

## Is There Hardening of the Heart During Medical School?

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### Abstract

#### Purpose

To determine whether vicarious empathy (i.e., to have a visceral empathic response, versus role-playing empathy) decreases, and whether students choosing specialties with greater patient contact maintain vicarious empathy better than do students choosing specialties with less patient contact.

#### Method

The Balanced Emotional Empathy Scale was administered at the beginning of each academic year at the University of Arkansas for Medical Sciences for four classes, 2001–2004. Students also reported their gender and specialty choice. Specialty choice was classified as core (internal medicine, family medicine,

obstetrics–gynecology, pediatrics, and psychiatry) or noncore (all other specialties).

#### Results

Vicarious empathy significantly decreased during medical education ( $P < .001$ ), especially after the first and third years. Students choosing core careers had higher empathy than did those choosing noncore careers. Men choosing core careers initially had empathy exceeding population norms, but their empathy fell to be comparable with that of norms by the end of their third year. The empathy of men choosing noncore careers was comparable with that of norms. Women choosing core careers had empathy scores comparable with those of norms,

but the scores of women choosing noncore careers fell below those of the norms by their second year.

#### Conclusions

The findings suggest that undergraduate medical education may be a major determinant differentially affecting the vicarious empathy of students on the basis of gender and/or specialty choice. The greatest impact occurred in men who chose noncore specialties. The significant decrease in vicarious empathy is of concern, because empathy is crucial for a successful physician–patient relationship.

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**M**edical professionalism is essential for maintaining the integrity of the profession, and it includes demonstrating compassion, caring, and a willingness to put the concerns of patient and society above one’s own. Medical education should promote the development of these professional qualities. However, studies

have shown that medical school can often have a detrimental effect on certain aspects of students’ professional growth. Negative characteristics such as cynicism may increase, and ethical and moral development can be stunted.<sup>1–3</sup>

Empathy is one of the most highly desirable professional traits that medical education should promote, because empathic communication skills promote patient satisfaction and adherence to treatment plans while decreasing the likelihood of malpractice suits.<sup>4,5</sup> Patients view physicians who possess the quality of emotional empathy as being better caregivers. A physician may possess competent diagnostic skills, yet be considered by patients as “ineffective” because the physician misses the link between patient satisfaction, adherence to medical instructions, and physician empathy.

Sociologists and psychologists have divided the concept of empathy into two main definitions or types: vicarious and imaginative. Vicarious empathy is “an individual’s vicarious emotional response to perceived emotional experiences of others” and imaginative empathy is “an

individual’s ability to imaginatively take the role of another so as to understand and accurately predict that person’s thoughts, feelings and actions.<sup>6</sup> The first definition reflects an innate emotional response, that is, a “gut reaction,” and is equivalent to the “empathic concern” described by Davis<sup>7</sup>; the second definition refers to “cognitive” empathy and reflects a learned ability to imagine and intellectualize.<sup>7</sup>

Many scales that measure empathy are investigating cognitive empathy of individuals to “role-play.”<sup>8</sup> Previous data concerning medical students’ cognitive empathy are conflicting, indicating either no changes, decreases, or increases in empathy during undergraduate medical training.<sup>9–13</sup> In our previous cross-sectional study, we observed a decline in vicarious empathy during medical school.<sup>14</sup> There are no known longitudinal studies of vicarious empathy. In the current study, we examined the longitudinal effect of medical education on vicarious empathy.

Previous studies suggest that certain measures of a medical student’s personality may predict whether the

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student will enter one of five core specialties that are characterized by continuity of patient care (i.e., family medicine, pediatrics, internal medicine, obstetrics–gynecology, and psychiatry) versus noncore specialties, where there is less interpersonal contact and continuity of care (all other specialties, for instance, emergency medicine, surgery, radiology, pathology).<sup>10,15</sup> With these possible personality–specialty connections in mind, we designed the present study to determine whether vicarious empathy decreases as students progress through medical school, and whether students choosing specialties with greater patient contact maintain vicarious empathy better than do students choosing specialties with less patient contact.

## Method

**Setting and sample.** We gathered this study's data from a single South-Central U.S. medical school: The University of Arkansas for Medical Sciences. Starting in the 1997, 1998, 1999, and 2000 academic years, the students in the graduating classes of 2001, 2002, 2003, and 2004 completed a survey at the *beginning* of their freshman (M1), sophomore (M2), junior (M3), and senior (M4) years. With approval from our local institutional review board in 2005, we contacted the 535 graduates and asked whether they would allow their data to be used in a research study. A total of 419 (78.3%) students agreed, 1 student refused, and 115 students did not reply.

**Survey instrument.** The survey instrument was the Balanced Emotional Empathy Scale (BEES), a well-established measure of the vicarious emotional qualities of empathy that examines the emotional “primitive” level of interpersonal interactions.<sup>8,16</sup> The BEES coefficient alpha is 0.87. The BEES consists of 30 positively or negatively worded items (15 items in each category) that measure responses to fictional situations and particular life events. Because the BEES is gender sensitive, with men scoring lower than women, the students were asked to report their gender. Using the students' responses to the BEES, we analyzed the changes in the students' vicarious empathy by gender across their first three years of medical school.

**Specialty choice.** We classified each student's specialty choice on the basis of his or her residency match at the time of graduation. Specialty choice was divided into two categories, five core specialties (i.e., internal medicine, family medicine, pediatrics, obstetrics–gynecology, and psychiatry) and noncore specialties (all other choices, for instance, surgery, pathology, and radiology).

**Timing of test administration.** Students completed the questionnaire during registration for each academic year. Therefore, the M1 classes had no medical training, providing a baseline empathy score.

**Analysis of data.** Scores for each student were calculated according to BEES instructions.<sup>16</sup> Descriptive statistics were calculated by class, gender, and choice of specialty. As stated earlier, we conducted separate analyses for men and women, because the BEES is gender specific. For each year, we conducted a two-factor repeated-measures ANOVA, using the general linear model procedure from SPSS, with the significance level set at  $P < .05$ . The between-subjects factor was specialty choice, and the within-subjects factor was time. Significant effects were followed by post hoc tests. We also performed single-sample tests of means to compare our respondents with those in the normed sample for the BEES.

## Results

Among the four classes, with 419 students in the study, 25.7% (108; 80.7% of the class) graduated in 2001, 26.0% (109; 78.4% of the class) graduated in 2002, 23.4% (98; 76.5% of the class) graduated in 2003, and 24.8% (104; 77.6% of the class) graduated in 2004. Our overall sample had 272 men (64.9%) and 147 women (35.1%). For comparison, the entire graduating medical school classes had 65.4% men and 34.5% women. Among the four classes, there were no significant differences in students' empathy scores as they began medical school. Therefore, we combined the four cohorts for the subsequent analyses. More than half of the students (227; 54.2%) selected a core specialty (men = 133; 58.6%; women = 94; 41.4%), whereas the remainder selected noncore specialties (men = 139; 72.4%; women = 53; 27.6%).

The percentages of men and women who were nonresponders (75.6%, 87 men, and 24.4%, 28 women) did not differ greatly by gender from the same type of percentages of the responders (77.8%, 326 men, and 22.2%, 93 women;  $P = .25$ ). For nonresponders, 53.9% entered core specialties, which did not differ from the percentage of responders that entered those specialties ( $P = 1.0$ ). The female nonresponders did not differ statistically in their likelihood of entering core or noncore specialties from the female responders ( $P = .82$ ). The same was true for men: there was no statistical difference between responders and nonresponders in the distribution of specialty choice between core and noncore ( $P = .63$ ). Therefore, the nonresponders do not represent a bias in the data.

There was a significant association between gender and specialty choice, with 94 (63.9%) women planning to enter a core specialty compared with 134 (48.9%) men ( $P = .004$ ). As anticipated from the gender-sensitive BEES, the women always had significantly higher BEES scores than the men ( $P < .001$ ).

Table 1 displays the mean scores by year (M1–M4) and specialty preference for men and women. Figure 1 shows part of the data in graphic form. Entering male medical students, regardless of specialty choice, had empathy scores that were significantly higher than those in the normal population ( $29 \pm 28$ ;  $P < .001$ ).<sup>16</sup> The core male medical students stayed significantly more empathic than the norms ( $P < .001$ ) until they finished the junior year (see the M4 data point in Figure 1), when there was no longer a significant difference ( $P = .91$ ). In contrast, after finishing their freshman year, noncore male BEES scores (see the M2 data point in Figure 1) dropped to where they were no longer significantly different from norm population scores.

Entering female students had empathy scores that were comparable with those of the normal female population ( $60 \pm 21$ )<sup>16</sup> until after completion of the junior year (see the M4 data point in Figure 1), when they dropped below the norm ( $P = .003$ ). When women were classified by core and noncore specialties, core women were always comparable with the norm ( $P > .05$ ). However, noncore women started comparable with the norm ( $P = .14$ ) but

Table 1

**Empathy Scores of 419 Medical Students by Year and Specialty Choice, 2001–2004 Graduating Classes, the University of Arkansas for Medical Sciences\***

Year of empathy score, by students' gender	Specialty choice <sup>†</sup>	Mean score <sup>‡</sup>	SD
<b>Empathy score 1, start of freshman year</b>			
Women	Noncore	57.13	23.22
	Core	64.35	19.98
	Total	61.75	21.41
Men	Noncore	35.88	23.99
	Core	39.95	20.53
	Total	37.87	22.42
Total	Noncore	41.74	25.56
	Core	50.05	23.57
	Total	46.25	24.82
<b>Empathy score 2, start of sophomore year</b>			
Women	Noncore	50.19	22.43
	Core	60.71	23.06
	Total	56.92	23.32
Men	Noncore	28.53	25.32
	Core	34.71	22.83
	Total	31.56	24.29
Total	Noncore	34.51	26.36
	Core	45.48	26.23
	Total	40.45	26.82
<b>Empathy score 3, start of junior year</b>			
Women	Noncore	49.19	27.59
	Core	61.49	25.76
	Total	57.05	27.00
Men	Noncore	26.32	26.14
	Core	36.05	22.64
	Total	31.08	24.93
Total	Noncore	32.64	28.39
	Core	46.59	27.02
	Total	40.19	28.49
<b>Empathy score 4, start of senior year</b>			
Women	Noncore	40.40	29.72
	Core	55.98	23.75
	Total	50.36	27.02
Men	Noncore	22.00	25.40
	Core	29.66	26.94
	Total	25.75	26.40
Total	Noncore	27.08	27.83
	Core	40.56	28.72
	Total	34.38	29.07

\* The table presents mean scores by medical school year, specialty preference, and students' gender. Scores are for students' vicarious empathy (i.e., to have a visceral empathic response); responses were to a well-established measure of the various emotional qualities of empathy, administered at the beginning of each medical school year. Vicarious empathy significantly decreased during medical education ( $P < .001$ ), especially after the first and third years. Students choosing core careers had higher empathy than did those choosing noncore careers.

<sup>†</sup> Core specialties (i.e., family medicine, internal medicine, obstetrics–gynecology, pediatrics, and psychiatry) have substantial patient contact and continuity of care, whereas noncore specialties (all others, including anesthesiology, dermatology, and general surgery) have minimal patient contact and continuity of care. Totals in this column are the combined women and men core or noncore scores for each year of the study.

<sup>‡</sup> Totals in this column are the average women's, men's, and combined women's and men's scores for all students at the start of the freshman, sophomore, junior, or senior year.

then dropped significantly lower than the norm ( $P < .002$ ) after completing the freshman year (see the M2 data point in Figure 1).

For both men and women, the pattern of empathy scores (see Figure 1) across the four time points (i.e., the first three years of medical school) is similar. For

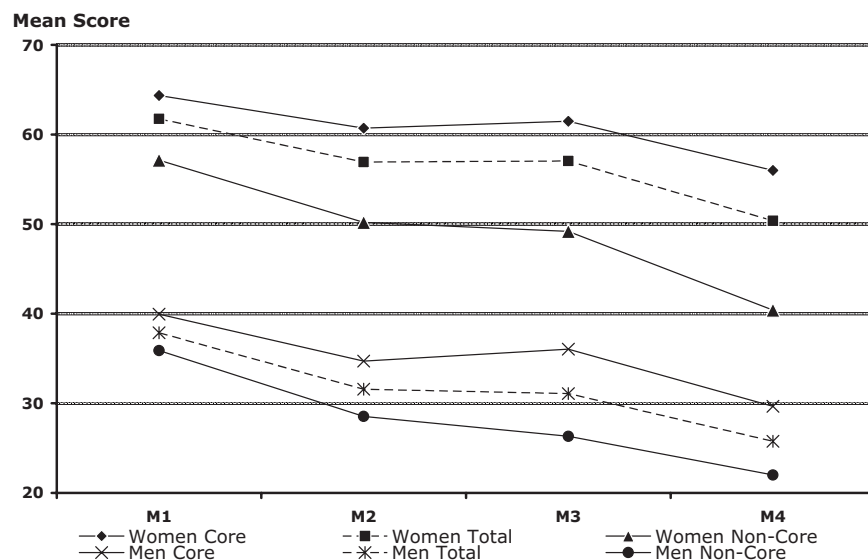
either gender, total BEES scores drop significantly from initial enrollment to the beginning of the sophomore year. Empathy scores stay level from the beginning of that year to the beginning of the junior year. After completing the first clinical year, BEES scores decline sharply, as evidenced by the senior BEES scores. Thus, men's and women's scores both have a significant cubic trend (i.e., a line with two inflection points and a central plateau;  $P < .001$  for men;  $P = .023$  for women).

For the women, there was no significant interaction of year in medical school with specialty choice ( $P = .22$ ), but there were significant main effects for type of specialty choice ( $P = .001$ ), with core women having both a higher score and year of school than did noncore women ( $P = .001$ ) where, as described above, empathy scores followed a cubic trend. Similar to the women, the men had no significant interaction of time with specialty choice ( $P = .19$ ). BEES scores for the men differed significantly for career choice ( $P = .006$ ) and year of medical school ( $P < .001$ ), as described above.

Women choosing a core specialty had the smallest M1–M4 decline of all groups at 13.0%. Men entering a noncore specialty had the greatest single-year decline (M1–M2; 20.5%) compared with all other groups. Men choosing a core specialty had a 25.8% drop in M1–M4 BEES scores, whereas noncore men had a 38.7% decline. Women entering a noncore specialty had a 29.3% M1–M4 decline in BEES scores, with a single 17.3% drop in empathy after completing the M3 year.

For students choosing a core specialty, there was a gender difference in the degree of decline in M1–M4 scores; the men's decline was essentially twofold greater than the women's decline. Among women, the drop in M1–M4 BEES scores was 2.25-fold greater for those who choose noncore versus those who chose core specialties. For men, the drop in M1–M4 BEES scores was only 1.5-fold greater for the noncore versus core students. In either gender, the greatest declines in M1–M4 BEES scores are associated with those students who selected a noncore specialty.

A secondary analysis was done to determine how similar women's scores



**Figure 1** Mean scores, by medical school year, specialty preference, and students' gender, for 419 men and women in the classes of 2001–2004, the University of Arkansas for Medical Sciences. Scores are for students' vicarious empathy (i.e., to have a visceral empathic response); responses were to a well-established measure of the various emotional qualities of empathy, administered at the beginning of each medical school year. The figure shows that vicarious empathy significantly decreased during medical education ( $P < .001$ ), especially after the first and third years. Students choosing core careers had higher empathy than did those choosing noncore careers. Core refers to core specialties (i.e., internal medicine, family medicine, obstetrics–gynecology, pediatrics, and psychiatry, which have greater patient contact), and noncore refers to all other specialties, where patient contact is less.

were to men's within specialty type. This analysis was prompted by the finding that women choosing noncore specialties had lower BEES scores than did the other women when there was no similar difference for the males. For students choosing a core specialty, women reported significantly higher empathy scores than men did across all four time points ( $P < .001$ ). The effect size, as measured by a partial eta squared, was 0.33. Women choosing noncore specialties also had higher scores than men choosing noncore specialties, but the difference was not as great ( $P = .02$ ). In this instance, the effect size was only 0.045.

## Discussion

Our study is unique in at least two aspects. It is the first longitudinal study to follow four cohorts of undergraduate medical students. Second, it is the first study to examine vicarious empathy (i.e., to have a visceral response) instead of cognitive empathy (i.e., to, in imagination, take the role of another) in medical students. We believe that the decrease in BEES scores revealed in this study represents a loss of vicarious empathy. If so, this study reveals a

significant decline in the component of empathy that is essential to patient care, because empathy is one of three core values needed to establish an effective physician–patient relationship.<sup>17</sup>

The results of this study suggest that student empathy is affected by medical education. Our study supports the findings of Coulehan and Williams,<sup>18</sup> who described deleterious changes in various humanistic qualities as medical students became “immunized” against these values after their matriculation into medical school. In the freshman year, the similar M1 BEES scores for all four classes indicate that the matriculates studied were drawn from a homogenous population, and that the undergraduate education of the matriculates, predominated by basic science courses, did not decrease vicarious empathy below the established norm. Indeed, the entering male medical students had BEES scores that were significantly higher than the norm. For both the men and the women, the M1 BEES scores were not significantly different between core and noncore groups.

For all the students studied, the significant decrease in vicarious empathy

that occurred after completing the freshman year of medical school may have resulted from a high degree of student stress and anxiety caused by the students' competitiveness and desire to overachieve on examinations. Additional stressful factors may include the media's presentation of doctors as heroes, which helps create a skewed image of the ideal physician for entering freshmen medical students. As the students progressed through their freshman year, they probably realized there is a mismatch between the media representation and reality.<sup>19</sup> Additionally, the freshmen likely considered themselves to be in a hostile educational environment that treated them like children.<sup>20</sup> All of these stressors induce self-preservation and coping behaviors. In our view, some of these behaviors, expressed as increased cynicism<sup>2</sup> and, ostensibly, decreased vicarious empathy, were used by the students to adjust to the stresses and internal conflicts associated with medical education.

The larger drop in the noncore empathy scores of the M2 women versus the M2 women suggest that the aforementioned stressors may have a differential effect on some women. We believe women choosing core specialties may better maintain their vicarious empathy, at least partially, because the continuity of patient care (a characteristic of core specialties) lends itself to attracting a more nurturing individual. Conversely, the marked drop in vicarious empathy of women choosing noncore specialties may reflect more of a “survival” or “coping” mechanism. Because noncore specialties (e.g., orthopedics and surgery) are still predominately chosen by men, the noncore women we studied were adjusting in the same way that the less empathetic noncore males did.

The sophomore year, which is an additional year of basic science courses similar to the freshman experience, maintained stable BEES scores. This may be explained by the students' acclimating to the academic rigors of basic science courses. The junior clinical year, where all students participate in standard rotations, produced another dramatic drop in BEES scores for both the men and the women. This drop substantiates findings from the literature that suggest that the first clinical year of medical

school is demanding and challenging.<sup>21</sup> The large drop in M3 students' vicarious empathy occurred while the students were seeing patients they had, presumably, looked forward to helping. It is interesting to note that a recent study showed that a similar drop in empathy occurred after dental students began seeing patients.<sup>22</sup> In university tertiary care centers, empathy is hard to direct toward the challenging patients when the treatment emphasis is on technology.<sup>23</sup> Immense cultural differences between physicians-in-training and patients may also make it more difficult to achieve adequate empathy. Physicians who are role models should work more closely with medical students to develop an empathic relationship with such patients.<sup>24</sup> Our own findings suggest that this could be particularly important for women who enter a noncore specialty, because their drop in vicarious empathy scores more closely emulated the naturally lower empathy scores of the men than the scores of their female colleagues who selected a core specialty.

Studies show that clinicians consider an empathic physician–patient relationship as one of the most important aspects of professionalism<sup>5</sup> and that professionalism and physician–patient interactions are best demonstrated by clinician role models at the bedside in hospitals or,<sup>25</sup> as suggested by Benbassat and Bauml,<sup>24</sup> in primary and chronic care clinics and/or hospice facilities. Other studies reveal a chronic lack of clinical role models,<sup>26</sup> and perhaps a lack of positive role models could have contributed to the decline in empathy scores we observed after the completion of the first clinical year of undergraduate medical education.

In addition to complicated treatment regimes and a lack of clinical role models, literature shows that juniors, as student/physicians (i.e., individuals that are learning to assume an authoritative role in providing care while simultaneously being subservient to their mentors), perceive themselves as being abused by their mentor/role models.<sup>1,21,27</sup> This student abuse has been termed “traumatic deidealization” by Kay<sup>19</sup> and is another factor possibly contributing to the declines in empathy. Other potential factors include fatigue and a lack of patient continuity that is exacerbated by starting a new clinical rotation every four to five weeks.

The “intended” medical curriculum, which is the formally offered and endorsed curriculum, often falls short of student expectations because of the “informal” and the “hidden” curricula.<sup>28</sup> The informal curriculum, as defined by Hafferty,<sup>28</sup> “is an unscripted, predominantly ad hoc, highly interpersonal form of teaching that takes place among and between faculty and students” (e.g., in the hallway, lounge, or on-call room), whereas the hidden curriculum “is a set of influences that function at the level of organizational structure and culture” (e.g., advertising the amount of National Institutes of Health dollars the institution garners or espousing the need for basic science rather than humanities courses when applying to medical school). These latter two curricula contribute to insidious declines in desirable professional traits, because students easily recognize that campus policies and resource allocations and “what’s really important to learn” often conflict with the stated institutional educational mission.<sup>1,28</sup> Instead, the mandate that should be implicit within the informal and hidden curricula should be the societal obligation of medical schools to provide and/or train better physician role models who can aid students in overcoming losses in empathy and other professional characteristics.<sup>26</sup>

The most frequently offered solutions to ameliorate the loss of professionalism at the undergraduate medical level involve teaching students to be empathic or “humanitarian” via courses that emphasize empathic communication skills.<sup>9,12,29</sup> Evidence suggests that in most instances the gains are modest and temporary,<sup>10,30</sup> and some feel that empathy and compassion are increasingly difficult to teach as an individual matures.<sup>20</sup> In contrast to traditional four-year schools, several recent studies have shown that six-year medical schools, or schools with a problem-based learning curriculum, have greater opportunities to integrate humanism and empathy into their curricula.<sup>31,32</sup> Despite some encouraging initial reports from several of these nontraditional schools, a large cadre feels that medical students possess a detrimental inertia, fueled by a frank decline in ethics, morals, empathy, and service-oriented attitudes, that cannot be overcome by a concurrent limited exposure to the humanities, especially when presented in an already crowded

four-year curriculum.<sup>2,9,33,34</sup> Some residency programs, aware of the reduction in humanitarian traits in medical graduates, have developed intensive workshops devoted to teaching and enhancing physician–patient interactions, yet studies show that even with such courses, idealism and empathy decrease and cynicism increases in as little as five months after the start of the intern year.<sup>35–37</sup> We maintain that the attempted maintenance of professionalism should be part of the medical school curriculum that is combined with the reinstatement of effective bedside teaching. However, our study findings suggest that the loss of innate, vicarious empathy could make it difficult to effectively teach medical students, interns, and residents to consistently role-play empathic concern.

This study was of a single four-year medical school in the mid-South. Therefore, the findings may not be directly applicable to other medical institutions in the United States. During the period of this longitudinal study, the curriculum at the institution remained fairly stable and can be described as “traditional.” Therefore, differences in empathy scores from year to year, or between graduating classes, were not influenced by large-scale curricular changes. The students voluntarily took the BEES four times. As with any repeated measure, there are concerns that familiarity with the survey may affect the students' responses. For logistical reasons, this study did not examine BEES scores after the completion of the senior year. It is unknown whether another significant decrease in vicarious empathy would have occurred after completion of the M4 year or even into residency training, but other studies suggest this would have been the case.<sup>34,35</sup> A number of students did not respond to our request to use their BEES data. Therefore, the effect that these purged data would have had on our current results cannot be determined. However, we do know that for either gender, the numbers of nonresponders who entered core or noncore specialties on graduation did not differ significantly from those who did permit their data to be used. Thus, nonresponder career choice was not a factor that could have skewed our results.

In conclusion, in our study, the first three years of medical education significantly

decreased students' vicarious empathy. The decline in empathy occurred in students who chose core and noncore specialties, with significant declines occurring during the first basic science year as well as the initial clinical year when students were exposed to patients. The decrease may constitute a coping or survival mechanism where empathic feelings are suppressed. Although a hardening of the heart may aid physicians coping with patients on a daily basis, this runs counter to the patient's need for an empathic caregiver.<sup>38</sup> Because of the significant drop in vicarious empathy during medical school, we propose that empathy should be constantly reinforced by the use of role-playing throughout students' education and be periodically reinforced during their residency training and practice as physicians.

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