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The choices we make: Ethical challenges in trauma surgery

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ABSTRACT

Background: Ethical issues in trauma surgery are commonplace but scarcely studied. We aim to characterize the ethical dilemmas trauma surgeons encounter in clinical practice and describe perceptions about the ability to manage these dilemmas and strategies they use to address them.

Methods: Members of a U.S. trauma society were electronically surveyed on handling ethically challenging scenarios. The survey instrument was developed using published ethics literature and iterative cognitive interviews. Domains included perceived frequency of encountering and self-efficacy of managing ethical situations in trauma surgery. Common situations were defined as those encountered monthly or weekly. Ethical problems were categorized within 7 larger categories: general ethics, autonomy, communication, justice, end-of-life, conflict, and other. Descriptive analyses were performed; group comparisons were analyzed using analysis of variance.

Results: Of 1,748 surveyed, 548 responded (30.6%) and 154 (28%) were female. Most were White, under 55 years age, had completed fellowship training, and were practicing at a level I or II trauma center. The most encountered ethical categories were generic ethics and communication (79%). Issues involving conflict were least frequent (21%). Respondents felt most uncomfortable with autonomy topics. Respondents with high self-efficacy in handling ethical situations were older, in practice $\geq$15 years, served on an ethics committee, and/or frequently experienced ethical challenges.

Conclusion: Most trauma surgeons regularly encounter ethical challenges, especially those related to communication. Trauma surgeons encounter ethical issues involving conflict least often, and lowest self-efficacy scores with issues involving autonomy. Experienced trauma surgeons reported higher self-efficacy scores in managing ethical issues. Future work should examine how self-efficacy translates to observed behavior, and how trauma surgeons build and enhance their ethical skillsets in the care of the injured patient.

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Introduction

Surgeons are professionally obligated to observe and maintain high standards of biomedical ethics, while striving for a best patient-centered outcome for their patients. While the ethically responsible practice of surgery includes using the lens of virtue, consequentialist, and care ethics, the 4 standard principles of biomedical ethics are useful for framing our issues. In a principle-based bioethical approach, primary ethical principles include autonomy, beneficence, non-maleficence, and justice, each of which can be operationalized to apply to a wide range of issues in clinical care.[1]

Trauma surgery often necessitates urgent treatment of uncertain benefit in injured patients with unknown wishes, which may result in ethical challenges. For example, upholding autonomy typically requires patient participation in decision making, which may be difficult in a trauma patient who may be unconscious, disoriented, intoxicated, or lacking a state of mind to participate. Similarly, the principles of beneficence, non-maleficence, and justice are also in jeopardy in certain trauma scenarios or settings, such as resuscitative thoracotomy without direct patient benefit but facilitating future organ donation to help other patients.[2,3]

Despite anecdotal evidence that such ethical scenarios arise frequently, literature characterizing ethical issues encountered in actual trauma practice is lacking. Understanding trauma surgeons' strategies and self-efficacy in navigating these situations is also needed. We conducted a national survey of the largest U.S. trauma organization to inform these questions.

Methods

Survey instrument

We developed a survey instrument using published ethics literature in concert with small focus groups comprising trauma surgeons, critical care physicians, biomedical ethicists, and other trauma practitioners. The survey was refined via cognitive interviewing and pilot testing involving practicing trauma surgeons at Vanderbilt University Medical Center. The final survey instrument included a total of 21 clinical scenarios that, by consensus, were deemed familiar to the practice of trauma surgery and represented an underlying ethical dilemma. By consensus, a traditional principle-based framework (eg, autonomy, beneficence, non-maleficence, and justice) for categorization was deemed inaccurate and insufficient. Therefore, again through a multidisciplinary and iterative process using published literature from similar studies in other medical specialties, 7 distinct ethical categories were identified as described in Table I. Once categories were established, each of the 21 clinical scenarios was assigned to 1 category according to the dominant ethical issue they represented as determined by expert consensus and review by 2 separate medical ethicists.

Domains included perceived frequency of encountering and self-efficacy of managing problematic ethical situations in trauma surgery practice. Frequency intervals were listed as weekly, monthly, semi-yearly, yearly, and never; "common" situations were those that respondents encountered monthly or weekly. Self-efficacy was determined by asking participants to characterize their own readiness to effectively manage each scenario on a scale ranging from 1 = "poor" to 5 = "excellent." Eight strategies were listed as possible ways a trauma surgeon may approach an ethical dilemma in their practice. Participants were asked to rate on a scale ranging from 1 = "poor" to 5 = "excellent" the usefulness of these strategies for managing ethically challenging situations generally.

Study population

A Web-accessible survey was sent via electronic mail to all surgeon members of the largest U.S. trauma organization (Eastern Association for the Surgery of Trauma). Reminders to complete the survey were sent up to 2 times, each at 2 weekly intervals. Participants who completed the survey were entered into a lottery to win a $500 gift certificate, which was awarded to a randomly selected individual after the survey was closed. Responses were collected between January 5, 2018, and February 7, 2018. After review of all applicable research material, including the finalized survey instrument and e-mail correspondence procedures, the Vanderbilt University Institutional Review Board deemed this research exempt under 45 C.F.R. §§46.104(d)(2)(ii).

Data analysis

Descriptive analyses of survey data were performed including frequencies for categorical variables and averages for continuous variables. Numerical values were assigned to the scale responses for frequency (weekly = 5, monthly = 4, semi-yearly = 3, yearly = 2, and never = 1) to allow for ranking the scenarios in terms of most to least frequent scenarios encountered in respondents' clinical practice. Using a similar process, a corresponding numerical value for categorical responses regarding self-efficacy to effectively manage scenarios (excellent = 5, very good = 4, good = 3, fair = 2, poor = 1) was determined. A "self-efficacy score" for each individual survey respondent to represent that individual's perception of self-efficacy, regarding managing ethical problems as a trauma surgeon, in general. This was accomplished by using an aggregate of the response values to self-efficacy questions for each of the 21 situation specific items. Higher scores indicated an individual with perception of high self-efficacy, and low scores indicating lower perceptions of self-efficacy. Owing to the numerical values we assigned to each response, an individual respondent's self-efficacy score could theoretically range from 21 (a respondent who selects "poor" in all 21 situations) to 105 (a respondent who selects "excellent" in all 21 situations). The actual distribution of scores ranged from 41 to 105. From this distribution of self-efficacy scores, we then created 5 approximately equal groups (quintiles with average of 109 surgeons per group) to assess a relationship between perceptions of self-efficacy and other variables using a using a χ^2 test.

The average values for each item were then used for final ranking of the 21 individual scenarios and the 7 larger categories. To compare differences in self-efficacy scores based on clinical experience, we used the response categories for frequency of encountering an issue to create a group with frequent experience (weekly or monthly) and another group with infrequent experience (semi-yearly, yearly, or never). Owing to the subjective nature of the terms frequent and infrequent, the decision to define the terms as such was done by consensus of the authors, 5 of whom are practicing trauma surgeons with national leadership roles, and it was done to reflect most accurately what these terms would mean for practicing trauma surgeons across the United States. A comparison between the groups of frequent and infrequent experience with an ethical issue of the same type and category was done using Wilcoxon rank sum test.

Results

A total of 547 practicing trauma surgeons out of the 1,794 invited completed the survey for a response rate of 30.6%%. Of

Table I
Frequency and comparison of mean self-efficacy to handle ethical situations between surgeons who encounter them frequently and surgeons who encounter them infrequently

	Percent encountered	No. Infreq	No. Freq	Mean self-efficacy infreq	Mean self-efficacy freq	Difference freq−infreq	T	P
Ethical challenges in general (not specified)	79%	112	420	3.80	3.80	0.00	0.01	.989
Communication	79%				3.71			
Guiding patients' or surrogates' decisions to make decisions that align with realistic goals of care		26	507	3.94	3.73	0.21	1.33	.184
Communicating adverse events or errors with patients or families		200	333	3.92	3.69	0.23	2.99	.003
Autonomy (including surrogate decision making)	70%				3.76			
Encountering patients who do not have capacity to make medical decisions		18	514	3.78	3.90	0.12	0.63	.531
Managing surrogate decision makers who do not seem to have the patient's best interest in mind		248	284	3.25	3.45	0.20	2.48	.013
Having to make medical decision in the absence of a clear surrogate		208	324	3.71	3.94	0.23	3.02	.003
End-of-life	66%				3.99			
Making decisions regarding life-sustaining treatment in potential organ donors		162	370	3.54	3.87	0.33	3.96	<.001
Offering or recommending withdrawal of life-support		80	452	3.36	4.14	0.78	7.72	<.001
Personal responsibility to establish diagnosis of brain death		250	282	3.55	4.28	0.73	8.69	<.001
Deciding that a patient's medical care is futile		193	339	3.47	3.87	0.41	5.17	<.001
Justice	58%				3.49			
Developing a treatment plan for patients whose insurance status limits access to care		140	393	3.21	3.54	0.33	3.25	.001
Using cost consideration for expensive therapies (eg, ECMO, RRY, PCC)		311	222	3.03	3.45	0.42	4.19	<.001
Other (trainee autonomy, institutional policies, etc)	42%				3.26			
Bear personal responsibility for balancing patient care needs with those of surgical trainees		236	295	3.80	3.71	−0.09	−1.13	.259
Feeling pressure to provide nonbeneficial treatment to patients		328	203	3.67	3.18	−0.49	−5.76	<.001
Institutional policies hindering patient care (ie, flawed, unclear, absent)		388	143	3.50	2.93	−0.57	−5.82	<.001
Feeling unsure that a medical decision you have made is the correct one		298	233	3.57	3.23	−0.34	−4.38	<.001
Conflict	21%				3.24			
Disagreements with medical consultants		207	326	3.41	3.31	−0.10	−1.28	.201
Disagreement with ethics or palliative care consultants		484	49	3.49	3.31	−0.18	−1.39	.166
Disagreements about whether to consult ethics or palliative care		470	63	3.74	3.46	−0.28	−2.31	.021
Conflict of religious or cultural issues between patient and medical team		458	75	3.53	3.25	−0.28	−2.48	.013
Conflict with administrators or hospital leadership regarding a patient's care		495	38	3.35	2.89	−0.46	−2.68	.008

We surveyed trauma surgeons from the largest U.S. trauma society to identify perceived frequency of encountering and self-efficacy of managing ethical situations in trauma surgery. Respondents' frequency of encountering ethically challenging situations in clinical practice was significantly associated with their self-efficacy for handling such situations.
Freq, weekly or monthly; *Infreq*, semi-yearly, yearly, or never.

respondents, 154 (28.2%) self-identified as female surgeons. Most respondents were White (408, 74.6%) and under 55 years of age (432, 78.9%). A majority completed fellowship training in either surgical critical care or acute care/trauma surgery. Most respondents (474, 86.6%) reported clinical practice in an American College of Surgeons verified level I or level II trauma center. Additional demographic characteristics are presented in Table II.

The most encountered overall ethical categories were General Ethics and Communication (79% of respondents reported issues in these categories were common in their practice), followed by autonomy, end-of-life, justice, and other ethical problems not otherwise captured. Conflict-related issues were encountered least frequently, with 21% of participants dealing with these situations on a monthly or a weekly basis. Figure 1, *A* summarizes the ethical situations most frequently reported in respondents' trauma surgery practice, ranked from most common to least common. End-of-life and general ethics issues were the categories that respondents felt the most confident handling. Participants expressed the lowest self-efficacy in independently managing ethical scenarios that were primarily related to the autonomy category. Figure 1, *B* shows reported self-efficacy to effectively manage these situations in order of decreasing self-efficacy scores.

Calculated self-efficacy scores ranged from 41 to 105 with a mean of 76.11 (± SD 13.07) (Figure 1, *C*). Overall reported self-efficacy to handle ethical situations did not differ by race, gender, size or location of city of practice, completion of fellowship training,

Table II
Demographic characteristics ($N = 548$)

Age*	No. (%)
25–34 years old	34 (6.2)
35–44 years old	220 (40.1)
45–54 years old	178 (32.5)
55–64 years old	86 (15.7)
65–74 years old	28 (5.1)
≥75 years old	1 (0.2)
Sex†	
Female	154 (28.1)
Male	391 (71.4)
Race*	
Asian/Pacific Islander	53 (9.7)
Black/African American	28 (5.1)
Hispanic/Latino	29 (5.3)
Native American/American Indian	1 (0.2)
White/Caucasian	408 (74.6)
Other	28 (5.1)
Fellowships completed*	
Surgical critical care	440 (80.3)
Acute care surgery or trauma surgery	192 (35.0)
Neither	80 (14.6)
Years in practice (board-eligible or board-certified)*	
Not board-eligible	13 (2.4)
<5 y	131 (23.9)
5–9 y	105 (19.2)
10–14 y	86 (15.7)
15–20 y	90 (16.5)
>20 y	122 (22.3)
Frequency of penetrating trauma in daily practice‡	
<10% of trauma patients	229 (41.9)
10%–20% of trauma patients	222 (40.7)
>20% of trauma patients	95 (17.4)
ACS verification status of trauma center of practice*	
Level I	354 (64.7)
Level II	120 (21.9)
Level III or below	14 (2.6)
Not verified	58 (10.6)
Do not know	1 (0.2)
Size of city of practice*	
Small	167 (30.5)
Medium	139 (25.4)
Large	142 (25.9)
Mega	99 (18.1)
Region of country of practice†	
Midwest	137 (25.1)
Northeast	174 (31.9)
South	161 (29.5)
West	59 (10.8)
Outside of the United States	14 (2.6)

We surveyed trauma surgeons from the largest U.S. trauma society to identify perceived frequency of encountering and self-efficacy of managing ethical situations in trauma surgery. A total of 548 trauma surgeons out of the 1,794 invited completed the survey (30.6%) to self-report demographic characteristics across a wide range.
ACS, American College of Surgeons.
* One participant did not respond ($n = 547$).
† Three participants declined to respond ($n = 545$).
‡ Two participants did not respond ($n = 546$).

or trauma center verification level. However, surgeons who reported high self-efficacy to handle ethical situations were more likely to be older, to have been in practice ≥15 years (linear relationship), and to have previously served on an ethics committee. Additionally, respondents' frequency of encountering ethically challenging situations in clinical practice was significantly associated with their self-efficacy for handling such situations. Table I compares mean self-efficacy to handle each surveyed ethical situation among surgeons who encounter it frequently (weekly or monthly) versus among surgeons who encounter it infrequently (semi-yearly, yearly, never). Figure 2 shows perceived usefulness of various strategies while navigating through ethical scenarios. Asking for a peer's opinion, as well as seeking help from ethics or palliative care consultation services were reported to be efficacious strategies in navigating through these ethical scenarios when encountered.

Discussion

This is the first study to comprehensively evaluate the incidence with which U.S. trauma surgeons directly encounter ethical challenges and their self- efficacy in navigating through them in their practice. We found that ethical challenges related to communication with patients, families, or other surrogate medical decision makers were encountered the most and were where trauma surgeons felt most confident. Similarly, more experienced trauma surgeons reported higher self-efficacy in managing ethical issues overall. The least commonly reported scenarios were those involving conflicts, such as disagreements with other consulting teams or hospital administration and those involving religious or cultural conflicts with the patient or their family. Of note, trauma surgeons had the least self-efficacy in managing justice-related ethical scenarios in which consideration shifted from the patient only to care of the patient in the context of broader systems-level issues. We also found that the survey participants reported lower self-efficacy in managing ethical situations that were encountered infrequently in their practice. All strategies for navigating effectively through ethical situations included on our survey were viewed as significantly less helpful by surgeons in the lowest self-efficacy quintile than by surgeons in the highest self-efficacy quintile who may be better equipped to use them.

Previous work has offered some context for several of these issues, either in large studies examining specific ethical scenarios, such as withdrawal of care, futility, and informed consent,[4–7] or in individual cases examining complex ethical situations.[8–11] These reports substantiate the commonness of certain ethical problems faced by trauma surgeons but did not assess the overall frequency over a full range of ethical challenges in trauma. Other authors have examined physician experiences with ethical challenges in surgical and nonsurgical specialties outside of traumatology. For example, Torjuul et al analyzed self-identified ethical challenges in surgical practice encountered by a small group of 8 surgeons (specialty not specified) in an academic practice in Norway.[11,12] The strategies identified by these surgeons for dealing with these issues were similar to those we found, with a strong emphasis on seeking trusted colleagues' opinions. Many of their interviewees expressed that knowing patients' backgrounds and wishes made difficult ethical decisions easier to handle. Another survey from DuVal et al summarizing US internists' experiences similarly concluded that almost all participating medical physicians encountered ethical challenges.[13] These comparisons highlight the uniqueness and the complexity of the practice of trauma surgery, in which many different ethical difficulties are encountered on a monthly if not weekly basis. In our analyses, trauma surgeons' sex, race, and previous fellowship training were not found to influence their self-efficacy to effectively handle ethical scenarios. This is consistent with findings from Torjuul et al, who report no differences in surgeons' experiences with ethical challenges based on gender.

The strengths of our work include a cross-section of more than 500 trauma surgeons from the largest American trauma organization (EAST), a majority of whom reported dealing with ethical issues on a weekly basis. This underscores the ubiquity of these challenges in trauma practice. We uniquely found that both structured experience in bioethics gained through serving on a bioethics committee and overall clinical experience, measured by surrogates of age and of time in practice, increased trauma surgeons' self-

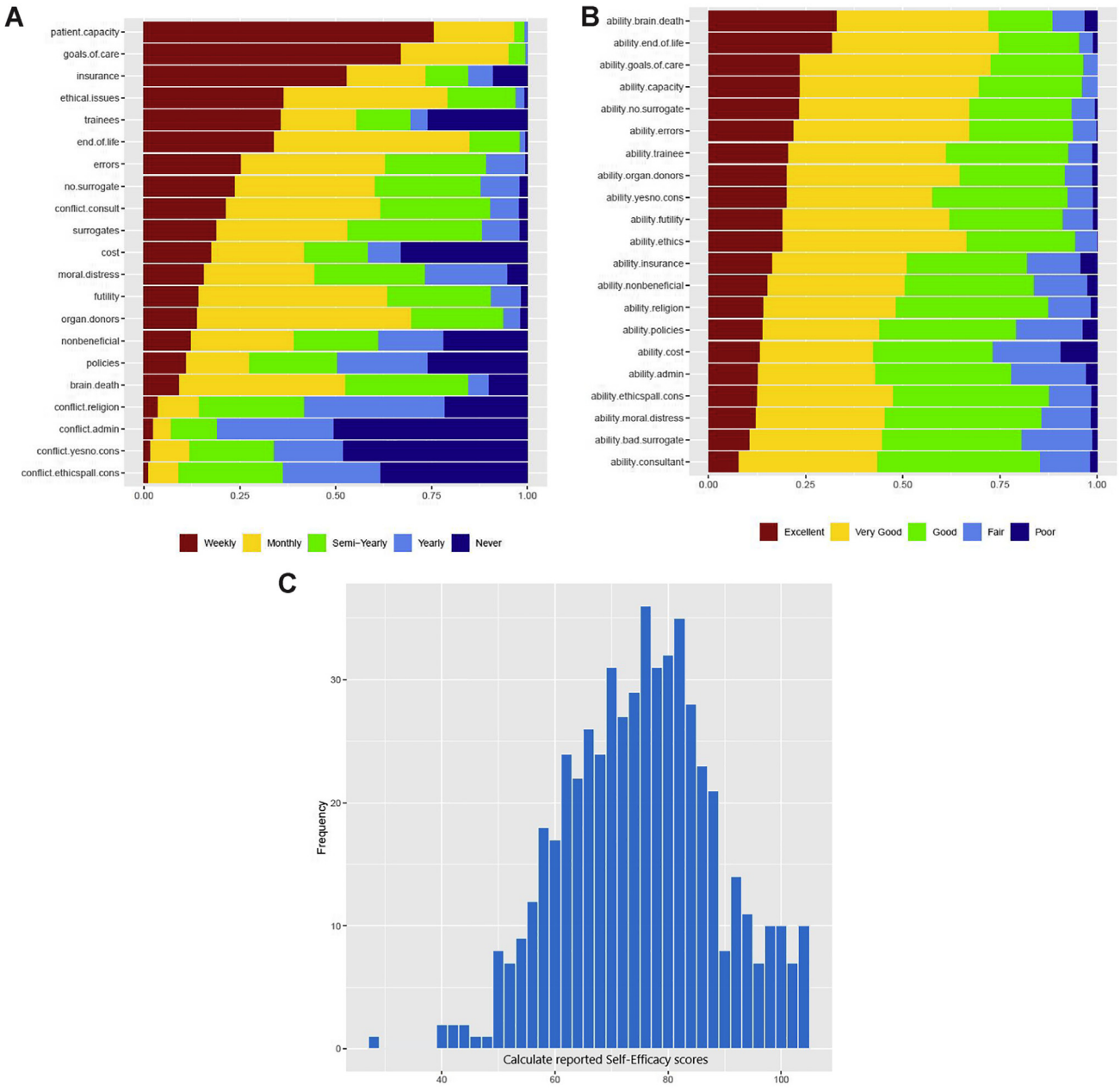

Figure 1. (A) Frequency of encountering various ethical situations among trauma surgeons. We surveyed trauma surgeons from the largest U.S. trauma society to identify perceived frequency of encountering and efficacy of managing ethical situations in trauma surgery. Respondents' frequency of encountering ethically challenging situations in clinical practice was significantly associated with their reported self-efficacy for handling such situations. (B) Reported self-efficacy for handling various ethical situations in trauma practice. We surveyed trauma surgeons from the largest U.S. trauma society to identify perceived frequency of encountering and efficacy of managing ethical situations in trauma surgery. Respondents' frequency of encountering ethically challenging situations in clinical practice was significantly associated with their reported self-efficacy for handling such situations. (C) Distribution of self-efficacy score in handling ethical issues among trauma surgeons. We surveyed trauma surgeons from the largest U.S. trauma society to identify perceived frequency of encountering and self-efficacy of managing ethical situations in trauma surgery. A "self-efficacy" score was calculated by summing respondents' self-efficacy scores (1 = "poor" to 5 = "excellent) for handling each of the 21 ethical situations. Participants reporting higher "self-efficacy" were more likely to have been in practice ≥15 years.

efficacy for navigating ethical issues. This finding suggests self-efficacy for managing ethically challenging situations in trauma surgery in daily practice may be gained either formally or informally, as trauma surgeons become more attuned to these issues and more aware of resources available to help to resolve them. More experienced surgeons reported more favorable views of seeking guidance from other surgeons or from supporting services such as ethics consults or palliative care when confronted with a challenging situation, suggesting that increased exposure to ethical challenges may increase comfort level not only with the situations themselves but also with effective strategies for dealing with them.

Of note, we found a few categories of ethical scenarios that were encountered infrequently, but the self-efficacy in managing these scenarios were higher (Table I). These areas were those related to institutional policy and conflict with other teams, religious or cultural beliefs of patients, or conflict with administrators regarding a patient's care. We postulate that this unexpected finding could be related to the inherent weakness of the study—that is, it reports self- efficacies and not objective efficacies in managing these scenarios. The survey participants could have erroneously self-perceived their comfort to handle these infrequently faced scenarios, for the very reason that they were infrequently experienced

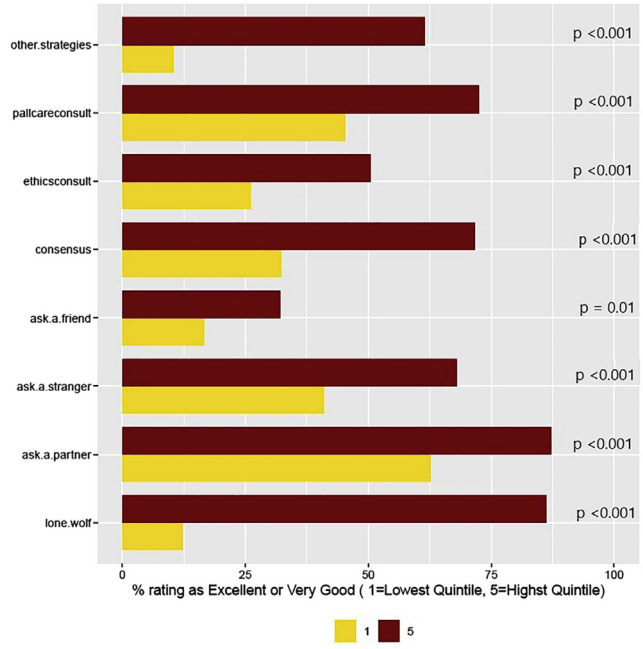

Figure 2. Perceived usefulness of strategies for managing ethical scenarios stratified by trauma surgeons self-efficacy. We surveyed trauma surgeons from the largest U.S. trauma society to identify self-perceived frequency of encountering and self-efficacy of managing ethical situations in trauma surgery. Respondents reporting higher self-efficacy for managing ethically challenging situations were more comfortable using various strategies to resolve them.

and hence did not have adequate opportunity to see a wide range of these scenarios to perceive the lower self-efficacy in these areas of clinical ethics.

Several important limitations should be considered in interpreting these findings. Our response rate of 30.6% is low and may represent a nonresponse bias, in which surgeons who did not respond may have differed significantly in their experience with ethical issues or in other important ways; however, this appears to be the response rate across several professional society membership-based surveys studies of trauma surgeons.[14–16] A survey of EAST membership to study variations in institutional review board processes and consent requirements for trauma research reports a 13.5% response rate from EAST membership.[14] Another survey of EAST membership to understand practice variations in blunt splenic injury reported a 38.4% response rate, which is similar to our response rate.[15] In a large national survey of American College of Surgeons membership studying association between moral distress and external factors that surgeons perceive to influence their decision to offer operations with limited patient benefit, 2,161 of 5,200 surgeons responded for a response rate of 41.5% with a reported adjusted response rate of 53%.[16] We also recognize that we have not studied effects of surgeon gender and race/ethnicity on the frequency as well as self-efficacy levels in navigating through these complex ethical challenges, and we understand our sample is overly saturated with White male trauma surgeons, not necessarily the demographics even at our own institution. Self-identified female trauma surgeon respondents comprised 28% of our respondents, which is similar to and represents the female membership of EAST society membership as published by Foster et al.[17] Our study is also limited by the lack of interval properties in the data we collected in our survey and specifically the response categories for questions related to self-efficacy and for frequency. Specifically, the response category labels we used for self-efficacy (excellent, very good, good, fair, and poor), are not perceptually equidistant from each other and are centered on the non-neutral term ("good"), both of which present limitations and potential bias to our results. Our definition of frequent (weekly and monthly) and infrequent (semi-yearly, yearly, never) aimed to reflect practical considerations and was done by consensus, but also assumes a relationship between ordinal data values that cannot be known in order to perform the Wilcoxon rank sum test.

We would like to caution our readers that this study should be interpreted as describing *a* range of ethical issues in trauma practice rather than *the* range as our survey was developed to try to capture a range of ethical challenges, but was not intended to reflect an exhaustive list of ethical issues encountered in trauma surgery. Additionally, given that our target study cohort was US surgeons, it should be noted that these results may not be generalizable to trauma surgery internationally. Future work in non-US settings may help to understand unique challenges requiring distinctive strategies in these other contexts where differences in cultures and in health care system structure may have an impact. Although our survey was focused on surgeons' perspectives as a starting point for assessing frequency of these issues in trauma practice, the perspectives of other stakeholders on the trauma care team are essential and should be included in future studies to fully understand the complex landscape of ethical challenges in trauma surgery.

Finally, our survey was designed to measure surgeons' self-efficacy navigating ethical issues rather than to objectively assess their success in this domain. In our study, the mean self-efficacy score was ~76 (maximum achievable 105) and is considered good. Results of our survey study provide intervenable and non-intervenable areas to improve self-efficacy in managing various ethical scenarios in trauma surgery. While older age and having been in practice for more than 15 years are non-intervenable factors, spending more time on an ethics committee or ethics education could be an area of focus for future studies to improve self-efficacy in handling ethical scenarios in practice of trauma surgery. Early-career trauma surgeons could consider focusing on one or more of the various strategies that were reported by our survey population to be helpful in navigating complex ethical scenarios in their current practice. These strategies ranged from a "lone wolf" approach to consulting ethics or palliative service, or asking a partner, friend, or seeking a consensus from several people in the group (Figure 2). While "self-efficacy" scores did appear to correlate with surgeons' self-efficacy with various scenarios and strategies, they may not necessarily reflect their actual ability to manage these issues effectively. This gap, especially when combined with the pervasiveness of these issues in practice, raises the need for further research examining the ways in which surgeons develop their skills over the course of their practice to allow them to not only feel but to be better equipped for ethically complex situations. By studying the exact ways in which trauma surgeons develop their ethical judgment, future work of this sort would provide a better understanding of how to support best surgeons in managing ethically challenging situations, now confirmed to be frequently encountered, through the development of practices, policies, and educational and training tools and materials. We believe that our work provides a strong foundation for future work on developing educational programs, policy statements, and to disseminate and improve exposure to ethics training in trauma training programs as well as for early career trauma surgeons.

In conclusion, this is the first study to describe the frequency of a spectrum of unique ethical challenges that trauma surgeons face. An overwhelming majority of trauma surgeons encounter a wide range of ethical problems on a regular basis in their clinical practice. Compared to early career trauma surgeons, experienced career trauma surgeons had higher self-efficacy to manage ethical issues

in clinical practice. We also identify a gap in knowledge regarding how trauma surgeons develop solutions to addressing these ethical problems effectively. Our work will provide a foundation for future work focused on developing educational curriculum for trauma fellows or early career trauma surgeons.

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Conflict of interest/Disclosure

None of the authors have any conflicts of interest to report regarding this work.

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