



Bridging the gap between professional development and leadership training among cardiovascular disease fellows: Results from a multi-institutional needs assessment

Barinder S Hansra^{1*}; Amit Jhaveri¹; Julie B Damp¹; Andrea M Elliott²

¹Department of Medicine, Division of Cardiovascular Medicine, Vanderbilt University Medical Center, Nashville, Tennessee, USA.

²Section of Critical Care Cardiology, Cardiovascular Division, University of Minnesota, Minneapolis, Minnesota, USA.

Corresponding Author: Barinder S Hansra

Department of Medicine, Division of Cardiovascular Medicine, Vanderbilt University Medical Center, Nashville, Tennessee, USA.

Email: Barinder.hansra@vumc.org

Introduction

There are currently 289 cardiovascular disease fellowship training programs across the United States [1]. With such a large number of programs, variability in educational content and emphasis is inevitable. To mitigate this, the Accreditation Council for Graduate Medical Education (ACGME) provides a standardized framework to guide fellowship training, ensuring all programs regardless of size, affiliation, or geography can prepare fellows to become competent and adaptable cardiologists [2,3].

Among the ACGME's core competencies, professionalism is a cornerstone: "fellows must demonstrate a commitment to professionalism and an adherence to ethical principles" [3]. Additionally, ACGME emphasizes recognition of impairment, including from illness, fatigue, and substance use, in themselves, peers, other health care team members, and recognize conditions and circumstances in which patient care should be transferred to another qualified and rested practitioner [3]. Other core requirements regarding professional development from ACGME highlight ensuring fellows have manageable patient care responsibilities and provide a culture of professionalism supporting patient safety and personal responsibility. However, unlike the Core Cardiovascular Training Statement (COCATS), which clearly defines procedural and imaging competency through required volumes and training duration [4], the ACGME professionalism and leadership competencies lack a similar structured roadmap. Given the increasing complexity of health care delivery, cardiologists must not only excel clinically but also navigate diverse practice environments, manage teams, and lead health systems. Despite this, formalized professional development in fellowships remains inconsistently defined and delivered. To address this gap, we sought to determine cardiology fellows' preparedness and interest in professional development and leadership training by conducting a

Abstract

Introduction: The Accreditation Council for Graduate Medical Education provides a standardized framework for cardiovascular disease fellowship training but competencies in professional and leadership development lack defined milestones. As cardiology practice grows more complex, fellows must be equipped with clinical skills and the ability to lead, communicate, and navigate diverse practice environments. To evaluate cardiology fellows' perceived preparedness in professional and leadership domains and to identify an unmet education need to inform development of a structured training curriculum. **Methods:** A multi-institutional survey to assess cardiology fellows' preparedness and interest in professional and leadership development was conducted in June 2025. A 27-question needs assessment was distributed during the University of Minnesota Critical Care Education Summit to Fellows from 59 U.S. training programs. Fellows-in-training were eligible to apply to the conference and their application was compressively reviewed by the planning committee to grant acceptance or denial. **Results:** Of the 110 attendees, 49 cardiovascular fellows completed the survey. 38.8% reported their programs had not adequately prepared them for leadership roles, while 93.9% expressed interest in additional structured professional and leadership training. Top-requested topics included job search and contract negotiation, practice environment differences, and academic promotion. **Discussion:** This first multi-institutional needs assessment reveals a significant gap in professional and leadership preparation among cardiology fellows. A structured, longitudinal three-year curriculum incorporating foundational, professional identity, and transition-to-practice themes could provide a flexible framework for programs nationwide. Integrating such education in CVD training may enhance fellows' readiness for independent practice and leadership in evolving health care environments.

Keywords: Leadership training; Professional development; Cardiovascular disease fellowship Training; Curriculum development; Career readiness.

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multi-institutional needs assessment that was accessible during this educational summit.

Methods

An initial pilot program evaluating professionalism and leadership needs was conducted at Vanderbilt University Medical Center, with results previously published [5]. Building upon this, we expanded the survey to a multi-institutional audience. The same 27-question needs assessment included dichotomous (yes/no) and 5-point Likert-type scale questions (1=low likelihood, 3=neutral, 5=highest likelihood) was distributed at the University of Minnesota Critical Care Education Summit in June 2025, which included fellows from multiple cardiovascular training programs across the United States. Fellows-in-training were required to apply via a centralized online application, which was reviewed by core faculty of the educational summit, after review of all applications a maximum number of fellows (due to limited space) were invited to attend the conference.

The survey assessed: 1) Interest in predefined professional development and leadership topics and 2) self-perceived preparedness in professional and leadership skills. No institutional review board approval was required due to voluntary participation and anonymity of participants.

Results

Of the 110 trainees in attendance of the Critical Care Cardiology Education Summit (CCCES) from 59 different institutions - the majority being traditional academic medical centers, across 23 different U.S States and District of Columbia - 49 (44%) completed the survey. The goal CCCES is to combine small group exercises, hands-on procedural skills practice, and detailed discussions in the form of lectures on topics not only pertinent but routinely encountered in the cardiac intensive care unit. Fellows represented a broad cross-section of training environments and post-graduate year standing (Figure 1). 38.8% (n=19) of the fellows reported their programs had not adequately prepared them to be effective leaders in cardiology (Figure 2). The term “effective leaders” was not formally defined in the survey and was left to respondents’ interpretation to capture individual perceptions based on their individual experiences and implicit frameworks of leadership within cardiology. 93.9% (n=46) of the fellows expressed strong interest in additional professional development and leadership

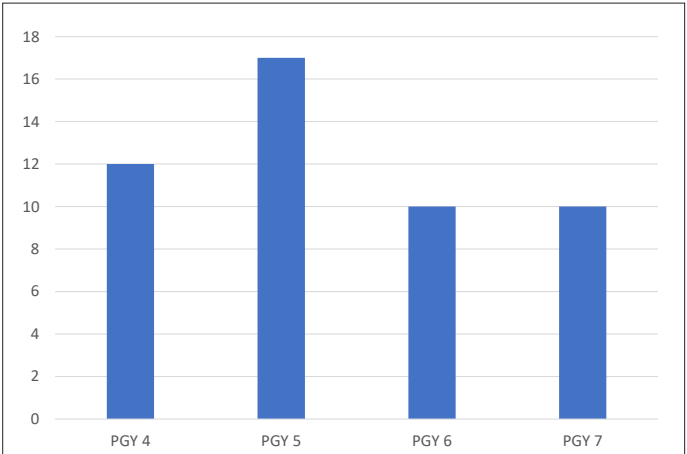


Figure 1: Respondents by training year.

training lectures or structured opportunities (Figure 3). The most requested topic in the multi-institutional cohort was job search and contract negotiation, mirroring the results from the Vanderbilt pilot study [5]. Other high-interest areas included practice environment (private, academic, community), and promotions/academic achievement (Figure 4). Fellows in both single center and national cohorts rated psychological safety and wellness/resilience lower compared to other topics.

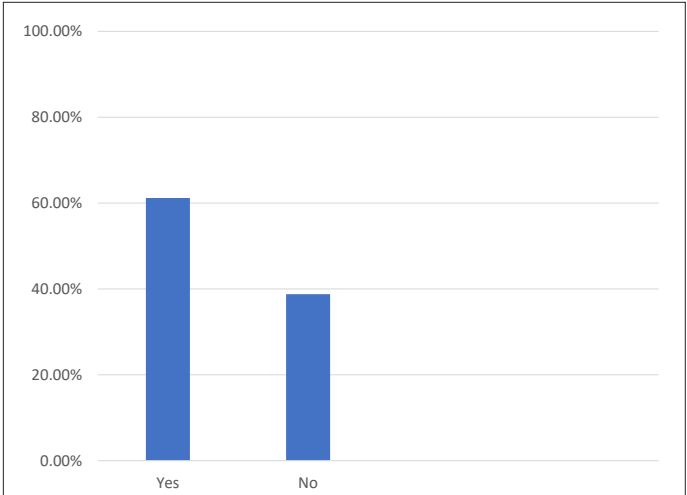


Figure 2: Percent response of fellows regarding readiness in professionalism and leadership.

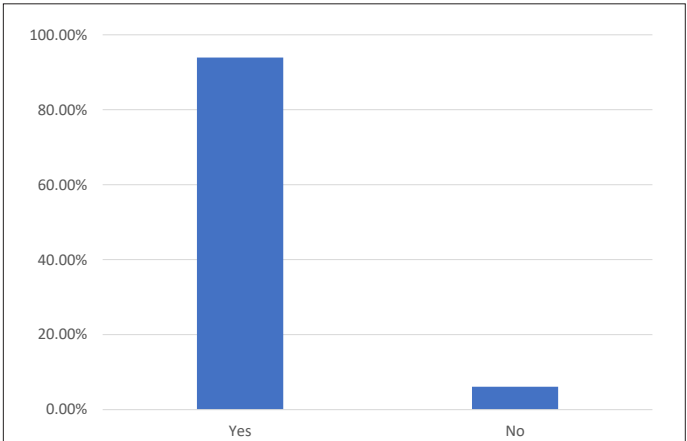


Figure 3: Interest as percentage in additional professional development.



Figure 4: Average interest in lecture topics.

Table 1: Road-map for curriculum design.

Year	Learning topics	Learning activities	Mapped ACGME competencies
1	Wellness and resilience Psychological safety Ethics Conflict resolution Team building Time management	Didactics, small-group workshops, reflective exercises, peer discussions	PROF: wellness, ethics ICS: team building, conflict resolution SBP: psychological safety
2	Professional identity Career goal setting Communication styles Difficult conversations Giving and receiving feedback Public speaking/presentations	Case-based discussions, mentorship pairing, simulation-based feedback sessions, presentation practice, workshops	PROF: professional identity, leadership ICS: feedback, presentations PBLI: feedback incorporation SBP: career/goal alignment
3	Job search & contract negotiation Practice environments (private, academic, community) Promotions & academic achievement Financial literacy Change management Motivating others	Panel discussions, mock contract reviews, workshops, career panels, workshops	SBP: practice environments, financial literacy PROF: career advancement, academic achievement ICS: negotiation PBLI: self-directed career planning

Discussion

This study provides the first multi-institutional assessment of cardiology fellows' perceived needs in professional development and leadership training and identifies a substantial gap in structured curricular offerings within cardiovascular disease fellowships. Nearly 40% of fellows reported feeling underprepared to assume leadership roles, while more than 90% expressed interest in additional professional development opportunities. While fellows' top areas of interests (job negotiation, practice environments, and academic advancement) primarily reflect preparation for the transition to independent practice rather than formal leadership roles, this apparent discordance may highlight an important conceptual gap. Specifically, fellows may perceive leadership as encompassing skills necessary for early career success, including navigating employment structures and academic progression, rather than traditional leadership domains such as team management, organizational strategy, or administrative responsibilities. This suggests that current training may not clearly delineate or explicitly teach leadership competencies, contributing to both the reported sense of under preparedness and the prioritization of career-oriented topics.

An important and somewhat paradoxical finding of this study is the relatively lower prioritization of wellness, psychological safety, ethics, and feedback by fellows, despite increasing recognition of their importance [8]. This discrepancy likely reflects a combination of competing clinical demands, fellows' focus on near-term career transitions, and the perception that these topics have been adequately addressed earlier in training through evolving ACGME requirements. It may also suggest the benefits of wellness and psychological safety initiatives are more apparent with increased professional experiences.

Notably, unlike procedural and clinical training, professional development and leadership education lack a standardized framework analogous to COCATS, leaving individual programs to independently determine scope, content, and timing. This variability risks inconsistent preparation of trainees for the professional responsibilities of independent practice. Our findings mirror broader graduate medical education literature demonstrating that insufficient leadership and professional

training can impair career readiness, contribute to burnout, and limit physicians' ability to positively influence health systems and team performance [4]. Together, these data support the need for a more deliberate and structured approach to professional development within cardiology training.

In response to this identified gap, and informed by both our multi-institutional needs assessment and pilot program experience, we propose a three-year longitudinal professional development and leadership curriculum (Table 1). Rather than focusing narrowly on an individual topic ranking, the curriculum was intentionally designed to be comprehensive and explicitly mapped to ACGME competencies. The needs assessment was used to identify broad domains of importance, which were then organized thematically to allow for progressive development across training years. This thematic structure enables inclusion of multiple high-value topics within each domain while maintain clear alignment with ACGME competencies in professionalism, interpersonal and communication skills, systems-based practice, and practice-based learning and improvement. Importantly, topics were not excluded solely based on relative importance ratings but instead, the framework prioritizes curricular coherence, feasibility, and coverage of essential competencies felt to be critical for successful transition to independent practice.

The proposed curriculum is designed to be flexible and longitudinal, allowing fellows to enter at any point and complete the full curriculum over the course of the standard three-year cardiovascular disease fellowship. Consistent with previously published educational models emphasizing staged leadership development and professional identity formation [6,7], the curriculum follows a spiral learning approach. The first year focuses on foundational knowledge and skills, including ethics, wellness, team building, and psychological safety. The second year emphasizes professional identity development, career goal setting, feedback, and advanced communication skills. The third-year concentrates on transition-to-practice topics such as job negotiation, practice, environments, academic advancement, financial literacy, and leadership skills. Early exposure to foundational concepts is reinforced through progressive layering of skills, culminating in readiness for independent

practice. These topics may be delivered longitudinally through existing didactic conferences, workshops, or dedicated retreats, allowing adaptation to local program structures.

This has several strengths. First, it highlights a significant unmet need in cardiology fellowship training, demonstrates consistency between single-center pilot data and multi-institutional findings. Second, it proposes a scalable, competency-aligned framework that balances standardization with program level flexibility. Third, unlike procedural training, professional/leadership training lacks standardization, but a nationally endorsed framework could align with ACGME principles.

However, several limitations of our manuscript should be acknowledged. First, the survey was administered to a specific group of fellows attending an educational conference focused on critical care, which could impact generalizability of the findings. Second, there was only a 44% response rate to the survey, which could also impact generalizability given fellows interested in leadership may have been more likely to respond. Third, the lack of standardized definitions (i.e. 'effective leadership') may have introduced variability in responses, as participants likely applied individual frameworks based on person and professional experiences. Despite these limitations, the proposed curriculum is adaptable and may be tailored to meet the unique needs and resources of individual training programs.

Ultimately, preparing cardiology fellows for independent practice requires not only clinical expertise but also the professional and leadership skills necessary to navigate complex health systems, lead teams, and sustain long-term career satisfaction. Future directions of this work include conducting a broader survey nationally, implementation studies across multiple fellowship sites to assess feasibility of the proposed curriculum, evaluation of fellows' self-reported improvement, as well as evaluation of skill acquisition and career outcomes among fellows exposed to structured professionalism and leadership training.

Conclusion

These multi-institutional needs assessment highlights a major gap in preparing fellows for the non-clinical dimensions of practice. Fellows overwhelmingly desire more structured learning opportunities, particularly in job negotiations, practice environments, and academic advancement. A flexible, three-year curriculum, adaptable to diverse programs, offers a roadmap to fill this gap. By embracing professional and leadership development as core elements of fellowship training, we can better prepare future cardiologists to succeed not only as clinicians but also as innovators and leaders.

Declarations

Acknowledgement: None to declare.

Declaration of interest statement: None to declare.

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