

Universal Health Care and Reform of the Health Care System: Views of Medical Students in the United States

Jeffrey Huebner, MD, Jaya R. Agrawal, MD, MPH, Ashwini R. Sehgal, MD, Paul Jung, MD, MPH, Joan Hedgecock, MSPH, and Steven R. Simon, MD, MPH

Abstract

Purpose

Nearly 46 million Americans did not have health insurance in 2004. Recent studies have documented physicians' support for various remedies, including universal health care. The authors undertook this study to assess medical students' views on these topics.

Method

In 2002, the authors surveyed a national random sample of first-year and fourth-year medical students (from the American Medical Association Masterfile) to determine their views about health care reform options, including universal health care. Response data were weighted and compared using chi-

squared tests; statistical significance was set at $p \leq .05$.

Results

Of 1,363 medical students, 770 completed the questionnaire (response rate = 56.5%). In rating the importance of several health care issues, more than 80% of both first-year and fourth-year students rated the expansion of health care coverage as important. Nearly all first-year (90%) and fourth-year (88%) students agreed with the statement, "Everyone is entitled to adequate medical care regardless of ability to pay." Most students favored health care reform that would achieve universal health care, with first-year students (70%) somewhat more likely than

fourth-year students (61%) to support universal health care ($p = .012$). Students were less likely to believe that physicians support universal health care, and more likely to believe that the public does.

Conclusions

Both groups of students generally support the expansion of health coverage to the uninsured and some form of universal health care. This may be relevant both to policymakers in their considerations of health care reform and to medical educators concerned with teaching students about health policy issues.

Acad Med. 2006; 81:721-727.

Nearly 46 million persons in the United States did not have health insurance in 2004,¹ and more than 31 million of America's workers are underinsured.² Numerous studies recently summarized by the Institute of Medicine have shown that being

uninsured translates into serious health consequences, including a higher risk of death.³

In addition to the growing numbers of uninsured, rising health care costs⁴ and concerns about the quality of health care have focused public attention on reforming the health care system.⁵⁻⁸ A wide range of physicians' organizations have been active in discussing the problems of the health care system and proposing solutions⁹⁻¹³ for "universal coverage."

Recent studies suggest that many physicians support dramatic health care reform. A national survey found that 49% of U.S. physicians supported governmental legislation to establish national health insurance, while 40% opposed it.¹⁴ In a survey of Massachusetts physicians, almost two-thirds (63.5%) of respondents indicated that a single-payer system would provide "the best care for the most people for a fixed amount of money."¹⁵

Medical students' views about universal health care and other issues of health care

policy are not well-known. Understanding the views of medical students is important, because these individuals will constitute the next generation of practicing physicians and will have the potential to help shape future reform efforts. Furthermore, students' views on these topics may provide insight into the messages that medical school curricula and faculty members are conveying to future physicians.

Previous studies have examined medical students' views of the health care system and perspectives on various reform options,¹⁶⁻²⁰ but to our knowledge no such studies have been published since the last major health care reform debate of the early 1990s, and those that were done were limited in scope and sample size. We therefore surveyed a nationally representative sample of first- and fourth-year medical students to determine their views about health care policy and universal health care in the United States. We hypothesized that support for universal health care would decline over the course of the medical

Dr. Huebner is clinical instructor, Department of Family Medicine, University of Washington, Seattle, Washington.

Dr. Agrawal is fellow in gastroenterology, Department of Gastroenterology, Brigham and Women's Hospital, Boston, Massachusetts.

Dr. Sehgal is director, Center for Reducing Health Disparities, Case Western Reserve University, Cleveland, Ohio.

Dr. Jung is senior lecturer, University of Maryland, College Park, Maryland.

Ms. Hedgecock is associate director, the American Medical Student Association Foundation, Reston, Virginia.

Dr. Simon is assistant professor, Department of Ambulatory Care and Prevention, Harvard Medical School and Harvard Pilgrim Health Care, Boston, Massachusetts.

Correspondence should be addressed to Dr. Huebner, Department of Family Medicine, University of Washington, 325 Ninth Ave., Seattle, WA 98103; telephone: (206) 744-9192; fax: (206) 744-9925; e-mail: (eino@u.washington.edu).

training process, and would be reflected by higher rates of support among first-year students compared with fourth-year students.

Method

Participants

We surveyed a national probability sample of first- and fourth-year students about their views of universal health care and related health policy topics. We used the Masterfile of the American Medical Association to draw stratified probability samples of 1,600 first-year and fourth-year medical students. We oversampled fourth-year students to ensure their adequate representation in the sample due to an expected lower rate of returns. After excluding students with incorrect addresses, 1,363 eligible participants remained. Our responding sample could provide an accurate estimate, with 95% confidence, of U.S. first-year and fourth-year medical students' views, with a sampling error of 3.6%.

The Center for Survey Research at the University of Virginia administered the mail questionnaire between March and May 2002. An advance letter was mailed to the randomly selected eligible participants, followed by a mailing that included a cover letter, the questionnaire, a prepaid return envelope, and a \$2 incentive. All recipients were assured that participation was voluntary and that their responses would be confidential. Those not responding were contacted up to three additional times by mail, phone, or e-mail. The University of Virginia institutional review board approved the study protocol.

Survey instrument

We developed the questionnaire* on the basis of a systematic review of the literature and the observations of a focus-group of current medical students. We chose final questions for the questionnaire based on an iterative process that involved feedback from survey experts, health policy specialists, and medical students. Some items were original and some were variants or replications of items from previously published health care surveys.

*The questionnaire is available from Joan Hedgecock, American Medical Student Association Foundation, 1902 Association Drive. Reston, VA 20191.

Table 1

Characteristics of First-Year and Fourth-Year Medical Student Respondents and of All Fourth-Year Students Graduating from U.S. Medical Schools in 2002*

Characteristic	No. (%) first-year respondents (n = 295) [†]	No. (%) fourth-year respondents (n = 475) [†]	% all fourth-year U.S. students
Gender			
Male	145 (48)	263 (54)	55
Female	157 (52)	224 (46)	45
Race[‡]			
White, non-Hispanic	187 (65)	346 (73)	65
Black, non-Hispanic	18 (6)	22 (5)	7
Spanish/Hispanic/Latino	15 (5)	18 (4)	6
Asian/Pacific Islander	57 (20)	67 (14)	17
American Indian/Alaskan	0	5 (1)	1
Area grew up[§]			
Rural	94 (31)	160 (33)	na
Suburban	146 (49)	227 (48)	na
Urban	61 (20)	91 (19)	na
Anticipated field			
Primary care	81 (38)	131 (29)	na
Specialty	131 (62)	320 (71)	na
Ever uninsured?			
Yes	116 (41)	204 (43)	na
No	168 (59)	266 (57)	na

* From a study of medical students' perceptions of universal health care and health care reform, 2002.

[†] The total numbers of respondents in some demographics are slightly more than the total numbers of students that actually completed entire questionnaire.

[‡] Sum does not equal 100% because of additional races that amounted to less than 5% of sample.

[§] The sum for fourth-year students does not equal 100% because of rounding.

Participants in the focus-group were somewhat divergent in their understanding of the terms "fee-for-service," "managed care," "single-payer," "multi-payer," and "universal health care," so these terms were defined for specific questions when the exact meaning was vital to understanding the question meaning and answer options. Some answer choices about health care financing structures were based on a survey question used previously¹⁹ that we edited and pilot tested in order to provide both additional explanations and an additional answer choice ("multi-payer") in order to reflect the multitude of financing mechanisms in other countries' universal health care systems. In response to the questions "Which of the following would offer the best health care to the greatest number of people for a given amount of money?" and "Of the following health care structures, please indicate your preference as well as what you believe to be the preference of doctors and patients in the United

States," the response choices were: (1) A "fee-for-service" system in a competitive marketplace (the predominant mode of coverage in the "old" American system); (2) a "managed care" system in a competitive marketplace (the predominant mode of coverage in the current system); (3) a "single-payer" system with universal coverage (publicly financed national health insurance); and (4) a "multi-payer" system with universal coverage (combination of publicly and privately financed national health insurance). We also asked students to rate various health system features related to access, quality, and physicians' work in the United States compared to those of other industrialized nations. A series of Likert-style questions were asked to assess values and knowledge about programs such as Medicare and care of the uninsured in the United States. Finally, we asked students about various academic and life experiences that had caused them to support or oppose universal health care. The survey

questions used for this study were part of a larger survey that took approximately 15 minutes to complete.

Statistical analysis

The analysis required weighting of the data to accurately represent the population of first-year and fourth-year medical students with regard to both gender and race, using current medical student population figures.²¹ All estimated means and percentages are weighted statistics and therefore represent estimates of the responses of the national population of medical students. We compared first-year and fourth-year students' responses using chi-squared tests for categorical variables, and we considered two-tailed $p \leq .05$ statistically significant.

Results

Sample

We received 770 completed questionnaires, yielding a response rate of 56.5%.²² A total of 295 first-year (57.2%) and 475 fourth-year (56.1%) students completed the survey. Table 1 shows characteristics of first-year and fourth-year students responding to the survey, along with characteristics of the population of fourth-year medical students in the United States in 2002,²³ the same year as the study. Fourth-year respondents were similar to the general U.S. fourth-year student population (as determined by the Association of American Medical Colleges (AAMC)

graduation survey²³) in terms of gender. A larger proportion of fourth-year respondents were white, compared with the general population of graduating students in 2002. However, the racial composition of the first-year respondents was very similar to the population of graduating students nationwide.

Prioritizing health care policy issues

More than four out of five first-year (82% [242]) and fourth-year (81% [380]) medical students indicated that expanding health care coverage for the uninsured was "very" or "extremely" important (versus "somewhat" or "not at all" important). Similar proportions of first-year (82% [243]) and fourth-year (78% [366]) students reported that it was "very" or "extremely" important to enact a patients' bill of rights to protect patients against some abuses of managed care. In comparison, about half of first-year (53% [158]) and fourth-year (50% [236]) students noted that strengthening the public health system in preparation for future bioterrorism attacks was "very" or "extremely" important.

Health insurance and universal access to health care

For the following questions, students were asked to indicate on a Likert scale whether they agree or disagree with several statements. A total of 90% [270] of first-year students and 88% [424] of fourth-year students agreed or strongly agreed with the statement, "Everyone is entitled to adequate medical care

regardless of ability to pay." In contrast, 84% [249] of first-year students and 72% [336] of fourth-year students disagreed or strongly disagreed with the statement, "People without health insurance still have access to the care they need." More than nine out of ten medical students (89% [268] of first-year students and 95% [457] of fourth-year students) said that receiving routine care in the emergency room was not an effective way for the uninsured to receive care. More than half of first-year (64% [193]) and fourth-year (58% [276]) students disagreed with the statement, "The U.S. cannot afford a universal health care system."

Of those that registered an opinion, a higher percentage of fourth-year students than first-year students agreed that "Medicare is an effective program that guarantees access to health care for all elderly persons in the U.S." (64% [296] vs. 55% [156], $p = .015$).

The "best" system for providing health care

Figure 1 shows a summary of all students' (first- and fourth-year students combined) responses to the question, "Which of the following would offer the best health care to the greatest number of people for a given amount of money?" Nearly two-thirds (64% [472 of 732 total responses for this question]) of all students identified a system with universal coverage as the best structure, with somewhat more support among first-year students (68% [195]) than fourth-year students (62% [277], $p = .11$). Just over half of students (51% [371 of 732]) selected "multi-payer" overall, and this type of system was most popular among those selecting a system with universal health care. A considerable proportion of students (19% [53] of first-year students and 21% [92] of fourth-year students) selected "don't know" as their response to this question.

Figure 2 contrasts first- and fourth-year students' assessments of their own preferences for health care financing structures, in addition to their assessments of the structures that would be favored by physicians or the public. Of note, students' personal preferences largely differed from their perceptions of what doctors and patients would prefer. Large majorities of both first- and fourth-

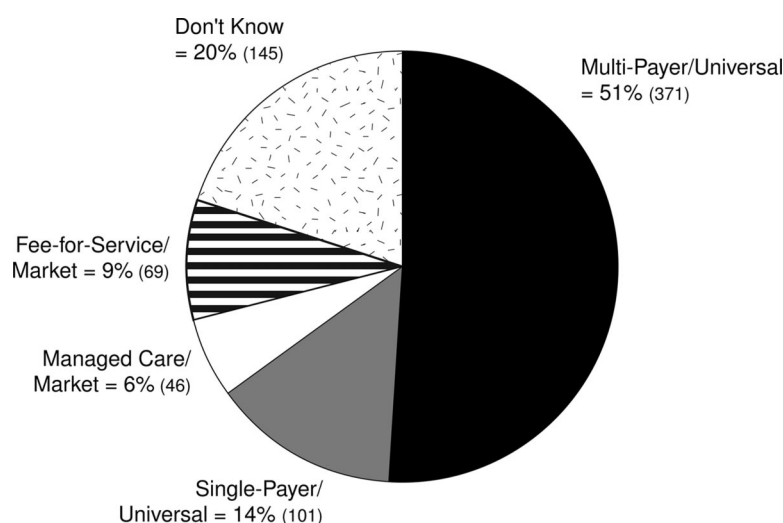


Figure 1 Medical student responses to the question: "Which of the following structures do you think would offer the best health care to the greatest number of people for a given amount of money?" Measured in percentage (actual).

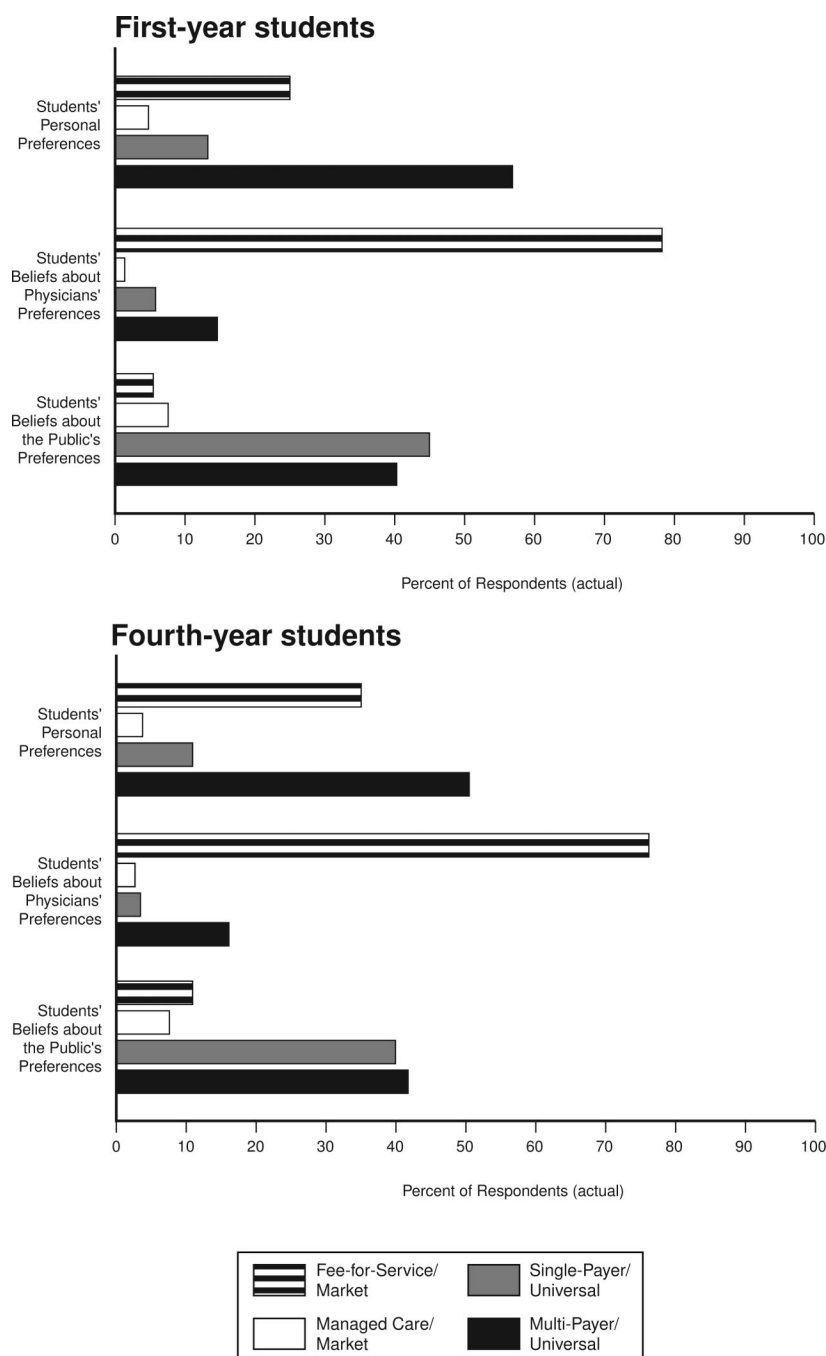


Figure 2 Medical students' preferences and beliefs about physicians' and the public's preferences for health care system.

year students supported a structure with universal health care, but even more believed that the public supports a structure with universal health care. First-year students were more likely to support a universal health care structure (70% [205]) than fourth-year students (61% [290], $p = .012$). More first-year students (46% [134]) believed that the public prefers a single-payer system than any other structure. In contrast to students' preferences and their beliefs about those

of the public, similarly large percentages of both first- (78% [229]) and fourth-year (76% [362]) students believed that physicians preferred a fee-for-service/marketplace system.

The United States versus other industrialized nations

Students were asked to rate on a Likert scale whether the U.S. health care system was better or worse than the systems of

other industrialized nations (Table 2). Majorities of both first-year and fourth-year students believed that the U.S. system performed better than other nations' in regards to freedom-of-choice of physician, length of wait for treatments, provision of high quality care, and development of innovative medical technologies. However, majorities of both first-year and fourth-year students indicated that the current U.S. system did worse than other industrialized nations in regards to providing access to care for everyone, protecting patients from out-of-pocket costs, the amount of interference in physician decision making, the amount of paperwork and administrative burden placed onto physicians, and medical student debt.

Influences on attitudes about universal health care

Table 3 shows students' perceptions of how various influences contributed to their attitudes about universal health care (answer choices were on a scale of "support" to "oppose," midpoint "did not influence"). Substantial proportions of both first-year and fourth-year students reported that a wide range of sources influenced their opinions on this topic, including personal experiences, educational experiences, and exposure to the media. A majority of students identifying each source as an influence on their opinion said that the direction was in support of universal health care, except for fourth-year students' reports of influences by residents. The three influences that were most likely to create support for universal health care were extracurricular learning, elective coursework, and required coursework. The influences that were most likely to create opposition to universal health care were residents, faculty/attending physicians, and opinions of family who were health professionals.

Discussion

A recent series of reports on the consequences of uninsurance from the Institute of Medicine culminated with a call for the nation to achieve universal health coverage by 2010.²⁴ Our study documents widespread support among U.S. medical students for this goal. Students' support for the expansion of health coverage to the uninsured was

Table 2

Medical Students' Perceptions of the U.S. Health Care System Compared to Other Industrialized Nations' Systems*

Characteristic	No. (%) first-year students (n = 295) [†]				No. (%) fourth-year students (n = 475) [†]				p value [§]
	Better	Same	Worse	Don't know	Better	Same	Worse	Don't know	
Access to care for everyone	57 (19)	30 (10)	201 (67)	14 (5)	98 (20)	54 (11)	303 (63)	26 (5)	0.78
Freedom of choice of physician [‡]	155 (52)	54 (18)	53 (18)	38 (13)	291 (61)	74 (16)	76 (16)	38 (8)	0.046
Waiting time for treatments [‡]	173 (58)	57 (19)	25 (8)	45 (15)	258 (75)	51 (11)	28 (6)	42 (9)	<0.001
High quality care [‡]	225 (75)	48 (16)	11 (4)	16 (5)	399 (83)	54 (11)	12 (3)	15 (3)	0.05
Development of technologies	274 (91)	21 (7)	1 (0)	6 (2)	451 (94)	18 (4)	1 (0)	10 (2)	0.25
Disease prevention	132 (44)	81 (27)	71 (23)	18 (6)	214 (45)	127 (26)	116 (24)	25 (5)	0.97
Paperwork burden for physicians [‡]	9 (3)	60 (20)	149 (50)	82 (27)	14 (3)	88 (18)	303 (63)	75 (16)	<0.001
Patients' out-of-pocket costs	25 (9)	43 (14)	175 (58)	57 (19)	47 (10)	82 (17)	288 (60)	62 (13)	0.12
Medical student debt [‡]	6 (2)	12 (4)	211 (71)	71 (24)	7 (1)	15 (3)	384 (80)	75 (16)	0.03

* From a study of medical students' perceptions of universal health care and health care reform, 2002.

[†] Sums do not necessarily equal 100% due to rounding. Also, the total numbers of respondents for some questions in this category are greater than the number of students that completed entire surveys.

[‡] Indicates $p \leq 0.05$ for chi-square comparison for first-year and fourth-year students' responses.

[§] p values are for the comparison of first-year and fourth-year students' responses.

shown in multiple areas of our study, including the belief that all individuals are entitled to adequate health care regardless of ability to pay, the rating of expanded health care coverage as a very important issue for the government to address, and the preferences for health care reform that would create a system with universal coverage. Support for expanded coverage and health care reform was high among both groups of students, but fourth-year students tended to be somewhat less supportive than first-year students. Less support for universal health care among fourth-year students may foreshadow the continued erosion of support once they graduate, as noted in one recent national study of physicians.¹⁴

Medical students' support for the expansion of health coverage to the uninsured might be explained by four other sets of results from our study. First, students' moral commitment was revealed in their strong and consistent support for the concept of health care as a right for all persons. The high level of support for this concept was consistent with the data collected in another national survey of fourth-year students conducted contemporaneously.²³ Second, medical students correctly identified that people have difficulty accessing the health

care they need if they do not have health insurance and that the emergency department is not an effective way for the uninsured to receive routine care.³ Third, students indicated their beliefs that the United States can afford a universal health care system and that Medicare is an effective system that guarantees health care access for the elderly. Medical students' favorable view of Medicare may indicate their receptiveness to other government-financed systems of universal coverage. Last, students recognized that other industrialized nations' health care systems have fewer problems with access to care.

While majorities of both first-year and fourth-year students preferred health care reform that would create universal health care, they also tended to believe that practicing physicians desire a fee-for-service system in the marketplace. At the same time, most medical students perceived that patients preferred universal health care. This dichotomy suggests that medical students perceive that physicians' interests may not always align with the best interests of patients. Whether students develop these perceptions as a result of their medical training or from other sources remains unknown. Both a formal and a hidden

curriculum during medical school play a role in students' education,²⁵ and our survey results suggest this is true, evidenced by their frequent reports of residents and faculty physicians contributing to negative perceptions about universal health care.

Fewer students in our study supported a "single-payer" system than in a previous study,¹⁹ perhaps because our question offered the additional response options of "multi-payer" and "don't know." We thought these additional response options would better reflect the wide range of policy solutions, as well as students' previously documented lack of knowledge about health policy issues.²⁶

This study has several limitations. First, in several instances, complex policy terms were not defined in the questionnaire. In order to counter this problem, we provided short definitions for some terms and a "don't know" response option, but phrases such as "single-payer" or "managed care" still may have conjured confusion or bias. Second, differences in responses between first-year and fourth-year students may be due to maturation and acculturation during medical school, but the cross-sectional design does not confirm these effects. A longitudinal study

Table 3

Influences on Medical Students' Support or Opposition to Universal Health Care*

Influence	No. (%) first-year students (n = 295) [†]	No. (%) fourth-year students (n = 475) [†]	p value [§]
Academic experiences			
Peers in medical school*			
Any influence	164 (56)	277 (58)	0.05
Support	114 (70)	167 (60)	
Oppose	50 (31)	110 (40)	
Residents			
Any influence	76 (26)	233 (49)	0.07
Support	46 (61)	114 (49)	
Oppose	30 (40)	119 (51)	
Faculty/attending physicians			
Any influence	124 (42)	311 (66)	0.22
Support	80 (65)	181 (58)	
Oppose	44 (36)	130 (42)	
Required coursework (including pre-med)			
Any influence	137 (46)	246 (52)	0.78
Support	109 (80)	193 (79)	
Oppose	28 (20)	53 (22)	
Elective coursework (including pre-med)			
Any influence	133 (45)	211 (44)	0.26
Support	110 (83)	164 (78)	
Oppose	23 (17)	47 (22)	
Extracurricular activities			
Any influence	181 (61)	275 (60)	0.89
Support	147 (81)	222 (81)	
Oppose	34 (19)	53 (19)	
Nonacademic experiences			
Personal/family experience as a patient			
Any influence	178 (60)	268 (56)	0.8
Support	136 (76)	202 (75)	
Oppose	42 (24)	66 (25)	
Health professional relatives			
Any influence	119 (40)	211 (44)	0.87
Support	71 (60)	124 (59)	
Oppose	48 (40)	87 (41)	
Media			
Any influence	215 (73)	346 (73)	0.84
Support	148 (69)	241 (70)	
Oppose	67 (31)	105 (30)	

* From a study of medical students' perceptions of universal health care and health care reform, 2002.

[†] "Any influence" answers are numbers and percentages of all respondents; "Support" and "Oppose" answers are numbers and percentages of "Any influence" answers. Percentages of "Support" and "Oppose" answers do not necessarily equal 100% of "Any influence" answers due to rounding.

[‡] Indicates $p \leq 0.05$ for chi-square comparison of first-year and fourth-year students' responses.

[§] p values are for the comparison of the influences between first-year and fourth-year students.

of medical students throughout their training and perhaps their early years in practice would help pinpoint where and why the erosion of their support for universal health care occurs. Finally, nonresponse bias may have influenced these results. It is possible that students with greater interest in health policy issues may have been more likely to respond, and these students' views may not be representative of all medical students.

This survey demonstrates strong support among U.S. medical students for expanding health care coverage to the uninsured. Although a majority of students expressed a preference for a system of universal health care, their perception that practicing physicians do not support universal health care could negatively influence their views over time. The negative influences on their perceptions of universal health care should be balanced by curricula that will contribute to maintaining their support for universal health care as students advance in their training and into practice. Medical school faculty may wish to engage in dialogues with medical students in a productive, educational exchange of ideas. Educational programs should teach students about health care systems in other nations and should provide learning experiences whereby medical students learn about health care reform primarily from the patient's point of view. In order to achieve the goal of universal coverage by 2010 as recommended by the Institute of Medicine, medical students and physicians should strengthen collaborative efforts both within professional circles and together with citizens' groups toward the common goal of achieving high quality, affordable health care for all.

Acknowledgments

Dr. Huebner had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The authors thank Ryan Hubbard, PhD, Center for Survey Research at the University of Virginia, for his role in conducting the study and assistance with statistical analysis.

This study was supported by a grant from the Robert Wood Johnson Foundation and by internal support from the American Medical Student Association/Foundation Jack Rutledge Fellowship, and was presented at the Annual Meeting of the American Medical Student Association Poster Session, March 21, 2003, Washington, DC.

References

- 1 US Census Bureau. Health insurance coverage, 2004 (<http://www.census.gov/hhes/www/hlthins/hlthin04/hlth04asc.html>). Accessed 27 April 2006.
- 2 Shearer G. Hidden from view: the growing burden of health care costs (<http://www.consumersunion.org/health/0122exec.htm>). Accessed 27 April 2006. Consumers Union, January 29, 1998.
- 3 Institute of Medicine. Care Without Coverage: Too Little, Too Late. Washington, DC: National Academies Press, May 2002.
- 4 Gabel J, Claxton G, Gil I, Pickreign J, Lo Sasso T. Health benefits in 2004: four years of double-digit premium increases take their toll on coverage. *Health Aff (Millwood)*. 2004;23:200–9.
- 5 Fein R. Universal health insurance—let the debate resume. *JAMA*. 2003;290:818–20.
- 6 Glenhill L, Martin M. Health insurance mandate OK'd, state firms with over 20 employees would be affected. *The San Francisco Chronicle*. 13 Sept 2003.
- 7 Kaiser Network Daily Health Policy Report. Maine Governor signs universal health care bill (http://www.kaisernetwork.org/daily_reports/rep_index.cfm?hint=3&DR_ID=18367). Accessed 27 April 2006. June 19, 2003.
- 8 Connolly C, Goldstein A. Health insurance back as key issue: campaign by unlikely allies for universal coverage reflects big shift in public opinion. *The Washington Post*. 16 March 2003:A5.
- 9 American Academy of Family Physicians. Assuring health care coverage for all (<http://www.aafp.org/PreBuilt/hccfa.pdf>). Accessed 27 April 2006. October 2001.
- 10 American College of Physicians – American Society of Internal Medicine. Achieving affordable health insurance coverage for all within seven years (http://www.acponline.org/hpp/afford_7years.pdf). Accessed 27 April 2006. April 9, 2002.
- 11 Proposal of the Physicians' Working Group for Single-Payer National Health Insurance. *JAMA* 2003;290:798–805.
- 12 American Medical Student Association. Medical students rally for universal health care coverage [press release] (<http://www.amsa.org/news/pr/03/0320.cfm>). Accessed 27 April 2006. March 20, 2003.
- 13 Palmisano D, Emmons D, Wozniak G. Expanding insurance coverage through tax credits, consumer choice, and market enhancements. *JAMA*. 2004;291:2237–42.
- 14 Ackermann R, Carroll A. Support for national health insurance among U.S. physicians: a national survey. *Ann Intern Med*. 2003;139:795–801.
- 15 McCormick D, Himmelstein D, Woolhandler S. Single-Payer national health insurance. *Arch Intern Med*. 2004;164:300–4.
- 16 Blendon R, Kohut A, Benson J, Donelan K, Bowman C. Health system reform, physicians' views on critical choices. *JAMA*. 1994;272:1546–50.
- 17 Hodgson C, Wilkes M, Wilkerson L. First-year medical students' attitudes toward access to medical care and cost containment. *Acad Med*. 1993;68 (suppl):S70–S72.
- 18 Wilkes M, Skootsky S, Hodgson C, Slavin S, Wilkerson L. Health care reform as perceived by first year medical students. *J Commun Health*. 1994;19:253–69.
- 19 Simon S, Pan R, Sullivan A, Clark-Chiarelli N, Connelly M, Peters A, et al. Views of managed care: a survey of students, residents, faculty, and deans at medical schools in the United States. *N Engl J Med*. 1999;340:928–36.
- 20 Schnipper J, Dorwart R. Medical students' opinions of health system reform. *JAMA*. 1995;273:80–81.
- 21 Barzansky B, Etzel S. Educational programs in US medical schools, 2000–2001. *JAMA*. 2001;286:1049–55.
- 22 Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. Ann Arbor, MI: American Association for Public Opinion Research, 2000.
- 23 Association of American Medical Colleges. 2002 Medical School Graduation Questionnaire All Schools Report. Washington, D.C., 2002 (<http://www.aamc.org/data/gq/allschoolsreports/start.htm>). Accessed 27 April 2006.
- 24 Institute of Medicine. Insuring America's health: principles and recommendations. Washington, DC: National Academies Press, January 2004.
- 25 Ludmerer K. Time to Heal. New York: Oxford Press; 1999.
- 26 Agrawal A, Huebner J, Hedgecock J, Sehgal A, Jung P, Simon S. Medical students' knowledge of the U.S. health care system and their preferences for curricular change: a national survey. *Acad Med*. 2005;80:484–88.

Did You Know?

In 1992, a team of researchers at the Pennsylvania State University College of Medicine demonstrated, for the first time, the complete human papillomavirus life cycle in vitro.

For other important milestones in medical knowledge and practice credited to academic medical centers, visit the "Discoveries and Innovations in Patient Care and Research Database" at (www.aamc.org/innovations).