Developing Physician-Leaders: A Critical Review of Leadership Education in Undergraduate Primary Care Training

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Background

- Primary care physicians routinely lead beyond the traditional physician–patient interaction. These responsibilities include coordinating interprofessional teams, navigating health systems, improving care delivery, stewarding resources, teaching, and advocating for patients and communities.[1] Engaged leadership is a recognized feature of high-performing primary care, and the specialty's integrative role in matching patient needs with health-system resources makes frontline leadership intrinsic to the work rather than an added responsibility.[1,2]
- Much of this leadership is non-positional. Physicians who demonstrate character can "stand out as leaders regardless of their career stage" and "need not be in a positional leadership role."[3] Since COVID-19, managerial and leadership demands have become increasingly difficult to avoid even for physicians who never sought formal leadership roles.[4] Leadership development should therefore reach all medical students, not only a select few.
- Yet graduates report feeling only partially prepared and often conceptualize leadership in hierarchical, positional terms.[5] Expecting accomplished clinicians to simply "learn on the job" perpetuates accidental administration rather than deliberate, competency-based preparation.



Fig 1. Frontline physician leadership extends beyond formal, positional roles into everyday clinical, team, systems, and community work.

Objective

To synthesize evidence on physician leadership and management competencies and the educational methods used to develop them, and to assess how well this evidence has been translated into undergraduate, primary-care-specific training.

Methods

- A critical evidence-based review was conducted to synthesize literature on leadership and management education relevant to undergraduate primary care training. Ovid MEDLINE was searched using three intersecting concept domains: primary care, leadership/management, and undergraduate medical education. This search yielded 334 English-language records. U.S. setting and relevance to undergraduate medical education were assessed during focused screening. Citation chasing of key systematic and scoping reviews was used to identify additional foundational literature.
- Sources were prioritized when leadership or management development was a substantive educational focus, including studies describing competencies, curricula, experiential learning, coaching or mentoring, systems/change leadership, practice management, or evaluation of leadership-development outcomes. Sources that discussed undergraduate medical education were prioritized for the project, although additional literature considering the merit of leadership preparedness and leadership qualities were identified.

Results

1. **Leadership can be deliberately developed, and can start in medical school.**
Leadership development is repeatedly framed as teachable throughout medical training, and student perceptions of leadership do not differ meaningfully between first- and final-year students. This supports the case that leadership education need not be postponed to residency or formal responsibilities. Practical frameworks describe integrating leadership longitudinally into existing UME structures rather than as isolated sessions.[6]

2. **Published U.S. UME leadership curricula are heterogeneous.**
Several published curricula were identified in a U.S. UME scoping review by Matsas et al., 2022.[7] Evaluation strength is a recurring limitation among these programs. An earlier systematic review scored curricula at a median effectiveness of 1.5/4 and median quality of evidence of 2/5, with most studies showing no change in behavior or quantifiable outcomes.[8] Published curricula favor experiential learning, but access, duration, competency alignment, and evaluation remain inconsistent (figure 2).

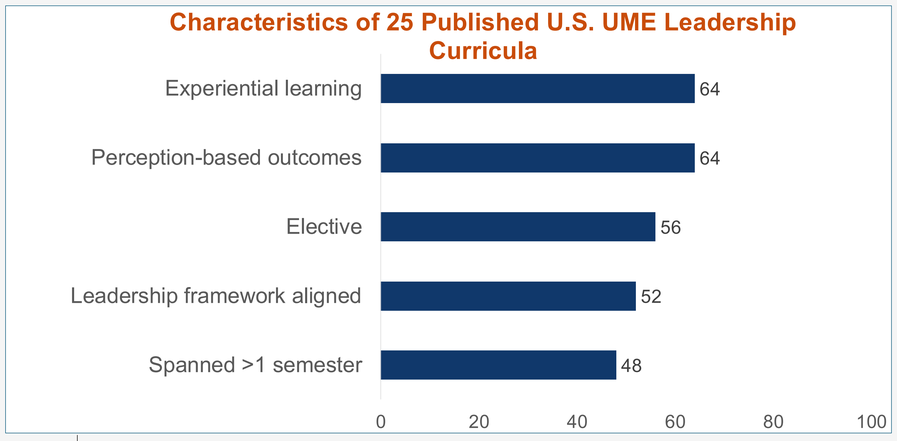


Fig 2. Selected characteristics of 25 published U.S. undergraduate medical leadership curricula. Categories are not mutually exclusive. Source: Matsas et al., 2022.

3. **Primary-care programs emphasize interpersonal leadership more consistently than systems-facing leadership.**
The Medical Leadership Competency Framework (MLCF) is a five-domain framework developed in the UK to describe physician leadership capabilities and was used by Matsas et al. (2022) to categorize U.S. UME leadership curricula.[7,9] Several verified primary-care-oriented programs were mapped across the five MLCF domains and by the deepest outcomes reported by their authors. Figure 3 illustrates how explicitly each domain was represented within these curricula and the depth of reported evaluation.

Competency Coverage in Identified U.S. Primary-Care-Oriented UME Programs

Program	Personal Qualities	Working With Others	Managing Services	Improving Services	Setting Direction
Brown PC–PM	◐	●	◐	●	◐
Duke PCLT	◐	●	○	●	◐
UIC UMed	●	●	○	◐	◐
NYU GLISOM	◐	◐	◐	◐	◐
Keck PCP	◐	●	○	◐	◐
VCU I²CRP	●	●	○	◐	●

Legend
● Explicit
◐ Partial/implicit
○ Not described

Fig 3. MLCF domain coverage in identified U.S. primary-care-oriented undergraduate programs. Coding represents critical review synthesis by a single reviewer based on published program description aims.

4. **Primary-care-specific UME leadership models are feasible, but the evidence remains limited and institution-specific**
Several longitudinal U.S. programs demonstrate that leadership development can be integrated into undergraduate primary-care training, including Brown PC–PM, Duke PCLT, UIC Urban Medicine, NYU GLISOM, Keck PCP, and VCU I²CRP.[10-15] These programs combine elements such as community engagement, longitudinal clinical experiences, quality improvement, population health, advocacy, health-systems education, and leadership development. However, the evidence remains institution-specific and heterogeneous. Reported outcomes frequently focus on learner attitudes, self-report, career choice, or residency destination rather than observed leadership behavior in practice or organizational outcomes.

	UME	Residency/Practice
Broad physician leadership	Growing evidence	Established literature
Primary-care-specific leadership	**SPARSE**	More developed

Fig 4. Distribution of physician leadership literature across learner stage and primary-care specificity.

Implications

The evidence suggests that stronger undergraduate leadership education should be:

- **Competency-based:** Define what students should be able to do as frontline physician-leaders, including systems-facing capabilities.
- **Accessible:** Leadership development should extend beyond self-selected students and elective tracks.
- **Experience-based:** Students need authentic responsibility, projects, feedback, coaching, and meaningful clinical and community engagement.
- **Longitudinal:** Leadership capabilities should develop progressively across training rather than through isolated sessions.
- **Meaningfully evaluated:** Assessment should move beyond satisfaction and self-perception toward observed behavior, transfer to practice, and meaningful organizational outcomes.

Why this matters:

- Higher supervisor leadership scores are associated with lower physician burnout.[16]
- Local leadership behavior is strongly associated with physician satisfaction.[17]
- Physicians who rate their leaders most favorably report markedly lower burnout and intent to leave than those rating leaders least favorably.[18]
- Stronger local leadership is associated with a more favorable patient-care climate.[19]

PROPOSED APPROACH:

A needs-driven approach may better align leadership education with the responsibilities physicians actually encounter in frontline practice.

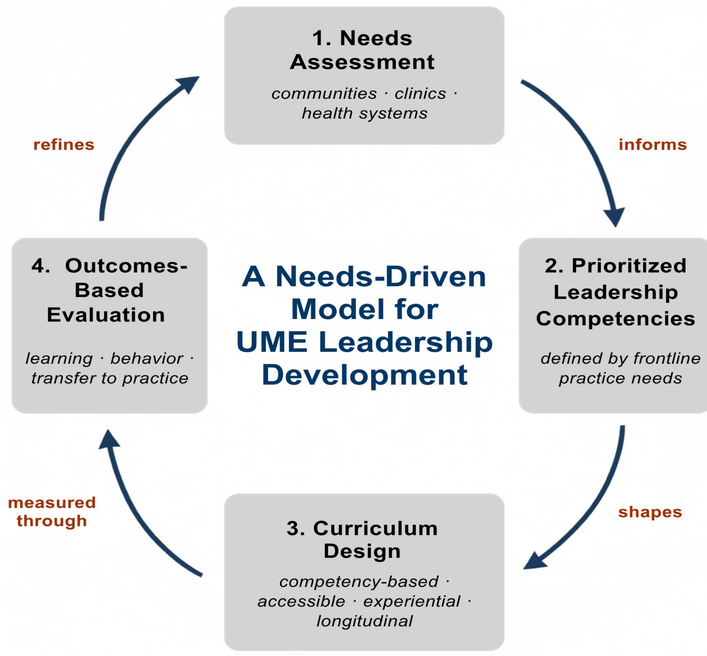


Fig 5. Proposed needs-driven model for undergraduate medical leadership development. Author synthesis.

Conclusion

Leadership development is teachable and associated with physician well-being, retention, and safety, yet U.S. undergraduate curricula remain heterogeneous in accessibility, structure, competency alignment, and evaluation. Primary-care-oriented programs demonstrate feasibility, but systems-based and frontline competencies remain less consistently emphasized. Broader translation may require curricula aligned with needs-based leadership assessments and thorough program evaluation.

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