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**Deaths from smoking and from HIV/AIDS among gay and bisexual
men in California,
2005-2050**

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ABSTRACT

Introduction: Deaths from HIV/AIDS have long been of concern to the gay community, but less attention has focused on smoking-attributable deaths despite the relatively high smoking rates among gay and bisexual men. This study compared deaths from HIV/AIDS with smoking-attributable deaths among California gay and bisexual men from 2005 to 2050.

Methods: Smoking-attributable fractions (SAFs) were estimated using smoking prevalence for gay and bisexual men from the 2011-2014 California Health Interview Surveys and published relative risks of death. Smoking-attributable deaths were calculated by multiplying the SAFs by deaths among gay and bisexual men. Deaths from HIV/AIDS among men who have sex with men was obtained from the California Department of Public Health. Future deaths from smoking and HIV/AIDS were projected using regression equations based on time trends.

Results: From 2005-2014, smoking caused over 6,800 deaths among gay and bisexual men, while nearly 9,500 died from HIV/AIDS. Mortality from both causes has been falling, but deaths from HIV/AIDS have been falling more rapidly. Projections suggest that in the mid 2040's, more gay/bisexual men will die from smoking than from HIV/AIDS.

Conclusion: Smoking will surpass HIV/AIDS as a cause of death among gay and bisexual men in California within a few decades. The lesbian, gay, bisexual and transgender (LGBT) community was highly effective in drawing attention and resources to the fight against HIV/AIDS, saving untold lives by

hastening effective treatments. Lessons learned in the fight against AIDS should be used to help fight the tobacco epidemic.

INTRODUCTION

Smoking is responsible for one in five deaths in the U.S. each year, including over 250,000 deaths among men.¹ In 2009, the deaths of 21,000 California men were attributed to smoking, resulting in \$5.2 billion in lost productivity.² The mortality and economic burdens of smoking on the gay and bisexual community is unknown, but is of particular interest given that sexual minority men smoke at higher rates than heterosexual men.³⁻⁶ Infection by the human immunodeficiency virus (HIV) has often resulted in full blown AIDS (acquired immune deficiency syndrome). AIDS has taken a large toll on the gay and bisexual community, where until the mid-1990s when effective treatments for AIDS changed the landscape dramatically, the disease quickly took the lives of most of those infected. While the lesbian, gay, bisexual and transgender (LGBT) community mobilized against AIDS⁷ less attention has been paid to the tobacco epidemic, with the exception of a small number of LGBT tobacco control groups.^{8,9} LGBT leadership,¹⁰ media outlets,^{11,12} and the community at large¹³ have viewed tobacco control as a lower priority than other health issues and threats to the community. No previous research has compared the death toll from AIDS and from smoking among gay and bisexual men, nor addressed the question of whether, or when, smoking-attributable deaths might exceed deaths from AIDS in this population.

The purpose of this paper is to compare the death toll that cigarette smoking and HIV/AIDS have taken on gay and bisexual men in California over time. We analyzed mortality data for gay and bisexual men in California

over a ten-year period (2005-2014) and then projected deaths from both smoking and HIV/AIDS, to the year 2050. We then consider lessons to be learned from AIDS activism that might be used to fight the tobacco epidemic.

METHODS

We estimated the number of smoking-attributable deaths among gay and bisexual men in California and compared this with deaths from HIV/AIDS. We then projected deaths from each cause to 2050 using time trend analysis.

Data Sources

Two datasets were analyzed to estimate smoking-attributable deaths.

Deaths from HIV/AIDS were obtained from the California Department of Public Health.

California Health Interview Survey (CHIS). The CHIS is a telephone survey of California households that has been conducted every two years since 2001 and annually beginning in 2011. It surveys more than 20,000 households per year to collect information about individual's smoking history, demographic characteristics including sexual identity, and socioeconomic characteristics. The CHIS uses a multi-stage geographically stratified random-digit-dial design that yields a representative sample of California's non-institutionalized population living in households. In 2007, the CHIS added a cell phone sample, which accounted for 19.3% of the adult interviews in 2013-2014.¹⁴ To obtain sufficient samples of gay and bisexual men, we pooled data from from 2005 to 2014. Our analyses were restricted to male respondents aged 18-70 who identified as heterosexual, gay, or bisexual

because CHIS only asks the sexual identity question of this age group. Because the sexual identity question is only available in the confidential CHIS dataset, all analyses were conducted using a Special Use Research File obtained from the Data Access Center based at the University of California, Los Angeles.

California Mortality File. This data file is a compilation of all death certificates in the state of California. The underlying cause of death is coded using ICD-10 codes. We analyzed data from the 2005-2014 California Mortality Files for males.

California Department of Public Health (CDPH) HIV/AIDS data. The number of deaths among men aged 20 and older who have sex with men (MSM) due to stage 3 HIV infection (i.e., AIDS) were obtained for each year from 2005-2014 from the CDPH. This includes MSM who were injection drug users and died of AIDS. We did not include deaths of men who were HIV-positive but did not die of AIDS.

Measures

Sexual identity status. Gay and bisexual status for males was defined based on the sexual identity question in the CHIS. Since 2005, all respondents between the ages of 18 and 70 have been asked: "Do you think of yourself as straight or heterosexual, as gay/lesbian or homosexual, or bisexual?" Fewer than 1% of the survey respondents responded "other", "not sexual, celibate, or none", or were skipped due to proxy interview. These responses were set to "missing". Sample size limitations required us

to combine gay and bisexual men into one gay/bisexual category.

Transgender status was not asked, prohibiting us from including it. Because sexual minority identification has been increasing over time, we used the mean rates from the pooled 2011-2014 CHIS. Gay/bisexual status prevalence was estimated for two age groups: 35-64 and 65-70.

Smoking prevalence. Smoking prevalence is the percentage of gay and bisexual men who smoke in California. Smoking prevalence was estimated from the 2005-2014 CHIS data. Prevalence of current, former, and never smoking was estimated by age group (35-59, 60-70) for male gay/bisexual Californians. Whereas sample size had been sufficient to derive stable estimates of gay/bisexual sexual identity prevalence rates for age groups 35-64 and 65-70 using pooled 2011-2014 CHIS data, further stratification of the male gay/bisexual subpopulation by smoking status resulted in sample sizes too small to either estimate or reliably predict smoking prevalence in the narrow 65-70-year age group. We were therefore obligated to expand the age range of the older subpopulation to those aged 60-70 when predicting smoking prevalence among male gay/bisexual respondents. A current smoker is someone who reports smoking at least 100 cigarettes in their lifetime and who smoked every day or some days at the time of the survey. A former smoker is someone who has smoked 100 cigarettes in their lifetime but did not smoke at the time of the survey. A never smoker is someone who has not smoked 100 cigarettes during their lifetime. Because small sample sizes for gay

/bisexual men resulted in unstable smoking prevalence rates, pooled 2005-2014 CHIS data (N=73,892) were used to run multiple logistic regressions of current, former, and never smoking on survey year (2005, 2007, 2009, 2011, 2012, 2013, and 2014) and age (continuous) within each age group (35-59, and 60-74 years). The resulting equations were then used, holding age at its mean value within the given age group, to predict mean current, former, and never smoking prevalence within each year and age group.

Relative risk. The relative risk (RR) is the ratio of the rate of death in the exposed population (current or former smokers) to the rate in the unexposed population (never smokers). The relative risks of mortality by cause of death were obtained from published studies as reported by the Centers for Disease Control and Prevention.¹⁵ We included 18 smoking-related underlying causes of death identified as causally linked to cigarette smoking for men based on the Cancer Prevention Study II for the period 1982-1988,¹ and three additional diseases — hypertension, respiratory tuberculosis, and asthma — based on the Cancer Prevention Study II for the period 1982-1986.^{16 17} The diseases included and the relative risks are shown in **Table 1**.

Deaths Attributable to Smoking

Deaths attributable to smoking are estimated for men aged 35 and older because most of the negative effects of smoking on mortality are not apparent until after many years of smoking.

Smoking-attributable fraction (SAF). The SAF for mortality, defined as the proportion of deaths that are attributable to smoking, is estimated using the standard epidemiological formula for attributable risk, which takes into account smoking prevalence and RR:¹⁸

$$\text{SAF} = \frac{[(p_n + p_c(\text{RR}_c) + p_f(\text{RR}_f)) - 1]}{[(p_n + p_c(\text{RR}_c) + p_f(\text{RR}_f))]}$$

(Equation 1)

$$[(p_n + p_c(\text{RR}_c) + p_f(\text{RR}_f))]$$

where p_n = percentage of never smokers

p_c = percentage of current smokers

p_f = percentage 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

Number of deaths among gay and bisexual men from smoking-related diseases. We determined the total number of deaths for gay and bisexual men for each of the 21 smoking-related causes of death by assuming that the proportion of deaths among gay and bisexual men for each age group was the same as the proportion of men who identified as

gay or bisexual. Sexual identity prevalence rates derived from pooled 2011-2014 CHIS data for two age groups (35-64 and 65-70) were applied to deaths in corresponding age groups (35-64 and 65 and older) to determine the number of gay/bisexual deaths for each cause of death.

Smoking-attributable deaths. For each of the 21 smoking-related causes of death, the SAF was calculated for gay/bisexual men for each age group (35-64 and 65+) and each year according to Equation (1), and then applied to the number of deaths for the corresponding disease and age group to determine the number of smoking-attributable deaths of gay/bisexual men for each year from 2005 to 2014.

Projections of Deaths from Smoking and HIV/AIDS

Based on the estimated number of smoking-attributable deaths and the number of deaths from HIV/AIDS among gay/bisexual men for each year 2005-2014, we projected deaths from smoking and HIV/AIDS through 2050 separately using simple linear regression models on year. While these trajectories may flatten out in the future with reductions in prevalence of smoking and HIV infection rates or improvements in treatments for smoking-related diseases and HIV/AIDS, there is no basis for making reasonable assumptions about future changes and thus we assumed a linear trend based on current data.

RESULTS

Sexual Identity Status

The percent of males identifying as gay or bisexual is shown in **Table 2**.

Because the rates have become relatively stable in recent years, we used the mean value for 2011-2014 of 4.0% for men aged 35-64 and 2.8% for men aged 65-70, which we applied to all men aged 65 and older since men over age 70 were not asked about their sexual identity.

Smoking Prevalence by Sexual Identity

Predicted current smoking prevalence of gay /bisexual men is shown in

Table 3. For both age groups, smoking prevalence has fallen between 2005 to 2014, with a more dramatic drop among gay or bisexual men aged 35-59 (from 28.7% to 12.5%) than among gay or bisexual men aged 60 and older (from 16.6% to 15.5%).

Smoking-attributable Deaths

The estimated smoking-attributable deaths among gay or bisexual men fell from 751 in 2005 to 629 in 2014, as shown in **Table 4.** The total number of deaths over the decade was 6,836.

Deaths from HIV/AIDS

Deaths from HIV/AIDS fell from 1,036 in 2005 to 918 in 2014, as shown in **Table 4.** 9,452 gay or bisexual men lost their lives over this decade due to HIV/AIDS.

Projection of Deaths from Smoking and HIV/AIDS through 2050

Figure 1 shows time trends of the predicted smoking-attributable deaths compared to deaths from HIV/AIDS for 2005 through 2014 and projections through 2050. Deaths from both causes continue to decrease over time, but deaths from smoking fall at a lesser rate. Projections suggest that by the

mid 2040's there will be more deaths attributable to smoking than to HIV/AIDS among gay/bisexual men.

DISCUSSION

It is good news that deaths from both smoking and from HIV/AIDS are decreasing in the gay and bisexual community. This can be attributed to a number of factors. For smoking, prevalence is decreasing in California as it is in the rest of the nation, though the rates for gay and bisexual men remain higher than rates for heterosexual men.⁶ In addition, lifestyle changes and improved treatments have resulted in fewer cases of and fewer deaths from smoking-related diseases.¹⁹ For HIV/AIDS, lifestyle changes such as safer sex practices have reduced the number of new infections, while improved treatments such as antiretroviral therapy have greatly improved the outcomes for those infected.²⁰ Nonetheless, deaths from both of these preventable causes are unacceptably high.

Although the number of lives lost among gay and bisexual men to HIV/AIDS and to tobacco is of similar magnitude (918 vs. 629 deaths in 2014), there are many differences that may explain why the former inspired a successful LGBT-led movement and the latter has received less attention.

AIDS appeared on the scene suddenly, with dire consequences leading to the rapid deaths of mostly young men.²¹ Although its cause was not immediately clear, it was obviously contagious and associated with the sexual behavior of men who have sex with men, spreading quickly through

networks. These factors contributed to a sense of urgency, at least among those who were affected and those who cared for them.²¹

Death and disease from tobacco among gay and bisexual men, on the other hand, is less visible. It most often takes decades to manifest, most who succumb are middle-aged or elderly, and many causes of death are indicated. Not contagious, its well-known cause is the long-term use of a highly addictive substance. Unlike AIDS, tobacco-related disease and death are not associated specifically with the gay community, claiming one life at a time and not entire friendship circles.

AIDS emerged as a lethal threat in 1981, initially with clusters of cases in otherwise-healthy young, urban gay men.²¹ Soon after, AIDS presented itself among other discrete sub-populations including intravenous drug users and hemophiliacs.²² Government response to the growing epidemic was slow or absent, often ascribed to the marginalization of those most affected.^{21 23} The lack of an appropriate government response to the AIDS emergency impelled the LGBT community and its allies to fill the vacuum by organizing support services for those who were ill and pressuring the government to acknowledge the health crisis by committing resources in search of effective treatments and awareness campaigns.^{21 23}

The 1969 Stonewall riots at a New York City bar ushered in an era of militant gay activism.²¹ In the process, the community has established an infrastructure and expertise well poised to address a life or death crisis. An international patient-centered movement was sparked that would eventually

contribute to transforming AIDS from a nearly-always and often-rapid fatal disease to the potentially manageable chronic condition it has become.⁷ Additionally, AIDS activism has helped inspire a host of other patient-centered movements, addressing such conditions as breast cancer²⁴ and other diseases.²⁵

Members of the LGBT community, like many marginalized minorities, use tobacco at higher rates than the mainstream, which makes them more vulnerable to the harmful consequences of such behavior.³⁻⁶ In spite of a growing movement to address tobacco addiction within the LGBT community, prevalence remains high, and tobacco use is rarely viewed as a priority issue by LGBT leaders or community members.⁸ A recent study ranked smoking as fifth most important of five health issues, lower than HIV and sexually transmitted diseases, drugs and alcohol, body image, and mental health.²⁶ For many in the LGBT community, tobacco has been integral to their identity, especially if their earliest experiences of socializing in the community were in smoky bars.²⁷ The tobacco industry has targeted the community since the early 1990s, with advertising, promotions, donations, and sponsorships.^{13 28 29} For many years, the tobacco industry has made large donations to organizations fighting AIDS, complicating LGBT opposition to tobacco, as recipients of industry support are often silent about tobacco harms.¹³ A youth-focused culture, which encompasses a significant component of the LGBT community, may not take seriously the threat of tobacco-related disease, which often does not manifest for decades.²⁷

Limitations of the study

We acknowledge several limitations of our study. First, our analyses focus on men. Both smoking and HIV/AIDS kill women as well as men, but we focused on men because the majority of deaths from AIDS are among males. If we were to include women as well, smoking would overtake HIV much sooner due to the many deaths attributable to smoking among women (40% of smoking-attributable deaths in California in 2009²) and the relatively small number of deaths attributable among women to HIV (13-15% , approximately 200 per year, in California between 2005 and 2014).

Second, we assumed that the proportion of men over age 70 who identify as gay or bisexual is the same as the proportion of men aged 65-70 who so identify, because the sexual identity question was not asked of men over age 70. This could result in an overestimate or underestimate of sexual identity prevalence among older men. Likewise, we were forced to assume that the smoking rates of gay/bisexual men aged 60-70 could be fairly applied to those aged 60 and older, with corresponding risk of either over- or underestimating smoking prevalence among older gay or bisexual men.

Third, deaths from HIV are for men who have sex with men (MSM) whereas smoking-attributable deaths are for men who identify as gay or bisexual. While these groups are very similar, there were a few MSM identified in the HIV death data as transsexual who were not included in our study.

Fourth, the relative risks used are not specific to gay and bisexual men. Cochran and colleagues reported that after adjusting for health and behavioral differences, there were significantly greater rates of all-cause mortality (adjusted hazard rate 2.50; 95% confidence interval 1.39,4.50) for sexual minority men compared to heterosexual men.³⁰ This suggests that our estimates of smoking-attributable deaths may be low. The relative risks used are also based on data from the 1980's, from the Cancer Prevention Study-II 4¹⁷ and 6³¹ year follow-ups. Relative risks are likely to change over time and newer data, when available, might lead to increased or decreased estimates of the number of smoking-attributable deaths.

Fifth, we assumed that the proportion of deaths among gay/bisexual men in each age group was the same as the proportion of men in that age group who identified as gay or bisexual. This will lead to an underestimate of deaths if the proportion of men who identify as gay or bisexual is less than the true proportion because not all sexual minority men chose to identify as such.

Sixth, HIV increases mortality from smoking,³² but data limitations precluded us from taking this into account. At the same time, smoking increases mortality for people with HIV and is a leading killer of HIV positive individuals. For example, a 40 year old with HIV who continued to smoke was found to be 6 to 13 times more likely to die of lung cancer than from other AIDS-related causes of death.³³ Higher mortality from cardiovascular disease and non-AIDS attributable cancers³⁴ as well as all non-AIDS-related

causes of death³² were also found among people with HIV/AIDS who smoked compared to those who didn't. While this study attributed deaths to smoking-attributable diseases or to HIV/AIDS, the two categories interact and compound the impact of smoking on the gay and bisexual community. It is possible that there is some double-counting in our estimates for men who both smoked and were HIV-positive.

Seventh, we assumed gay/bisexual sexual identity prevalence was constant at the 2011-14 rates. However, it may be increasing as sexual minority identity becomes more accepted over time. If the rates we used are too low, this would result in an underestimation of smoking-attributable deaths among gay and bisexual men.

Eighth, we did not include deaths attributable to secondhand smoke exposure among gay and bisexual men or from the use of other tobacco products due to data limitations. This likely results in an underestimate in the number of deaths attributable to smoking.

Ninth, our findings are for California and may not be generalizable to other states or countries. Smoking prevalence in California is the second lowest in the nation,³⁵ while LGB disparities in smoking are smaller than most of the country due to a climate in which gay and bisexual identity is well-accepted. Thus, our findings may not represent the relationship between deaths from smoking and HIV/AIDS elsewhere.

Finally, there is uncertainty in projecting deaths into the future. For example, it is possible that deaths from tobacco may overtake deaths from

AIDS sooner than we have projected, if advances in research yield more effective treatments for AIDS or even a cure. There is recent evidence that it may be possible to cure someone with HIV,³⁶ but this has not yet been validated in the peer-reviewed scientific literature. As discussed earlier, there have also been improvements in preventing and treating smoking-related diseases. It is also possible that smoking prevalence in the gay and bisexual community will decrease more or less rapidly than expected. These changes could result in a nonlinear trajectory of the number of deaths in the future, though it is not possible to reasonably predict what either curve would look like. For this reason, we used simple linear trends based on current data but acknowledge that changes might result in a different relationship between deaths from smoking and from HIV/AIDS in the future.

All these limitations represent areas where additional work needs to be done to further refine the analysis and present a clearer picture of the impact of smoking and HIV/AIDS on the CA gay and bisexual community. However, no one has addressed this issue previously, and our work represents a starting point for discussion that utilizes the best data available at present.

CONCLUSIONS

Tobacco will claim the lives of more gay and bisexual men than HIV/AIDS within several decades, but the LGBT community has taken a much less aggressive stand than they did when HIV was first identified. Perhaps the most significant factor in preventing the LGBT community from mobilizing

against tobacco is the same problem faced by the general public: the acceptability of tobacco use. Nearly half a million Americans die each year from tobacco—1,200 a day—with no sustained outrage from the public.¹ It may be quixotic to expect the LGBT community to protest the enormous death toll from tobacco use when the public at large has not.

And yet, AIDS activism may provide lessons for challenging the ubiquity of tobacco in the community. AIDS activists demanded the government act, and it eventually did.²¹ LGBT tobacco control advocates might pressure government to enact policies effective at reducing tobacco use in the LGBT community. AIDS activists pressed for awareness campaigns to educate gay and bisexual men about how to protect themselves and each other. Advocates might promote far more visible messages in the community about the deadliness of tobacco, including secondhand smoke. AIDS activists tailored messages to different segments of the community, including young men just coming out, ethnic groups, transgender people, and substance users. Tobacco control advocates should do the same. Perhaps as the community matures, there will be increased concern about a disease that takes its toll over time.

Pharmaceutical corporations were targeted by AIDS activists for price gouging.³⁷ The tobacco industry, should be made unwelcome in the community, eliminating sponsorships of all kinds. As AIDS activists fought for affordable drugs, tobacco control advocates might lobby for affordable cessation programs. AIDS activists challenged the myths associated with

AIDS and people with AIDS. Tobacco control advocates should challenge the industry's propaganda of smoking as a personal choice,³⁸ when the addictive nature of nicotine renders that concept an oxymoron.

AIDS activism saved untold lives among gay and bisexual men and many others, hastening the development of effective treatments. Though not perceived with the urgency that AIDS was, tobacco disease and death in the LGBT community can also come to be seen as the ongoing crisis it is. The strategies developed by the LGBT community in their fight against AIDS provide a valuable roadmap for combatting the toll of tobacco.

WHAT THIS PAPER ADDS

What is already known

- One in five deaths in the U.S. is attributable to smoking
- Gay and bisexual men smoke at higher rates than heterosexual men, suggesting that many of them may be victims of smoking-attributable mortality

What important gaps exist

- The mortality toll of cigarette smoking on the gay and bisexual community has not been studied
- The LGBT community, which mobilized effectively against the AIDS epidemic, has largely ignored the tobacco epidemic

What this study adds

- We found that smoking-attributable deaths will exceed deaths from AIDS in the California gay/bisexual community within a few decades
- The LGBT community could build upon its successful organizing against AIDS to help diminish the toll of tobacco

Table 1. Relative Risk of Death for Male Current and Former Smokers by Cause of Death, based on US Cancer Prevention Study II data from 1982-1988*

Cause of Death	ICD-10 Code	Currentl y Smoke	Former ly Smoke d
Neoplasms			
Lip, oral cavity, pharynx	C00-C14	10.89	3.40
Esophagus	C15	6.76	4.46
Stomach	C16	1.96	1.47
Pancreas	C25	2.31	1.15
Larynx Trachea, lung, bronchus	C32 C33-C34	14.60 23.26	6.34 8.70
Urinary bladder	C67	3.27	2.09
Kidney, other urinary Acute Myeloid Leukemia	C64-C65 C92.0	2.72 1.86	1.73 1.33
Cardiovascular disease			
Hypertension Ischemic Heart Disease (IHD)	I10-I15 I20-I25	1.85	1.32
35-64 years		2.80	1.64
65 years plus		1.51	1.21
Other heart disease	I00-I09, I26-I51	1.78	1.22

Cerebrovascular disease	I60-I69		
35-64 years		3.27	1.04
65 years plus		1.63	1.04
Atherosclerosis	I70	2.44	1.33
Aortic aneurysm	I71	6.21	3.07
Other arterial diseases	I72-I78	2.07	1.01
Respiratory Diseases			
Respiratory TB	A16-A19	1.99	1.56
Pneumonia, influenza Bronchitis,	J10-J18	1.75	1.36
emphysema	J40-J42, J43	17.10	15.64
Asthma	J45-J46	1.99	1.56
Chronic airways obstruction	J44	10.58	6.80

Note: Among adults aged 35 years and older

*Source: Data are based on the 6 year follow-up of the Cancer Prevention Study (CPS) II 1982-1988¹ except for hypertension, respiratory TB, and asthma, which are based on the 4 year follow-up of the CPS-II study (1982-1986).¹⁷

Table 2. Percent of Males Identifying as Gay or Bisexual by Age: California, 2011-2014

	2011	2012	2013	2014	2011-2014
35-64	3.9	4.0	4.1	4.1	4.0
65-70	2.6	2.7	2.9	3.0	2.8

Source: California Health Interview Survey, authors' analysis

Table 3. Predicted Current Smoking Prevalence (%) of Gay or Bisexual Men by Age:

	California, 2005-2014									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
35-59	28.7	26.4	24.2	22.2	20.2	18.4	16.7	15.2	13.8	12.5
60-70	16.6	16.5	16.4	16.3	16.1	16.0	15.9	15.7	15.6	15.5

Source: California Health Interview Survey, authors' analysis

Table 4. Estimated and Predicted Deaths from Smoking and Actual and Predicted Deaths from HIV/AIDS Among Gay or Bisexual Men: California, 2005-2050

	Smoking-Attributable Deaths		Deaths from HIV/AIDS	
	Estimated	Predicted*	Actual	Predicted*
2005	751	742	1,036	1,036
2006	738	729	1,081	1,016
2007	711	716	1,019	996
2008	701	703	945	976
2009	685	690	925	955
2010	667	677	867	935
2011	642	664	892	915
2012	656	651	891	895
2013	654	638	878	874
2014	629	625	918	854
TOTAL 2005-2014	6,836	6,836	9,452	9,452

* Predicted deaths are based on a smoothing function applied to the estimated or actual death

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