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## Enculturation of Unsafe Attitudes and Behaviors: Student Perceptions of Safety Culture

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### Abstract

**Purpose**—Safety culture may exert an important influence on the adoption and learning of patient safety practices by learners at clinical training sites. This study assessed students' perceptions of safety culture and identified curricular gaps in patient safety training.

**Method**—A total of 170 fourth-year medical students at the University of California, San Francisco, were asked to complete a modified version of the Agency for Healthcare Research and Quality Hospital Survey on Patient Safety Culture in 2011. Students responded on the basis of either their third-year internal medicine or surgery clerkship experience. Responses were recorded on a five-point Likert scale. Percent positive responses were compared between the groups using a chi-square test.

**Results**—One hundred twenty-one students (71% response rate) rated "teamwork within units" and "organizational learning" highest among the survey domains; "communication openness" and "nonpunitive response to error" were rated lowest. A majority of students reported that they would not speak up when witnessing a possible adverse event (56%) and were afraid to ask questions if things did not seem right (55%). In addition, 48% of students reported feeling that mistakes were held against them. Overall, students reported a desire for additional patient safety training to enhance their educational experience.

**Conclusions**—Assessing student perceptions of safety culture highlighted important observations from their clinical experiences and helped identify areas for curricular development

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to enhance patient safety. This assessment may also be a useful tool for both clerkship directors and clinical service chiefs in their respective efforts to promote safe care.

The patient safety movement continues to earn significant attention since being catalyzed by the landmark Institute of Medicine report *To Err Is Human* more than a decade ago.<sup>1</sup> In recent years there has been an increasing mandate to incorporate patient safety principles into medical education, including at the undergraduate level.<sup>2–9</sup> Yet, despite its widespread support, only a minority of medical schools have implemented formal patient safety educational programs.<sup>8,10–12</sup>

Successful implementation of patient safety education programs requires receptive learning environments. Medical students are engaged in a critically important socialization process during their clinical clerkships.<sup>13</sup> They often emulate the behaviors of their residents and attendings and follow norms that are set by the clinical setting in which they learn. A recent systematic review noted that a positive safety culture can promote curricular success when present and undermine it when absent.<sup>14</sup>

Medical students may have unique perspectives of safety culture given their exposure to a variety of clinical settings and their transient role on medical teams. Whereas institutional safety culture assessments are used to learn about and prioritize improvement efforts, assessing student perceptions of safety culture may drive different outcomes. For instance, medical educators can use the findings to identify areas for curricular development, whereas clinical service chiefs may use the findings to foster student engagement in patient safety practices. Few studies have addressed student attitudes about patient safety or used validated safety culture assessment tools on this group of learners. We aimed to survey students about their safety culture perceptions during internal medicine (IM) and surgery clerkships, which were chosen because of similar rotation lengths and sites.

## Method

### Study setting and design

The University of California, San Francisco (UCSF), is a large academic training institution with three core clinical training sites: an academic tertiary care hospital (UCSF Medical Center), a large public health county hospital (San Francisco General Hospital [SFGH]), and a Veterans Affairs medical center (San Francisco Veterans Affairs Hospital [SFVA]). There are 634 registered medical students who rotate across these sites and many others in the community setting. We conducted a cross-sectional survey of the 171 graduating medical students to assess their perceptions of safety culture during their third-year core clerkship experiences. Students were asked to recall perceptions from clerkships that had been completed up to 12 months before survey administration. We also wanted to compare their perceptions of safety culture on different clerkships and selected IM and surgery because of their similar eight-week rotation length and corresponding clinical training sites. Students were assigned alphabetically by last name and asked to respond to the survey on the basis of either their IM or surgery clerkship experience, but not both. Students at our institution are assigned clerkships through a random lottery system. This study was approved by a UCSF committee on human research waiver for quality improvement activities.

## Survey development

We combined and adapted two related survey instruments: the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture<sup>15</sup> and the UCSF Department of Medicine survey, which was modified from the AHRQ one. We included 8 out of 12 AHRQ safety domains, with 26 safety domain questions being omitted. Questions were omitted if they were not applicable to the student experience or if students had minimal exposure to question content (e.g., “hospital management provides a work climate that promotes patient safety”). Selected questions also required minor word substitution to ensure student understanding. We incorporated three novel domains from the modified UCSF instrument: “disclosure of patient safety events,” “supervision of trainees,” and “physician-to-physician handoffs.” We also added a specific “education and training” domain to identify areas for future curricular development. We then conducted survey beta-testing for language and ease of completion as part of the development process (see Appendix 1).

## Survey administration

During July to August 2011, surveys were distributed to 170 graduating medical students via electronic communication. E-mail addresses were obtained through the UCSF registrar’s released e-mail list. All e-mail communication was sent by a fourth-year medical student (C.B.) who was excluded from survey participation. The introductory e-mail described the survey goal and provided a Web link to the survey, which was reproduced using a commercial online survey tool. We sent reminder e-mails, with participants having the ability to opt out of receiving them. On the basis of alphabetic last name ordering, students were asked to complete either the IM or surgery-based survey. Participation was voluntary, and all responses to the multiple-choice questions were anonymous. Respondents received no financial or other incentives for participating in our survey.

## Analysis

The commercial online survey tool provided a spreadsheet of responses with basic descriptive statistics. Responses to questions were recorded on a five-point Likert scale, with 5 = strongly agree and 1 = strongly disagree. Responses were grouped into agree (i.e., 4 or 5) and disagree (i.e., 1 or 2 on the Likert scale) categories, and overall percentages were obtained. Domain scores were calculated based on a summary of the individually scored questions within that given domain. We compared percent positive responses between IM and surgery groups using a chi-square test. We excluded unanswered questions from data analysis. Level of significance was a *P* value of less than .05. We conducted statistical analysis using Stata/IC version 12 (StataCorp, LTD, College Station, Texas).

## Results

One hundred twenty-one of 170 students (71%) completed the survey. Response rates from IM and surgery subgroups were similar (Table 1). Eighty-three percent of respondents (100 of 121) completed their clinical rotations at a UCSF core clinical training site (e.g., UCSF Medical Center, SFGH, or SFVA); however, the IM subgroup had greater exposure to the core sites compared with the surgery subgroup. Respondents reported similar future

intended specialty, and they also reported similar elapsed time from completion of their rotation to the time of this survey.

### Perceptions of safety culture

Table 2 summarizes safety culture perceptions by survey domain for the combined group and for the IM and surgery subgroups. The table displays results sorted by safety domain score.

Among the safety domains, “teamwork within units,” “supervisor promoting patient safety,” and “organizational learning” were rated highest. The majority of students (65%, 70 of 108) reported (i.e., agreed or strongly agreed) that clinical services were actively doing things to improve patient safety. Similarly, students reported that attendings and residents addressed patient safety problems during the IM and surgery clerkships (76% and 71%; 78 of 103 and 73 of 103, respectively) and that there was adequate clinical supervision of trainees (70%, 72 of 103). Students also overwhelmingly reported (80%, 84 of 105) that medical errors should be disclosed to patients. However, a much smaller number (42%, 44 of 105) reported that physicians were in fact encouraged to disclose adverse events.

“Communication openness,” “nonpunitive response to error,” and “physician-to-physician handoffs” received the lowest ratings among assessed safety domains. More than half of students (56%, 57 of 101) reported that they would not speak up when witnessing an event that may negatively affect patient care. A similar percentage (55%, 57 of 103) reported that they were afraid to ask questions when things did not seem right, and nearly half (48%, 49 of 102) reported that their mistakes were held against them during the clerkship. Table 3 shows aggregate and subgroup percent positive responses for all survey questions assessing perceptions of patient safety culture. In addition, the 2011 AHRQ comparative database averages are provided as a benchmark.<sup>15</sup>

Independent of the survey domains, when students were asked, “Your ability to provide safe patient care is most influenced by the culture of . . .,” the majority reported the team of providers (60%, 59 of 99) and the clinical service (23%, 23 of 99) as having the greatest influence. Only a minority of students reported the medical center culture (13%, 13 of 99) or medical school culture (4%, 4 of 99) as having an influence on providing safe patient care.

### Comparing safety culture between IM and surgery clerkships

Comparing IM and surgery clerkships, only the “teamwork within units” domain had statistically significant differences between subgroups (Table 2). Table 3 shows all questions and denotes the four specific questions within the domains that yielded statistically significant differences between groups.

### Education and training needs assessment

Overall, students felt additional training in a variety of patient safety practices would enhance their education. Table 4 outlines their prioritized learning needs, with patient handoffs being the most desired and coping with errors the least.

## Discussion and Conclusions

Students constitute a distinct subgroup of providers in our increasingly complex health care system. Their perceptions of safety culture can highlight areas of strength and opportunities for improvement in both the clinical and educational setting. We surveyed medical students to learn about their perceptions of safety culture during their third-year IM and surgery clerkships. The findings provide a unique perspective on the safety culture of key clinical services as experienced by students who are exposed to a variety of diverse clinical settings during their third year. The lessons learned provide both clerkship directors and clinical service chiefs with a real-time assessment that can drive curricular enhancements while fostering a culture of safety.

Overall, our study highlights that despite the progress made by the safety movement in the past decade, much room for improvement in safety culture remains, particularly for medical students and their medical socialization process.<sup>16</sup> Most notably, communication and punitive response to errors continue to be identified as strong barriers to student engagement in patient safety behaviors. This fear of speaking up is a consistent theme in studies evaluating students and their position in the traditional medical hierarchy.<sup>17–19</sup> Student narratives have highlighted low positions of power and steep authority gradients as hindrances to open communication.<sup>20</sup> Explicit encouragement of open communication, including role modeling by residents and faculty, may be an important strategy. An absence of such role modeling is suggested in our study, as only 55% of students agreed that there was good communication flow within the medical hierarchy. Communication barriers were identified not only within the medical team but also between providers and patients. Only 42% of students felt that physicians were encouraged to disclose patient safety events. A likely contributing factor to the communication barrier is the fear of punitive response, as many students felt mistakes would be held against them and 21% agreed that asking for help was a sign of incompetence. This persistence of a culture of blame can contribute to concealing errors and mitigate current advances in patient safety.

Comparing our findings with benchmarks provided by the 2011 AHRQ comparative database provided additional lessons learned. Students in our study reported less positive responses overall, but this was most striking within the “communication openness” and “nonpunitive response to error” domains. Unfortunately, we are unable to compare our students’ perceptions with those of a comparable set of attendings or residents from the same clinical settings to further understand these discrepancies. A possible explanation to the lower positive responses may be secondary to students’ historically low position in the medical hierarchy compared with typical respondents of the AHRQ survey.

Comparing students’ perceived differences in safety culture between IM and surgery clerkships also yielded notable findings. Other studies have shown that safety culture perceptions vary across hospitals, units, and disciplines.<sup>21–23</sup> Although we did not compare results on the basis of clinical training site, we did find perceived differences in safety culture on IM and surgery clerkships. These differences are not surprising given that students also reported that the “team of providers” and “clinical service” are the most influential to their providing safe care. Assessing student perceptions of safety culture on

specific clerkships may help tailor interventions and guide improvement at the microsystem level. For example, because students in our study perceived physician-to-physician handoffs as more problematic on the IM clerkship, we can examine how these are performed in surgery and examine best practices.

Finally, data on student-reported perceptions of safety culture can also provide a tool to guide medical educators in addressing gaps in patient safety education.<sup>24</sup> In our study, we found that students prioritized a need for a curriculum focused on safe handoffs and error disclosure. Their identified educational needs were consistent with the corresponding safety culture domains that were rated the lowest.

There are several limitations to our study. First, we modified a validated survey tool that was not specifically geared toward medical students. Second, our nonrandomized cross-sectional survey may have led to some recall bias, with students having completed their IM or surgery clerkship up to 12 months before survey administration. Third, students completing the surgery-based survey rotated at a greater number of clinical training sites, which may have affected their perceptions and responses to questions. In addition, our anonymous survey did not allow for analyzing responses by specific rotation site. Finally, our findings may not reflect those of students in other schools or in other hospital systems. However, our tool and survey administration process is generalizable to other academic settings where there is similar interest in assessing and learning from students' safety perceptions.

In conclusion, our study highlighted that medical students continue to be inducted into a culture of unsafe attitudes and behaviors. Whereas the third-year clerkship provides an exciting time to continue the broad enculturation process into physician culture, it is also a highly influential experience that can affect the future practice and behavior of clinicians. Many students sensed a punitive attitude surrounding the reporting of medical errors and expressed concerns about speaking up or asking questions when they perceived problems with the care of patients received. This raises the concern that they may perpetuate these attitudes and behaviors as residents and attendings, which can further threaten patient safety. Assessing student perceptions of safety culture can provide clerkship directors and clinical service chiefs with information that enhances the educational environment and promotes patient safety. Furthermore, achieving competency in patient safety principles is an increasing mandate for future physicians, which must be fostered by academic departments' efforts to establish a positive safety culture. Safety culture assessment tools can highlight opportunities for improvement and offer important comparative reflections from different clerkships. While patient safety education continues to make important strides, the traditional medical hierarchy remains a significant barrier to engaging medical students in contributing to a positive safety culture.

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## Appendix

**Please reflect on your core INTERNAL MEDICINE rotation.** Select the training site you completed your core Internal Medicine rotation.

UCSF Medical Center (Parnassus/Mt. Zion)

SFGH

VA San Francisco

Other\_\_\_\_\_

**Approximately when did you complete your core Internal Medicine rotation?**

Less than 6 months ago

Between 6–12 months ago

Over 12 months ago

### SECTION A: Rotation Experience

**Please indicate your agreement or disagreement with the following statements based on your core Internal Medicine rotation.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. People supported one another on this rotation	5	4	3	2	1
2. The medicine service had enough staff to handle the workload (i.e., RN, MD, pharmacist etc.)	5	4	3	2	1
3. On this rotation, people treated each other with respect	5	4	3	2	1
4. The medicine service is actively doing things to improve patient safety	5	4	3	2	1
5. It is by chance that more serious mistakes didn't happen on this rotation	5	4	3	2	1
6. Work was done in "crisis mode" on this rotation, trying to do too much, too quickly	5	4	3	2	1
7. Patient safety was never sacrificed to get more work done on this rotation	5	4	3	2	1
8. There were patient safety problems on this rotation	5	4	3	2	1
9. The medicine services' procedures and systems were good at preventing errors from happening	5	4	3	2	1

### SECTION B: Communication

**Please indicate your agreement or disagreement with the following statements based on your core Internal Medicine rotation.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know
1. On this rotation, teams discussed ways to prevent errors from happening again	5	4	3	2	1	
2. Physician shift changes were problematic for patients on this rotation	5	4	3	2	1	
3. Problems often occurred in the exchange of patient information during handoffs and signout	5	4	3	2	1	
4. Physicians on this rotation were encouraged to	5	4	3	2	1	



**SECTION B: Communication**

**Please indicate your agreement or disagreement with the following statements based on your core Internal Medicine rotation.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know
disclose adverse events to patients						
5. Patient safety events should be disclosed to patients	5	4	3	2	1	
6. Good communication flow exists up and down the chain of command on this rotation	5	4	3	2	1	

**Section C: Student Experience**

**Please indicate your agreement or disagreement with the following statements based on your core Internal Medicine rotation.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Students work longer hours than is best for patient care	5	4	3	2	1
2. Students receive sufficient clinical supervision from resident & attending physicians	5	4	3	2	1
3. Patient safety would be improved if students received more supervision from resident & attending physicians	5	4	3	2	1
4. Whenever pressure builds up, residents want students to work faster, even if that means taking shortcuts	5	4	3	2	1
5. Residents overlook patient safety problems that happen over and over	5	4	3	2	1
6. Attendings overlook patient safety problems that happen over and over	5	4	3	2	1
7. Students will freely speak up if they see something that may negatively affect patient care	5	4	3	2	1
8. Students are afraid to ask questions when something does not seem right	5	4	3	2	1
9. Students feel like mistakes are held against them	5	4	3	2	1
10. Asking for help is a sign of incompetence	5	4	3	2	1

**Section D: Education & Training**

<b>I would like to receive additional training on ...</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Systematically reviewing a case to identify the underlying causes of why an error occurred	5	4	3	2	1
2. Disclosing an error to a patient	5	4	3	2	1
3. Improving my documentation (i.e., Progress notes) to highlight patient safety issues	5	4	3	2	1
4. Assessing patients at risk for adverse events (e.g. hospital-acquired infections, falls, medication errors, etc.)	5	4	3	2	1
5. Incorporating the use of checklists to improve patient care	5	4	3	2	1



**Section D: Education & Training**

**I would like to receive additional training on ...**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6. Preventing medication errors	5	4	3	2	1
7. Practicing effective and safe handoffs to improve patient care (i.e., signout, discharge, etc.)	5	4	3	2	1
8. Coping with an error that I was involved in	5	4	3	2	1
9. Supporting others who have been involved in an error	5	4	3	2	1
10. What other aspects of patient safety would you like additional education and training on?					

2. Please give an overall grade on patient safety for your core **Internal Medicine** rotation.

A	B	C	D	F
Excellent	Very Good	Acceptable	Poor	Failing

3. Please give an overall grade on patient safety for your core **Surgery** rotation.

A	B	C	D	F
Excellent	Very Good	Acceptable	Poor	Failing

**Section E: Demographics**

1. Please indicate your gender

Male    Female    Decline to state

2. Please indicate your intended future specialty

Internal Medicine                      Unknown

Surgery                                      Other\_\_\_\_\_

**Thank you for taking the time to share your opinions.**

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**Table 1**

Demographic Characteristics of Student Respondents, From a Study of Perceptions of Safety Culture in Clinical Experiences, University of California, San Francisco (UCSF), 2011

Demographic characteristic	No. (%) of respondents <sup>*</sup>	
	Internal medicine	Surgery
<b>Survey respondents</b>	60 (71)	61 (72)
<b>Male</b>	18 (36)	18 (40)
<b>Rotation site</b>		
UCSF Medical Center	24 (40)	20 (33)
San Francisco VA	14 (23)	9 (15)
San Francisco General Hospital	20 (33)	13 (21)
Other	2 (3)	19 (31)
<b>Future specialty</b>		
Internal medicine	9 (18)	11 (23)
Surgery	7 (14)	7 (15)
Other	32 (63)	26 (54)
<b>Completed rotation</b>		
Less than 6 months	10 (17)	8 (13)
Between 6 and 12 months	20 (33)	27 (45)
Over 12 months	30 (50)	25 (42)

<sup>\*</sup> Students who responded to the survey (85 total in each subgroup).

**Table 2**

Overall Student Ratings of Safety Culture Domains, From a Study of Perceptions of Safety Culture in Clinical Experiences, University of California, San Francisco (UCSF), 2011

Domain	Average % positive response <sup>*</sup>		
	Overall	Internal medicine	Surgery
Teamwork within units <sup>†</sup>	75	91	60
Supervisor promoting patient safety	66	65	68
Organizational learning	65	72	57
Event disclosure to patients	61	64	58
Feedback about error	59	57	62
Staffing	58	68	49
Supervision of trainees	53	56	50
Overall perceptions of patient safety	49	49	49
Physician-to-physician handoffs	43	42	44
Nonpunitive response to error	32	25	40
Communication openness	22	23	21

<sup>\*</sup> Positive responses are those who responded “agree” or “strongly agree.” Each domain comprises 1–4 questions as detailed in Table 3. The average percent positive response is calculated by taking the positive responses to each question within a given domain and averaging them with other questions in the same domain. The denominator for each question varies because not every student responded to every question.

<sup>†</sup> Domain with statistically significant difference between the IM and surgery groups. Chi-square; *P* value < .05.

**Table 3**

Comparing Selected Safety Culture Responses by Subgroup and AHRQ Benchmark, From a Study of Perceptions of Safety Culture in Clinical Experiences, University of California, San Francisco (UCSF), 2011

Domain	No. (%) of positive responses <sup>*</sup>			% AHRQ positive responses <sup>†</sup>
	Overall	Internal medicine	Surgery	
Overall perceptions of patient safety				
It is by chance that mistakes don't happen on this rotation <sup>‡</sup>	52 (49)	24 (44)	28 (53)	62
Patient safety is never sacrificed to get more work done	43 (40)	22 (41)	21 (39)	65
Patient safety is a problem on this rotation <sup>‡</sup>	53 (50)	28 (53)	25 (46)	65
This service has procedures that are good at preventing errors	63 (58)	32 (59)	31 (57)	72
Teamwork within units				
People support one another on this rotation <sup>§</sup>	84 (79)	49 (91)	35 (66)	86
On this rotation, people treat each other with respect <sup>§</sup>	76 (71)	48 (91)	28 (52)	78
Organizational learning				
This service is actively doing things to improve patient safety	70 (65)	39 (72)	31 (57)	84
Event disclosure to patients				
Patient safety events should be disclosed to patients	84 (80)	42 (79)	42 (81)	NA
Physicians are encouraged to disclose patient safety events to patients	44 (42)	26 (49)	18 (35)	
Supervisor promoting patient safety				
Whenever pressure builds up, residents want students to take shortcuts <sup>‡</sup>	54 (52)	29 (55)	25 (50)	74
Residents overlook patient safety problems <sup>‡</sup>	73 (71)	36 (68)	37 (74)	76
Attendings overlook patient safety problems <sup>‡</sup>	78 (76)	38 (72)	40 (80)	76
Feedback about error				
Teams discussed ways to prevent errors from happening again	62 (59)	30 (57)	32 (62)	71
Staffing				
There is enough staff to handle the workload <sup>§</sup>	66 (61)	41 (76)	25 (46)	56
Work is done in “crisis mode,” trying to do too much too quickly <sup>‡</sup>	69 (64)	38 (70)	31 (58)	50
Students work longer hours than is safe for patient care <sup>‡</sup>	51 (50)	30 (57)	21 (42)	53
Supervision of trainees				
Students receive sufficient clinical supervision	72 (70)	40 (75)	32 (64)	NA
Patient safety would be improved if students received more supervision	31 (30)	16 (30)	15 (30)	
Good communication flow exists up and down the chain of command <sup>§</sup>	57 (55)	34 (64)	23 (45)	
Asking for help is a sign of incompetence <sup>‡</sup>	60 (58)	29 (55)	31 (62)	
Physician-to-physician handoffs				
Physician shift changes are problematic for patients <sup>‡</sup>	48 (46)	21 (40)	27 (52)	NA
Problems occur in the exchange of patient information during sign-outs <sup>‡</sup>	41 (40)	23 (43)	18 (36)	

Domain	No. (%) of positive responses <sup>*</sup>			% AHRQ positive responses <sup>†</sup>
	Overall	Internal medicine	Surgery	
Nonpunitive response to error				
Students feel like mistakes will be held against them <sup>‡</sup>	33 (32)	13 (25)	20 (40)	50
Communication openness				
Students speak up if they see something that may negatively affect patient care	21 (21)	11 (21)	10 (20)	76
Students are afraid to ask questions when something does not seem right <sup>‡</sup>	24 (23)	13 (25)	11 (22)	63

<sup>\*</sup> The denominator for each question may vary because not every student responded to every question in the survey.

<sup>†</sup> Agency for Healthcare Research and Quality (AHRQ) 2011 Comparative User database average percent positive results.

<sup>‡</sup> Negatively worded item, where percent positive response is based on those who responded “strongly disagree” or “disagree.”

<sup>§</sup> Questions with statistically significant differences between the internal medicine and surgery groups (chi-square;  $P < .05$ ).

**Table 4**

Identified Student Priorities for Educational Needs, From a Study of Perceptions of Safety Culture in Clinical Experiences, University of California, San Francisco (UCSF), 2011

<b>I would like to receive additional training on ...</b>	<b>No. (%) of positive responses<sup>*</sup></b>
Practicing effective and safe handoffs to improve patient care	88 (90)
Disclosing an error to a patient	82 (83)
Preventing medication errors	78 (80)
Incorporating the use of checklists to improve patient care	75 (77)
Assessing patients at risk for adverse events	75 (76)
Systematically reviewing a case to identify why an error occurred	70 (71)
Improving my documentation to highlight patient safety issues	66 (67)
Supporting others who have been involved in an error	64 (65)
Coping with an error that I was involved in	60 (63)

\* Positive responses are those who responded "agree" or "strongly agree." The denominator for each question may vary because not every student responded to every question in the survey.