That could easily be a video that I watch on my own time to learn how to edit the videos. An overview of all the technology we have available to us as [our institution's] faculty or employees. I could watch a video of that on my own. Things like small group facilitation, growth mindset I feel should be in person, or not in person but synchronous (in person or virtual). So, when I was thinking about how much time I would be able to have to take these courses I was thinking of them as being…1- to 2-hour workshops that are in person or virtual. So, my answer would be the same for that. As far as asynchronous, I think if I had a half-hour video to watch every week that would be very easy to fit into my schedule. But I guess it varies from person to person."
Time	Lack of time, protection of time, payment for time, prioritization of time (educational vs clinical vs research), volunteer time issues, time for faculty development	22	119	"I think one of the challenges with getting people ready will be that the old curriculum will still be ongoing. So, a lot of us have things that we have commitments with the old curriculum — we can't just not do them. So, that's one of their competing concerns."
Understanding	Participant's understanding or knowledge about case-based learning and inquiry-based education	15	24	"Since I teach in a medical college, I think it will be incredibly useful because we are going to be focusing on cases, and training future clinicians to receive information in the way that they will receive it… – in a stepwise manner, not getting all of the facts at once – I think is important. And I also think it can correlate really well – as they are learning clinical reasoning skills, it can really be incorporated into the case. So that is why I am a big fan of case-based learning, especially in medical education."
Theme: Feelings about implementing a new curriculum				
Uncertainty	Role, timing, what is needed for success, timeline for product development, resources while providing 2 curriculums simultaneously	19	86	"On the flip side of that, we are wondering if we will be overwhelmed in our work, that there won't be enough manpower to go around because we'll be asked to teach throughout all 3 phases of the curriculum and will be expected to be in two places at once."
Experience	Participant discusses or describes their experience with case-based learning and inquiry-based education	20	68	"You know, in my teaching experience I wouldn't say that I have formally used either of those. I think more that principles within those probably have been part of the various teaching that I've done."
Partnerships	Build on strengths, fill in gaps, excitement working with others	15	60	"I think we have to partner with our basic scientists and our clinicians to ensure that we're all speaking, number 1, the same language, we all have a shared understanding of the vision that we want for each of our curriculum [sic]. But, again, I can't emphasize the language piece enough because the minute we miscommunicate, that's when I think the students are going to get turned off, faculty might get frustrated, coaching might go astray, feedback may be misdirected."

ulty to identify opportunities for improvement in the curriculum's design and to support the creation of efficient and effective faculty development interventions. The research questions guiding this study were: "What aspects of the new curriculum are faculty most excited and most apprehensive about implementing?" and "What types of support and faculty development offerings are necessary to prepare faculty to be successful in delivering the new curriculum?"

METHODS

The Medical College of Wisconsin, the site of this study, is a private health professions graduate-level university located in a midwestern US city, with two regional satellite campuses located in other areas of the state. It is one of two medical schools in the state. Semistructured interviews were conducted with basic science and clinical faculty members from November 2021 through April 2022. Any basic science or clinical faculty member actively involved in the medical student curriculum was eligible to participate (approximately 39 faculty members). Basic science and clinical faculty who had minimal (<4 hours per academic year) or no contact with medical students were not eligible. The MCW Institutional Review Board determined the project was not human subjects research in January 2022.

Potential participants were contacted via email by a study team member; those who elected to participate were scheduled for a 30- to 60-minute interview. Interviews were conducted and recorded on the Zoom platform; Zoom-generated transcripts were downloaded, cleaned, deidentified, and labeled basic science or clinical faculty. The list of semistructured interview questions is provided in the Figure. Questions focused on the participants'

Table 1B. Themes, Definitions, Frequencies, and Sample Quotations

Subtheme	Definition	No. That Discused Theme	Code Frequency	Participant Quote
Theme: Inputs for curricular development and design				
Facilitators	Number, role, preparation, volunteer issues, departmental or leadership support	16	57	"The concept of instead of a lecture…where you have 1 instructor teaching 200 students, you're going to have 1 facilitator, with a group of 10 to 12 to 14 students means that you need to have 20 times the number of facilitators…I know that's part of the plan, but I don't think anybody has explained to us how we're going to magically get 20 times the number of instructors for our students."
Development of materials	Synchronous vs asynchronous, active with expert guidance, timing, depth of materials	18	53	"Practical tools that will help faculty do these skills, so, for instance, if there's a template to follow, make that available. if there's a toolbox of, you know, how do you structure a case appropriately, make that available. Those are by far very practical approaches and that doesn't require a whole lot of time. Talking at faculty about concepts that they may or may not implement in the given course that they teach is probably going to be less helpful."
Skills	Mentions abilities to create or design cases, lead case discussions, facilitate implementation of case-based learning or inquiry-based education	14	31	"I routinely use cases in my teaching already. Most of my colleagues do as well, whether it is a formal case or sprinkled in throughout large reflectors does not matter, case-based is something I have long incorporated into existing teaching."
Support staff	Need additional staff (departments), Office of Educational Improvement's role	11	33	"I feel isolated or like in a silo. It's like, you go ahead, you are a block director, design your curriculum, design your instructional methods. It would be helpful or reassuring to feel that there is some support for that or some sort of training."
Educational theory	Describes or mentions the use of educational theory, such as adult learning theory. Or describes the benefits of case-based learning and inquiry-based education	11	29	"That active learning is a richer, deeper way to learn than didactic lecture, that decreases achievement gaps between groups of students, that ensures long-term retention of the material and applicability to real world experiences. I'm thrilled that [our institution] is moving towards active learning strategies – which I should clarify is sort of an umbrella term for inquiry-based in case-based – both of those are different forms of active learning you get into, you know, team-based learning, problem-based learning, case-based learning, etc."
Feedback	Students: giving AND receiving Faculty: giving feedback to students, co-facilitators, and leadership	9	25	"But you know I don't always know that the student response to my teaching is the only perspective I should be getting in terms of faculty development and feedback. So, I think at some point…there needs to be a loop back where it's like OK, you did this for this last year – again, the same thing here's what you did well, here's what you need to do better, here's what you just need to stop there, just don't do this any more."

experiences with implementing specific teaching strategies, perceptions of the new curriculum, and potential faculty development strategies. Objectives included identifying components of the proposed curriculum that participants found exciting, worrisome, anxiety-provoking, or challenging, as well as identifying useful faculty development methods that would align with the time available during curriculum redesign and implementation and support skill acquisition.

After all interviews were completed, transcribed, and cleaned, transcripts were coded using a shared codebook developed by the study team through an inductive and deductive process. The study team included 2 medical students, an experienced medical educator and physician, and a medical education researcher. The team coded 1 clinical and 1 basic science faculty transcript independently and then met to discuss the codes generated. This initial codebook was then applied to 2 additional transcripts, after which the team met again to discuss coding, any new codes created, and discrepancies. Once consistency was achieved, the remaining transcripts were assigned to the team. Each transcript was coded by at least 2 study team members using NVivo qualitative data analysis software (Lumivero). Intercoder reliability was assessed via Nvivo's Coding Comparison Query feature for each transcript. Average intercoder reliability was 92%. The final thematic codebook consisted of 5 major themes and 21 subthemes (Table). After all transcripts were coded, frequencies of themes and subthemes were tallied, and the number of interviewees addressing each theme or subtheme was determined. Data were stratified by specific codes to identify representative quotations within each theme and subtheme.

RESULTS

Interviews were conducted with 8 basic science faculty and 16 clinical science faculty, for a 61.5% response rate. The major themes were: (1) preparation for the new curriculum, (2) faculty feelings about curricular implementation, (3) inputs for curricular development, and (4) concerns focused on students, along with several minor subthemes. Key subthemes– faculty development, time, and uncertainty – were prominent, with faculty raising these issues 4 to 5 times on average per interview. Other common subthemes included facilitators, skills, and partnerships. The Table displays

Table 1C. Themes, Definitions, Frequencies, and Sample Quotations

Subtheme	Definition	No. That Discused Theme	Code Frequency	Participant Quote
Theme: Concerns surrounding students				
Clinical reasoning	Students start earlier, "mimic" steps in real world, ultimate goal is patient care, enhanced integration of basic and clinical science, enhances value of basic science in clinical medicine	23	44	"You know, helping them to take the initiative to think through what they would do and whether there's certain curveballs thrown in a case, of thinking through when things don't go as straightforward as you'd like them to… there's often other obstacles and things that you have to consider in a treatment plan, and so I think there's a lot of value to thinking through not only the medicine – this is what the textbook would say we need to do – but then also taking into account the resources available and, again, obstacles that families may have to a follow-up plan, and those kinds of things I think can be incorporated really well in case-based learning."
Outcomes	Residency choice, residency attainment, Step 1 and Step 2 scores, evidence-based teaching use, increased curiosity, collaborations between faculty	15	42	"We have to realize too…that, you know, preparing them for the practice and then also making them as appealing…an applicant for residency as possible, and so the thing we have to be careful about in this is that there's a lot of moving pieces right now."
Knowledge retention	Apply knowledge consistently, recognize value of basic science	15	32	"That active learning is a richer deeper way to learn than didactic lecture, that decreases achievement gaps between groups of students, that ensures long-term retention of the material and applicability to real world experiences."
Critical thinking	Describes the need to move beyond memorization or presentation of facts. Acknowledges that students need to ask questions, be equipped with necessary problem-solving skills to be successful	13	30	"And so, teaching students how to inquire, how to critically think, is the most important skill that we teach them. So, that's really exciting, and that's what we're trying to get them to do because we deal with people and not with diseases and people's diseases don't present like they do in textbooks. They do a little bit, but not completely."
Increased student engagement	Attendance, active participation, communication with peers/instructors	12	23	"…that is usually what students find much more engaging, this is the 'Why do I have to bother learning this.' Cases demonstrate that in a very active way, as far as inquiry -based."
Student preparation	Acknowledges that students will need support in preparing and participating in case-based learning and inquiry-based education. Students may be used to more traditional teaching methods, and they will need to be able to self-direct their own learning.	10	21	"There's this really weird thing we're at in medicine right now, where there's this crisis of trust, where we will tell students to study things, give them really robust materials. Then they'll not do any of the prework that we tell them to do. Instead, they'll do their own stuff up but they maybe – sometimes rightly so, sometimes not rightly so – they have their own materials that they're able to resource so, if you flip that and just say OK, well we're going to give you the questions and the case, like you do the research, that's actually more realistic to how real physicians work and then it solves the problem of academic trust. You're not just teaching off this one textbook anymore, you're letting the students kind of find their own answers."
Prepare students for Step 1	Insufficient exposure to basic science and multitude of clinical cases, cost of review materials, need for students to prepare outside of curriculum, cases too artificial (to include all components)	8	14	"Like we just said, really it's the application of the knowledge, so that's where it's the most useful because…we're going beyond just teaching these students for Step 1… which is not all memorization but a lot of it, and then into their clinical years where they have to apply it, you know, so it's kind of that stepping stone, if you will."
Professional identity development	Students: professional identity formation, self-direction skills, buy-in; Faculty: addressing change issues	4	13	"I feel like the reason why people go to school, particularly professional schools, is they want to flourish as a professional and want to find that career that rewards and motivates them. And I think as educators, when I find myself flourishing most is when I get to have dynamic growing relationships with my learners."
Theme: Miscellaneous minor themes				
Regional campus	An issue is raised specifically about 1 or both regional campuses and their unique needs	2	6	"In the regional campus, we're already so bare bones – like, you know, during COVID when we lost a couple of people and then we couldn't bring in people from the outside, we had to 'hunker down folks, we got to do this teaching' – so I'm the course director for the LIC, which means that I'm essentially managing 7 clerkships by myself."

the coded themes and subthemes, their definitions, frequencies, and representative quotations.

The theme of preparation for the new curriculum focused on faculty members' preparation needs and their perception of others' needs related to designing and implementing the curriculum. The theme included three subthemes: faculty development, time, and understanding of new pedagogical practices. Faculty expressed excitement about the new curriculum but also voiced concerns regarding their own and others' preparedness to implement it. Time was a major concern, although discussion varied. For example, several faculty noted the lack of a clear timeline for developing course sessions. One faculty member said:

> *"I haven't seen a timeline for the curriculum … except that we know it is going to start in July 2023… I know it's going to be that foundations course, but I don't know if I am going to be teaching in that."*

Faculty were also concerned about the time required for faculty development activities and whether such activities would fit within their existing schedules. When asked how much time they could devote to faculty development, one faculty member said, *"Probably 1 hour a month would be a reasonable guess, and I'd probably miss, you know, a handful of those on busy months."*

Another preparation-related concern involved scheduling faculty development, such as facilitator training sessions, prior to teaching. One faculty member said, *"Trying to find a time that works for reviewing materials with facilitators is very challenging because… invariably people have other commitments and… I don't know that I have a good solution."*

Faculty also expressed concerns about balancing time commitments during the transitional period when the institution would run two curricula simultaneously:

> *"I think I will have the same amount of time for education that I do now. It's just that you're going to ask me to do two things at the same time. Right, you're going to ask me to run my clerkship as best I can and make meaningful improvements and you're going to ask me to develop new curriculum at the same time."*

The faculty development subtheme extended beyond discussions of time. Several faculty described faculty development as an opportunity to enhance teaching skills. One stated, *"I always love hands-on practice [faculty development]. A big pet peeve of mine is didactic lectures about active learning… I can't get over the hypocrisy there."*

The second major theme centered on faculty feelings about the creation and implementation of the new curriculum. Faculty expressed mixed emotions – ranging from excitement to concern – with uncertainty being the most prominent subtheme. Much of uncertainty stemmed from the lack of a detailed map for the new curriculum. As a faculty member explained, *"I guess what I am a little bit unsure of, and I think we'll have a better idea once we map some of the curriculum … how do you decide what are going to be important concepts."* Another said, *"we haven't figured out the specific content needs … so that's another worry."*

A second area of uncertainty involved delivering the curriculum through small groups, particularly given the shift in teaching strategies. A basic science faculty member said:

> *"You're worried about the students getting all the base knowledge that they need to get, you're worried about some students dominating the process, whereas other personalities may not be involved and will step back. It's hard, you have to really do it [small group facilitation] effectively."*

Despite this uncertainty, many faculty expressed enthusiasm for the new curriculum. A faculty member commented:

> *"The fact that the literature supports it being beneficial to the learners and supports retention of material with these methods, I think that's going to be really important as we are training new clinicians. So, that is exciting, and I also think it is more enjoyable for the learners and it is a way to reach a lot more different learning styles. And I think that is really great because we can achieve more equity in the classroom as well."*

Another said, *"I'm thrilled because it's just better education, the student outcomes are so appreciably greater across so many different disciplines, and the pedagogy literature really supports them."*

Faculty also discussed inputs for curricular development and design, focusing on the practical requirements for implementation. Key subthemes included developing curricular materials, faculty skill in creating such materials, educational theory supporting the design, and the personnel needed for implementation (ie, facilitators, support staff).

The final major theme involved concern for students, particularly regarding student outcomes and how faculty could ensure student success. Faculty noted that students' preparation for case-based and inquiry-based learning might vary and that additional support could be needed. They also expressed concern about how effectively the new curriculum would engage students and ensure that they achieved the key milestones, such as the United States Medical Licensing Examination (USMLE) Step 1 exam. Additional subthemes are described in the Table.

DISCUSSION

Obtaining faculty perceptions through human-centered design interviews is an effective way to learn about faculty needs. Faculty members interviewed offered rich perspectives and candidly discussed concerns about the new curriculum and their roles within it. Follow-up questions were rarely needed to prompt replies and were most helpful for exploring details related to previously raised concerns. The needs assessment revealed that faculty had significant concerns regarding time, faculty development offerings, and uncertainty about details of the new curriculum. Moreover, concerns within each theme often differed and overlapped with other themes. For example, concerns about time included balancing responsibilities in two curricula simultaneously, finding time for faculty development, and feeling uncertain about the curriculum's overall timeline.

Faculty needs assessments such as this are essential to ensuring new curricula are implemented smoothly and with appropriate supports in place to help both faculty and students succeed. As a result of better understanding faculty concerns, the curriculum leadership team was able to adjust plans, including reducing the number of faculty facilitators needed and incorporating near-peer teaching by fourth-year medical students. Additionally, the new curriculum includes numerous paid faculty positions for the facilitator roles, creating full-time equivalent roles that emphasize the value of faculty time and the importance of teaching students. These changes reduced the burden on already busy faculty and created opportunities for increased interaction between the incoming students and senior medical students. Studies have demonstrated the benefits of near-peer teaching for both learners and peer teach-

ers, including increased networking, greater comfort in asking questions, and enhanced confidence and skill mastery among peer teachers.[17] Furthermore, students taught by both faculty and peer teachers have comparable academic outcomes, making near-peer teaching a viable approach to supporting overextended faculty.[18]

The curriculum leadership team also addressed faculty uncertainty by introducing a monthly institution-wide newsletter, quarterly retreats, and a dedicated webpage to increase transparency regarding curriculum design and implementation.[3] The monthly newsletter provided brief updates and key information about curriculum development, while the quarterly retreats offered more detailed updates and consolidated faculty development opportunities, with designated tracks tailored to specific curriculum roles. Additionally, the intranet site served as a central repository for all information regarding the new curriculum for faculty or students who desired to learn more. Although some degree of uncertainty is inherent in any curriculum change, these efforts helped faculty gain a clearer understanding of the curriculum's goals and their roles within it.

Limitations

This study focused on one institution undergoing curricular change, which may not reflect faculty concerns at other institutions. Additionally, only faculty who were highly involved in teaching were interviewed, as the goal was to understand the concerns of those most affected by and most engaged in the new curriculum. Consequently, the perspectives of faculty with infrequent teaching roles are not represented. Further, the sample included twice as many clinical faculty as basic science faculty, which may have influenced the distribution of concerns expressed. Next steps include conducting follow-up interviews with the original 24 participants after the first year of the curriculum implementation to evaluate whether needs were met and to explore new or emerging challenges.

CONCLUSIONS

Findings from this needs assessment enabled curriculum designers to refine curricular plans and associated faculty development offerings in ways that better engage faculty and promote buy-in and support for the new curriculum. Similar human-centered needs assessments will likely be essential components of future curricular innovations at our institution and at other medical schools. Faculty play a critical role in medical education, and their comfort and excitement are vital to ensuring that students succeed in medical school and beyond.

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Perceptions of Point-of-Care Ultrasound Among Internal Medicine Residents and Faculty

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ABSTRACT

Introduction: Point-of-care ultrasound (POCUS) is an increasingly common tool to address pointed clinical management and diagnostic questions in real time. The implementation of POCUS into graduate medical education, specifically in internal medicine training, has varied. This heterogeneity is likely due to several factors, including availability of ultrasound equipment, faculty with appropriate training, cost of equipment and curriculum development, and perceived utility in its application.

Methods: To further address the question of perceived utility, we surveyed internal medicine residents and faculty at an urban academic medical center in Milwaukee, Wisconsin without an established longitudinal POCUS curriculum.

Results: Surveyed residents consisted of internal medicine residents (postgraduate year [PGY] 1-3) and combined internal medicine-pediatric residents (PGY1-4 or higher). The faculty surveyed had completed training in general internal medicine and several internal medicine subspecialties. We found a consistent perceived utility in POCUS training, with 89% of residents and 92% of faculty indicating that it would be beneficial to patient care and resident education. In contrast, only 73% of faculty indicated that it adds value to their own patient care.

Conclusions: We find that the perceived value and utility of POCUS for patient care are high when the scope of the user is broad, as seen in general internal medicine faculty and residents. Subspecialization in internal medicine, particularly non-critical care medicine subspecialties, were less inclined to utilize POCUS and less likely to perceive it as valuable.

INTRODUCTION

Point-of-care ultrasound (POCUS) is an increasingly common imaging modality for real-time diagnosis and management of cardiac pathologies, pleural effusions, pulmonary edema, vascular patency, and intra-abdominal fluid accumulation, among other conditions.[1-4] Its implementation in the emergency department, operating rooms, inpatient medical wards, and outpatient medical offices has resulted in improved patient outcomes, including decreased diagnostic costs and shorter hospital length-of-stay.[5-8] Support for the incorporation of POCUS into clinical practice has been endorsed by several professional medical societies, including the American College of Physicians, Society of Hospital Medicine, and American College of Emergency Physicians.[9-11]

Coinciding with this rise has been an ongoing effort by academic medical institutions to systematically incorporate POCUS training postgraduate medical education curricula. Like their emergency medicine or anesthesiology counterparts, internal medicine residency programs are also increasingly likely to have dedicated POCUS instructional time.[12-23] However, development and implementation of a dedicated internal medicine curriculum can be a years-long process, and the scope and management of these programs can be fairly heterogeneous. For example, curricula may be organ-system specific or whole-body, resident driven or faculty led, and delivered in-person or remotely.[18-23] To date, there are no unified or sanctioned criteria set forth by accrediting bodies for POCUS training in graduate medical education.

Given this heterogeneity, internal medicine residency programs seeking to advance their POCUS educational initiatives may be hesitant to pursue what is often a resource- and labor-intensive endeavor. In addition, variability in existing ultrasound capabilities and faculty attitudes across institutions, suggests that conducting a needs assessment may be a prudent step to ensure that the

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needs of residents, faculty, and patient population are met. Faculty and trainee attitudes represent an important but underreported characteristic of previously published internal medicine POCUS curriculum initiatives.[17,18]

To address this knowledge gap and offer a framework for future POCUS-related needs assessments, this study reports the attitudes and current ultrasound practices of resident and faculty at various stages of medical training within a large urban academic medical center in the Midwestern United States without an established longitudinal POCUS training curriculum.

METHODS

A questionnaire was developed as part of a needs assessment conducted during the implementation of a new point-of-care ultrasound (POCUS) training curriculum. The survey was distributed via email to internal medicine and combined internal medicine-pediatric residents and interns training at a large urban academic medical center that did not have a POCUS training program at the time of distribution. The survey was also distributed concurrently to all general internal medicine faculty and internal medicine subspecialists at the same institution. Participation was voluntary, and no reimbursement was offered. Survey responses were collected using Qualtrics XM (Qualtrics) over a 2-week period in April 2024.

The surveys distributed to faculty and residents differed, reflecting the distinct POCUS-related needs of 2 groups. To enhance the utility of results for curriculum development, most survey questions were resident oriented. Shared question themes included comfort and training with POCUS use prior to the curriculum launch, perceived need for expanded POCUS education, local barriers to implementation, and anticipated future POCUS use following training. Resident-specific questions solicited feedback on existing POCUS training opportunities available before curriculum expansion. Faculty-specific questions assessed willingness to participate in future POCUS training opportunities for themselves and for trainees.

RESULTS

Overall, 145 faculty and residents responded, including 97 residents (67%) and 47 faculty (32%) (Table 1). Among residents, 52 (54%) were postgraduate year (PGY) 1 (interns), 26 (27%) were PGY-2, 16 (16%) were PGY-3, and 3 (3%) were PGY-4 or higher. Among faculty respondents, 18 (38%) practiced general internal medicine, 3 (6%) were trained in internal medicine-pediatrics, and 26 (54%) were trained in an internal medicine subspecialty.

At the time of the survey, 87 residents (92%) reported receiving some level of POCUS training, with 80 (92%) describing that training as sporadic. Twenty-seven faculty members (56%) reported currently using POCUS in their clinical practice.

Surveyed residents reported consistently favorable perceptions of the utility and value of POCUS in clinical care. Eighty-nine residents (97%) indicated that implementation of POCUS increases the clinical value of their care (Table 2), and 88 (91%) agreed to some degree that POCUS is an essential skill to learn during residency. Eighty-seven residents (90%) reported plans to incorporate POCUS into their practice within the next 5 years, and 91 (94%) believed POCUS has potential for daily or weekly use, irrespective of perceived value. More advanced trainees were more likely to report favorable perceptions of POCUS value and use, although the number of respondents decreased with each successive year of training (PGY-1, 52 [54%]; PGY-3, 16 [16%]).

Faculty responses demonstrated greater heterogeneity and were less uniformly favorable. Regarding the impact of POCUS training on the value of care delivered by residents, 42 faculty respondents (93%) believed it would be beneficial. In contrast, 32 faculty (73%) believed that it adds value to their own clinical practice. Faculty practicing general internal medicine were most likely to report that POCUS training added value, with 17 (94%) indicating benefit to resident-provided care and 15 (83%) indicating benefit to their own care. Faculty trained in a non-critical

Table 1. Distributions of Medical and Point-of-Care Ultrasound Training Among Respondents

Respondents	n (%)
Residents	97 (67)
PGY-1	52 (54)
PGY-2	26 (27)
PGY-3	16 (16)
≥ PGY-4	3 (3)
Faculty	47 (32)
General internal medicine	18 (38)
Internal medicine–pediatrics	3 (6)
Internal medicine subspecialty	26 (55)
Cardiology	6 (23)
Endocrinology	1 (4)
Gastroenterology	1 (4)
Geriatrics	1 (4)
Hematology/oncology	4 (15)
Infectious disease	1 (4)
Infectious disease/critical care	1 (4)
Nephrology	4 (15)
Rheumatology	1 (4)
Pulmonology/critical care	6 (23)
Current POCUS familiarity	
Residents, n = 95	
Received prior POCUS training	87 (91)
Longitudinal training	7 (8)
Sporadic exposure	80 (92)
No prior POCUS training	8 (8)
Faculty, n = 47	
Using POCUS in clinical practice	27 (55)
Completed POCUS certification	9 (33)
Not currently using POCUS in clinical practice	20 (43)

Abbreviations: POCUS, point-of-care ultrasound; PGY, postgraduate year.

care internal medicine subspecialties were less likely to perceive added value, with 14 (82%) reporting benefit to resident care and 10 (63%) reporting benefit to their own care. Faculty trained in critical care medicine unanimously reported that POCUS education beneficial for residents (7, 100%), while only 4 (57%) perceived benefit to their own clinical practice.

When asked how POCUS training would affect their own care, 32 faculty respondents (73%) anticipated a positive impact, whereas 41 (91%) reported that POCUS training would positively influence patient care by residents (Figure). Faculty trained in combined internal medicine-pediatrics reported high perceived added value across all training levels.

Supplemental Table 1 presents complete results for survey items not specific to institutional barriers or local training policies.

Table 2. Perceptions of Point-of-Care Ultrasound Among Surveyed Residents and Faculty

Residents, n = 97	Total n (%)	PGY-1 n (%)	PGY-2 n (%)	PGY-3 n (%)	≥ PGY-4 n (%)
How often could diagnostic POCUS be beneficial during patient assessments?					
Totals	97 (100)	52 (54)	26 (27)	16 (16)	3 (3)
Daily	52 (54)	21 (40)	20 (77)	9 (56)	2 (67)
Weekly	39 (40)	27 (52)	5 (19)	6 (38)	1 (33)
Monthly	1 (1)	1 (2)	0 (0)	0 (0)	0 (0)
Rarely or never	1 (1)	0 (0)	1 (4)	0 (0)	0 (0)
I don't know	4 (4)	3 (6)	0 (0)	1 (6)	0 (0)
POCUS is an essential skill for patient care during residency.					
Totals	97 (100)	52 (54)	26 (27)	16 (16)	3 (3)
Strongly agree	72 (74)	34 (65)	23 (88)	13 (81)	2 (67)
Agree	16 (16)	12 (23)	2 (8)	1 (6)	1 (33)
Neutral	5 (5)	3 (6)	0 (0)	2 (13)	0 (0)
Disagree	3 (3)	2 (4)	1 (4)	0 (0)	0 (0)
Strongly disagree	1 (1)	1 (2)	0 (0)	0 (0)	0 (0)
It is very likely I will use POCUS through the next 5 years of my career.					
Totals	97 (100)	52 (54)	26 (27)	16 (16)	3 (3)
Strongly agree	74 (76)	39 (75)	19 (73)	13 (81)	3 (100)
Agree	13 (13)	8 (15)	4 (15)	1 (6)	0 (0)
Neutral	5 (5)	1 (2)	2 (8)	2 (13)	0 (0)
Disagree	3 (3)	2 (4)	1 (4)	0 (0)	0 (0)
Strongly disagree	2 (2)	2 (4)	0 (0)	0 (0)	0 (0)
Do you agree that the integration of POCUS into your clinical toolset would improve the quality of patient care provided?					
Totals	92 (95)	47 (48)	26 (27)	16 (16)	3 (3)
Strongly agree	72 (74)	36 (77)	21 (81)	12 (75)	3 (100)
Agree	17 (18)	9 (19)	4 (15)	4 (25)	0 (0)
Neutral	2 (2)	2 (4)	0 (0)	0 (0)	0 (0)
Disagree	1 (1)	0 (0)	1 (4)	0 (0)	0 (0)
Strongly disagree	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Faculty, n = 47	**Total n (%)**	**GIM n (%)**	**Med-Ped n (%)**	**CCM n (%)**	**No CCM n (%)**
How could resident POCUS training impact the quality of patient care provided by that resident?					
Totals	45 (96)	18 (38)	3 (6)	7 (15)	17 (36)
Essential for optimal care	8 (18)	5 (28)	1 (33)	1 (14)	1 (6)
Significantly improves patient care	21 (47)	8 (44)	2 (67)	3 (43)	8 (47)
Somewhat improves care	12 (27)	4 (22)	0 (0)	3 (43)	5 (29)
Minimal impact	1 (2)	0 (0)	0 (0)	0 (0)	1 (6)
I don't know	3 (7)	1 (6)	0 (0)	0 (0)	2 (12)
How much do you think being proficient in POCUS would impact the quality of patient care you provide?					
Totals	44 (94)	18 (38)	3 (6)	7 (15)	16 (34)
Significantly beneficial	13 (30)	6 (33)	3 (100)	1 (14)	3 (19)
Somewhat beneficial	19 (43)	9 (50)	0 (0)	3 (43)	7 (44)
Neutral	9 (20)	3 (17)	0 (0)	3 (43)	3 (19)
Not beneficial	3 (7)	0 (0)	0 (0)	0 (0)	3 (19)

Abbreviations: POCUS, point -of-care ultrasound; GIM, general internal medicine; Med-Ped, internal medicine-pediatric; CCM, trained in internal medicine subspecialty with critical care medicine training; no CCM, trained in internal medicine subspecialty without critical care medicine training.

DISCUSSION

Point of care ultrasound (POCUS) is a widely used diagnostic tool among internal medicine residents and faculty across multiple levels of academic training. Residents, in particular, expressed strong enthusiasm for POCUS and its incorporation into clinical practice, whereas faculty had mixed perceptions. Both groups reported a high perceived value in resident-focused POCUS training. Faculty respondents were more likely to endorse the positive impact of POCUS on resident-delivered care than on their own clinical practice. General internal medicine physicians were among the most likely to report increased value of their own patient care with POCUS integration, whereas non-critical care internal medicine subspecialists were the least likely.

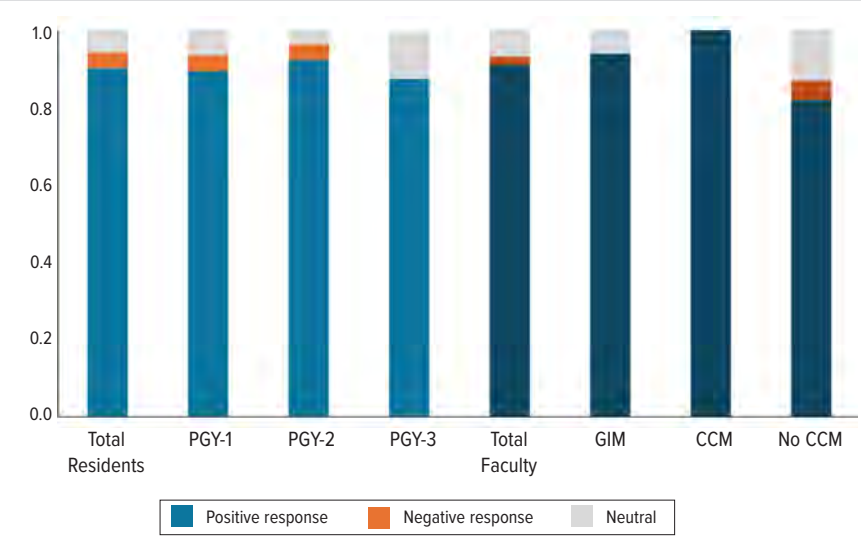
These findings are consistent with trends described in current medical education literature. Multiple reports have described the development and implementation of POCUS curricula in internal medicine residency programs and subspecialty fellowships.[17-23] However, perceptions of POCUS prior to curriculum implementation have not been consistently reported. In this study, perceived value and utility of POCUS for patient care were highest among clinicians with a broad clinical scope, as seen in general internal medicine faculty and residents. Greater subspecialization, particularly among non-critical care subspecialties, was associated with lower anticipated utilization and perceived value of POCUS.

Although several non-critical care medicine subspecialty programs offer organ-specific training, such as on nephrology, cardiology, or endocrinology, our findings suggest that attending physicians in those fields are less likely to use POCUS.[21-23] This discrepancy may reflect several factors, including hesitancy to adopt

new clinical tools at later career stages, as previously reported in some surgical disciplines, or a need for more specialized imaging modalities driven by a higher degree of variability in patient populations and their pathology profiles.[24,25] Alternatively, these findings may reflect sampling bias within our cohort and may not fully represent attitudes across all non-critical care subspecialties.

Critical care medicine faculty were more likely to endorse the benefit of POCUS training for residents than for themselves. This finding was unexpected, given the widespread use of ultrasound in intensive care settings and the extensive literature supporting its use in the intensive care unit (ICU).[26-28] This result may be influenced by institution-specific practice patterns and, more than other findings in this study, may reflect local variation rather than broader trends reflected in the literature.

Figure. Overall Perception of Resident Patient Care With POCUS Training



Responses to questions regarding the impact to the quality of care that residents provide with POCUS training were compiled and averaged to reflect overall perceptions of each demographic in this cohort.

Abbreviations: POCUS, point-of-care ultrasound; PGY, postgraduate year; GIM, general internal medicine; CCM, trained in internal medicine subspecialty with critical care medicine training; no CCM, trained in internal medicine subspecialty without critical care medicine training.

These results may be applied in several ways. First, academic medicine training programs seeking to introduce or expand POCUS curricula may use these findings to contextualize expected faculty and trainee attitudes. Second, institutions conducting local needs assessment may use these data as a comparative reference. Finally, as POCUS education continues to evolve, these findings may serve as a benchmark for longitudinal assessment of changing perceptions among trainees and faculty.

Limitations

This study has several limitations. Survey questions were developed as part of a needs assessment focused on identifying logistical considerations for implementation of a new POCUS curriculum at a large urban academic center. As a result, question wording was intentionally oriented toward resident education, and differences in question phrasing between faculty and resident surveys may confound some of the interpretation.

Inherent limitations of voluntary, anonymous survey distribution include the potential for sampling bias, particularly from respondents with prior POCUS exposure or bias towards favorable opinions. As POCUS becomes increasingly integrated into clinical care and medical education, mitigating this bias may become more challenging. Finally, the demographic distribution of respondents—particularly among faculty subspecialists—was highly variable.

CONCLUSIONS

POCUS is widely viewed by internal medicine residents and faculty as a valuable diagnostic modality with the potential to enhance patient care. Both groups perceived substantial benefit from resident-focused POCUS education. Training programs considering introducing or expanding POCUS curricula may use these findings to support their initiatives.

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Appendix: Available at www.wmjonline.org

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Curriculum for Planners of Accredited Interprofessional Continuing Education for Health Care Professionals: Results of a Modified Delphi Process

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ABSTRACT

Introduction: Our academic institution is planning training for accredited interprofessional continuing education professionals. Focused training is essential to ensure planners can effectively design, implement, and evaluate educational activities while meeting accreditation standards.

Methods: A modified Delphi process was used to develop the training curriculum. Initial content statements were grouped into 6 areas. In round 1, 15 panelists rated each statement, explained their ratings, and suggested additions. In round 2, 13 panelists rated original and new statements after reviewing aggregated round 1 feedback.

Results: Final mean ratings ranged from 2.7 to 4.8. New statements included both unique contributions and expansions of original content. Of 84 statements rated across both rounds, 58% reached agreement (mean rating ≥ 4.0).

Conclusions: The modified Delphi process was feasible, in both process and results, and can inform development of similar programs in other institutions.

INTRODUCTION

Accredited continuing education professionals who plan or manage activities for health care professionals should have expertise in designing, implementing, and evaluating educational activities, while ensuring compliance with accreditation standards. (We refer to these professionals as planners hereafter.) New planners, regardless of clinical or nonclinical background, require focused training to fulfill their roles effectively. Ongoing professional development is essential for all continuing education professionals to remain current with educational innovations and to adapt to evolving accreditation requirements.

Professional organizations for providers of accredited continuing education offer learning opportunities for planners, such as annual conferences, the Accreditation Council for Continuing Medical Education (ACCME) Academy,[1] and the ACCME's CE Educator's Toolkit.[2] These opportunities are typically complemented by workplace orientations and trainings. For example, institutions often provide courses[3,4] and other resources[5] for coordinators of regularly scheduled series (RSS) tailored to their continuing education programs. RSS is an educational activity designed as a series with multiple, ongoing sessions, typically offered weekly, monthly, or quarterly, and is primarily planned by and presented to the accredited organization's staff.[6] Formats include grand rounds, tumor boards, and morbidity and mortality conferences.

The University of Wisconsin–Madison Interprofessional Continuing Education Partnership (UW-Madison ICEP) team is developing a training program for planners of interprofessional continuing education activities for practicing clinicians. While various groups offer educational resources for planners within our institution and nationally, we are not aware of any comprehensive training specifically for interprofessional continuing education planners that also provides formal recognition of completion. Our goal is to establish a customizable curriculum that provides relevant, substantial content and inspires planners to strive for excellence in their practice. Planners who complete the training will be eligible to earn a digital badge recognized at our institution. A digital badge is an online record of demonstrated competency, skills, and/or knowledge achieved through a learning activity. It can be displayed and verified online and includes detailed metadata about the learner and their achievement, such as the date the

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badge was earned, issuing organization, criteria for earning a badge, and a description of the assessments used.

RSS coordinators comprise the first cohort of planners to participate in the training. We expect this training will enhance their competence and performance as accreditation managers, improve RSS coordinator retention, and elevate recognition of their role within their department or program.

METHODS

Our team of accreditation specialists developed global learning objectives for the training. As a result of participation, planners will:

1. Apply principles of interprofessional continuing education for health care professionals to activity planning and implementation, leading to desired educational outcomes.
2. Optimize planning team dynamics through increased knowledge and appreciation of each team member's roles and responsibilities.
3. Integrate UW-Madison ICEP policies and best practices into the workflow for planning and implementing accredited interprofessional continuing education.
4. Increase skills in using tools, technology, and other resources that support planning and implementation of educational activities accredited under the UW-Madison ICEP umbrella.

Table 1. Examples of Panelists' Comments

Bucket 1 – Overview of Interprofessional Continuing Education
C. Explanation of interprofessional competencies. Purpose: to improve planners understanding of interprofessional continuing education (CE).
Round 1: The average group rating was 4.5 (n = 15). Round 2: The average group rating was 4.5 (n = 12).
Rationales for high ratings (ie, 4 and 5) • Panelist 3: Explanation of competencies is very important. • Panelist 9: Value of interprofessional continuing education is important as a "selling" point.
Rationales for lower ratings (ie, 1, 2, or 3) • Panelist 5: For Statement C – I think competencies are important for those developing programming and content, but for most of your target audience, I don't think that it needs a detailed overview (if that's what you were planning). I think this will be addressed organically in the content development and strategies section. I also think that the IPEC [Interprofessional Education Collaborative] subcompetencies are much more helpful than the core competencies. Our continuing education office staff gets hung up on the core competencies and then things seem to click once we introduce the subcompetencies.
Bucket 2 – Interprofessional Continuing Education Planning Process, Roles, and Responsibilities
N. New suggestion: Understanding that high quality interprofessional continuing education includes teams caring for patients. The patients help center the planning.
Round 2: The average group rating was 3.4 (n = 13).
Rationales for high ratings (ie, 4 and 5) • Panelist 1: I think it's of great value to have consistent reminders that the end result of what we do is for the best interest of the patient. • Panelist 3: Patients are definitely beneficiaries of good continuing education so including them in planning is a good idea. • Panelist 6: Statements N and O provide clarity on options for presenting the details of the statements included in this bucket. • Panelist 8: Good point about patient-centered continuing education planning. • Panelist 10: A, C and N should be combined, since they all are getting at the same concept. • Panelist 11: N and P I think would be great additions to the curriculum; however, I'm not entirely sure how we could effectively execute suggestion P.
Rationales for lower ratings (ie, 1, 2, or 3) • Panelist 5: While important, isn't that understood – by the team, for the team? • Panelist 7: This does not make sense as worded. Is the idea to include patients/caregivers as part of the planning? If so, this is a commendation criterion. • Panelist 9: This should have already been discussed, very general knowledge. • Panelist 11: I think that patient discussion is important; however, for this curriculum/the sake of length, I would leave the commendation criteria and more in-depth discussions to future opportunities.
Likert scale: 1 = strongly disagree to 5 = strongly agree.

A modified Delphi process[7,8] was used to identify the content blueprint for the training that addresses the stated global objectives. Initial content statements were developed by the authors based on a review of the CEhp National Learning Competencies,[9] which offers a comprehensive compendium of abilities for practitioners in continuing education for health professions, and internal planning resources. Each statement pertained to knowledge and skills required to successfully work in the accredited interprofessional continuing education space and included "what" and "why" components (eg, "Practical considerations for communication with the activity faculty regarding conflict of interest (COI) – to help planners set up expectations for the COI process and collect COI disclosures on time"). The statements were organized into 6 curriculum buckets and mapped to the learning objectives.

Sixteen accreditation specialists from our institution's interprofessional continuing education program and two other similar programs were invited to participate in the modified Delphi process. In round 1, panelists rated the importance of each content statement using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). At the end of each curriculum bucket, panelists provided explanations for the 2 statements they rated highest and the two they rated lowest and could suggest additional content. In round 2, panelists received a summary of their ratings and the anonymous aggregated findings and explanations. They then retook the survey, rating the same statements and those suggested during round 1 and providing additional comments. We used a predefined average group rating of 4.0 or higher to determine consensus on a statement. This study did not meet the definition of human subjects research and did not require Institutional Review Board review and approval.

RESULTS

The numbers of panelists in rounds 1 and 2 were 15 and 13, respectively. Table 1 provides examples of ratings and comments. Most comments in both rounds explained rationale for ratings. Some comments included suggestions for combining similar content or ideas for learning objectives corresponding to a content statement.

Table 2 features ratings for content statements included in 1 curriculum bucket. Rated statements for all 6 curriculum domains are available from the authors upon request or at the following link: https://ce.icep.wisc.edu/delphi-method-build-curriculum-results-uw-madison.

Mean ratings changed – either increased or decreased – from round 1 to round 2 for 69% of the 58 initial content statements. Some new statements proposed by the panelists in round 1 introduced unique content not mentioned in any of the initial statements, while others expanded on initial statements or suggested an educational strategy rather than new content. Nineteen percent of 26 new statements achieved a mean rating of 4.0 or higher. Overall, mean ratings for all statements in round 2 varied from 2.7 to 4.8. Fifty-eight percent of the 84 statements received a mean rating of 4.0 or higher, meeting the criteria for consensus.

Table 2. Content Statements Pertaining to Conflict of Interest: Results of the Delphi Process

Content Statement	Round 1[a]	Round 2[a]
Bucket 3 – Compliance, Conflict of Interst Disclosure, and Mitigation		
A. Discussion of how CE planners and presenters ensure CE content validity and integrity. Purpose: to expand planners' understanding of the roles of all involved in planning and implementation of CE in relation to COI.	4.7 (15)	4.8 (13)
B. High-level overview of the COI disclosure and mitigation process. Purpose: to help planners understand that this process applies to all accredited CE programs in the country.	4.7 (14)	4.8 (13)
C. Explanation of the ACCME's Standards for Integrity and Independence in Accredited Continuing Education. Purpose: to familiarize planners with the standards.	4.3 (15)	4.2 (13)
D. Discussion of practices that can be used to help ensure continuing education content validity, independence, and balance. Purpose: to expand planners' knowledge of the COI process.	4.5 (15)	4.5 (13)
E. Practical considerations for communication with the activity faculty regarding COI. Purpose: to help planners set up expectations for the COI process and collect COI disclosures on time.	4.5 (15)	4.8 (13)
F. Case studies of challenging disclosure statements. Purpose: to allow planners to practice researching the relevance of financial relationships to the activity content and mitigating COI, and to prepare planners for work with complex COI cases and mitigating issues in compliance with UW-Madison ICEP policies.	4.1 (15)	4.3 (13)
G. Explanation of UW-Madison ICEP policies for COI, commercial support, and presenter honoraria. Purpose: to provide planners with guidance for the planning and implementation of valid, independent, balanced, and evidence-based CE activities.	4.6 (15)	4.5 (13)
H. Demonstration of how the COI process is accomplished using the UW-Madison ICEP learning portal. Purpose: to enhance planners' skills in requesting and processing COI disclosures.	4.5 (15)	4.4 (13)
I. Discussion of common pitfalls, dealing with multiple accounts, and other challenging situations related to disclosure of COI, and supporting resources available at the learning portal. Purpose: to prepare planners for work with complex COI cases and mitigating issues.	4.3 (15)	4.3 (13)
J. New suggestion: A separate content segment for when individuals need to be excluded from controlling content.	N/A	3.8 (12)
K. New suggestion: A separate content segment for Standard 5: Manage Ancillary Activities Offered in Conjunction with Accredited Continuing Education (Standards for Integrity and Independence in Accredited Continuing Education).	N/A	3.5 (13)
L. New suggestion: Resources available on the community planners' site to assist with determining if a disclosure is a COI and tools to use for mitigation.	N/A	4.2 (13)
M. New suggestion: A video walk-through of H and a graphical representation of B.	N/A	3.7 (13)

[a]Denotes mean rating (number of panelists).

Likert scale: 1 = strongly disagree, 5 = strongly agree.

Abbreviations: CE, continuing education; COI, conflict of interest; ACCME, Accreditation Council for Continuing Medical Education; UW-Madison ICEP, University of Wisconsin-Madison Interprofessional Continuing Education Partnership.

DISCUSSION

We used a modified Delphi process to engage 15 panelists – all experts in adult education planning – to identify a content blueprint for training planners of accredited interprofessional continuing education for health care professionals in our institution. Panelists provided feedback on content statements organized into 6 curriculum buckets, which were subsequently translated into 5 online modules and 1 project. Content related to the inclusive excellence bucket was integrated across all 5 modules. Figure 1 outlines the training structure.

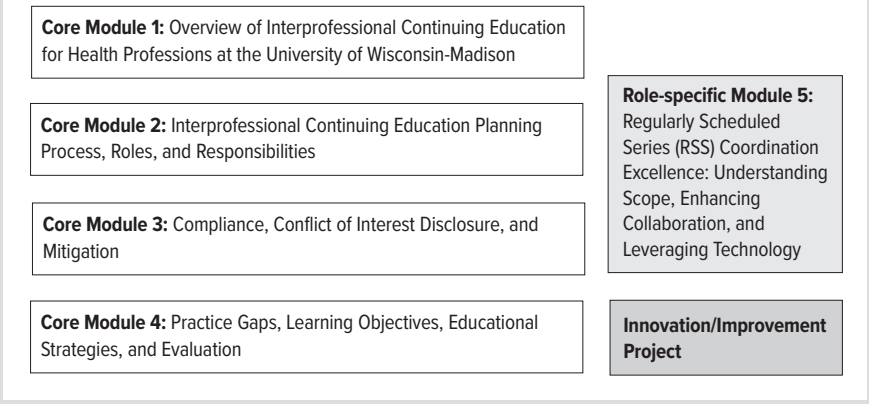
The first 4 modules are designed for all planners, while the fifth module is intended for RSS coordinators. The final component is an individual project. Planners will receive guidance and coaching for the project to help them develop and successfully implement innovations or improvements in their interprofessional continuing education practice. Initially, this training will focus on developing the RSS coordinator role, while future iterations of the last module will be customized for additional audiences, including conference coordinators, enduring activity coordinators, and planning committee members.

The training curriculum was tailored to address the needs and context of our interprofessional continuing education program. Participation of panelists from outside our institution helped ensure comprehensive coverage of content and provided diverse perspectives on its importance. Notably, more than half of all content statements received high mean ratings, which we interpreted as strong agreement among panelists on the importance of many

teaching points. Final ratings and panelists' comments guided decisions regarding inclusion of specific content and time allocation within the modules. Additionally, the "why" component of content statements informed the articulation of module-specific learning objectives.

To advance the curriculum development, we formed an activity planning committee separate from the Delphi process panelists. The planning committee included faculty and staff with expertise in adult learning, educational design, and interprofessional education, as well as members of the intended audience. This committee reviewed and recommended appropriate educational strategies for each segment of the training. The modules are currently under development and are expected to launch in 2026.

Figure. Training Program for Planners of Accredited Interprofessional Continuing Education for Health Care Professionals: A Digital Badge Curriculum



To earn a digital badge, planners must complete 4 core modules, a role-specific module, which is a module for RSS coordinators in this figure, finish an innovation or improvement project, and pass a posttest.

Limitations

We acknowledge a limitation of our methods: not all relevant resources may have been used to inform development of the initial content statements. For example, a guide for the professional development of frontline educators in continuing education for health care professionals[10] was not available when we began the Delphi process. Another limitation is that the resulting content blueprint includes elements specific to our program, which may not be applicable to all providers of interprofessional continuing education.

CONCLUSIONS

The Delphi study was feasible and provided guidance for developing interprofessional continuing education planner training in our institution. We recommend this method to other institutions seeking to establish similar training programs. The resulting curriculum framework is available for others to use and adapt and may be particularly relevant to academic continuing education units, especially Joint Accreditation providers. At the very least, it offers a foundation for discussing initial content components. Moving forward, we will revisit the curriculum framework based on assessment and evaluation data collected from training participants to ensure its continued relevance and effectiveness.

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Framing Primary Care Clinicians' Experiences Managing Behavioral and Psychological Symptoms of Dementia: Insights From an Educational Intervention

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ABSTRACT

Introduction: Approximately 90% of persons with dementia experience behavioral and psychological symptoms of dementia (BPSD). Primary care clinicians often are the main health care professionals managing the care of persons with dementia who exhibit BPSD, yet many lack training and resources needed for management. DETAILD (Dementia Educational Techniques: Academic detalLing and DICE) is an educational intervention designed to enhance clinicians' knowledge, confidence, and implementation of evidence-based practices for recognizing and managing BPSD.

Objectives: This study aimed to identify clinician-level factors that influence the reach, adoption, implementation, and effectiveness of the DETAILD intervention in supporting primary care clinicians in managing BPSD.

Methods: Semistructured qualitative interviews were conducted with 14 clinicians. A framework-guided analysis was used to identify knowledge and practice gaps in BPSD management and factors that affect engagement with the DETAILD program.

Results: Clinicians identified gaps in knowledge and self-efficacy related to recognizing and managing BPSD, particularly in applying nonpharmacologic strategies and care planning. Eleven themes emerged that influenced DETAILD's reach, adoption, implementation, and effectiveness, including the need for personalized care approaches, team-wide buy-in, applied learning methods, and training logistics. Clinicians emphasized the benefits of case-based learning and the need for flexible formats and foundational knowledge.

Conclusions: Findings highlight significant gaps in knowledge, confidence, and resources related to BPSD management among primary care clinicians. Identified barriers and facilitators informed adaptations to the DETAILD intervention aimed at enhancing clinician engagement, supporting practice change, and ultimately improving dementia care within primary care settings.

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INTRODUCTION

Approximately 6.7 million Americans aged 65 years and older are living with Alzheimer's disease and other types of dementia.[1] Over the course of their illness, about 90% of persons with dementia experience behavioral and psychological symptoms of dementia (BPSD), such as agitation, disinhibition, hallucinations, sleep disturbances, and wandering. These symptoms are associated with reduced quality of life, increased risk of injury for both persons with dementia and their caregivers, and higher rates of caregiver stress and depression.[2] Behavioral and psychological symptoms of dementia can lead to increased hospitalizations, earlier nursing home placement, and reduced survival.[2]

There is a well-documented shortage of clinicians with specialty training in dementia care, resulting in most persons with dementia receiving care from primary care clinicians.[3,4] However, many clinicians have limited training in dementia care, particularly in the identification and management of BPSD.[5,6] Clinicians often report insufficient knowledge, confidence, and self-efficacy in managing these symptoms.[5,6] Given that most persons with dementia experience at least 1 BPSD during the course of their disease,[7] this gap in training represents a critical need in dementia care.

An effective educational intervention could enhance clinician self-efficacy and improve identification and management of BPSD, ultimately benefiting both patients and caregivers. In response to this need, our team at the Wisconsin Alzheimer's Institute developed DETAILD (Dementia Educational Techniques: Academic

detaILing and DICE). This intervention aims to increase knowledge, confidence, and implementation of best practices for BPSD management in primary care settings by combining academic detailing with the DICE Approach.

The DICE Approach – Describe, Investigate, Create, Evaluates – is a structured, evidence-based framework for assessing and addressing BPSD. It is designed to support clinicians in identifying the causes of challenging behaviors and implementing person-centered strategies to address them.[8] The DICE Approach emphasizes using behavioral and environmental strategies for managing BPSD rather than relying solely on medication.[8]

Academic detailing employs principles of adult learning theory, social cognitive theory and the transtheoretical (stages of change) model, as well as a case-based approach, to facilitate knowledge acquisition, skill development, and practice change in real-world settings.[9,10] It involves trained subject-matter experts delivering noncommercial, evidence-based, interactive educational visits – in-person or virtually, one-on-one or in groupss – to support clinician decision-making and implementation of changes in clinical practice. Academic detailing has been successfully used to improve dementia detection, reduce sedative-hypnotic prescribing, and promote safer use of controlled substances in primary care.[11-14] In nursing home settings, academic detailing has contributed to reductions in antipsychotic medication use.[15,16]

During a prior pilot study of DETAILD, 2 members of our team (a geriatric psychiatrist and an advanced practice provider) conducted in-person and virtual academic detailing visits at 2 clinic sites in Wisconsin. Each session consisted of 30 minutes of didactic content on a specific type of BPSD, including work-up, diagnosis, and management, followed by case discussions to promote real world application. Fifteen primary care clinicians participated and demonstrated improved BPSD and dementia knowledge and attitudes, as well as high satisfaction.[17]

The qualitative study presented in this article aimed to identify barriers and facilitators to implementing the DETAILD intervention by capturing the perspectives of clinicians with varying levels of experience with the intervention and memory care. This work builds on prior findings[17] and seeks to understand factors affecting the reach and relevance of the intervention for the target audience, as well as its adoption, implementation, and effectiveness in preparing clinicians to manage BPSD. The methods for this study were described in detail in a previously published manuscript.[18] The purpose of this article is to present the qualitative findings and offer insights to guide future adaptations of the DETAILD intervention, with the aim of enhancing its effectiveness and scalability in pri-

Table 1. Interview Questions by RE-AIM Domain for Program Champions and Novices

RE-AIM	Champion Topics
Reach	What are the greatest barriers or challenges you face to caring for patients with BPSD?
	Where do you see opportunities for continuing to improve in your ability to manage BPSD?
	Describe how you think a DICE approach training would meet the needs of families served by your organization?
Adoption	Considering your organization, clinic, and team, what factors influenced your participation in AD?
	How can we modify/address the challenges you've described?
	How could we better enlist team members to engage in case review discussions and case consultation?
	How difficult would it be for you or your clinic to scale up the AD/DICE program, to serve more clinicians at your site?
Implementation	How has AD helped you manage BPSD in your patient?
Effectiveness	What features of discussions/consultations were most effective for your learning?
RE-AIM	**Novice Topics**
Reach	Please start by telling me about your approach to caring for patients with dementia and behavioral and psychological symptoms of dementia or BPSD. (Q1) What challenges do you face when managing patients with dementia and BPSD?
	Do you feel there are areas for improvement in managing patients with BPSD? Tell me more.
Adoption	How could we best enlist you to participate in this AD approach?
	What features of your organization, clinic, or team might make it hard for you to join AD?
	How can we address the challenges you have described?
	What resources would be needed to support holding future training or interventions at your clinic?
Implementation	Describe ways you utilize or integrate clinical expertise, expert opinion, or evidence-based practices into your approach to caring for patients with dementia and BPSD.
(Intervention)	How could an evidence-based approach like AD best facilitate your needs as a provider?
	What other evidence-based resources do you find valuable and use on a regular basis?
	What motivates you to change practice? What factors are most likely to encourage you to alter the way in which you approach your practice?

Abbreviation: RE-AIM, reach, effectiveness, adoption, implementation, and maintenance; BPSD, behavioral and psychological symptoms of dementia; DICE, Describe, Investigate, Create, Evaluate; AD, academic detailing.

Table 2. Demographic Characteristics of Interview Participants (N = 14)

Characteristic	N (%)
Professional role	
Advanced practice provider	3 (21%)
Physician	10 (71%)
Psychologist	1 (7%)
Years in professional role	19 years (median 16; range 2-42)
Academic detailing program status	
Champion	7 (50%)
Novice	7 (50%)
Race and ethnicity	
Black or African American	1 (7%)
Non-Hispanic	14 (100%)
White	13 (93%)
Gender identity	
Female	9 (64%)
Male	5 (36%)

mary care settings for the improved BPSD management.

METHODS

A qualitative descriptive study design was used to elicit clinician feedback to guide adaptations to the DETAILD program. The qualitative descriptive method guided sampling, data collection, and data analysis to better understand clinicians' experiences managing BPSD and participating in the DETAILD program. The Institutional Review Board at the University of Wisconsin-Madison approved the study protocol. A waiver of written consent allowed individuals to document consent electronically. The electronic REDCap database,[19] hosted by the Department of Medicine at the University of Wisconsin School of Medicine and Public Health, was used for the survey data collection.

Table 3. Comparison of Themes by RE-AIM Domain for Program Champions and Novices

Themes	Reach		Adoption		Implementation and Effectiveness	
	Champs	Novices	Champs	Novices	Champs	Novices
Self-efficacy in the management of BPSD	X	X	X	X	X	X
Methods for taking a personalized care approach	X	X			X	
Learning culture and values			X	X	X	X
Underlying philosophy of DETAILD			X	X	X	X
Buy-in across health care team	X				X	
Care planning communication	X				X	X
Benefits of applying DICE Approach with families in the clinic setting	X				X	
Format/structure of sessions			X	X		
Time and schedule	X	X	X	X	X	
Access to training and materials	X	X	X	X	X	
Incentivizing training	X		X	X		

Abbreviations: Champs, champions; BPSD, behavioral and psychological symptoms of dementia; DETAILD, Dementia Educational Techniques: Academic detaILing and DICE; DICE, Describe, Investigate, Create, Evaluate.

Participants

Participants were purposively selected among clinicians practicing within 2 health care systems affiliated with the Wisconsin Alzheimer's Institute Dementia Diagnostic Clinic Network.[20] Clinicians practiced in family medicine, internal medicine, or behavioral health. Several had participated in the prior pilot study on improving BPSD management.[17] Clinicians who will be referred to as program "champions" encouraged others to participate in DETAILD, supported implementation by bringing cases for discussion and consultation, and participated in at least half of the previous academic detailing sessions. Clinicians with little to no academic detailing experience are categorized as program "novices."

Clinicians from the Wisconsin Research and Education Network (WREN),[21] a statewide family medicine practice-based research network, formed an additional convenience sample of novices. Clinicians were invited to participate by email and provided with a link to study information and an electronic survey to indicate their interest.

Qualitative Interviews

Semistructured qualitative interviews were conducted over Zoom and lasted 30 to 45 minutes. Unique interview guides were developed for champions and novices.

Interview questions were guided by the RE-AIM/PRISM implementation framework, which has been shown to support intervention development, implementation, and evaluation across diverse health care settings.[22] RE-AIM examines the impact of a health intervention across 5 domains: reach, effectiveness, adoption, implementation, and maintenance.[22] PRISM (Practical, Robust, Implementation and Sustainability Model) builds on RE-AIM by incorporating contextual factors that affect implementation and sustainability, including intervention characteristics, clinician perspectives, and organizational factors.[22]

Questions pertaining to the framework domains were used to explore the program's reach, adoption, implementation, and effectiveness. Questions also reflected the internal and external contextual factors as multilevel barriers or facilitators that may influence these domains.[23,24] Participants were asked how they, their organizations, clinic settings, and teams might influence the identified features of academic detailing. Interview question topics are summarized in Table 1.

Qualitative Analysis

Thematic qualitative analysis was performed on deidentified interview transcripts by a multidisciplinary research team with clinical, community-based, and research-related experience in dementia care. Inductive thematic analysis included transcript review, open coding to assign initial codes, and identification of themes within code groups.[18] Team members reviewed and refined themes through an iterative process to achieve consensus on names and definitions.

Next, a deductive approach was used to incorporate the RE-AIM framework and multilevel domains (organization, clinician, intervention)[24] to organize data according to factors influencing the program's future reach, adoption, implementation, and effectiveness. Themes were compared across domains and contextual levels to evaluate for convergence or across program components, implementation strategies, and contextual influences. Themes were also compared between champions and novices

Table 4. Adaptations to Improve Fit of the DETAILD Intervention Operationalized by Reach, Adoption, Implementation, and Effectiveness (RE-AIM) Domains, Following Identified Themes That Address Organizational, Clinician, and Health Care Team Context

R	A	I/E	Intervention Component	Benefit to Achieve With Adaptation	DETAILD Original Model	DETAILD Following Adaptations
√	√		Outreach	Improve outreach and buy-in across the health care team by highlighting value of building self-efficacy, especially among nonspecialists and program's support for taking a personalized care approach	Memory clinic clinician outreach	Listening session and outreach in advance with administration and broad target audience, including nonspecialist clinicians and staff, that highlights gaps that can be addressed through the program
	√	√	Visit schedule	Need sufficient time for building self-efficacy; be efficient with clinic team's time to maximize participation	18 months, 11 visits	6-12 months, 6-9 visits, tailored to needs
	√	√	Time	Efficient and consistent schedule	1.5-2 hours; didactics (30 min); visits tailored to memory clinic clinicians only	Up to 1 hour; scheduling further in advance; didactics (20 min); 1-2 case discussions (20-40 min); hold sessions over lunch
	√	√	Format of visit	Emphasis on case discussions for collaborative, experiential learning; case consultation with patients was not always feasible	Case discussions and case consultations scheduled with clinicians	Case discussions with clinicians and staff; case consultation by request
	√	√	Curriculum content	Highlight tailored content delivery; tailored didactics coincide with cases discussed to maximize applied learning	6 visits with predetermined content; 5 visits with tailored content; clinicians or staff determine future tailored topics	3 visits with predetermined content; 3-6 visits with tailored content; clinicians or staff determine future tailored topics
		√	Flexible access to materials	Provide flexible access to training materials, for missed visits or for post-visit review; expand access to DICE training for benefits of applying DICE with families	Synchronous didactics; self-directed web-based DICE training modules[8] with staff for a fee	Recorded didactic sessions made available; expanded access to free, self-directed web-based DICE training modules[8]
		√	Clinical decision support	Support decision-making and request for treatment algorithms	–	Concise decision guides to reference following didactics; future clinical support EHR tools

√ = RE-AIM domain (R, Reach; A, Adoption; I, Implementation; E, Effectiveness) impacted by the adaptation.
Abbreviations: DETAILD; Dementia Educational Techniques: Academic detalLing and DICE; DICE, Describe, Investigate, Create, Evaluate; EHR, electronic health record.

across RE-AIM domains and contextual levels to identify similarities or differences based on BPSD practice experience. This report focuses on clinician-level factors identified for future adaptations.

Further methodological details are available in a separate publication.[18]

RESULTS

Fourteen clinicians were interviewed between December 2022 and August 2023, specifically 7 champions and 7 novices. Participant demographics are shown in Table 2.

The analysis identified several overarching clinician-level themes affecting the reach and needs of the target audience, as well as the adoption, implementation, and effectiveness of the DETAILD model for preparing clinicians to better manage behaviors and psychological symptoms of dementia (Table 3 and Supplemental Table).

Reach of DETAILD for Meeting Primary Care Clinician Needs

Champion primary care-based memory clinic specialists and nonspecialist novice colleagues reported gaps in self-efficacy for managing BPSD and emphasized the program's effectiveness in addressing these needs. Identified gaps included (1) recognizing BPSD, (2) applying nonpharmacologic treatment approaches, and (3) confidence in medication prescribing. Both groups noted lower confidence in identifying BPSD triggers and in managing more complex behaviors. Novices reported lacking direct care experience necessary to identify needs in persons with dementia.

Both champions and novices identified a need to understand how to address behaviors in persons with dementia using a personalized care approach. Champions also recognized the day-to-day variation in responsiveness to behavioral techniques as a challenge and the need for education across multiple care settings. Buy-in across the health care team was noted as a perceived gap for training outside a memory clinic setting.

DETAILD Adoption

Champions and novices identified the importance of learning culture and finding value in learning to foster program participation. Champions reported being motivated by colleagues who participated and were highly invested. Both groups described strong intrinsic motivation linked to caring for patients across the lifespan and the desire to expand their knowledge. However, some novices reported that caring for patients across the lifespan was a barrier if dementia wasn't their specialty.

Champions were motivated by a desire to better address the community and patients they serve, including older patients with

chronic comorbidities and younger adults with cognitive changes. Both groups reported wanting to support families to avoid facility placement due to behavioral symptoms. Novices also expressed a desire to stay updated on evidence-based practices and to improve their ability to provide the best care possible.

Champions and novices also described the appeal of DETAILD's underlying approach, including co-learning – particularly the benefits of group discussions that allow participants to learn from colleagues' experiences. Novices indicated a preference for group sessions, particularly when they were not currently caring for patients with dementia. They pointed to the expected breadth of knowledge in primary care as important to their adoption of DETAILD, and suggested involving nurses and medical assistants, who often get initial questions from patients and caregivers. Similarly, champions noted the advantages of team-based education, including participation from physicians, advanced practice providers, nurses, and medical assistants.

Both groups recognized the impact of experiential learning and the effectiveness of DETAILD's approach to foster applied case-based learning through real-life patient discussions. Champions reported that pairing didactic content with case discussions reinforces key points. Novices also noted that applying concepts is important for retention of nonpharmacologic approaches, such as DICE.

Practical features such as visit scheduling and time commitment, format or structure of visits, and access to training and materials were important determinants of program adoption. Both groups reported that consistent, predictable, and recurring visit schedules and designated time in work schedules are essential for training. Novices suggested virtual, recorded sessions to alleviate scheduling challenges and eliminate travel time.

Implementation Strategies and Effectiveness of the DETAILD Model

Champions noted that DETAILD provides tools for addressing diagnostic challenges related to behavioral conditions in dementia and recognizing behavioral patterns along the dementia trajectory. Champions uniquely highlighted the importance of avoiding reactionary medication use. Novices particularly valued access to medication use guidelines.

Champions reported that case discussions helped affirm their decisions, facilitate application of new knowledge, and educate other care team members. They described experiential learning as instrumental in building confidence and self-efficacy for managing behaviors. Novices recognized that experience enhances learning and facilitates practice change. Champions indicated a need for regular educational sessions for improving follow-through on recommendations.

Both champions and novices reported that the program was effective in teaching strategies to recognize and address family dynamics on communication and care planning. Champions described the effectiveness of modeling the detailer's communication approach, which helped build rapport with the patient and family, foster open discussion, and improve attitudes and communication on addressing behaviors. This approach can support clinician efforts to get family buy-in. Novices did not report this, as they did not experience the in-person case consultations, but they recognized the value of an integrated approach for gathering and sharing information with families.

Champions who had prior knowledge of the DICE Approach through DETAILD, indicated that applying DICE engages and educates family members. They viewed DICE as a tailored approach to help clinicians provide families with more strategies for coping with BPSD. They also reported the benefit of implementing DICE with family members for promoting personalized holistic approaches and supporting families with the understanding that individual techniques will vary daily in their effectiveness. Champions also indicated that a DICE-trained liaison would be useful for sharing information with families and facilitating referrals through community outreach. They reported that implementing DICE helps empower clinicians to educate families, build caregiver confidence and compassion, and develop realistic care and follow-up plans.

Additional comparison of themes identified by champions and novices from the pilot are provided in the Supplemental Table.

Adaptations to the DETAILD model

Adaptations made in response to these findings centered on improving the program's reach, supporting clinician participation among increasing demands in primary care, and enhancing the effectiveness of implementation strategies for managing behaviors and symptoms of dementia. Several strategies to expand access and participation emerged, including offering virtual and recorded sessions to accommodate clinicians' limited availability and need for flexible access to learning materials. Requests for treatment algorithms and greater access to materials prompted the creation of decision guides for clinicians to review after sessions. Expanding access to self-directed DICE modules also became possible after the creator removed associated fees for use.[8]

To promote buy-in across the health care team, efforts should highlight identified gaps and the program's benefits in addressing them. The findings also underscore the importance of tailoring content to the unique needs of different clinician roles. While this pilot included physicians and advanced practice providers, future implementations will broadly engage additional interdisciplinary team memberss – including nurses, medical assistants, and social workerss – who play key roles in dementia care. Table 4 lists all DETAILDs adaptations.

DISCUSSION

This qualitative study identified key factors influencing the reach, adoption, implementation, and effectiveness of the DETAILD

intervention in preparing primary care clinicians to manage BPSD. Champions and novices reported gaps in self-efficacy, particularly in recognizing BPSD, applying nonpharmacologic strategies, and prescribing medications. DETAILD was perceived as effective, especially due to case-based learning and use of the DICE Approach. DETAILD strengthened clinicians' knowledge and confidence in addressing BPSD through holistic strategies and appropriate medication use.

Facilitators of engagement included strong intrinsic motivation, often driven by a desire to better support patients and caregivers, and opportunities for co-learning with peers. Champions and novices valued the combination of didactic sessions with real-world case discussions, which allowed learning to be tailored to their clinical needs. However, barriers such as limited time, competing demands, and varying levels of dementia care experience affected participation. Novices emphasized the need for flexible, foundational training, while champions underscored the value of applied learning and ongoing reinforcement.

These findings informed meaningful adaptations to the DETAILD intervention, including offering virtual and recorded sessions and the development of decision-support tools. Future implementation should continue to tailor content and format to fit the needs of interdisciplinary teams. Broadening the reach of DETAILD through scalable delivery formats can strengthen primary care capacity for dementia care and improve outcomes for persons with dementia and their caregivers.

These findings align with prior studies, including a systematic review and qualitative study in Ireland, which also found that primary care clinicians often lack training and resources for managing BPSD.[5] As in those studies, our findings highlight the importance of family involvement and the need to address caregiver expectations. However, this study adds new insight by examining how an educational intervention can be designed and implemented specifically within primary care settings to address BPSD.

The findings should be interpreted considering a few limitations. The sample was a small, nonrandom group composed primarily of non-Hispanic White physicians, which – while reflective of Wisconsin's primary care workforce – limits generalizability. Including a more racially and ethnically diverse sample, as well as more advanced practice providers, would strengthen future evaluations and adaptations.

Understanding the factors that motivate clinician engagement and support practice change is essential to designing effective educational programs. Applying the RE-AIM/PRISM framework allowed for a structured and practical analysis of program elements in need of refinement. Clinicians offered input on both core components and modifiable features to enhance DETAILD's relevance and impact. Future studies are planned to evaluate whether participation in the DETAILD intervention leads to measurable practice changes aligned with best-practice recommendations for BPSD management.

More broadly, the study offers implications for educational interventions in other areas of primary care. Many barriers – such as limited time, competing priorities, and variable experiences – are common across chronic disease management. Our focus on case-based learning, team-based training, and flexible delivery formats offers a model that can be adapted in other areas, including mental health, palliative care, and complex chronic disease management.

CONCLUSIONS

The DETAILD intervention showed promise for improving primary care clinicians' knowledge, confidence, and skills in managing BPSD. Adapting the program to include flexible delivery formats, decision-support tools, and interdisciplinary engagement can enhance its reach and relevance.

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Data statement: A sample of these data has been previously presented in posters at Alzheimer's Association International Conference and manuscript in Implementation Science Communications, which is referenced in this manuscript. The datasets generated and analyzed during the current study are not publicly available to protect study participant privacy. Summary data are available from the corresponding author on reasonable request.

Supplemental table: Available at www.wmjonline.org

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Educating Health Science Educators: A Flexible, Asynchronous E-Learning Framework for Interprofessional Development in Teaching

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ABSTRACT

Background: Health science educators often receive little formal training in teaching methods, which may limit the adoption of evidence-based strategies. Synchronous, less flexible development programs are also difficult for many interprofessional educators to access.

Methods: We designed Education Essentials, a modular, asynchronous curriculum to support foundational teaching skill development across health professions. Guided by growth mindset and experiential learning frameworks and informed by our needs assessment, we developed 9 modules aligned with core teaching domains.

Results: As of April 2025, 185 unique learners had enrolled in at least 1 of the first 6 modules, with 110 modules completed.

Discussion: This curriculum addresses an institutional need and supports scalable, accessible educator development across clinical, basic science, and interprofessional settings.

BACKGROUND

Health science educators play a key role in shaping future clinicians and researchers, and despite significant teaching responsibilities, many report minimal formal training in effective teaching strategies.[1-3] Instead, most rely on self-taught methods or informal modeling to teach, which may limit adoption of evidence-based teaching and learning activities.[1,2]

Many health care organizations and academic institutions have implemented teacher development curricula, with evidence of improvement in participants' teaching knowledge, skills, attitudes, and behaviors.[3,4] However, many teacher development programs rely on synchronous, longitudinal curricula, which can be challenging for busy health science professionals to access due to clinical, research, or administrative workload and complex schedules.[3,4] Additionally, many initiatives focus on physician teachers, leading to underrepresentation of other key health and basic science professions educators, such as nurses, therapists, and scientists.[3,4] Asynchronous learning formats are well suited to meet the needs of time-constrained and diverse health science teachers by providing flexible access and allowing for self-pacing. Moreover, sound educational design aligned with adult learning theory to promote reflection, deliberate practice, and real word applications are needed.

Hence, we created a centralized, flexible, and engaging asynchronous online curriculum for interprofessional health science educators to further develop teaching skills based on individual goals and needs. In this article, we describe our process to design and build the first phase of our online professional development curriculum, Education Essentials, including early outcomes and lessons learned.

METHODS

General and Targeted Needs Assessments

The University of Wisconsin School of Medicine and Public Health (UWSMPH) is an academic health center within a major public research university and encompasses clinical, biomedical science, and public health programs. Across statewide campuses, clinical and basic science departments, and health professions degree programs, more than 3250 full- and part-time faculty—and numerous additional instructors and staff—engage in teaching UWSMPH learners. Historically, UWSMPH has offered various faculty development activities to support teaching improvement, including lon-

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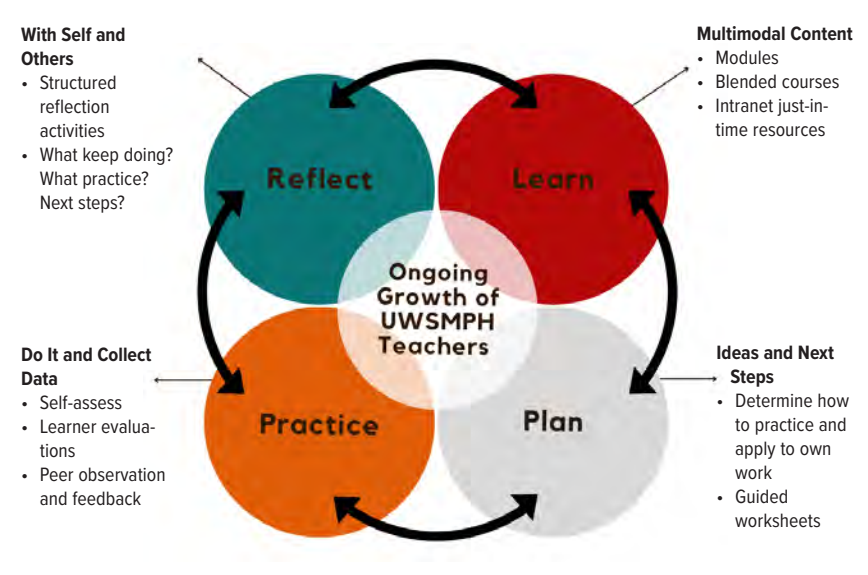
gitudinal cohort programs, department-led workshops, and grand rounds. Our general needs assessment included from review of historical and current offerings, institutional priorities, national health professions education trends, and accreditation standards.[2-6]

We conducted a targeted needs assessment from April to October 2022, by completing 29 semistructured, virtual interviews with institutional stakeholders representing a range of UWSMPH health science programs, departments, sites, and educational leadership across professions, including nursing, physician assistants, genetic counseling, public health, and physical therapy. Twenty-nine recruitment requests were sent to individuals and groups, with a 100% response rate. Interviewees were recruited via email, and we conducted 8 natural organizational group interviews (maximum of 6 participants, typically 2 or 3) and 21 individual interviews. Our interview questions included the following:

1. What do you see as the vision for what UWSMPH faculty need to develop as teachers?
2. If you were to highlight the most important goals of this faculty development program in education, what would you say they are from your standpoint? Why?
3. If you were to outline the biggest challenges of this faculty development program in education from your vantage point, what would those be? Why?
4. Who are other key stakeholders from your vantage point for us to connect with?

Qualitative analysis was conducted collaboratively by 2 authors (AS and SJ) with iterative review, code identification, discussion, and comparison of codes with emergent themes until consensus and agreement were achieved. Specific themes, barriers, opportunities, and current states were identified and grouped or collapsed from the codes. We asked interviewees for names of additional stakeholders to increase the depth of our sample and provide a broader perspective. This work is institutional educational development and quality improvement and therefore was not submitted for institutional review board review, per institutional guidelines.

Figure 1. Reflect-Learn-Plan-Practice Teacher Development Cycle and Module Template



Adapted from Kolb's Experiential Learning Cycle.[10]

Curricular Framework and Content Development

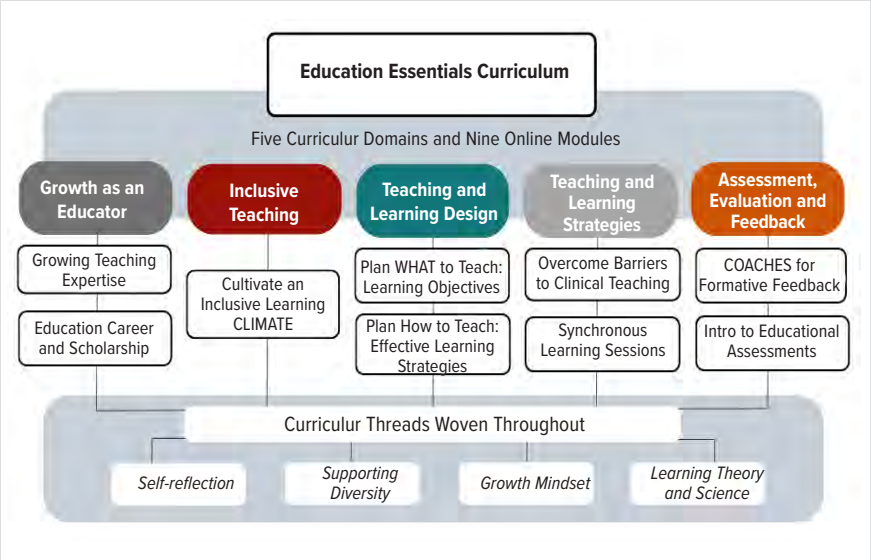
The needs assessment informed our tiered, 2-phased professional development curriculum to grow educator expertise and synergize with current programs. The first phase is Education Essentials, a curriculum on foundational knowledge and skills for interprofessional health science teachers. We adopted a growth mindset conceptual framework in our curriculum design to emphasize capacity for change and recognize that teachers bring their own experience and knowledge.[7] We also applied Kern's curricular development model for systematic design and implementation.[8] Finally, we integrated Ericsson's theory of expertise development and Kolb's experiential learning cycle.[9,10] Merging these frameworks with our institutional needs and resources, we created a curricular model, the Reflect-Learn-Plan-Practice cycle (Figure 1). This cycle provides the scaffolding for each module to promote self-reflection, targeted knowledge acquisition, application, and next steps. Additionally, the Reflect-Learn-Plan-Practice cycle provides a meta-model for longitudinal teaching expertise development.

We then outlined 5 curricular domains for Education Essentials content (Figure 2): (1) Growth as an Educator; (2) Inclusive Teaching; (3) Teaching and Learning Design; (4) Teaching and Learning Strategies; and (5) Assessment, Evaluation, and Feedback. Within domains, we determined foundational skills and knowledge for interprofessional health science teachers. Across content, we identified 4 threads to embed throughout the curriculum: learning theory and science, supporting diversity, self-reflection, and growth mindset. This high-level curricular plan was translated into learning objectives and organized into 9 asynchronous Education Essentials online modules (Figure 2). We employed a standardized module template—the Reflect-Learn-Plan-Practice cycle—for consistency in learner navigation and inclusion of effective learning methods. At a broader level, we modeled best educational practices for module development by incorporating strategies such as chunking content, balancing concept text with actions, interactive learning sequences, active learning, and reflection opportunities. Additionally, content examples and cases were created to represent diverse health science teaching roles, settings, and professions.

Content Validation and Interprofessional Review

We sought expert feedback throughout development. The curriculum plan was presented to 3 internal education leadership groups for review and feedback at least twice to demonstrate responsiveness to feedback and subsequent development. Each module was co-developed or reviewed by at least 1 content expert from various clinical, basic science, and interprofessional disciplines. Typically, 1 interprofessional expert co-created a module with authors AS and AJ, and another 2 interprofessional faculty or staff reviewed the content as it neared completion. Two interprofessional faculty reviewers (co-authors AA and AD) from nursing and physician assistant education reviewed every module for interprofessional relevance. After final edits, up to 3 beta-testers completed each module for functionality and continuing medical education credit validation.

Figure 2. University of Wisconsin School of Medicine and Public Health Education Essentials Curriculum Overview



Delivery Platform and Accessibility

Given the widespread geography of UWSMPH teachers and need for flexibility, we selected the web-based Interprofessional Continuing Education Partnership (ICEP) portal as the delivery platform, which allows anyone to create an account and access content. This platform provides asynchronous, self-paced, easily accessible modules with interprofessional continuing education (CE) credits, reminders, and continued access after completion. Modules were designed for either standalone or combination use, enabling a learner-driven approach. Modules also cross- reference each other to integrate concepts and encourage exploration of other modules.

Outcome Measures

We tracked module enrollment and completions to date as a measure of feasibility. In addition, we captured deidentified participant learning plans to extract themes for future professional development.

RESULTS

Needs Assessment Themes

The needs assessment yielded 4 expansive themes to guide curricular design (Table). Within each theme, we identified specific needs, challenges, and possible approaches. For example, the theme "broad range of teaching roles, contexts, and interests" encompasses highly variable teaching roles, settings, and responsibilities both between and within stakeholder groups. The "time and energy limitations" theme highlights barriers to engagement in teacher development, including misaligned schedules with synchronous activities, lack of centralized opportunities, and competing work priorities. The theme "centralized addition to current efforts" reflects limitations of existing development opportunities and the need for a high-yield curriculum that builds on current institutional efforts with an emphasis on belonging and growth mindset. Finally, the "shared educator skills priorities" theme captures common interest in similar teaching topics across stakeholder groups. The Table connects these themes to our curriculum development approaches.

Module Implementation and Engagement

As of April 2025, 6 of the 9 asynchronous modules were deployed (Figure 2), including Growth Mindset in Teaching, Feedback, Learning Climate, Synchronous Teaching, Planning Teaching Content, and Planning Teaching Methods. The remaining modules—Career Development for Teachers, Clinical Teaching, and Educational Assessments—are anticipated for deployment in 2025.

By April 2025, 185 unique learners had enrolled in at least 1 of the first 6 modules, with 110 module completions. Geographically, learners were primarily located within Wisconsin (N = 153, 83%) but also represented 13 US states and 8 international locations. The professions represented included mostly physicians (N=90, 49%), nurses (N = 31, 17%), and other health professionals (N = 43, 23%) including social workers, physician assistants, dentists, psychologists, students, and optometrists.

DISCUSSION

Education Essentials, our centralized, modular, and flexible asynchronous e-learning curriculum, successfully enhanced self-assess-

ment of teaching skills among a diverse group of health science educators. This initiative addressed an institutional need for accessible, relevant teaching development and provides a scalable approach for supporting educators across a large organization.

Creating enduring, effective, and engaging online curricula requires time, resources, and a stepwise approach. A multiphase strategy—beginning with core skills and expanding over time—has allowed us to be strategic and to involve diverse expert teachers in this project. In addition, successful e-learning requires an accessible online platform and team members with expertise in online curriculum development. Promoting awareness and uptake also requires focused time, an array of approaches, and consistent messaging.

Limitations include our retrospective validation approach: while we engaged institutional leadership groups and interprofessional reviewers throughout development, earlier formal feedback on curriculum design might have strengthened the process. Additionally, the lack of a control group and reliance on self-report outcomes measures limit the interpretability of effectiveness.

Table. Summary of Needs Assessment Themes and Curricular Response

Identified Needs Assessment Themes	Curricular Response
Range of roles, contexts, and interests Faculty and instructor teaching roles and settings are highly variable with wide-ranging responsibilities both between and within stakeholder groups. Hence, an approach that fosters individualized teacher development is key.	• Designed modular, flexible curriculum relevant across disciplines, settings, and levels • Adopted a "choose-your-own-adventure" format with asynchronous access • Embedded high-yield teaching tools in each module for ad hoc use
Time and energy limitations Barriers to engagement in teacher development are limited time, misaligned schedules with synchronous activities, lack of centralized opportunities, and competing work priorities.	• Delivered asynchronous modules through a centralized online hub • Accessible at users' convenience and able to revisit at any time • Aligned with institutional priorities and offered continuing education credit for participation • Working on badge certification for completion of 6 out of 9 modules
Centralized addition to current efforts Currently, limited centralized, uniformly accessible teaching development resources exist, especially for clinical teaching. It is important to have a high-yield curriculum that adds to current institutional efforts as well as fosters belonging and growth mindset.	• Integrated feedback from institutional leadership • Content reviewed by interprofessional peers and content experts • Included variety of clinical teaching examples and additional resources • Focus on fostering growth mindset, reflective activities and personal development planning
Shared educator skills priorities Across stakeholder groups there is high interest in similar teaching topics. The most requested topics included giving feedback, effective teaching methods, and learning climate. Foundational teaching skill priorities included effective feedback, inclusive teaching, adapting to individual learner needs, evidence-based teaching methods, clinical teaching, and educational scholarship.	• Developed 9 modules addressing prioritized topics, starting with feedback as the pilot • Included evidence-based strategies across all modules

Currently, we are working with stakeholder groups to promote the modules for individual use, facilitated group learning, and blended learning sessions with skills practice. The next step is development of Phase Two of this curriculum—modules focused on more complex teaching competencies. The Education Essentials curriculum complements existing offerings while expanding support for all UWSMPH educators as they develop teaching expertise. The curriculum is available on the UW ICEP website (https://ce.icep.wisc.edu/) by searching "Education Essentials."

CONCLUSIONS

Education Essentials represents a scalable, interprofessional approach to building foundational teaching skills among health science educators. Early engagement demonstrates institutional demand for flexible, evidence-informed development opportunities. Ongoing expansion and evaluation will further inform how asynchronous curricula can enhance teaching expertise across diverse educational roles.

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Three-Year Outcomes of a Longitudinal Department of Medicine Fellow as Medical Educator Training Program Pilot

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ABSTRACT

Background: Developing the next generation of physician educators is an important priority and persistent challenge for academic medical centers, and dedicated educator training is highly desired by physicians in training. To address this need, our Department of Medicine launched a longitudinal fellow-as-medical-educator (FAME) program.

Methods: We implemented the FAME program over a 3 year period in a midsized Department of Medicine, offering faculty-led didactic sessions, fellow-led journal clubs, mentorship, and structured opportunities for direct observation and feedback. Program engagement, perceived relevance of sessions, and self-assessment of teaching skills were evaluated annually through attendance logs, session evaluations, "and a modified System for Evaluating Teaching Qualities tool.

Results: Participation increased among both fellows and volunteer faculty across the 3 years. Faculty-led sessions were consistently rated as highly relevant, with an average score of 3.7 out of 4.0. Self-assessment of teaching skills improved across multiple domains each year, with gains demonstrated in 11 of 25 domains across the implementation period.

Discussion: Despite limited resources, the FAME program was well received and associated with improved self-assessed teaching skills among physician fellows. Ongoing refinements aim to optimize synchronous participation and enhance program sustainability.

BACKGROUND

Developing the education workforce in medicine is a perennial challenge; having capacity for our students, residents, fellows, and other health profession trainees to learn from qualified educators is critical. Physician fellows are attuned to the need for professional development in education and have a strong interest in medical education training.[1]

In early 2021, we conducted a department-wide needs assessment to inform development of our fellow-as-medical-educator (FAME) program. Among respondents to the survey of leaders were 8 program directors, 6 associate program directors, and 7 program coordinators (21 responses total); there were 24 fellow respondents. Nearly two-thirds of program leaders indicated having a current or recent fellow interested in a medical education training track and reported having variable resources they could offer that fellow. Most program leaders reported being asked about such opportunities during fellowship interviews. Most responding fellows had at least some training in teaching during fellowship, and more than 80% indicated they would be at least somewhat likely to participate in medical education training if offered.

To meet the needs of our fellowship leaders and trainees, we developed a longitudinal educator development program—the FAME program—which is administered across the Department of Medicine. We implemented a multimethod approach to educator training and have improved the program iteratively over the 3-year pilot period. We aimed to develop instructional skills as well as skills in education scholarship and program building.

METHODS

Setting

Our curriculum was developed and implemented in an academic Department of Medicine in a midsized medical school in the

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Midwest. The department trains 80 to 90 fellows each year across 17 divisions, with 23 active fellowships.

Curriculum Design and Implementation

In the needs assessment, fellows ranked the following components in decreasing order of importance as preferred curriculum elements, which informed our curricular offerings:

1. Developing instructional skills
2. Learner feedback and assessment
3. Mentorship
4. Educational leadership skills
5. Curriculum design
6. Technology use in instruction
7. Learning theory
8. Program evaluation
9. Critical appraisal of education research
10. Education research skills

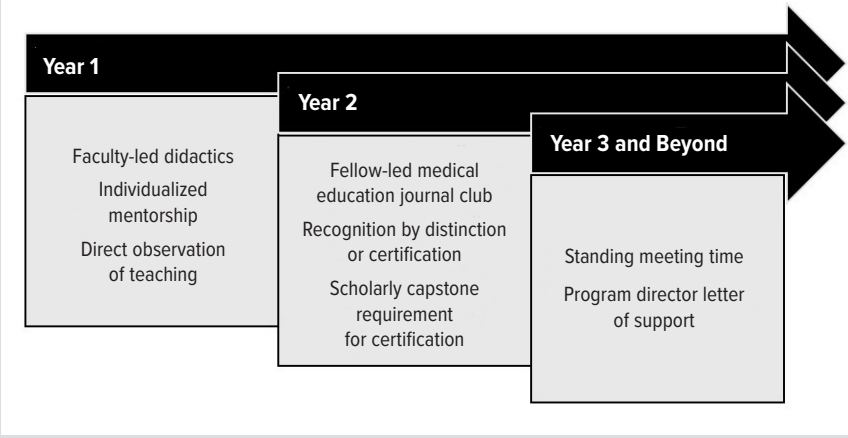
We applied Kern's 6-step model for curriculum development[2] to design the FAME program. Using recommendations by Ramani et al[3] and the priority areas identified by the 2021 survey of fellows, we constructed the FAME content. The program's main objectives are to:

1. Develop instructional skills in all venues relevant to medical education.
2. Provide learners and peers with high-quality feedback.
3. Gain a working knowledge of evidence-based curriculum design and program evaluation.
4. Remain up to date on advances in medical education literature.
5. Critically appraise medical education literature.
6. Develop a toolbox for designing, conducting, and disseminating a scholarly education project.
7. Appreciate the many career paths in medical education and begin defining individual career goals relevant to medical education.
8. Articulate a teaching philosophy.

Our program grew in a scaffolded manner over the first 3 years (Figure). In year 1, we implemented faculty-led didactic sessions with expert educators that focused on teaching skills and educational theory. We also paired fellows with a faculty mentor for career advising and for direct observation and feedback of teaching.

In year 2, we added fellow-led medical education journal clubs. We established the expectation that fellows address issues of diversity, equity, and inclusion in medical education during journal club. We also introduced a tiered recognition program, whereby fellows could graduate with "distinction" or "certification," depending on engagement level. Certification required an education scholarship component.

Figure. Fellow-as-Medical-Educator (FAME) Development Over the Three-Year Implementation Period



In year 3, we instituted a standing meeting time and requested letters of support from fellowship program directors to enhance accountability and promote regular attendance. All sessions were held over the noon hour on weekdays. Some were virtual only, but most were hybrid, with in-person attendance incentivized with lunch. One or 2 sessions were held monthly from September to May; half were didactic sessions and the other half fellow-led journal clubs. Most faculty didactic sessions rotated on a 2-year calendar. Support with calendar invites and web conferencing was provided by Department of Medicine education staff.

Volunteer faculty mentors were solicited via email and during a standing fellowships meeting. Faculty and fellows were paired based on a fellow's desire to have mentorship within or outside their division; no faculty members were assigned more than 2 fellow mentees at any one time. Direct observation and feedback were encouraged in a variety of clinical and classroom venues; use of a direct observation and feedback tool developed by the Department of Medicine Education Committee was encouraged to ensure a minimum standard of feedback. In many cases, faculty outside FAME were sought for mentorship on education scholarship, often aligning with scholarly endeavors in their home fellowship program.

Program Evaluation

We employed multiple evaluation methods, including self-report of activity completion, attendance, fellow evaluation of faculty sessions, open-ended program feedback, and self-assessment of teaching skills[4] conducted at the beginning and end of the academic year (Table).

Resources

Resources dedicated to FAME are limited, with reliance on time volunteered by faculty members and program leaders. In year 2,

Table. Self-assessment of Teaching Skills at Baseline to Year-end Across the First Three Years of the Fellow-as-Medical Educator (FAME) Program

	2021-2022 (N = 5)		2022-2023 (N = 7)		2023-2024 (N = 8)	
	Baseline Mean (SD)	Year-end Mean (SD)	Baseline Mean (SD)	Year-end Mean (SD)	Baseline Mean (SD)	Year-end Mean (SD)
In my role as a fellow teacher, I generally…						
Encourage learners to participate actively in discussions	6.000 (0.577)	6.286 (0.488)	6.000 (0.707)	6.600* (0.548)	**5.625 (0.518)**	**6.250* (0.463)**
Stimulate learners to bring up their problems	5.714 (1.113)	6.143 (0.690)	5.200 (1.095)	6.200 (0.447)	5.500 (1.069)	6.000 (0.756)
Motivate learners to study further	5.857 (0.690)	5.714 (0.951)	5.400 (0.894)	6.000 (0.000)	5.125 (1.126)	5.750 (0.707)
Stimulate learners to keep up with the literature	5.571 (0.976)	5.571 (0.787)	**4.400 (0.894)**	**5.600* (1.140)**	**4.500 (0.926)**	**5.500* (0.756)**
Prepare well for teaching presentations and talks	6.429 (0.535)	6.000 (0.816)	5.800 (1.304)	6.800 (0.447)	**5.375 (0.744)**	**6.250* (0.707)**
Teach learners the full spectrum of care relevant to my specialty	5.857 (1.574)	5.429 (1.718)	4.600 (1.673)	6.000 (0.707)	**5.125 (1.126)**	**5.875* (0.354)**
Listen attentively to learners	6.143 (0.690)	6.429 (0.787)	**5.600 (1.140)**	**6.400* (0.894)**	6.250 (0.707)	6.625 (0.518)
Am respectful toward learners	6.429 (0.535)	6.571 (0.535)	6.400 (0.548)	6.600 (0.548)	6.500 (0.535)	6.625 (0.518)
Am easily approachable while on call	**5.714 (0.951)**	**6.429* (0.535)**	6.200 (0.447)	6.000 (0.707)	6.250 (0.707)	6.375 (0.744)
Am easily approaching for discussion during routine daytime work	6.286 (0.488)	6.286 (0.488)	6.400 (0.548)	5.800 (0.447)	6.125 (0.641)	6.375 (0.744)
Clarify learning goals for the learning session	5.429 (0.976)	6.000 (1.000)	4.800 (1.304)	5.600 (0.548)	5.000 (1.069)	5.625 (0.518)
Match learners' and supervisors' learning expectations	5.286 (0.756)	6.000 (1.000)	5.200 (0.837)	5.400 (0.548)	**4.875 (1.126)**	**5.750* (0.463)**
Provide learners responsibility based on their abilities	**5.429 (0.535)**	**6.143* (0.690)**	5.600 (0.548)	6.200 (0.447)	5.750 (0.886)	6.000 (0.756)
Teach learners how to deal with competing personal/ professional demands	5.143 (0.690)	5.571 (1.272)	5.400 (0.548)	5.000 (0.707)	4.875 (1.246)	5.750 (0.463)
Evaluate learners' specialty knowledge regularly	**4.857 (1.215)**	**5.571* (1.272)**	4.600 (1.140)	5.200 (1.304)	4.875 (0.991)	5.750 (0.463)
Evaluate learners' analytical knowledge regularly	**4.000 (0.816)**	**5.429* (1.272)**	4.400 (0.894)	5.000 (1.225)	5.000 (0.756)	5.250 (0.463)
Evaluate learners' application of knowledge in daily practice regularly	5.000 (1.155)	5.000 (1.826)	5.000 (0.707)	5.200 (1.483)	5.250 (0.463)	5.625 (0.744)
Evaluate learners' procedural skills regularly	5.286 (2.289)	4.714 (2.059)	4.800 (2.280)	6.000 (2.345)	5.375 (2.722)	6.625 (2.200)
Give positive feedback to learners	6.000 (0.816)	6.429 (0.535)	6.200 (0.447)	6.000 (0.707)	6.500 (0.535)	6.500 (0.535)
Give corrective feedback to learners	5.143 (1.215)	5.857 (0.378)	5.200 (1.095)	5.200 (1.304)	4.875 (1.458)	5.750 (0.463)
Explain why learners are (in)correct	5.429 (0.787)	5.286 (1.380)	5.000 (0.707)	5.200 (0.837)	5.625 (0.916)	6.000 (0.535)
Offer suggestions for improvement	**5.143 (0.690)**	**5.857* (0.900)**	5.800 (0.837)	5.800 (0.837)	**5.625 (0.744)**	**6.125* (0.354)**
Teach learners how to deal with colleagues with questionable or inappropriate practice	5.000 (1.633)	5.429 (1.718)	4.800 (1.643)	5.800 (1.643)	4.500 (1.852)	4.750 (1.488)
Teach organizational aspects of my specialty practice	5.286 (1.604)	5.571 (1.272)	4.800 (0.837)	6.200 (1.924)	5.125 (1.246)	5.625 (0.518)
Create awareness of economic aspects of medical care	4.571 (1.618)	5.286 (2.059)	4.400 (1.817)	4.600 (1.673)	4.500 (1.195)	4.375 (0.744)

Responses possible are totally disagree (1), disagree (2), somewhat disagree (3), neutral (4), somewhat agree (5), agree (6), totally agree (7), or not applicable/cannot judge.
Bold text and * indicate *P* values < .05.

we were afforded a small budget for food to optimize in-person attendance. After year 3, we received additional administrative support to manage emails, calendar invites, food orders, attendance, and requirement tracking.

RESULTS

In year 1 (2021-2022), 10 fellows participated in FAME and were paired with 10 faculty mentors. In year 2 (2022-2023), 6 fellows continued, 2 fellows were added, and 8 faculty served as mentors. In year 3 (2023-2024), 2 fellows continued, 13 fellows were added, and 13 faculty mentors volunteered.

Regarding engagement, fellows in 2021-2022 (n=5 evaluations returned) attended an average of 3 to 4 sessions, 1 to 2 sessions asynchronous sessions, and participated in 1.8 instances of direct observation and feedback with their faculty mentor. In 2022–2023 (n=6), fellows attended 4 to 5 synchronous sessions, 1 to 2 asynchronous sessions, and averaged 2.8 observation/feedback encounters. In 2023–2024 (n=9), fellows attended 3 to 4 synchronous sessions, 2 to 3 asynchronous sessions, and averaged 1.6 observation/feedback encounters. Faculty session evaluations were very favorable. Across all years, the mean score for the question, "How relevant was this session to your development as an educator? Was greater than 3.7 on a 4-point scale (with 87 evaluations collated).

Open-ended feedback emphasized the need for scheduling accommodations to maximize attendance increased opportunities for direct observation with mentors and other faculty. One fellow suggested "providing schedules to fellowship coordinators to maximize fellow availability for sessions."

Strengths identified were the engaged and supportive faculty, the high-quality didactic sessions, and the flexibility afforded by the hybrid format and asynchronous viewing option. Fellows commented, "It was helpful to stream the sessions so that I could attend remotely," and "I specifically like having a 1:1 mentor and sessions that are observed."

Self-assessment of teaching skills, measured with a modified System for Evaluating Teaching Qualities (mSETQ), improved in many domains each year (Table). The largest gains occurred in years 1 and 3, likely reflecting the onboarding of a larger group of new fellows in those years compared with year 2.

DISCUSSION

FAME addresses the educator development needs of Department of Medicine fellows and fellowship programs with limited resources, demonstrating improvements in self-assessed teaching skills and sustainability over the 3-year pilot period. The longitudinal nature of the curriculum is relatively unique fellow education training curricula and fosters community-building among fellows and faculty across the department. Further, it allows brief sessions to be scheduled across time, minimizing disruptions to clinical schedules that may come with more intensive teaching courses that require longer, uninterrupted blocks of time.[5] We expect—though have not measured—that relationships built through FAME may benefit patient care by improving familiarity and communication within clinical teams.

Interpretation of specific skill improvements is limited by statistical power. However, gains in evaluation and feedback skills likely relate to our curricular emphasis on these areas through didactics, direct observation, and structured feedback. The addition of a journal club in year 2 may have contributed to improved self-assessed ability to stimulate learners to keep up with the literature. While few components of the mSETQ improved significantly, the greater gains in years 1 and 3 coincide with onboarding more fellows into the program for the first time, suggesting that fellows may benefit more during their first year of participation than in subsequent years.

Our work builds on previously published curricula designed to develop fellow' educator skills[5-9] but is unique in offering multiple methods of skill development over 1 to 2 years, concurrent with clinical fellowship. We are aware of only 1 other centralized departmental curriculum in the literature,[10] which was delivered over a shorter period and lacked the scholarship component expected of FAME graduates. Most existing curricula offer only a small number of sessions or workshops and lack the longitudinal component present in FAME.[7-9] One aspirational program provides a 1 year-long fellowship in which participants are largely protected from clinical duties.[6] Meanwhile, our program offers the benefits of a longitudinal curriculum and interdisciplinary learning community, while affording the flexibility to complete it during a busy clinical fellowship.

As with any education innovation, there are several limitations. First, we cannot measure higher-level learner outcomes and the impact of educator development on patient care. Nonetheless, we are confident in FAME's success based on our multipronged evaluation strategy. Integrating the program into the workday supports work-life integration but sometimes limits synchronous attendance, particularly for fellows at off-site locations or on demanding clinical rotations. Finally, with the program's growth, tracking fellows progress has become more challenging. Future iterations will require increased administrative and faculty support.

A resource-limited, department-wide fellow-as-medical-educator program can successfully improve self-assessed teaching skills. We are using these early successes to advocate for increased program support and buy-in from fellowship program directors to ensure FAME fellows are equipped with the time and resources needed to fully engage with the curriculum.

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Empowering Birth Workers to Address Maternal Hypertension: Evaluation of a Community-Based Training in Wisconsin

Kristine Alaniz, PhD, MPH; Kristina Kaljo, PhD; Kara Hoppe, DO, PhD

ABSTRACT

Background: Hypertensive disorders of pregnancy are a leading cause of maternal morbidity, especially among Black, Indigenous, and rural birthing individuals.

Methods: A multidisciplinary team developed and evaluated a community-based training for birth workers to enhance knowledge and response to maternal hypertension.

Results: Participants reported high satisfaction with the training across multiple domains. Confidence increased across all learning objectives. Follow-up data showed strong intent to apply learning, with most participants planning practice changes. Planners also observed a need to focus on skill-building and inclusion of birth workers in the planning process.

Discussion: Results suggest that targeted training for birth workers is feasible, impactful, and supports their critical role in addressing hypertensive disorder disparities. Ongoing sessions will integrate skill-building and deeper community engagement.

BACKGROUND

Hypertensive disorders of pregnancy (HDP) are conditions marked by high blood pressure during pregnancy, including chronic hypertension, gestational hypertension, preeclampsia, and eclampsia. HDP affect approximately 1 in 7 deliveries in the United States and are more common among birthing people who are Black (20.9%), Indigenous (16.4%), those who reside in rural areas (15.5%), and those with lower incomes (16.4%).[1] HDP are a leading cause of adverse birth outcomes and maternal mortality.[1] Black birthing people experience a maternal mortality rate over twice that of Whites, with a 5-fold higher risk of death from eclampsia or preeclampsia.[1]

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Access to maternal health care is critical to addressing inequities, yet communities face provider shortages, hospital closures, poverty, and limited culturally responsive care.[1-3] Birth workers – including doulas, home visitors, and community health workers – bridge gaps in care by supporting birthing people across the perinatal period in health care, home, and community settings.[4] Birth worker support is associated with lower rates of maternal hypertension,[5] preterm birth, low birth weight, depression, and anxiety.[6-8] However, birth workers face barriers including inadequate reimbursement, limited integration into health systems, and lack of access to affordable, standardized training.[4] While efforts to expand and finance the community-based maternal health workforce are underway,[4] urgent action is needed to respond to local needs.

The Wisconsin Department of Health Services (DHS) identified a need to support birth workers in addressing maternal hypertension, based on insights from a community of practice – defined as a group of health professionals who regularly share knowledge and collaborate to improve skills, care practices, and health outcomes.[9] A multisector planning team – including the Title V Program, Maternal Mortality Review team, Home Visitation Program, the Wisconsin Association for Perinatal Care, and the Department of Obstetrics and Gynecology at the University of Wisconsin School of Medicine and Public Health – was convened. The team co-developed a birth worker training program focused on maternal hypertension.

This evaluation assessed whether a community-based training improved birth workers' ability to address maternal hypertension. Key questions included: (1) How did birth workers respond to the

training? (2) Did it meet their learning needs? (3) Will it influence their practice? And (4) What were the strengths, gaps, and areas for improvement?

METHODS

This evaluation employed a mixed-methods approach, combining pre- and post-session polling, an emailed follow-up survey, and virtual debriefs with the planning team. Polling assessed confidence in learning objectives, while the survey captured participant feedback and suggestions. Evaluation findings were reviewed to inform program improvements. The Kirkpatrick model—a 4-level evaluation framework—was used to measure the effectiveness of the training across reaction, learning, behavior, and results.[10] Levels 1–3 focused on birth workers, while level 4 involved the planning team. This evaluation captured only immediate effects on participants and organizations; longer-term effects on the communities they serve were not assessed. Institutional review board approval was not obtained because this project evaluated previously collected, deidentified data.

Participants

The training targeted birth workers—health professionals focused on prevention, collaboration, and support for pregnant and postpartum individuals. Participants were recruited through partner networks, events, and social media. Of 309 registrants, 154 attended (50% attendance). Approximately 60% of attendees met the birth worker definition, including doulas, midwives, and home visitors.

Intervention

The intervention was a birth worker training program titled *Recognizing and Responding to Pregnancy and Postpartum Hypertension: The Critical Role of Birth Workers.* It was designed as a 3-part series to strengthen participants' ability to recognize, respond to, and support individuals at risk for or experiencing hypertension during pregnancy and the postpartum period. The planning team developed the series based on research and clinical guidelines, including the Hypertension in Pregnancy Change Package.[11] This manuscript focuses on the first session, Foundations of Perinatal Hypertension, which provided a basic understanding of maternal hypertension, its prevalence, and its impact on maternal and child health.

The session was facilitated by a maternal-fetal medicine specialist and employed a variety of evidence-based and interactive teaching methods, including real-time polling, quizzes, videos, word clouds, case studies, and a live question-and-answer (Q&A) session. Participants were also provided with curated resources to support continued application of knowledge in their practice settings.

Outcomes

The primary outcomes assessed were:

1. birth workers' reactions to the training
2. changes in birth workers' knowledge of maternal hypertension
3. intent to apply new knowledge in practice
4. organizational benefits for planning team partners

Measures

Reaction. Participant reactions were assessed via a follow-up survey emailed to all attendees. Satisfaction with the facilitator was rated on a 4-point Likert scale (1 = low, 4 = high) across 5 domains: (1) subject knowledge, (2) presentation organization and clarity, (3) participant interaction, (4) effective use of time, and (5) use of audiovisual aids. Participants also indicated whether they would recommend the session and whether it addressed health disparities or equitable care (yes/no).

Learning. Learning outcomes were evaluated through the follow-up survey and live polling. In the survey, participants indicated whether their learning and professional development needs were met (yes/no). Polling assessed self-reported confidence before and after the session in: (1) describing hypertensive disorders of pregnancy, (2) explaining hypertension's impact on short- and long-term perinatal outcomes, and (3) identifying populations most affected. Confidence was rated on a 5-point scale (1 = not at all, 5 = extremely confident).

Behavior. Behavioral outcomes were assessed via the follow-up survey. Participants rated their confidence in applying session knowledge and skills on a 4-point scale (1 = low, 4 = high) and indicated: (1) whether the session reinforced their current practice, (2) whether they intended to apply what they learned, and (3) whether they planned to change their practice (all yes/no).

Results. Organizational-level outcomes were assessed through planning team debrief sessions. Discussions focused on identifying training strengths, gaps, and areas for improvement, as well as opportunities for adaptation. Meeting notes were used to document insights and inform future training development.

Analysis

For yes/no questions, the proportion of "yes" responses was calculated. Items measured on 4- and 5-point scales were treated as ordinal variables, and mean scores were computed. For polling questions, mean scores were calculated for both preassessments and postassessments. Qualitative responses to open-ended questions were grouped thematically, and selected excerpts were used to illustrate key themes.

RESULTS

Of the 154 participants, most (70%) completed the presession polls (n = 105-111) and about half completed the postsession polls (n = 69-82). Just over half (51.9%) completed the follow-up survey.

Level 1: Reaction—Participants reported high satisfaction (mean score, 3.70-3.91) with the training, including speaker knowledge,

organization/clarity, participant interaction, use of allotted time, and audiovisual aids. All participants (100%) would recommend the session and agreed it addressed health disparities and equitable care. Open-ended responses were overwhelmingly positive, describing the session as informative, relevant, and useful.

Level 2: Learning–As shown in the Figure, live polling demonstrated increases in participants' confidence describing hypertensive disorders, explaining their impact on perinatal outcomes, and identifying affected populations. Participants also rated how well the session met their learning and professional development needs (mean score, 3.73).

Level 3: Behavior–Follow-up survey responses indicated high confidence in applying session content to participants' work (mean, 3.49). All respondents reported that the session reinforced their practice and that they planned to apply what they learned; 75% intended to change their practice.

Level 4: Results–Planning team debriefs highlighted positive effects on collaboration, network-building, and integration of clinical and community care. Strengths included live polling, the Q&A, and a multidisciplinary panel. Recommendations included consolidating resources, expanding hands-on skills training, support for practice change, deepening birth worker engagement, and addressing implicit biases.

DISCUSSION

While HDP toolkits exist, gaps remain in interactive, real-time training that enables birth workers to apply knowledge and translate learning into practice. This training engaged birth workers as equity-focused partners in maternal health, bridging clinical and community care. Polling and surveys indicated learning gains, and feedback was highly positive.

Key lessons emerged in content delivery, training structure, and collaboration. Synchronous polling, case examples, and resources supported engagement and learning. Embedding equity-focused content within maternal health efforts was valuable. Planners recommended a structured debrief and clearer evaluation of intended practice changes and implementation barriers.

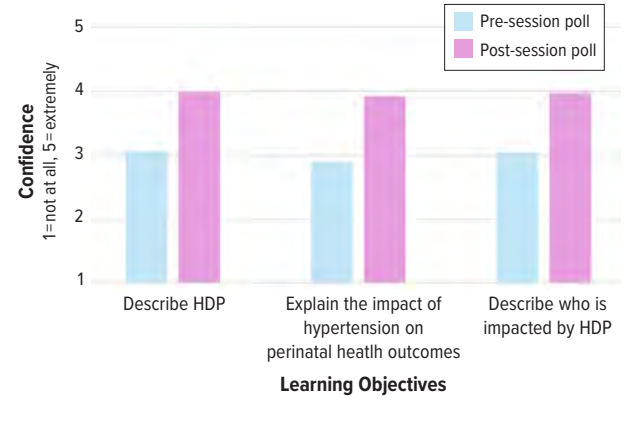
Strengths and Limitations

Strengths of this evaluation included use of the Kirkpatrick model and a combination of real-time polls and a follow-up survey to assess outcomes. Limitations included potential response-shift bias affecting participants' self-reported knowledge and confidence and the lack of data on longer-term effects of birth workers application of knowledge in community settings.

Implications and Next Steps

The training modeled integration of maternal health initiatives and strengthened birth workers' role in addressing disparities. Two future sessions will focus on skill-building and workforce impact.

Figure. Pre- and Post-session Confidence in Learning Objectives



Additional efforts will support practice changes, engage birth workers in planning, and assess downstream effects on birth workers and their communities.

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ACGME Mandated Scholarship: Process and Product—A Proposed Process to Maximize Trainee Experience

Amanda M. Jentsch, BA; Alexandra C. Istl, MD, MPH; Tammy L. Kindel, MD, PhD; Jacob R. Peschman, MD, MSPE

The Accreditation Council for Graduate Medical Education (ACGME) has developed program requirements for each medical and surgical specialty, including length of training, faculty assessment of knowledge acquisition, numbers of patient encounters, minimum case volumes for various procedures performed, and participation in "scholarly activity."[1] The purpose of scholarly activity participation is to develop physicians who are capable of participating in lifelong learning, advancing medical knowledge, and using a systematic approach to answer questions and address problems.[2] The importance of this is clear: as medical knowledge is constantly growing, practicing physicians must stay up to date with new conceptualizations of disease, available treatment options, and standard-of-care practices to best care for their patients. However, from a practical standpoint, the specifics necessary to meet this requirement have been less straightforward for programs and their trainees.

How many of these requirements are met varies, and it often falls to the specific residency program to develop its own unique curriculum or process. The scholarly activity requirement was proposed with the intention of developing the practices of discovery (advancing knowledge), integration (synthesizing knowledge), application (applying existing knowledge), and teaching (disseminating current medical knowledge) for trainees.[3]

Through this process-focused approach, residents will be more familiar with the research process from conception to presentation, thus better equipped to engage in scholarly activity and critical appraisal and ultimately apply findings to patient care.

ACGME Expectations

In the current ACGME accreditation system, general surgery, obstetrics and gynecology, pediatrics, emergency medicine, and internal medicine residency programs are required to "demonstrate evidence of scholarly activities," and each program's residents "must participate in scholarship."[2,4-7] In addition, emergency medicine residents must demonstrate one of the following: active participation in research and quality improvement projects, presentations, peer-reviewed publications, or other scholarly leadership activities such as editorial board or committee membership.[6] Internal medicine residents must also "demonstrate dissemination of research" through presentations, publications, or other scholarly activities.[7] That is the extent of the national guidance.

Since 2014, meeting these requirements and program reporting requirements have shifted from periodic program reviews (every 3 to 5 years) that demonstrated evidence of processes in place to reporting outcomes annually. The data points are now reported numerically, quantifying scholarly work completed in the previous year by number of presentations, publications, and national and regional organization memberships achieved by residents and faculty members.[8] These numbers are reported via electronic forms by program administrators and allow annual tracking by the ACGME and its review committees to identify and intervene on any deficiencies. While this has made program reporting to the ACGME more streamlined and objective, it remains up to the individual program to determine what qualifies as a "scholarly project" for a resident, how many projects are required from each resident, and how to define adequate "scholarly activity."

Learning from the Process

To clarify these ambiguities, we advocate that programs follow the spirit of the requirement—strengthening a resident's skills in critical appraisal and evaluation of clinical nuance. If a resident does not intend to continue their

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post-training career in academia, meeting a quota of posters, presentations, and publications may not be of value beyond residency. However, all physicians, regardless of practice setting, must engage in the process of answering clinical questions in a systematic manner throughout their careers to provide the best care for their patients. This capability cannot be adequately measured by research productivity alone. Thus, residency programs should incorporate a process-focused approach into their initiatives to increase resident scholarly output and make the requirement as applicable as possible to all residents.

To return to national practices as a guide, the ACGME began implementing competency-based educational milestones in 1999. Competency-based learning emphasizes knowledge application to meet stated criteria and formative assessment tool usage that mimics professional tasks.[9] While the competency milestones incorporate a quantitative element, the intent behind them is an illustration of the process required to develop a clinical skill. The competency concept has been further adapted to guide a rubric for faculty development and promotion.[10]

Rubrics have been used to clarify the ACGME scholarly activity requirement. They allow the skills necessary for scholarly activity to be translated into observable behaviors and can be adapted to a wide variety of projects.[11] A rubric has also been proposed as a method to track residents' scholarly activity as it aligns with the practices of discovery, integration, application, and teaching.[12] However, neither of these rubrics aligns process, behavior, and scholarship components into a clear roadmap for trainees and mentors to follow throughout scholarly activity.

To guide our approach to the ACGME requirement, we have applied processual, competency-based thinking to develop a rubric (Figure) to address each component of scholarship that makes up the ACGME requirement through the research experience.

The rubric: (1) requires that residents participate in each step of the research process to satisfy the scholarly activity requirement, (2) identifies potential resources available to assist the resident in completing the project component, (3) tracks faculty primary investigator verification that each step is complete, and, most notably, (4) aligns each step with a domain of the scholarly activity requirement: discovery, integration, application, and teaching. This alignment distinguishes the rubric as one focused on learning rather than task completion. These domains extend into patient care regardless of practice setting, and placing emphasis on the scholarly domains prompts residents to shift their focus away from simply completing a project to satisfy a program requirement. Instead, the goal becomes the practice of scientific inquiry. Furthermore, assigning defined responsibilities to the resident for the entire project removes certain barriers, such as waiting for other team members to perform a literature review or craft the specific implementation plan for an institutional review board submission. In addition, highlighting opportunities for use of subject matter experts such as statisticians helps build the trainees' collaborative abilities. Implementation of the rubric must also be accompanied by careful mentor supervision to assist with time management—a key skill for any physician, a natural part of the research process, and a benefit of a process-focused approach.

The rubric was successfully trialed by one of the authors at a single general surgery residency program after it was developed with one class of three residents. Two of these residents utilized the structure to design unique projects to answer clinical questions that they had developed based on their experience as a trainee. One was a retrospective development of a risk assessment tool, and another was a cadaver study to assess a surgical technique, both of which were published in the *Wisconsin Medical Journal*.[13,14] Both projects

Figure. Resident Scholarly Project Rubric

Scholarly Domain	Task	Potential Resource to Assist Resident	Completed (Y/N) (Initials)
Integration	Did the resident develop a written research/ quality question or hypothesis to be answered?	PI	
	Identify a faculty PI	APD, RC	
	PD or APD informed of the project?		
Application	Did the resident perform a literature review on the topic identifying pertinent (topic or process) resources?	RC, librarian	
Integration	Did the resident identify a data source (ie, electronic medical record, national data set)?	PI or RC	
Integration	Did the resident identify primary and secondary outcomes to be measured?	PI	
Integration	Did the resident work with the statistician to determine appropriate statistical plan?	PI, RC, statistician	
Application	Draft Institutional Review Board application	PI, RC	
Discovery	Identify targeted meeting for presentation and journal for publication	PI	
Integration	Data collection	RC	
Integration	Data review	PI, RC	
Integration	Data analysis	PI, RC, statistician	
Discovery	Did the resident draft an abstract?	PI, RC	
Teaching	Did the resident present at a meeting?	PI, RC	
Discovery	Did the resident draft and submit a manuscript based on the project?	PI, RC	

PI Signature:

All tasks must be answered "Y" to receive credit

Abbreviations: PI, primary investigator; RC, research coordinator; PD, program director; APD, associate program director.

were resident-driven, scientifically innovative, led to presentations/publication, and provided a comprehensive scholarly experience.

Upon completion of each rubric component, a residency program will have verified that the resident has contributed to the quantitative data reported to the ACGME and has satisfied the intention of the requirement. Through this process-focused approach, residents will be more familiar with the research process from conception to presentation, thus better equipped to engage in scholarly activity and critical appraisal and ultimately apply findings to patient care after completing their training. The end result is learning from the process, in addition to receiving credit for the product.

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Reverse Transcriptase

Bryan Welm, PhD

Sculpture

Artist Statement:

The sculpture is composed of representations of the DNA-RNA hybrid supported by three lengths of sheet steel. Howard Temin challenged mainstream concepts. His trajectory is represented by a metal branch flowing through the sculpture. The branch illustrates how science advances from past observations through new discoveries. It also resembles the path along Lake Mendota shore where Howard would commute by bicycle and, perhaps, contemplated his science.

Thank You!
to our Reviewers

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