

Young Adult Smokers: Are They Different?

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Objective: To compare smoking-cessation interest and behaviors in younger and older smokers to develop better smoking-cessation strategies for younger smokers.

Study Design: Mail survey with phone follow-up of age-stratified members of a large Midwestern health plan to identify current and former smokers, followed by a second follow-up survey of this subgroup 12 months later.

Methods: The follow-up survey asked about change in smoking status, quit attempts, interest in quitting, and experience with various aids to quitting. Analyses compared adults age 18-24 years with adults age 25-65 years.

Results: Follow-up surveys were completed by 66.5% of subjects. Young adults smoked at much higher rates than older adults (24.5% vs 17.1%), but were less likely to smoke daily or to smoke as many cigarettes. Young adults were as likely to be interested in quitting and more likely to report a quit attempt in the past year (60.6% vs 49.6%; $P = .009$), but these attempts were much more likely to be unaided (51.2% vs 33.7%; $P = .0003$). They also were more likely to report decreasing smoking in response to new restrictions on smoking in restaurants and bars (37.2% vs 24.7%; $P = .001$).

Conclusions: Higher rates of smoking among young adults don't reflect less interest in quitting, fewer quit attempts, or less success in quitting compared with older adults. However, their reports of receiving or using much less help in quitting suggest that health plans and clinicians might be able to increase this group's cessation with more active support.

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For author information and disclosures, see end of text.

Recent reports from the National Health Interview Survey and the Monitoring the Future Project both confirm that 18- to 24-year-olds have the highest smoking prevalence of any age group.¹⁻³ Smoking rates of young adults in college have increased more than those of their non-college peers, but the less well-educated young adults still have the highest rates in this age group. The Prevention Priorities Project has demonstrated that smoking-cessation assistance is one of the most important and cost-effective clinical preventive services.⁴ However, efforts to reduce smoking overall will be unsuccessful unless a way can be found to change these trends among those who are just beginning their smoking habits. Relatively little published information exists about the cessation patterns and activities of a representative cross-section of young adults, because what has been published about this age group's smoking has largely been limited to the minority who are in 4-year colleges. There also is no published information that directly compares smoking-cessation patterns and activities of younger versus older adults who have been drawn from the same population.

It is particularly important to understand whether there are any important differences between younger and older adult smokers that might affect smoking-cessation interventions with young adults. To develop more effective interventions for young adults, we compared the smoking-cessation behaviors and changes in smoking status over a 12-month period of a broadly representative sample of younger (age 18-24 years) and older (age 25-65 years) smokers. Both samples were drawn randomly from a large Midwestern health plan's membership, which closely approximates the state's population in socioeconomic class and race/ethnicity.

METHODS

First, we conducted a baseline cross-sectional survey of health plan members stratified by age to identify those with any history of smoking. A follow-up survey was conducted 12 months later of those respondents who indicated current or former smoking on the baseline survey.

Study Setting

This project was conducted at HealthPartners, an integrated health-care system providing medical services through a large network of owned and contracted clinics. As one of the largest healthcare organizations in Minnesota, HealthPartners provides coverage to more than 670 000 members. About 30% of these enrollees

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receive care in 1 of the 22 multispecialty owned clinics (HealthPartners Medical Group).

Identification of Smokers

All 18- to 24-year-old enrollees of HealthPartners ($n = 40\,274$) and 25- to 65-year-old enrollees ($n = 282\,074$) with 1 year of continuous enrollment as of June 1, 2004, were eligible for the baseline survey. Enrollees were stratified by age group. A random sample of 5580 members age 18-24 years and 4420 members age 25-65 years were identified as the baseline study sample ($N = 10\,000$). We oversampled 18- to 24-year-old enrollees to ensure an adequate comparison sample. The primary purpose of this survey was to identify smokers and to collect baseline information related to smoking characteristics, quitting interest, and demographics. We defined current smokers as those who had smoked 100 or more cigarettes in their lifetime and now smoked every day or on some days. Infrequent smokers had smoked on 1 or more days in the past 30 days but reported smoking fewer than 100 cigarettes in their lifetime. Former smokers had smoked 100 or more cigarettes in their lifetime, but had not smoked at all in the past 30 days at the time of completing the survey. Baseline survey respondents identified as currently smoking, smoking infrequently, or no longer smoking were sent a follow-up survey 12 months later. Those who reported that they never smoked at baseline did not receive a follow-up survey.

Survey Development and Measures

Baseline survey items were adapted from a recent survey of health plan members,⁵ Minnesota state surveys,⁶ and national surveillance system surveys.⁷ The survey instrument included information about current health status (rating of health, any diagnosis of asthma or depression), smoking status, and demographic characteristics (sex, race, employment, school enrollment, education, health insurance type). Current and infrequent smokers were asked about previous quit attempts, use of medications to quit, and interest in quitting.

To increase the response rate, we limited the baseline survey to 15 questions over 2 pages. We conducted a cognitive pretest of the instrument with health plan members ($n = 16$) before administration to the entire sample, and made minor changes. The follow-up survey used the same smoker categories, but items were added to assess change in smoking status between baseline and follow-up. The follow-up survey also included questions about use of cessation services. The format and content of follow-up questions were based on information gathered from focus group members ($n = 7$), who also completed a pilot version of the instrument.

Data Collection Procedures

We used HealthPartners administrative enrollment records to obtain subjects' age, sex, and address, and to determine whether a subject was the primary policy holder. The initial survey was mailed in late summer 2004 to reach the college students in our sample population at their home address. A \$2 bill was included in the mailing as an incentive, and postcard reminders were sent to all nonresponders about 1 week after the original survey mailing.⁸ A second survey was sent to nonresponders approximately 3 weeks after the first survey was sent. Subjects who did not respond to the mail surveys were contacted by telephone beginning 5 weeks after the first mailing and asked to complete the survey by phone. Up to 6 telephone calls were made to reach nonresponders. The 12-month survey was mailed in the summer of 2005 using similar methods for follow-up of nonrespondents.

Analysis

Contingency tables and Pearson χ^2 tests were used to compare the younger (age 18-24 years) and older (age 25-65 years) subjects. We initially compared 3 age groups: 18-24, 25-44, and 45-65, but the latter 2 groups were so similar that reporting on all 3 groups only served to confuse the comparisons.

Different subsamples of the data were utilized for different analyses. The sample of all baseline survey completers was utilized to describe the sociodemographic characteristics of survey respondents and to estimate smoking prevalence. The subsample of baseline survey completers who were current smokers was used to describe respondents with respect to sociodemographic characteristics, smoking frequency, quit interest, and quit attempts. Respondents who completed the 1-year follow-up survey and who also were former smokers, nondaily smokers, or daily smokers at baseline comprised the denominator in an analysis describing changes in smoking status over time. Respondents who completed the follow-up survey and who were daily smokers at baseline served as the denominator for analyses describing smoking behavior and quit interest at the follow-up as well as quit activities undertaken in the 12 months before the follow-up.

This study was powered at 90% to detect a 3.2% difference in current smoker rates when the rate in 1 group was 20% (20.0% vs 23.2%), and to detect a 2.8% difference when the rate in 1 group was 15% (15.0% vs 17.8%). These calculations assume use of the baseline survey completer sample ($n = 7161$), a 2-sided test of proportions, and a type I error rate of 0.05.

■ METHODS ■

■ **Table 1.** Characteristics of Current Smokers at Baseline*

Respondent Characteristics	Daily Smokers			Nondaily Smokers		
	Age 18-24 y (n = 552)	Age 25-65 y (n = 418)	P	Age 18-24 y (n = 359)	Age 25-65 y (n = 160)	P
Female	56.2	52.4	.24	54.9	49.4	.25
White	83.1	93.5	<.001	86.3	88.0	.60
Employed full-time	52.6	74.3	<.001	58.9	81.1	<.001
Current school enrollment						
Not in any school	53.5	96.9	<.001	40.2	88.7	<.001
GED/high school	4.4	0.5		1.7	0.7	
College program (2 y)	19.7	1.0		18.0	2.7	
College program (4 y)	21.0	0.8		36.0	4.7	
Graduate school	1.5	0.8		4.2	3.3	
Health insurance type						
Commercial	79.7	93.0	<.001	89.1	93.1	.16
Medicaid	20.3	7.0		10.9	6.9	
Rates health as excellent	8.2	8.6	.82	14.3	11.9	.46
One or more close friends smoke	99.6	95.2	<.001	98.6	90.5	<.001
Smokes >10 cigarettes per day	45.5	69.2	<.001	6.0	6.1	.97
Smokes within 5 min of waking	11.2	21.8	<.001	0.6	1.3	.59
Quit interest in next 6 mo	57.9	66.3	.008	68.4	65.1	.51
Any quit attempts in past year	58.5	52.3	.06	57.7	49.6	.13

*Values are percentages except where indicated.

RESULTS

Baseline surveys were completed by 3756 younger adults and 3405 older adults. Response rates adjusted for 209 undeliverable surveys and 24 ineligible subjects (because of language barriers or death) were 69.1% and 78.6%, respectively. Among older adults, 88.5% of baseline surveys were completed by mail and 11.5% by phone (compared with 85.6% and 14.4%, respectively, for younger adults). The eligible sample for the follow-up survey consisted of 1352 younger adults and 1583 older adults who had indicated being current, infrequent, or former smokers. Follow-up surveys were obtained from 809 young adults and 1144 older adults for response rates of 60% and 72%, after adjusting for the same reasons as above. Older and younger adults who were daily or nondaily smokers at baseline had similar follow-up response rates (unadjusted rate of 62.0% for older adults, 58.1% for younger adults). However, among those not smoking at baseline, follow-up response rates differed by age group (unadjusted

response rate of 78.4% for older adults and 63.6% for younger adults; $P < .001$). Among older adults, 89.2% of follow-up surveys were completed by mail and 10.8% by phone (compared with 75.2% and 24.8% for younger adults).

Among the older adult sample, nonrespondents to the survey were more likely than respondents to be male (54.1% vs 44.4%; $P < .001$), to be younger (mean age 39.8 vs 44.1 years; $P < .001$), and to have insurance through Medicaid (9.0% vs 3.2%; $P < .001$). There were no differences with respect to metro/nonmetro residence. Among the younger adult sample, nonrespondents to the survey were more likely than respondents to be male (50.8% vs 43.5%; $P < .001$) and to have insurance through Medicaid (15.9% vs 10.5%; $P < .001$). There were no differences with respect to age or metro/nonmetro residence.

Attributes of Baseline Survey Respondents

This section, which describes all baseline survey respondents, does not involve any corresponding tables. About 56%

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of the baseline survey respondents were female and most identified themselves as white (87%), although a significantly higher proportion of the younger than the older sample were nonwhite (16.6% vs 10.0%; $P < .0001$). Most were residents of the Minneapolis/St. Paul metropolitan area (79%) and had commercial medical insurance (93%), although the younger sample was more likely to be on medical assistance programs than the older sample (10.5% vs 3.5%; $P < .0001$). We found expected differences in the proportion employed and enrolled in school, with 73.1% of the older and 44.7% of the younger sample employed full-time ($P < .0001$). The majority of the younger subjects (65.3%) were enrolled in an education program compared with 8.1% of the older subjects ($P < .0001$).

Among all respondents, individuals in the younger age group were significantly more likely ($P < .0001$) than individuals in the older age group to be current smokers (24.5% vs 17.1%), infrequent smokers (3.7% vs 0.5%), and never smokers (63.8% vs 53.5%). In contrast, the older sample consisted of more former smokers (28.9% vs 8.1%). In addition, the younger group was more likely to report having close friends who smoked than the older group (70.4% vs 54.7%; $P < .0001$).

Attributes of Current Smokers

In **Table 1** we report the characteristics of the current smokers in the baseline survey (ie, the infrequent smokers and quitters were eliminated) separately for daily and nondaily smokers. Among these current smokers, daily smoking was more common among the older than the younger smokers (72.3% vs 60.6%; $P < .001$). The sociodemographic differences between the younger and older adult samples noted above among all respondents were generally true of this subset of current smokers, although some differences occurred only for the daily smokers. For example, among daily smokers only, younger smokers were less likely than older smokers to smoke more than 10 cigarettes a day, to have a cigarette within 5 minutes of waking, and to be interested in quitting in the next 6 months. However, among the nondaily smokers, younger

■ **Table 2.** Smoking Status at 12-Month Follow-up Stratified by Baseline Smoking Status

Baseline and Follow-up Smoking Status	Age 18-24 y	Age 25-65 y	P*
Former smoker	n = 190	n = 765	
Follow-up status			<.001
Not smoking	78.2%	94.9%	
Smoking some days	16.7%	3.0%	
Smoking daily	5.2%	2.1%	
Nondaily smoker	n = 207	n = 101	
Follow-up status			.99
Not smoking	25.9%	25.5%	
Smoking some days	56.5%	56.4%	
Smoking daily	17.6%	18.1%	
Daily smoker	n = 320	n = 258	
Follow-up status			.02
Not smoking	11.4%	12.7%	
Smoking some days	14.0%	3.7%	
Smoking daily	74.7%	83.6%	

*P values are from the Pearson χ^2 test for differences in follow-up smoking status by age within each stratum of baseline smoking status.

and older smokers were equally likely to be interested in quitting in the next 6 months. Younger and older smokers were equally likely to report making a quit attempt in the past year. Nearly all of the current smokers had close friends who smoked, but for young adult smokers, this was universal.

Change in Smoking Status from Baseline to Follow-up 1 Year Later

We compared and tested for differences in the distributions of follow-up smoking status by age after first stratifying on baseline smoking status at baseline (**Table 2**). **Table 2** also illustrates change in smoking status in the 12 months from baseline to follow-up. Those who were former and daily smokers at baseline showed differences in their follow-up smoking status by age group, with younger adults more likely than older adults to have changed smoking status between the baseline and the follow-up measurements. However, the most change between baseline and follow-up smoking status occurred among nondaily smokers, where 44% of those who were nondaily smokers at baseline migrated into other smoking categories at follow-up. For this group of nondaily smokers at baseline, follow-up smoking patterns were identical for both age groups.

■ METHODS ■

To test whether quit rate differences (ie, not smoking at follow-up) by age group among daily smokers (11.4% for younger adults, 12.7% for older adults) existed after controlling for the higher cigarette smoking frequency and addiction found in the older adult group, we conducted a logistic regression analysis predicting nonsmoking status versus daily or nondaily smoking at follow-up. This model used only data from individuals who were daily smokers at baseline and included predictors of age group (younger/older), amount smoked at baseline (>10 cigarettes per day vs ≤10 cigarettes per day), and whether smoking occurred within 5 minutes of waking (yes/no). The age group association still was not significant (odds ratio = 0.65; 95% confidence interval = 0.37, 1.14) but continued in the direction observed in the bivariate analysis, with a lower quit rate among the younger compared with the older daily smokers. Computing follow-up quit rates for baseline daily smokers within strata defined by either the amount smoked at baseline or smoking within 5 minutes of waking yielded similar results, with quit rates always directionally lower among younger than older adults, but never statistically significantly different (data not shown).

Characteristics of Daily and Nondaily Baseline Smokers 1 Year Later

Table 3 summarizes the smoking and quitting behaviors at follow-up of the 578 individuals identified as daily smokers and the 308 identified as nondaily smokers in the baseline survey, some of whom were not smoking at follow-up. Among daily smokers, young adults were more likely to report making quit attempts in the past year, but much less likely to use any resources to aid them in those quit attempts. They primarily had tried to quit cold turkey and infrequently reported using help from a doctor or medical clinic. Among nondaily smokers there were far fewer differences by age group, with younger smokers less likely to use nicotine-replacement therapy or help from a doctor or medical clinic.

In the follow-up survey, we had asked daily smokers at baseline to report on clinician actions at their most recent doctor's office visit. Among those who reported any medical discussion of smoking (66.9% of young adults and 72.5% of older adults; $P = .15$), similar proportions of younger (98.1%) and older (98.4%) adults reported being asked whether they smoked. Younger and older smokers also were equally likely to report being asked to quit smoking (77.6% and 74.9%, respectively). But older adults were more likely to report being asked by a clinician to set a quit date than younger adults (19.3% vs 9.4%; $P = .004$), and marginally more likely to have a clinician suggest that they use a cessation medication (31.6% vs 23.4%; $P = .07$).

Impact of Local Smoking Restrictions

On March 31, 2005 (about 4 months before our follow-up survey), smoking bans in restaurants and bars went into effect in several cities and counties in the metropolitan area, including Minneapolis and St. Paul. In the follow-up survey we asked current smokers whether the new smoking restrictions were causing them to smoke less or to try to quit. More than a third of younger adults reported smoking fewer cigarettes compared with about a quarter of older adults (37.2% vs 24.7%; $P = .001$), but younger adults were just as likely as older adults to report trying to quit because of the restrictions (16.2% and 13.5%, respectively).

DISCUSSION

This study provides previously unavailable information directly comparing the smoking-cessation patterns and behaviors over time of a broad sample of younger and older adult smokers. Compared with the older adults, the young adults were lighter, less frequent smokers who were still fluctuating in their smoking behavior over time. Contrary to popular belief, they were as interested in quitting, more likely to make quit attempts, and as likely to have quit 1 year later. However, their quit attempts were much more likely to be made without medication or counseling assistance, and they were much less likely to have received help from medical sources. (As plan members, these young adults had greater access to assistance and medications, so the finding that so few use smoking-cessation aids is even more striking.) New environmental restrictions on public smoking were at least as likely to affect their smoking as that of older adults, perhaps in part because this age group tends to spend more time in restaurants and bars.⁹

What makes these findings particularly important and unique is that these subjects were broadly representative of younger and older smokers in Minnesota. At least in Minnesota, where only 6% of the population is uninsured and most low-income people on medical assistance are included in health plan rolls through a contract with the state, an insured population reflects the community quite well. This is important because most of the existing literature on smoking and cessation behaviors of young adults comes from studies of the minority who are students in 4-year colleges or are in the military.¹⁰⁻¹⁵ In a separate analysis of the young adult responders in this study, we demonstrated that college students are more likely to smoke fewer than 11 cigarettes per day and to have quit smoking at follow-up and are much less likely to smoke daily and to smoke immediately on awakening.¹⁶ However, we confirmed in this more representative sample the 3 separate studies of DeBernardo et al, Hines, and Morrison et al in col-

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Table 3. Characteristics at 12-Month Follow-up of Those Who Were Daily or Nondaily Smokers at Baseline, by Age Group*

Respondent Characteristics	Daily Smokers			Nondaily Smokers		
	Age 18-24 y (n = 320)	Age 25-65 y (n = 258)	P	Age 18-24 y (n = 207)	Age 25-65 y (n = 101)	P
Smokes daily	74.7	83.6	.011	17.6	18.1	.92
Smokes >10 cigarettes per day	37.9	60.1	<.0001	7.3	7.1	.94
Smokes within 5 min of waking	13.7	26.1	.0005	2.2	1.7	.99
Quit interest in next 6 mo	59.3	64.6	.23	64.2	67.9	.64
Quit behavior in past 12 mo						
One or more quit attempts	60.6	49.6	.009	65.2	66.3	.84
Used nicotine-replacement therapy	19.1	44.2	<.0001	14.4	29.8	.011
Used bupropion hydrochloride (Zyban)	7.9	21.6	<.0001	4.1	10.5	.08
Used telephone counseling	0.8	8.8	<.0001	1.4	3.5	.31
Used Web-based counseling	1.6	8.8	.0004	1.4	7.0	.054
Used help from a doctor or medical clinic	6.4	32.6	<.0001	7.5	19.3	.02
Used cold turkey method	51.2	33.7	.0003	59.6	45.6	.07

*Values are percentages except where indicated.

lege students, who also found that cold turkey was the predominant method for quit attempts, and there was little interest in assistance.^{11,13,15} We also confirm the findings of Schoenborn and colleagues, who found based on 1997-1998 National Health Interview Survey data that 54.2% of all smokers age 18-24 years had tried to quit smoking in the year prior to the survey, compared with 43.5% of those age 25-44 years and 39.4% of those age 45-64 years.¹⁷

These findings have many implications for interventions in this high-risk age group. Although more adults age 18-24 years smoke compared with older adults, these younger smokers are just as ready to quit, and they might quit in larger numbers if given more encouragement and support. Physicians and medical care organizations should pay particular attention, because these young smokers reported receiving much less help than older smokers did. That may be part of the reason why those young smokers who tried quitting were much less likely to use medications or other support, but recent studies both confirm our results and suggest that young adults have negative attitudes toward traditional smoking cessation approaches.^{18,19} Physicians seem well placed to change this pattern if they implement practice systems that make it more likely that individualized support and assistance are provided, going well beyond the usual Ask and Advise sections of the Public Health Service clinical guideline *Treating Tobacco Use and Dependence*.²⁰ Health plans also might develop programs

to reach out to assist those young smokers interested in quitting instead of assuming that they have to be persuaded to quit.

We chose to focus on these comparisons between younger and older adult smokers because the much higher rate of smoking in young adults and their status as the smokers of the future require greater efforts to encourage and support their cessation interests. Moreover, we specifically did not conduct logistic regression analysis of cessation predictor variables because we believe that such statistical findings are of dubious value for targeting interventions and distract from the main usable conclusions. These findings instead highlight the comparability of young adult smoking behaviors and interests, and what health plans, medical clinics, and individual physicians need to know to take action.

This study's limitations include the fact that all of the respondents are health plan members who provided self-reports. The response rate to the follow-up survey was lower than hoped and lower than that of the original survey, probably because we have demonstrated that smokers are known to be less likely to respond to surveys about this habit.⁵ In addition, young adults had lower response rates to both the baseline and follow-up surveys, potentially leading to an exaggeration of differences between them and older smokers. However, significant differences in response rates to the follow-up survey by age group were found only among those who

Take-away Points

Survey of Midwestern health plan members who smoke indicated that younger (age 18-24 years) and older (age 25-65 years) smokers were equally interested in quitting.

- Young adults smoked at much higher rates than older adults, but were less likely to smoke daily and smoked fewer cigarettes.
- Young adults were more likely than older adults to report an attempt to quit in the past year, although these attempts were much less likely to be unaided.
- Health plans might be able to aid young adults in quitting by providing more active support.

were not smoking at baseline. Thus, quit rates and other characteristics (eg, quit behaviors, medical assistance for quitting) computed at follow-up for those who were smoking at baseline are unlikely to be affected by differences in response rates to the follow-up survey.

These results should be useful to policymakers, health promotion planners, and those in medical settings who want to reduce smoking prevalence by paying greater attention to the age group who have the highest prevalence of smoking and who will form the smokers of the future.

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REFERENCES

1. Johnston LD, O'Malley PM, Bachman JG. *Monitoring the Future National Survey Results on Adolescent Drug Use: Overview of Key Findings, 2001*. Bethesda, Md: National Institute on Drug Abuse; 2002. NIH publication 02-5105.
2. National Center for Health Statistics. National Health Interview survey data. Available at: http://www.cdc.gov/tobacco/research_data/

adults_prev/adstat2print.htm. Accessed November 21, 2003.

3. Cigarette smoking among adults—United States, 2001. *MMWR*. 2003;52:842-844.
4. Solberg LI, Maciosek MV, Edwards NM, Khanchandani HS, Goodman MJ. Repeated tobacco-use screening and intervention in clinical practice: health impact and cost effectiveness. *Am J Prev Med*. 2006;31:62-71.
5. Solberg LI, Hollis JA, Stevens VJ, Rigotti NA, Quinn VP, Aickin M. Does methodology affect the ability to monitor tobacco control activities? Implications for HEDIS and other performance measures. *Prev Med*. 2003;37:33-40.
6. Minnesota Department of Health, Blue Cross and Blue Shield of Minnesota, Minnesota Partnership for Action Against Tobacco, and University of Minnesota. Patterns of smoking among Minnesota's young adults. January 2004. Available at: <http://www.health.state.mn.us/divs/hpcd/tpc/pdf/YoungAdult2003Report.pdf>. Accessed August 5, 2005.
7. National Center for Chronic Disease Prevention & Health Promotion. Behavioral Risk Factor Surveillance System. Trends data. Minnesota—grouped by age. Available at: <http://apps.nccd.cdc.gov/brfss/Trends/agechart.asp?qkey=100000&state=MN>. Accessed August 1, 2003.
8. Dillman DA. *Mail and Internet Surveys: The Tailored Design Method*. New York: John Wiley and Sons; 2000.
9. Biener L, Albers AB. Young adults: vulnerable new targets of tobacco marketing. *Am J Public Health*. 2004;94:326-330.
10. Black DR, Loftus EA, Chatterjee R, Tiffany S, Babrow AS. Smoking cessation interventions for university students: recruitment and program design considerations based on social marketing theory. *Prev Med*. 1993;22:388-399.
11. DeBernardo RL, Aldinger CE, Dawood OR, Hanson RE, Lee SJ, Rinaldi SR. An e-mail assessment of undergraduates' attitudes toward smoking. *J Am Coll Health*. 1999;48:61-66.
12. Haddock CK, Lando H, Klesges RC, Peterson AL, Scarinci IC. Modified tobacco use and lifestyle change in risk-reducing beliefs about smoking. *Am J Prev Med*. 2004;27:35-41.
13. Hines D. Young smokers' attitudes about methods for quitting smoking: barriers and benefits to using assisted methods. *Addict Behav*. 1996;21:531-535.
14. Klesges RC, Ward KD, Ray JW, Cutter G, Jacobs DR Jr, Wagenknecht LE. The prospective relationships between smoking and weight in a young, biracial cohort: the Coronary Artery Risk Development in Young Adults Study. *J Consult Clin Psychol*. 1998;66:987-993.
15. Morrison K, Banas J, Burke M. Understanding college students' salient attitudes and beliefs about smoking: distinctions between smokers, nonsmokers, and ex-smokers. *Public Health Rev*. 2003;31:95-109.
16. Solberg LI, Asche SE, Boyle R, McCarty MC, Thoele MJ. Smoking and cessation behaviors among young adults of various educational backgrounds. *Am J Public Health*. 2007;97:1421-1426.
17. Schoenborn CA, Vickerie JL, Barnes PM. *Cigarette Smoking Behavior of Adults: United States, 1997-98*. Hyattsville, Md: National Center for Health Statistics; February 7, 2003. Advance Data From Vital and Health Statistics, No. 331.
18. Bader P, Travis HE, Skinner HA. Knowledge synthesis of smoking cessation among employed and unemployed young adults. *Am J Public Health*. 2007;97:1434-1443.
19. Curry SJ, Sporer AK, Pugach O, Campbell RT, Emery S. Use of tobacco cessation treatments among young adult smokers: 2005 National Health Interview Survey. *Am J Public Health*. 2007;97:1464-1469.
20. Fiore MC, Bailey WC, Cohen SJ, et al. *Treating Tobacco Use and Dependence. Clinical Practice Guideline*. Rockville, Md: US Department of Health and Human Services; June 2000. AHRQ publication 00-0032. ■