

Health care practitioners' motivation for tobacco-dependence counseling

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Abstract

Smoking cessation counseling by practitioners occurs at low rates in spite of strong evidence that counseling increases quit rates and reduces patient mortality. In a preliminary study, 1060 New York State physicians completed a survey concerning use of the Agency for Health Care Policy and Research (AHCPR) Guidelines, perceived autonomy and perceived competence for counseling, perceived autonomy support from insurers, and barriers to counseling. Considered together, perceived autonomy, perceived competence and perceived autonomy support predicted time devoted to counseling and use of the AHCPR guidelines. The primary, longitudinal study of 220 health care practitioners who attended a smoking cessation workshop predicted change in the practitioners' perceived autonomy and perceived competence for counseling as a function of the degree to which they experienced the workshop instructor as autonomy-supportive. In turn, change in perceived autonomy predicted

change in time spent counseling and change in use of the AHCPR guidelines.

Introduction

During the past several years, the Public Health Service (PHS) has strongly advised health care clinicians to address the issue of tobacco use in every visit with nicotine-dependent patients. The guidelines, initially proposed in the late 1980s by the National Cancer Institute, recommended a systematic intervention using the so-called 4-As model (Ask, Advise, Assist and Arrange) and clinical trials showed this brief intervention to be effective in improving quit rates (Glynn *et al.*, 1990).¹ Subsequent meta-analyses of smoking cessation studies indicated that longer counseling sessions were even more effective in promoting cessation (Fiore *et al.*, 1996, 2000). Because tobacco use is responsible for about 400 000 American deaths per year (McGinnis and Foege, 1993; Woolf, 1999), the effectiveness of practitioner interventions is very important for the health care system. However, research suggests that only half the nicotine-dependent patients who saw their primary care physicians during a particular year were asked about their smoking (Robinson *et al.*, 1995) and only a relatively small percentage were advised to quit (Centers for Disease Control, 1993). Further, the population-based 1995 National Ambulatory Care Survey of physicians indicated that they did cessation counseling in only 21% of their visits with patients who smoke (Thorndike *et al.*, 1998).

Previous studies using the Health Belief Model and Social Learning Theory have found low rates

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of preventive interventions as a function of a variety of barriers such as felt time pressures and lack of reimbursement (Jaen *et al.*, 1994), and of low levels of physician self-efficacy (Bandura, 1985, 1996). Interventions to increase counseling rates have relied on contingency and efficacy expectations to maintain behavior change over time.

Self-Determination Theory (SDT) suggests that adoption and maintenance of behaviors such as tobacco-dependence counseling depend on health care practitioners' feeling both autonomous and competent with respect to the counseling (Deci and Ryan, 1985; Williams *et al.*, 1998a). Autonomy concerns the experience of volition and choice about counseling, and internalization of the value of counseling is the process through which practitioners come to experience greater autonomy and choice with respect to the behavior (Schafer, 1968). In contrast to autonomous motivation, controlled motivation involves practitioners' feeling pressured or coerced, either interpersonally or intrapersonally, to do the counseling. SDT suggests that initially, when instructors or health care systems introduce a new guideline, practitioners who use it are likely to feel controlled, but gradually they may internalize the value of the behavior by accepting its importance for themselves. When they have done that they will enact the behavior volitionally.

The treatment self-regulation questionnaire (Williams *et al.*, 1996) and the learning self-regulation questionnaire (Williams and Deci, 1996) measure autonomous motivation by assessing the degree to which individuals do a behavior because it is important or enjoyable for them personally, and they measure controlled motivation by assessing the degree to which the individuals do the behavior because they feel pressured by their family, their providers or an internal demand. Studies have shown that autonomous motivation for activities such as taking one's medications (Williams *et al.*, 1998c) or losing weight (Williams *et al.*, 1996) is negatively related to controlled motivation for doing it ($-0.11 < r < -0.34$) and that

autonomous motivation promotes greater maintained behavior change.

SDT further posits that autonomy-supportive social contexts facilitate both perceived autonomy (i.e. autonomous motivation) and perceived competence. Autonomy support on the part of an instructor or physician involves understanding the perspective of the student or patient, providing them with choice and minimizing the use of pressure to promote a behavior. Past research with medical students has shown that when the learning climate was autonomy-supportive, students felt more autonomous and competent about patient interviewing, and this, in turn, resulted in students being judged more effective when they subsequently counseled simulated patients about cardiovascular risk reduction (Williams and Deci, 1996).

In the present research, we predict that when various aspects of the health care system support practitioners' autonomy for counseling patients who smoke, practitioners will come to feel more autonomous and competent with respect to the counseling. This will lead, in turn, to long-term use of the counseling intervention.

Preliminary study

A preliminary study was performed to ascertain whether there would be relations between the key concepts of SDT and physicians' engaging in smoking cessation counseling.

Methods

An 18-item questionnaire regarding smoking cessation was mailed to 10 000 physicians whose names were randomly selected from the 63 000 practicing physicians in the state.² Non-respondents were sent a second request 4 weeks later. A total of 1060 physicians responded, which was a relatively low response rate, but nonetheless provided a basis for determining whether a more extensive study was appropriate. Physicians who responded were internists (59.0%), surgeons (27.9%), psychiatrists (10.1%) and other (3.0%).

The mean age of respondents was 50.2 years (SD = 11.4), 80.2% were male and 1.7% were smokers.

Measures

One item each, taken from multi-item scales (Williams and Deci, 1996), was used to assess: perceived autonomy ('Counseling my patients about smoking is personally important to me as a doctor'), perceived competence ('I have the skills necessary to help my patients quit smoking') and autonomy support from insurers ('Insurers encourage and support me to counsel my patients who smoke'). Two perceived barriers, i.e. time constraints and non-reimbursement, were also assessed with single items (Jaen *et al.*, 1994). Physicians responded to the questions on five-point Likert-type scales.

The primary dependent variables were self-reported use of the AHCPR model based on 'yes'/'no' answers to 10 specific questions about cessation counseling and self-reported amount of time the physicians spent counseling smokers based on responses to a four-point scale ranging from none to more than 10 min.

Results

Preliminary analyses

Concerning physicians' use of the AHCPR model, the mean score was 6.5 on the 10-point scale (SD = 2.6). Concerning time spent counseling, 94.7% of

the physicians reported counseling their smokers at least 1–3 min, the minimum efficacious counseling time. Clearly, this percentage is considerably higher than that of the general population of physicians, suggesting that the people who responded were more motivated for counseling than those who did not. On the one hand, this suggests that the sample is not representative of the population; however, it also suggests that from a statistical perspective the range of scores for the key variables would be restricted, making it more difficult, rather than easier, to find significant correlations and regression coefficients. As such, the magnitude of relations is probably even greater than that detected.

Analyses for time spent counseling

The correlations for the study variables are presented in Table I. As hypothesized, the variables that were significantly positively related to physicians' counseling time included perceived autonomy ($r = 0.33$, $P < 0.001$), perceived competence ($r = 0.29$, $P < 0.001$) and perceived autonomy support from insurers ($r = 0.10$, $P < 0.001$). The barriers of feeling time constraints ($r = -0.31$, $P < 0.001$) and lack of reimbursement ($r = -0.06$, $P < 0.05$) were negatively related.

Hierarchical multiple regression was used to test the general motivational hypotheses by entering the demographic and barrier variables in the first

Table I. Correlations of variables in the preliminary study

	2	3	4	5	6	7	8	9	10	11
1. Age	0.19 ^c	0.02	0.01	-0.05	0.01	0.09 ^c	0.00	0.03	0.03	-0.10 ^c
2. Gender	-	0.08 ^b	0.05	-0.06 ^a	0.01	0.02	0.00	0.02	0.01	-0.05
3. Medical society		-	-0.01	-0.04	0.00	0.05 ^a	-0.07 ^a	0.02	-0.06 ^a	0.01
4. Smoker			-	-0.01	0.05	0.01	0.07	-0.01	-0.01	-0.03
5. Perceived autonomy				-	0.26 ^c	0.11 ^c	0.31 ^c	-0.05	0.33 ^c	0.41 ^c
6. Perceived competence					-	0.13 ^c	0.33 ^b	-0.10 ^c	0.29 ^c	0.41 ^c
7. Autonomy support, insurers						-	-0.10 ^c	-0.37 ^c	0.10 ^c	0.15 ^c
8. Time constraints							-	0.11 ^c	-0.31 ^c	-0.41 ^c
9. Lack of reimbursement								-	-0.06 ^a	-0.09 ^b
10. Time spent counseling									-	0.54 ^c
11. AHCPR 4-As										-

^a $P < 0.05$; ^b $P < 0.01$; ^c $P < 0.001$.

step and then the three motivation variables in the second step. Analyses revealed that when entered in the first step of the regression, the demographic and barrier variables accounted for 17.4% of the variance in counseling time [$F(7,1052) = 17.4, P < 0.001$], with time constraints being significant ($\beta = -0.31, P < 0.001$). The block of three motivation variables (autonomy, $\beta = 0.23, P < 0.001$; competence, $\beta = 0.17, P < 0.001$; and autonomy support, $\beta = 0.04, NS$) accounted for an additional 8.6% of the variance in average counseling time [$\Delta F(3,1049) = 37.0, P < 0.001$].

Secondary analyses were conducted to test for mediation by perceived autonomy and perceived competence in the relation between autonomy support and self-reported counseling behavior. Using the criteria set forth by Baron and Kenny (Baron and Kenny, 1986), the analyses demonstrated that autonomy support accounted for significant variance in counseling time beyond that of the demographic and barrier items ($F(1,1052) = 6.43, P < 0.01$), and then fell to non-significance after entering the autonomy and competence items. Thus, as predicted, the relation of autonomy support to counseling time was mediated by perceived autonomy and perceived competence.

Analyses for use of the AHCPR model

Parallel analyses were conducted using scores from the 10-item AHCPR model as the dependent variable. Correlations of the three motivation variables with use of the model were all significant ($0.15 < r < 0.41, P < 0.05$).

Results of the hierarchical multiple regression revealed that, after controlling for the demographic and barrier variables, perceived autonomy ($\beta = 0.25, P < 0.001$), perceived competence ($\beta = 0.25, P < 0.001$) and perceived autonomy support ($\beta = 0.07, P < 0.01$) together accounted for 14.6% of the variance in use of the AHCPR model [$\Delta F(3,927) = 67.4, P < 0.001$]. Analyses concerning the mediational hypothesis indicated that the relation of perceived autonomy support to use of the AHCPR model was partially mediated by perceived autonomy and perceived competence because the rela-

tion between autonomy support and use of the model was diminished, but not eliminated. Specifically, the β for autonomy support fell from 0.12 ($P < 0.001$) to 0.07 ($P < 0.01$).

Primary study

Although there were numerous limitations in the preliminary study, the results suggested that an additional study to test the SDT model would be appropriate. In it, we used a longitudinal design and analyses were done with Structural Equation Modeling (SEM) to test the overall fit of the self-determination model. We performed the study in the context of an intervention workshop designed to teach health care practitioners (both physicians and other providers) to do tobacco-dependence counseling. We examined whether change in counseling behavior over a 3-month period would be predicted by change in participants' perceived autonomy and perceived competence for counseling over the same period, and whether those variables would be predicted by perceptions of the autonomy-supportiveness of the workshop leader. In addition, we replicated the results of the preliminary study using pre-intervention data by testing whether perceptions of autonomy support by the health care system (i.e. insurers) affected practitioners' motivation variables and, in turn, their counseling behavior.

We assessed practitioners' perceived autonomy, perceived competence, time spent counseling and use of the 4-As on two occasions: right before the workshop on smoking cessation counseling (Time 1) and 3 months later (Time 2). To improve the reliability of the measures (relative to those used in the preliminary study) and to provide multiple indicators for the SEM analyses, we used short validated scales to assess the SDT constructs of perceived autonomy support (both from insurers and from the workshop instructors), perceived autonomy and perceived competence.

Methods

Between January and June of 1998, 20 workshops, supported by the New York State Department of

Health, were conducted to train practitioners to use the AHCPR Smoking Cessation Guidelines. Participants were 384 health care practitioners (104 physicians and 280 other providers, including nurses, respiratory therapists and health counselors) who chose to attend one of the training workshops (which ranged from 1 to 3 h in duration) in order to improve their skills at tobacco-dependence counseling. Of the 384 practitioners, 220 (61 physicians and 159 other providers) completed questionnaires at both Time 1 and Time 2, thus representing the primary sample for the analyses. Respondents' mean number of years in clinical practice was 15.5 years (SD = 10.92), 67.2% were female and 10.2% were smokers.

At Time 1 and 3 months later at Time 2, practitioners completed measures of perceived autonomy support from insurers, perceived autonomy and perceived competence for counseling, time spent counseling, and use of the AHCPR model. At the end of the workshop, practitioners also reported their perception of the level of autonomy-supportiveness of the instructor. Workshop participation was voluntary and free of charge, and continuing medical education credits were offered. All participants who completed both questionnaires were entered into a lottery for a laptop computer (valued at \$2000).

Measures

The motivation variables were assessed with short scales that had been demonstrated in previous studies to be internally reliable and valid (Williams and Deci, 1996; Williams *et al.*, 1998b). Descriptions of these measures follow and the items appear in the Appendix.

- *Perceived support from insurers.* Two items were used (e.g. the reverse of 'I feel pressured by insurers to counsel my patients who smoke to quit'). Participants answered each item using a five-point Likert-type scale anchored by 'not true at all' and 'very true.' For purposes of testing the structural model, these two items were used as indicators of the latent construct autonomy support from insurers.
- *Perceived autonomy support from workshop instructors.* This measure consists of five items from the Learning Climate Questionnaire (Williams and Deci, 1996) which use a five-point Likert-type scale to assess the extent to which practitioners perceived the workshop leader as autonomy-supportive (e.g. 'I felt the instructor provided me with choices and options about how to help my patients stop smoking'). In the present study, the α was 0.85. In the SEM model, the five items were used as indicators of the latent variable.
- *Perceived autonomy.* Four items (e.g. 'Counseling my patients about smoking is personally important to me as a clinician') assessed the extent to which practitioners do smoking cessation counseling because they personally endorse its importance. Participants answered each item using a five-point Likert-type scale. In the present study, the scale showed a marginally acceptable level of internal consistency ($\alpha = 0.67$). For the purpose of testing the structural model, these four items were used as indicators of the latent construct of perceived autonomy.
- *Perceived competence.* Three items assessed the extent to which practitioners perceived themselves as competent regarding smoking cessation counseling (e.g. 'I have the skills necessary to help my patients quit smoking'). A five-point Likert-type scale was used. The scale showed a high level of internal consistency ($\alpha = 0.82$). In the SEM analyses, these three items were used as indicators of the latent variable, perceived competence.

The primary dependent variables were self-reports of the amount of time spent counseling each smoker and of using the full AHCPR model. These measures also appear in the Appendix.

- *AHCPR model.* Practitioners were asked to estimate the percentage of their patients with whom they regularly used 13 counseling behaviors recommended in the 4-As model. Whereas in the preliminary study there were only 10 items and respondents simply answered

‘yes’ or ‘no’ to each item, here there were 13 and respondents reported the percentage of time they did each behavior with their patients. The additional items were one each for Ask (Ask at each visit if your patients who smoke want to quit), Advise (Advise at least once per year that your patients who smoke quit) and Assist (Recommend pharmacological treatment for smoking cessation). Scores on each item could range from 0 to 100%. Scores for each subscale (Ask, Advise, Assist and Arrange) and for the composite variable comprising all items were calculated by averaging relevant item scores. For the purpose of testing the SEM models, two indicators of the AHCPR guidelines were created by averaging the items of the Ask and Advise subscales, and by averaging the items of the Assist and Arrange subscales ($\alpha = 0.91$ for both indicators).

- *Time spent counseling.* This measure was the same as in the preliminary study. Specifically, the four answer categories were: 0, 1–3, 3–10 or more than 10 min in response to the question, ‘On average, how much time in each visit do you spend counseling each patient who smokes about cessation?’. In order to create a continuous variable for *t*-test, regression and SEM analyses, 0 min was scored 0, 1–3 min was scored 2, 3–10 min was scored 7 and more than 10 was scored 12. Further, in order to have a second indicator for the SEM, we also used the coding used in the preliminary study of 0, 1, 2 and 3 assigned to the four categories.

Analyses

We tested the two overall structural models with the LISREL VIII program (Jöreskog and Sorbom, 1996). One of the advantages of using SEM as opposed to multiple regression analyses is that it permits the estimation of the adequacy of an overall hypothesized model in addition to providing a test of the measurement model. As a result, various indices are calculated to reflect the degree of fit between the hypothesized model and the observed data. In other words, with SEM, the predictive strengths of the

constructs included in the model are assessed simultaneously so that the constructs compete to account for variance in the data. A resultant significant relation between variables is interpreted as demonstrating the importance of this path over and above the influence of the other estimated paths in the model.

Results

Preliminary analyses

As noted, 220 of the 384 practitioners who participated in the workshops completed both questionnaires. We compared the means on all variables at Time 1 for those who completed both questionnaires with the means for those who did not. There were two significant differences. Those who completed both questionnaires were higher in autonomous motivation at Time 1 than were those who did not and those who completed both questionnaires had significantly higher reports at Time 1 of using the AHCPR model that did those who did not complete both questionnaires. It appears that, as in Study 1, the participants included in the analyses were more highly motivated for tobacco-dependence counseling than are practitioners in general. As in Study 1, this represents a problem for generalizability of results, but at the same time the restriction in range of the key variables means that the relations among these variables are likely to be even stronger in the population of practitioners than the results indicate.

Time 1 model

We used Time 1 data to replicate the general findings of the preliminary study. We hypothesized that autonomy support from insurers would predict clinicians’ perceived autonomy and perceived competence, and that those variables would predict the outcomes of time spent counseling and use of the AHCPR model. Correlations among Time 1 variables are contained within Table II.

The paths corresponding to the structural portion of the Time 1 SEM model are represented as paths in Figure 1. The model was tested using the maximum likelihood method of estimation. All cross-loadings and item error covariances were

Table II. Correlations among variables from Time 1 and Time 2 in the primary study

	2	3	4	5	6	7	8	9	10
1. Autonomy (T1)	0.51 ^c	0.36 ^c	0.43 ^c	0.22 ^b	0.53 ^c	0.39 ^c	0.34 ^c	0.34 ^c	0.27 ^c
2. Competence (T1)	–	0.25 ^c	0.37 ^c	0.21 ^b	0.26 ^c	0.62 ^c	0.19 ^b	0.25 ^b	0.18 ^b
3. Time spent counseling (T1)		–	0.56 ^c	0.13 ^a	0.19 ^b	0.21 ^b	0.36 ^c	0.37 ^c	0.06
4. AHCPR 4-As (T1)			–	0.19 ^b	0.28 ^b	0.37 ^c	0.20 ^a	0.70 ^c	0.17 ^a
5. Autonomy support (insurers, T1)				–	0.00	0.06	0.00	0.05	–0.06
6. Autonomy (T2)					–	0.57 ^c	0.35 ^c	0.39 ^c	0.23 ^b
7. Competence (T2)						–	0.27 ^c	0.47 ^c	0.12
8. Time spent counseling (T2)							–	0.24 ^b	0.12
9. AHCPR 4-As (T2)								–	0.19 ^a
10. Autonomy support (instructors)									–

fixed to 0. The adequacy of the hypothesized model was satisfactory as revealed by all the fit indices considered [$\chi^2(57) = 191.03$, $P < 0.01$; RMSEA = 0.08; CFI = 0.96; IFI = 0.96; PNFI = 0.69]. These results suggest that the correspondence between the hypothesized model and the sample covariance structure was good. All estimated parameters were significant and of acceptable magnitude, except for the links between practitioner perceived competence and both use of the AHCPR 4-As and time spent counseling. Neither of these path coefficients was significant.

Specifically, results show that the more insurers are perceived as autonomy-supportive with respect to tobacco-dependence counseling, the more practitioners perceived themselves as being autonomous ($\gamma = 0.55$) and competent ($\gamma = 0.50$) with respect to counseling. In turn, practitioner autonomous motivation for counseling was strongly associated with greater self-reported use of the AHCPR 4-As ($\beta = 0.44$) and length of time spent counseling ($\beta = 0.60$). It appears that, although perceived competence correlated significantly with both outcomes, the shared variance between perceived competence and perceived autonomy led perceived autonomy, but not perceived competence, to be a significant predictor of the outcomes in the model.

Time 1 and Time 2 data

The correlations among the Time 1 and Time 2 study variables appear in Table II. Table III

presents the means for Time 1 and Time 2 on these variables, along with *t*-tests for the differences, first for all participants, then for physicians and then for non-physician practitioners. First, consider the combined data. Of the variables to be examined in the longitudinal model, perceived competence, time spent counseling and use of the AHCPR model all increased significantly from Time 1 to Time 2, although perceived autonomy did not. In addition, from Time 1 to Time 2, all individual components of the AHCPR 4-As model increased significantly, the percentage of providers who identified themselves as smokers significantly decreased and there was no change in the perceived barriers. Looking separately at the two categories of providers is interesting. First, there were no differences between physicians and non-physicians in the motivation variables. However, the non-physicians, relative to the physicians, tended to engage in less counseling behavior at Time 1, but then the non-physicians tended to increase somewhat more than the physicians in their counseling behavior from Time 1 to Time 2.

Longitudinal model

The statistical hypotheses corresponding to the structural portion of the longitudinal model are represented in Figure 2. The model was tested using maximum likelihood estimation. All cross-loadings and item error covariances were fixed to 0. First, we predicted use of the 4-As at Time 2 from use of the 4-As at Time 1 and time spent

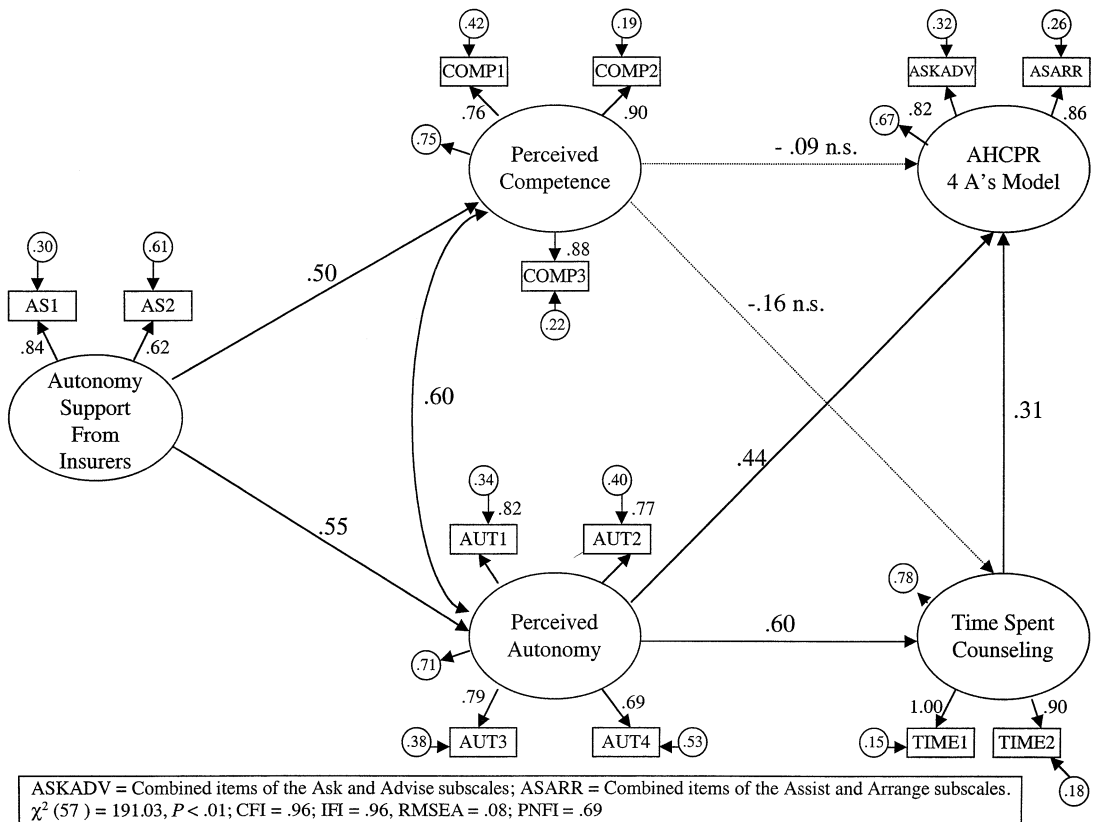


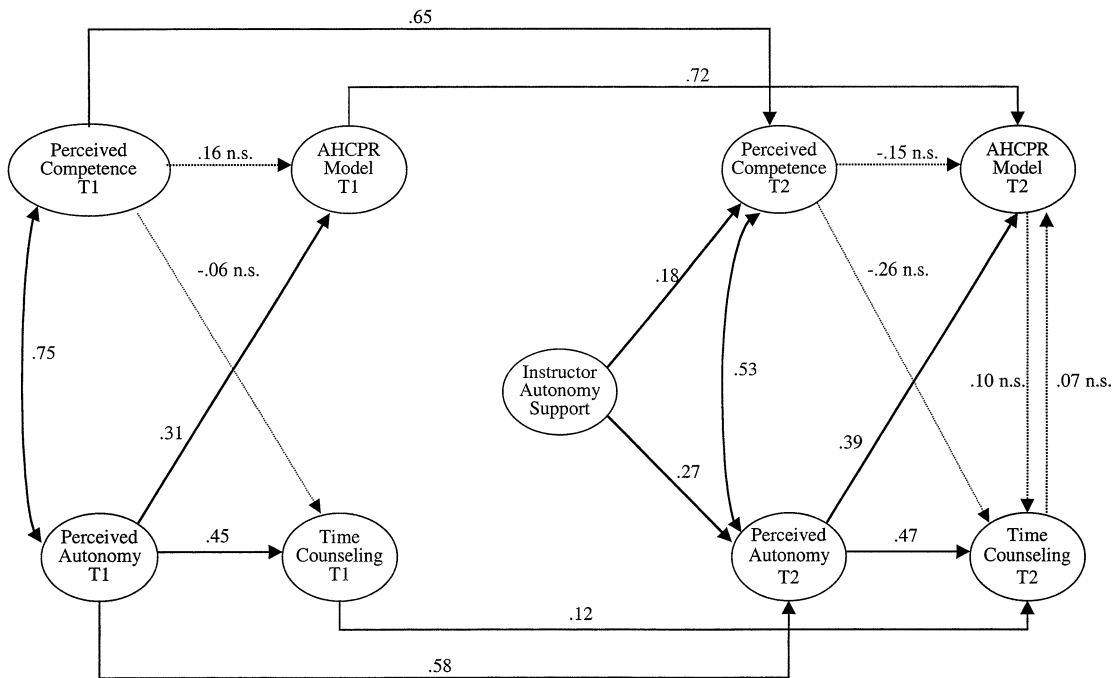
Fig. 1. SEM with Time 1 variables.

counseling at Time 2 from time spent counseling at Time 1 in order to measure change in the use of the AHCPR model and time spent counseling. Similarly, we predicted Time 2 latent variables (perceived autonomy and perceived competence) from the corresponding Time 1 latent variables to assess change in the variables of perceived competence and perceived autonomy. In other words, this allowed us to test the model for Time 2 data controlling for Time 1.

After controlling for the influence of Time 1 variables on Time 2, we tested the following relations. First, we examined the interplay between the two outcomes (i.e. use of the AHCPR model and time counseling) by testing for a positive recursive pathway between them. Second, the path

coefficients from change in participants' perceived autonomy and perceived competence were examined as significantly positive predictors of change in use of the 4-As and change in time spent counseling. Third, we tested whether the parameter estimates reflecting the relations between perceived autonomy support by workshop leaders and changes in practitioners' levels of perceived autonomy and perceived competence were positive and significant. These are shown in Figure 2.

The measurement model fit the data well, as shown in Table IV. Specifically, across the top are the latent constructs used in the model. In the body of the table are the confirmatory factor loadings for each indicator of the latent constructs. All but one of the indicators had loadings of at least 0.55 and



$\chi^2 = 657.35, P < .01, RMSEA = .07, CFI = .91, IFI = .91, PNFI = .74$

Note: All paths are significant at $P < .05$ or greater unless the notation "n.s." (nonsignificant) appears after the parameter estimate.

Fig. 2. SEM assessing change in use of the AHCPR 4-As model and time spent counseling.

the other loaded at 0.32. Although it is not shown in Table IV, there were no cross-loadings greater than 0.30.

The hypothesized structural model also fit the data satisfactorily as revealed by all the fit indices considered [$\chi^2(306) = 657.35, P < 0.01; RMSEA = 0.07; CFI = 0.91; IFI = 0.91; PNFI = 0.74$]. These results suggest that there was adequate correspondence between the hypothesized model and the sample covariance structure. All estimated parameters were significant and of acceptable magnitude, except for the paths from change in perceived competence to both change in use of the 4-As and change in time spent counseling.³

More specifically, results of the SEM show that, initially, practitioners' perceived autonomy predicted spending more time counseling ($\gamma = 0.45$)

and, in doing so, greater use of the 4-As ($\gamma = 0.31$) at Time 1. Practitioners initial perceived competence for counseling was not associated with time spent counseling or with use of the 4-As at Time 1. Importantly, practitioners' experience of autonomy support from the workshop instructor was positively associated with changes in their perceptions of autonomy and competence toward smoking cessation counseling. Perceived autonomy-supportiveness of the workshop instructor reliably predicted change in practitioners' perceived autonomy ($\beta = 0.27$) and change in perceived competence toward counseling ($\beta = 0.18$). In turn, change in practitioners' perceived autonomy toward counseling was strongly associated with change in the use of the 4-As ($\beta = 0.39$) and change in time spent counseling ($\beta = 0.47$). However, change in per-

Table III. Mean differences between Time 1 and Time 2 variables in the primary study

	All participants (<i>n</i> = 220)		Physicians (<i>n</i> = 61)		Non-physician only (<i>n</i> = 159)	
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
Perceived autonomy	3.97	3.94	4.00	3.89	3.95	3.95
Perceived competence	3.40	3.74 ^a	3.48	3.73 ^b	3.37	3.74 ^a
Autonomy support from insurers	3.35		3.33		3.36	
Autonomy support from instructors	4.33		4.18		4.38	
Ask	56.98%	68.28% ^a	64.37%	66.38%	53.57%	69.16% ^a
Advise	56.61%	70.05% ^a	68.39%	73.20%	50.72%	68.47% ^a
Assist	36.75%	47.18% ^a	40.28%	48.28% ^b	34.70%	46.54% ^a
Arrange	39.67%	55.86% ^a	40.11%	51.29% ^a	39.41%	58.50% ^a
AHCPR 4-As model	49.97%	60.54% ^a	54.06%	58.67% ^b	47.38%	61.73% ^a
Time spent counseling	4.20	5.01 ^a	4.50	4.75	4.07	5.12 ^a
Time constraints	2.06	2.08	1.97	2.11	2.10	2.07
Non-reimbursement	4.37	4.31	4.23	4.08	4.43	4.41

^a*P* < 0.01; ^b*P* < 0.05.

ceived competence was not significantly associated with change in use of the 4-As or change in time spent counseling.

To test whether the relations of perceived autonomy to the outcomes was greater than those of perceived competence, we ran an alternative model in which we first constrained the estimated paths to be equal between both perceived autonomy and perceived competence and the outcome of using the AHCPR model, and we then constrained the paths to be equal between both perceived autonomy and perceived competence and the outcome of time spent counseling. This led to a significant deterioration in the overall model fit, as indicated by the significant change in the χ^2 value (51.36, *P* < 0.001) and all the fit indices considered [χ^2 (313) = 708.71; RMSEA = 0.08; CFI = 0.90; IFI = 0.90; PNFI = 0.75]. These results confirm that perceived autonomy had significantly stronger relations with counseling behaviors than did perceived competence.

Controlling for barriers: time constraints and lack of reimbursement

To test the motivational hypotheses, and examine the relations of perceived competence and perceived autonomy with change in use of the AHCPR

model and time spent counseling over and above the influence of barrier variables, we performed hierarchical multiple regressions similar to the ones conducted in the preliminary study.

We regressed time spent counseling at Time 2 onto time spent at Time 1 in order to reflect change in time spent counseling. Then, in a second step, we entered time constraints and lack of reimbursement as barrier variables. Finally, we added to the equation the motivation variables at Time 2 in an attempt to explain the change. Analyses revealed that after controlling for the barriers, perceived autonomy ($\beta = 0.21$, *P* < 0.01) and perceived competence ($\beta = 0.09$, *P* = 0.28) accounted for an additional 6.5% of the variance in change in time spent counseling, $\Delta F(2,171) = 7.59$, *P* < 0.001. However, the influence of perceived competence on change in time spent counseling was not significant over and above the effect of the barrier variables.

Parallel analyses were conducted using the 4-As at Time 2 as the dependent variable. Again, we first controlled for the 4-As at Time 1 to examine change in the use of the 4-As. Results revealed that, after controlling for the barriers, perceived autonomy ($\beta = 0.19$, *P* < 0.05) and perceived competence ($\beta = 0.17$, *P* = 0.06) accounted for an

Table IV. Measurement model for SEM

	AHCPR T2 (0.26)	TIME T2 (0.85)	COMP T2 (0.55)	AUTO T2 (0.59)	AUTOSUP (-)	AHCPR T1 (0.80)	TIME T1 (0.84)	COMP T1 (-)	AUTO T1 (-)
ASKADV T2	0.61								
ASARRA T2	0.71								
TIME1 T2		1.00							
TIME2 T2		0.93							
COMP1 T2			0.69						
COMP2 T2			0.82						
COMP3 T2			0.78						
AUTO1 T2				0.70					
AUTO2 T2				0.55					
AUTO3 T2				0.69					
AUTO4 T2				0.32					
AS1					0.84				
AS2					0.79				
AS3					0.85				
AS4					0.69				
AS5					0.84				
ASKADV T1						0.81			
ASARR T1						0.83			
TIME1 T1							1.00		
TIME2 T1							0.92		
COMP1 T1								0.75	
COMP2 T1								0.91	
COMP3 T1								0.82	
AUTO1 T1									0.82
AUTO2 T1									0.73
AUTO3 T1									0.74
AUTO4 T1									0.62

AHCPR = AHCPR 4-As model; TIME = time spent counseling; COMP = perceived competence; AUTO = perceived autonomy; AUTOSUP = perceived instructor's autonomy support. The percentage of variance accounted for in the endogenous latent constructs are presented in parentheses.

additional 8.7% of the variance in change in use of the 4A's [$\Delta F(2,86) = 9.03, P < 0.001$]. As seen above, the influence of perceived competence on change in the use of the AHCPR model was only marginally significant.

Brief discussion

Results of the primary study indicate that health care practitioners' autonomous motivation is central in facilitating the regular use of evidenced-based counseling with their patients who smoke. First, the Time 1 data replicated the pattern of correlations among autonomous motivation, perceived competence and perceived autonomy support from insurers, as was found in the preliminary

study. In the SEM model based on Time 1 data, autonomy support from insurers was found to be strongly associated with practitioners' perceived competence and perceived autonomy, which in turn was associated with counseling behavior. Second, the longitudinal model confirmed the importance of autonomous motivation for change over time in counseling behavior. Further, perceptions of the autonomy-supportiveness of instructors was positively related to change in practitioners' perceptions of both competence and autonomy over the 3 months between the workshop and follow-up. The self-determination model of behavior change which emphasizes the importance of perceived autonomy was thus supported.

Practitioners who experienced the learning climate as more autonomy-supportive internalized the motivation for counseling their patients who smoke, and as a result they increased their use of the 4-As⁴ and time spent counseling.

While perceived competence was significantly related to the outcome variables in most of the cross-sectional analyses, it was not significant in predicting counseling behavior in the change analyses when autonomy was accounted for. It seems that perceived autonomy captured most of the shared variance so perceived competence failed to make a significant contribution.

There are two important limitations to the generalizability of this study. First, it was not a randomized controlled trial of the teaching intervention as participants were self-selected and there was not a no-treatment comparison group. Thus, there is the possibility that some other unmeasured variable may have contributed to the observed change. Still, the relations of autonomy support to increases in autonomous motivation and of enhanced autonomy to change in counseling does provide support for the importance of these variables. Second, the self-report outcomes are not as meaningful as measuring actual practitioner behavior with audiotapes, videotapes or patient reports. Interestingly, however, physician self-reports of their smoking counseling (Thorndike *et al.*, 1998) have actually been shown to represent more conservative estimates of their behavior than what was provided by patient reports (Robinson *et al.*, 1995). Moreover, the longitudinal analysis relates to the change in counseling rates, so individual practitioner biases in reporting are, in a sense, controlled for when the Time 1 reports are removed from the Time 2 reports.

Discussion

The current studies were conducted to test the importance of motivational concepts derived from SDT for predicting tobacco-dependence counseling by health care practitioners. The major findings across the studies were that perceived autonomy

support is an important predictor of perceived competence as well as autonomous motivation, and that, in turn, autonomous motivation functions as a predictor of practitioner counseling behavior and its change. It is worth noting that these results were found at two quite different levels of the health care system. First, the relation of autonomy support by insurers to practitioners' perceived competence and perceived autonomous motivation, and, in turn, to counseling behavior highlights the importance of autonomy support, and is consistent with the PHS assertion that smoking cessation counseling is a problem that needs to be addressed by the health care system as a whole (Fiore *et al.*, 2000). Second, perceived autonomy support from workshop instructors also predicted change in perceived competence and perceived autonomy, and the change in perceived autonomy predicted change in counseling behavior, which further emphasizes the importance of autonomy support at a quite different level of the system. As such, although the larger system affects motivation for counseling, this study suggests that it is possible to intervene at a more proximal level to influence motivation and counseling behaviors. The latter finding thus highlights the importance of having autonomy-supportive interventions for health care practitioners in order to facilitate their routine use of the Tobacco Dependence Guidelines (Fiore *et al.*, 2000).

In addition, the general self-determination model of behavior change received support with respect to practitioners. Specifically, the constructs of perceived autonomy support, perceived autonomy and perceived competence were found to be important correlates of practitioners' behavior cross-sectionally, and both perceived autonomy support and perceived autonomy were found to be important for predicting change in practitioners' behavior longitudinally. This is particularly interesting because much of the past health care research that has supported the model was done with respect to patient behavior. For example, Williams *et al.* (Williams *et al.*, 2002) found that provider autonomy support predicted patient autonomous motivation for smoking cessation,

which in turn predicted maintained cessation. The parallel between the results of the current studies which isolate factors that influence *practitioner* autonomous motivation and tobacco-dependence counseling and the results of previous studies which isolated factors that influence *patient* cessation is particularly interesting. It appears that the same kinds of factors that facilitate practitioners' providing counseling also facilitate the patients' effectively utilizing that counseling.

Moreover, supporting practitioners' autonomous motivation for doing tobacco-dependence counseling may lead them to provide the autonomy support that patients need to stop smoking. In fact, this relation in which providing autonomy-supportive training for clinicians leads them in turn to provide autonomy-supportive counseling for patients was observed in a study of medical students' learning to interview patients (Williams and Deci, 1996). Specifically, in that study, medical students' perceived autonomy increased when educators supported their autonomy by acknowledging their perspectives, listening actively, offering feedback and providing a rationale for the importance of counseling. The students' perceived autonomy, in turn, predicted their being more autonomy-supportive 6 months after the course ended when they counseled simulated patients about cardiovascular risk reduction.

In the current studies, most cross-sectional analyses (*t*-tests, zero-order correlations) indicated that perceived competence was important for predicting counseling behaviors, although the SEM model based on cross-sectional data and the longitudinal analyses indicated that perceived competence did not explain variance over and above that explained by perceived autonomy. After controlling for the effect of autonomous motivation in the SEM models tested, the relationship between perceived competence and self-reported counseling behaviors became non-significant. Actually, some previous research has indicated that patient autonomy for smoking cessation and medication adherence predicted those outcomes, while perceived competence did not (Williams *et al.*, 1998c, 2001). Although we typically expect

both variables to be predictors of behavior change, SDT does propose that changes in perceived competence influence motivation only when they are experienced as autonomous (Deci and Ryan, 1991). In other words, some of the practitioners in this study may have felt more competent over time without that increase being experienced as autonomous and that may be part of the reason that change in perceived competence did not predict change in counseling behaviors.

Analyses of the barriers to tobacco-dependence counseling that practitioners report facing indicate that time constraints negatively influence their use of the AHCPR guidelines, so it is important to teach counseling techniques that are geared to the time frame of busy practitioners. The PHS meta-analysis (Fiore *et al.*, 2000) and other proposed models (Williams *et al.*, 1991) indicate that even a two-question, 3-min model in which physicians ask 'Do you smoke?' and 'Do you want to quit?' improves patient quit rates, although devoting more time to the counseling is even more effective. The present analyses also indicate that not being reimbursed for tobacco-dependence counseling decreases the amount of counseling, so changes in reimbursement policy by insurers could make a difference in the amount of counseling.

Health care practitioners' failing to adopt guidelines in various domains is a significant problem (Cabana *et al.*, 1999) that contributes to the gap between what is known scientifically to improve patient health and what is actually done. Beyond the issue of tobacco-dependence counseling, the current research has importance for motivating practitioners' adherence to other clinical guidelines. Numerous studies have supported the utility of SDT concepts for predicting learning in medical students (and students of all ages) and the current findings further indicate that it is important to support learners' autonomy in order to promote internalization of the desired clinician behaviors (Williams and Deci, 1998).

In conclusion, it appears that physicians and other practitioners who are more autonomously motivated to counsel their tobacco users to stop, who feel more competent at performing the

counseling, who perceive support for learning guidelines and who experience support from insurers are more likely to use the tobacco-dependence guidelines in their practice.

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Notes

1. More recently, the PHS (Fiore *et al.*, 2000) has expanded the guidelines and has recommended that all health care clinicians counsel patients who smoke.
2. The project was administered through the Medical Society of the State of New York's, Medical Educational and Scientific Foundation of New York, Inc.
3. Because instructors' autonomy support was significantly correlated with autonomy (Time 1) and competence (Time 1), we specified an alternative model in which we included the path between autonomy at Time 1 and autonomy support from instructors and the path from competence (Time 1) to autonomy from the instructor. These two additional paths were not significant and did not change the fit of the model.
4. The indirect effects of perceived autonomy support on use of the AHCPR model and time spent counseling through perceived autonomous motivation at Time 2 were found to be positive and significant ($\beta_s = 0.09, P < 0.05$). These indicate that the effect of perceived instructor's autonomy support on the tobacco-dependence counseling outcomes was mediated by practitioners' autonomous motivation for the counseling.

References

- Bandura A. (1985) *Social Learning Theory*. Prentice-Hall, Englewood Cliffs, NJ.
- Bandura A. (1996) *Self-Efficacy: The Exercise of Control*. Freeman, New York.
- Baron, R.M. and Kenny, D.A. (1986) The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, **51**, 1173–1182.
- Cabana, M.D., Rand, C.S., Powe, N.R., Wu, A.W., Wilson, M.H., Abboud, P.-A.C., *et al.* (1999) Why don't physicians follow clinical practice guidelines? A framework for improvement. *Journal of the American Medical Association*, **282**, 1458–1464.
- Centers for Disease Control (1993) Physician and other health care professional counseling of smokers to quit: United States, 1991. *Morbidity and Mortality Weekly Report*, **42**, 854–857.
- Deci, E.L. and Ryan, R.M. (1985) *Intrinsic Motivation and Self-determination in Human Behavior*. Plenum, New York.
- Deci, E.L. and Ryan, R.M. (1991) A motivational approach to self: integration in personality. In Dienstbier, R. (ed.), *Nebraska Symposium on Motivation. Vol. 38. Perspectives on Motivation*. University of Nebraska Press, Lincoln, NE, pp. 237–288.
- Fiore, M.C., Bailey, W.C., Cohen, S.J., Dorfman, S.F., Goldstein, M.G., Gritz, E.R., *et al.* (1996) *Smoking Cessation: Clinical Practice Guideline 18*. Publ. no. 96-0692. Agency for Health Care Policy and Research, Rockville, MD.
- Fiore, M.C., Bailey, W.C., Cohen, S.J., Dorfman, S.F., Goldstein, M.G., Gritz, E.R., *et al.* (2000) *Treating Tobacco Use and Dependence. Clinical Practice Guideline*. Publ. no. 00-0032. Agency for Health Care Policy and Research, Rockville, MD.
- Glynn, T.J., Manley, M.W. and Pechacek, T.F. (1990) Physician-initiated smoking cessation program: the National Cancer Institute trials. In Engstrom, P.F., Rimer, B. and Mortenson, L.E. (eds), *Advances in Cancer Control: Screening and Prevention Research. Vol. 339. Progress in Clinical and Biological Research*. Wiley-Liss, New York, pp. 11–25.
- Jaen, C. R, Strange, K.C. and Nutting, P.A. (1994) Competing demands of primary care: a model for the delivery of clinical preventive services. *Journal of Family Practice*, **38**, 166–171.
- Jöreskog, K.G. and Sorbom, D. (1996) *LISREL VIII: User's Reference Guide*. Scientific Software International, Chicago, IL.
- McGinnis, M.J. and Foege, W.H. (1993) Actual causes of death in the United States. *Journal of the American Medical Association*, **270**, 2207–2212.
- Robinson, M.D., Laurent, S.L. and Little, J. M, Jr (1995) Including smoking status as a new vital sign: it works. *Journal of Family Practice*, **40**, 556–563.
- Schafer, R. (1968) *Aspects of Internalization*. International University Press, Madison, CT.
- Thorndike, A.N., Rigotti, N.A., Stafford, R.S. and Singer, D.E. (1998) National patterns in the treatment of smokers by physicians. *Journal of the American Medical Association*, **279**, 604–608.
- Williams, G.C. and Deci, E.L. (1996) Internalization of biosychosocial values by medical students: a test of self-determination theory. *Journal of Personality and Social Psychology*, **70**, 767–779.
- Williams, G.C. and Deci, E.L. (1998) The importance of supporting autonomy in medical education. *Annals of Internal Medicine*, **129**, 303–308.
- Williams, G.C., Quill, T.E., Deci, E.L. and Ryan, R.M. (1991) The facts concerning the recent carnival of smoking in

- Connecticut (and elsewhere). *Annals of Internal Medicine*, **115**, 59–63.
- Williams, G.C., Deci, E.L. and Ryan, R.M. (1998a) Building health-care partnerships by supporting autonomy: promoting maintained behavior change and positive health outcomes. In Suchman, A.L., Hinton-Walker, P. and Botelho, R. (eds), *Partnerships, Power and Process: Transforming Health Care Delivery*. University of Rochester Press, Rochester, NY, pp. 67–87.
- Williams, G.C., Freedman, Z.R. and Deci, E.L. (1998b) Supporting autonomy to motivate patients with diabetes for glucose control. *Diabetes Care*, **21**, 1644–1651.
- Williams, G.C., Rodin, G., Ryan, R.M., Grolnick, W.S. and Deci, E.L. (1998c) Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychology*, **17**, 269–276.
- Williams, G.C., Gagné, M., Ryan, R.M. and Deci, E.L. (2002) Supporting autonomy to motivate smoking cessation: a test of self-determination theory. *Health Psychology*, **21**, 40–50.
- Woolf, S.H. (1999) The need for perspective in evidence-based medicine. *Journal of the American Medical Association*, **282**, 2358–2365.
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Appendix

Table AI. *Items used in the primary study*

Perceived autonomy support from insurers

1. Insurers encourage and support me to counsel patients who smoke
2. I feel pressured by insurers to counsel my patients who smoke to quit (reverse scored)

Perceived autonomy

1. Counseling my patients about smoking is personally important to me as a clinician
2. Helping my smoking patients quit is the most important thing I can do for their health
3. Helping my patients quit smoking is a challenge I enjoy
4. Smoking cessation counseling just isn't as important as the other things I do for my patients (reverse scored)

Perceived competence

1. I have the skills necessary to help my patients quit smoking
2. I feel I have the ability to help my patients quit smoking
3. I have confidence that I can help my patients quit smoking

Perceived autonomy support from workshop instructor

1. I felt the instructor provided me with choices and options about how to help my patients stop smoking
2. The instructor answered our questions fully and carefully
3. The instructor made sure we understood the goals of the smoking cessation counseling and what we needed to do to be successful
4. The instructor tried to understand how we do things before suggesting a new way to do things
5. The instructor was informative without pressuring us

AHCPR model

Ask

1. Estimate the percentage of your patients (10 years and older) that you screen for tobacco use at each visit?
2. Estimate the percentage of your smoking patients that you ask if they want to quit at each visit?

Advise

1. Estimate the percentage of your smoking patients that you advise to quit at each visit?
2. Estimate the percentage of your smoking patients that you advise to quit at least once per year?

3. Estimate the percentage of your smoking patients that you chart their tobacco use at each visit?

Assist

1. Estimate the percentage of your smoking patients that you provide self-help material to?
 2. Estimate the percentage of your smoking patients who are willing to quit that you help set a quit date?
-

Table AI. *Continued*

3. Estimate the percentage of your smoking patients who are willing to quit that you refer to cessation programs?
4. Estimate the percentage of your smoking patients who are willing to quit that you recommend pharmacological treatment for smoking cessation?
5. Estimate the percentage of your smoking patients who are willing to quit that you prescribe pharmacological treatment for smoking cessation?

Arrange

1. Estimate the percentage of your smoking patients who are willing to quit that you follow up on quit date?
2. Estimate the percentage of your smoking patients who are willing to quit that you schedule a follow-up visit specific to the patient's smoking cessation effort?
3. What percentage of your smoking patients do you ask about their progress on their next visit?