

Characterizing and Identifying “Hard-Core” Smokers: Implications for Further Reducing Smoking Prevalence

ABSTRACT

Objectives. Some smokers may never quit. Depending on how many of these “hard-core” smokers exist, tobacco control efforts could reach the limits of a minimum achievable smoking prevalence. We defined the hard core as heavy smokers with weak quitting histories who expect never to quit smoking. We compared them with other smokers and analyzed whether they represent a meaningful barrier to further reducing smoking prevalence.

Methods. We used data from the 1996 California Tobacco Surveys (18616 adults; response rate = 72.9%).

Results. In 1996, 5.2% of California smokers 26 years and older (1.3% of the California population) were hard-core smokers. Compared with other smokers, hard-core smokers were more likely to be retired non-Hispanic White males, with 12 years or less of education and incomes below \$30000 a year, who live alone. They began smoking at younger ages and attributed fewer negative health consequences to smoking than other smokers.

Conclusions. Current tobacco control efforts have a long way to go before they “hit the wall.” Nonetheless, the group of hard-core smokers represents a challenge because they appear to be largely unaffected by the messages of tobacco control. (*Am J Public Health.* 2000;90:387–394)

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Smoking prevalence is often used as a benchmark for evaluating tobacco control activities. Over the past 3 decades, adult smoking prevalence has decreased by nearly 33% nationally and by approximately 40% in California.¹ Although some of this decline in smoking can be explained by lower uptake rates, much of the reduced prevalence has resulted from increased quitting among adult smokers.^{2,3} In fact, it has been estimated that three quarters of all smokers have attempted to quit,⁴ and at least 70% of current smokers—perhaps as many as 95%—say they would like to stop smoking.^{5,6} These large and steady decreases in smoking prevalence suggest that state and federal tobacco control efforts, along with an increased antismoking climate at the local and national levels, have been successful in motivating a significant portion of adult smokers to quit.

Recent decreases in smoking prevalence and widespread quitting behavior among adult smokers, however, may not be sustainable. It has been suggested that a group of smokers may exist that can be described as “hard core.”⁷ If such a group exists, and if that group is relatively large, current tobacco control efforts may prove less effective in the future as the hard core makes up a larger proportion of the remaining smokers.⁸ Tobacco control efforts could conceivably, perhaps even soon, “hit the wall” of a minimum level of smoking prevalence in the population.

For many, the concept of hard-core smokers has an intuitive connotation as those smokers least likely to quit, because they have never thought about it, because they would not choose to quit even if there were an easy way to do so, or because they have become totally discouraged from failed past attempts to quit.⁷ The Transtheoretical Model identifies a group of current smokers, “precontemplators,” who, on the basis of their lack of intention to quit smoking in the next 6 months, are least likely to successfully quit.^{9,10} By this criterion, approximately 40%

of current smokers can be considered “precontemplators,”¹¹ a far greater proportion of smokers than would seem reasonable to consider “hard core,” or unlikely to ever quit smoking. Because the hard-core smoker has yet to be adequately formally defined, little is known about this group or the extent to which it may shape future tobacco control activities. This analysis seeks to fill that gap.

Previous research has identified at least 3 major indicators of quitting behavior: a smoker’s current addiction level,^{12–14} quitting history,^{15,16} and stated intentions regarding smoking in the future.^{17,18} While evidence suggests that eventual success in quitting is best predicted by a smoker’s level of addiction and quitting history,¹⁹ an expressed intention to quit smoking is an important indicator that a smoker has begun the process of quitting.¹⁵ Using this conceptual framework, Pierce et al.¹⁹ analyzed longitudinal data from California and identified a subset of smokers with the lowest probability (3%) of successfully quitting smoking 2 years in the future. In this report, we refer to that group as *low-probability quitters*; these smokers are characterized by a high addiction level (≥ 15 cigarettes/day), no recent attempt to quit (at least 24 hours within the past year), and no intention of quitting in the next 6 months.¹⁹ We define hard-core smokers as a subset of the low-probability quitters: specifically, those highly addicted smokers (≥ 15 cigarettes/day) with no recent attempts to quit who express no intention to quit smoking anytime. On the basis of these characteristics, we are able to show that hard-

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core smokers constitute a distinct group who likely will never quit smoking. With this definition, we characterize the category of hard-core smokers, compare it with the larger group of current smokers, and analyze whether it represents a meaningful barrier to further reductions in smoking prevalence.

Methods

Data Source

We used data from the 1996 California Tobacco Survey (CTS), which drew a random sample from the California population. Data were collected by random-digit-dialed telephone interviews. Interviewers attempted to contact 71 989 households. A 5-minute "screener" survey was completed for 39 674 of the households contacted, and 78 337 adults were enumerated. From this group, 25 546 adults were selected for an extended 25-minute interview; 18 616 were interviewed, for a response rate of 72.9%. The probability of selection for the extended interview was greater for those who had smoked within the past 5 years, compared with never-smokers or longtime quitters. Details of the survey methodology are presented elsewhere.^{1,20}

Definition of Hard Core

To be characterized as hard core, smokers had to meet the following 6 criteria: (1) They were current smokers, defined as those who had smoked at least 100 cigarettes in their lifetime and answered "every day" or "some days" to the question, "Do you smoke cigarettes every day, some days, or not at all?" (2) They answered "yes" to the question "Were you smoking at all around this time 12 months ago?" (3) They had no history of attempts to quit in the past 12 months. (4) They smoked at least 15 cigarettes per day on average. (5) They answered that they "never expect to quit" in response to the question "What best describes your intentions regarding quitting? Would you say: never expect to quit; may quit in the future but not in the next 6 months; will quit in the next 6 months; or, will quit in the next month." (6) They were 26 years or older. Individuals 25 years and younger were excluded from this category, because many of these younger smokers are still engaged in the process of smoking uptake and therefore may not have reached a stable level of average daily consumption or solidified their intentions regarding quitting.^{21,22} All smokers who did not meet the criteria for hard-core smoking were considered non-hard-core smokers.

Characterizing the Hard Core

Demographics. The CTS provided information about the respondents' age, race, educational attainment, and household income.

Environmental characteristics. The CTS also included several questions about respondents' home and work life. The composition of the household was determined from answers to the screener survey, which asked the respondent to describe the age, sex, and smoking status of everyone living in the household. Respondents were asked about home smoking bans, and respondents who reported that they worked outside the home in an indoor setting were asked about workplace smoking restrictions. (The exact phrasing of the questions and the possible responses are available from the corresponding author).

Smoking habit. The CTS included questions about smoking initiation, how many cigarettes smokers usually smoked daily, how soon they smoked after waking up, and how confident they were about their ability to refrain from smoking. Smokers were also asked several questions about actions that could be considered harm reducing—for example, whether they had considered switching to or were currently smoking low tar/low nicotine cigarettes, whether they had considered or had accomplished a reduction in the number of cigarettes they smoked, and whether they had ever made a serious attempt to quit smoking.

Smoking and health beliefs. Respondents were asked several questions about their beliefs concerning their smoking behavior and the health effects of smoking on themselves and others.

Statistics

To compute estimates, we used sample weights that were representative of the California population. All analyses were performed with the WesVarPC statistical package,²³ which takes into account the sample design and uses a jackknife procedure for variance estimation and tests of statistical significance.²⁴ We compared hard-core smokers with other low-probability quitters and with all non-hard-core smokers, using univariate groupings and multivariate logistic regression models. *P* values were based on χ^2 statistics or ANOVA, as appropriate.

Results

Demographics

In 1996, 5.2% of California smokers 26 years and older could be classified as

hard-core smokers on the basis of the 6 criteria identified above. Table 1 summarizes the demographic characteristics of hard-core smokers. Overall, hard-core smokers were more likely to be men than women. Proportionally fewer hard-core smokers were aged 26 to 44 years, compared with either other low-probability quitters or all non-hard-core smokers; conversely, more hard-core smokers were in the older age groups. Compared with all non-hard-core smokers, a greater proportion of the hard core was non-Hispanic White and a smaller proportion was African American or Hispanic, but there were no significant differences in race/ethnicity between hard-core smokers and other low-probability quitters. Fewer hard-core smokers had household incomes over \$50 000, compared with other low-probability quitters or all non-hard-core smokers. There were no significant differences in educational attainment between hard-core smokers and other low-probability quitters or between hard-core smokers and non-hard-core smokers.

Environment

Table 2 shows that compared with other low-probability quitters and all non-hard-core smokers, a greater percentage of hard-core smokers lived alone and a smaller percentage were the sole smokers in a household of nonsmokers. A higher percentage of hard-core smokers were widowed and fewer lived in homes with children, compared with other low-probability quitters or with all non-hard-core smokers. Also, fewer hard-core smokers agreed with the statement "My family would prefer that I didn't smoke."

The data revealed a significant relationship between home smoking bans and hard-core status. While slightly more than half of other low-probability quitters reported no restrictions on smoking anywhere in their home, more than 70% of hard-core smokers reported no home smoking restrictions. Additionally, compared with other low-probability quitters, fewer hard-core smokers reported partial restrictions on smoking at home. Compared with all non-hard-core smokers, more than twice as many hard-core smokers reported no home ban, and fewer hard-core smokers reported partial or complete home bans.

Similarly, there appeared to be a relationship between having a smoke-free workplace and hard-core status. Because fewer hard-core smokers were employed for wages, and more were retired, fewer hard-core smokers were potentially exposed to workplace smoking bans. Among smokers who worked for wages outside the home, hard-core smokers were less likely than all non-hard-core

TABLE 1—Demographic Distribution of Hard-Core Smokers, Other Low-Probability Quitters, and Non-Hard-Core Current Smokers

	Hard Core Smokers, % (±95% CI)	Non-Hard-Core Low-Probability Quitters, % (±95% CI)	P of Hard-Core vs Non-Hard-Core Low-Probability Quitters	All Non-Hard-Core Current Smokers, ^a % (±95% CI)	P of Hard-Core vs Non-Hard-Core Current Smokers
Sample size, n	500	1323		8404	
Sex					
Male	63.3 (±4.8)	55.9 (±3.2)		54.5 (±1.5)	
Female	36.7 (±4.8)	44.2 (±3.1)	.0097	45.5 (±1.5)	.0076
Age, y					
<25	NA	8.53 (±1.7)		18.4 (±1.2)	
25–44	30.9 (±5.8)	51.2 (±3.1)		52.2 (±1.2)	
45–64	44.6 (±5.6)	35.0 (±3.2)		23.4 (±1.0)	
65+	24.5 (±3.7)	5.3 (±1.5)	<.0001 ^a (n = 1679)	6.0 (±1.1)	<.0001 ^a (n = 7306)
Race					
African American	3.3 (±1.9)	4.0 (±1.3)		8.4 (±0.6)	
Asian/Pacific Islander	3.1 (±2.2)	5.7 (±1.5)		6.9 (±0.8)	
Hispanic	8.2 (±3.4)	8.1 (±2.1)		25.3 (±1.3)	
Non-Hispanic White	78.0 (±4.8)	77.7 (±3.0)		55.2 (±1.3)	
Other	7.4 (±2.8)	4.5 (±1.8)	.1396	4.2 (±0.5)	<.0001
Annual household income					
<\$20 000	32.0 (±5.5)	23.4 (±2.6)		28.3 (±1.7)	
\$20 001–\$50 000	37.2 (±6.2)	38.5 (±3.9)		36.3 (±1.5)	
>\$50 000	17.1 (±3.7)	29.6 (±3.0)		25.5 (±1.3)	
Unknown	13.7 (±5.3)	8.5 (±1.7)	.0009	9.9 (±1.1)	.0385
Education, y					
<12	23.9 (±5.3)	20.5 (±2.6)		25.2 (±1.5)	
12	37.4 (±6.1)	36.4 (±2.6)		31.2 (±1.2)	
13–15	23.3 (±4.4)	28.4 (±2.6)		27.8 (±1.3)	
16+	15.4 (±3.4)	14.8 (±2.1)	.3101	15.9 (±1.1)	.1513

Note. Percentages shown were computed using sample weights. In Tables 2–5, “all non-hard-core current smokers” includes non-hard-core low-probability quitters (i.e., all other current smokers). CI = confidence interval; NA = not applicable.

^aP value for differences in age between hard-core and other smokers was calculated on the basis of other smokers over age 25. The percentages reported in the age rows reflect all ages of other smokers.

smokers to report that their workplace was smoke free.

Smoking Habit

Nearly 80% of hard-core smokers smoked their first cigarette within 30 minutes after waking up, compared with 72% of other low-probability quitters and 49% of all non-hard-core smokers (Table 3). Nearly half of hard-core smokers smoked between 15 and 24 cigarettes a day on average. Compared with the hard core, more of the other low-probability quitters smoked 15 to 24 cigarettes a day, but fewer smoked more than 35 cigarettes a day. As expected from the definition of hard core, the majority of all non-hard-core smokers smoked fewer than 15 cigarettes a day on average.

Hard-core smokers were approximately evenly divided between those who answered yes and those who answered no to the question “Have you ever smoked more cigarettes a day than you do now?” In contrast, among the other low-probability quitters and all non-hard-core smokers, a greater proportion indicated they had smoked more in the past. Among smokers who were currently at their peak daily smoking levels, fewer hard-core

smokers reported that they had ever considered reducing the number of cigarettes they smoked per day.

Approximately the same proportions of hard-core and non-hard-core smokers reported that they currently smoked low-tar or low-nicotine cigarettes. Compared with other low-probability quitters, however, fewer hard-core smokers reported that they smoked low-tar or low-nicotine cigarettes. Among smokers who were currently not smoking low-tar or low-nicotine cigarettes, fewer hard-core smokers than other low-probability quitters reported that they had ever considered switching to a cigarette with low levels of nicotine and tar. Approximately the same percentage of hard-core and non-hard-core smokers reported they had ever considered switching to low tar or low nicotine cigarettes.

Not only did hard-core smokers reject the possibility of quitting in the future when they were interviewed in 1996, but they also appeared to have a history of having no intention to quit smoking. Even among smokers who had never made a serious attempt to quit, hard-core smokers were significantly less likely than other low-probability quitters or all non-hard-core smokers to report that they had ever seriously considered quitting

smoking. Additionally, hard-core smokers were significantly less likely than either the other low-probability quitters or other non-hard-core current smokers to have ever made a serious attempt to quit smoking. Among those who had made a serious attempt to quit sometime in their lives, there was no difference between hard-core smokers and other low-probability quitters in the length of their longest attempt to quit. There was a marginally significant difference between hard-core smokers and all other current smokers in the length of their longest attempts to quit, but there is no clear pattern to this difference.

The average age at which hard-core smokers smoked their first cigarette was 15.0 years (95% confidence interval [CI] = ±0.37), significantly younger than all other current non-hard-core smokers (15.9 years; 95% CI = ±0.17), but not significantly different from other low-probability quitters (15.2 years; 95% CI = ±0.31). Similarly, the average age at which hard-core smokers began to smoke regularly (17.1 years; 95% CI = ±0.60) was significantly younger than that of all non-hard-core smokers (18.3 years; 95% CI = ±0.20), but not different from that of other low-probability quitters (17.4 years; 95% CI = ±0.36).

TABLE 2—Environment of Hard-Core Smokers, Other Low-Probability Quitters, and Non-Hard-Core Current Smokers

	Hard Core, % (±95% CI)	Non-Hard-Core Low-Probability Quitters, % (±95% CI)	P of Hard-Core vs Non-Hard-Core Low-Probability Quitters	All Non-Hard-Core Current Smokers, % (±95% CI)	P of Hard-Core vs Non-Hard-Core Current Smokers
Sample size, n	500	1323		8404	
Composition of household					
Single adult	33.3 (±5.6)	22.6 (±2.6)		20.1 (±1.3)	
All adults smoke	28.2 (±4.1)	30.6 (±2.5)		24.1 (±1.4)	
Smokers and nonsmokers	10.7 (±5.0)	12.5 (±2.5)		13.6 (±1.3)	
Sole smoker	27.9 (±4.6)	34.4 (±3.4)	.0086	42.2 (±1.8)	<.0001
Marital status					
Married/partner	41.3 (±5.0)	49.7 (±3.2)		47.1 (±1.4)	
Divorced	22.4 (±5.2)	20.2 (±2.6)		14.0 (±0.9)	
Never married	15.1 (±3.6)	21.0 (±2.8)		30.3 (±1.6)	
Widowed	15.8 (±3.5)	4.1 (±1.6)		3.9 (±0.7)	
Separated/other	5.5 (±3.9)	4.9 (±4.6)	<.0001	4.7 (±0.7)	<.0001
Children in home	16.5 (±4.3)	35.5 (±3.0)	<.0001	41.0 (±2.0)	<.0001
Agree with statement "My family would prefer I didn't smoke"	61.2 (±4.4)	85.4 (±2.6)	<.0001	80.2 (±1.6)	<.0001
Home smoking ban					
Complete	9.7 (±2.4)	18.8 (±2.7)		39.7 (±1.5)	
Partial	16.3 (±3.9)	27.3 (±3.2)		25.7 (±1.5)	
None	73.9 (±5.1)	53.9 (±3.2)	<.0001	34.7 (±1.5)	<.0001
Employment status					
Employed	38.0 (±6.0)	59.3 (±3.4)		58.8 (±1.6)	
Retired	27.0 (±4.5)	6.5 (±1.7)		6.4 (±1.0)	
Homemaker/self-employed/other	14.6 (±3.1)	18.3 (±2.3)		16.2 (±1.2)	
Student	0.7 (±1.0)	3.5 (±1.0)		7.0 (±1.0)	<.0001
Unemployed/unable to work	19.8 (±4.6)	12.4 (±2.4)	<.0001	11.5 (±1.1)	
Smoke-free workplace ^a	79.3 (±7.6)	86.1 (±4.2)	.1190 (n = 885)	87.7 (±1.4)	.0355 (n = 4898)

Note. Percentages shown are based on population-weighted totals. See also note to Table 1.

^aIncludes only smokers who are employed.

Beliefs About Smoking and Health

The CTS data showed that, in general, hard-core smokers' beliefs about their own health and about the health effects of cigarette smoking differed significantly from those of other low-probability quitters or all non-hard-core smokers (Table 4). Compared with all non-hard-core smokers, fewer hard-core smokers ranked their own health as "good" and more ranked their own health as "poor." Nonetheless, compared with other low-probability quitters or with non-hard-core smokers, fewer hard-core smokers agreed that their smoking was harming their own health.

The majority of hard-core smokers, low-probability quitters, and non-hard-core smokers agreed with the statement "I believe that I am addicted to cigarettes." Compared with other low-probability quitters, fewer hard-core smokers agreed with this statement, but compared with all non-hard-core smokers, a greater proportion of hard-core smokers agreed that they were addicted to cigarettes. More hard-core smokers reported that they were "very unsure" whether they could refrain from smoking for at least 1 month, and fewer reported they were "very sure" or "somewhat sure" they could refrain from smoking for at least 1 month. Despite

the apparent recognition of their own addiction to cigarettes, however, more hard-core smokers agreed with the statement "Tobacco is not as addictive as other drugs such as heroin or cocaine."

Hard-core smokers were also significantly less likely than other low-probability quitters or all non-hard-core smokers to attribute health effects to secondhand smoke. Among hard-core smokers, fewer than one third agreed that "inhaling smoke from someone else's cigarette causes lung cancer in a nonsmoker," compared with more than half of the other low-probability quitters and more than two thirds of all non-hard-core smokers. While a majority of all smokers agreed that secondhand smoke harms the health of babies and children, fewer hard-core smokers agreed with this statement, compared with other low-probability quitters or all non-hard-core smokers.

Multivariate Analyses

We used logistic regression analysis to compare hard-core smokers with other low-probability quitters and with all non-hard-core smokers. We excluded from the models the smoking-habit variables that we used to define hard-core status. Addition-

ally, because many of the variables in Tables 1 through 4 are obviously correlated, we did not include all of the variables we used in the univariate analyses. To construct the models, we first ran preliminary logistic regressions that compared hard-core smokers with other low-probability quitters and with all non-hard-core smokers, on the basis only of the demographic variables (Table 1). Similarly, we ran models that included only environmental characteristics (Table 2) as independent variables and models that included only beliefs about smoking and health (Table 4). From these preliminary analyses, we developed a set of variables to include in our fully specified models. Table 5 summarizes the results of these analyses.

The odds of being a hard-core smoker were significantly higher for older smokers relative to other low-probability quitters and to all other non-hard-core smokers. Being female, working (for wages, for self, or as a homemaker or student), agreeing that "my family would prefer that I didn't smoke," having a complete home smoking ban, agreeing that "smoking is harming my health," being very or somewhat sure that "I could refrain from smoking for at least 1 month," and agreeing that secondhand smoke harms the health of babies and children all reduce the odds of

TABLE 3—Smoking Habits of Hard-Core Smokers, Other Low-Probability Quitters, and Non-Hard-Core Current Smokers^a

	Hard Core, % (±95% CI)	Non-Hard-Core Low-Probability Quitters, % (±95% CI)	P of Hard-Core vs Non-Hard-Core Low-Probability Quitters	All Non-Hard-Core Current Smokers, % (±95% CI)	P of Hard-Core vs Non-Hard-Core Current Smokers
Sample size, n	500	1323		8404	
Time to first cigarette in morning <30 min	79.6 (±4.2)	71.5 (±2.6)	.0005	49.0 (±1.6)	<.0001
Cigarettes smoked per day					
<15	NA	NA		62.5 (±1.5)	
15–24	48.3 (±4.9)	68.1 (±2.8)		27.2 (±1.2)	
25–34	23.4 (±5.2)	19.3 (±2.2)		6.1 (±0.6)	
35+	28.3 (±4.7)	12.7 (±2.1)	<.0001	4.2 (±0.5)	<.0001 ^b (n=4227)
Ever smoked more than now	44.8 (±6.9)	55.3 (±3.5)	.0109	54.9 (±1.7)	.0051
Ever considered reducing amount smoked/day	40.3 (±7.0)	69.5 (±4.2)	.0000 ^c (n=868)	55.7 (±3.0)	.0001 ^c (n=3499)
Currently smoke low-tar/ low-nicotine cigarettes	40.6 (±7.0)	50.78 (±3.2)	.0021	43.3 (±1.5)	.3959
Ever considered switching to low-tar/low-nicotine cigarettes	26.0 (±6.8)	38.7 (±5.6)	.0059 ^d (n=916)	27.4 (±2.)	.6340 ^d (n=4480)
Quitting history					
Ever seriously considered quitting smoking	14.1 (±4.4)	49.6 (±6.6)	.0000 ^e (n=690)	50.5 (±3.4)	<.0001 ^e (n=1625)
Ever made a serious quit attempt ^f	47.7 (±5.1)	65.4 (±3.0)	<.0001	75.4 (±1.7)	.0000
Longest quit attempt					
1–7 days	23.9 (±6.0)	23.5 (±3.9)		19.2 (±1.3)	
8–90 days	25.5 (±5.4)	30.2 (±3.2)		30.9 (±1.6)	
91 days to 1 y	33.3 (±7.9)	26.0 (±3.4)	.2545 ^g (n=1091)	27.0 (±1.4)	.0560 ^g (n=6771)
1+ y	17.3 (±5.6)	20.3 (±3.7)		22.9 (±1.6)	
Average age when smoked first cigarette	15.0 y (±0.37 y)	15.2 y (±0.31 y)	.4427 ^h (n=1797)	15.9 y (±0.17 y)	<.0001 ^h (n=8635)
Average age when first began regular smoking	17.1 y (±0.60 y)	17.4 y (±0.36 y)	.3700 ^h (n=1802)	18.3 y (±0.20 y)	.0009 ^h (n=8623)

^aPercentages shown are based on population-weighted totals. See also note to Table 1.

^bComparisons for *N* value include only current smokers who smoked ≥15 cigarettes/day.

^cComparisons restricted to smokers who had not previously reduced their smoking.

^dComparisons restricted to smokers who were not currently smoking low-tar/low-nicotine cigarettes.

^eComparisons restricted to smokers who had never tried to quit smoking.

^fHard-core smokers and other low-probability quitters, by definition, made this attempt ≥1 year prior to the survey; other non-hard-core smokers made a quit attempt of ≥1 day within the past year or a serious quit attempt ≥1 year ago.

^gComparisons restricted to smokers who reported that they had ever made a serious attempt to quit smoking; for hard-core smokers and other low-probability quitters, the serious quit attempt must have occurred ≥1 year prior to the survey.

^h*P* values for comparisons of average age when first cigarette was smoked and average age when first regular smoking occurred are based on ANOVA tests, using the full sample. Comparisons include only those smokers who provided an age in response to these questions.

being a hard-core smoker, compared with other low-probability quitters and with all other non-hard-core smokers. Compared with all other non-hard-core smokers, being non-Hispanic White increased the odds of being a hard-core smoker. Compared with other low-probability quitters, living in a household with children reduced the odds of being a hard-core smoker. Belief that “I am addicted to cigarettes” reduced the odds of being a hard-core smoker, compared with other low-probability quitters, but increased the odds compared with all other non-hard-core smokers.

Discussion

Our data showed that 5.2% of California smokers over the age of 25 years, or 1.3% of the California population in that age group (approximately 243 800 people), could be

classified as hard-core smokers. With adult (18 years and older) smoking prevalence at 18.1% in California in 1996, these results suggest that current tobacco control efforts, far from having reached any barrier to further reducing smoking, have a long way to go before they “hit the wall.”

Our data describe the typical hard-core smoker as a retired White man, with 12 or fewer years of education, whose income is below \$50000, and who lives alone. This profile of the hard-core smoker is strikingly similar to that of a group of smokers described by Meyer and the prominent sociologist Paul Lazarsfeld as “continuous smokers with no regrets” in research conducted for Philip Morris Tobacco Company in 1972.²⁵ In this early research, such smokers were characterized as having “never tried to quit or . . . quit only once . . . They don’t want to quit and have no regrets.” Further, these smokers were “more likely to be males, over 40, to have a

blue collar background, to have less than a high school education, and to come from socially and economically deprived backgrounds. They are less likely to be married, but if married, their spouse is more likely to smoke.”²⁵ This group constituted nearly 60% of a nonrandom sample of smokers in a 1966 survey. In the 30 years since Meyer and Lazarsfeld’s study, smoking prevalence has decreased significantly and the vast majority of smokers have thought about quitting and/or attempted to quit. These trends suggest that even people who state that they are unwilling to change their behavior may eventually change as social norms evolve and their incentives become different.

Although tobacco-control activities have significantly reduced adult smoking prevalence over the past 30 years, our research shows that tobacco-control messages appear to have made less impact on hard-core smokers than on others. For

TABLE 4—Beliefs About Smoking and Health Among Hard-Core Smokers, Other Low-Probability Quitters, and Non-Hard-Core Current Smokers

	Hard Core, % (\pm 95% CI)	Non-Hard-Core Low-Probability Quitters, % (\pm 95% CI)	<i>P</i> of Hard-Core vs Non-Hard-Core Low-Probability Quitters	All Non-Hard-Core Current Smokers, % (\pm 95% CI)	<i>P</i> of Hard-Core vs Non-Hard-Core Current Smokers
Sample size, n	500	1323		8404	
Health status					
Excellent	22.4 (\pm 4.9)	17.1 (\pm 2.5)		18.0 (\pm 1.2)	
Very good	27.9 (\pm 4.9)	31.2 (\pm 3.2)		29.2 (\pm 1.5)	
Good	25.4 (\pm 5.8)	32.1 (\pm 2.7)		33.4 (\pm 1.6)	
Fair	14.9 (\pm 4.2)	13.9 (\pm 2.2)		15.7 (\pm 1.2)	
Poor	9.4 (\pm 3.9)	5.6 (\pm 1.8)	.0539	3.8 (\pm 0.5)	.0042
Agree with statement "Smoking is harming my health"	61.6 (\pm 6.0)	86.4 (\pm 2.1)	<.0001	79.5 (\pm 1.7)	<.0001
Agree with statement "I am addicted to cigarettes" "I could refrain from smoking for \geq 1 month"	79.5 (\pm 4.1)	91.0 (\pm 1.6)	<.0001	66.8 (\pm 1.8)	<.0001
Very sure	19.3 (\pm 3.8)	21.0 (\pm 2.7)		38.4 (\pm 1.6)	
Somewhat sure	5.0 (\pm 2.0)	14.7 (\pm 2.2)		20.2 (\pm 1.3)	
Somewhat unsure	18.2 (\pm 3.5)	26.5 (\pm 2.3)		26.8 (\pm 2.1)	
Very unsure	57.4 (\pm 4.6)	37.9 (\pm 2.6)	<.0001	14.8 (\pm 1.0)	<.0001
Agree with statement "Tobacco is not as addictive as other drugs"	39.8 (\pm 5.7)	28.2 (\pm 2.8)	<.0001	29.3 (\pm 1.4)	.0007
Agree with statement "Inhaling secondhand smoke causes lung cancer in nonsmokers"	31.7 (\pm 5.9)	54.5 (\pm 4.1)	<.0001	70.2 (\pm 1.4)	<.0001
Agree with statement "Inhaling secondhand smoke harms the health of babies and children"	61.5 (\pm 6.3)	84.0 (\pm 2.3)	<.0001	89.4 (\pm 1.0)	<.0001

Note. Percentages shown are based on population-weighted totals. See also note to Table 1.

TABLE 5—Logistic Regression Analysis Comparing Hard-Core Smokers With Other Smokers

	Odds Ratio of Hard-Core vs Non-Hard-Core Low-Probability Quitters (95% CI)	Odds Ratio of Hard-Core vs Non-Hard-Core Current Smokers (95% CI)
Female	0.56 (0.41, 0.76)*	0.44 (0.33, 0.58)*
Age, y	1.49 (1.12, 1.98)*	1.48 (1.13, 1.93)*
25–44		
45–64		
65+		
Non-Hispanic White	1.0 (0.63, 1.58)	2.34 (1.67, 3.27)*
Employment status ^a		
Employed, including homemaker, self-employed, student	0.38 (0.21, 0.67)*	0.59 (0.37, 0.95)**
Unemployed/unable to work	0.82 (0.44, 1.52)	1.27 (0.76, 2.12)
Household composition ^b		
Other adults (no children)	0.80 (0.55, 1.67)	1.13 (0.81, 1.56)
Children in household	0.60 (0.37, 0.99)**	0.69 (0.44, 1.09)
Agree: "Family prefers I don't smoke"	0.47 (0.35, 0.62)*	0.53 (0.42, 0.68)*
Complete home smoking ban	0.66 (0.44, 1.01)	0.30 (0.22, 0.41)*
Agree: "Smoking is harming my health"	0.54 (0.38, 0.79)*	0.54 (0.39, 0.77)*
Agree: "I am addicted to cigarettes"	0.63 (0.42, 0.94)**	2.03 (1.32, 3.14)*
Very/somewhat sure I could refrain from smoking for \geq 1 month	0.52 (0.37, 0.72)*	0.29 (0.22, 0.37)*
Agree: "Tobacco is not as addictive as other drugs"	1.13 (0.78, 1.63)	1.34 (0.99, 1.80)
Agree: "Inhaling secondhand smoke causes lung cancer in nonsmokers"	0.91 (0.61, 1.38)	0.68 (0.49, 0.94)**
Agree: "Inhaling secondhand smoke harms the health of babies and children"	0.60 (0.39, 0.93)**	0.61 (0.43, 0.86)*

^aReference group=retired.

^bReference group=lives alone.

* $P < .01$; ** $P < .05$.

example, although hard-core smokers readily admitted that they were addicted to cigarettes and had little confidence that they could quit smoking, they were less likely than other smokers to associate negative health consequences with their smoking habit. Hard-core smokers were also less likely than others to agree that tobacco is a highly addictive drug, that smoking was harming their own health, or that secondhand tobacco smoke harms the health of others. Our multivariate analyses confirmed that beliefs in the harmful effects of smoking are independently negatively related to hard-core status. Although California’s tobacco control strategy explicitly aimed to “emphasize [the] addictive nature of tobacco [and] its harmful health effects” and also to “educate the public about the serious health risks from secondhand smoke,”²⁶ the beliefs of hard-core smokers did not reflect these messages.

These findings are consistent with other research that found that older smokers “both underestimate the risks of smoking and overestimate the benefits.”²⁷ This characteristic denial of the negative effects of smoking was also identified by Lazarsfeld, who explained that the committed smokers with no regrets developed “two major mechanisms for effectively resisting the anti-smoking campaign. These can generally be described as denying the dangers and discounting their importance.”²⁵ Since many hard-core smokers are retired and many live alone, they are largely unexposed to important antismoking stimuli, such as workplace smoking bans, home smoking bans, or sentiments of concern or disapproval about their smoking expressed by coworkers or family members. Research has shown that social support is associated with successful smoking cessation.^{28–30} Our multivariate analyses confirmed that living with a complete home smoking ban was independently related to a reduced likelihood of being a hard-core smoker. Additionally, both workplace and home smoking bans have been shown to be associated with quitting behavior.^{30,31} Without either informal social input or the structure of smoking bans at home or work, hard-core smokers appear to be able to live in unopposed denial about the effects of their habit.

Another important characteristic of our hard-core smokers was that they typically began experimenting with smoking and became regular smokers at a younger age than non-hard-core smokers. These findings are consistent with other research showing that earlier smoking initiation was associated with an increased probability of dependence³² and heavier smoking³³ among

adult smokers. Although today’s hard-core smokers appear to be mainly a cohort of older smokers, evidence that adolescents are currently experimenting with cigarettes at increasingly younger ages^{1,34} suggests that a new cohort of highly addicted individuals may be developing. This trend and its implications for future smoking patterns and tobacco-control activities merit ongoing surveillance. Nonetheless, even if adolescent smoking increases beyond current levels, it is likely that smoking rates will continue to decline over the next 2 to 3 decades as the current cohort of older smokers diminishes through death and quitting.³⁵

Finally, our research suggests that hard-core smokers are distinct from other low-probability quitters. The characteristic that distinguishes hard-core smokers is their active lack of intention to quit smoking anytime in the future. In addition, hard-core smokers differ in several important characteristics from those described by DiClemente et al. as “precontemplators.”⁹ Our question that assesses the intention to quit includes 2 possible answers that were not available to respondents to the DiClemente et al. question on intention (i.e., “Intend to quit sometime in the future, but not in the next 6 months” and “No intention to quit smoking ever”). Therefore, we were able to identify a group with no intention ever to quit smoking.

Additionally, by defining the hard core as smokers who had smoked for at least a year and were at least 26 years of age, we eliminated a group of smokers who could qualify as precontemplators but who could be in the process of becoming a smoker. Such smokers may be able to quit sometime in the future but have not yet identified their habit as a problem. The most important criterion that distinguishes the hard-core smoker from the precontemplator, however, is the restriction that hard-core smokers cannot have attempted to quit within the past 12 months. Earlier research has shown that precontemplators who have recently attempted to quit were ultimately able to quit successfully at approximately twice the rate of precontemplators with no recent attempt to quit.³⁶ Among 1996 CTS respondents who could be classified as precontemplators by the definition of DiClemente et al., only 11% qualified as hard-core smokers.

By showing that the hard-core smokers represent a unique group, this research defines them as smokers who are least likely to quit smoking. This group of smokers may never quit. Alternatively, this group may represent a difficult-to-reach, special population, for whom tobacco-control efforts may need to be specifically tailored. With

the right stimuli, even hard-core smokers may be able to quit. As Fagerström et al. note, as smoking prevalence rates decline, different—and perhaps more intensive—types of tobacco control interventions may be necessary to influence the remaining highly addicted smokers.³⁷

The group of hard-core smokers may be somewhat larger than our estimates suggest. Research has shown that the vast majority of adults with alcohol problems smoke,^{38,39} that alcoholism and binge drinking are related to failure in attempts to quit smoking,^{40,41} and that alcoholics are more nicotine dependent and report more withdrawal symptoms during attempts to quit smoking than do non-alcoholics.⁴² Furthermore, other factors shown to be associated with smoking, such as dependence on other drugs,⁴³ depression, and other psychiatric states,^{42,44,45} may further complicate identification of the truly hard-core smokers. It is unknown how many smokers in our study are alcoholics, users of other drugs, or individuals with psychiatric illnesses who may express the intention of quitting sometime in the future—thereby eliminating themselves from the hard core—but who realistically will never quit smoking. Longitudinal analyses and further investigation into multiple addictions would strengthen our results, but the data do not yet exist for such research. □

Contributors

S. Emery was the primary author of all drafts of the manuscript and worked with the statistical analysts in all phases of the research. E. A. Gilpin guided the statistical analyses and edited all drafts of the manuscript. C. Ake conducted most of the statistical analyses. A. J. Farkas conducted statistical analyses and commented on all drafts of the manuscript. J. P. Pierce conceived the idea of the paper, commented on and edited all drafts of the manuscript, and was the principal investigator for both of the grants that supported this research.

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