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Authors
Max, Wendy
Sung, Hai-Yen
Shi, Yanling
et al.

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The Cost of Smoking in California, 2009

Wendy Max, PhD[1]

Hai-Yen Sung, PhD[1]

Yanling Shi, MS[1]

Brad Stark, BA[1]

[1]Institute for Health & Aging, School of Nursing, University of California, San Francisco, CA

Corresponding author: Wendy Max, Ph.D., Institute for Health & Aging, School of Nursing, University of California, San Francisco, 3333 California Street, Suite 340, San Francisco, CA 94118, USA. Telephone: 415-476-8023; Fax: 415-476-3915; Email: wendy.max@ucsf.edu

ABSTRACT

Introduction: The economic impact of smoking, including healthcare costs and the value of lost productivity due to illness and mortality, was estimated for California for 2009.

Methods: Smoking-attributable healthcare costs were estimated using a series of econometric models that estimate expenditures for hospital care, ambulatory care, prescriptions, home health care, and nursing home care. Lost productivity due to illness was estimated using an econometric model predicting how smoking status affects the number of days lost from work or other activities. The value of lives lost from premature mortality due to smoking was estimated using an epidemiological approach.

Results: Almost 4 million Californians still smoke, including 146,000 adolescents. The cost of smoking in 2009 totaled $18.1 billion, including $9.8 billion in healthcare costs, $1.4 billion in lost productivity from illness, and $6.8 billion in lost productivity from premature mortality. This amounts to $487 per California resident and $4,603 per smoker. Costs were greater for men than for women. Hospital costs comprised 44% of healthcare costs.

Conclusions: Despite extensive efforts at tobacco control in California, healthcare and lost productivity costs attributable to smoking remain high. Compared to costs for 1999, the total cost was 15% greater in 2009. However, after adjusting for inflation, real costs have fallen by 13% over the past decade, indicating that efforts have been successful in reducing the economic burden of smoking in the state.

INTRODUCTION

Cigarette smoking is a leading cause of preventable death in the United States and in California, and it also leads to substantial healthcare costs and lost productivity from illness and premature death.[1-4] Many tobacco control activities take place at the state and local level, so it is important to have current and accurate information about smoking available at this level. California was one of the first states to implement a comprehensive tobacco control program, yet nearly 4 million people in the state still smoke.[5]

There have been many changes in smoking behavior in recent years, including changes in prevalence and intensity of smoking in California. Adult smoking prevalence has fallen in California from 21.6% of adults in 1989[6] to 18.7% in 1999[1] to 13.6% in 2009.[5] In 2010, 11.9% of the state's adults smoked, reaching the federal Healthy People 2020 target of reducing the adult smoking prevalence rate to 12%.[7] In addition, there has been a decline in smoking intensity among those who continue to smoke, with the average number of cigarettes smoked per day among daily smokers falling from 19.3 in 1992 to 14.5 in 2008.[8] There has also been a shift from daily to nondaily smoking; nondaily smokers represented 14.8% of California smokers in 1992 and increased to 28.1% in 2008.[8]

In California there have also been changes in population demographics. Non-Hispanic Whites comprised 77.3% of the population in 1970[9], but only 40.3% in 2010.[10] During this same period, the Hispanic population has increased from 12.1% to 37.7%, and the Asian population has increased from 3.4% to 12.9%. Given the different smoking behaviors among subpopulations, these population demographic shifts will have important implications for smoking patterns and smoking-attributable costs.

This paper provides information on smoking-attributable healthcare and lost productivity costs in 2009 that reflect the recent changes in smoking behavior and population demographics in California. We compare these costs to the costs estimated a decade ago to

determine how the economic costs of smoking in the state has changed.

METHODS

We estimated three measures of the health-related economic costs of smoking from a societal perspective regardless of by whom the costs were borne: smoking-attributable direct healthcare costs, smoking-attributable indirect cost of lost productivity due to illness, and smoking-attributable indirect cost of lost productivity due to premature death. These smoking-attributable costs were estimated using a prevalence-based, annual cost approach, meaning that the annual cost is estimated for all smoking-related expenditures, illness, or death incurred in a given year regardless of when the person first became ill. For each cost measure, a smoking-attributable fraction (SAF), which indicates the proportion of expenditures, illness, and mortality that could be attributed to smoking, was estimated and then applied to the total measure to obtain smoking-attributable cost. The approaches to determine the SAF for the three cost measures were somewhat different and are described separately in the sections below.

Direct healthcare costs of smoking include expenditures for hospital care, ambulatory care, prescriptions, home health care, and nursing home care, and are estimated for adults aged 18 and older. Hospital care includes room and board and inpatient physician services. Ambulatory care includes office-based medical provider visits, outpatient visits, and emergency department visits. Prescriptions include prescription drugs, glasses, and other medical nondurables. Indirect costs of lost productivity from illness attributable to smoking are estimated as the value of time lost from work and household production for adults aged 18 and older. Indirect mortality costs from premature death attributable to smoking are measured as the present value of earnings, including both paid employment and household production, that are lost over the expected remaining lifetime. Indirect mortality costs of smoking are estimated for adults aged 35 and older because the negative effects of smoking on mortality

usually show up after many years of smoking. We also included deaths from perinatal illnesses due to in utero exposure to maternal smoking for children under the age of one.

Data Sources

The *California Health Interview Survey (CHIS*) was used to estimate California smoking prevalence by age and gender. The CHIS includes information about an individual's smoking history, other risk behaviors, and demographic and socioeconomic characteristics. The 2009 CHIS contained 47,614 adults and 3,379 adolescents, comprising a representative sample of California's population.

The number of deaths from smoking-related diseases was estimated using the *California Mortality File*. This data file is a compilation of all death certificates in the state. The underlying cause of death is coded using ICD-10 codes. We used the data file for 2009, which contains death certificates for 231,764 Californians.

The linked *Medical Expenditures Panel Survey (MEPS) and National Health Interview Survey (NHIS)* data were used to estimate national models of healthcare cost of smoking. The MEPS is a nationally representative survey containing detailed information on individual's healthcare utilization, expenditures, source of payment, diagnoses, health insurance coverage, health status, medical conditions, and sociodemographic characteristics. The MEPS can be linked to the NHIS and the details about their linkage can be found at http://www.cdc.gov/nchs/nhis/nhismep.htm. To increase the sample size, we pooled the linked MEPS-NHIS data from 2004-2009. The final sample contained nearly 60,000 adults.

The NHIS is a nationally representative survey conducted annually to collect individual's sociodemographics, employment status, smoking and other risk behaviors, limitation of activity including the number of days missed from work and days spent in bed due to illness or injury, health status, and acute and chronic conditions. The 2009 NHIS was used to estimate smoking-attributable work-loss days for working people and bed-disability

days for those who were not in the labor force but mainly keeping house. It contains 27,731 adults.

Smoking Prevalence

Smoking prevalence in California was estimated by gender and age (adolescents aged 12-17, and adults aged 18 and older). Adolescents are categorized as current smokers if they have ever smoked cigarettes and smoked cigarettes for at least one day in the past 30 days. They are categorized as former smokers if they ever smoked cigarettes but did not smoke at all in the past 30 days. A never smoking adolescent is someone who reports never having smoked cigarettes. For adults, smoking status was classified into never, former, current light, current moderate, and current heavy smoking. Never smokers are those who have not smoked 100 cigarettes during their lifetime. Former smokers are those who have smoked 100 cigarettes in their lifetime but did not smoke at the time of interview. Current smokers are those who have smoked at least 100 cigarettes in their lifetime and who smoked every day or some days at the time of interview. Current smokers were further categorized by smoking intensity as light (smoked fewer than 10 cigarettes per day or smoked some days), moderate (smoked 10-19 cigarettes per day), and heavy (smoked 20 or more cigarettes per day) smokers.

Direct Healthcare Cost

Calculation of the smoking-attributable fraction (SAF). The SAFs for hospital care, ambulatory care, prescriptions, and home health care were estimated using the econometric models that we have developed and refined over the last 20 years. First, a 10-equation national model was estimated to analyze the impact of current (light, moderate, heavy) and former smoking on healthcare expenditures using the linked 2004-2009 MEPS–NHIS data. The model specification has been described in detail elsewhere.[5] The model was estimated separately for each of six subgroups stratified by age (18-34, 35-64, 65+) and gender (female,

male). Second, after the national model was estimated, we applied the estimated parameters to the 2009 CHIS data to obtain California-specific estimates by calculating two sets of predicted healthcare expenditures for each smoker: one for a factual case, and one for a counterfactual case – that is, for someone who has all the same characteristics as the smoker except that they are assumed to be a never smoker. The difference between the factual and the counterfactual predictions among all smokers is the excess cost of smoking. This excess cost divided by total predicted healthcare expenditures for all individuals (including smokers and never smokers) is the SAF for these four types of healthcare expenditures for California.

The SAF for nursing home expenditures was estimated following the conceptual model developed by Zhang.[14] This model considers two ways in which smoking influences nursing home expenditures. Patients may be admitted to a nursing because they, themselves, suffer from smoking-related illnesses (the disability effect), or they may be forced to move to a nursing home when their caregiver dies from a smoking-related illness and there is no one to care for them (the mortality effect). Both of these effects combine to cause an increase in nursing home expenditures that is attributed to smoking. The relative risks estimated by Zhang were used along with smoking prevalence estimated from the 2009 CHIS to determine the SAF for nursing home care.

*Estimation of California adult healthcare expenditures***.** For each type of healthcare services except nursing home care, a national model with annual expenditures as the dependent variable and sociodemographics as independent variables was estimated using the 2009 MEPS data.[7] The estimated parameters were then applied to the 2009 CHIS data to predict expenditures for each California adult and obtain average per person expenditures for each subgroup. Finally, the per-person expenditure estimates were multiplied by the 2009 California population for the corresponding subgroup to derive unadjusted California expenditure totals, which were then calibrated on the basis of the state expenditure figures

published by the Centers for Medicare and Medicaid Services (CMS).[15] Because the original CMS figures were reported for all ages combined, we first converted them to proxy CMS figures relevant for adults based on the proportion of U.S. healthcare expenditures spent for persons aged 18+ that was estimated from the 2009 MEPS data (0.87 for hospital care, 0.89 for ambulatory care, and 0.93 for both prescriptions and home health care). Then, we calculated an adjustment factor by dividing the proxy CMS figure for adults by the sum of unadjusted California totals across all subgroups, and applied the adjustment factor to the unadjusted California expenditure totals for each subgroup.

Per person nursing home expenditures for men and women aged 55 and older were derived from our previous research.[15] The per person expenditures were applied to the 2009 California population for men and women aged 55 and older to derive unadjusted total nursing home expenditures. An adjustment similar to that described above was made so that the sum of adjusted California expenditures over both genders equaled the product of California nursing home expenditure estimate published by the CMS[16] and the proportion of U.S. healthcare expenditures for adults aged 55+ that was derived from our previous research (.95).[15]

*Estimation of smoking-attributable expenditures***.** For each type of health service, we multiplied the SAF by the corresponding California health care expenditure to derive smoking-attributable healthcare cost.

Lost Productivity Due to Illness

Lost productivity from smoking-related illness includes days lost from work for people who are working, and bed-disability days for those who are not in the labor force but are keeping house.

Calculation of the SAF for lost productivity due to illness. A two-part model[17] was estimated to analyze how smoking status affects the number of work-loss days or bed-

disability days. In the first-part equation, the probability of having positive days is estimated as a function of smoking status and other independent variables. In the second-part equation, the logarithmic level of days for those with positive days is estimated as a function of the same independent variables specified in the first-part equation. More details about the model specification are available elsewhere.[5] The model was estimated separately for work-loss days and bed-disability days for adults aged 18 and older using national data from the 2009 NHIS. After the models were estimated, we applied the estimated parameters to the 2009 CHIS data to calculate two sets of predicted days: one for a factual case, and one for a counterfactual case. Dividing the difference between the factual and the counterfactual predictions among all smokers by total predicted healthcare expenditures for all individuals derives the SAF for work-loss days or bed-disability days.

Estimation of California work-loss days and bed-disability days. We first estimated the average annual work-loss days per working adult, and bed-disability days per adult not in the labor force but keeping house for each subgroup using the 2009 NHIS data. Next, the labor force and housekeeping participation rates in California were estimated for each subgroup using the 2009 CHIS data. Finally, the labor force participation and housekeeping rates were multiplied by the average days per person per year and the California population for the corresponding subgroup to derive the total days lost from work and bed-disability days.

Estimation of the value of smoking-attributable lost productivity from illness. The SAFs for days lost were applied to the total number of days lost in California to obtain smoking-attributable days of lost productivity. These days were valued using mean daily earnings estimated from the 2009 CHIS data and an imputed value for housekeeping services. Household work was valued using the methodology developed by Douglass, Kenney, and Miller.[18]

Lost Productivity Due to Premature Death

Three measures of the losses associated with premature death from smoking-related diseases were calculated: deaths attributed to smoking, years of potential life lost (YPLL), and the value of smoking-attributable lost productivity. We included 19 smoking-related underlying causes of death identified as causally linked to cigarette smoking based on the Cancer Prevention Study II (CPS-II) for the period 1982–1988.[19] We also included three additional adult diseases – hypertension, respiratory tuberculosis (TB), and asthma – based on the CPS-II for the period 1982–1986 – as well as four pediatric diseases for children under the age of one.[22]

Calculation of the SAF for premature death. For each underlying cause of death and subgroups stratified by gender and age, the SAF was estimated among adults aged 35+ using an adaptation of the standard epidemiological formula:[23]

$$SAF = \frac{[(p_n + p_c(RR_c) + p_f(RR_f)] - 1}{[(p_n + p_c(RR_c) + p_f(RR_f)]} \quad \text{(Eq. 1)}$$

where p_n = prevalence of never smokers

p_c = prevalence of current smokers

p_f = prevalence of former smokers

RR_c = relative risk of death for current smokers compared to never smokers

RR_f = relative risk of death for former smokers compared to never smokers

Applying this formula to the published RRs for adult deaths[19-21] and pediatric deaths[22] as well as the smoking prevalence estimates, the SAF can be calculated.

Deaths attributed to smoking. For each of the smoking-related causes of death and subgroup, we multiplied the SAF estimated from Equation (1) by total deaths to derive the number of smoking-attributable deaths. Total deaths by gender and age for each cause of death were obtained from the 2009 California Mortality file.

Years of Potential Life Lost (YPLL). The number of YPLL is the average number of years of life expectancy remaining at age of death, obtained from the most recently available life tables for California. Unpublished 2007 California abridged life tables were obtained by request from the California Department of Health Services, Center for Health Statistics. Smoking-attributable YPLL is calculated by multiplying smoking-attributable deaths (by gender and 5-year age group) by the number of YPLL.

*Estimation of the value of smoking-attributable lost productivity from premature death***.** The value of lost productivity from lives lost due to smoking was estimated as the product of smoking-attributable deaths and the present value of lifetime earnings (PVLE) for each California adult who died using the human capital approach. The calculation of PVLE takes into account life expectancy, expected lifetime labor market earnings and/or the imputed value oflifetime household production.[24] A discount rate of 3% was used to convert all future earnings to the present value.

Analyses

The models for the direct costs of smoking were estimated using NLOGIT 3.0 (Econometric Software, Inc, Plainview, NY, USA) and all other analyses were conducted using SAS Version 9.3 (SAS Institute, Cary, North Carolina, USA). Healthcare costs were adjusted from 1999 or 2004-2008 to 2009 dollars, and from 2009 to 2014 dollars using Consumer Price Index for all urban consumers for all items.[25] Estimates for the value of lost productivity were adjusted using the index of hourly compensation in the business sector.[26]

RESULTS

Smoking prevalence

Nearly four million Californians smoked in 2009, as shown in Table 1. This included 146,000 adolescents (4.5% of adolescents) and 3.8 million adults (13.6% of adults). More males smoked than females among both adolescents (5.8% vs. 3.2%) and adults (17.2% vs.

10.1%). Most adult smokers – 60.2% - were light smokers, including 59.7% of male and 61.0% of female smokers. Only 15.5% of adult smokers were heavy smokers (17.7% of male and 11.3% of female smokers).

Total costs

The total cost of smoking in the state was $18.1 billion in 2009 (Table 2). This included over $9.8 billion for healthcare costs (54.4% of the total), over $1.4 billion for lost productivity from illness (7.9%), and nearly $6.8 billion for lost productivity from premature death (37.6%). Costs were greater for men ($11.7 billion) than for women ($6.4 billion). These costs represent $487 for every resident of the state, and over $4,600 per smoker.

Direct Costs

Over 40% of healthcare costs - $4.3 billion – were for hospital care, followed by ambulatory care ($2.1 billion), nursing home care ($1.5 billion), prescriptions ($1.1 billion), and home health care ($0.8 billion). Healthcare costs were greater for men than for women for each type of healthcare service. Direct healthcare costs were $265 per resident and $2505 per smoker. Costs per smoker were greater for women than for men for all healthcare costs ($2840 vs. $2304) as well as for each category of healthcare costs except hospitalizations.

Lost productivity due to illness

Adults with smoking-attributable illness lost over $1.4 billion in labor market earnings and household productivity. Costs for men were greater than those for women ($848 million vs. $582 million). These losses amounted to $39 for every resident of the state, and $365 per smoker. Losses per smoker were greater for women ($395) than for men ($346).

Lost productivity due to premature death

The value of productivity losses from smoking-attributable premature death totaled $6.8 billion in 2009 — $5.2 billion for men and $1.6 billion for women. This amounted to $280 and $88 per male and female resident, and $2110 and $1106 per male and female

smoker respectively.

Almost 15% of all deaths in the state – 34,363 deaths – were attributed to smoking in 2009, as shown in Table 3. The largest number of deaths was from cancer (13,514), followed by cardiovascular disease (10,490), and respiratory disease (10,331). In addition, 27 infants died as a result of being exposed to their mother's smoking while pregnant.

These smoking-attributable deaths resulted in a loss of over 17 years of potential life per death, but there was considerable range among diseases. The value of lost productivity per death was almost $200,000, and ranged from almost $85,000 for atherosclerosis to $537,000 for cervical and uterine cancer. The lost productivity for children was 81 years of life and $1.3 million per death.

DISCUSSION

This is the third in a series of studies estimating the cost of smoking in California, following studies conducted for 1989[6] and 1999.[1] We estimated the cost of smoking for 1999 at $15.8 billion and for 1989 at $7.6 billion. It is difficult to compare the current estimates to 1989 because the methodology used was completely different. However, the models used here are similar to those used a decade ago, and those estimates can be reasonably compared.

The 2009 estimate for the total economic cost of smoking is 15% higher than the 1999 estimate, $18.1 billion compared to $15.8 billion in current dollars (Table 4). However, after adjusting for inflation, a very different picture emerges. The real inflation- adjusted value of the 1999 total cost of smoking expressed in 2009 constant dollars is estimated to be $20.8 billion. Therefore, while the nominal cost of smoking in California increased by 15% during 1999-2009, the real costs of smoking after taking inflation into account actually decreased by over 13% during this period.

The real cost of direct healthcare services attributable to smoking fell by over 10% between 1999 and 2009. Costs for every type of healthcare service except home health fell,

with reductions in real costs ranging from 7% for nursing home care to 22% for ambulatory care. These differences result from three factors. First, there was wide variation in changes in healthcare expenditures by type of service in California during this 10-year period, ranging from the highest nominal growth rate of 353% for home health care, to 136% for prescriptions, 110% for hospital care, 95% for nursing home care, and 66% for ambulatory care.[16] Second, the SAF estimates for 2009 were smaller than the SAF estimates for 1999 for all types of healthcare expenditures except home health care, reflecting declining smoking prevalence rates. In 1999, the SAF estimates were .05, .10, .12, .04, and .23 for ambulatory care, prescriptions, hospital care, home health care, and nursing home care, respectively. In 2009, the corresponding SAFs were .03, .04, .06, .09, and .14, respectively. Therefore, the SAF for home health care more than doubled during the 10-year period, while the SAFs for other health services were approximately cut in half. Third, advances in medical technology have made it possible for care previously provided in hospital or ambulatory care settings to be provided in the home setting.

Smoking-attributable productivity losses due to illness and premature death decreased by over 15% in real terms between 1999 and 2009, driven mainly by declining smoking prevalence. Lost productivity from illness fell by 30% and the value of productivity losses due to premature death fell by 12% in real terms over the decade. In 1999, the number of smoking-related deaths was estimated at 43,137; the number in 2009 was 34,363, a 20% decrease.

One of the reasons that the cost of smoking in California has fallen in the last decade is that smoking prevalence has fallen, from 18.7% of adults in 1999[1] to 13.6% in 2009. This reduction has resulted from increased cessation and reduced initiation rates, relatively more light and fewer heavy smokers among those who smoke, an increase in the proportion of smokers who do not smoke daily, and also from population shifts, including a greater

proportion of Hispanic and Asian Californians, two population groups with relatively low smoking prevalence.

In California as in the U.S., cancer has now overtaken cardiovascular disease as the leading cause of smoking-attributable death.[19] This reflects the fact that while smoking-attributable deaths have fallen in the past decade for both cardiovascular disease (from 17,137 to 10,490 deaths) and cancer (from 14,290 to 13,514 deaths), the reduction was much greater for cardiovascular disease (-39%) than for cancer (-5%).

California once had one of the highest cigarette taxes in the U.S.; it now ranks 33rd among states.[27] The excise tax on cigarettes in California is currently $0.87 per pack. Yet, the total cost of smoking in 2009 amounts to $18.06 per pack for each of the 1,000,243,076 packs[28] sold in the state that year, including $9.83 for healthcare costs alone. While we did not estimate costs by payer, a recent study suggests that the proportion of the healthcare costs borne by the public sector is more than 65%,[29] which would amount to $6.39 per pack. Cigarette tax revenues do not come close to equaling these costs, suggesting that tobacco taxes could be raised to cover the public costs imposed by smoking. The Centers for Disease Control and Prevention publishes detailed best practices state spending recommendations for tobacco control for every state. The recommendations include funding for state and community interventions, mass-reach health communications, cessation, surveillance and evaluation, and infrastructure, and take into account state-level smoking prevalence. For California, the recommended funding for tobacco control programs is $347.9 million for 2014, whereas the state actually spent $67.4 million (including $58.9 million in state funding and $8.6 million received from the federal government for state tobacco control).[30] Based on the cost of smoking in California, there is justification for raising tobacco taxes to increase funding for the tobacco control program. However, it is not enough to raise the tax on

cigarettes. The revenues generated must continue to be earmarked for tobacco control and prevention.

This study focused on estimating the health-related economic burden of cigarette smoking on smokers. We acknowledge several limitations of our analyses. While our estimates of SAFs for healthcare costs are based on 2009 California-specific smoking prevalence rates and other individual characteristic, the estimates also use the parameters derived from a national model using the 2004-2009 linked MEPS−NHIS data. Thus, our estimates might be influenced by national healthcare cost patterns prior to 2009. However, if the pattern of healthcare costs over time for smokers were similar to those for never smokers, this influence may be negligible because the SAFs measure the relative comparison between smokers' and never-smokers' healthcare costs. Our estimate of the number of deaths attributed to smoking is based on specific diseases shown to be caused by cigarette smoking. However, a recent study of pooled data from five US cohort studies concluded that 17% of excess mortality among smokers results from diseases that are not currently included among those caused by smoking.[31] Thus, our estimates of mortality costs are likely to be low. We did not include the impact of smoking on nonsmokers who are exposed to secondhand smoke. A recent study reported that in 2009, secondhand smoke exposure at home cost $241 million in excess healthcare expenditures for all California children and adults, and also led to almost 800 adult deaths from lung cancer (81), ischemic heart disease (700), and asthma (13) representing lost productivity of $83.3 million.[32] We did not take into account costs attributed to the use of other tobacco products including cigars, smokeless tobacco, electronic cigarettes, and emerging products such as dissolvables. Little is known about the health effects and costs associated with these products, but they would likely add to the economic burden of tobacco use. Finally, we acknowledge that smoking-attributable costs are not the same as the costs that would be saved from successful cessation. Even if all smokers quit, former smokers have

greater healthcare costs than never smokers, at least for a number of years.

The economic burden of smoking is high in California, amounting to $18.1 billion in 2009 or $20.0 billion expressed in 2014 dollars. However, behind these high costs, there is also some good news. There is evidence that the state's tobacco control efforts are having a positive impact, resulting in fewer smoking-attributable deaths, reduced real costs of smoking, lower smoking prevalence rates, and fewer cigarettes smoked per day among those who continue to smoke.[8] Despite these successes, California's tobacco control program has experienced diminishing funding over time, made worse by the erosion of inflation.[33] It is critical that funding for the program be maintained and increased in order to continue to reduce the high economic burden of smoking in the state.

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DECLARATION OF INTERESTS

None of the authors have any competing interests to declare.

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Table 1. Smoking Prevalence by Gender, Age, and Smoking Intensity, California, 2009

	Currently Smoke					Formerly Smoked	
	Number	%	% Heavy	% Moderate	% Light	Number	%
Total	3,923,433	12.7				6,748,739	21.8
Male	2,448,736	16				3,878,930	25.3
Female	1,474,697	9.4				2,869,809	18.3
Ages 12-17	146,033	4.5				327,026	10.1
Male	95,246	5.8				178,456	10.8
Female	50,787	3.2				148,570	9.4
Age 18+	3,777,400	13.6	15.3	24.6	60.2	6,421,713	23.1
Male	2,353,490	17.2	17.7	22.6	59.7	3,700,474	27.0
Female	1,423,910	10.1	11.3	27.8	61.0	2,721,239	19.3

Note: Heavy, moderate, and light percentages were assessed for adults only, and are calculated as a percent of current smokers

Table 2. Cost of Smoking by Type of Cost and Gender, California, 2009

Type of Cost & Gender	Amount (thousands)	Percent Distribution	Per Resident	Per Smoker
Total	$18,058,012	100.0	$487	$4,603
Direct Cost	9,830,115	54.4	265	2,505
Hospital	4,310,875	23.9	116	1,099
Ambulatory	2,058,077	11.4	56	525
Nursing home care	1,517,363	8.4	41	387
Prescriptions	1,149,527	6.4	31	293
Home Health	794,273	4.4	21	202
Indirect Cost	8,227,898	45.6	222	2,097
Illness	1,430,618	7.9	39	365
Premature Death*	6,797,280	37.6	183	1,732
Men, Total	11,657,133	100.0	632	4,760
Direct Cost	5,642,380	48.4	306	2,304
Hospital	2,754,518	23.6	149	1,125
Ambulatory	986,548	8.5	53	403
Nursing home care	862,695	7.4	47	352
Prescriptions	583,343	5.0	32	238
Home Health	455,277	3.9	25	186
Indirect Cost	6,014,753	51.6	326	2,456
Illness	848,214	7.3	46	346
Premature Death*	5,166,538	44.3	280	2,110
Women, Total	6,400,879	100.0	344	4,340
Direct Cost	4,187,734	65.4	225	2,840
Hospital	1,556,356	24.3	84	1,055
Ambulatory	1,071,529	16.7	58	727
Nursing home care	654,668	10.2	35	444
Prescriptions	566,185	8.8	30	384
Home Health	338,996	5.3	18	230
Indirect Cost	2,213,145	34.6	119	1,501
Illness	582,404	9.1	31	395
Premature Death*	1,630,741	25.5	88	1,106

Note: Numbers may not add to total due to rounding.
*Discounted at 3 percent.

Table 3. Deaths, Years of Potential Life Lost, and Productivity Losses Attributed to Smoking, California, 2009

Cause of Death	Deaths			Years of Potential Life Lost *		Productivity Losses **	
		Attributed to Smoking					
	Total	Number	Percent	Number	Per Death	Amount ($1000)	Per Death ($)
All Causes	231,764	34,363	14.8	586,815	17.1	6,797,280	197,807
Neoplasms	24,893	13,514	54.3	245,622	18.2	2,856,125	211,346
Lip, oral cavity, pharynx	875	521	59.5	10,955	21.0	188,506	361,841
Esophagus	1,251	790	63.2	15,269	19.3	229,985	291,029
Stomach	1,499	263	17.6	5,202	19.7	84,265	319,794
Pancreas	3,668	732	20.0	13,868	18.9	166,591	227,469
Larynx	309	239	77.4	4,563	19.1	66,564	278,288
Trachea, lung, bronchus	13,058	9,992	76.5	178,745	17.9	1,898,596	190,009
Cervix, uterus	439	34	7.8	1,035	30.4	18,289	537,356
Urinary bladder	1,325	487	36.8	7,107	14.6	63,738	130,872
Kidney, other urinary	1,250	286	22.9	5,630	19.7	92,091	322,319
Acute Myeloid Leukemia	1,219	170	13.9	3,248	19.1	47,502	279,537
Cardiovascular disease	77,966	10,490	13.4	187,377	17.9	2,798,909	266,829
Hypertension	7,888	1,076	13.6	18,082	16.8	257,174	239,009
Ischemic heart disease	40,266	5,954	14.8	108,905	18.3	1,678,579	281,925
35-64 years	6,970	2,135	30.6	63,719	29.8	1,545,337	723,714
65 years plus	33,296	3,819	11.5	45,186	11.8	133,242	34,893
Other heart disease	14,109	1,615	11.4	24,244	15.0	289,799	179,455
Cerebrovascular disease	13,268	1,142	8.6	24,827	21.7	435,275	381,151
35-64 years	1,993	561	28.2	17,998	32.1	416,750	742,605
65 years plus	11,275	581	5.2	6,829	11.8	18,525	31,882
Atherosclerosis	806	115	14.3	1,444	12.6	9,763	84,856
Aortic aneurysm	925	496	53.6	8,547	17.2	117,840	237,693
Other arterial diseases	704	92	13.0	1,328	14.5	10,479	114,281
Respiratory Diseases	19,232	10,331	53.7	151,620	14.7	1,107,049	107,158
Respiratory TB	94	19	20.6	367	19.0	5,992	310,154
Pneumonia, influenza	6,350	936	14.7	13,911	14.9	154,015	164,558
Bronchitis, emphysema	1,018	841	82.7	12,771	15.2	99,303	118,017
Asthma	415	68	16.4	1,482	21.7	24,933	365,618
Chronic airways obstruction	11,355	8,467	74.6	123,089	14.5	822,806	97,182
Pediatric Diseases	685	27	4.0	2,195	81.1	35,198	1,299,677
Short gestation, low birth weight	349	13	3.8	1,068	81.4	17,135	1,305,551
Sudden infant death syndrome	186	11	6.0	913	81.4	14,585	1,301,475
Respiratory distress syndrome	57	1	1.3	61	81.0	993	1,322,478

Respiratory conditions of newborn	93	2	2.0	154	81.3	2,485	1,311,389

Note: Numbers may not sum to total due to rounding

*Based on life expectancy at death

**Discounted at 3 percent

Table 4. Comparison of the Cost of Smoking in California: 1999 and 2009

Type of Cost	Amount (in millions)			Percent Change 1999-2009	
	1999* ($1999)	1999 ($2009)	2009 ($2009)	Nominal	Inflation-Adjusted
Total Cost	$15,760	$20,769	$18,058	14.6	-13.1
Direct Healthcare Costs	8,565	11,028	9,830	14.8	-10.9
Hospital	4,017	5,173	4,311	7.3	-16.7
Ambulatory Care	2,060	2,653	2,058	-0.1	-22.4
Nursing Homes	1,267	1,632	1,517	19.7	- 7.0
Prescriptions	1,133	1,459	1,150	1.5	-21.2
Home Health	87	112	794	812.6	609.0
Indirect Costs from Lost Productivity	7,195	9,741	8,228	14.4	-15.5
Illness	1,512	2,047	1,431	-5.4	-30.1
Premature Death**	5,683	7,694	6,797	19.6	-11.7

Note: *Estimate from Max & Rice et al.[1]

** Discounted at 3 percent.