Tobacco Cessation and Prevention Practices Reported by Second and Fourth Year Students at US Medical Schools

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BACKGROUND: Tobacco dependence counseling is recommended to be included as core curriculum for US medical students. To date, there has been little information on students' self-reported skills and practice opportunities to provide 5A's (Ask, Advise, Assess, Assist, and Arrange) counseling for tobacco cessation.

METHODS: We conducted anonymous surveys of second year and fourth year students at multiple US medical schools between February 2004 and March 2005 (overall response rate 70%). We report on the tobacco control practices of the 860 second year and 827 fourth year students completing the survey.

MEASUREMENTS AND MAIN RESULTS: Fourth year students reported multiple opportunities to learn tobacco counseling in case-based discussions, simulated patient encounters, and clinical skills courses. They reported more instruction in family medicine (79%) and Internal Medicine (70%) than Pediatrics (54%), Obstetrics/Gynecology (41%), and Surgery clerkships (16%). Compared with asking patients about smoking, advising smokers to quit, and assessing patient willingness to quit, fourth year students were less likely to have multiple practice opportunities to assist the patient with a quit plan and arrange follow-up contact. More than half of second year students reported multiple opportunities for asking patients about smoking but far fewer opportunities for practicing the other 4 As.

CONCLUSIONS: By the beginning of their fourth year, most students in this group of medical schools reported multiple opportunities for training and practicing basic 5A counseling, although clear deficits for assisting patients with a quit plan and arranging follow-up care exist. Addressing these deficits and integrating tobacco teaching through tailored specific instruction across all clerkships, particularly in Surgery, Pediatrics, and Obstetrics/Gynecology is a challenge for medical school education.

KEY WORDS: tobacco; medical schools; medical students; curriculum; 5As; smoking cessation.
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INTRODUCTION

Cigarette smoking remains the leading cause of preventable morbidity and mortality in the United States.[1] Despite this overwhelming burden of disease, 45 million Americans continue to smoke.[2] The Public Health Service Guidelines recommend that every clinician counsel patients to quit smoking and a large body of evidence supports the effectiveness of physician interventions.[3] The "five A's" (*ask* about smoking status, *advise* all smokers to quit, *assess* willingness to quit, *assist* patients with a quit plan, and *arrange* follow-up) have been proposed as a mnemonic to structure the physician's approach to cessation counseling.[3] Research has shown, however, that physicians do not routinely and effectively counsel their patients to quit smoking.[4–6]

In response to "missed opportunities" for tobacco counseling, a National Cancer Institute Expert Panel (1992) on cigarette smoking and undergraduate medical education recommended a specific curriculum devoted to smoking cessation and prevention.[7] Subsequent studies and reviews documented sub optimal adherence to these recommendations.[8,9] In 2004, the Subcommittee on Cessation of the Interagency Committee on Smoking and Health's National Action Plan for Tobacco Cessation also included a recommendation for investing in training and education "to ensure that all clinicians in the United States have the knowledge, skills and support systems necessary to help their patients quit tobacco use."[10]

The Tobacco Prevention and Cessation Education Project (PACE) is a consortium of 12 US medical schools, funded by the National Cancer Institute (NCI), whose goal is to evaluate existing tobacco dependence teaching content at participating schools and then to develop and integrate new tobacco teaching modules into the schools' curricula.

Before curriculum development, PACE completed 3 tasks to guide its work. First, a faculty and administrator assessment of the curriculum at each school was conducted in the 2003–

04 school year.[11] It found that schools provided an average range of 5 to 8 hours of tobacco teaching. More than 30% of first and second- year classes had at least some mention of tobacco. Some third year clerkships, notably family medicine and Internal Medicine, provided basic tobacco counseling teaching skills. Second, curricula assessments and subsequent deliberations of the investigators led to the development and refinement of tobacco competencies,[12] including those for adult and pediatric cessation and prevention, public health advocacy and population sciences, support systems in clinical settings, and professional development and global issues. Third, each school surveyed second and fourth year medical students to assess students' self-efficacy and confidence for tobacco cessation and prevention, their perceived skills for counseling patients about tobacco cessation and prevention, and the extent and characteristics of the tobacco prevention and cessation instruction they had received. In particular, we sought to explore student experiences with the 5A's, the basic hallmark of tobacco cessation counseling.

METHODS

Participants

The PACE is a consortium of 12 medical schools that was funded by the NCI. It includes Boston University, Case Western Reserve University, Dartmouth Medical School, Harvard Medical School, Loma Linda University, University of Alabama at Birmingham, University of California at Los Angeles, University of Iowa, University of Kentucky, University of Massachusetts Medical School, University of Rochester School of Medicine and Dentistry, and the University of South Florida. Schools and site investigators were identified and selected via curriculum in publications (n=3), recruitment by contacting members of the American Association of Cancer Education (n=4), and calls made to curriculum leaders or tobacco experts (n=5). One school in the consortium (School A) was excluded from this study because of variation in survey questions. The remaining schools are both public (n=6) and private (n=5), geographically diverse, and located in inner-city and rural areas. The site investigators were members of the Departments of Medicine or Family Medicine (n=9) or the Offices of the Dean or Curriculum Development (n=2). The extent of tobacco education at each school, as defined by a curriculum survey, varied considerably.[11]

Data Collection

We anonymously surveyed second year and fourth year students between February 2004 and March 2005. Led by site investigators at each school, self-administered surveys were collected in classrooms (n=9) or online (n=2). In general, fourth year students completed surveys in the beginning of the fourth year (after completion of all clinical clerkships), whereas second-year students most commonly completed surveys toward the latter part of their second-year.

Data from 147 second year students from school B and 55 fourth year students from school C were excluded because of slightly different phrasing of survey questions at these schools. Institutional Review Boards at each university approved the data collection protocol.

Measures

The data in this study are from a self-report survey. We used a test blueprint (see Table 1) to construct 94 questions (see examples in Appendix) building on content and format used in previous research.[13,14] Items purposively focused on skills recommended for effective patient-centered counseling[3] as well as recommendations for multimethod teaching principles for developing graduate medical education competencies.[12] The survey was piloted with 10 students from 1 university and refined.

Measures of *personal characteristics* included intended career (primary care, specialty or uncertain) and personal smoking history. In addition, the following measures related to tobacco education and training were included: *exposure to tobacco curricula* in various rotations and courses (yes/no); *teaching methods* (case-based discussion, simulated patient encounter, clinical skills course, or web-based education experience [yes/no]); and the number of *training sessions* the students had in how to take a patient's smoking history, counsel children about

Table 1. Survey Development Blueprint*

Variable	Skills	Practice (10+ times)	Practice (Ever)	Observation (4+ times)	Instruction (4+ times)
Ask about smoking	X	X		X	X
Advise smokers to quit	X	X		X	X
Assess patient willingness to quit	X	X			
Assist with a quit plan	X	X			
Arrange follow-up contact	X	X			
Recommend NRT	X				X
Provide ETS information	X	X	X	X	X
Discuss smoking with pregnant women	X	X	X	X	X
Refer hospitalized patient		X			
Counsel hospitalized smokers			X		
Counsel parents at a pediatric appt					X
Taught how to do 5A's by community preceptor					X
How to include family member in smoking discussion					X
Counseling children about smoking	X			X	X

* Blueprint of key concepts (Y axis) and student activities or outcomes (X axis) used to develop questionnaire items for a survey of second year and fourth year students. X denotes concept/activity included in survey. Selected questions are shown in the Appendix. Complete survey is available from authors.

smoking prevention, prescribe nicotine replacement therapy (NRT), and include family members when they are talking about smoking.

Practice opportunity measures assessed the frequency of student experiences with the 5A's and in counseling about environmental tobacco smoke (ETS) exposure, smoking in pregnancy, and hospitalized smokers. *Observations* ascertained the frequency with which a student observed another physician taking a smoking history, counseling children about smoking prevention, counseling patients to quit smoking, counseling pregnant women, and counseling parents regarding ETS. Students were asked to describe their *level of skill* (a 4-point scale ranging from not at all skilled to very skilled) in asking, advising, assessing, assisting, and arranging for tobacco cessation, recommending NRT counseling children about prevention, providing information about ETS, talking with a pregnant patient about the effects of smoking, and counseling adolescents.

Confidence and self-efficacy measures determined agreement (using a 4-point scale) with statements such as 'I am able to…' prevent some young patients from smoking, convince patients to quit smoking, and impact patients' smoking behaviors.

Statistical Analysis

To examine self-reported practice, observations, and training, we set thresholds for each measure: at least 10 practice opportunities, at least 4 observations, and at least 4 trainings for measures noted above. These standards had been used earlier in medical student cancer education studies following recommendations and consensus from a Cancer Education Evaluation Committee at Boston University.[13]

Using Pearson's chi-square test, we examined differences between second and fourth year students regarding their strong agreement with statements regarding their tobacco counseling skills, including preventing young patients from smoking, convincing adult patients to quit, and discussing smoking with parents.

We assessed the proportion of students within each class year who reported higher levels of skill (defined as very skilled or moderately skilled) in advising, assessing, assisting, and arranging at each visit compared to the proportion who reported a higher level of skill for asking about smoking and reported odds ratios and 95% confidence intervals for these comparisons. We then conducted a similar analysis to compare the proportion of students within each class year who reported $\geq$10 practice opportunities for each component of the 5As. Among fourth year students, we compared each student's likelihood of receiving tobacco instruction in courses in family and Internal Medicine compared to Obstetrics/Gynecology, Pediatrics, and Surgery. Because these sets of analyses were based on within-student comparisons, to calculate odds ratios and confidence intervals, we used generalized linear models with a logit link function, assuming binomial distributions, and repeated measures on students (SAS Proc Gen Mod). All covariates were included in the model as fixed effects.

RESULTS

The survey was administered to 1,229 second year students at 10 schools and 1,181 fourth-year students at 10 schools. Of these, 860 second year and 827 fourth year students responded, for an overall response rate of 70%. The mean (SD) age of second and fourth-year students was 25.4 (3.2) and 26.7 (2.6) years, respectively, and approximately half were female in both classes (N=403 for 2nd years and N=397 for 4th years). Second year students reported their intended careers as primary care (N=156 [19%]), specialty (N=377 [47%]), and uncertain (N=274 [34%]). For fourth year students, intended careers were reported as primary care (N=183 [24%]), specialty (N=516 [67%]), and uncertain (N=74 [9%]). Eighty (12%) second year students and 55 (9%) fourth year students had smoked for at least 3 years at some time in their lives.

Courses and Training for Tobacco Cessation and Prevention

With respect to teaching methods, fourth year students were asked to recap the sum of all educational activities to date. They were taught tobacco counseling at least once in a case-based discussion (N=666 [82%]), a clinical skills course (N=652 [81%]), and/or a simulated patient encounter (N=624 [77%]). Only 273 (34%) had received a web-based education exercise. Fourth year students were more likely to report receiving instruction in tobacco cessation counseling in family medicine (N=655 [79%]) and Internal Medicine (N=577 [70%]) clerkships compared to Pediatrics (N=447 [54%]), Obstetrics/Gynecology (N=338 [41%]), and Surgery (N=130 [16%]). Only 8% of second year students (N=65) and 16% of fourth-year students (N=133) believed that there was too much tobacco information in their courses.

Fourth year students were taught at least 4 times how to counsel a smoking parent at a pediatric appointment (N=440 [61%]), how to appropriately prescribe NRT (N=468 [65%]), and how to include family members when discussing smoking (N=355 [58%]). Second year students were taught at least 4 times how to counsel a smoking parent at a pediatric appointment (N=210 [29%]), how to appropriately prescribe NRT (N= 240 [33%]), and how to include family members when discussing smoking (N=239 [38%]).

Skills

Self-reported skills for advising, assessing, assisting, and arranging were compared with asking about smoking separately for second and fourth year students. Second year students reported being very or moderately skilled in asking about smoking but poorly skilled in the other 4A's. Fourth year students reported being very or moderately skilled in advising smokers to quit and least skilled in assisting the patient with a quit plan and arranging follow-up contact (Table 2). There were negligible differences in the rating of self-reported skills for 5A's counseling between students whose intended career was primary care compared to specialty as well as for students with a personal history of smoking (data not shown).

Fourth year students' self-reported skill levels were as follows: recommending NRT (N=472 [58%]), providing information about ETS (N=453 [56%]), talking with a pregnant patient about the effects of smoking (N=515 [64%]), counseling adolescents (N=442 [55%]), and counseling children for smoking prevention (N=351 [43%]) (data not shown). Second year students' self-reported skill levels were as follows: recommending NRT (N= 280 [33%]), providing information about ETS (N=

Table 2. Self- reported Skill and Practice Opportunities in 5As of Tobacco Counseling, by Class Year *

	2nd Years (*n*=860)			4th Years (*n*=827)		
	%	Odds ratio (OR)	95% CI	%	OR	95% CI
5A Skill (Very/moderately skilled) for:						
Asking about smoking at every visit	73.2	1.0		73.6	1.0	
Advising all smokers to quit	60.0	0.55	0.48, 0.63	79.7	1.41	1.20, 1.66
Assessing patient willingness to quit	53.7	0.43	0.36, 0.50	75.8	1.12	0.94, 1.35
Assisting the patient with a quit plan	34.2	0.19	0.16, 0.23	59.9	0.54	0.45, 0.64
Arranging follow-up contact	43.5	0.28	0.24, 0.33	63.0	0.61	0.51, 0.73
10+ practice opportunities in which student:						
Asked about smoking history	54.8	1.0		94.3	1.0	
Advised patients to quit	20.5	0.21	0.18, 0.25	82.6	0.29	0.22, 0.37
Assessed willingness to quit smoking	19.5	0.20	0.17, 0.23	74.6	0.18	0.13, 0.24
Assisted with quit plan	5.1	0.04	0.03, 0.06	30.0	0.03	0.02, 0.04
Arranged follow-up contact	3.0	0.03	0.02, 0.04	22.2	0.02	0.01, 0.02

*Owing to missing data, the actual number of respondents ranged from 831 to 854 for second year students and 791 to 820 for fourth year students.

365 [43%]), talking with a pregnant patient about the effects of smoking (*N*=367 [43%]), counseling adolescents (*N*=275 [32%]), and counseling children for smoking prevention (*N*= 230 [27%]) (data not shown).

Practice Opportunities

Relative to asking patients about smoking, second year and fourth year students were far less likely to report 10+ practice opportunities for advising smokers to quit, assessing patient willingness to quit, assisting the patient with a quit plan, and arranging follow-up contact (Table 2).

Observation

Fourth year students observed a faculty member demonstrate aspects of cessation assistance practices at least 4 times as follows: cessation counseling (*N*=652 [80%]), taking a smoking history (*N*=622 [77%]), ETS counseling (*N*=414 [51%]), smoking prevention counseling (*N*=375 [46%]), and cessation counseling for pregnant women (*N*=374 [46%]). Second year students observed a faculty member demonstrate aspects of cessation assistance practices at least 4 times as follows: (*N*=316 [38%]), taking a smoking history (*N*=410 [49%]), ETS counseling (*N*= 102 [12%]), smoking prevention counseling (*N*=124 [15%]), and cessation counseling for pregnant women (*N*=64 [7%]).

Confidence in Ability to Change Behavior

In general, confidence and self-efficacy in tobacco counseling skills were worse for fourth year students as compared to second year students. They were less likely to strongly agree that they could prevent young people from smoking (*N*=110 [13.5%] vs *N*=195 [23%], $p<.0001$), convince patients to quit smoking (*N*=107 [13.1%] vs *N*= 159 [18.7%], $p=.0019$), or have an impact on patients' smoking behaviors (*N*=94 [11.6%] vs *N*=140 [16.5%], $p=.039$).

DISCUSSION

This survey of second and fourth year students at 11 US medical schools provides reasons for both cautious optimism and some concerns. On the positive side, fourth year students reported modest exposure to tobacco control content and training in tobacco cessation skills through a variety of teaching formats and medicine clerkships. Reasonably high rates of self-perceived skill are reported by students regardless of their intended career and personal smoking status. Clerkships in adult primary care, particularly Internal Medicine and family medicine, provided multiple teaching opportunities. However, fourth year students reported fewer exposures to tobacco teaching in 3 other clerkships (Pediatrics, Obstetrics/Gynecology, and Surgery).

Second year students had substantial practice only in asking about smoking history, something that is typically taught in the medical interviewing courses of the preclinical years, whereas a majority of fourth year students reported having had many opportunities to practice the additional steps in the 5A counseling protocol, presumably during third year clerkships. Although the majority of fourth year students reported that they felt skilled in delivering all 5 steps of the protocol, only a minority of fourth year students reported frequent opportunities to practice the assist and arrange steps. This mirrors recent studies measuring practice opportunities for 5As of primary care physicians.[4,5,15,16]

Based on these findings, reforms in tobacco curriculum could be considered. Medical school preceptors should be trained on how to provide cessation activities, such as helping patients set up and follow through with a quit date, working with office staff to determine insurance status for cessation services, and helping patients reconcile some of the cost-to-benefit ratios of using nicotine replacement therapy. The "fall-off" between the different 5As is natural, as all smokers examined can be asked, advised, and assessed, whereas a smaller percentage will be interested in quitting, and thus the pool for assisting and arranging will be smaller. Thus, teaching programs must either expand the number of smokers to counsel or provide more experiences for students with patients to practice assisting and arranging.

Only about half of fourth year students report feeling skilled to counsel parents, children, and adolescents in the pediatric setting. Lack of consistent recommendations for counseling parents of pediatric patients[17] may discourage subsequent student learning. Only a minority of students reported receiving teaching of tobacco cessation skills in the Surgery or Obstetrics/

Gynecology clerkships despite a strong rationale for encouraging smoking cessation in the perioperative, prenatal, and postnatal settings.[4,18–20] The psychiatry clerkship is another site where tobacco teaching should be included as 40% of all cigarettes smoked in the US are among people with well-established mental health concerns or other addictions.[21]

Despite their greater level of skill and practice in counseling, fourth year students were less confident than second year students about their ability to succeed in getting patients to change smoking behavior. Second year students likely overstate their confidence for impacting patient behavior, whereas fourth year students' lower level of confidence probably reflects their greater experience and challenges in actually counseling smokers. Nonetheless, it illustrates the importance of boosting student confidence and self-efficacy (e.g., by observation of successful physician–patient encounters) and including in tobacco training the information that behavior change for patients and physicians is a process that requires repeated interventions.

Our study is consistent with our companion in-depth survey of the curriculum at these 12 schools.[11] To the extent that these findings can be generalized, our study suggests that medical student training in tobacco dependence treatment has improved since a study of 126 US medical school administrators conducted in 1997 found that nearly 70% did not require clinical training in smoking cessation techniques.[8]

We acknowledge several limitations to this study. First, the analysis was conducted at only 8% of US medical schools and the results may not be generalizable to all schools given possible selection bias of schools' participation. Second, all data were self-reported with no objective measures available to evaluate student performance. However, we attempted to reduce the influence of social desirability in response by making the surveys anonymous and reporting school results only in aggregate. Students may have overstated their skill level, as has been shown in studies of physicians.[22] Third, the investigators acknowledge the limitations in survey development including lack of in-depth cognitive pretesting and rigorous psychometric testing.

In response to gaps described in this survey, our team has developed a module for pediatric and family medicine clerkships that instructs students on how to counsel parents about second-hand tobacco exposure, an interactive web-based curriculum developed by researchers at Dartmouth Medical School that teaches tobacco counseling in prenatal and postpartum settings, and a recently developed Objective-structured Clinical Examination (OSCE) to corroborate or provide an alternative perspective on students' report of skill level. More recent studies have described a web-based smoking cessation program and the use of standardized patients for the teaching of smoking cessation skills during a psychiatry clerkship.[23,24] A recent study at the University of Connecticut found that even a modest amount of teaching for first year students coupled with a brief booster in the third year led to high skills retention rates for all 5As as fourth year students.[25]

CONCLUSION

In this, the largest survey to date of the tobacco control practices of US medical students, second year students report early opportunities to practice cessation skills in clinical settings. By the beginning of fourth year, most students have been afforded multiple opportunities for observing, training in, and practicing basic 5A counseling, although clear deficits for assisting patients with a quit plan and arranging follow-up care exist. Addressing these deficits and integrating tobacco teaching through tailoring specific instruction across all clerkships, particularly in Surgery, Pediatrics, Obstetrics/ Gynecology, and possibly psychiatry, is the next major challenge.

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APPENDIX

Selected Questions Used in PACE Survey (entire survey is available upon request)

Skills	Not at all skilled	Somewhat skilled	Moderately skilled	Very skilled
Please rate your current skill level for the following:				
Counseling a child for smoking prevention	①	②	③	④
Counseling an adolescent for smoking prevention	①	②	③	④
Asking about smoking at every visit	①	②	③	④
Advising all smokers to quit	①	②	③	④
Assessing patient willingness to quit	①	②	③	④
Assisting the patient with a quit plan	①	②	③	④
Arranging follow-up contact	①	②	③	④
Recommending nicotine replacement therapy	①	②	③	④

Practice

Estimate the number of <u>adult patients</u> for whom you have:	None	1-3	4-9	10-25	>25
Asked about smoking history?	①	②	③	④	⑤
Advised patients to quit?	①	②	③	④	⑤
Assessed willingness to quit smoking?	①	②	③	④	⑤
Assisted with a quit plan?	①	②	③	④	⑤
Arranged follow-up contact?	①	②	③	④	⑤

Observation

How many times during medical school have you:	None	1-3	4-9	10-25	>25
Observed a physician take a smoking history?	①	②	③	④	⑤
Observed a physician counsel children about smoking prevention?	①	②	③	④	⑤
Observed a physician counsel patients to quit smoking?	①	②	③	④	⑤
Observed a physician give tobacco counseling to a pregnant woman?	①	②	③	④	⑤
Observed a physician talk with a parent about environmental tobacco smoke?	①	②	③	④	⑤