

Article

Are We Talking About the Same Thing? US Medical Student Definitions of Value-Based Care

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Abstract

Wasteful care is a prevalent, costly problem in the United States. Medical schools are addressing this by teaching about value-based care. However, students still struggle with the application of this concept. We hypothesized that this struggle may be due to students' uncertainty about how to define value-based care. In this article, we evaluated a novel, interactive, value-based care session for first-year medical students and assessed students' abilities to define value-based care pre- and post-session. Our curricular session introduced first-year medical students to value-based care principles and included both a lecture and small-group role-play exercise focused on value-based decision-making. Students completed pre- and post-session surveys that assessed how they defined value-based care, from which we identified 11 unique themes. Following the session, students provided more complete definitions. Early instruction using peer-led sessions, application through role-play, and assessment through open-ended responses were associated with improved student ability to conceptualize and define value-based care. Improved definitional clarity may allow students to better apply value-based principles to their clinical practice. However, further research is needed to assess how the ability to conceptualize this concept translates to clinical application.

Keywords: quality education; medical education; evidence-based medicine; value-based care; high-value care



Academic Editor: Branko Aleksic

Received: 1 May 2026

Revised: 2 July 2026

Accepted: 2 July 2026

Published: 13 July 2026

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1. Introduction

Health care overuse is a costly, intractable problem in the United States [1–3]. An estimated 25% of U.S. medical spending is wasteful [4], and unnecessary medical services cause physical, financial, and psychological harm to patients [5]. Medical students and trainees participate in low-value practices—such as wasteful ordering—contributing to this ongoing problem [6,7]. When uncorrected, students and trainees continue practicing low-value care throughout their careers, perpetuating healthcare overuse [8,9].

Value-based care aims to optimize patient outcomes relative to the cost of care, emphasizing the delivery of high-quality, patient-centered care while minimizing unnecessary and potentially harmful interventions. Among the many reasons trainees may struggle to apply value-based care clinically is incomplete conceptualization and misunderstanding of what

practicing high-value care entails. Without a coherent conceptual framework, students may struggle to integrate these principles into clinical reasoning [10–12].

Recent efforts to integrate value-based care into undergraduate medical education have included didactic sessions, case-based learning, and Choosing Wisely informed curricula. However, these approaches often focus on knowledge acquisition or clinical decision-making without explicitly assessing how students conceptualize value-based care. As a result, little is known about how students define and interpret this concept [13–19].

This study evaluated how first-year medical students conceptualize value-based care and whether a structured, peer-led session incorporating role-play and open-ended assessment improves students' ability to define and integrate key components of value in clinical practice.

2. Materials and Methods

This cross-sectional, single-arm, pre-post study evaluated first-year medical students' ability to conceptualize high-value care before and after a novel curricular intervention implemented in March 2023 as part of the first-year curriculum at the Frank H. Netter MD School of Medicine at Quinnipiac University. The novel curricular intervention was delivered as a two-hour, peer-led session that consisted of a one-hour lecture on value-based care concepts, directly followed by a one-hour small-group role-play and reflection session.

Given that peer-led teaching has been shown to improve student knowledge, retention, motivation, and engagement in complex topics [20–22], four first-year medical students trained in high-value care through the national Students and Trainees Advocating for Resource Stewardship (STARS) program served as peer leaders for the session, facilitating the didactic and reflection portions alongside experienced faculty. Prior to the session, two of the four peer leaders and all facilitating faculty attended a one-hour facilitator training led by the course director, during which curricular session content and facilitation strategies were reviewed. The two peer leaders who were unable to attend the training were briefed before the curricular intervention.

In addition to the facilitator training, all faculty facilitators and peer leaders were provided with a facilitator guide to promote consistency of session delivery across classrooms. In the months preceding implementation, peer leaders contributed to session development, providing faculty with recommendations to enhance student engagement. For example, peer leaders designed the session's role-play and reflection component, which fostered active learning, collaboration, and communication skills necessary to understand and apply value-based care principles [18,23,24].

The lecture component of the session aimed to clearly introduce students to the concept of value-based care prior to application of the concept via a small group, patient-provider role-play exercise. In the lecture, students were taught the Dell Medical School at the University of Texas at Austin's definition of high-value care: "care that optimizes the ratio of outcomes that matter to patients to the total costs of care" [25]. The Choosing Wisely campaign, professional society guidelines, and communication strategies for discussing value with patients and colleagues were also introduced [26,27]. The subsequent small-group role-play allowed students to simulate patient-provider discussions of value using provided clinical scenarios and instructions. For the role-play component, students were divided into four classrooms, each with one peer leader supervised by a faculty facilitator. Within each classroom, students were further divided into four small groups of approximately six students. All students received a clinical scenario packet containing four role-play scenarios. Each scenario was based on one of the following Choosing Wisely guidelines:

- (1) Avoid prescribing antibiotics for uncomplicated upper respiratory infections [27]
- (2) Do not order imaging for uncomplicated headaches [28]

- (3) Avoid annual ECGs for low-risk patients without symptoms [29]
- (4) Do not perform population-based screening for Vitamin D deficiency [30,31]

Each group of six students participated in two of the four clinical role-play scenarios before faculty facilitators and peer leaders engaged students in large group reflection within each classroom. Peer-leaders and faculty facilitators ensured that each of the four role-plays were performed by at least two small groups in each room to provide all students with the opportunity to learn from and reflect on all four scenarios. During this group reflection, students shared the scenario, guideline, and outcome of their role-play, including how the students felt while engaging in the mock discussion, what went well, and what they might do differently in future discussions of value with patients and colleagues.

All first-year medical students who attended the curricular session were eligible to participate in identical pre-session and post-session surveys, which included an open-ended question asking them to define value-based care [32]. Students were given ten minutes at the start of the lecture portion of the session to complete the pre-survey and ten minutes at the end of the role-play session to complete the post-survey. The pre-survey closed once the lecture began, whereas the post-survey remained open for one week following the session.

To analyze the definitions of value-based care provided by students in the pre-session and post-session surveys, we employed a mixed methods approach that included both qualitative content analysis and quantitative counting.

In the qualitative analysis, students' conceptualizations of value-based care were evaluated via inductive content analysis to identify themes in provided definitions. Two authors (EK and KLM) reviewed and coded responses [33,34].

After identifying the 11 unique themes present across all student-provided definitions of value-based care, quantitative counting was performed by converting each identified theme into a binary variable (present versus absent), allowing comparison of the proportion of pre- and post-session responses containing each theme. The two primary coders (EK and KLM) independently revisited each response to determine the presence or absence of each theme. Multiple themes could be coded to responses if applicable. Discrepancies in the presence versus absence of a theme were reconciled by a third author (AMM). Differences in proportions of coded themes were compared using either chi-square or Fisher's exact tests, as appropriate.

To promote student participation and emphasize that survey participation had no impact on student academic standing, surveys were anonymous and did not ask for any student identifiers. As a result, individual pre- and post-session responses could not be paired, and pre- and post-session groups were treated as independent samples for statistical analyses.

Data management was performed using Microsoft Excel, and all statistical analyses were conducted using the latest version of R (R Foundation for Statistical Computing, Vienna, Austria).

3. Results

Out of the 89 students who attended the session, 85 students (95.5%) completed the pre-session survey, and 71 students (79.8%) completed the post-session survey. Analysis of the survey responses identified 11 unique themes within student definitions of value-based care (Table 1) [35].

In the pre-session survey, 32 students (37.6%) recognized achieving optimal patient outcomes as value-based care; 27 students (31.8%) referenced patients' and physicians' beliefs and values; 17 students (20.0%) focused on minimizing costs of care, with 7 students (8.2%) considering monetary costs only; and 12 students (14.1%) described a patient-first approach to decision-making. Only 12 students (14.1%) included a balance of both costs

and outcomes in their pre-session definitions, and 16 students (18.8%) reported being unsure of how to define value-based care (Table 2).

Table 1. Themes Identified in Student Definitions of Value-Based Care.

Domain	Theme	Description
Cost	Costs	Students considered financial and non-financial costs, including time, resources, and emotional burden.
	Monetary Costs Only	Students considered only direct financial costs of care.
Core Concepts	Outcomes	Students focused on achieving the best possible outcomes for patients.
	Costs & Outcomes Integration	Students defined value as balancing costs with outcomes meaningful to patients.
Application	Mindful Ordering	Students described thoughtful ordering practices considering necessity and evidence.
	Quality vs. Quantity	Students emphasized fewer, higher-quality interventions rather than unnecessary volume.
	Patient-First Mentality	Students described tailoring care to individual patient goals.
	Evidence-Based Medicine	Students referenced using data and clinical evidence.
	Shared Decision Making	Students described collaborative decision-making with patients.
	Compensation Models	Students referenced billing, payment, or reimbursement models.
Conceptual	Beliefs & Values	Students emphasized aligning care with patient preferences.
	Unsure	Students explicitly stated uncertainty or lack of understanding.

Themes were identified using inductive content analysis of student definitions.

Table 2. Changes in Medical Student Definitions of Value-Based Care Following Instruction.

Theme	Pre (n = 85)	Post (n = 71)	Absolute Change (%)	p-Value
Costs & Outcomes	12 (14.1%)	62 (87.3%)	+73.2%	<0.001
Costs	17 (20.0%)	41 (57.7%)	+37.7%	<0.001
Outcomes	32 (37.6%)	48 (67.6%)	+30.0%	<0.001
Mindful Ordering	8 (9.4%)	18 (25.4%)	+15.9%	0.014
Quality vs. Quantity	8 (9.4%)	13 (18.3%)	+8.9%	0.166
Patient First	12 (14.1%)	12 (16.9%)	+2.8%	0.797
Evidence-Based Medicine	7 (8.2%)	7 (9.9%)	+1.6%	0.943
Shared Decision-Making	6 (7.1%)	4 (5.6%)	−1.4%	0.973
Compensation Models	4 (4.7%)	0 (0.0%)	−4.7%	0.126
Monetary Costs Only	7 (8.2%)	1 (1.4%)	−6.8%	0.072
Unsure	16 (18.8%)	1 (1.4%)	−17.4%	<0.001
Beliefs & Values	27 (31.8%)	9 (12.7%)	−19.1%	0.009

p-values calculated using chi-square or Fisher's exact tests. p-values are unadjusted. Given the exploratory nature of thematic analyses, results should be interpreted in the context of multiple comparisons.

In the post-session survey, 62 students (87.3%) included both cost and outcome considerations in their definitions, compared to 12 students (14.1%) pre-session ($p < 0.001$) (Table 2). The number of students who included cost considerations also increased, from 17 students (20.0%) pre-session to 41 students (57.7%) post-session ($p < 0.001$). Moreover, the number of students who mentioned patient outcomes increased from 32 students (37.6%) to

48 students (67.6%) ($p < 0.001$). The proportion of definitions that considered only monetary costs rather than costs of care more broadly (e.g., time, resources, and emotional burden) decreased from 7 students (8.2%) pre-session to 1 student (1.4%) post-session, though this change was not statistically significant.

The proportion of students who included mindful ordering in their definitions of value-based care also increased from 8 students (9.4%) pre-session to 18 students (25.4%) post-session ($p < 0.014$). Similarly, the proportion of students who weighed quality over quantity in their definitions increased from 8 students (9.4%) to 13 students (18.3%). However, this change was not statistically significant. Responses reflecting uncertainty in defining value-based care decreased from 16 students (18.8%) pre-session to 1 student (1.4%) post-session ($p < 0.001$).

Overall, students' post-session definitions more closely reflected the conceptualization of value-based care presented during the didactic session, describing it as the optimization of patient-centered outcomes relative to the total costs of care, as illustrated by the following examples:

"[Value-based care is] a balance between improving outcomes for patients while also keeping treatment/intervention costs down." (Student 13)

"The idea is that you want to maximize outcomes for patients while driving down all costs to the patient, both financially, emotionally, and time-wise" (Student 9)

"Minimizing cost, whether that be financial or other resources while maximizing the output for the patients to give them the best care that they deserve" (Student 70)

4. Discussion

In this study, most first-year medical students attempted to provide a definition of value-based care prior to an educational session on the topic, but few provided a complete and accurate definition.

Pre-session definitions frequently conflated value-based care with patient-centered care or reflected a fragmented understanding of cost and outcome considerations [36]. Additionally, many students identified either costs or outcomes as an important part of value-based care in their pre-session definitions but did not explicitly recognize the importance of finding balance between costs and outcomes, suggesting that students had a fragmented understanding of value-based care.

Post-session, most students provided a more complete definition of value-based care with a greater proportion of students emphasizing the balance between outcomes that matter to patients with the costs of care and recognizing that costs of tests and treatments extend beyond financial burden and include time, resource, social, and emotional burdens. Overall, students' post-session definitions of value-based care reflected a more comprehensive understanding of the topic.

Accurate conceptualization of high-value care principles is meaningful in early medical education, as students must understand value to apply value principles to clinical practice [37]. Although most students could not accurately and completely define value-based care pre-session, we found that our short lecture, peer-led teaching, and role-play intervention positively impacted students' abilities to define value-based care immediately following the curricular intervention. These findings suggest that early exposure to value-based care concepts in preclinical curricula may improve first-year medical students' short-term conceptualization of value. The broader goal of early intervention is to lay the foundation of value-based knowledge prior to engaging in clinical practice, allowing value-based principles to become embedded within trainees' developing clinical reasoning and decision-making processes.

5. Conclusions

First-year medical students often lack a clear conceptualization of value-based care and struggle to provide a comprehensive, standardized definition of value. We found that the use of peer-led sessions, role-play scenarios, and assessment through open-ended responses improved medical students' abilities to identify and conceptualize the components of value-based care. This may in turn translate to improved readiness to apply value-based care in clinical scenarios, though this warrants longitudinal study. Future development of high-value care curricula in medical schools should incorporate peer-to-peer learning and role-play strategies to enhance comprehension.

6. Limitations

This study has several limitations. First, demographic data were not collected, limiting the ability to describe the study population or assess differences across learner characteristics. In addition, the intervention was conducted at a single institution among first-year medical students, which may limit generalizability to other institutions, educational settings, or levels of training.

Similarly, this single-arm, pre-post study design did not include a control group and is therefore somewhat limited in its ability to establish causality. Although changes in students' conceptualization of value-based care were observed immediately following the session, these changes may have been influenced by factors other than the curricular intervention itself. Additionally, student understanding of value-based care was assessed immediately following the intervention without longitudinal follow-up, limiting evaluation of knowledge retention over time.

Pre- and post-session responses were collected anonymously and analyzed in an unpaired fashion, precluding assessment of within-student change. Nonresponse bias may also have influenced the findings, for although 89 students attended the session, only 96% completed the pre-survey and 80% completed the post-survey. Similarly, this drop-in response rate from pre-session survey to the post-session survey introduces the possibility of attrition bias, and differences between respondents at each time point could influence observed changes.

This study was also limited in that the primary outcome evaluated students' ability to define value-based care rather than their application of value principles to clinical practice. Therefore, the impact of the intervention on clinical behaviors and patient outcomes was not directly assessed.

Author Contributions: Under the supervision of R.A., K.L.M. and E.K. served as co-first authors, contributing equally to the conceptualization and design of this study, as well as to writing the original manuscript. K.L.M., E.K., A.M.M., B.L.R. and R.A. contributed to the development of session materials and data collection. K.L.M., E.K., A.M.M., S.G. and J.R. conducted data curation and analysis. All authors critically revised the manuscript for important intellectual content. All authors have read and agreed to the published version of the manuscript.

Funding: The authors did not receive funding to complete this work.

Institutional Review Board Statement: The Frank H. Netter MD School of Medicine institutional review board approved this project under exemption from federal regulations on 28 April 2023 (protocol #07923). It satisfies the criteria for category 1 exemption: research conducted in an established educational setting involving normal educational practices (45 CFR 46.104).

Informed Consent Statement: The Frank H. Netter MD School of Medicine institutional review board deemed this project exempt from informed consent policies and full review on the basis of data collection occurring during normal educational activities that were not likely to negatively impact students' learning opportunities.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author, Elina Kurkurina, upon reasonable request.

Acknowledgments: This work was completed as part of the national STARS program, directed by the non-profit Costs of Care. We thank Katherine McLeod, for her leadership in implementing this initiative as part of the Scholarly Research Concentration and Capstone course at the Frank H. Netter MD School of Medicine at Quinnipiac University and Ingrid Philibert, for her thoughtful feedback on this manuscript.

Conflicts of Interest: Rahul Anand reports previous stock ownership in Paratek Pharmaceuticals outside of this work.

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