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Disparity in Smoking Prevalence by Education: Can We Reduce It?

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Abstract
Can an intervention program that is highly effective in reducing the prevalence of an unhealthy behavior in the general population also reduce the disparity among its subgroups? That depends on what measure of disparity is used. Using simple algebraic models, this study demonstrates that disparity measured in terms of relative difference between two groups tends to increase when the prevalence of the behavior is in decline. The study then shows an empirical example, by analyzing the effects of the California tobacco control program on smoking prevalence of two education groups, the lowest (<12 years) and the highest (16+ years). It examines the data from four California Tobacco Surveys covering the years 1996, 1999, 2002, and 2005. The effects of three components of the tobacco control program known to be effective in decreasing prevalence (media, worksite policy, and price) on the two education groups are assessed. The smoking prevalence for the two groups is obtained from these four surveys and a regression line is computed for each education group from 1996 to 2005. Results show that the California program is effective with both low education and high education groups and that the rate of decline in smoking prevalence from 1996 to 2005 is no smaller for the low education group than for the high education group. The paper then discusses that an analysis of disparity based on relative difference, however, could result in misleading recommendations that an intervention like the California tobacco program needs to change from its current whole-population approach to one that focuses on targeting subgroups because it has not reduced disparity. It proposes that research should focus more on increasing the rate of change among less advantaged groups and less on the relative disparity compared to some other group.

INTRODUCTION

Reducing disparities in health behavior is a difficult task because any existing disparity tends to have multiple underlying factors which are complex and not easily changed (1-3). For example, two ethnic groups can have very different smoking prevalence rates. Underlying this disparity are many contributing factors, of which ethnicity is only an index (4). These factors may include biological characteristics, social-cultural background, and current living environment (5-8). Some of these factors cannot be changed, others the individual may not wish to change, and still others are difficult to change even if the individual wishes to. The difficulty in changing the contributing factors is often what makes it hard to reduce disparities in health behavior.

The present study focuses on disparities in smoking behavior between two groups with different education levels. We chose education as an indicator of disparity for two reasons: education is one of the strongest predictors of smoking behavior, especially in countries where smoking prevalence is declining (9-12), and education is a factor that can be modified.

There are often conceptual ambiguities in the discussion of reducing disparities that stem, in part, from methodological difficulties in measuring disparity (13-20). For this reason, we will first use a simple illustration to clarify the measurement of disparity.

There are two common ways of describing disparity between two groups: absolute difference or relative difference (13-16). The absolute difference involves subtracting the rate of one group from the rate of the other. The relative difference involves computing the ratio between the rates for the two groups. There is no inherent theoretical reason to choose one measure over the other and there is no consensus in the field as to which measure should be the standard (13-20). However, the practical purpose of any disparity discussion is to find ways to reduce disparities. Thus, the measurement question is whether absolute or relative difference is better suited for assessing change in disparity over time. Figure 1 illustrates the concepts using the simplest case where the change of prevalence of a given health behavior in the population is a linear function of time.

Two groups are labeled as M and N; they represent a disparity across some dimension such as education or ethnicity where the groups are relatively more or less advantaged. Figure 1A shows behavior A is on the decline in both groups M and N and Figure 1B shows behavior B is on the rise for both. These four lines have the same slope, except that the slope is negative in Figure 1A and positive in Figure 1B. The question is: Has disparity increased or decreased from Time 1 to Time 2?

In Figure 1A, the absolute difference between groups M and N remains the same because the rate of decline is the same for both groups: $(m_2 - n_2)/(m_1 - n_1) = 1$, [(20-10) ÷ (30-20) = 1]. Thus, one may conclude that the disparity has remained the same from Time 1 to 2. However, given that $m_1 > n_1$ at Time 1, the relative difference (i.e. the ratio) increases from Time 1 to Time 2: $(m_2/n_2) \div (m_1/n_1) > 1$, [(20/10) ÷ (30/20) = 1.33]. In other words, even though the prevalence in both groups is decreasing at the same rate, the relative disparity has increased.

In Figure 1B, the absolute difference between groups M and N also remains the same because the rate of increase is the same, [(30-20) ÷ (20-10) = 1]. However, given that $m_1 > n_1$ at Time 1, the ratio will decrease from Time 1 to Time 2: $(m_2/n_2) \div (m_1/n_1) < 1$, [(30/20) ÷ (20/10) = 0.75]. In other words, even though the prevalence in both groups is increasing at the same rate, the relative disparity has decreased.

From these two hypothetical cases, it would appear that the absolute difference is the better measure because it is not affected by whether the behavior is on the rise or on the decline.

However, the relative difference is more often used both to describe disparity (14-16,18) and to set goals for reducing disparities (13,17). There are probably many reasons for this. A ratio is a more intuitive measure of disparity (e.g., a coworker's salary is twice as high as mine) and ratio is the preferred measure in epidemiology (18).

A serious problem can arise, however, when relative disparity is used to assess the effectiveness of an intervention program. In fact, whenever the term *disparity* is used in the field of health promotion it carries with it an implicit comment on the quality of the intervention. If the disparity between two groups has increased over time, it implies that the intervention is not equally effective for them. However, the effectiveness of an intervention is not the same as its ability to reduce disparity.

In the hypothetical case illustrated in Figure 1A, the two lines could be represented by the following pair of equations (where t stands for time). In this case, j = k, because the prevalence for the two groups is decreasing at the same rate (i.e., same slope).

$$m = a + jt$$
$$n = b + kt$$

To keep the ratio of m and n at Time 2 the same as at Time 1, the rate of reduction for group M has to be greater than that for group N. Precisely, we need $j = k\,(a/b)$, where $a > b$.

Given the behavior in question is generally declining, this means the intervention needs to achieve a more rapid reduction for the disadvantaged group (M) than for the advantaged group (N). While this is not impossible, it would be difficult. Conceptually, one might consider the difference between a and b in the equations above to represent the total sum of the effects of all existing contributing factors that have led group M to have a higher prevalence than group N at Time 1. It is expected that these factors, which cannot be easily changed, will continue to exert their influence between Time 1 and Time 2, whether there is an intervention or not. If this is true, then it will be quite an accomplishment for an intervention to achieve the same rate of reduction for both groups. It will be much harder to achieve a greater rate of reduction for the disadvantaged group.

With this conceptual clarification as the background, the present study examines the changing disparity in smoking prevalence between two educational groups in California, U.S.A. The purpose of the study is not merely to find out if the disparity is increasing or decreasing. It also aims to address the question of whether the kind of tobacco control interventions conducted in California can reduce disparity while reducing smoking prevalence in general (21). We chose California because the state is well recognized as having conducted over the last two decades one of the most effective tobacco control programs in the world (22-25). Since 1990, when the comprehensive tobacco control program in California started, smoking prevalence in California has declined at a faster rate than the US national average and it is well recognized that the differential rate is at least partly attributable to the program (24-25). Few studies, however, have addressed the program's ability to reduce disparity among subgroups (26). This study uses California as a case study to examine whether a program well-recognized for its effectiveness in reducing an unhealthy behavior (i.e., smoking) on the population level also reduces disparity among subgroups.

The present study chooses to compare two subgroups of education attainment: the highest and lowest education groups among the California adult population. Since the paper is conceptual in nature, the study leaves out those who are in the middle of the education continuum to simplify the analysis on disparity.

The analysis of this study proceeds in the following manner. First, we examine the effects of three tobacco control program components that are known to impact smoking behavior: anti-smoking media campaigns (27-29), worksite policies against secondhand smoke (30), and price of cigarettes (31). Each of these has already been shown to contribute to the decline of smoking in California (32-38). The present analyses focus on whether these interventions have had differential impacts on low and high education groups. Next, we examine the changing smoking prevalence of each education group and assess whether the disparity between the education groups changed over time.

METHODS

Data Source

In 1989, California voters passed an initiative to place a 25 cent excise tax on each pack of cigarettes, with a portion of the money allocated to fund a comprehensive tobacco control program (38). The tax increase, which itself had an effect on cigarette consumption, was followed in 1990 with the start of the tobacco control program (39). The program is a multi-prong, multi-language campaign, in recognition of the fact the state has multiple ethnic and linguistic populations (40). The program also funds the California Tobacco Survey (CTS), which has been conducted every three years since 1990 to evaluate the effects of the comprehensive program (41).

This study uses data from the 1996, 1999, 2002, and 2005 CTS's. Earlier surveys did not include questions about media and price that are of interest to this study and the most recent CTS 2008 data are not yet available for public use. The CTS is a large-scale, population based telephone interview survey conducted in English or Spanish that collects data on tobacco use, attitudes and beliefs toward tobacco use and related issues among the California population. All non-institutional California residents age 18 or older have the probability of being selected for interview. The surveys use a stratified random digit-dialing design and include a screening interview and an extended interview, which over-samples smokers. The response rate for the screening interview was 55.2%, 51.3%, 45.7%, 27.6%, for 1996, 1999, 2002, and 2005, respectively. The response rate for the extended surveys was 74.0%, 69.7%, 68.1%, and 49.9%, for 1996, 1999, 2002, and 2005, respectively. The effective sample sizes, therefore, are 18,616 for CTS 1996; 14,729 for 1999, 20,525 for 2002; and 14,262 for 2005. The details on the survey methodology can be found at http://libraries.ucsd.edu/ssds/tobacco.htm (41).

Measures

This study focuses on two groups with different education levels: the lowest and highest education groups. The lowest is defined as having less than 12 years of education and the highest is defined as having 16 years of education or more.

Current smokers were those who had smoked at least 100 cigarettes and were smoking every day or some days at the time of being interviewed (41). Former smokers were those who had smoked at least 100 cigarettes, but did not smoke at all at the time of interview (41).

Both current and former smokers were asked if they were smoking 12 months before the interview. Those who were smoking 12 months ago were asked if they had made a quit attempt in the last year. A serious quit attempt was defined as "having tried to quit and made it for at least 24 hours." Those who were smoking 12 months ago but were no longer smoking at the time of survey were considered to have quit smoking. The number of these respondents divided by the total number of those who reported smoking 12 months ago was the overall quit rate (41).

Those who made a quit attempt were further asked if they had sought any help in their most recent quit attempt. Help includes any behavioral counseling or self-help material and any form of nicotine replacement therapy or Zyban.

Media exposure is defined as having seen/heard an anti-smoking message on television, billboard or radio in the last month before the survey. Respondents who said they had seen "a lot" or "a few" of the media messages were considered to have been exposed to anti-smoking media in the last month.

To measure the effect of the price of cigarettes, current smokers were asked whether they were worried about the money they spent on cigarettes. In 2002, an extra question was added to assess the perceived impact of tobacco price on their desire to quit ("Has the price of cigarettes influenced your desire to quit?").

To assess the effect of worksite policy on secondhand smoke, all non-smokers who worked for money in an indoor setting (outside of their house) were asked whether someone had smoked in their work area during the past two weeks. Respondents answering "Yes" are considered to have been exposed to second hand smoke.

Analyses

Each survey was analyzed separately. Percentages were weighted by census-derived weights, making them representative of the California population for the given survey year (41). Confidence intervals were obtained with the jackknife method with the replicate-weights developed for CTS (42). All computations were performed with SAS 9.1, and confidence intervals estimated with SUDAAN 9.1.

For cross survey comparisons, we a priori made a decision to compare smoking prevalence without adjusting for other demographic information. Although the demographic composition of California population changes over time, the unadjusted numbers constitute the "true" prevalence in any given year and are more typically reported in the literature and is what is usually used by policymakers. Likewise, to be consistent with reports of adult smoking prevalence in California, the analysis included adults 18 years and older even though 18 year olds are unlikely to have received sufficient education (16 years or more) to be in the high education group.

The changing smoking prevalence for the two education groups were modeled by computing a regression line for each education group over four survey years (1996 to 2005) using weighted least squares method, and the group by time interaction was tested by analysis of variance. The test of interaction is to examine if the rate of decline in smoking prevalence for these two groups differs over time.

RESULTS

The proportion of the California population in the two education groups examined in this study (less than 12 years of education and 16 or more years of education) has been relatively stable. The respective proportions for the low and high education groups were: 21.3% vs. 27.3%, 19.6% vs. 27.6%, 19.3% vs. 29.9%, and 19.9% vs. 30.4%, for the years 1996, 1999, 2002, and 2005, respectively. In short, the low education group was approximately the lowest 20 percentile and the high educated group was approximately the highest 30 percentile of the population during the study periods.

Table 1 presents the results related to three tobacco control components: media, worksite policy, and price. The proportion of smokers reporting seeing anti-smoking media in the last

month was high for both low and high education groups. There was no statistical difference between the two groups, except for 2005 when the high education smokers were more likely to be exposed to these media messages. Among nonsmokers, the high education group was more likely to report being exposed to anti-smoking media compared to the low education group in 1996 and 1999, but the difference was not statistically significant in 2002 or 2005. Overall, the rate of exposure to anti-smoking media among nonsmokers was also very high.

The rate of exposure to second hand smoke was significantly different between the two education groups. About one fifth to one third of the low education group reported exposure to second hand smoke at work in the last two weeks, which was more than double the rate of the high education group.

The price of cigarettes tended to have a stronger effect on smokers in the low education group compared to those in the high education group. Smokers in the low education group were significantly more likely to report being worried about the amount of money spent on cigarettes. In 2002 and 2005, when an additional question was asked about price, the low education smokers were significantly more likely to report that the price of cigarettes made them want to quit.

Table 2 presents the rate of quit attempts and overall quit rate among current smokers. Among those who were smoking 12 months before the survey, more than half had made a serious quit attempt in the past 12 months. There was no statistically significant difference in attempts between the low and the high education groups in any of the four survey years.

Table 2 also shows that a substantial proportion of those who were smoking 12 months before the survey had quit by the time of survey. The quit rate tended to be lower among the low education group although the difference was only statistically significant in 1996 and 2005. Since those in the low education group had about the same rates of making a quit attempt as those in the high education group, the lower overall quit rate suggests those in the low education group had a greater likelihood of relapse following their attempts.

Table 2 shows two other pieces of information relevant to understanding the overall lower quit rate for the low education group. Across four surveys, the low education group tended to be less likely to seek assistance when they tried to quit smoking, although the difference was generally not statistically significant. The low education group was also more likely to have other smokers in the same household, although the confidence intervals overlap for most of the years except 1996.

Figure 2 shows the smoking prevalence in the two education groups for each survey year. The observed data are presented with 95% confidence intervals. A regression line was fitted to the data for each education group. The smoking prevalence declined for both education groups from 1996 to 2005. The slopes for the fitted lines (i.e., the rates of reduction) were slightly greater for the low education group than for the high education group, but were not statistically different from each other. A test for an interaction of the two regression lines fails to reject the null hypothesis of equal slopes, $F(1,4) = 0.125$, $p = 0.741$.

DISCUSSION

This study uses the well known California tobacco control program as an example of how difficult it is to reduce disparity in health behavior on a population level, and how problematic it can be to use relative disparity as the measure to evaluate an intervention program. Using education level as the dimension for disparity analysis, the study established that the California program has been successful in reaching those with the lowest education level (<12 years) as

well as those with the highest (16+ years). Each of the three main tobacco control components (media, worksite nonsmoking policies, and price of cigarettes) has impacted both low and high education groups. Smoking prevalence declined for low and high education groups from 1996 to 2005, and the rate of decline was no smaller for the low education group than for the high education group. However, the equal rate of decline in smoking prevalence means that the disparity between the two education groups has not been reduced. In fact, if the disparity is measured in relative terms, then it will likely increase if the program continues to have the same impact on the two education groups.

Before addressing the implications of these results for the analysis of disparities, we will first discuss what the California data have generally shown. Tables 1 and 2 show that the California program has had a broad population impact, even though the effects of individual tobacco control components varied across education line. For example, the low education group may be affected less by the nonsmoking policies but more by price of cigarettes. However, the overall effects seem quite similar across education line. The best indication of the broad program impact is seen in the nearly equal rates of smokers attempting to quit from both the low and high education groups in each survey year. The quit attempt rates shown in Table 2 are quite high compared to US national average (43). It is clear that California smokers from both education groups were motivated to quit. Of course, it is desirable to further improve the quit attempt rate for both groups, which can lead to a greater overall population cessation rate (44). But the fact that both groups attempted to quit at high rates is a strong indication that the California tobacco control program is having its intended effect on smokers, regardless of socio-economic background (45).

Low education smokers, however, tended to be less likely to seek assistance to quit smoking. They were also more likely than high education smokers to have other smokers in the same household. These two facts do not completely explain why the low education group has lower success in quitting, but they no doubt contribute to their lower cessation rate. The result is consistent with other studies that found lower education smokers were less likely to succeed in quitting smoking (46-49).

It should be noted that there is no logical contradiction in the low education group having a lower quit rate than the high education group but having similar rates of decline in smoking prevalence. The reason is that quit rate is computed with smokers as the denominator while the smoking prevalence is computed over the total population. The low education group has a greater proportion of smokers than the high education group at time 1. Thus, even a lower quit rate in this group can result in the same percentage point reduction in smoking prevalence as the high education group at time 2 because the prevalence is computed over the total population of each of the education groups.

The most encouraging result from the California data is that the rate of decline in smoking prevalence for the low education group is no smaller than that for the high education group. This is not what is usually reported in the literature regarding education and smoking (4, 50). It is certainly not what would be expected given that the health disparity literature generally gives the impression that disparity between the less advantaged and the more advantage groups in the society is increasing (4,10,12,51). This impression, however, is partly caused by the way disparity is measured and presented in the literature (13, 20).

What are the implications of these results for the discussion of disparity? Has the disparity in smoking prevalence between low and high education groups in California increased or decreased from 1996 to 2005? One answer to this question is that the disparity has not

changed because the slopes for the two regression lines in Figure 2 are not statistically different. In other words, the absolute disparity remains the same while the overall smoking prevalence has dropped.

However, as explained in Figure 1A, the relative disparity will increase if the two lines are parallel and both are declining. For the relative disparity not to increase, the smoking prevalence in the low education group has to decline at a much faster rate than in the high education group.

Can a tobacco control program create an intervention that reduces the smoking prevalence for the lowest education group at a significantly greater rate than for the highest education group such that it will reduce the relative disparity? It is not impossible, but it will be difficult. The reason is that there are many underlying factors that contribute to the low education group having a higher smoking prevalence prior to any intervention. For example, low education is associated with low income and low income is associated with lower rate in quitting smoking (52). Low income is not a condition that a tobacco control program can easily change. As a result, it will likely continue to exert its influence thereby making it difficult to increase the rate of reduction for this population.

Probably the simplest explanation for the difficulty in increasing the rate of decline among the low education group is the higher smoking prevalence itself. Given the low education group had a higher smoking prevalence before the intervention, smokers in this group are more likely to come into contact with other smokers in their community/homes than smokers in the high education group. The prevalence in one's social group affects the perception of how normative smoking is, which affects the current smokers' likelihood of quitting (53), and the nonsmokers' likelihood of taking up cigarettes (54). In other words, the differential prevalence between groups at any time inherently works against the intervention efforts that aim to achieve a greater reduction rate among the group that has the higher prevalence.

This brings us to a critical point that has been often overlooked in the discussion of disparity in health behavior. Part of the difficulty in reducing relative disparity (i.e., measured in ratio) is that the smoking prevalence in places like California is on the decline. If the behavior in question is on the rise, then it is much easier to reduce the relative disparity. This can be seen clearly in Figure 1B, mentioned in the introduction section. For example, if the behavior outcome were obesity (which is on the rise in California and many other places), then the rate of low education group has to *increase* at a significantly greater rate than in the high education group, in order to keep the relative disparity constant. In fact, if the slope of increase for obesity for the low education is anything less what is specified ($j = k(a/b)$) then the relative disparity would decrease, as has been indeed found in California (51).

Thus, we have a paradox. If an intervention program is successful in that it leads to a decline in the unhealthy behavior, then the relative disparity will likely increase if we continue with the same strategies that have been proven successful. If the intervention program is not successful such that unhealthy behavior is on the rise, then the relative disparity will likely decrease if we continue with the same unsuccessful strategies. Viewed in this light, the problem of using the measure of relative disparity to evaluate an intervention program for health behavior is serious indeed.

One important caveat is in order. The difficulty of reducing relative disparity when the behavior is on the decline has much to do with the fact that health behavior such as smoking is voluntary in nature. If the behavior were something that could be mandated by policy as in the

case of vaccination, then the initial differential prevalence is less likely to exert such an inherently strong counter-disparity-reduction effect on the intervention programs.

Given that smoking is voluntary, using relative difference to set goals for disparity reduction can be problematic. It can result in conclusions about program effectiveness that are misleading. In the case of the California tobacco control program analyzed in this study, the conclusion would have been that the program increased health disparity even though it had remarkable success in reaching the disadvantaged group and reducing their smoking prevalence. It would suggest that an alternative intervention program is needed since the program is not effective in reducing disparity.

One possible consequence would be a shift from the whole-population intervention approach to a focus on developing specific interventions for subgroups, with the hope that targeted interventions will be more effective for subgroups. However, this could be counter-productive because the combined costs of interventions that target various subgroups tend to be greater than the total costs of a program that employs a general campaign on the total population. This is most clearly seen in mass media approach to reduce smoking prevalence. Anti-smoking media campaigns that target the whole population have been shown to have equal effects on subgroups (28). Given this is the case, then a media campaign that is divided into multiple subgroup campaigns is likely to be less cost-efficient than a campaign that targets the total population. Thus, unless an alternative intervention can maintain the same overall program effect while reducing the relative disparity, the intervention that can drive down the overall prevalence of unhealthy behavior across all groups is more cost-efficient (45).

This study has limitations because it employed simple analysis of California survey data throughout, without making adjustment for changing demographic composition over multiple survey years. Also, the results on the impact of media, worksite policy and prices are based on survey respondents' self report, although the effects of them have been well established (27-37).

The significance of analyzing these data shown in Tables 1 and 2 is to demonstrate that the lack of difference in the slope of decline for the two education groups is not due to the lack of effect of these interventions on the low education group. In fact, the data shows these strategies are quite impactful, which contributed to two groups having the same slope of decline in smoking prevalence. The problem is that the relative disparity is going to increase if the slope of decline continues to be the same for the two groups.

The key implication of the conceptual and empirical analyses of this study is that disparity research in health behavior should focus more on ways to increase the rate of change among disadvantaged groups and less on the relative disparity compared to some other group. Because of the declining smoking prevalence in the overall population, the relative disparity in smoking prevalence across education may stay unchanged or even increase. The more important goal is to reduce the smoking prevalence of the less educated group at a greater rate than what has been seen so far in most places in the world.

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Table 1.The Impact of Media, Nonsmoking Worksite Policy and Price

	Education level			
	<12 years		16+ years	
	N	% (95% CI)	N	% (95% CI)
Exposure to anti-smoking media in last month (smokers)				
1996	1037	85.3 (82.4, 87.8)	1592	88.3 (86.4, 90.0)
1999	766	91.2 (88.1, 93.6)	1087	93.4 (91.1, 95.2)
2002	688	89.7 (86.5, 92.1)	1030	91.7 (89.4, 93.4)
2005	507	76.5 (59.1, 88.0)	712	91.9 (89.2, 94.0)
Exposure to anti-smoking media in last month (nonsmokers)				
1996	993	70.5 (66.1, 74.6)	3003	77.8 (75.7, 79.8)
1999	1014	82.3 (78.9, 85.3)	2817	89.9 (88.6, 91.1)
2002	1785	81.7 (77.4, 85.3)	4175	83.9 (82.5, 85.3)
2005	1157	71.6 (63.5, 78.5)	3065	74.6 (70.7, 78.1)
Exposed to second-hand smoke in last 2 weeks (nonsmokers)				
1996	325	28.2 (21.8, 35.7)	2048	5.0 (3.9, 6.4)
1999	349	25.9 (19.3, 33.8)	1839	11.0 (9.0, 13.3)
2002	603	18.7 (14.2, 24.2)	2761	8.5 (7.0, 10.4)
2005	335	35.9 (11.0, 71.7)	1907	6.9 (4.9, 9.8)
Worried about the amount of money on cigarettes (smokers)				
1996	1038	41.5 (37.8, 45.3)	1597	25.9 (23.2, 28.9)
1999	764	56.6 (50.9, 62.2)	1090	42.6 (39.1, 46.2)
2002	691	52.1 (47.9, 56.3)	1034	38.9 (35.5, 42.3)
2005	509	50.3 (39.1, 61.4)	709	34.5 (27.9, 41.7)
The price of cigarette makes me want to quit (smokers)				
1996		-		-
1999		-		-
2002	679	54.3 (50.0, 58.5)	1020	36.0 (32.5, 39.6)
2005	504	61.8 (53.1, 69.8)	703	27.2 (20.8, 34.8)

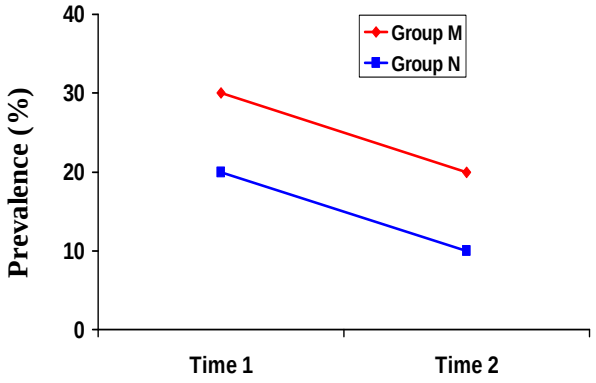
All percentages are weighted by population parameters

Table 2. Quit Attempts, Overall Quit Rate, Help-seeking in Quitting and Living with Other Smokers

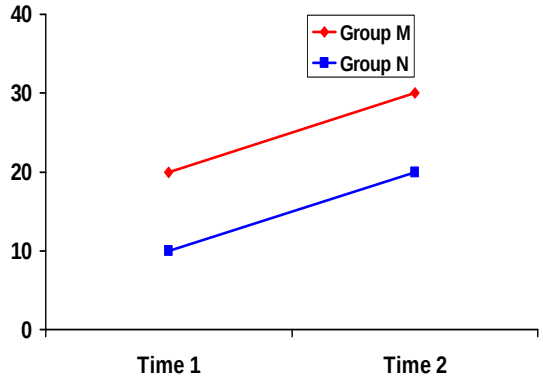
	Education level			
	<12 years		16+ years	
	N	% (95% CI)	N	% (95% CI)
Quit attempt in last 12 months				
1996	1039	56.6 (53.8, 59.4)	1657	56.7 (53.4, 60.1)
1999	769	59.6 (55.0, 64.0)	1084	60.6 (57.6, 63.5)
2002	668	60.0 (55.4, 64.5)	1077	60.7 (57.0, 64.3)
2005	493	54.8 (41.2, 67.6)	728	59.1 (52.4, 65.4)
Overall quit rate for those who smoke 12 month ago				
1996	1039	9.8 (7.9, 12.2)	1657	14.4 (12.6. 16.5)
1999	769	11.6 (9.3, 14.3)	1084	15.4 (13.0, 18.2)
2002	668	10.6 (8.1, 13.8)	1077	14.4 (11.8, 17.5)
2005	493	6.8 (4.1, 10.9)	728	18.5 (13.9, 24.2)
Seeking help in quit attempt				
1996	654	17.5 (13.9, 21.8)	1004	24.4 (20.4, 29.0)
1999	517	17.9 (14.2, 22.3)	753	25.1 (21.2, 29.4)
2002	413	19.8 (15.1, 25.5)	626	25.1 (20.8, 30.1)
2005	233	24.8 (17.1, 34.3)	274	35.4 (24.2, 48.4)
Living with other smokers				
1996	1041	51.4 (48.1, 54.8)	1600	43.2 (39.8, 46.6)
1999	767	36.4 (32.1, 40.9)	1092	30.9 (28.1, 33.8)
2002	694	36.6 (32.3, 41.1)	1036	29.7 (26.8, 32.9)
2005	511	32.6 (23.1, 43.8)	713	23.6 (19.2, 28.7)

*Note: All percentages are weighted by population parameters.

Figure 1. Comparison of Two Groups for Disparity (Hypothetical Examples)



Panel A: Prevalence is decreasing



Panel B: Prevalence is Increasing

Figure 2. Smoking Prevalence for the Two Education Groups in California, 1996- 2005