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The 2011 California Smokers' Cohort:  
A Longitudinal Perspective

California Department of Public Health  
California Tobacco Control Program



EDMOND G. BROWN JR.  
GOVERNOR  
State of California

Diana S. Dooley, Secretary  
California Health and Human Services Agency

Karen L. Smith, MD, MPH  
Director and State Public Health Officer  
California Department of Public Health



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## INTRODUCTION

The California Tobacco Control Program (CTCP), funded by Proposition (Prop) 99 (Tobacco Tax and Health Protection Act 1988), was established as the first state-level comprehensive tobacco control program in the nation. The mission of CTCP is to improve the health of all Californians by reducing illness and premature death attributable to the use of tobacco products. Through leadership, experience and research, CTCP empowers statewide and local health agencies to promote health and quality of life by advocating social norms that create a tobacco-free environment.<sup>1</sup>

The California Tobacco Survey (CTS) was one of the primary surveillance studies conducted by CTCP since 1990. The CTS used a cross-sectional design and stratified random samples of all California adults for the purpose of estimating the prevalence of smoking and learning more about tobacco use patterns, attitudes, and behaviors among smokers in order to inform tobacco prevention efforts.<sup>2</sup> The CTS was conducted approximately every three years from 1990 to 2008.

With the historic decline in the prevalence of cigarette smoking since 1990, the method of surveying a random sample of all California adults no longer yields a sufficient sample of smokers to characterize cigarette smoking behaviors and inform California's tobacco control efforts. In response to this, the 2011 CTS survey design was modified to survey only smokers, and moreover to perform longitudinal surveys to investigate factors associated with quitting behavior. **The CTS, was renamed the 2011 California Smokers' Cohort (CSC) to distinguish it from earlier surveys and to reflect the longitudinal aspect of the survey.** This report describes the methodology and summarizes main findings of the 2011 CSC.

## METHODS

### Study Design and Population

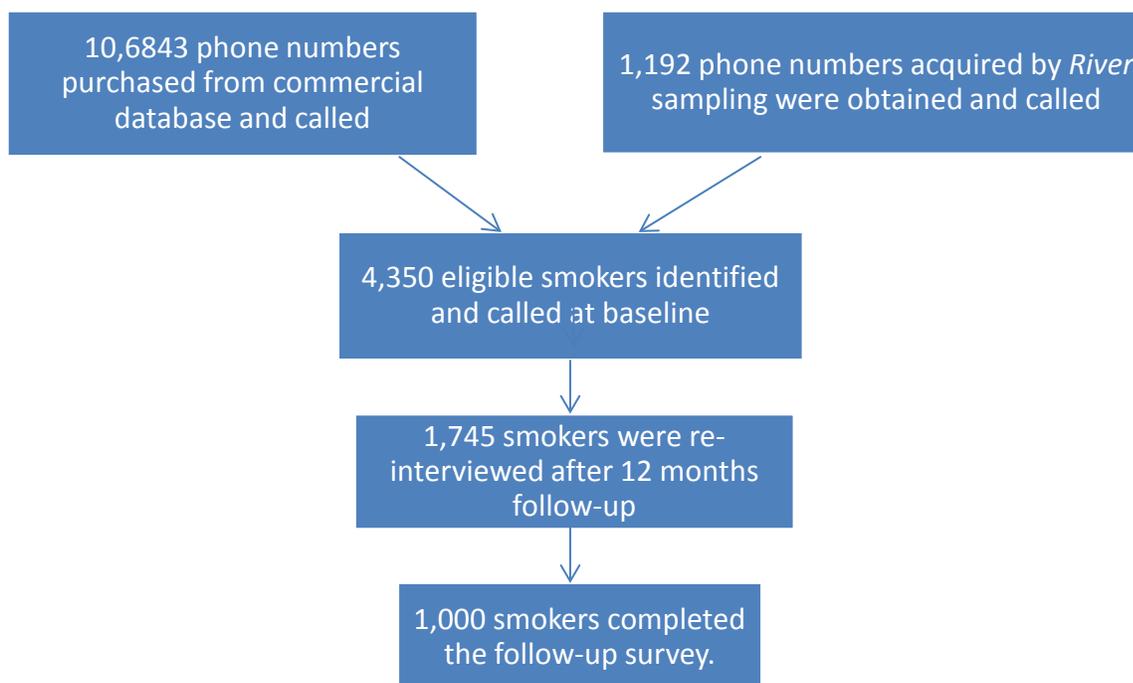
The 2011 CSC investigated current cigarette smokers' tobacco-related behaviors, knowledge of and attitudes towards smoking and cessation among California adults from a longitudinal perspective and monitored the effect of state-initiated tobacco control programs on target populations. The 2011 CSC included two components. The first component was a convenience sample of smokers whose telephone contacts were purchased from data brokers. These smokers were contacted to participate in a baseline interview and a follow-up interview 12 months later. This group was referred as the California Smokers' Cohort (CSC) since they were a cohort fully followed up after 12 months. The second component was a follow-up survey of smokers aged 18 and over identified by the 2009 California Health Interview Survey (CHIS) and re-interviewed in 2011 using the modified version of CTS smokers' questionnaire by limiting the questions to those relevant to smokers and adding additional questions relevant to prediction of quitting. This survey was titled as the 2011 CHIS Longitudinal Smokers Survey (CLSS). The

2011 CLSS data were only included at baseline without follow-up information because of the cross-sectional design. The purpose of including the 2011 CLSS data in the CSC baseline was to examine whether the baseline characteristics for both CSC sample and CLSS sample were comparable and whether significant differences exist between the two samples. This comparison was used to assess if the CSC convenience sample was as representative as the CLSS sample, which applied a dual-frame, multi-stage sample design. This comparison was necessary to determine if the CSC results could be generalized to all California smokers.

### **The California Smokers' Cohort (CSC)**

CSC was a longitudinal survey designed to investigate factors that predict cigarette cessation behaviors among California residents. The study was comprised of a baseline survey to establish a cohort of current and former smokers, and a follow-up survey to determine changes in smoking behaviors, including quit attempts, reduction in consumption, and quitting behaviors since the initial contact. CSC applied a convenience sampling approach and the sampling frame consisted of commercial lists of telephone numbers of presumed California cigarette smokers. *Figure 1* shows the process of CSC sample recruitment and selection. Eligible respondents were aged 18 to 59, California residents, and current or former smokers. Eligibility was confirmed at the beginning of each phone interview. A total of 4,350 eligible current smokers in California were identified and interviewed. The questionnaire covered respondents' current smoking status, recent smoking history, lifetime smoking history, quitting, other tobacco use, smoking restrictions, media exposure, social norms, social networks, current state of mind, other health behaviors, demographics, and follow-up contact information. Only respondents who had not explicitly declined to be re-contacted were selected to be re-interviewed (n=1,745); 1,000 follow-up surveys were completed. The follow-up survey established current smoking status and repeated the baseline behavior and attitudes questionnaire. Interviews for both waves of the study were conducted via landline and cell phone. The response rate for the baseline survey was 23.4% and 53.4% for the follow-up survey. The interview was administered in both English and Spanish.

**Figure 1: 2011 CSC Participants Recruitment Flow**



### **CHIS Longitudinal Smokers Survey (CLSS)**

The 2011 CLSS began with a sample of known smokers in California who were previously identified and selected from the 2009 CHIS. 2009 CHIS applied a random-digit-dialed (RDD) survey approach. While all sampled respondents indicated in the CHIS 2009 survey that they were at least age 18, lived in California and were current smokers, the 2011 CLSS survey re-asked age, state of residence, and a series of questions about smoking behavior to confirm the eligibility for 2011 CLSS. Overall, 3,121 current adult (age 18 and over) smokers identified in CHIS 2009, who reported they would be willing to participate in follow-up studies, were included in 2011 CLSS. The final weighted response rate for 2011 CLSS was 36.0%. The interview was conducted in both English and Spanish. Details of 2009 CHIS methodology could be found elsewhere.<sup>4</sup>

### **Outcome variables and other related characteristics**

Quitting outcomes at follow-up were measured in three ways: (1) quit attempt, reported as quitting smoking for at least one day; (2) prolonged smoking abstinence, reported as quitting smoking for at least one month; (3) reduction in consumption of cigarettes, reported as a reduction in cigarette consumption of 20% or more in the period between baseline and follow-up.

Baseline smoking-related characteristics included in the regression analyses were: (1) smoking behaviors, such as smoking status (daily vs non-daily), time for the first cigarette in the

morning after getting up (more than 30 minutes vs within 30 minutes), beliefs of addiction to cigarettes, and use of e-cigarettes; (2) quitting behavior, such as switched to light cigarettes, switched to smokeless tobacco, quitting cold turkey, stopped hanging out with friends who smoke, tried to quit with a friend, exercised more, used acupuncture, used herbal remedies, and called a telephone quit line; (3) use of assistance for quitting, such as medications, counseling, advice and self-help; (4) anti-tobacco media exposure and price sensitivity; (5) anti-smoking attitudes, such as taking a stand against tobacco, wanted to get involved to get rid of smoking, agreed with banning smoking everywhere, wanted tobacco companies out of business, and thought tobacco companies were not punished enough; (6) smoking ban policies, such as total/partial home ban, working ban, smoking in car ban, and perceived total/partial city ban; and (7) physical and mental health, including perceptions of personal health, report of tobacco-related diseases, depression, anxiety, obesity, physical activity, and sedentary behavior.

## Statistical Analysis

Multivariable logistic regression analysis was used to assess the relationship between quitting outcomes at one-year follow-up and baseline smoking-related characteristics, with controlling for the following demographic variables: gender, age, ethnicity, and education. No weighting strategy was used for analyzing CSC data. The CLSS data were weighted to take into account the complex survey sampling design of CHIS, and the CLSS weighting calculation was based on the final adult weight from CHIS 2009<sup>5</sup> while adjusting for CHIS 2009 follow-up nonresponse and exclusion of Asian language interviews.

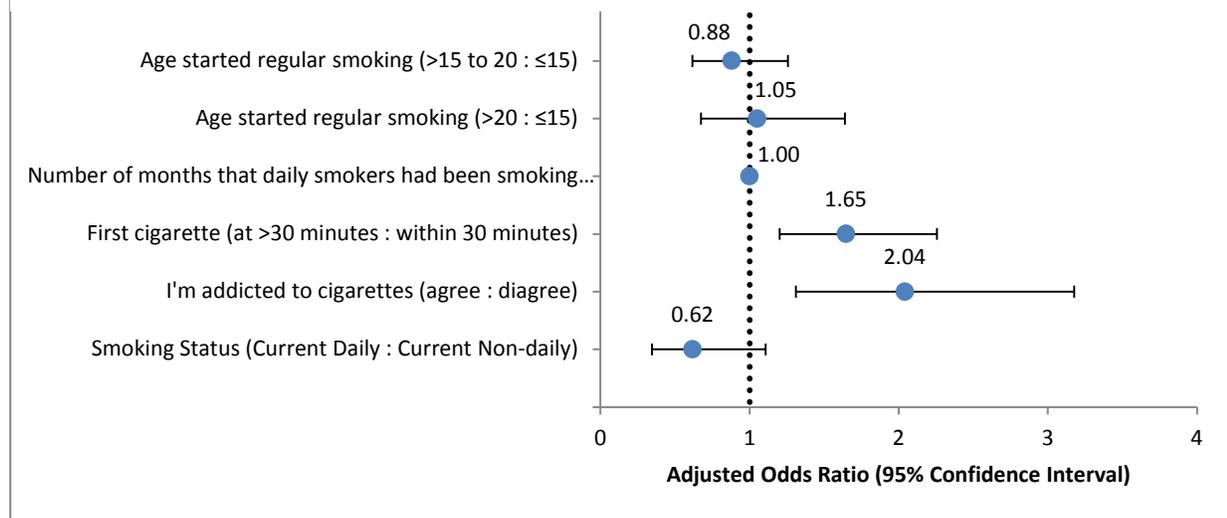
## RESULTS

In comparing the 2011 CSC convenience sample to the 2011 CLSS population-based sample, comparable demographic characteristics suggested the representativeness of CSC sample. Detailed comparative results could be found in Appendix 1 and Appendix 2. This report only discusses the summarized results of CSC convenience sample that were fully followed up for 12 months. Overall, 1,000 smokers responded to both the baseline survey and follow-up survey, including 47.8% male and 52.2% female, 30.5% were 19-45 years of age, 39.7% were 46-55 years of age, and 29.8% were 56-62 years of age. About 31.4% completed high school or less, 60.7% some college or college, and 8.0% had exposure to graduate or professional education.

## Smoking Behaviors

A large majority (83%) of the respondents in CSC self-reported they believed they were addicted to cigarettes. In comparison to smokers who do not perceive themselves as addicted, the self-identified addicted smokers were 2.04 times (95% CI: 1.31-3.17) more likely to make a quit attempt but were not more likely to abstain from smoking for one month or more or to reduce their cigarette consumption after one year (*figure 2.1*).

**Figure 2.1: The association between baseline smoking behavior and attempting to quit smoking for >1 day at follow-up after 1 year, 2011 CSC.**

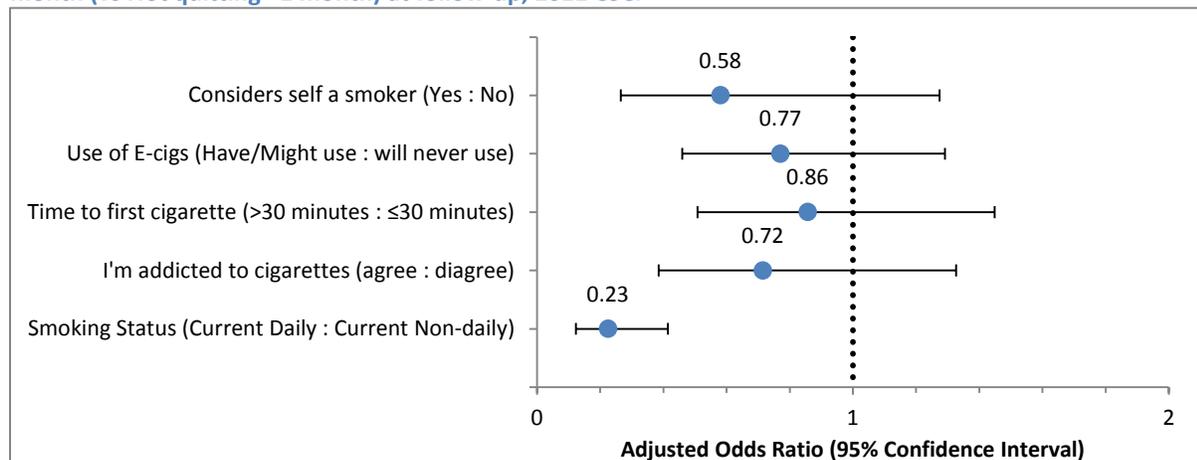


Note: Model specified as quit smoking for at least 1 day = Yes; multivariable model adjusts for each variable that adjust for Age, Gender, Ethnicity, Education Level and the predictors of interest.

Those who smoked their first cigarette after 30 minutes of waking up had 1.65 higher odds of making a quit attempt at follow-up compared to those who were more addicted and smoked within 30 minutes of waking up. There was no significant difference between these two groups in abstaining for one month or more or reducing cigarette consumption.

The odds of being in a period of prolonged abstinence at follow-up were lower for respondents who were daily smokers at baseline than for non-daily smokers at baseline (adjusted odds ratio (AOR) = 0.23, 95% CI: 0.12- 0.34) (*figure 2.2*), while the odds of reducing cigarette consumption by 20% or more were much higher for daily smokers (AOR = 2.69, 95% CI: 1.52- 4.75) compared to non-daily smokers (*figure 2.3*).

**Figure 2.2: Assessing the effect of e-cigarette use or prospective use on prolonged abstinence for at least 1 month (vs Not quitting >1 month) at follow-up, 2011 CSC.**

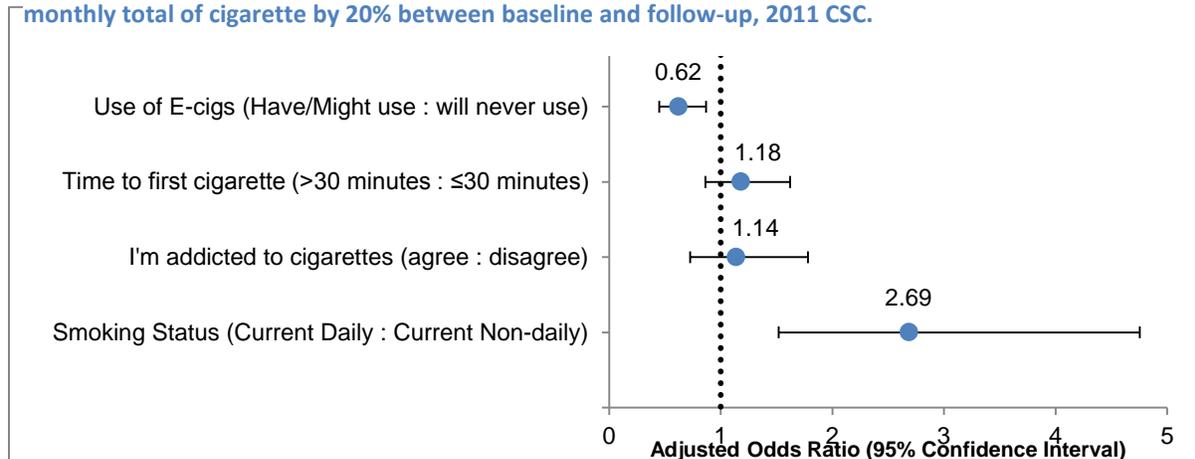


Note: Model specified as quit smoking for at least 1 month = Yes; multivariable model adjusts for each variable that adjust for Age, Gender, Ethnicity, Education Level and the predictors of interest .

Among all the participants, 72.5% of them believed that tobacco was as addictive as other drugs like heroin or cocaine, but this belief did not impact quitting behavior. A fifth (20.2%) of respondents reported smoking menthol cigarettes and 27.2% reported smoking low-tar cigarettes but these behaviors were not related to quitting behavior.

Most (91.4%) respondents have heard about electronic cigarettes (e-cigarettes) and 65.8% have or might use it, whereas 42.1% have heard of snus and 26.8% have or might use it. Those who indicated they have used or might use e-cigarettes in the future were less likely (AOR=0.62, 95% CI: 0.45- 0.86) to reduce their cigarette consumption by 20% at follow-up (*figure 2.3*).

**Figure 2.3: Assessing the effect of e-cigarette use or prospective use on the reduction of the average monthly total of cigarette by 20% between baseline and follow-up, 2011 CSC.**

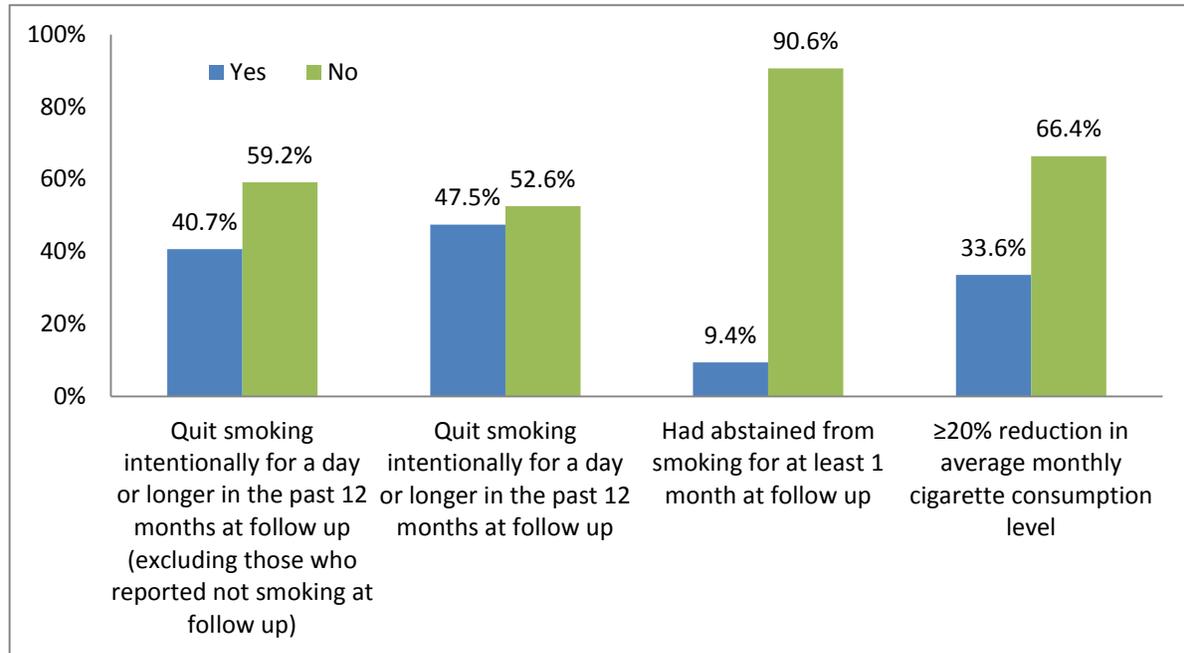


Note: Model specified as reduce consumption by 20% = Yes; model adjust for Age, Gender, Ethnicity, Education Level and the predictors of interest.

## Quitting Behavior

After one year of follow-up, 59.4% of all current smokers in the CSC did not attempt to quit smoking for 24 hours or more during the 12 month follow-up period and 66.4% of them indicated they had not reduced their average monthly cigarette consumption by at least 20%. Only 9.4% of respondents reported they quit for at least one month at the end of one year of follow-up (*figure 3*).

Figure 3: Percentage of quitting attempts, smoking reduction and prolonged abstinence at follow-up among respondents who were smokers at baseline, 2011 CSC



Among those who reported at baseline their intention to quit, 59.3% attempted to quit for 24 hours or more and 14.2% reported prolonged abstinence at the follow-up interview compared to 26.7% and 4.8%, respectively, among those who did not intend to quit. Those who had an intention to quit at baseline were three times more likely to have a quit attempt or abstinence for one month or more at the 12-month follow-up (AOR =3.11, 95% CI: 1.88 – 5.16).

Smokers who reported a quit attempt of 24 hours or more in the previous 12 months at baseline were 4.1 times (95% CI: 3.11- 8.10; 65.2% vs. 23.7%) more likely to make a quit attempt at follow-up and 1.8 times (95% CI: 1.05- 2.96; 13.7% vs. 6.2%) more likely to abstain from smoking for at least one month at follow-up than smokers without a history of quit attempt at baseline.

At baseline, non-medication methods of cessation reported, such as switching to light cigarettes, use of smokeless tobacco, cold turkey, stop hanging out with friends who smoke, exercising more, trying to quit with a friend, or calling the telephone quit line were all predictive of reporting a quit attempt at follow-up. At follow-up, not using any assistance (cold turkey) to quit for the last quit attempt was significantly associated with higher odds (AOR=6.92, 95% CI: 3.61-13.28) of having a prolonged abstinence of one month or more. None of the other non-medication quitting methods used at baseline or follow-up were predictive of prolonged abstinence at follow-up.

## Use of Assistance and Quitting Behavior

Overall, 30.8% of smokers who reported quitting for 24 hours in the previous year used a nicotine replacement therapy (NRT) during the quit attempt. Among those who used NRT at baseline, 50.8% of them reported making a quit attempt, 9.4% quit for a month or more, and 31.1% reduced their cigarette consumption at follow-up. Smokers who used counseling as assistance reported similar quitting behavior.

Predictors of follow-up use of NRT were baseline use of NRT (AOR=11.06, 95% CI: 6.31-19.38), and being daily smokers (AOR=2.67, 95% CI: 1.28-5.56). Smokers who believed they can quit without any medications were less likely to use NRT at follow-up (AOR=0.47, 95% CI: 0.27-0.82). Smokers with moderate/severe mental health problems were more likely than smokers without mental health problems to use counseling (13.2% vs 3.4%) or combined treatment (18.4% vs 9.1%), and less likely to not use any treatment (44.7% vs 65.9%).

The smokers who consistently reported using assistance for cessation at both the baseline and follow-up were more likely to be females, older age (45 years or older), non-Hispanic Whites, daily smokers, and smoke their first cigarette within 30 minutes of waking up.

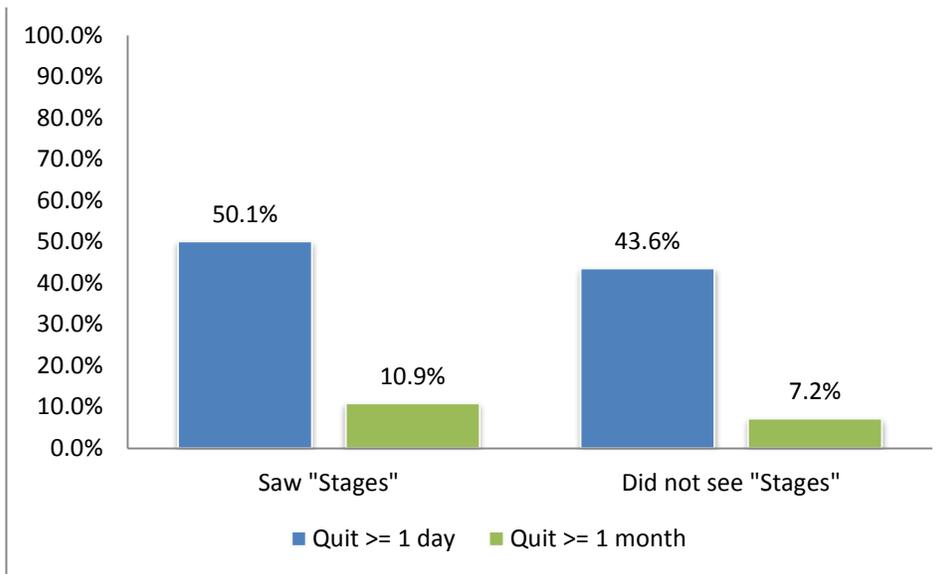
Once smokers use assistance for quitting they are more likely to continue using it. As shown in our study sample, using cessation assistance at baseline was associated with odds of 7.39 (95% CI: 4.52-12.09) to use it at follow-up after one year. More addicted smokers who were daily smokers or smoke their first cigarette in the morning within 30 minutes were also more likely to utilize assistance at follow-up.

## Media Exposure and Price Sensitivity

When presenting five different anti-tobacco commercials to study participants, there was wide variability in recall with 61% remembering the more graphic commercial with a woman having to breathe through a hole in her throat compared to a non-graphic advertisement (ad) of people trapped inside a cigarette that only 28% recalled.

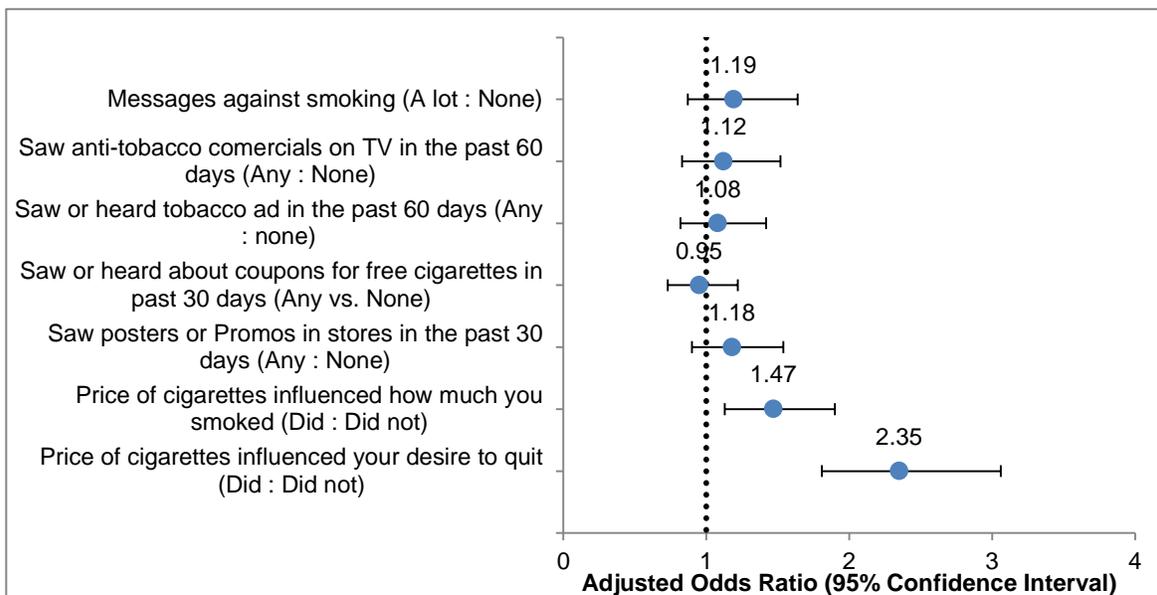
Recall of any of the five anti-tobacco commercials at baseline was not related to quitting behavior after one year of follow-up. However, when relating specific anti-tobacco commercials, only the ad of the woman who breathes through a hole in her neck was significantly related to higher quit attempts (AOR=1.30, 95% CI: 1.01- 1.68) and prolonged quitting of at least one month (AOR=1.58; 95% CI: 1.00- 2.50) after one year of follow-up (*figure 4*).

**Figure 4: California adult smokers' quit attempt and prolonged quitting at follow-up according to their report of seeing the anti-tobacco commercial called "Stages," at baseline, 2011 CSC.**



Nearly half (47.5%) of smokers reported seeing or hearing about tobacco coupons, and 34.5% reported seeing posters or promotions in stores, which was significantly associated with decreased odds (AOR=0.43, 95% CI: 0.27-0.68) of quitting for one month or longer.

**Figure 5: Assessing the association between baseline exposure to advertisement, reported price influence and attempting to quit smoking for > 1 day (vs Not quitting >1 day) at follow-up (n =1000), 2011 CSC.**



Among smokers who indicated at baseline that price influenced how much they smoke (AOR =1.47; 95% CI: 1.13 -1.90) or influenced their desire to quit (AOR =2.35; CI: 1.81- 3.05) had higher odds of making a quit attempt at follow up than those who did not indicate the influence of price on how much they smoke and desire to quit (*figure 5*). Smokers who reported at baseline that price influenced their desire to quit were more likely (AOR =1.36; 95% CI: 1.06-1.75) to report awareness of coupon promotions than those who did not report price influenced their desire to quit.

### **Change in Anti-Smoking Attitudes and Smoking Cessation**

The smokers who agreed with the statement, “Taking a stand against smoking is important to you,” were more likely than the smokers who disagreed with this statement to have made a quit attempt (56.5% vs 33.0%,  $p<.001$ ), quit for month or longer (12.4% vs 7.1%,  $p<.006$ ), and reduced cigarette consumption (38.2% vs 30.4%,  $p<.018$ ) after one year.

The smokers who agreed with the statement, “You want to be involved in efforts to get rid of smoking,” were more likely than the smokers who disagreed with this statement to have made a quit attempt (64.0% vs 36.3%,  $p<.001$ ), quit for month or longer (14.2% vs 7.7%,  $p<.003$ ), and reduced cigarette consumption after one year but it was not statistically significant (39.6% vs 31.4%,  $p<.039$ ).

The smokers who agreed with the statement “there should be a total ban on smoking everywhere in your city or town, except in one’s home,” were more likely than the smokers who disagreed with this statement to have made a quit attempt (62.8% vs 41.1%,  $p<.001$ ). The smokers who agreed with the statement, “You would like to see tobacco companies go out of business,” were more likely than the smokers who disagreed with this statement to have made a quit attempt (56.5% vs 37.0%,  $p<.001$ ). The smokers who agreed with the statement “Tobacco companies have been punished enough” were less likely than the smokers who disagreed with this statement to have made a quit attempt (36.6% vs 49.6%,  $p<.001$ ).

The strong attitudes described above, all point in the expected direction of predicting quitting behavior. Anti-tobacco attitudes strongly predict quit attempts but moderately predict prolonged quitting of one month (*figure 6.1 and 6.2*). This is expected given that prolonged quitting is a stricter criterion for quitting behavior.

Figure 6.1: Relationship between attitudes and tobacco behavior and odds of making a quit attempt in the past year, 2011 CSC.

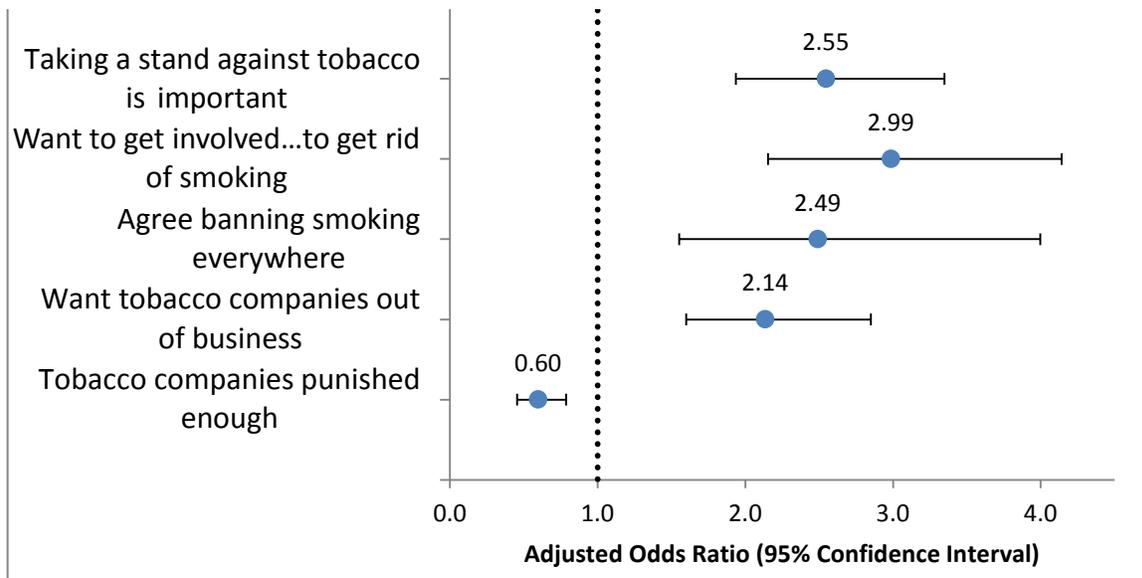
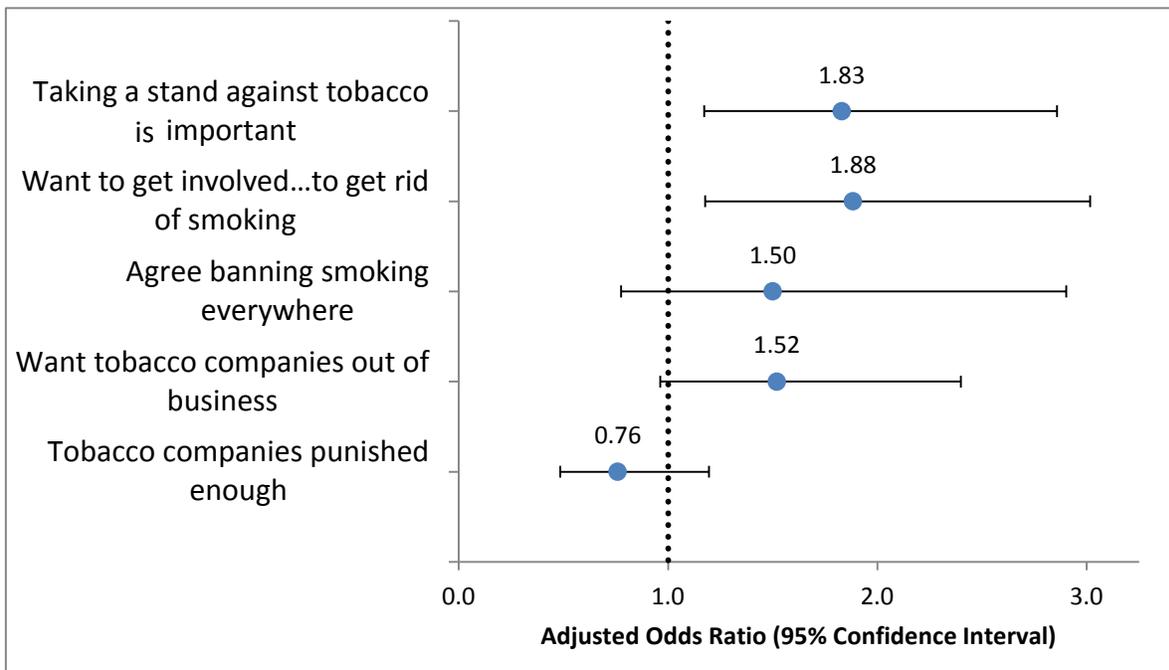


Figure 6.2: Relationship between attitudes and tobacco behavior and odds of quitting for at least 1 month during the last year, 2011 CSC.



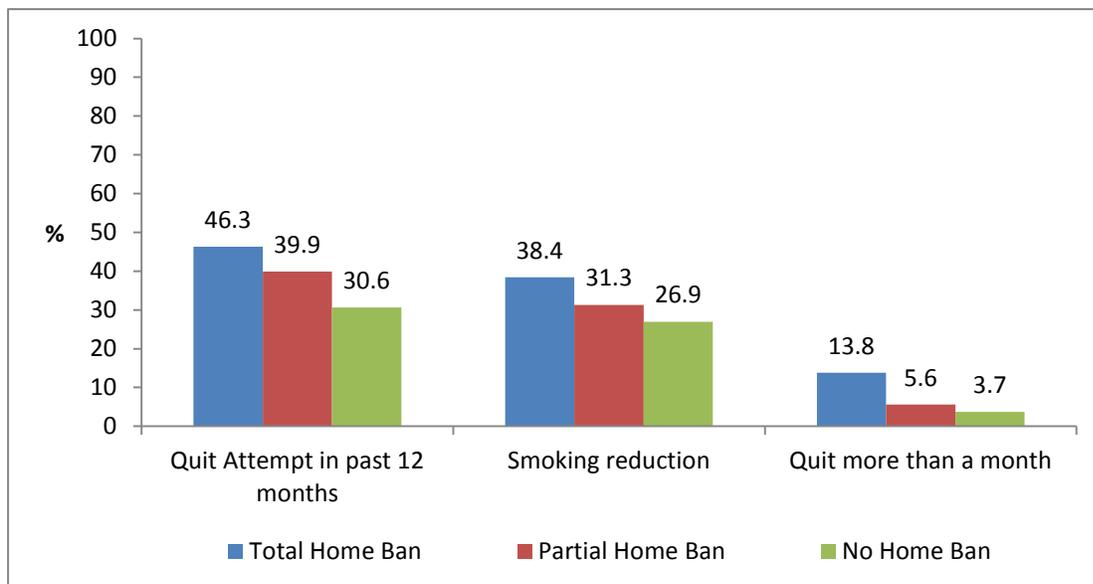
## Smoking Bans and Quitting Behavior

Smokers with a total home ban were more likely to make a quit attempt (AOR= 1.70, 95% CI: 1.16-2.50; 46.3% vs 30.6%) and remain abstinent at follow-up for one month or more (AOR=2.95, 95% CI: 1.38-6.28; 13.8% vs 3.7%) compared to smokers with no home smoking ban (figure 7). Those who at baseline reported they reduced the number of cigarettes they smoked as a result of a home smoking ban were significantly more likely to make a quit attempt at follow-up than those who did not reduce the number of cigarettes as a result of a home smoking ban (AOR=1.82, 95% CI: 1.24 -2.68; 50.7% vs 39.6%).

Smokers who perceived that there was a city/community smoking ban were more likely to report a quit attempt than smokers who did not have such a perception (43.9% vs 32.8%). Smokers who allowed smoking in their car were significantly less likely to make a quit attempt (AOR=0.56, 95% CI: 0.39-0.79; 35.8% vs 54.0%) and less likely to have a prolonged quit of one month or more (AOR=0.51, 95% CI: 0.32- 0.83; 6.8% vs 17.5%) than those who did not.

Smokers who agreed secondhand smoke (SHS) causes lung cancer in non-smokers were significantly more likely to make a quit attempt (AOR=1.43, 95% CI: 1.02- 2.01; 44.8% vs 31.6%) than those who disagreed.

Figure 7: Frequency of quit attempts, smoking reduction, and prolonged quitting at follow-up by level of home ban at baseline, 2011 CSC.



## Physical and Mental Health and Tobacco Use

At baseline, current daily smokers reported significantly lower levels of perceived health ( $2.9 \pm 1.1$ ) than non-daily smokers ( $3.1 \pm 1.0$ ). However, perceived health did not predict any quitting behavior at follow-up.

Smokers with respiratory diseases reported significantly higher rates of a past quit attempt compared to smokers without respiratory disease (AOR=1.70, 95% CI: 1.21-2.39; 54.9% vs 45.6%). Having diabetes, heart disease, or hypertension was not related to any quitting behavior.

Having depressive symptoms was related to reduction of cigarette consumption (42.6% vs 31.2%) at follow-up but not to making a quit attempt or prolonged quitting behavior. Smokers with anxiety were more likely than smokers without anxiety to make a quit attempt (51.5% vs 45.2%) and smoking reduction (38.2% vs 30.4%), but not prolonged quitting behavior. Comorbid conditions of anxiety and depression was significantly associated with approximately 1.5 times higher odds of making a quit attempt and reducing consumption, but not associated with prolonged quitting behavior for one month or more.

Obesity was not related to any quitting or smoking behavior at follow-up. However, physically active smokers were more likely to make a quit attempt at follow-up compared to physically inactive smokers (AOR=1.46, 95% CI: 1.03-2.05). Having one or more chronic medical conditions was associated with significantly higher odds (AOR=1.42, 95% CI: 1.06-1.90) of reduced smoking over the year of follow-up. There was no relation to quit attempts or prolonged quitting. There were higher odds (AOR=2.03, 95% CI: 1.22-3.38) of making a quit attempt after receiving advice to quit by a health care provider among smokers with moderate/severe mental health problems.

## SUMMARY

Despite the scientific evidence and personal experiences with addiction among respondents in CSC, most downplayed the addictive nature of tobacco reporting it was less addicting than other drugs. There is well established evidence nicotine dependence resulting from cigarette smoke is the most common form of drug dependence in the United States (U.S.) and nicotine is as addictive as heroin, cocaine or alcohol, creating symptoms of both physical and psychological withdrawal.<sup>6-8</sup> Better communication on the severity of nicotine addiction may be an important step for decreasing smoking initiation and prompting smokers to seek assistance in their quit attempts. Previous studies indicate that self-identifying as a smoker may be associated with making quit attempts and prolonged abstinence,<sup>9-11</sup> however we did not find this association in CSC or in the representative population from the 2011 CLSS.<sup>12</sup> A relatively large number of respondents in CSC had heard of e-cigarettes and reported they either had used or might use these products. Compared to those who said they would never use e-cigarettes, smokers who had or might use e-cigarettes were less likely to reduce their average monthly cigarette consumption by 20% between baseline and follow-up. These findings demonstrate the popularity surrounding e-cigarettes and indicate that e-cigarette usage may be negatively associated with successful consumption reduction. We also demonstrated that past use of e-cigarettes was associated with lower odds of prolonged abstinence.<sup>13</sup> Future confirmation of this finding is needed, especially in establishing the temporality of this association with quitting

behavior to determine if smokers are mostly using e-cigarettes to try quit or as a ‘bridge’ to augment combustible cigarette consumption.<sup>14</sup>

For most smokers, cessation is a long process that may be both psychological, physiologically and socially challenging. Those who continue to persevere through multiple quit attempts, however, are usually the ones who are successful at quitting.<sup>15-17</sup> Among respondents in CSC, the large majority of smokers did not make a quit attempt, decrease their cigarette consumption, nor quit for at least a month after one year of follow-up. However, those who intended to quit or reported a past quit attempt at baseline were more likely to make a quit attempt at follow-up and were more likely to be in a prolonged quit attempt at the time follow-up. Encouraging smokers to continue persevering through unsuccessful quit attempts may be an important role for tobacco control programs to play. While more than half of the respondents in CSC reported using methods of smoking cessation other than the traditional nicotine replacement and prescription pills methods, these methods did not appear to have a significant impact on producing prolonged abstinence from smoking but were mostly related to making future quit attempts. This may demonstrate that these cessation assistance methods are not effective and the success obtained when using these methods may be driven more by the will to quit as demonstrated by relationship of quitting cold turkey. This finding has important implications for program planning. Tobacco control programs should teach smokers who are serious about quitting to continue to learn from their previous quit attempts and encourage them to use methods of cessation that have proven effectiveness.

Overall, 44.7% of CSC respondents who attempted to quit in the previous year reported use of assistance and this proportion was substantially higher than observed in a large national sample.<sup>18</sup> This discrepancy may reflect regional differences in awareness and availability of smoking cessation resources, or alternately may reflect sampling issues and/or self-report bias. Of those who used assistance, the majority (56.6%) used medications only, 12.5% used counseling advice or self-help only, and 30.9% used medication and counseling advice or self-help. Smokers who have previously failed but believe they cannot quit without assistance seem likely to continue employing assistance to quit. Less than half of quit attempts reported in the follow-up survey involve use of any quitting assistance, thus presumably reducing the likelihood of successful quitting. This may reflect smokers’ attitudes about the value of cessation medications and treatment as well as provider’s failure to recommend treatment. These findings suggest giving attention to smoker’s beliefs about the role of medication and counseling. This can be done by reinforcing smokers’ beliefs in their ability to quit regardless of assistance, and to articulate the ways in which assistance, whether medication or counseling support, can enhance efforts to quit smoking.

Smokers were more likely to remember seeing two graphic anti-smoking commercials developed by CTCP (“Stages” and “Secondhand Sally”) than non-graphic smoking commercials. These graphic commercials depicted emotional testimonials, physical harm, or harm to family

members resulting from tobacco exposure. Recent findings from similar national mass media advertisements in the U.S. reported consistent findings.<sup>19</sup> These data suggest that graphic anti-smoking commercials are more memorable and likely more effective to help smokers quit. A large number of smokers (63%) reported being exposed to point-of-sale tobacco promotions. Individuals who reported price influenced their desire to quit smoking had higher odds of making a quit attempt during follow-up than those who did not report price had an influence. However, a large percentage of survey respondents were exposed to free coupons for tobacco products (47.5%) and those who had seen or heard about free coupons had lower odds of making a prolonged quit attempt for at least a month than those who were not aware of ads.

One of the most important findings in this study is that attitudes at baseline predict future tobacco behaviors, including intentional quit attempts, intentional quit for at least a month, and cutting down on the number of cigarettes smoked. It was demonstrated that attitudes expressed to interviewers about a year prior to the measurement of quitting smoking and reducing the number of cigarettes smoked were related to attitudes measured a year later. Attitudes make a difference in behaviors reported by smokers and tend to be effected by characteristics of the environment, including social norms, peer influences, and an atmosphere of social propriety when it comes to smoking.<sup>20-26</sup> It appears that media campaigns, such as those mounted by CTCP, should be continued, since repeated messages that are designed to engage public response, may have a direct impact on perceptions and attitudes when broadcast frequently. Efforts in public schools,<sup>27-29</sup> and other institutions, concerning smoking can also continue to be effective in preventing initiation and in the formation of attitudes hostile to smoking. Since we find that many intense attitudes are most consistently related to smoking behavior and to other attitudes, strong attitudes provide a target for informational tobacco control efforts in an attempt to modify tobacco use in the desired direction. The implication of this view is that persons who hold intensive attitudes about tobacco control issues are more likely to live in a social environment that is hostile to tobacco, and perceive support for these views within social relationships will also tend to articulate attitudes hostile to tobacco.

Smokers living in a home with a total home ban were more likely to make a quit attempt, reduce consumption and quit. However, smokers living in a home with a partial home ban were no more likely to exhibit these behaviors than smokers living in a home with no ban. We found that smokers with a car smoking restriction at baseline were more likely to make a quit attempt and more likely to have quit more than a month at follow-up. While direct causation cannot be inferred from this association, it is reasonable to expect that public health interventions leading to car smoking bans would reinforce attempts by smokers to make a quit attempt or quit directly. Regardless, car smoking bans serve to protect nonsmokers from exposure to SHS in cars. Smokers who agreed that SHS causes lung cancer at baseline were more likely to make a quit attempt or reduce cigarette consumption at follow-up, suggesting that increasing knowledge of the health effect of smoking and SHS is an effective tobacco control strategy. The perceived city/community smoking ban and workplace smoking ban did not show consistent associations

with the outcomes at the follow-up. There was a non-significant trend suggesting smokers who perceived there was a city/community smoking ban at baseline were more likely to make a quit attempt at follow-up in multiple regression analysis. The lack of significance could be due to the power issue and/or the fact that follow-up period was not long enough to show the effect. Larger sample sized long-term prospective studies are necessary to further address these issues.

The prevalence of physical and mental health vulnerabilities was high in this cohort of smokers. Physical and mental health characteristics of smokers were associated with attempts to quit smoking or significantly reduce tobacco use. Future iterations of this survey will enable comparisons over time with regard to the relationships between smoking and physical and mental health and health behaviors. Clearly, smoking is highly associated with other negative health behaviors that together exacerbate the risk of multiple health problems.

In summary, the results of 2011 CSC survey provided informative evidence in changes of smoking behavior over a 12-month follow-up period, suggesting the effectiveness of state-initiated tobacco control programs.

## **Additional READING**

More information regarding the CSC can be found in the technical reports:

1. Technical Report on Analytic Methods and Approaches Used in the 2011 California Smokers Cohort Analysis: Volume I: Data Collection Methodology. La Jolla, CA: University of California, San Diego; 2014. By Al-Delaimy WK, Edland S, Norman G, Wivagg J.
2. Technical Report on Analytic Methods and Approaches Used in the 2011 California Smokers Cohort Analysis: Volume II: Statistical Methodology. La Jolla, CA: University of California, San Diego; 2014. By Al-Delaimy WK, Edland S, Norman G, Wivagg J.

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## Appendix 1

### Comparisons of UNWEIGHTED frequency (%) of demographic characteristics between 2011 CTS and 2011 CLSS

Variables	Categories	2011 CTS	2011 CLSS
		Frequency (%)	Frequency (%)
Total		1088 (100)	3121 (100)
Gender	Male	519 (47.7)	1585 (50.8)
	Female	569 (52.3)	1536 (49.2)
Age	18-29	102 (9.4)	440 (14.1)
	30-39	132 (12.1)	440 (14.1)
	40-49	249 (22.9)	765 (24.5)
	50-59	605 (55.6)	1476 (47.3)
Ethnicity/Race	Hispanic	158 (14.5)	463 (14.8)
	Non-Hispanic White	747 (68.7)	2142 (68.6)
	Non-Hispanic Black	49 (4.5)	171 (5.5)
	Non-Hispanic Asian/PI	48 (4.4)	98 (3.1)
	Non-Hispanic Other/Multiple	86 (7.9)	247 (7.9)
Education	Less than High School/Other	93 (8.6)	289 (9.3)
	High School Diploma	271 (24.9)	872 (27.9)
	Some College or More	724 (66.5)	1960 (62.8)
Income	≤ \$20,000	185 (17.0)	637 (20.4)
	\$20,001-\$30,000	130 (12.0)	404 (12.9)
	\$30,001-\$50,000	195 (17.9)	547 (17.5)
	>\$50,000	489 (44.9)	1243 (39.8)
	Missing	89 (8.2)	290 (9.3)
Region	01. LA	167 (15.4)	601 (19.3)
	0.2.San Diego	120 (11.0)	253 (8.1)
	03.Orange	37 (3.4)	206 (6.6)

	04.Santa Clara	21 (1.9)	76 (2.4)
	05.San Bernardino	38 (3.5)	227 (7.3)
	06.Riverside	45 (4.1)	233 (7.5)
	07.Alameda	30 (2.8)	91 (2.9)
	08.San Francisco, etc	81 (7.4)	198 (6.3)
	09.Fresno, etc	111 (10.2)	329 (10.5)
	10.Amador,etc	269 (24.7)	411 (13.2)
	11.Sacramento, etc	95 (8.7)	303 (9.7)
	12.Monterey,etc	74 (6.8)	193 (6.2)
Smoke Status	Current Daily Smokers	728 (66.9)	2096 (67.2)
	Current Non-Daily Smokers	224 (20.6)	500 (16.0)
	Short-term Quitters	28 (2.6)	160 (5.1)
	Long-term Quitters	108 (9.9)	365 (11.7)
Phone Status (Speaking on landline or cell phone)	Landline	898 (82.5)	2581 (82.7)
	Cell Phone	187 (17.2)	517 (16.6)
	Missing	3 (0.3)	23 (0.7)

## Appendix 2

### Comparison of WEIGHTED frequency (%) of demographic characteristics between 2011 CTS and 2011 CLSS

Variables	Categories	2011 CTS	2011 CLSS
		Frequency (%)	Frequency (%)
Total		3134005 (100)	3134005 (100)
Gender	Male	1962074 (62.6)	1962124 (62.6)
	Female	1171930 (37.4)	1171881(37.4)
Age	18-29	880854 (28.1)	879138 (28.1)
	30-39	758806 (24.2)	761486 (24.3)
	40-49	696836 (22.2)	702050 (22.4)
	50-59	797508 (25.5)	791331 (25.3)
Ethnicity/Race	Hispanic	1018858 (32.5)	1019019 (32.5)
	Non-Hispanic White	1443643 (46.1)	1443584 (46.1)
	Non-Hispanic Black	152642 (4.9)	152623 (4.9)
	Non-Hispanic Asian/PI	367274 (11.7)	367193 (11.7)
	Non-Hispanic Other/Multiple	151587 (4.8)	151585 (4.8)
Education	Less than High School/Other	383654 (12.2)	383609(12.2)
	High School Diploma	875726 (27.9)	875637 (27.9)
	Some College or More	1874625 (59.8)	1874759 (59.8)
Income	≤ \$20,000	453410 (14.5)	453451 (14.5)
	\$20,001-\$30,000	384628 (12.3)	384733 (12.3)
	\$30,001-\$50,000	650164 (20.8)	650117 (20.7)
	>\$50,000	1448485 (46.2)	1448395 (46.2)
	Missing	197316 (6.3)	197308(6.3)
Region	01. LA	822361 (26.2)	822337 (26.2)
	0.2.San Diego	250960 (8.0)	250998 (8.0)
	03.Orange	194780 (6.2)	194833 (6.2)

	04.Santa Clara	66203 (2.1)	66211 (2.1)
	05.San Bernardino	174533 (5.6)	174539 (5.6)
	06.Riverside	193292 (6.2)	193303 (6.2)
	07.Alameda	129548 (4.1)	129560 (4.1)
	08.San Francisco, etc	308559 (9.9)	308552 (9.9)
	09.Fresno, etc	262736 (8.4)	262729 (8.4)
	10.Amador,etc	266432 (8.5)	266383 (8.5)
	11.Sacramento, etc	251423 (8.0)	251387 (8.0)
	12.Monterey,etc	213179 (6.8)	213173 (6.8)
Smoke Status	Current Daily Smokers	1866878 (59.6)	1866972 (59.6)
	Current Non-Daily Smokers	866785 (27.7)	866641 (27.7)
	Short-term Quitters	75357 (2.4)	75396 (2.4)
	Long-term Quitters	324984 (10.4)	325033 (10.4)
Phone Status (Speaking on landline or cell phone)	Landline	1705760 (54.4)	1705760 (54.4)
	Cell Phone	1408149 (44.9)	1408149 (44.9)
	Missing	20096 (0.6)	20096 (0.6)