

Individual and Contextual Factors Related to Family Practice Residents' Assessment and Counseling for Tobacco Cessation

Nell H. Gottlieb, PhD, Jong-Long Guo, PhD, CHES, Shelley A. Blozis, PhD, and Philip P. Huang, MD, MPH

Background: Tobacco use is the chief avoidable cause of death in the United States. Physicians, however, are not routinely assessing this risk and providing counseling for risk reduction. This study examines tobacco cessation counseling practices among family practice residents and explores the determinants of residents' smoking-counseling behaviors and counseling duration.

Methods: One hundred ten family practice residents (response rate = 93.2%) from four Texas residency training programs completed a survey designed to assess tobacco cessation counseling practices.

Results: A high proportion of residents reported that they usually or always assessed tobacco use (59.3%) and advised their patients to quit smoking (80.9%), with a lower proportion reporting specific counseling behaviors (7.3% - 21.9%), referrals (1.8%), or follow-up visits (1.8%). Year of residency, perceived effectiveness, and the interaction between perceived effectiveness and residency year were significantly associated with number of counseling behaviors, and year of residency and perceived effectiveness were significantly associated with counseling duration.

Conclusions: Faculty physicians should assist residents to implement the Public Health Service-sponsored clinical practice guideline for tobacco control. There is a need to increase behavioral skills and perceived effectiveness for assessing and counseling smokers among first-year residents. (J Am Board Fam Pract 2001;14:343-51.)

Although tobacco use is the chief avoidable cause of death in the United States,¹ physicians and other health care providers are not routinely assessing this risk and providing counseling for risk reduction.² According to the National Ambulatory Care Survey, physicians assessed smoking status at 61% of all visits in 1995 and reported counseling 21% of smoking patients in that year.³ Primary care physicians are more likely to provide treatments to smokers than are specialists or other providers.^{3,4}

Meta-analyses conducted by the Agency for Health Care Policy Research (AHCPR) estimated the cessation rate of patients who received physician advice to quit to be 10.2%, compared with 7.9% for the no-advice reference group; the cessa-

tion rate for patients in practices with a screening system to determine smoking status was 6.4%, compared with 3.1% for the reference group.^{5,6} Elements of clinician counseling include advice to quit,⁷⁻¹² setting a specific quit date,^{7,9} follow-up,^{11,13,14} referring patients to an intensive smoking-cessation program,¹⁰ preparing the patient for withdrawal symptoms,^{10,14} prescribing a nicotine patch or gum,^{10,11,14-17} and providing self-help material.^{7,16} Cromwell and colleagues¹⁸ found smoking counseling based on AHCPR guidelines to be cost-effective, and the more time (up to 35 minutes at the first visit) and follow-up visits (up to two) of the counseling process, the more cost-effective its estimated effect. The National Cancer Institute (NCI) summarizes its physician counseling guidelines as, "Ask about smoking at every opportunity. Advise all smokers to stop. Assist the patient in stopping. Arrange follow-up visits."¹⁹

Recent studies suggest that physicians give different amounts of antismoking advice to their patients.^{3,4} During the past two decades, various correlates of physicians' smoking counseling behaviors have been noted. In a 1983 representative sample of

Submitted, revised, 14 February 2001.

From the Department of Kinesiology and Health Education (NHG) and the Department of Educational Psychology (SAB), The University of Texas at Austin; the Department of Health Education (JLG), National Taiwan Normal University, Taipei; and the Bureau of Disease, Injury and Tobacco Prevention (PPH), The Texas Department of Health, Austin. Address reprint requests to Nell H. Gottlieb, PhD, Department of Kinesiology and Health Education, Bellmont 222, University of Texas at Austin, Austin, TX 78712.

Texas general practitioners, internists, and family physicians, internists were found to be most likely to report taking smoking histories and making outside referrals for cessation, whereas family physicians were most likely to report cessation counseling.²⁰ Internists were more likely than family physicians to inquire about tobacco use and to discuss strategies to quit in the national 1992 primary care provider surveys.²¹ Younger physicians were found to be more likely to report history taking and outside referrals for smoking,²⁰ although faculty physicians have been shown to perform more counseling behaviors than internal medicine residents.²²

Self-efficacy or confidence in counseling behaviors has been associated with performing counseling²³ and history taking²⁰ but not with obtaining outside referrals.²⁰ Expectations for patients to follow through on advice and satisfaction with counseling efforts were positively related to bringing up the subject of smoking²⁴ and negatively associated with outside referrals.²⁰ Several studies have found physicians' preparedness²⁵ and self-efficacy^{20,26} to counsel smokers to be higher than their belief that patients will comply with their recommendation.

The purpose of this study was to examine tobacco cessation counseling practices among family practice residents and to explore the determinants of residents' use of specific counseling behaviors and counseling duration.

Methods

Survey Participants

One hundred ten family practice residents (response rate = 93.2%) completed a questionnaire designed to assess smoking counseling practices from December 1997 to January 1998. The residents represent four residency programs and clinics that received funding from the Texas Department of Health to implement the Put Prevention into Practice (PIIP) office system program.²⁷ According to 1990 census estimates, the residency programs were located in small cities (85,000–260,000).²⁸ Site A was located in a health science center setting, site C was affiliated with a health science center but located in a different city, and the other two sites have the local medical society and hospital as parent organizations. Site A was using a combination electronic and paper record system, whereas site C was initiating an electronic record system at the time of

the survey. Site B had already implemented PIIP in one of its clinics and had received a contract to extend it to additional clinics. The number of eligible residents ranged from 21 to 36. Participants were approximately equally distributed among first (35.5%), second (33.6%), and third (30.9%) years of residency. Approximately two thirds (65.5%) were male.

Study Design

This survey served as a baseline needs assessment for the PIIP program. Questionnaires were administered at clinical sites by research assistants. The questionnaire elicited information regarding residents' sex, residency year, workload, assessment of patients' tobacco use, smoking counseling, counseling duration, perceived effectiveness for patient behavior change, perceived barriers, use of office systems, and use of educational resources for providing preventive services. All variables were measured by single items except smoking counseling, perceived effectiveness, office system, and educational resources. Workload was measured by the item: "About how many different patients have you personally examined or treated in the last 30 days?" Tables 1 and 2 show items measuring assessment of tobacco use, counseling duration, and smoking cessation counseling. A summative score was constructed for the seven items measuring smoking counseling behaviors (Table 2), with a possible range of 7 to 49. An estimate of the reliability of the scale using Cronbach α was 0.78. Based on preliminary data analysis, the variable assessment of patients' tobacco use required a log transformation, as the variable was not approximately normally distributed (Lilliefors and Shapiro-Wilk tests, $P < .05$).

Perceived effectiveness was operationalized as the sum of five items measured on a 4-point Likert scale with a possible range of 5 to 20. Residents were asked how effective they were in changing their patients' behaviors with respect to (1) smoking cessation, (2) alcohol reduction, (3) exercise, (4) safe sex practices, and (5) healthy diet. The response categories were 4 = extremely effective, 3 = often effective, 2 = somewhat effective, and 1 = minimally effective. An estimate of internal consistency of the scale by coefficient α was 0.84.

Use of the office system was assessed by the sum of six items with a possible range of 6 to 18. Residents were asked how often they used the follow-

Table 1. Family Practice Residents' Assessment of Tobacco Use and Counseling Duration, by Residency Year.

Questions Regarding Use and Counseling	Percent of Total Cases	Percent of First-Year Residents	Percent of Second-Year Residents	Percent of Third-Year Residents
<i>How often did you ask the patient about tobacco use?</i>				
	(n = 108)	(n = 39)	(n = 36)	(n = 33)
Never	0	0	0	0
Rarely (1%–20%)	0	0	0	0
Sometimes (21%–40%)	7.4	5.1	13.9	3.0
About half the time (41%–60%)	9.3	10.3	13.9	3.0
Often (61%–80%)	24.1	12.8	25.0	36.4
Usually or always (81%–100%)	59.3	71.8	47.2	57.6
<i>During the past 30 days, when you counseled a patient about stopping smoking, about how long did you spend on average?</i>				
	(n = 108)	(n = 38)	(n = 36)	(n = 34)
Did not discuss	0	0	0	0
Less than 1 minute	3.7	5.3	2.8	2.9
1–2 minutes	27.8	39.5	22.2	20.6
3–5 minutes	36.1	39.5	33.3	35.3
6–9 minutes	21.3	2.6	27.8	35.3
10 minutes or more	11.1	13.2	13.9	5.9

ing: (1) summary lists or flowcharts of preventive services in patient charts (eg, the PPIP adult preventive care flow sheet), (2) computerized tracking or prompting system, (3) reminder notices or stickers on patient charts (eg, PPIP “prevention services needed” sticker notes or alert stickers), (4) reminder notices or postcards mailed to patients (eg, PPIP reminder postcards), (5) patient-held mini-records for preventive services (eg, The Personal Health Guide), and (6) nursing or office staff to track care. Items were measured using 1 = never or don’t know, 2 = sometimes, 3 = routinely. An estimate of internal consistency of the scale by Chronbach α was 0.75.

Use of educational resources for educating patients was measured by the sum of three items with

a possible range of 3 to 9: (1) pamphlets or brochures, (2) health risk appraisal instruments, and (3) counseling by nursing or other office staff. Items were measured as 1 = never or don’t know, 2 = sometimes, 3 = routinely. An estimate of internal consistency of the scale by Chronbach α was 0.71.

Data Analysis

Analyses were executed using SPSS 8.0 for Windows.²⁹ Hierarchical regression was used to ascertain determinants of clinicians’ practices regarding tobacco use assessment, smoking counseling, and counseling duration. We specified the order of entry of predictors from distal clinical setting variables to proximal cognitive ones. The first step (model 1) included clinic factors (workload, office

Table 2. Rate of Specific Smoking Counseling Behaviors (n = 110).

Counseling Behavior Questions	Percent Never (0%)	Percent Rarely (1%–20%)	Percent Sometimes (21%–40%)	Percent About Half the Time (41%–60%)	Percent Often (61%–80%)	Percent Usually (81%–99%)	Percent Always (100%)
<i>How often did you</i>							
Advise the patient to quit smoking?	0.0	0.9	3.6	2.7	11.8	33.6	47.3
Advise setting a specific “quit” date?	15.5	16.4	17.3	12.7	16.4	15.5	6.4
Call or have a staff member call the patient a week after the quit date?	76.4	14.5	4.5	0.9	1.8	1.8	0.0
Refer the patient to a group clinic or intensive smoking cessation program?	54.5	26.4	10.9	1.8	4.5	1.8	0.0
Prepare the patient for withdrawal symptoms?	16.4	15.5	24.5	16.4	10.0	14.5	2.7
Prescribe a nicotine patch or gum?	30.0	20.0	20.0	13.6	9.1	5.5	1.8
Provide self-help materials?	28.2	18.2	20.9	10.9	6.4	11.8	3.6

system, educational resources, and site). The second step (model 2) included resident characteristics (residency year and sex). The third step (model 3) included the cognitive factor of perceived effectiveness. The last step (model 4) included the interaction of perceived effectiveness and resident year. The proportion of variation in each dependent variable was measured by R^2 . Changes in R^2 between steps in the analyses are also reported. A significant change in R^2 is an indication that the variables included in that step account for an additional amount of variation in the dependent variable above that accounted for by the variables included in the preceding step.

Results

Descriptive Analysis

More than one half of the residents (59.3%) indicated they usually or always ask whether a patient uses tobacco (Table 1). The modal average duration reported for counseling about smoking cessation was 3 to 5 minutes. As shown in Table 2, 80.9% of residents indicated they usually or always advised the patient to quit smoking. From 15% to 22% of residents responded they usually or always advised patients to set a specific quit date (21.9%), prepared a patient for withdrawal symptoms (17.2%), and provided self-help materials (15.4%). A large percentage reported they never telephoned or had a staff member telephone a patient after the quit date (76.4%). Slightly more than one half indicated that they had never referred a patient to a smoking-cessation program (54.5%), and 50% indicated that they rarely or never prescribed nicotine replacement. The mean scores of counseling behaviors of first-, second-, and third-year residents are 19.9, 23.2, and 23.9 respectively ($F = 3.63$, $df = 2$, $P = .03$). Third-year residents used more counseling elements than first-year residents (Scheffé post hoc, $P < .05$).

The majority of residents reported they are somewhat (60.6%) or quite (14.7%) effective at changing their patients' behaviors with respect to smoking cessation. Almost one fourth (23.9%) believe they are minimally effective, and 0.9% believe they are extremely effective.

The most frequently reported major barriers were lack of time (by 61.8% of the residents) and lack of patient interest in prevention (58.2%), followed by lack of availability of health educators

(33.9%) and lack of systems for tracking and promoting preventive care (33.9%). Fewer reported lack of financial reimbursement for clinical preventive services (20%), lack of effective patient education materials (17.6%), and uncertainty about what preventive services to provide (5.6%).

More than one half of the residents reported they never used five of the seven office systems. Summary lists or flowcharts of preventive services were reported to be used routinely by 23.9% of the residents, nursing or office staff were used to track care by 15% of the residents, and reminder notices or stickers on patient charts were used by 13.8% of the residents. For patient education, more than one half never used health risk appraisal instruments. Most residents indicated they sometimes or routinely used pamphlets or brochures (79.8%) and counseling by nursing or other office staff (75.2%). Site B was highest on both office system and educational resources utilization.

Multivariate Analysis

As shown in Table 3, determinants of smoking counseling were examined. Clinic factors accounted for an initial 13% ($P < .05$) of the variation in smoking counseling. The largest difference in smoking counseling behavior was due to differences in clinic site. Specifically, residents of site A reported more counseling behaviors, holding constant resident characteristics and other clinic factors, relative to sites B, C, and D. Resident characteristics accounted for an additional 7% ($P < .05$) of the variation in smoking counseling beyond that accounted for by clinic characteristics. Residents in years 2 and 3 provided more smoking counseling relative to those in their first year. In the third step, cognitive factors were considered. Perceived effectiveness accounted for an additional 13% ($P < .001$) of the variation in smoking counseling. Lastly, we examined the interactions of perceived effectiveness and residency year, and these accounted for another 6% ($P < .05$) of the variation in smoking counseling.

The negative coefficient for perceived effectiveness and residency year 3 vs year 1 indicated that perceived effectiveness was positively associated with the number of counseling behaviors used by first-year residents, but not by third-year residents. In the final model, educational resource utilization was also a significant predictor of counseling behaviors. The total proportion of variation in smok-

Table 3. Hierarchical Regression Analysis of Effect of Clinic, Resident, Cognitive, and Interaction Factors on Smoking Counseling Behaviors of Family Practice Residents.

Heading	Heading	Model 1 β	Model 2 β	Model 3 β	Model 4 β
Clinic factors	Workload	0.16	0.08	0.07	0.06
	Office system	0.08	0.06	-0.14	-0.16
	Educational resource	0.22	0.24*	0.28*	0.30 [†]
	Site A vs site D	0.28*	0.29*	0.28*	0.28*
	Site B vs site D	0.03	0.04	0.12	0.12
	Site C vs site D	0.16	0.16	0.20	0.18
Characteristics of residents	Residency year 2 vs year 1	—	0.28*	0.27*	-0.19
	Residency year 3 vs year 1	—	0.22*	0.26*	1.06 [†]
	Sex	—	-0.10	-0.08	-0.12
Cognitive factor	Perceived effectiveness	—	—	0.40 [‡]	0.47 [‡]
Interaction factors	PE*RY (year 2 vs year 1)	—	—	—	0.47
	PE*RY (year 3 vs year 1)	—	—	—	-0.82*
		R ² = 0.13	R ² change = 0.07	0.13	0.06
Adjusted R ²		0.07	0.13	0.26	0.31
F value		2.38*	2.76*	18.54 [‡]	4.50*

**P* < .05, [†]*P* < .01, [‡]*P* < .001.

PE: perceived effectiveness, RY: residency year.

ing counseling explained by these factors was 39% (adjusted R² was 31%).

We used a similar hierarchical approach to examine possible determinants of counseling duration. Clinic factors accounted for only 4% (not significant) of the variation in counseling duration, with resident characteristics accounting for an additional 3% (not significant). Cognitive factors accounted for an additional 10% (*P* < .01) of the variation, and, in the final equation, the only significant predictor was perceived effectiveness (β = 0.34). The total proportion of variation in counseling duration explained by the final equation was 17% (adjusted R² was 9%). Because residency year was not significantly associated with counseling duration, the interaction of residency year and perceived effectiveness was not entered into the model.

Discussion

The recently released update to the clinical practice guideline for tobacco dependence calls for physicians to assess for tobacco use and for users to deliver specific counseling interventions and pharmacotherapy.⁶ Although a number of studies exam-

ining assessment and counseling have reported high rates, they have not looked at the specific components of counseling endorsed by the guideline. For example, the Direct Observation of Primary Care study found that 25.2% of smokers were given cessation advice and that the mean duration of advice was 1.5 minutes.³⁰

Although our study looked only at the behavior of family practice residents, the results have important implications for all family physicians. Residents should be receiving the latest information and training regarding tobacco use in family practice and should represent family practice at its best.

The behavior reported by resident physicians in our study fell short of the NCI guidelines of ask, advise, assist, and arrange follow-up. Although a high proportion of residents reported assessment and counseling, few carried out recommended tobacco-counseling behaviors, used pharmacotherapy, and referred patients into organized cessation programs. These specific counseling behaviors are appropriate only for smokers who are ready to quit smoking (approximately 20%).³¹ The proportion of residents who reported using pharmacotherapy,

follow-up counseling, and outside referrals is low, however, even if their smoking patients had been appropriately assessed for stage of change.

Education about state-of-the-art counseling for cessation is clearly needed.^{19,32} For those not yet contemplating stopping, the counseling goal is increasing awareness of the need to quit,^{33,34} and for those contemplating quitting, to tip the balance of pros and cons toward a decision to quit smoking.³⁵ At that point, the full panoply of cessation activities is needed, as studies have shown that more intervention components are associated with a greater cessation outcome.^{32,36,37} The clinical practice guideline is most appropriate for smokers in the preparation and action stages of cessation, although the revised guideline acknowledges the need to move smokers through the stages of change.⁶

Time was the primary barrier reported by the respondents, a finding consistent with other studies.³⁸⁻⁴² Even so, the actual time required for brief cessation counseling is short⁴³ and can be done concurrently with physical assessment. The other barrier frequently mentioned was lack of patient interest in prevention. This perception held by residents, however, does not reflect reported patient and consumer concerns. Most smokers (70%) report that they want to quit and have made at least one self-described serious attempt to quit.⁴⁴ Smokers also cite a physician's advice to quit as an important motivator for attempting to stop.^{37,45-47} Lack of financial reimbursement, often reported in the literature as a barrier,⁴⁸⁻⁵⁰ was seen as a major barrier by only one fifth of the physicians in this study. This finding could be because reimbursement was not a key concern of physicians in training or to the increasing number of health maintenance organizations in which physician reimbursement is not based on services delivered.

Resources for tracking and promoting preventive services, including smoking cessation counseling, did not appear to be routinely available in all clinics studied. The use of flow sheets and reminder notices would prompt clinicians to ask about tobacco use and counsel patients to quit. PPIP^{27,51,52} is the comprehensive system that these clinical sites were beginning to implement. The "smoking as a vital sign" stamp for charts is a small innovation that was shown to increase clinician advice to quit from 49% to 70%⁵³ and from 50% to 80%⁵⁴ by cueing providers.

Patient education resources, which were significantly associated with counseling behaviors, were underutilized by the physicians we surveyed. Self-help brochures and referral information should be available in examining rooms or placed in the charts of smokers. Nurses and health educators, as part of the health care team, could assist the physician in the provision of counseling and follow-up of smokers who have set quit dates. Both physicians and allied health staff should know the essential elements of counseling for cessation.

The affiliation of site A with a university health science center and use of an electronic medical record system could be responsible for its higher counseling score. The site that had experience with PPIP and whose residents reported more use of both office system and educational resources, surprisingly, did not show counseling rates that were significantly different from those of other sites. Perhaps the comprehensive nature of PPIP was not sufficient to change the specific counseling behaviors of residents.

Our finding that third-year residents tend to use more counseling behaviors than first-year residents indicates that postgraduate training is emphasizing these techniques. Perceived effectiveness, however, is associated with the number of counseling behaviors used only among first-year residents compared with third-year residents. This finding suggests that initial learning and feedback of success with counseling are effective at the beginning of training. Perhaps the perceived effectiveness beliefs of third-year residents are fixed and hard to change because of the residents' additional years of experience with patients. Our findings for duration were similar to those for counseling behaviors, although the interaction of perceived effectiveness and residency year was not significant, perhaps because of the limited range of the duration variable or the small sample size.

Our study was limited by the selection bias of the sites and self-report. We were unable to collect observational data and have chart audit data from only one site. Surveys, however, offer valuable information concerning the perceptions by physicians of perceived effectiveness, perceived barriers, use of office system, and education resources. Data regarding these perceptions cannot be gathered by chart audit. The cross-sectional design also limits our ability to examine the influence of training on smoking cessation counseling. Unfortunately, we

were not able to collect complete data from residents in the study sites after early implementation of the PPIP program and an additional year of training. In another study, however, we found that 3 years after implementation of the PPIP program in two family practice residency programs and three community health centers, documented assessment of smoking had increased from 56% to 80%.⁵⁵ The linking of such chart audit data to physicians' self-report, patients' self-report, and direct observations would provide a fuller picture of the actual delivery of tobacco assessment and counseling and a guide for interpreting data from each collection method.

In their summary of Cochrane Review Group findings, Bero et al⁵⁶ found the following methods to promote behavioral change consistently among health professionals: educational outreach visits, manual or computerized reminders, interactive educational meetings, and multifaceted interventions that used at least two of the following: audit and feedback, reminders, local consensus processes, or marketing. Audit and feedback, the use of local opinion leaders, local consensus processes, and patient-mediated interventions had variable effectiveness, whereas educational materials and didactic educational meetings had little or no effect. Residency training, including tutorial sessions, video modeling, and role-playing using a simulated patient, and chart reminders have been shown to increase smoking cessation counseling rates among residents, whereas lectures and seminars made no difference.^{51,57,58}

Family physicians are in a unique position to influence smoking among both youth and adults. This potential is currently not being fully realized.^{20,59} Increasing emphasis on effectiveness for tobacco cessation, skills training, and reinforcement of counseling elements and duration in continuing medical education, as well as in residency training, will assure that family practice physicians are prepared to meet this challenge.

These data were collected under a contract from the Texas Department of Health to the first author.

References

1. Cigarette smoking-attributable mortality and years of potential life lost: United States, 1990. *MMWR Morb Mortal Wkly Rep* 1993;42:645-49.
2. Missed opportunities in preventive counseling for cardiovascular disease—United States, 1995. *MMWR Morb Mortal Wkly Rep* 1998;47:91-5.
3. Thorndike AN, Rigotti NA, Stafford RS, Singer DE. National patterns in the treatment of smokers by physicians. *JAMA* 1998;279:604-8.
4. Kviz FJ, Clark MA, Prohaska TR, et al. Attitudes and practices for smoking cessation counseling by provider type and patient age. *Prev Med* 1995;24:201-12.
5. Smoking cessation. Clinical practice guideline, no. 18. Smoking Cessation Guideline Panel. Rockville, Md: Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, Centers for Disease Control and Prevention, 1996. (AHCPR publication no. 96-0692.)
6. Treating tobacco use and dependence. Tobacco Use and Dependence Guideline Panel. Washington, DC: Department of Health and Human Services, Public Health Service, 2000.
7. Royce JM, Ashford A, Resnicow K, Freeman HP, Caesar AA, Orlandi MA. Physician- and nurse-assisted smoking cessation in Harlem. *J Natl Med Assoc* 1995;87:291-300.
8. McIlvain H, Susman JL, Davis C, Gilbert C. Physician counseling for smoking cessation: is the glass half empty? *J Fam Pract* 1995;40:148-52.
9. Gilpin EA, Pierce JP, Johnson M, Bal D. Physician advice to quit smoking: results from the 1990 California Tobacco Survey. *J Gen Intern Med* 1993;8:549-53.
10. Wilson DM, Gellatly-Frey H, Bauman HC. Initial experience of McMaster SmokeStop. Smoking Cessation Clinic at McMaster Family Practice Unit. *Can Fam Physician* 1998;44:1310-8.
11. Goldstein MG, Niaura R, Willey-Lessne C, et al. Physicians counseling smokers. A population-based survey of patients' perceptions of health care provider-delivered smoking cessation interventions. *Arch Intern Med* 1997;157:1313-9.
12. Rogers LQ, Johnson KC, Young ZM, Graney M. Demographic bias in physician smoking cessation counseling. *Am J Med Sci* 1997;313:153-8.
13. Adams JA. Smoking cessation counseling in adults and children: the clinician's role. *Md Med J* 1995;44:779-87.
14. Christen AG. Helping patients quit smoking: lessons learned in the trenches. *Quintessence Int* 1998;29:253-9.
15. Ockene JK, Kristeller J, Pbert L, et al. The physician-delivered smoking intervention project: can short-term interventions produce long-term effects for a general outpatient population? *Health Psychol* 1994;13:278-81.
16. Daskalakis C, Goldberg RJ, Ockene JK, Kalan K, Hosmer DW, Pbert L. Comparison of patients' and their resident physicians' responses regarding smok-

- ing-cessation interventions. *Acad Med* 1993;68:168–70.
17. Fiscella K, Franks P. Cost-effectiveness of the transdermal nicotine patch as an adjunct to physicians' smoking cessation counseling. *JAMA* 1996;275:1247–51.
 18. Cromwell J, Bartosen WJ, Fiore MC, Hasselblad V, Baker T. Cost-effectiveness of the clinical practice recommendations in the AHCPR guideline for smoking cessation. Agency for Health Care Policy and Research. *JAMA* 1997;278:1759–66.
 19. Glynn TJ, Manley MW. How to help your patients stop smoking: a National Cancer Institute manual for physicians. Bethesda, Md: Smoking and Tobacco Control Program, Division of Cancer Prevention and Control, National Cancer Institute, Department of Health and Human Services, Public Health Service, National Institutes of Health, 1998. (National Institutes of Health publication no. 98–3064.)
 20. Gottlieb NH, Mullen PD, McAlister AL. Patients' substance abuse and the primary care physician: patterns of practice. *Addict Behav* 1987;12:23–32.
 21. Health people 2000 review, 1998–99. Hyattsville, Md: Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, 1999.
 22. Ockene JK, Adams A, Pbert L, et al. The Physician-Delivered Smoking Intervention Project: factors that determine how much the physician intervenes with smokers. *J Gen Intern Med* 1994;9:379–84.
 23. Zapka JG, Fletcher KE, Ma Y, Pbert L. Physicians and smoking cessation. Development of survey measures. *Eval Health Prof* 1997;20:407–27.
 24. Jelley MJ, Prochazka AV. A survey of physicians' smoking counseling practices. *Am J Med Sci* 1991;301:250–5.
 25. Wechsler H, Levine S, Idelson RK, Schor EL, Coakley E. The physician's role in health promotion revisited—a survey of primary care practitioners. *N Engl J Med* 1996;334:996–8.
 26. McIlvain HE, Crabtree BF, Gilbert C, Havranek R, Backer EL. Current trends in tobacco prevention and cessation in Nebraska physicians' offices. *J Fam Pract* 1997;44:193–202.
 27. Goodson P, Gottlieb NH, Smith MM. Put prevention into practice. Evaluation of program initiation in nine Texas clinical sites. *Am J Prev Med* 1999;17:73–78.
 28. Bureau USC. Population estimates for cities with populations of 10,000 and greater: July 1, 1999. Washington, DC: Population Estimates Program, Population Division, US Census Bureau. Available at <http://www.census.gov/population/estimates/metro-city/SC10K-T3.txt>.
 29. SPSS, Inc. SPSS base 8.0 for windows: user's guide. Chicago: SPSS Inc, 1998.
 30. Jaen CR, Crabtree BF, Zyzanski SJ, Goodwin MA, Stange KC. Making time for tobacco cessation counseling. *J Fam Pract* 1998;46:425–8.
 31. Velicer WF, Fava JL, Prochaska JO, Abrams DB, Emmons KM, Pierce JP. Distribution of smokers by stage in three representative samples. *Prev Med* 1995;24:401–11.
 32. The Agency for Health Care Policy and Research smoking cessation clinical practice guideline. *JAMA* 1996;275:1270–80.
 33. Colby SM, Monti PM, Barnett NP, et al. Brief motivational interviewing in a hospital setting for adolescent smoking: a preliminary study. *J Consult Clin Psychol* 1998;66:574–8.
 34. Ruggiero L, Rossi JS, Prochaska JO, et al. Smoking and diabetes: readiness for change and provider advice. *Addict Behav* 1999;24:573–8.
 35. Prochaska JO, Goldstein MG. Process of smoking cessation. Implications for clinicians. *Clin Chest Med* 1991;12:727–35.
 36. Wilson DM, Taylor DW, Gilbert JR, et al. A randomized trial of a family physician intervention for smoking cessation. *JAMA* 1988;260:1570–4.
 37. Ockene JK, Kristeller J, Goldberg R, et al. Increasing the efficacy of physician-delivered smoking interventions: a randomized clinical trial. *J Gen Intern Med* 1991;6:1–8.
 38. Prochazka A, Koziol-McLain J, Tomlinson D, Lowenstein SR. Smoking cessation counseling by emergency physicians: opinions, knowledge, and training needs. *Acad Emerg Med* 1995;2:211–6.
 39. Polyzos A, Gennatas C, Veslemes M, Daskalopoulou E, Stamatiadis D, Katsilambros N. The smoking-cessation promotion practices of physician smokers in Greece. *J Cancer Educ* 1995;10(2):78–81.
 40. Goldberg RJ, Ockene IS, Ockene JK, Merriam P, Kristeller J. Physicians' attitudes and reported practices toward smoking intervention. *J Cancer Educ* 1993;8(2):133–9.
 41. McVea K, Crabtree BF, Medder JD, et al. An ounce of prevention? Evaluation of the 'Put Prevention into Practice' Program. *J Fam Pract* 1996;43:361–9.
 42. Solberg LI, Brekke, ML, Kottke TE. How important are clinician and nurse attitudes to the delivery of clinical preventive services? *J Fam Pract* 1997;44:451–561.
 43. Demers RY, Neale AV, Adams R, Trembath C, Herman SC. The impact of physicians' brief smoking cessation counseling: a MIRNET study. *J Fam Pract* 1990;31:625–9.
 44. Preventing tobacco use among young people: a report of the Surgeon General. Washington, DC: Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.
 45. Tobacco and the clinician: interventions for medical and dental practice. Washington, DC: Department

- of Health and Human Services, Public Health Service, National Institutes of Health, 1994.
46. Ockene JK. Smoking intervention: the expanding role of the physician. *Am J Public Health* 1987;77:782-3.
 47. Pederson LL. Compliance with physician advice to quit smoking: a review of the literature. *Prev Med* 1982;11:71-84.
 48. Funnell MM, Donnelly MB, Anderson RM, Johnson PD, Oh MS. Perceived effectiveness, cost, and availability of patient education methods and materials. *Diabetes Educ* 1992;18:139-45.
 49. Wells KB, Lewis CE, Leake B, Ware JE, Jr. Do physicians preach what they practice? A study of physicians' health habits and counseling practices. *JAMA* 1984;252:2846-8.
 50. Rosen MA, Logsdon DN, Demak MM. Prevention and health promotion in primary care: baseline results on physicians from the INSURE Project on Lifecycle Preventive Health Services. *Prev Med* 1984;13:535-48.
 51. Gemson DH, Ashford AR, Dickey LL, et al. Putting prevention into practice. Impact of a multifaceted physician education program on preventive services in the inner city. *Arch Intern Med* 1995;155:2210-16.
 52. Gemson DH, Dickey LL, Ganz ML, Ashford AR, Francis CK. Acceptance and use of Put Prevention into Practice materials at an inner-city hospital. *Am J Prev Med* 1996;12:233-7.
 53. Fiore MC, Jorenby DE, Schensky AE, Smith SS, Bauer RR, Baker TB. Smoking status as the new vital sign: effect on assessment and intervention in patients who smoke. *Mayo Clin Proc* 1995;70:209-13.
 54. Robinson MD, Laurent SL, Little JM, Jr. Including smoking status as a new vital sign: it works! *J Fam Pract* 1995;40:556-61.
 55. Gottlieb NH, Huang PP, Blozis SA, Guo JL, Smith MM. The impact of Put Prevention into Practice on selected clinical preventive services in five Texas sites. *Am J Prev Med* 2000;21:35-40.
 56. Bero LA, Grilli R, Grimshaw JM, Harvey E, Oxman AD, Thomson MA. Closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. The Cochrane Effective Practice and Organization of Care Review Group. *BMJ* 1998;317:465-8.
 57. Hall MN, Pettice YJ, Robinson MD, Alexander M. Teaching smoking cessation to family practice residents: an experiential approach. *Fam Med* 1996;28:331-6.
 58. Strecher VJ, O'Malley MS, Villagra VG, et al. Can residents be trained to counsel patients about quitting smoking? Results from a randomized trial. *J Gen Intern Med* 1991;6:9-17.
 59. Young JM, Ward JE. Improving smoking cessation advice in Australian general practice: what do GPs suggest is needed? *Aust N Z J Public Health* 1998;22:777-80.