Improving Tobacco Dependence Education Among the Loma Linda University School of Dentistry Faculty

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Abstract: Tobacco-related health problems are among the most preventable forms of illness. By assuming proactive tobacco use counseling roles, dental professionals can help reduce the number of people who use tobacco. Minimum standards for intervention by dental care providers were established more than a decade ago by the American Dental Association and the American Dental Hygienists' Association. The goal of Loma Linda University School of Dentistry in its tobacco-cessation efforts is to move beyond those standards towards more effective interventions. The school conducted a study to determine the formal education of the faculty, evaluate the current state of tobacco dependence education (TDE) delivered to students, identify topics that dental faculty members wanted to further their education, promote tobacco dependence education among the dental faculty, and enhance teaching moments on the clinic floor. A fifty-seven question survey was e-mailed to all faculty members with >0.4 FTE (full-time equivalent) during the 2007–08 school year. The response rate was 80 percent (101 out of 126). The results revealed that faculty members have limited formal training; however, 73.1 percent agreed that TDE would be beneficial to them. They also believed that, upon graduation, dental professionals should be able to perform at least a ten-minute moderate intervention program and discuss options for tobacco dependence treatments with patients. This project was designed to establish a 2008–09 baseline of TDE clinical practices, knowledge, and attitudes and to assess the effects of faculty development, curricular didactic, and clinical changes.

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Cigarette smoking remains the leading preventable cause of death in the United States, accounting for approximately one out of every five deaths (443,000) each year.[1] Annually, cigarette smoking costs more than $193 billion, based on lost productivity (>$97 billion) and health care expenditures (>$96 billion).[1] Smoking has been associated with several forms of oral disease and symptoms: it is a risk factor for oral cancer,[2,3] contributes to periodontal diseases,[4,5] delays wound healing after periodontal treatment[5] and tooth extractions,[4-9] and increases dental implant failures and complications with the implants.[6,10] More than 50 percent of smokers see a dentist every year,[5,6] an appointment that is typically longer in duration and more frequent than a visit to a primary care physician. Numerous dental organizations have adopted policies encouraging their members to provide tobacco cessation services.[10,11] Two approaches have strong evidence of effectiveness with smoking cessation: counseling and pharmacotherapy.[12] However, there are no established national standards for tobacco cessation that could be used in the curricula of dental schools in the United States and around the world.[13-17] In 1999, Weaver et al. reported that forty-four of the then-fifty-four U.S. dental schools included tobacco dependence education in their curriculum.[11] However, in 2000, Tomar and Asma reported that less than 50 percent of U.S. dental schools and dental hygiene programs provided clinical services to assist tobacco-dependent patients.[7]

Large numbers of smokers express a desire to quit using tobacco products, but many users are not successful at quitting on their own.[18,19] Minimum standards of care for intervention were established more than a decade ago by the American Dental Association (ADA) and the American Dental Hygienists' Association (ADHA).[20,21] Several studies have evaluated tobacco cessation services in the dental

profession and suggested that the profession is an effective resource in assisting patients to quit using tobacco.[22-26] The need to formally educate instructors in tobacco cessation has long been recognized,[12,27-31] but it has been reported that only 40 percent of dental professionals provide advice regarding how to quit[7] and often this provision of advice is made with limited information.[24-26]

Loma Linda University School of Dentistry (LLUSD) was invited to collaborate with three other health science schools on campus to enhance the process of intervention on behalf of patients. Upon graduation every student at the Loma Linda University Schools of Dentistry, Medicine, Nursing, and Pharmacy will be able to assess these patients, recommend therapy, and follow up appropriate to their discipline. In the process, the goal of Loma Linda University School of Dentistry (LLUSD) is to move beyond the ADA and ADHA standards towards more effective interventions. Toward those ends, LLUSD conducted a curriculum assessment to determine the formal education of faculty members, evaluate the current state of tobacco dependence education delivered to students, identify topics that faculty members desired to further their education, promote tobacco dependence education among faculty members, and enhance teaching moments on the clinic floor.

Methods

This project was designed to establish a 2008-09 baseline of tobacco dependence education (TDE) and TDE clinical practices, knowledge, and attitudes among the faculty. Additionally, it identified the effects of faculty development, curricular didactic, and clinical changes. After receiving the results of the faculty survey, we placed a focus on improving areas of curricular deficiencies and faculty development courses to enhance faculty knowledge.

Three weeks prior to distribution of the survey, additional TDE resources and patient educational materials were prominently displayed in three areas of the school: the patient lobby, the dental hygiene common area, and the Oral Health Care Stations of the clinic. Following a curriculum review, we established a Tobacco Treatment Committee comprised of chairs and faculty members from the departments of oral diagnosis, radiology and pathology, periodontics, dental hygiene, and restorative dentistry, the Center for Dental Research, and the dental school administration. The committee was formed to continue comprehensive curriculum revisions, improve clinical practice, enhance professional care of patients, and provide a faculty development resource.

An introductory letter was sent from the dean and the associate dean of academic affairs to 126 faculty members. Dental and dental hygiene faculty members employed at >0.4 FTE were e-mailed a SurveyMonkey link to an online questionnaire, which was anonymous and voluntary. SurveyMonkey, a web-based resource center, has the ability to track and remind survey nonresponders without violating their anonymity. The initial e-mail was followed by a ten-day reminder e-mail, a twenty-one-day reminder e-mail, and a final reminder at thirty days. Signs were posted in each department and on the school's digital signage requesting faculty members' participation in the survey.

The survey used in this investigation was adapted with permission from the instrument used by Davis et al.[30] The first section covered teaching methods, formal training, and lifelong learning; the second section focused on topics covered and time devoted to such topics; the third section inquired about respondents' evaluation of student skills; and the fourth section investigated factors related to delivery of tobacco dependence training. Of the total fifty-seven questions, ten related to their formal training and teaching methods, fourteen focused on the topics faculty covered in their courses, seventeen related to resources and the use of the resources, and sixteen focused on assessing student skills and competency. Survey results were analyzed using Statistical Package for the Social Sciences for Windows (SPSS v. 15.0, Chicago, IL). The dean shared highlights from the survey with the faculty during a quarterly Faculty Advance Seminar. These tools were used to enhance the quality of education provided to students and the quality of health care provided to patients.

Results

The response rate to the survey was 101 out of 126 (80 percent) faculty members; seventy-one males and thirty females responded. The survey results revealed that while faculty members had limited formal training, numerous resources were being used to teach students: continuing education workshops, conferences, textbooks, professional journals, government agencies, private organizations, and websites. While 39.2 percent did not provide any tobacco-related instruction, the survey results

revealed that tobacco-related topics are addressed in some way in every department. When asked about current graduates, 68.4 percent said they believe that, upon graduation, dental professionals should be able to perform at least a ten-minute moderate intervention, which as defined by the survey included Ask, Advise, Assess, Assist, Arrange, brief motivational interviewing, discussion of tobacco dependence treatment medications, and the 5Rs about benefits of quitting.

When asked about the benefit of additional faculty training, 73.4 percent of respondents agreed that faculty development in tobacco dependence treatment interventions would be beneficial. With this additional training, 58.5 percent agreed they would include TDE methods in their lectures and in clinic (Figure 1). Among the respondents, 59.8 percent requested training in behavioral intervention techniques, 43.5 percent in diagnosis and treatment planning, and 42.4 percent in pharmacotherapy prescribing options. The results obtained from faculty members who were concerned about their lack of training during dental school are similar to those of other studies.[19,22-24]

The survey results were also used to determine the type of courses needed to increase respondents' knowledge base and confidence levels. As an intervention, five tobacco-related educational courses were provided to LLUSD faculty members to increase their knowledge and confidence levels in teaching TDE to students and treating tobacco-dependent patients. Faculty members perceived their educational needs to be greater than their available resources (Figure 2). This result is similar to that in the Warnakulasuriya study,[19] which found the most significant barrier to effective tobacco counseling in the dental office was a lack of formal training while in dental school. As a result, calibration sessions and additional faculty development courses designed to increase faculty confidence levels have been planned (Table 1) as a further effort to improve the level of student interventions.

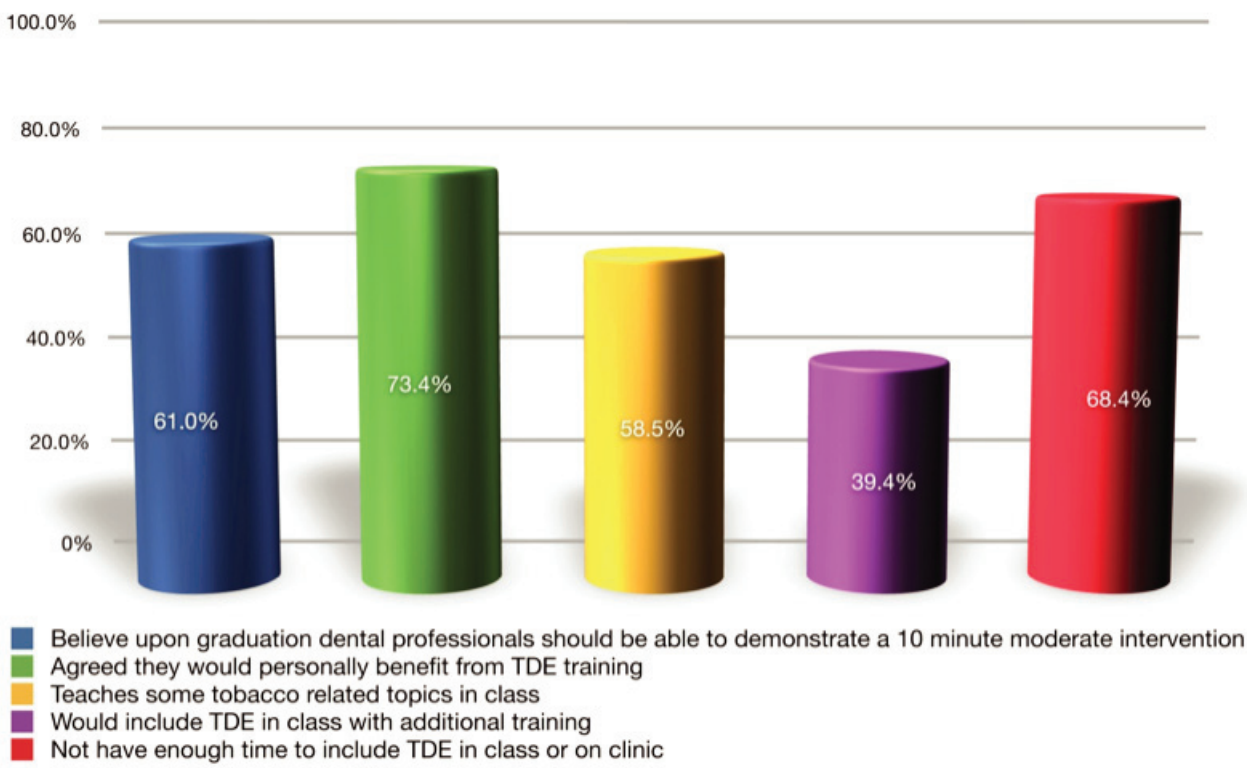

Figure 1. Faculty responses to tobacco dependence education (TDE) survey

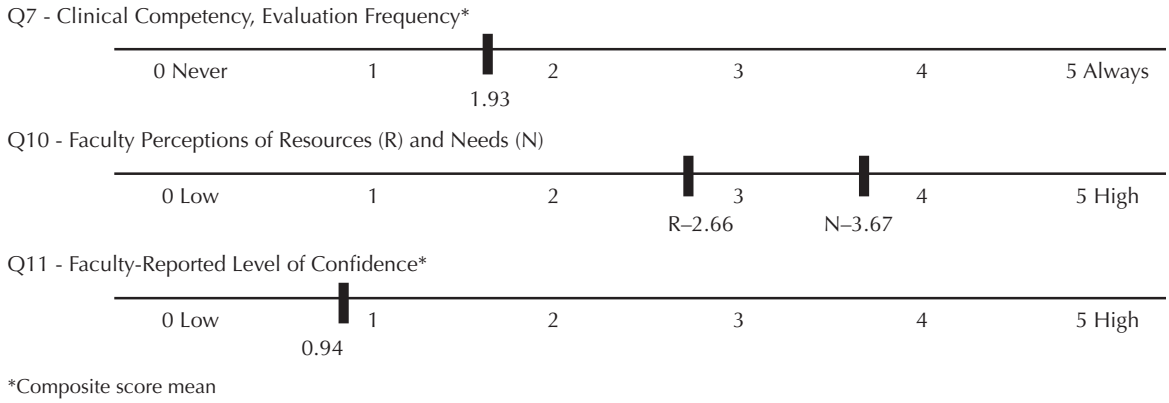

Figure 2. Faculty perceptions and confidence levels

Discussion

Through the use of the online survey, a baseline of the school's curricular content, clinical practices of faculty, faculty knowledge, attitudes and perceived barriers toward counseling, and the treatment of tobacco dependent patients was established. The Tobacco Treatment Committee reviewed the curriculum and restructured courses for a comprehensive curriculum in which topics were built on each other. Through these efforts, eight and four hours of TDE were added to the dental curriculum and dental hygiene curriculum, respectively (Table 1).

In results similar to those of the study by Spangler et al.,[31] LLUSD discovered a lack of integration between didactic content and clinical practice. Additionally, there was a failure to provide and teach supportive intervention skills (such as interviewing techniques, pharmacotherapy options, and instructions for working with patients who relapse), identified as missing components in the curriculum. While LLUSD has formerly taught tobacco-related topics in the departments of periodontics, dental hygiene, oral diagnosis, radiology, and pathology, the subject was also discussed in departments such as implant dentistry, pediatric dentistry, and public health dentistry although the tobacco curriculum had not been coordinated across the four-year dental curriculum and two-year dental hygiene curriculum. The topics were left to the discretion of each course director and lecturer. Utilizing the curriculum review and the faculty survey, there was a reorganization of tobacco-dependence teaching efforts across departments. Key faculty members were contacted regarding core courses and incorporating material related to tobacco dependence education. Changes were made in axiUm (v. 4.6 Exan Academic, Port Coquitlam, BC, Canada), the school's computerized clinical patient records system, to include the Fagerstrom test,[32] a nicotine withdrawal symptoms quiz,[33,34] and a tobacco counseling code.

Table 1. Timeline of curriculum review, survey, and modifications

November 2007	March 2008	July 2008	November 2009	February 2010	July/August 2010
• Curriculum review • Curriculum mapping	• Faculty survey • Tobacco Tx committee formed	• Curriculum increased hours (8 hrs D and 4 hrs DH) • 5 hours of faculty development • Increased emphasis on data collection	• Tobacco Tabs on AxiUm (clinical software program)	• Biomechanical markers on clinic (CO Monitors)	• Faculty calibration, 5 hours

Since the survey indicated there were insufficient education materials in the clinic for patients, we distributed referral flyers from the closest tobacco-dependence treatment clinic. Five hundred wallet cards from the California Smoker's Helpline were distributed in the common areas and to the departments of dental hygiene, periodontics, oral diagnosis, radiology, and pathology, and 250 more wallet cards were distributed to students (two cards each) prior to their transition onto the clinic floor. The wallet cards, flyers, and fax referral forms are introduced annually during class to both dental and dental hygiene students. Referral flyers and wallet cards were replenished every quarter for faculty, students, and patients. Within two years after the initial survey, an eye-catching educational brochure was created that includes quitting tips, health tips, nicotine replacement therapy information, contact information for counseling, and pertinent websites. While wallet cards are available to patients in the lobby, the faculty use a team approach with compliant patients. The patient's contact information is immediately faxed to the California Quit Line while the patient is still in the clinic. The use of biochemical monitoring was also made available via a carbon monoxide breath analyzer (COmpact Smokerlyzer, Bedfont Scientific Ltd., Williamsburg, VA) to motivate patients to quit using tobacco prior to oral surgery. Previous research has shown that when patients see initial results from a CO monitor, it plays an important role in correcting their problem.[35-37] Tobacco-using patients can be tested for baseline results and counseled about the ramifications of delayed wound healing and/or implant failure. At the subsequent appointment and also on the day of the surgery, the patient can then be retested to check progress.

LLUSD does not have clinical competencies in place to specifically measure dental student communication related to tobacco cessation, students' motivational and counseling skills during patient treatment, and the monitoring of a patient's tobacco withdrawal symptoms and pharmacotherapy needs. The lack of such clinic competencies may be a direct reflection of the faculty time constraints of supervising students on the clinic floor, combined with lack of formal training and low confidence levels.

However, identical to California statistics,[38] 14 percent of the LLUSD patient population have indicated in their health history that they use tobacco products. Additionally, an internal audit showed that only 0.56 percent of these patients have expressed an interest in quitting. With few tobacco dependent patients and even fewer interested in quitting, many faculty and dental students will never have the opportunity to experience treating and counseling this population at LLUSD. The survey results that showed a lack of faculty confidence toward counseling a patient could be a direct reflection of a lack of interested patients to treat.

Conclusions

LLUSD has a good model for the acquisition of dental knowledge and clinical skills, but there are no competencies in place related to TDE for graduating dentists. Because the dental hygiene program does have TDE competencies, some dental students have utilized a team approach and referred patients to the dental hygiene students for treatment. Currently, the LLUSD dental hygiene students are more competent and confident than dental students in counseling tobacco users, due to an existing curriculum, faculty commitment, and established clinical competencies. But until there are questions on the National Dental Board Examination regarding treating tobacco dependent patients or at the state level for dental license renewal, the barriers to treating these patients will continue to be hard to overcome.

Many positive and sustainable changes have been made at LLUSD, including twelve hours of additional curriculum (eight hours in dental and four in dental hygiene), establishment of a formal committee, additions to computerized clinic patient records, CO monitors available in the clinic, and personalized education materials. More time is spent in the curriculum on strategies to counsel and support these patients. Faculty development and clinic calibration sessions were scheduled for competency at moderate interventions. We will re-evaluate the LLUSD curriculum after the changes have been implemented for two years to measure effectiveness and determine if further changes are required.

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REFERENCES

1. Centers for Disease Control and Prevention. Smoking-attributable mortality, years of potential life lost, and productivity losses, United States, 2000–04. MMWR Morb Mortal Wkly Rep 2008;57(45):1226–8.
2. Stucken E, Weissman J, Spiegel JH. Oral cavity risk factors: experts' opinions and literature support. J Otolaryngol Head Neck Surg 2010;39(1):76–89.
3. Dietrich AJ, O'Connor GT, Keller A, Carney PA, Levy D, Whaley FS. Cancer: improving early detection and prevention, a community practice randomized trial. BMJ 1992;302(6828):687–91.
4. Moimaz SA, Zina LG, Saliba O, Garbin CA. Smoking and periodontal disease: clinical evidence for an association. Oral Health Prev Dent 2009;7(4):369–76.
5. Bergstrom J, Eliasson S, Dock J. A 10-year prospective study of tobacco smoking and periodontal health. J Periodontol 2000;71(8):1338–47.
6. Guo S, Dipietro LA. Factors affecting wound healing. J Dent Res 2010;89(3):219–29.
7. Tomar SL, Asma S. Smoking-attributable periodontitis in the United States: findings from NHANES III. J Periodontol 2000;71(5):743–51.
8. Winn DM. Epidemiology of cancer and other systemic effects associated with the use of smokeless tobacco. Adv Dent Res 1997;11(3):313–21.
9. Gordon JS, Severson HH. Tobacco cessation through dental office settings. J Dent Educ 2001;65(4):354–63.
10. Abt E. Smoking increases dental implant failures and complications. Evid Based Dent 2009;10(3):79–80.
11. Weaver RG, Whittaker L, Valachovic RW, Broom A. Tobacco control and prevention effort in dental education. J Dent Educ 2002;66(3):426–9.
12. Clinical practice guideline: treating tobacco use and dependence, 2008 update panel, liaisons, and staff—a clinical practice guideline for treating tobacco use and dependence, 2008 update. A U.S. Public Health Service report. Am J Prev Med 2008;35(2):158–76.
13. Beaglehole RH, Tsakos G, Watt RG. Tobacco control and the dental profession: a survey of the Organization for Economic Cooperation and Development (OECD) national dental associations. Int Dent J 2005;55(5):325–8.
14. Gordon JS, Albert DA, Cerws KM, Fried J. Tobacco education in dentistry and dental hygiene. Drug Alcohol Rev 2009;28(5):517–32.
15. Pizzo G, Licata ME, Piscopo MR, Conglio MA, Pignata S, Davis JM. Attitudes of Italian dental and dental hygiene students toward tobacco-use cessation. Eur J Dent Educ 2010;14(1):17–25.
16. Vasquez-Mayoral EE, Sanchez-Perez L, Olguin-Barreta Y, Acosta-Gio AE. Mexican dental school deans' opinions and practices regarding oral cancer, 2007. J Dent Educ 2008;72(12):1481–7.
17. Coan LL, Christen A, Romito L. Evolution of a tobacco cessation curriculum for dental hygiene students at Indiana University School of Dentistry. J Dent Educ 2007;71(6):776–84.
18. Ho MK, Tyndale RF. Overview of the pharmacogenomics of cigarette smoking. Pharmacogenics J 2007;7(2):81–9.
19. Warnakulasuriya S. Effectiveness of tobacco counseling in the dental office. J Dent Educ 2002;66(9):1079–87.
20. ADA positions and statements: summary of policy and recommendations regarding tobacco. Chicago: American Dental Association, 2010.
21. Public Health Policy 17-94. American Dental Hygienists' Association policy manual, 2002. Chicago: American Dental Hygienists' Association, 2002.
22. Dolan TA, McGorray SP, Grinstead-Skigen CL, Mecklenburg R. Tobacco control activities in U.S. dental practices. J Am Dent Assoc 1997;128(12):1669–79.
23. Stacey F, Heasman PA, Heasman L, Hepburn S, McCracken GI, Preshaw PM. Smoking cessation as a dental intervention: views of the profession. Br Dent J 2006;201(2):109–13.
24. Carr AB, Ebbert JO. Interventions for tobacco cessation in the dental setting: a systematic review. Community Dent Health 2007;24;(2):70–4.
25. Tomar SL, Husten CG, Manley MW. Do dentists and physicians advise tobacco users to quit? J Am Dent Assoc 1996;127(2):259–65.
26. Albert D, Ward A, Ahuluwalia K, Sadowsky D. Addressing tobacco in managed care: a survey of dentists' knowledge, attitudes, and behaviors. Am J Public Health 2002;92(6):997–1001.
27. Giacona MB. Tobacco cessation within the dental curriculum in the United States and internationally. NY State Dent J 2004;70(6):40–3.
28. Ramseier CA, Christen A, McGowan J, McCartan B, Minenna L, Ohrn K, Walter C. Tobacco use prevention and cessation in dental and dental hygiene undergraduate education. Oral Health Prev Dent 2006;4(1):49–60.
29. Fried JL, Rubenstein-DeVore L. Tobacco use cessation curricula in U.S. dental schools and dental hygiene programs. J Dent Educ 1990;54(12):730–5.
30. Davis JM, Stockdale MS, Cropper M. The need for tobacco education: studies of collegiate dental hygiene patients and faculty. J Dent Educ 2005;69(12):1340–52.
31. Spangler JG, George G, Foley LK, Crandall SJ. Tobacco intervention training: current efforts and gaps in U.S. medical schools. JAMA 2002;288(9):1102–9.

32. Fagerstrom KO, Schneider NG. Measuring nicotine dependence: a review of the Fagerstrom tolerance questionnaire. J Behav Med 1989;12(2):159–82.
33. Hughes JR, Hatsukami DK, Pickens RW, Krahn D, Malin S, Luknic A. Effect of nicotine on the tobacco withdrawal syndrome. Psychopharmacology (Berl) 1984;83(1):82–7.
34. Hatsukami DK, Hughes JR, Pickens RW, Svikis D. Tobacco withdrawal symptoms: an experimental analysis. Psychopharmacology 1984;84(2):231–6.
35. Jarvis MJ, Belcher M, Vesey C, Hutchinson DCS. Low-cost carbon monoxide monitors in smoking assessment. Thorax 1986;41:886–7.
36. Fagerstrom KO. Assessment of the smoker who wants to quit. Monaldi Arch Chest Dis 2001;56(2):124–7.
37. McClure JB. Are biomarkers useful treatment aids for promoting health behavior change? Am J Prev Med 2002;22(3):200–7.
38. Giovano GA, Chaloupka FL, Hartman AM, Joyce KG, Chriqui J, Orleans TC. Cigarette smoking prevalence and policies in the 50 states: an era of change. The Robert Wood Johnson Foundation ImpacTeen tobacco chart book. Buffalo, NY: University at Buffalo, 2009.