

# Religious Involvement and Cigarette Smoking in Young Adults

## The CARDIA Study

Mary A. Whooley, MD; Alisa L. Boyd, MPH; Julius M. Gardin, MD; David R. Williams, PhD, MPH

**Background:** Results of previous studies have suggested that involvement in religious activities may be associated with lower rates of smoking. We sought to determine whether frequent attendance at religious services is associated with less smoking among young adults.

**Methods:** This prospective cohort study of 4569 adults aged 20 to 32 years included approximately equal numbers of blacks and whites and men and women from 4 cities in the United States who attended the 1987/1988 examination of the Coronary Artery Risk Development in Young Adults (CARDIA) study. Frequency of attendance at religious services and denominational affiliation were determined by self-report questionnaire in 1987/1988. Cigarette smoking was determined by interview at this time and again 3 years later.

**Results:** Of 4544 participants who completed the tobacco questionnaire in 1987/1988, 34% (891/2598) who

attended religious services less than once per month or never and 23% (451/1946) who attended religious services at least once per month reported current smoking (odds ratio [OR], 1.7; 95% confidence interval [CI], 1.5-2.0;  $P < .001$ ). This association between less frequent attendance at religious services and current smoking was found in most denominations and remained significant after adjusting for potential confounding variables (OR, 1.5; 95% CI, 1.3-1.8;  $P < .001$ ). During 3-year follow-up, nonsmokers who reported little or no religious involvement had an increased risk of smoking initiation (adjusted OR, 1.9; 95% CI, 1.3-2.7;  $P < .001$ ).

**Conclusions:** Young adults who attend religious services have lower rates of current and subsequent cigarette smoking. The potential health benefits associated with religious involvement deserve further study.

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CIGARETTE SMOKING ranks as the primary cause of premature death in industrialized countries throughout the world.<sup>1,2</sup>

Despite an ongoing decline in smoking among older adults,<sup>1,3</sup> the recent increase in smoking among youths (from 28% in 1991 to 36% in 1997)<sup>4</sup> is alarming. Because the negative health effects of cigarette smoking are cumulative, the risk of developing a smoking-attributable disease increases the earlier that smoking begins.<sup>4</sup>

Previous studies<sup>2,5-16</sup> have suggested that involvement in religious activities may affect smoking behavior. However, most studies were cross-sectional, limiting inferences about cause and effect<sup>2,5-7,9-14,16</sup>; many did not examine whether employment, education, or social network might confound the association between smoking and religion<sup>5,9,11,12</sup>; and the results of others may not be generalizable.<sup>2,13,14</sup>

We analyze the association between religious involvement and cigarette smoking

and describe the distribution of religious affiliation among young men and women and black and white participants enrolled in the Coronary Artery Risk Development in Young Adults (CARDIA) study. We examined whether frequent attendance at religious services was associated with smoking prevalence and whether it predicted subsequent smoking 3 years later.

## RESULTS

### CHARACTERISTICS OF PARTICIPANTS

**Table 1** lists the distribution of participants by religious denomination. Almost half of the participants were either Baptist or Roman Catholic. Most Baptists were black, and most Roman Catholics were white. Of the 4569 participants, 1953 (43%) reported attending religious services at least once per month in 1987/1988 (**Table 2**). Compared with those who attended religious services at least

From the Department of Veterans Affairs Medical Center, San Francisco, Calif (Dr Whooley and Ms Boyd); the Departments of Medicine, Epidemiology, and Biostatistics, University of California, San Francisco (Dr Whooley); the Division of Cardiology, St John Hospital and Medical Center, Detroit, Mich (Dr Gardin); and the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor (Dr Williams).

## PARTICIPANTS AND METHODS

### PARTICIPANTS

The CARDIA study is a multicenter prospective cohort study designed to describe the evolution of coronary heart disease risk factors in young adults and to identify associated habits, behaviors, and lifestyles. The study design and baseline characteristics of the participants have been described previously.<sup>17</sup> Between March 1985 and June 1986, we recruited 5115 participants, aged 18 to 30 years, including approximately equal numbers of black and white participants and men and women, from 4 American cities (Birmingham, Ala; Chicago, Ill; Minneapolis, Minn; and Oakland, Calif). Participants were recruited primarily through telephone contact, except in Oakland, where a health plan membership roster was used. The appropriate institutional review boards approved the study, and all participants provided written informed consent.

### MEASUREMENTS

From May 1987 to July 1988, 4569 participants completed the following self-report question: "How often do you attend religious services such as those at a church or synagogue?" The 7 response categories were every day, more than once a week, once a week, 2 or 3 times a month, once a month, less than once a month, and never. We defined high-frequency attendees as those attending religious services at least once per week; moderate-frequency attendees as attending 1, 2, or 3 times per month; and low-frequency attendees as attending less than once per month or never.

We also asked participants: "What is your religion? Please specify a religious denomination." We coded denominations using 25 categories: Baptist, Roman Catholic, Methodist, Lutheran, Pentecostal, Presbyterian, Jewish, Episcopal, Christian Church or Church of Christ, Seventh Day Adventist, Congregational or United Church of Christ, Orthodox, Reformed, Muslim, Mormon, Buddhist, Christian Scientist, Quaker, Mennonite, Hindu, Moravian, atheist, agnostic, other, or none/don't know/unable to code. For this study, we collapsed participants into 11 denominational groups, including 1 for each of the 9 groups with at least 50 participants, 1 for other, and 1 for agnostic, atheist, or none/don't know/unable to code.

Smoking status was determined in 1987/1988 and in 1990/1991 based on responses to 3 interview-administered questions:

1. Have you ever used any tobacco product, such as cigarettes, cigars, tobacco pipe, chewing tobacco, snuff, or nicotine chewing gum?
2. If yes to number 1, have you ever smoked cigarettes regularly for at least 3 months? By "regularly," we mean at least 5 cigarettes per week, almost every week.
3. If yes to number 2, do you still smoke cigarettes regularly?

Participants were defined as current smokers if they responded "yes" to all 3 questions. All other participants were considered nonsmokers. In 1987/1988, we asked current smokers the following yes/no question: "Have you tried

to stop smoking cigarettes in the past 2 years?" We also ascertained the number of cigarettes smoked by asking, "How many cigarettes do you smoke per day on the average?"

In 1987/1988, we determined age, sex, ethnicity, marital status, years of education, employment status, family history of myocardial infarction (MI), presence of hypertension, presence of diabetes mellitus, body mass index, alcohol use, level of physical activity, social network, and whether participants belonged to any organizations or clubs. The physical activity score was defined as the sum of the total number of months (weighted by frequency and intensity) during which each of 13 activities was performed during the previous year.<sup>18,19</sup>

Social network adequacy was measured using a 4-item scale (How often do you [1] feel lonely, [2] find yourself wishing someone would comfort you, [3] feel that other people really care for you [reverse scored], and [4] wish that you had more close friends?). Each question had 4 response categories (4 indicates frequently; 3, occasionally; 2, rarely; and 1, never), with higher scores indicating a better social network. For participants who completed only 2 or 3 of the 4 items ( $n=4$ ), we assigned the mean value of nonmissing responses to the other items. Participants who answered fewer than 2 of the questions did not receive a score. As an additional measure of social activity, we asked participants the following yes/no question: "Do you belong to any organizations or clubs (such as political groups, athletic teams, or regular groups you play sports with)?"

### STATISTICAL ANALYSIS

For the primary analysis, we decided a priori to compare cigarette smoking in participants who reported attending religious services at least once per month (high- or moderate-frequency attendees) with those who reported attending religious services less than once per month or never (low-frequency attendees). Differences in characteristics between groups were compared using  $\chi^2$  tests for dichotomous variables and 2-tailed  $t$  tests for continuous variables. We used backwards elimination logistic regression for a cross-sectional analysis examining the risk of current smoking in participants who were less frequent attendees of religious services compared with those who attended religious services more frequently. We added any variables that were associated with smoking (at  $P<.05$ ) to multivariate models that included frequency of attendance at religious services. Tests of  $P$  for trend were calculated using the  $\chi^2$  test for trend in proportions.

We examined the association between frequency of attendance at religious services in 1987/1988 and subsequent smoking in 1990/1991 using analyses stratified by initial smoking status. Among participants who were not smoking in 1987/1988, we examined the association between frequency of attendance at religious services in 1987/1988 and starting to smoke by 1990/1991. Among participants who reported current smoking in 1987/1988, we examined the association between frequency of attendance at religious services in 1987/1988 and smoking cessation by 1990/1991. For these analyses, we reported odds ratios (ORs) and 95% confidence intervals (CIs). Analyses were performed using statistical software (SAS version 6.12; SAS Institute Inc, Cary, NC).

**Table 1. Distribution of 4569 Participants by Religious Denomination and Proportion Who Reported Current Smoking in 1987/1988**

Denomination	Black Participants		White Participants		Total	% Current Smokers
	Men	Women	Men	Women		
Baptist	487	675	115	122	1399	36
Roman Catholic	74	91	296	346	807	30
Methodist	58	66	75	90	289	29
Lutheran	19	16	113	126	274	34
Pentecostal	55	95	7	17	174	25
Presbyterian	5	7	57	49	118	18
Jewish	0	1	62	48	111	12
Episcopal	10	9	29	45	93	24
Christian Church/Church of Christ	27	22	17	17	83	31
Other*	82	165	114	143	504	20
Agnostic/atheist/none/don't know/unable to code	149	123	205	212	689	27
Missing	5	7	8	8	28	29
<b>Total</b>	<b>971</b>	<b>1277</b>	<b>1098</b>	<b>1223</b>	<b>4569</b>	<b>29</b>

\*Seventh Day Adventist, Congregational/United Church of Christ, Orthodox, Reformed, Muslim, Mormon, Buddhist, Christian Scientist, Quaker, Mennonite, Hindu, or Moravian.

**Table 2. Characteristics of 4569 Participants by Religious Service Attendance**

Characteristic	<1/mo or Never (n = 2616)	≥1/mo (n = 1953)	P Value
Age, mean ± SD, y	27.1 ± 3.6	26.8 ± 3.7	.008
Female, %	50	61	.001
Ethnicity			
Black	41	61	.001
White	59	39	
Married, %	26	37	.001
Education, mean ± SD, y	14.2 ± 3.4	14.2 ± 2.2	.50
Employment, %			
Full- or part-time	84	84	.60
Not working	16	16	
Current drinks per week, mean ± SD, No.	6.2 ± 10.4	3.2 ± 7.0	<.001
Family history of myocardial infarction, %	12	12	.60
Diabetes mellitus, %	1	1	.10
Hypertension, %	2	2	.90
Body mass index,* mean ± SD	24.8 ± 5.0	25.7 ± 5.8	<.001
Physical activity score, mean ± SD	400 ± 288	358 ± 288	<.001
Social network score, mean ± SD	2.7 ± 0.5	2.8 ± 0.5	<.001
Belong to organization or club, %	32	28	.007
Geographic location, %			
Birmingham, Ala	14	36	.001
Chicago, Ill	23	21	
Minneapolis, Minn	32	22	
Oakland, Calif	31	21	

\*Calculated as weight in kilograms divided by the square of height in meters.

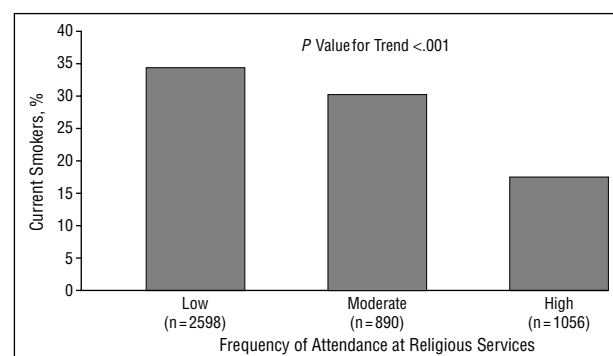
once per month, participants attending less than once per month or never were slightly older; were more likely to be male, white, and unmarried; and reported greater alcohol consumption (Table 2). Less frequent attendees were also more physically active, were more likely to belong to an organization or club, and had a lower body mass index. However, these participants had poorer social network scores than those who attended religious services more frequently. Geographic location was strongly associated with attending religious services, but there were no differences in education, employment, family history of MI, presence of diabetes mellitus, or presence of hypertension by frequency of attendance.

### Current Smoking

Greater frequency of attendance at religious services was associated with less current smoking. High-frequency attendees (≥1/wk) had the lowest prevalence (17%) (**Figure 1**). Of the 4544 participants who completed the tobacco questionnaire in 1987/1988, 34% (891/2598) who attended religious services less than once per month or never reported current smoking compared with 23% (451/1946) who attended religious services at least once per month (OR, 1.7; 95% CI, 1.5-2.0;  $P<.001$ ). This association was diminished but still significant after adjusting for potential confounding variables (OR, 1.5; 95% CI,

1.3-1.8;  $P < .001$ ) (**Table 3**). Among smokers ( $n = 1342$ ), less frequent attendees reported smoking a greater mean number of cigarettes per day than more frequent attendees ( $14 \pm 10$  vs  $12 \pm 9$ ;  $P < .001$ ). In subgroup analyses, less frequent attendance at religious services was associated with current smoking in all race-sex subgroups except black men (**Table 4**).

Among participants who attended religious services 1 to 3 times per month (moderate-frequency attendees), 30% (267/890) reported current smoking compared with 17% (184/1056) of those who attended religious services once per week or more (OR, 2.0; 95% CI, 1.6-2.5;  $P < .001$ ). This association remained significant after adjusting for age, ethnicity, marital status, education, employment status, alcohol use, belonging to an organization, and geographic location (OR, 1.9; 95% CI, 1.5-2.4;  $P < .001$ ).



**Figure 1.** Participants reporting current smoking by frequency of attendance at religious services. Low indicates less than once per month or never; moderate, 1, 2, or 3 times per month; and high, at least once per week.

## Religious Denomination

The prevalence of smoking ranged from 12% among Jewish participants to 36% among Baptists (Table 1). Overall, Baptists and Pentecostals who attended religious services less than once a month or never had the greatest prevalence of smoking (**Table 5**). Jewish and Presbyterian participants had the lowest prevalence of smoking, regardless of how frequently they attended religious services. Participants in the “other” category who reported attending religious services at least once per month also had a low prevalence of smoking.

Less frequent attendees of religious services had a greater prevalence of smoking than did more frequent attendees across all denomination categories, with the exception of Presbyterians, who had a relatively low prevalence of smoking regardless of frequency of attendance at religious services (Table 5). However, in multivariate analyses, these associations were statistically significant at the  $P < .05$  level in the Baptist, Pentecostal, and “other” denominational categories only.

## Smoking Incidence

Of the 4569 study participants, 4072 (89%) had follow-up smoking data in 1990/1991. Of these, 1741 (43%) attended religious services at least once per month in 1987/1988 compared with 212 (43%) of the 497 participants who were lost to follow-up ( $P = .97$ ).

A total of 2913 of 3202 participants (91%) who were nonsmokers in 1987/1988 completed the follow-up tobacco questionnaire in 1990/1991. Greater frequency of attendance at religious services was associated with less

**Table 3. Univariate and Multivariate Predictors of Current Smoking (Among All Participants) and Smoking Initiation (Among Nonsmokers)\***

Predictor (in 1987/1988)	Current Smoking		Smoking Initiation During 3-Year Follow-up	
	Unadjusted OR (95% CI) (n = 4544)	Adjusted OR (95% CI)† (n = 4439)	Unadjusted OR (95% CI) (n = 2913)	Adjusted OR (95% CI)† (n = 2902)
Attending religious services <1/mo or never	1.7 (1.5-2.0)	1.5 (1.3-1.8)	1.8 (1.3-2.5)	1.9 (1.3-2.7)
Age (per 10-y increase)	1.0 (0.8-1.1)	1.5 (1.3-1.9)	1.0 (0.6-1.5)	...
Female	0.8 (0.7-0.9)	...	1.0 (0.7-1.3)	...
Black	1.5 (1.3-1.7)	1.2 (1.0-1.4)	1.6 (1.1-2.1)	1.5 (1.0-2.1)
Married	0.6 (0.5-0.7)	0.7 (0.6-0.9)	0.7 (0.5-0.9)	...
Education (per 3-y increase)	0.4 (0.3-0.4)	0.4 (0.4-0.5)	0.5 (0.4-0.6)	0.6 (0.5-0.7)
Employed	0.5 (0.4-0.6)	0.7 (0.6-0.9)	0.7 (0.5-1.1)	...
Current drinks per week (per 7-drink increase)	1.5 (1.5-1.6)	1.5 (1.4-1.6)	1.2 (1.1-1.3)	1.1 (1.0-1.3)
Family history of myocardial infarction	1.1 (0.9-1.4)	...	0.9 (0.5-1.4)	...
Diabetes mellitus	1.2 (0.6-2.1)	...	1.7 (0.5-5.6)	...
Hypertension	1.0 (0.7-1.6)	...	1.4 (0.5-3.5)	...
Body mass index‡ (per 5.4 increase)	1.0 (0.9-1.1)	...	1.0 (0.9-1.2)	...
Physical activity score (per 577-point increase)	0.9 (0.8-1.0)	...	1.0 (0.8-1.4)	...
Social network score (per 1-point increase)	0.8 (0.7-0.9)	...	0.9 (0.7-1.2)	...
Belong to organization or club	0.5 (0.4-0.6)	0.7 (0.6-0.8)	0.7 (0.5-1.0)	...
Geographic location				
Birmingham, Ala	0.9 (0.7-1.0)	1.4 (1.1-1.7)	0.9 (0.6-1.3)	...
Chicago, Ill	0.9 (0.8-1.1)	1.3 (1.1-1.7)	0.8 (0.5-1.2)	...
Minneapolis, Minn	1.8 (1.6-2.1)	1.8 (1.4-2.1)	1.7 (1.2-2.4)	1.7 (1.1-2.6)
Oakland, Calif	0.6 (0.5-0.7)	...	0.8 (0.5-1.1)	...

\*OR indicates odds ratio; CI, confidence interval; and ellipses, variables that were not included in the model.

†Based on a backward elimination logistic regression model including all variables in Table 2. Variables associated with smoking (at  $P < .05$ ) were retained in the adjusted models.

‡Calculated as weight in kilograms divided by the square of height in meters.

smoking initiation, with high-frequency attendees ( $\geq 1$ /wk) having the lowest incidence (3%) (**Figure 2**). A total of 7% (109/1571) of nonsmokers who attended religious services less than once per month or never started smoking cigarettes during 3-year follow-up compared with 4% (54/1342) of those attending religious services at least once per month (OR, 1.8; 95% CI, 1.3-2.5;  $P < .001$ ).

In multivariate analyses, participants attending religious services less frequently in 1987/1988 had a 90% increased risk of starting to smoke during 3-year follow-up compared with participants attending religious services at least once per month (adjusted OR, 1.9; 95% CI, 1.3-2.7;  $P < .001$ ) (Table 3). The independent association between less frequent attendance at religious services and starting to smoke seemed to be present in all race-sex subgroups except black men (Table 4).

Among nonsmokers who attended religious services 1 to 3 times per month (moderate-frequency attendees), 5% (29/554) started to smoke during 3-year follow-up compared with 3% (25/788) of those who attended services once per week or more (OR, 1.7; 95% CI, 1.0-2.9;  $P = .06$ ). This

association remained present but not statistically significant after adjusting for ethnicity, education, alcohol use, and geographic location (OR, 1.6; 95% CI, 0.9-2.8;  $P = .11$ ).

## Smoking Cessation

In 1987/1988, 57% of the 891 smokers who attended religious services less than once per month or never reported efforts to quit in the previous 2 years compared with 67% of the 451 smokers who attended religious services at least once per month (adjusted OR, 0.7; 95% CI, 0.6-0.9;  $P = .005$ ). However, of the 1159 participants (86%) who were smokers in 1987/1988 and who completed the follow-up tobacco questionnaire in 1990/1991, only 15% (117/760) of the less frequent attendees reported that they were no longer smoking compared with 17% (69/399) of those attending religious services at least once per month (OR, 0.9; 95% CI, 0.6-1.2;  $P = .4$ ). Multivariate analysis that adjusted for potential confounding variables produced similar results (OR, 0.8; 95% CI, 0.6-1.1;  $P = .2$ ).

## COMMENT

Compared with participants who attended religious services frequently, less frequent attendees were more likely to report current smoking and to start smoking during 3-year follow-up. This association was particularly evident for the Baptist, Pentecostal, and "other" (Seventh Day Adventist, Congregational/United Church of Christ, Orthodox, Reformed, Muslim, Mormon, Buddhist, Christian Scientist, Quaker, Mennonite, Hindu, or Moravian) denominations and was present in all race-sex subgroups except black men. Other independent predictors of current smoking included age; being black, unmarried, less educated, or unemployed; consuming more alcohol; and belonging to a club or organization. Other independent predictors of smoking initiation included being black or less educated and consuming more alcohol. Living in Minneapolis was associated with current and incident smoking.

As with any observational study, we cannot eliminate the possibility of confounding because the charac-

**Table 4. Adjusted Risk of Current and Incident Smoking Associated With Attending Religious Services Less Than Once per Month or Never by Race-Sex Subgroups\***

	Adjusted Odds Ratio (95% CI)†	P Value
<b>Current Smoking Among All Participants</b>		
White men (n = 1095)	1.6 (1.1-2.3)	.01
White women (n = 1205)	1.7 (1.2-2.3)	.003
Black men (n = 942)	1.2 (0.9-1.6)	.30
Black women (n = 1248)	1.6 (1.2-2.2)	<.001
<b>Smoking Initiation During 3-Year Follow-up Among Participants Who Were Nonsmokers at the Outset</b>		
White men (n = 760)	2.5 (0.9-6.8)	.07
White women (n = 860)	2.8 (1.2-6.3)	.01
Black men (n = 517)	1.1 (0.6-2.1)	.80
Black women (n = 770)	2.4 (1.3-4.5)	.01

\*CI indicates confidence interval.

†Based on a backward elimination logistic regression model including all variables in Table 2. Variables associated with smoking (at  $P < .05$ ) were retained in the models.

**Table 5. Risk of Current Smoking Associated With Attending Religious Services Less Than Once a Month or Never vs Once or More per Month by Religious Denomination**

Denomination	<1/mo or Never		$\geq 1$ /mo		Odds Ratio (95% CI)*	
	Total No.	% Smokers	Total No.	% Smokers	Unadjusted	Adjusted†
Baptist	615	47	778	27	2.3 (1.9-2.9)	1.6 (1.2-2.0)
Roman Catholic	516	33	283	24	1.5 (1.1-2.1)	1.3 (0.9-1.8)
Methodist	143	34	145	24	1.6 (1.0-2.7)	1.6 (0.9-3.0)
Lutheran	195	36	79	29	1.4 (0.8-2.5)	0.9 (0.5-1.8)
Pentecostal	35	51	139	19	4.6 (2.1-10.1)	2.6 (1.0-6.8)
Presbyterian	68	18	50	18	1.0 (0.4-2.5)	1.2 (0.4-3.7)
Jewish	102	13	7	0	...	...
Episcopal	51	27	41	20	1.6 (0.6-4.2)	2.4 (0.7-7.8)
Christian Church/Church of Christ	35	34	48	29	1.3 (0.5-3.2)	1.0 (0.4-2.9)
Other‡	212	30	289	12	3.2 (2.0-5.2)	2.8 (1.6-4.9)

\*CI indicates confidence interval.

†Adjusted for age, ethnicity, marital status, education, employment status, alcohol use, belonging to an organization, and geographic location.

‡Seventh Day Adventist, Congregational/United Church of Christ, Orthodox, Reformed, Muslim, Mormon, Buddhist, Christian Scientist, Quaker, Mennonite, Hindu, or Moravian.



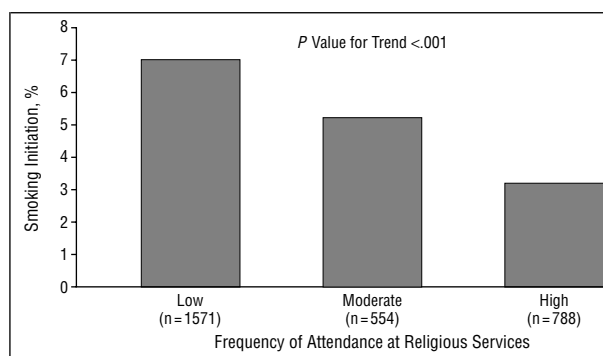
ter traits leading to religious involvement may also result in avoidance of smoking. Likewise, we cannot exclude the possibility that smokers may have chosen not to attend religious services owing to concerns about social pressures against smoking. However, given the low probability values, it is unlikely that the strength of the observed association between religious involvement and smoking is due to chance. It is also unlikely that biased ascertainment of smoking (eg, underreporting by those who attend religious services) is responsible for this finding given the high validity of self-reported smoking in CARDIA study participants.<sup>20</sup>

If attending religious services does affect cigarette smoking, what are the potential reasons for this association? Although some denominations, such as Mormon,<sup>21</sup> prohibit substance use, most do not have explicit proscriptions against smoking. Religious beliefs may provide coping mechanisms that reduce the impact of stressful circumstances that would otherwise precipitate cigarette smoking.<sup>22</sup> Faith-based coping strategies have been related to improved well-being,<sup>23</sup> and religious behaviors are useful in managing stressful life changes.<sup>24</sup> Women seem to derive particular support from religious activities<sup>15</sup> and are more likely than men to use religion as a coping mechanism for stress.<sup>24</sup> This could explain the stronger association between attendance at religious services and less frequent smoking initiation among women in our study.

Another causal possibility is that frequent attendance at religious services may provide an educational and supportive social environment. Religious involvement offers a sense of belonging to a group with shared values,<sup>7</sup> and this environment may promote healthy behaviors.<sup>25</sup> Religious adherents may be more likely to adopt healthy practices because many religions emphasize respect for the body<sup>26</sup> and discourage risk-taking behavior.<sup>27</sup>

Two other cohort studies have examined the association between religious involvement and cigarette smoking, but we are unaware of any studies demonstrating an association between attending religious services and not starting to smoke. One study<sup>2</sup> found that participation in private religious activity predicted less subsequent smoking in the elderly, but attendance at religious services was not associated with subsequent smoking. Another study<sup>15</sup> of adults aged 16 to 94 years found that attendance at religious services was associated with smoking cessation, but its effects on smoking prevalence or incidence were not examined. Other studies<sup>5-7,9-14</sup> of religious involvement and smoking have used only cross-sectional analyses or lacked appropriate multivariate adjustments.

It is unclear why we observed an association between religious attendance and cigarette smoking in all race-sex groups except black men. This apparent interaction likely is not due to chance because it was present for both current and incident smoking. It is possible that black men attend religious services for different reasons than do women or white men. Perhaps black men are more likely to attend services to accommodate other family members, less likely to adopt coping strategies associated with religious involvement, or less likely to derive support from the social and educational environment of a church because of more stressful life circumstances.



**Figure 2.** Nonsmokers reporting smoking initiation at 3-year follow-up by frequency of attendance at religious services. Low indicates less than once per month; moderate, 1, 2, or 3 times per month; and high, at least once per week.

Although our categories of religious denomination may not have captured the considerable variation within distinct denominational subgroups,<sup>28,29</sup> they reveal some interesting findings. We observed substantial differences in the distribution of participants across religious denominations. Black participants were more likely than white participants to be Baptist or Pentecostal and less likely to be Roman Catholic, Lutheran, Presbyterian, Jewish, or Episcopal. We also observed a wide range of smoking prevalences across denominational categories. Jewish and Presbyterian participants were less likely to smoke than were members of any other denomination, regardless of their frequency of attendance at religious services. Baptist and Pentecostal participants who attended religious services fewer than 1 time per month or never had a greater prevalence of smoking than members of any other denomination. Although differences in ethnicity and socioeconomic status may account for some of these discrepancies, it is possible that some religions but not others espouse themes that promote healthier behaviors and lifestyle.

Our study has 2 major limitations. First, although frequency of attendance at religious services is a commonly used measure, it does not represent all aspects of religious involvement.<sup>22,28</sup> Second, the health effects of involvement in religious activities may not differ from those associated with participation in other community organizations.<sup>28</sup> However, even after adjusting for the CARDIA study's measure of social network and for belonging to organizations or clubs, the association between attendance at religious services and smoking behavior was unchanged.

In summary, frequent attendance at religious services is associated with a decreased risk of current smoking and smoking initiation in white men, white women, and black women, but not in black men. Whether less smoking may explain part of the association between religious involvement and decreased mortality<sup>15,30</sup> is unknown. Further studies are needed to clarify the role that religious involvement may play in disease prevention through its effect on cigarette smoking and other behaviors.

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Corresponding author and reprints: Mary A. Whooley, MD, Department of Veterans Affairs Medical Center (111A1), 4150 Clement St, San Francisco, CA 94121 (e-mail: whooley@itsa.ucsf.edu).

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