

Evaluation of Current Tobacco Curriculum at 12 US Medical Schools

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ABSTRACT

Background: Training medical students in tobacco prevention and treatment skills is critical if we are to have competent physicians, prepared to address the grave levels of morbidity and mortality associated with tobacco use. Tobacco Prevention and Cessation Education at US Medical Schools (PACE), a National Cancer Institute funded project, was launched to assess and improve curriculum content and teaching at 12 US medical schools.

Methods: The 2003 survey was completed by faculty and administrators. The survey was divided into four main sections: tobacco content and skills, curricular evaluation, faculty perceptions of barriers and promoters, and educational vision.

Results: Thirty-six percent of all medical school courses had some tobacco-related content. Five schools provided a total of between 4 and 8 hours of teaching, 5 schools provided 10-13 hours, and 2 schools provided 17 and 18 hours of teaching. Of the 12 schools, 8 had fewer hours devoted to tobacco teaching in the clerkships than during the first year courses. Only two schools noted any tobacco content for Obstetrics/Gynecology clerkships and only four schools provided teaching in the pediatric setting (range 5-201 minutes).

Conclusion: In comparison to earlier studies, it appears that more tobacco content is now integrated into medical school courses. More improvement is necessary, however, particularly in tobacco use prevention. Institutions need to examine the role of faculty in prioritizing tobacco information and promoting a culture which builds competency in tobacco control and treatment.

INTRODUCTION

Training physicians in cancer prevention and detection is critical if we are to achieve the cancer goals of Healthy People 2010.¹ Since one in every five deaths in the United States is attributed to tobacco use, it is the single most preventable cause of mortality and morbidity in the U.S.² It is estimated that at least 80% of smokers visit a physician annually, but most are not advised or assisted in attempts to quit.^{3, 4}

Additionally, while more than 90% of children visit a pediatrician annually, smoking prevention or cessation counseling is not routinely practiced with either the children or the parents.⁵⁻⁶

Many physicians believe that they are ill prepared to offer patient counseling and that their medical school training has not sufficiently prepared them to help patients stop smoking. In a 1996 survey of 122 associate deans of medical education at US medical schools, Ferry et al⁷ found that 60 percent of the schools surveyed did not require tobacco cessation training and 31 percent of the schools offering cessation training had 1 hour or less per academic year. While various methods are used to educate medical students, there is still a need for specific training in evidence-based skills⁸ and other issues such as cross-cultural understanding, smokeless tobacco addiction,^{9, 10} and how to organize the office practice setting to support prevention services. Several curricular trends have emerged in medical education, including the design of early clinical experiences, longitudinal preceptorships, and community-oriented experiences.^{11, 12} While the clinical experience provides the ideal opportunity for practicing tobacco cessation, only about five percent of medical schools evaluate tobacco cessation training in the clinical setting.⁹

Tobacco Prevention and Cessation Education at US Medical Schools (PACE), a National Cancer Institute funded project, was launched to assess tobacco teaching and institute curricular change at 12 US medical schools. Prior to instituting new tobacco efforts at these schools, we investigated existing tobacco curriculum, institutional structure and possible opportunities for and challenges to the integration of new curriculum.

METHODS

Participating Institutions and Respondents

The 12 participating schools and their enrollment for 2003 are shown in Table 1. This convenience sample was selected to include representation of all US geographic areas and a mix of public and private institutions. Upon recruitment to the study in 2001, anecdotal reports indicated a wide range of tobacco teaching with 3 of the schools having little or no tobacco teaching.

The Site Investigator at each school supervised the collection of data and information from key informants. Surveys were completed in 2003 by 12 Site Investigators and 12 medical school administrators. The site investigators were members of the Departments of Medicine or Family Medicine (n=10) and the Offices of the Dean or Curriculum Development (n=2). Administrator/Dean's surveys were administered to determine any similarities or differences in perceptions of medical education among faculty and administrators at the same institutions.

The Curriculum Assessment Tool and Measures

The format was tailored to capture the curriculum structure in each individual school. A draft of the Curriculum Assessment (CA) was circulated to all Site Investigators for comments and revised. The final survey consisted of four major sections: 1) tobacco content and skills; 2) detailed curricular evaluation; 3) faculty perceptions of barriers and promoters and 4) educational vision. These domains are described briefly below. A glossary of terms was provided to ensure that respondents used common operational definitions.

Tobacco Content and Skills

Course offerings for tobacco education included either ‘stand-alone’ courses or modules integrated into a specific course. We inquired about required courses in years 1 and 2, clerkships and electives. For each course or clerkship, respondents estimated the number of minutes of tobacco teaching and whether the teaching methodology was didactic, skills training, applied skills or a web-based format. Skills training was defined as role-plays, counseling, video or other forms of interactive teaching. Applied skills were defined as supervised clinical training in a practice setting. We also inquired about the major content themes and evaluation method, if any.

Respondents ranked graduating students’ skills on a 5-point scale (poor, fair, moderate, very good and exceptional) in the following areas: prevention counseling, cessation counseling, knowledge of culturally sensitive counseling, knowledge of public health and public policy related to tobacco. Additional questions (yes/no) related to students’ knowledge of the Stages of Change model,¹³ practice with patients at various stages, and making referrals for patients who wish to stop smoking.

Curriculum Content and Detailed Curricular Evaluation

The second section of the CA was subdivided into four sections: curriculum content and educational structure, student development, faculty development and education, and institutional structure. The curriculum content and educational structure asked about non-tobacco behavioral intervention offerings in the curriculum in the areas of cultural competency and patient-centered communication using 4 and 5 point Likert scales. The student development section asked about students’ knowledge and skills related to tobacco prevention and treatment.

Faculty Barriers and Promoters

The ‘Faculty Development and Education’ section asked about the level of institutional commitment for faculty development, support among faculty for workshops for integrating tobacco prevention and treatment, and

whether the institution provides faculty training for prevention in the following areas: tobacco education Continuing Medical Education (CMEs), workshops for prevention counseling, tobacco prevention/cessation guidelines, guidelines for pharmacologic therapy, mentors/master teachers, and instructional development seminars.

The institutional structure section queried about tobacco-related institutional policies (i.e. smoking prohibition on campus) and barriers to curricular innovation. Questions included: lessons learned adopting curriculum for other prevention topics, referral programs for tobacco cessation, barriers and challenges to curricular innovation (i.e. faculty, student, administrative resistance, funding) and champions of curricular change. The format of questions included 4 point Likert scales and open-ended questions.

Educational Vision

In the final section, educational vision, we asked respondents what new ideas, modules, cases or activities they would like to add to the curriculum. Respondents also provided responses on possible ‘champions’ of curricular change and reports of potential obstacles and challenges.

Data Collection, Management, and Analysis

The survey instrument was mailed to the 12 Site Investigators. An instruction manual, glossary of terms, and a key informant log were provided. Key informants were defined as an individual or individuals providing curricular information. Site Investigators supervised the curriculum assessments over an 8 week period usually working with a data coordinator, who collected and coordinated information on current tobacco teaching. Using the key informant log, data coordinators recorded the name, title, position, and answers to questions for each respondent. Information from all respondents was confidential and was viewed only by the data analysis team. Site Investigators completed the detailed curricular evaluation and educational vision sections.

Responses were tabulated in spreadsheets and analyzed using descriptive statistical techniques. The findings were verified with individual investigators. Investigators were also provided curricular matrices customized for each individual medical school, which reflected current and proposed tobacco curriculum. This graphic presentation helped participants brainstorm possible changes within their institutions and between the 12 site investigators. A model of the graphic presentation is illustrated in Figure 1.

Our primary outcome measure was the assessment of the inclusion of tobacco teaching in the medical student curriculum. Secondary outcomes included determining the degree to which non-tobacco behavioral teaching was imbedded into the curriculum, the amount of faculty training in tobacco and faculty attitudes toward tobacco education, students' tobacco knowledge and skills, and the institutional structure to support the integration of tobacco information.

RESULTS

Tobacco Teaching Content

Overall for the 4 years of medical school, schools reported that 36% of the courses had some inclusion of tobacco information. Courses containing tobacco information constituted approximately 37 % (41/110) for the first year. In all, 5 schools provided between 4 and 8 hours of teaching, 5 schools provided 10-13 hours, and 2 schools provided 17 and 18 hours of teaching. Of the 12 schools, 8 had fewer hours devoted to tobacco teaching in the clerkships than in the first year.

The 12 schools had a total sum of 110 required courses offered in year one with a range of 6 to 11 courses per school (Table 2). The mean number of tobacco teaching minutes in year 1 included: skills training (75), applied skills (66), didactic teaching (51), with no schools performing web-based training. In year 2, there were 92 required courses, of which courses including tobacco content constituted 44% of the course offerings. A similar number of courses were available in clerkships but the percentage of courses providing tobacco

information declined significantly to 29%. Only 3 of 12 schools offered web-based teaching during clerkship years.

Only two schools noted any tobacco content for Women and Children's Health or Obstetrics/Gynecology (OB/GYN) clerkships, offering 20 and 5 minutes respectively. Pediatrics clerkship totaled 266 minutes of tobacco teaching with only four schools providing teaching in the pediatric setting (range of 5 to 201 minutes).

Formal evaluation of tobacco courses was limited across all four years. In years 1 and 2 respectively, 32% and 29% of the courses with tobacco content had some form of evaluation, including test questions and faculty or student observation and feedback. Of the 27 clerkships with tobacco teaching, 4 had mandatory Observed Structured Clinical Exams (OSCE) and 2 had optional OSCEs.

Participants reported key themes within broad content areas for tobacco in required courses including: adult and pediatric epidemiology/disease causation, adult and pediatric counseling efficacy, pathology/addiction, public health, special issues, and populations.

Nine schools reported 47 electives that included tobacco information with a range of 1-19 electives per school. A wide variety of objective themes were reported as demonstrated in Table 3. There were a wide variety of approaches to offering the electives, including community prevention and cessation sessions, lunch seminars, interclerkships of various lengths and intensity and elective role-plays within a required course. Respondents reported the type of tobacco elective offered, but no specific data was reported on evaluation or specific content for tobacco electives. Table 3 illustrates the content by objective theme.

In terms of ratings of students' knowledge and skills, 11 of 12 schools reported that their graduating students were aware of the Stages of Change Model and 10 schools reported that their graduating students knew how to intervene with patients at various stages. However, only 6 of the respondents reported that their students were knowledgeable about how to make referrals for smoking cessation.

Overall, administrators and faculty generally agreed that students' skills in prevention and cessation counseling were poor to average. Nine faculty members and eight administrators ranked their graduating students' *cessation skills* as poor or average. Eleven faculty members and eight administrators reported that graduating students' *prevention skills* were poor to average. Graduating students' knowledge of public health and public policy also demonstrated a potential area of improvement in medical education. Nine faculty members reported that students' skills were poor to average. In contrast, 9 of 12 administrators reported that 75 percent of graduating students had very good or exceptional skills in this area.

Detailed curricular evaluation

In response to questions about non-tobacco behavioral intervention teaching, all 12 of the schools taught patient communication and 83% taught patient counseling (hereafter called behavioral intervention skills). Behavioral intervention skills were taught in years 1 (10/12), year 2 (9/12), year 3 (10/12), and year 4 (3/12). In addition, 9 of the schools reported a broad range of non-tobacco teaching methods, including: role-plays, lectures, standardized patients, Observed Structured Clinical Examinations (OSCE's), and other teaching formats.

Faculty Training and Support

None of the schools reported any faculty training in tobacco prevention and cessation guidelines nor offered tobacco CME's. Few of the schools offered prevention counseling workshops, mentors, master teachers, or instructional development seminars. Three schools offered education and training in pharmacologic therapy. While training was apparently minimal, 9 site investigators reported a strong institutional commitment for faculty development (using a 4 point Likert scale). However, 10 of 12 schools disagreed that there was a high level of faculty support for workshops integrating tobacco prevention and cessation into the coursework.

Barriers and Challenges to Tobacco Education

Faculty and administrators ranked potential barriers and obstacles to curricular change. Notably, faculty resistance and low priority on prevention constituted major or moderate barriers to curricular change in a majority

of the schools. Overall, faculty-related issues constituted a majority of the reported barriers to curricular innovation.

Educational Visioning

Respondents were asked to report three areas of proposed curricular change for their respective institutions. Proposed changes fell within 6 major domains: pediatrics clerkships, adding cases to currently existing courses, greater opportunities for practice, web-based teaching and technology, faculty development and public health initiatives. Eight of the schools sought to make changes within the pediatric curriculum, while 6 chose to make changes to existing course curriculum and wanted greater opportunities for students to practice.

DISCUSSION

This is the first in-depth study to examine current tobacco teaching and to assess the potential for inclusion of curriculum innovation at US medical schools. This study finds that tobacco information is relatively well integrated in preclinical and clinical years, although the amount of training is very uneven and notably absent from several key clerkships.

The findings of the current study differ from earlier reports that found limited inclusion of tobacco across the curriculum.^{9,13} This variation may be attributable to a number of factors: the PACE survey methodology, which provided course grids individualized for each school, the selection of study participants who were committed to improving tobacco teaching, and/or actual increases in attention to the topic from 1996-2003. (Sample instrument available from the primary author).

Generic behavioral intervention teaching is well-integrated into medical school curriculum. This finding supports the potential for new tobacco teaching as it involves effective communication, patient education, and counseling skills that increase physicians' effectiveness in disease prevention involving numerous lifestyle behaviors.¹⁴ Nearly all of the schools taught patient communication curriculum and patient counseling uniformly across the first three years of medical school. In addition, at least $\frac{3}{4}$ of the schools reported a broad

range of non-tobacco teaching methods, including: role-plays, lectures, standardized patients, OSCEs, and other teaching formats. Additionally, schools were very creative in building in tobacco content into electives, although in most cases only a minority of the students or faculty would be exposed to these learning opportunities.

In this study, faculty and institutional-related barriers were reported as significant. No schools offered faculty CME training in tobacco prevention or cessation. It is unclear whether minimal activity in faculty training is the result of their resistance to tobacco workshops or that the absence of tobacco training and CME's has resulted in a lack of familiarity with the importance of tobacco issues and the need for training, or some other reason. The survey did not ask about the possibility of bias among basic and medical science faculty against behavioral and preventive sciences.

Successful faculty development offers individuals the skills to implement change at the organizational, personal and instructional level.¹⁵ While the NCI's 1992 expert panel on tobacco education in medical schools emphasized the importance of faculty workshops,⁸ this study indicates that institutions planning to introduce faculty development may need to determine the source of resistance to tobacco workshops and explore complementary educational strategies and incentives for their faculty.¹⁶ As clinical experience in the community setting is increasingly important in medical education, PACE'S emphasis in the next four years will be to improve preceptor modeling of tobacco teaching. Future studies within the PACE project will examine the relationship between faculty attitudes and practices on student's tobacco counseling skills.

Bolstering faculty participation has been the cornerstone of recent advances in medical school education. For example, the five-year, 27 school Community Partnerships in Health Professions Education (CPHPE) curricular initiative, attempted to produce more primary care providers and shift training from inpatient facilities to community-based academic health centers. The study found that successful curricular change was correlated with a collegial culture and institutional support for curricular change. Project success was attributed to the involvement of key faculty in the initiative, rewards linked to faculty activity, and the perception of faculty that

the change would have a positive impact.¹⁶ Similarly, faculty development was identified as a critical aspect of sustainable change at Baylor College of Medicine where curricular changes institutionalizing clinical experiences in community settings were introduced. Resistance was partly allayed over time as innovative programs to develop, recognize, and reward faculty were instituted.¹⁷

The lack of tobacco teaching during the pediatrics and OB/GYN clerkships poses a formidable challenge for reform. ‘Changing the culture’ to improve pediatrician practice for counseling the parents of their young patients is essential given the prenatal and postnatal effects of Environmental Tobacco Smoke (ETS) on children.^{18, 19} Additionally, children of smokers have higher rates of smoking than the children of non-smokers.²⁰ Moreover, the risks of smoking-related mortality and morbidity for pregnant smokers’ and their children present a unique and immediate challenge for the medical community. New PACE curriculum will emphasize specific plans for improving the counseling skills (particularly ETS reduction) of students caring for young children.

Integrating computer web-cases into clerkships has been observed as a successful method for improving students’ knowledge compared to reading articles and completing a case on paper.²¹ Web-based teaching has increasingly become a part of curricular revision, due to the ability to reach multiple sites simultaneously.²² Little is known, however, how this trend in curricular revision impacts the skills’ training or student efficacy in applied skills.

Public Health Service guidelines recommend that all physicians use the 5A’s to identify tobacco users and provide treatment and brief tobacco cessation intervention to every patient at every visit.⁴ While most schools reported that their graduating students knew how to intervene with patients at various stages, only half of the respondents believed that their students were knowledgeable about how to make referrals for smoking cessation. Additionally, while schools were confident about their graduating students’ *knowledge* in behavioral intervention, schools ranked students’ *skills* in prevention and cessation as only average to poor. This may be attributed to methods used to teach tobacco information that apparently favor didactic teaching. Schools reported 4795

minutes of didactic teaching and only 655 minutes of applied skills. Students lacking applied skills in tobacco prevention and cessation may be less likely to make referrals. Trials of various methods for tobacco teaching should be investigated to determine which types are more efficacious.

Physicians, by the virtue of their extensive medical training and their role in society as leaders and educators, are uniquely qualified and obligated to advocate for public health and policy.²³ The Liaison Committee on Medical Education (LCME) advocates that medical school curricula provide elective opportunities for students to participate on the frontline of public health and policy.²⁴ Schools ranked graduating students' skill levels in public health and policy as poor to average. In viewing the variety of elective tobacco teaching opportunities currently employed by the respondents, additional training on public health and policy issues related to tobacco could be readily added in a number of different formats depending on the needs and curricular structure of the institution.

Limitations

There are a number of limitations to this study. First, it was undertaken at 12 self-selected medical schools and all information was self-reported. Results may not be generalizable to all universities but concerns that the sample may not be representative of other medical schools is somewhat mitigated by the fact that few sites had any infrastructure in place to support tobacco education, workshops, seminars or CMEs. Second, the assessment instrument measured tobacco education quantitatively (often by number of minutes), and was not able to assess the quality of teaching. Third, complete accuracy regarding the quantity of tobacco teaching may be limited since faculty could only estimate the number of tobacco teaching minutes and there was often no formal mechanism to monitor classroom teaching. Future evaluations should record student perspectives and include more qualitative assessments of tobacco teaching.

CONCLUSION

While it appears that there are many courses at these 12 schools that integrate tobacco information, many deficits remain.. Most notably, there is scant clerkship teaching in pediatrics or OB/GYN and suboptimal training to engage faculty in tobacco teaching. Few schools have evaluated their content; thus we hope that this curriculum assessment will be the first step to determine deficiencies in the curriculum and establish graduating competencies for all students. The survey process demonstrated to investigators, that curriculum in and of itself in the curriculum may not be sufficient, especially considering there were few courses with learning objectives and competencies linked to the content. Therefore as part of the PACE initiative, efforts will be made to articulate tobacco skills and learning objectives and link these to the innovation. In light of the survey findings, the 12 PACE participants and numerous representatives from other medical schools held a consensus conference to address these deficiencies. Three major areas for curricular reform emerged with the call for new teaching in preceptor training, community experience for medical students and Environmental Tobacco Smoke (ETS) training for physicians who care for children and families. Based on these objectives, PACE participants are developing tobacco curriculum, and hope to implement these curricular changes in the 2004-05 curriculum.

TABLE 1

Participating PACE Survey Schools and Number of Medical Students per School
(American Association of Medical Colleges, 2003)

Institution Name	Number of Medical Students
1. Harvard University	831
2. University of Alabama – Birmingham	684
3. Boston University	671
4. Loma Linda University	671
5. University of California-Los Angeles	669
6. Case Western Reserve University	661
7. University of Iowa	637
8. University of Rochester	446
9. University of Massachusetts Medical	439
10. University of South Florida	419
11. University of Kentucky	389
12. Dartmouth Medical School	320

TABLE 2

Tobacco Content and Methods at 12 US Medical Schools

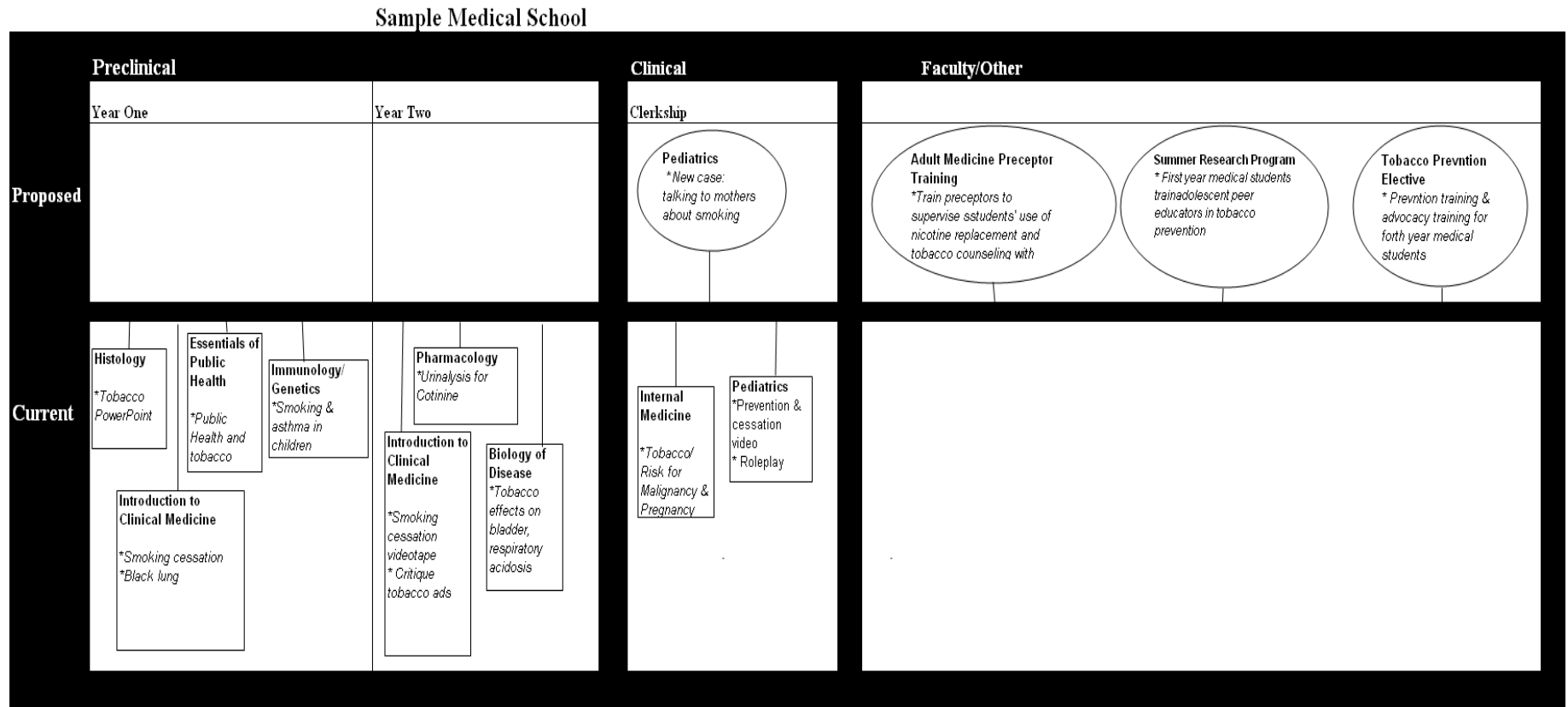
	Number of Academic Courses	Courses with Tobacco	Tobacco Teaching Minutes by Method					Total
			Didactic	Skills Training	Applied Skills	Web-based		
			Mean %	Mean %	Mean %	Mean %		
Year 1	110 (range 6-11)	41 (range 0-7)	51 27%	75 39%	66 34%	0 0%	192	
Year 2	92 (range 4-17)	41 (range 1-10)	48 13%	138 40%	80 23%	83 24%	349	
Clerkships	93 (range 4-10)	27 (range 1-7)	45 15%	70 23%	93 31%	90 31%	298	

TABLE 3
Tobacco Content in Elective Courses at 12 US Medical Schools

CONTENT BY OBJECTIVE THEME (Examples from Medical School Survey)	
<p>Pathology, addiction</p> <ul style="list-style-type: none"> · Reward pathways and mechanisms of addiction · Mention lung findings in cadaver, tobacco and squamous metaplasia · Smoking and immune system · Addiction pathways · Smoking and P53 carcinogenesis · Pathophysiology of smoking, vascular disease <p>Epidemiology, disease causation</p> <ul style="list-style-type: none"> · Case of young man with alpha-1 antitrypsin deficiency, smoking related COPD · Tobacco as causative factor in cervical and lung cancer · 24 hour urinalysis for cotinine, a nicotine metabolite · Lifestyle, stroke risks, cessation · Lung lecture, epidemiology of smoking · Smoking exacerbated PVD in diabetics · Effects of smoking on pulmonary/cardiac systems · Smoking, elastics of skin, aging <p>Epidemiology – Pediatrics</p> <ul style="list-style-type: none"> · Passive smoking and asthma in children · Environmental pathology/toxicology <p>Counseling, efficacy, principles</p> <ul style="list-style-type: none"> · Major finding of PHS guidelines, practice 5A's, 5R's, behavior change · Stages of change, motivational intervention · COPD, chest x-ray, role play · Cessation guidelines, pharmacology · Patient with lung mass, link to cessation guidelines · Smoker with stroke non-compliant with cessation 	<p>Pharmacotherapy</p> <ul style="list-style-type: none"> · Treating tobacco use/dependence, pharmacotherapy · Over-the-counter meds, NRT · Ability to write prescription for Zyban <p>Special Issues: Pregnancy, weight gain</p> <ul style="list-style-type: none"> · Smoking associated with low birth weight in infants · Teratology - placental development and findings · Obesity and use of nicotine as an appetite suppressant · Preterm labor/abortion that includes smoking risk <p>Issues of Culture, gender, age</p> <ul style="list-style-type: none"> · Cultural competency with standardized patient · Role play young woman smoker with weight gain <p>Public Health</p> <ul style="list-style-type: none"> · Public health and tobacco, use of media · Epidemiology of disease burden, economic costs · Use of video critique of anti-tobacco ads · Tobacco industry marketing <p>Counseling, efficacy, principles (Pediatrics)</p> <ul style="list-style-type: none"> · Adolescent Med lecture on tobacco screening · Smoking behavior in kids, peer pressure · Assess adolescents and smoking habits · Discussing passive smoke with parent

FIGURE 1

Curriculum Matrix for Current and Proposed Tobacco Education



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