The Journal of Education in Perioperative Medicine

Original Research

Brief Report – The Current State of Biomedical Ethics Education Among Anesthesiology Training Programs: *A Call to Arms*

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Introduction

The Accreditation Council for Graduate Medical Education (ACGME) formally recognizes professionalism as an essential component of physician training, having identified it as 1 of the 6 Core Competencies for all physicians.[1] As a part of this competency, physicians are expected to display expertise in professional conduct, which includes following principles of biomedical ethics through interactions with patients, colleagues, and society at large.[1] Although the development of ethics-based practice begins early in medical school, it must mature and evolve throughout residency with the introduction of specialty-specific considerations.[2]

Just as anesthesiologists must be competent at diagnosis and treatment of clinical conditions, they must also be comfortable with recognition and management of ethical conflicts.[1] In a methodical fashion similar to that of interpreting an electrocardiogram or arterial blood gas, a structured approach to ethical dilemmas can be successfully taught.[3] In fact, incorporating a formal biomedical ethics curriculum into medical school and residency training has been shown to increase comfort in practicing clinical ethics, and such training has been shown to significantly increase moral reasoning scores.[4] Additionally, resident physicians who receive this formal training report long-lasting and continued influence on their clinical practices after training.[5]

Concerning the professional development of anesthesiologists, the American Board of Anesthesiology (ABA) now requires that physicians demonstrate competence in the practice of biomedical ethics to receive board certification.[6] Specifically, ethics is covered on the Advanced Examination (Content outline: II.D.4.b), and an ethics-based scenario has been incorporated in the Objective Structured Clinical Examination component of the Applied Exam.[6] Given this new requirement, anesthesiology residency programs must be intentional about preparing residents to recognize and manage ethical dilemmas. Accordingly, to define the current state of biomedical ethics training among anesthesiology residencies in the United States, we performed a needs assessment and gap analysis by surveying program directors (PDs) regarding biomedical ethics training in their programs. We also solicited their views on the structure and content of an optimal ethics curriculum.

Materials and Methods

The Vanderbilt University Medical Center (VUMC) Institutional Review Board reviewed this study and determined eligibility for exempt status. In 2018, a questionnaire was developed to query PDs about the extent of biomedical ethics education within their established anesthesiology programs (Appendix). Questions were designed specifically to evaluate: (1) the relative importance of ethics education for anesthesiology trainees, (2) how well individual programs prepared residents to manage ethical dilemmas upon graduation, and (3) the level of interest in using a standardized biomedical ethics curriculum. The instrument was developed through a modified Delphi technique using published best practices.[7] It was prepiloted and then piloted with 9 academic physicians in departmental leadership positions at VUMC, including a representative from the Center for Biomedical Ethics and Society and 5 former anesthesiology residency PDs from various institutions. It was iteratively revised with each cycle to improve clarity and construct validity. An anonymous, online REDCap survey was then distributed to anesthesiology residency PDs in the United States, with weekly electronic reminders to increase response rate over a 6-week period.

Statistical Analysis

Quantitative data was analyzed using simple descriptive statistics and Student's *t* test. Categorical variables were compared using Fisher exact test. Free text comments were analyzed using conventional qualitative content analysis.[8] Comments were categorized into representative themes, and a coding scheme was established using an inductive, grounded approach.[8]

Results

Of 153 accredited anesthesiology programs in the United States, contact information was identified for 150 PDs. The questionnaire was distributed (n = 150) with a response rate of 53% (n = 79). Respondents' programs had an average of 41 residents, excluding interns. One survey was incomplete and excluded from analysis.

Although 94% of respondents (n = 73) reported that ethics education is important

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for professional development, slightly less than half of respondents (n = 38, 49%) reported specific training on biomedical ethics within their anesthesiology residency programs (Table 1). Of those with a formal curriculum, the average reported duration of ethics education was 3.8 ± 1.6 hours per year (mean ± SD). Only 58% (n = 45) of PDs agreed that their residents were competent at managing biomedical ethical dilemmas upon graduation (Table 1). When asked to identify areas of insufficient training, a majority of PDs identified *Medically Ineffective Care (futility)* (n = 53, 68%) and *Resource Allocation* (n = 43, 55%) as the weakest subsets of biomedical ethics for their residents (Table 2).

An ethics consult service was available at 73%, absent at 18%, and of unknown status at 9% of responding institutions. Most respondents (n = 58, 74%) expressed a desire for additional resources for teaching residents about biomedical ethics. Of 56 reported free text comments, lack of time (71%), experienced faculty (55%), and defined curriculum content (25%) were the most frequently cited barriers to incorporating ethics training into resident didactics. Almost all respondents (n = 65, 83%) would be interested in using a standardized biomedical ethics curriculum if offered by a credible academic society (eg, Society for Education in Anesthesia, Society of Academic Associations of Anesthesiology and Perioperative Medicine [SAAPM], ABA, ACGME, American Society of Anesthesiologists [ASA]). Additionally, most respondents (n = 53, 68%) believe that such a curriculum should be a required part of resident education (Table 1).

Subgroup analysis was performed to determine if any associations were present between the size of the residency program and survey responses. With a median number of residents of 38, the data were divided into 2 groups: (1) 'smaller programs' defined as ≤ 37 residents, and (2) "larger programs" defined as ≥ 39 residents (no programs had exactly 38 residents). Using a Fisher exact test, we found no statistically significant associations between smaller and larger programs, respectively, for the presence of an ethics consult service (64% vs 82%, $P = 0.12$), inclusion of biomedical ethics training in residency curricula (38% vs 59%, $P = 0.11$), or PDs' attitudes toward mandatory ethics training (59% vs 77%, $P = 0.14$). Although the data favored larger programs in each category, the sample size is likely insufficient to detect a meaningful difference.

Additionally, further subgroup analysis was performed to compare survey responses based upon the PD's stance on requiring biomedical ethics education within residency curricula ("Should be a requirement," n = 53; "Should NOT be a requirement," n = 25). The programs, of stances "should" vs "should NOT" respectively, did not statistically differ in regards to the presence of an ethics consult service (77% vs 64%, $P = 0.3$), inclusion of ethics training within their present didactics (57% vs 68%, $P = 0.5$), or the mean number of residents within their programs (43 vs 36, $P = 0.2$).

Discussion

The ABA requires that anesthesiologists demonstrate competence in ethical practice to receive board certification.[6] Accordingly, biomedical ethics education, designed specifically for anesthesiologists, should be an essential element of anesthesiology residency training. Although only half of PDs reported formalized ethics education within their residency curriculum, this represents a 2-fold increase over the past 25 years.[9] The results of our survey indicate that a uniform biomedical ethics curriculum—ideally one with endorsement from an academic anesthesiology society—would be a welcome resource to continue this progressive trend.

Evidence from medical ethics literature suggests that professionalism among faculty is crucial to the development of moral practice among learners.[10] Therefore, to have an enduring impact on residents, academic programs must commit to invest in the professional development of the faculty as well. A majority of PDs surveyed identified the shortage of trained or interested faculty as a key barrier to implementing formal ethics education for their residents.

Our results are limited by the use of survey methodology. As such, the results only estimate the state of ethics education in anesthesiology by self-reported curricular time and PD perceptions of ethics education. Furthermore, this study reflects only half of all residency PDs in the United States. Although our survey was prepiloted and piloted to efficiently optimize data collection, some questions may have been phrased with positive bias. Nevertheless, these data are both encouraging and meaningful, particularly as they relate to educators' interest in improving ethics curricula for anesthesiology. Future studies are warranted to explore how programs are currently incorporating biomedical ethics education in their residents' training. Experiential feedback from PDs at these institutions would be valuable in guiding the development of a widely adaptable ethics curriculum.

As ACGME has emphasized the value of biomedical ethics through the establishment of Core Competencies and Professionalism Milestones,[6] we hope our data will also encourage medical educators in anesthesiology to acknowledge the necessity of providing formal ethics instruction to their residents. The results of our survey can provide a valuable foundation for educators to design and implement a structured ethics curriculum going forward.

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Funding statement: *This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.*

Conflicts of interest: *The authors declare no competing interests.*

Dr. Matthew McEvoy discloses research funding from the GE Foundation, Edwards Lifesciences, and Cheetah Medical, none of which are related to this manuscript.

Dr. Peter Goldstein discloses research funding from the Daedalus Fund for Innovation, which is not related to this manuscript.

Abstract

Background: Anesthesiology presents unique challenges to the discipline of biomedical ethics, as providers must practice ethical principles under high-stress and time-restricted conditions. The American Board of Anesthesiology has recognized the value of ethical competence through incorporation of ethics-based scenarios on the Advanced and Applied Exams. Accordingly, we performed a needs assessment and gap analysis of the current state of biomedical ethics training among anesthesiology residency programs.

Methods: A survey instrument was formed to assess existing ethics curricula and to identify perceived interest and barriers to integrating a formal ethics curriculum into residency training. The survey was distributed online to anesthesiology residency program directors in the United States.

Results: The survey was distributed (N = 150) with a response rate of 53% (n = 79). Half the respondents reported providing formal ethics training in their program, which averaged 3.8 ± 1.6 h/year. Only 58% of respondents agreed that their residents were competent at managing biomedical ethical dilemmas upon graduation. The lack of a preestablished curriculum, knowledgeable faculty, and time were the most cited barriers to providing ethics training. Most respondents expressed interest in using a standardized ethics curriculum if offered by a credible academic society and believed it should be a requirement during training.

Conclusion: Our needs analysis is reflective of considerable interest among anesthesiology program directors to use a uniform biomedical ethics curriculum for trainees, with a majority (n = 53, 68%) endorsing it as a proposed requirement for graduation.

Keywords: Bioethics, ethics, anesthesiology, residency, anesthesia, education

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Appendix

Appendix. *Anesthesiology Biomedical Ethics Curriculum Survey*

Confidential

Anesthesiology Biomedical Ethics Curriculum Survey

Please take 1-2 minutes to complete the short survey below.

Thank you!

Dear Program Director:

Vanderbilt University Medical Center is developing a biomedical ethics curriculum to integrate within our clinical and didactic educational series for anesthesiology residents. We value your input as an educational leader and hope you will help us by participating in this needs assessment.

Does your institution have a biomedical ethics consult team/service available for you or your residents?	◯ Yes ◯ No ◯ I don't know
What is the total number of residents (i.e. CA1+CA2+CA3) in your program?	_____
Does your anesthesiology curriculum include training specifically on biomedical ethics?	◯ Yes ◯ No
In your program, approximately how many curricular hours are devoted to teaching biomedical ethics each year?	_____

Please select one response for each of the following statements:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Biomedical ethics training during residency is important	◯	◯	◯	◯	◯
I believe my residents are competent at managing biomedical ethical dilemmas when they graduate	◯	◯	◯	◯	◯
I wish I had more resources (e.g., grand rounds, trained faculty, online modules) available for teaching my residents about biomedical ethics	◯	◯	◯	◯	◯

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Appendix. *Anesthesiology Biomedical Ethics Curriculum Survey*

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A standardized biomedical ethics curriculum provided by one of our professional societies (e.g., SAAPM, ABA, ACGME, ASA) would be useful to me as program director	○	○	○	○	○

What modality or pedological approach to learning biomedical ethics (i.e. face-face lecture, online module, PBLD, simulation, etc.) do you believe your residents would prefer the most?

_____

Please list any anticipated barriers to including a biomedical ethics curriculum in your residency program (i.e. time, experienced faculty, defined curriculum content)

_____

In your opinion, should a biomedical ethics curriculum be a required part of resident education?

○ Yes
○ No

In your opinion, residents in your program receive INSUFFICIENT training/education on which of the following biomedical ethics topics (select all that apply):

☐ Ethical principles: autonomy, beneficence, non-maleficence, justice
☐ Decision making: informed consent, capacity, surrogacy
☐ Goals of care discussions
☐ End of life issues (withdrawal of care, DNR, DNI)
☐ Medically ineffective care (futility)
☐ Resource allocation, financial conflicts
☐ Conflicts of interest
☐ Biomedical ethics in research
☐ Other (specify below)

Other, please specify:

_____

Any additional comments or feedback?

_____

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Figures

Table 1. *A Brief Summary of PD Responses (n = 78) to Questionnaire*[a]

	Yes	No			
Does your anesthesiology curriculum include training specifically on biomedical ethics?	48 (38)	52 (40)			
In your opinion, should a biomedical ethics curriculum be a required part of resident education?	68 (53)	32 (25)			
	Yes	**I Don't Know**			**No**
Does your institution have a biomedical ethics consult team/ service available for you or your residents?	73 (57)	9 (7)			18 (14)
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Biomedical ethics training during residency is important.	22 (17)	78 (56)	6 (5)	0 (0)	0 (0)
I believe my residents are competent at managing biomedical ethical dilemmas when they graduate.	3 (2)	55 (43)	36 (28)	5 (4)	1 (1)
I wish I had more resources (eg, grand rounds, trained faculty, online modules) available for teaching my residents about biomedical ethics.	26 (20)	49 (38)	22 (17)	3 (2)	1 (1)
A standardized biomedical ethics curriculum provided by one of our professional societies (eg, SAAPM, ABA, ACGME, ASA) would be useful to me as program director.	27 (21)	56 (44)	12 (9)	4 (3)	1 (1)

[a] Responses are reported as % (n).

Table 2. *Insufficient Training Identified by Subset of Biomedical Ethics*[a]

Biomedical Ethics Subsets with Insufficient Training	Percent of PDs (n = 78)
Ethical principles: autonomy, beneficence, nonmaleficence, justice	37 (29)
Decision-making: informed consent, capacity, surrogacy	26 (20)
Goals of care discussions	45 (35)
End of life issues (withdrawal of care, do not resuscitate, do not intubate)	45 (35)
Medically ineffective care (futility)	68 (53)
Resource allocation, financial conflicts	55 (43)
Conflicts of interest	42 (33)
Biomedical ethics in research	32 (25)
Other (specify): "Goals of care discussions with surgeons," n = 1 "What to do if your patient asks if your surgeon is any good and they are not good," n = 1	3 (2)

[a] Responses are reported as % (n).