

2025 Update: The Burden of Tobacco in Alabama

Prepared for the Alabama Department of Public Health

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Executive Summary

Tobacco use is a health burden for those who use it, as well as an economic burden for the communities that support them. Key findings of *Updated: The Burden of Tobacco in Alabama, 2025* are featured below. Unless noted otherwise, the tobacco use data and years of potential life lost findings refer to 2023 annual estimates, while health impact and economic impact findings refer to 2024 annual estimates.

Tobacco Use

- 14.2 percent of adults in Alabama are current cigarette smokers.
- 16.8 percent of males smoke
- 11.9 percent of females smoke
- Alabama has the 12th highest adult smoking prevalence rate in the nation.
- 10.1 percent of mothers reported smoking during pregnancy.
- From 1996 to 2023 adult smoking prevalence fell on average only 0.3 percent per year.
- 5.7 percent of high school students are current cigarette smokers
- 9.5 percent of adults and 17.5% of youth use electronic nicotine delivery systems (ENDS)

Health Impact of Tobacco

- **6,248 deaths** in Alabama were attributable to smoking-related causes.
 - 3,365 deaths due to cardiovascular disease
 - 944 deaths due to cancer
 - 832 deaths due to respiratory disease
 - 336 deaths due to diabetes
 - 771 deaths due to indirect tobacco-related causes (secondhand smoke, smoking-related fires, prenatal deaths)
- 246,647 years of potential life were lost due to smoking-attributable premature death.

Economic Impact of Tobacco

- \$7.88 billion in excess personal medical care expenditures were attributable to smoking.
- \$2.65 billion in productivity losses were estimated as a result of smoking-attributable premature death.
- \$2.38 billion in productivity losses were estimated as a result of smoking-attributable illnesses.
- \$277.9 million in economic costs were attributed to personal medical costs and productivity losses associated with secondhand smoke.
- Over **\$13 billion** in economic costs was the estimated total annual economic impact of smoking in Alabama.

Introduction

The illness, death, and economic costs of tobacco use have long been a burden on communities worldwide and Alabama is no exception. Historically, examinations of the costs of smoking in terms of health, well-being, and monetary losses provide details of the magnitude and trajectory of this burden (Fosson & McCallum, 2011; Dunlap & McCallum, 2019), even as the prevalence of cigarette smoking has declined. While the current report includes indications that the use of traditional tobacco products is at an all-time low, the conditions caused by this use are chronic and the burden of previous decades of use continues to accumulate. In addition, it is no surprise that the use of alternatives to traditional tobacco products such as electronic nicotine delivery systems (ENDS) has become more prevalent, with the long-term consequences of these products less predictable. These facts make the examination of the burden of tobacco use on Alabama more imperative than ever.

Recent data examined for the current report indicates that approximately 14.2 percent of adult Alabama residents currently smoke cigarettes and 9.5 percent use ENDS, with some likely overlap (CDC, 2024; Kramarow & Elgaddal, 2023). Though ENDS use has remained stable in Alabama in recent years, cigarette smoking prevalence rates have dropped precipitously since 2016 (when the previous Burden report indicated an adult use rate of 21.5 percent; Dunlap & McCallum, 2019). Prior to this recent decline, reduction of tobacco use in Alabama happened in very small increments. For youth, while cigarette use has shown an even greater decline as compared to adult use, ENDS use is substantially higher than that seen for adults (CDC, 2021). Though still slightly higher than national averages, changes in smoking rates in Alabama have mirrored those seen throughout the U.S.

Despite some decline in use prevalence, tobacco-attributable conditions are still responsible for approximately 6,248 annual deaths in the state. According to recent estimates, approximately 33 people are living with a tobacco-attributable disease for every one person who dies (CDC, 2024). Thus, the associated medical costs and lost productivity of both tobacco-attributable deaths and for those living with the associated conditions amounted to more than \$13 billion expended due to tobacco use in Alabama alone in 2024. This report provides visualizations of current data regarding tobacco-use prevalence, smoking-attributable morbidity, mortality, years of potential life lost, medical expenditures, and productivity losses. Its purpose is to illustrate the burden of tobacco use in Alabama, as well as to provide an estimate of the potential benefits to the state should the prevalence of its use continue to decline.

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Tobacco Trends in Alabama

Smoking prevalence trends- Figure 1

In recent years smoking prevalence has declined in the U.S., including Alabama. Adult cigarette use reached an all-time low of 14.2 percent in the state in 2023, according to Behavioral Risk-Factor Surveillance System data (BRFSS; CDC, 2023).

The adult smoking prevalence in Alabama is now only 2.1 percentage points higher than the national rate of 12.1 percent.

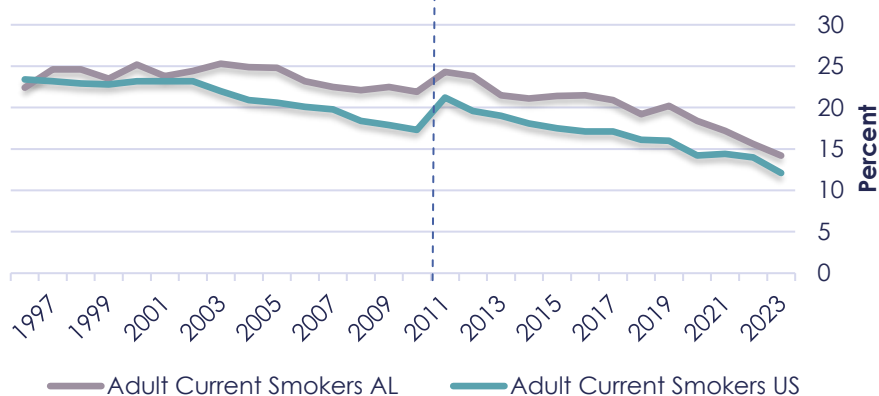
Smoking prevalence ranking- Figure 2

In 2023, Alabama had the 12th highest smoking prevalence rate among the 50 states and Washington D.C. Utah had the lowest rate at 6.0 percent and West Virginia had the highest smoking prevalence rate at 20.4 percent. The median smoking prevalence rate among the 50 states and Washington D.C. was 12.1 percent. **This median is down from that previously reported (Dunlap & McCallum, 2019) of 17.1 percent.**

Tobacco Use in Alabama

Figure 1. Smoking prevalence among Alabama adults 18+, 1996 – 2023

Source: CDC BRFSS



*Due to changes in weighting methodology for the Alabama Behavioral Risk Factor Surveillance System, data collected prior to 2011 may not be comparable to that collected at more recent time points

Figure 2. Smoking prevalence among adults in U.S. states (and DC) by rank, 2023

Source: CDC BRFSS 2023

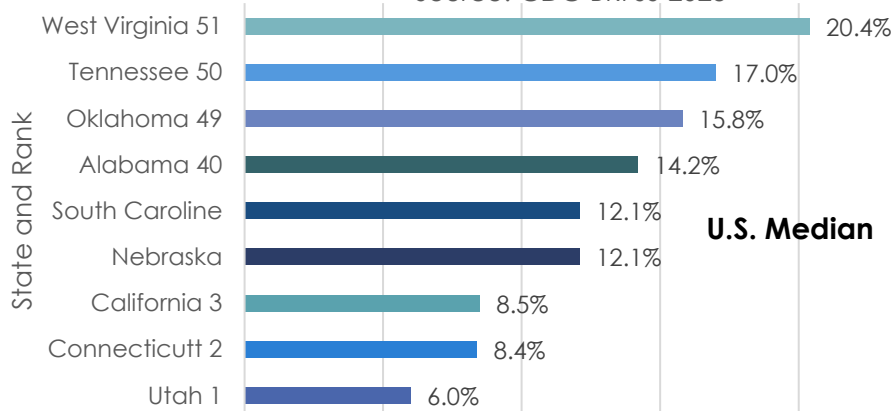


Figure 3. Smoking status among Alabama adults 18+, 2023

Source: CDC BRFSS 2023; AECF, 2023

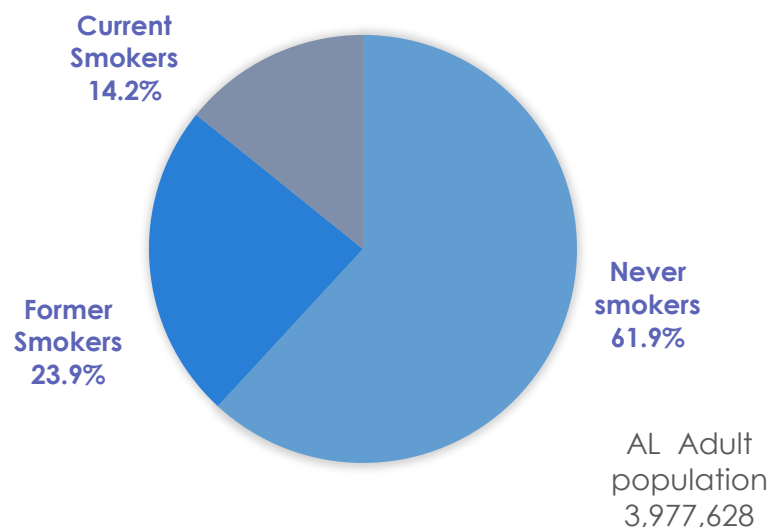
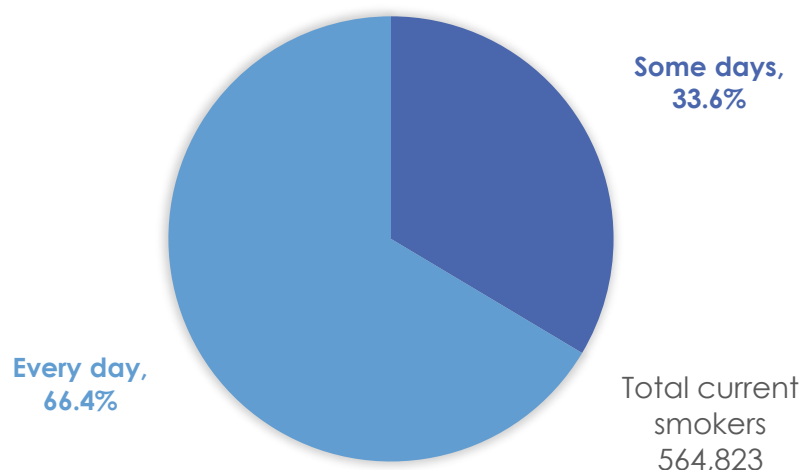


Figure 4. Frequency of cigarette usage among Alabama adults who were current smokers, 2023

Source: BRFSS 2023; AECF, 2023



Smoking status- Figure 3 According to recent BRFSS data, in 2023, 14.2 percent of adults in Alabama reported being current cigarette smokers, 23.9 percent reported being former smokers, and 61.9 percent reported being never smokers (CDC, 2023). Based on these figures and the concurrent adult population of the state (AECF, 2023), it is estimated that approximately 564,823 adults in Alabama were current cigarette smokers in 2023. This represents an abrupt drop in smoking prevalence from that reported in 2019 (21.5 percent) while the former smoker rate did not change (Dunlap & McCallum, 2019). This results in a substantial overall decrease in current smokers as there are now an estimated 564,823 in Alabama, down from 775,433 in 2019.

Frequency of cigarette usage-

Figure 4 Among the adults in Alabama who were current smokers, 66.4 percent smoked cigarettes every day, while 33.6 percent smoked cigarettes only on some days. These data further indicate a shift toward some day versus everyday smoking seen in previous reports.

Adult Smoking Prevalence by Demographics 2023- Figure 5

Pregnant mothers

According to a report by America's Health Ranking (2023), approximately 4.8 percent of pregnant women in Alabama report smoking during pregnancy.

Gender

Smoking prevalence rates remain higher for males (16.8 percent) than for females (11.9 percent).

Race/Ethnicity

White Alabama residents (14.6 percent) smoke at a greater rate than those identifying as African American (12.5 percent).

Age

The prevalence of smoking for adults ages 45 to 64 was appreciably higher than for younger or for older adults.

Education

Consistent with nationwide data as well as previously reported state data, there is a strong negative correlation between level of education and smoking prevalence in Alabama.

ENDS: Adult Prevalence – Figure 6

Due to the recent increase in popularity of Electronic Nicotine Delivery Systems (ENDS), tobacco product use prevalence surveys now index adult use of such products, in addition to traditional tobacco products. Alabama BRFSS data indicates that adult use rates of ENDS were similar in 2023 as compared to 2019 when these data were first collected.

Figure 5. Smoking prevalence among Alabama adults by varied demographics, 2023

Source: BRFSS 2023; AHR 2023

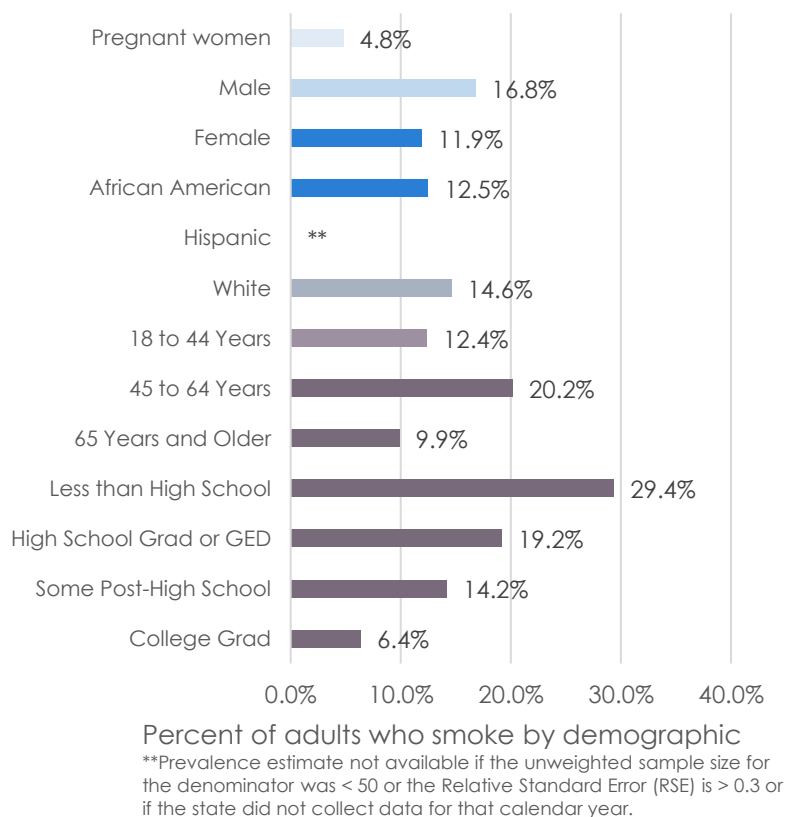


Figure 6: ENDS use prevalence among Alabama adults 18+, 2019-2023

Source: BRFSS, 2023

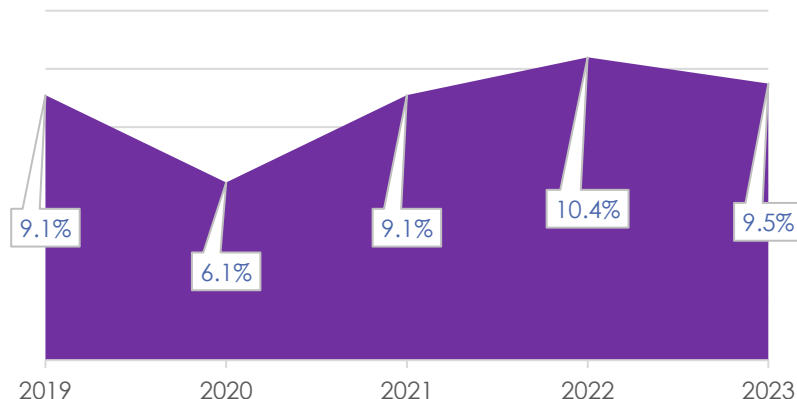


Figure 7: High school student cigarette smoking prevalence in Alabama by gender and race, 2021

Source: CDC YRBS, 2021

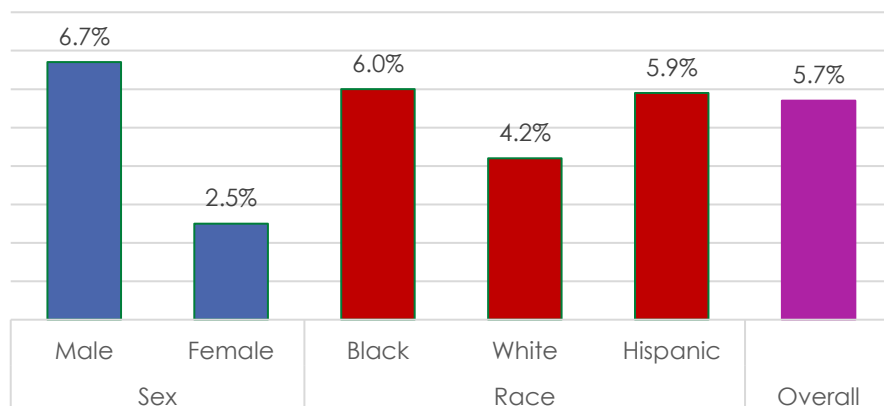
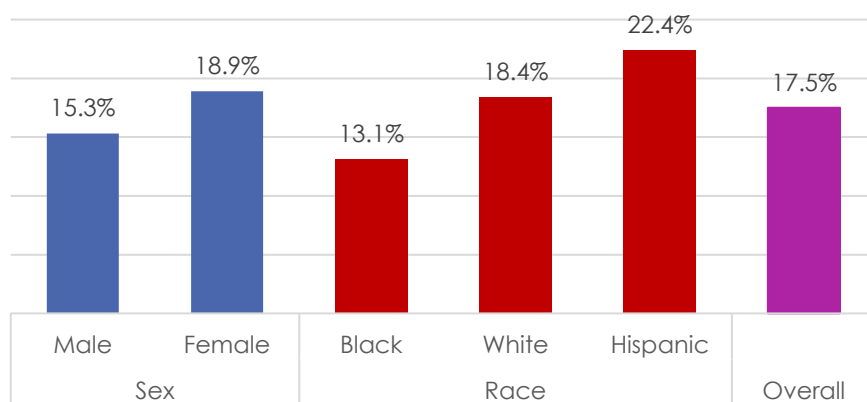


Figure 8: High school student ENDS use prevalence in Alabama by gender and race, 2021

Source: CDC YRBS, 2021



Youth Smoking and E-Cigarette Prevalence-2021

The Youth Risk Behavior Survey (YRBS) was administered to a sample of Alabama high school students in 2021 (CDC, 2021). Results indicate that only 5.7% of those responding to the survey have smoked cigarettes on one or more days in the 30 days preceding the survey.

Gender and race- Figure 7 In 2021, male high school students smoked at a higher rate (6.7 percent) than female students (2.5 percent). Among racial groups, Black students' smoking prevalence rate was highest at 6.0 percent, followed by Hispanic (5.9 percent) and white (4.2 percent) students. *These statistics reflect a decline in youth smoking rates over recent years (Dunlap & McCallum, 2019).*

ENDS use prevalence among youth- Figure 8 By contrast, 17.5 percent of youth respondents reported recent use of ENDS products. Use of these products was higher among females (18.9 percent) than males (15.3 percent) and higher among Hispanic (22.4 percent) and White (18.4 percent) than Black (13.1 percent) students.

Alabama Tobacco Excise Tax-Table 1

Prior to 2016, despite the CDC’s recommendation that increasing the cost of cigarettes constitutes a “Best Practice” for reducing youth initiation of tobacco use (CDC, 2014), Alabama excise taxes on tobacco had not changed in more than 10 years. In 2016, the excise tax on a pack of 20 cigarettes was raised from \$.425 it to \$0.675. The tax rate on snuff (per ounce) also increased slightly while tax on other tobacco products remain unchanged.

Additional revenue created by cigarette tax increase

Table 2
In the three years prior to the 2016 excise tax increase on cigarettes (2012-2015), approximately \$126.6 million in revenue was generated through these taxes annually (ADR, 2023). In the three most recent years reported (2021-2023), this average increased to \$157.0 million per year, yielding 27 percent more revenue annually.

State cigarette excise tax ranking- Figure 9

Alabama is currently ranks 40th among the 50 states and Washington D.C. in cigarette excise tax rates. The average excise tax per pack of cigarettes is \$1.97. (CTFK, 2023). New York has the highest rate at \$5.35 and Missouri the lowest at \$.17.

Tobacco Excise Tax in Alabama

Table 1. Alabama Excise Taxes on tobacco products, 2023

Source: ADR, 2023

2023 Alabama Excise Tax	Amount
Pack of cigarettes	\$0.675
Chewing tobacco (per ounce)	\$0.015
Snuff (per ounce)	\$0.020

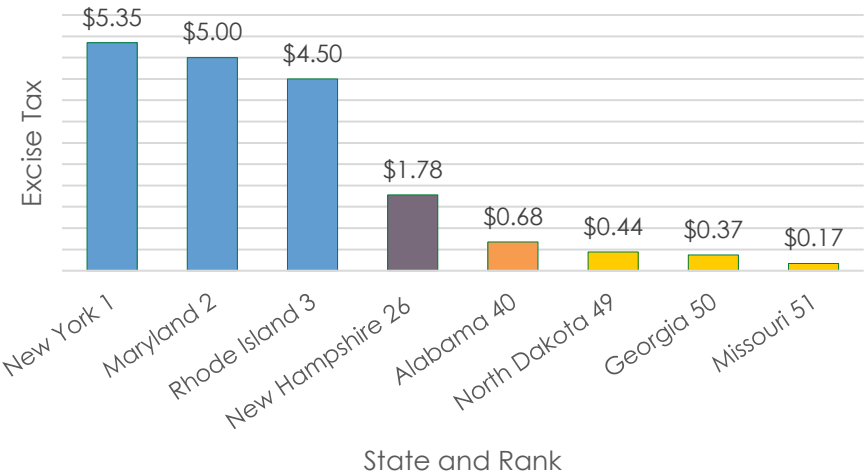
Table 2. Average annual additional revenue generated by 2016 \$.25/pack cigarette excise tax increase in Alabama

Source: ADR, 2023

Period	Average annual tobacco taxes collected
2012-2015	\$126.6 million
2021-2023	\$157.0 million
Average annual increase	\$30.4 million

Figure 9. State excise tax per pack on cigarettes in U.S. states by rank, 2023

Source: CTFK, 2023



The Health Impact of Tobacco

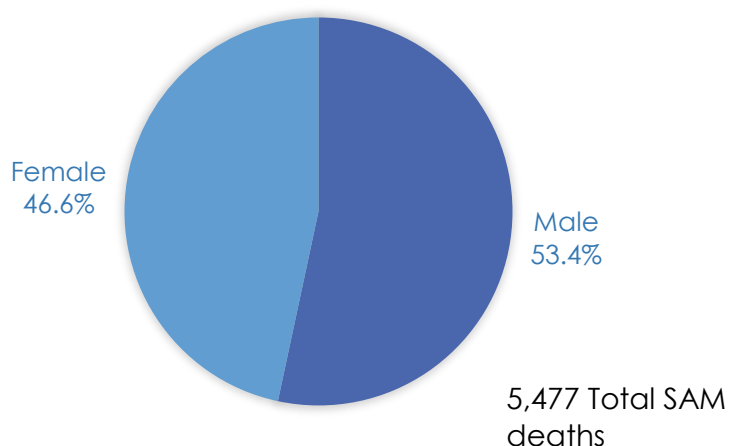
Figure 10. Deaths among adult citizens of Alabama, 2023

Sources: BRFSS, 2023; ACHS, 2022; Lariscy et al, 2019



Figure 11. Smoking-attributable deaths among Alabama adults by gender, 2023

Sources: BRFSS, 2023; ACHS, 2022; Lariscy et al 2019



Smoking-Attributable Mortality (SAM)

According to the Centers for Disease Control and Prevention (CDC), tobacco use has been and continues to be the **leading cause of preventable death in the United States, killing more than 480,000 Americans annually** (Garcia et al., 2024). Smoking Attributable Mortality (SAM) is a measure used by the CDC to estimate the number of deaths directly caused by smoking.

Adult mortality- Figure 10 SAM calculations are based on 2023 tobacco use prevalence data available through the BRFSS (CDC, 2023) and mortality data provided in the 2022 Alabama Vital Statistics Report (ACHS, 2022), as well as tobacco use relative risk of death rates (Lariscy et al, 2019). Employing these statistics as well as smoking attributable fraction formulas (Lilienfeld and Lilienfeld, 1980) it is estimated that 8.8 percent (5,477 deaths) of all 62,241 deaths that occurred in Alabama in 2023 were directly attributable to cigarette smoking-related illness.

Gender-

Figure 11 In 2023, more males than females died of smoking-related causes. Of the 5,477 SAM deaths, it is estimated that 53.4 percent were male deaths and 46.6 percent were female deaths, continuing a shift toward parity between men and women re: SAM.

Note: The percentage of deaths due to smoking and other causes are rounded.

Disease Categories

Smoking-attributable deaths have been causally linked to four main disease categories: cancer, cardiovascular disease, respiratory disease, and diabetes.

Type of disease- Figure 12
In 2023, cardiovascular diseases caused the greatest proportion of adult SAM deaths (3,365 deaths) at 61.4 percent. Cancers (944 deaths), respiratory diseases (832 deaths) and diabetes (336 deaths) were responsible for the remaining 17.2 percent, 17.0 percent, and 6.1 percent of total smoking attributable deaths, respectively.

Disease and gender- Figure 13
More men than women likely experienced SAM due to cancer, cardiovascular disease, and diabetes in 2023 due not only to the higher prevalence of smoking among men but also to the overall higher incidence of these causes of death for men. By contrast, more women than men likely died of smoking attributable respiratory diseases.

Figure 12. Smoking-attributable deaths among Alabama adults by disease category, 2023

Sources: BRFSS, 2023; ACHS, 2022, Lariscy et al 2019

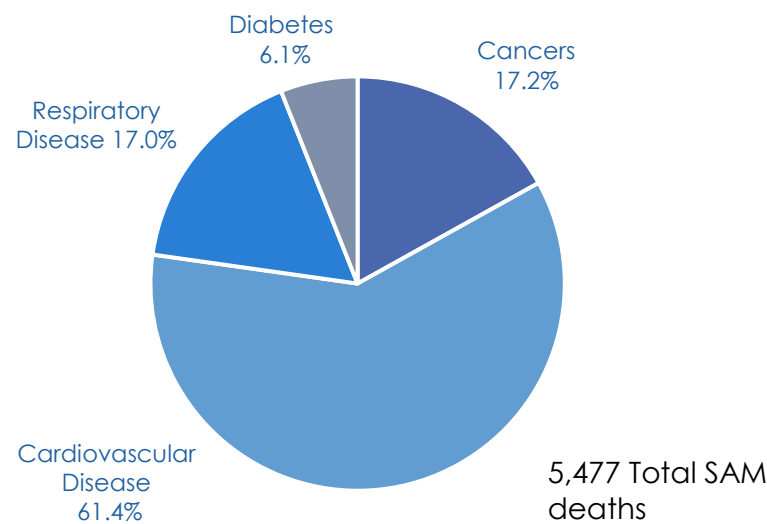


Figure 13. Smoking-attributable deaths among Alabama adults by disease category and gender, 2023

Sources: BRFSS, 2023; ACHS, 2022, Lariscy et al, 2019

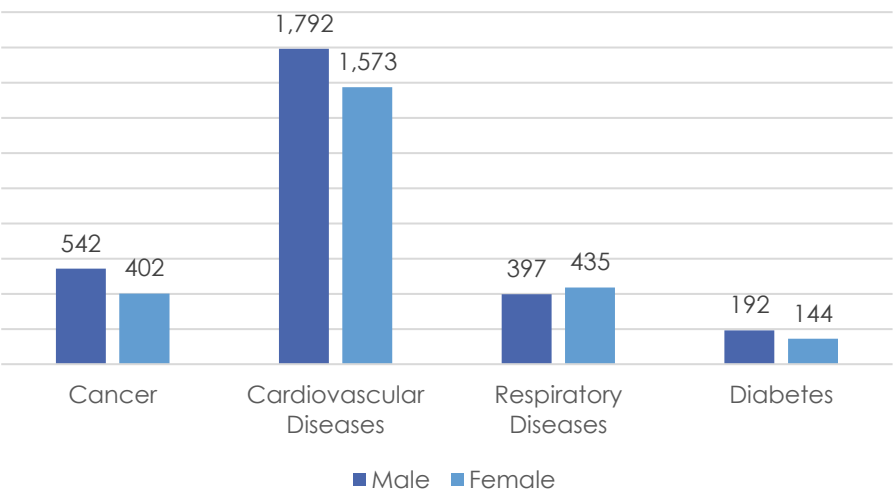


Figure 14. Infant mortality in Alabama, 2023

Source: ADPH, 2023; Sun et al., 2023



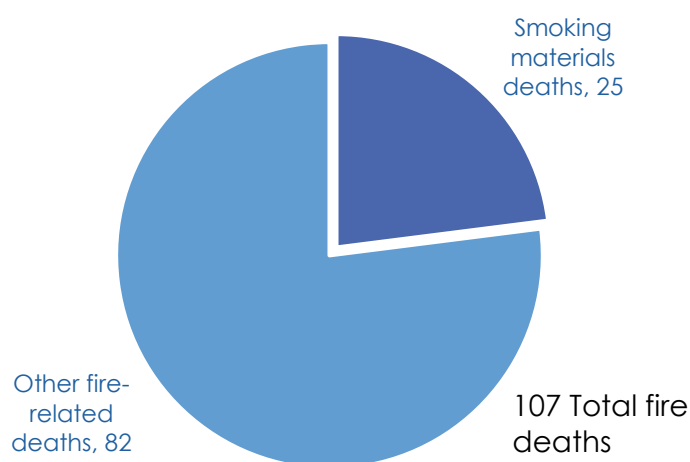
Indirect Smoking-related Deaths

Infant mortality- Figure 14 Cigarette smoking also contributed to deaths among infants in Alabama. Maternal smoking during pregnancy is estimated to be responsible for four percent (18 deaths) of all 449 infant deaths that occurred in Alabama in 2023.

Smoking-attributable infant deaths are stillbirths or neonatal deaths of infants (perinatal deaths) attributable to maternal smoking or to exposure to secondhand or environmental smoke during pregnancy.

Figure 15. Smoking-related fire deaths in Alabama, 2022

Sources: ACHS, 2022; NFPA, 2024



Smoking-related fire deaths-

Figure 15 The Alabama Center for Health Statistics reported that in 2022, 107 residents died from accidental exposure to smoke, fire, and flames. The National Fire Protection Association estimates that approx. 23 percent of all fire-related deaths occur due to smoking materials, resulting in 25 deaths in Alabama in 2022. With 2023 Alabama Vital Statistics data unavailable, it is estimated that this statistic will remain similar in 2023.

Total Smoking-related Deaths - Table 3

In 2023, a total of 6,248 deaths in Alabama were attributable to smoking. Of these deaths, 5,477 were directly related to smoking and 771 deaths were indirectly related to smoking and were caused by secondhand smoke exposure, maternal smoking, or fires.

Causes of death- Figure 16 Comparing deaths attributable to smoking in 2023 with other categories, it is estimated that smoking caused:

- More than six times as many deaths as motor vehicle accidents
- More than seven times as many deaths as were caused by suicides
- Nearly nine times as many deaths as were caused by homicides
- More deaths than have occurred among the U.S. military in Iraq since 2001

Similar-sized populations

The number of smoking-attributable deaths is larger than the populations of towns in Alabama such as Attalla (5,807) and Monroeville (5,598).

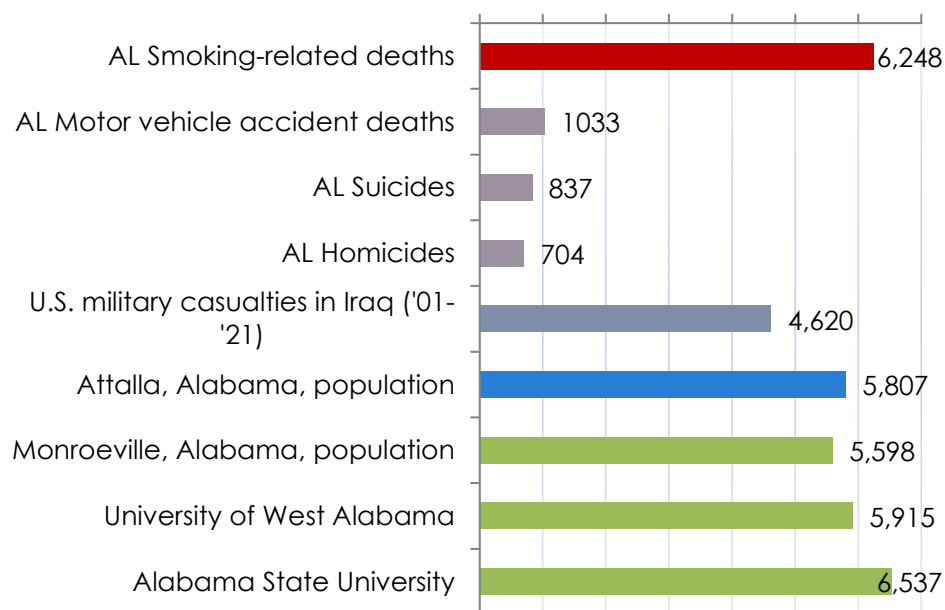
Other similar-sized populations include the enrolled student bodies at the University of West Alabama (5,915 students) and Alabama State University (6,537 students).

Table 3. Total smoking-related deaths in Alabama, 2023

Cause of Death	Number of Deaths
Deaths directly related to smoking	
Cardiovascular disease	3,365
Cancer	944
Respiratory disease	832
Diabetes Mellitus	336
Subtotal Direct	5,477
Deaths indirectly related to smoking	
Secondhand smoke	730
Perinatal conditions- maternal smoking	16
Fires	25
Subtotal Indirect	771
Total deaths	6,248

Sources: CDC, 2021; CDC, 2023; Sun et al 2023, ACHS, 2022; Lariscy et al, 2019; CFTKF, 2017; U.S. DHHS, 2014

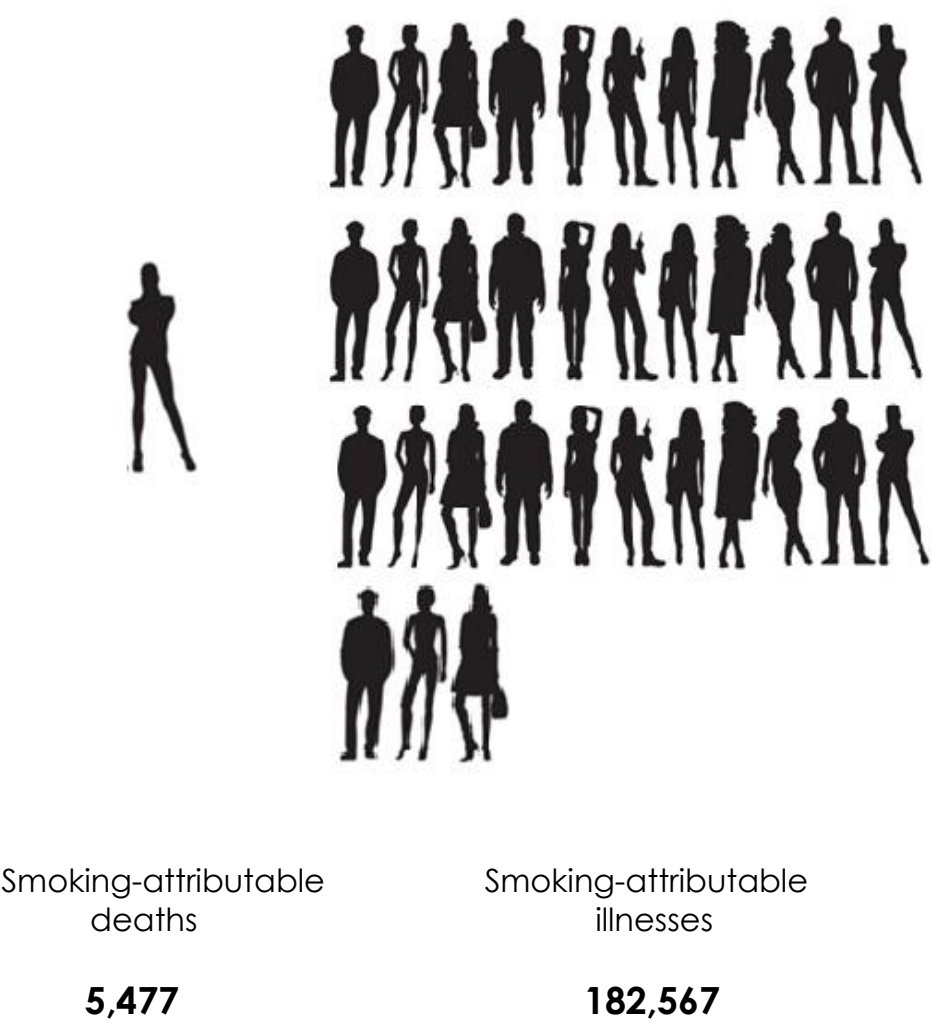
Figure 16. Causes of death by frequency and comparable-sized populations, 2023



Sources: City Populations, <https://worldpopulationreview.com/us-cities/alabama>; University enrollments, ACHS Preliminary Opening Fall Enrollment Report, Fall 2024; Other causes of Death in Alabama, Alabama Vital Statistics 2022; Iraq War deaths, <https://usafacts.org/articles/how-have-military-deaths-changed-over-time/>

Figure 17. Smoking-attributable morbidity among Alabama adults, 2023
(Source: CDC, 2024)

(Ratio of smoking-attributable death to illness 1:33)



Smoking-attributable Morbidity

According to the CDC (2024), 16 million Americans are living with a disease caused by smoking. That amounts to more than 33 people suffering from illnesses including cancer, heart disease, stroke, lung diseases, diabetes, and chronic obstructive pulmonary disease (COPD) for every one person who dies of a smoking-attributable condition. Based current data, this means that approximately 182,567 Alabamians were living with these conditions, and other health-related issues caused by cigarette use in 2023.

Years of Potential Life Lost (YPLL)

Years of Potential Life Lost (YPLL) is a measure of premature death used by the CDC to calculate the total years of life lost among adults who die prematurely from smoking-attributable illnesses. The YPLL data refer to adult smokers in Alabama age 35+ and do not account for deaths due to secondhand smoke or fires.

Disease category- Figure 18
In 2023, a total of 246,647 years of potential life were lost among Alabama adults ages 25-79 due to smoking-attributable illnesses. Cardiovascular disease was responsible for 62 percent (151,515) of the years lost, while cancers accounted for 17 percent (42,520 years), respiratory diseases accounted for 15 percent (37,474), and Diabetes led to 6 percent (15,138) of the potential years lost.

Disease and gender- Figure 19
The YPLL were higher for men than for women for those smokers who died of cancer, cardiovascular, or diabetes. However, YPLL due to respiratory diseases were greater for women than for men. For detailed, gender specific statistics regarding statewide mortality, SAM, and YPLL due to tobacco use, provided by disease category, see Appendix Table A.

Figure 18. Years of potential life lost among Alabama adults aged 25-79 by disease category, 2023

Sources: BRFSS 2023; ACHS, 2022; USDHHS, 2014; Islami et al 2022

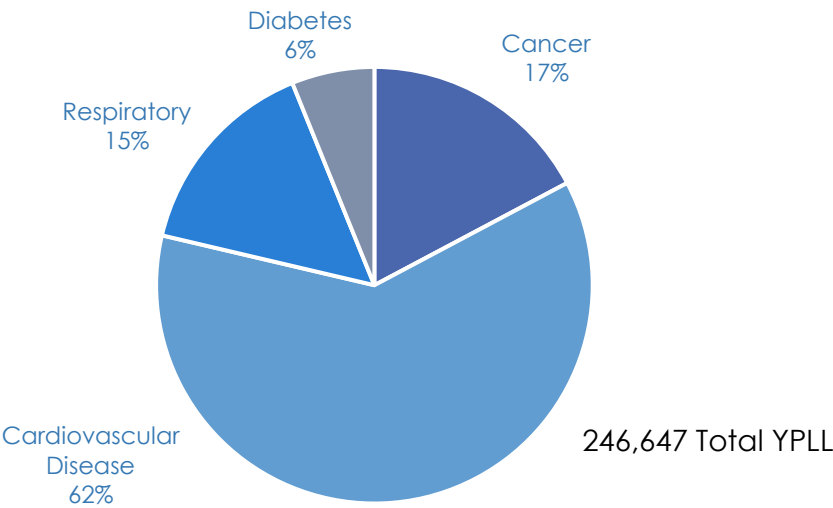
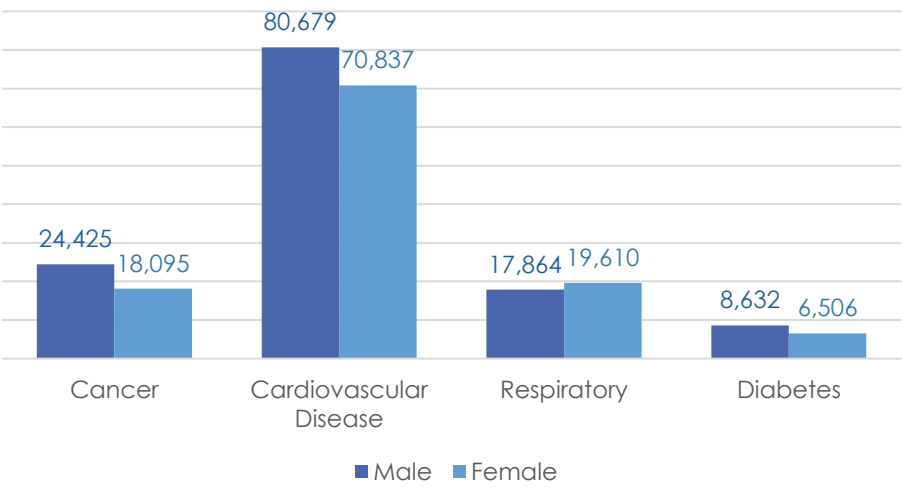


Figure 19. Years of potential life lost among Alabama adults aged 25-79 by disease category and gender, 2023

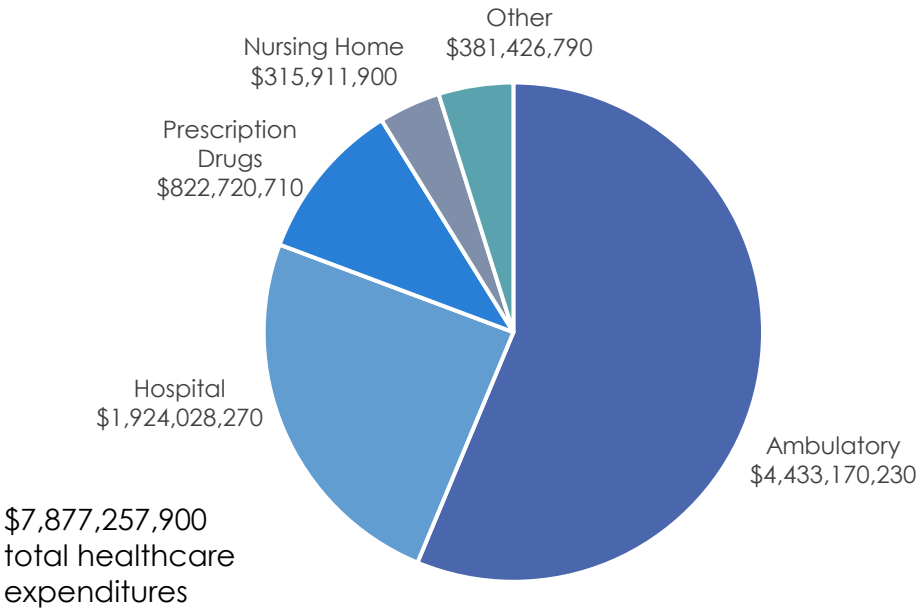
Sources: BRFSS, 2023; ACHS, 2022; USDHHS, 2014, Islami et al 2022



The Economic Impact of Tobacco

Figure 20. Direct medical expenditures attributable to smoking among Alabama adults, 2024*

Sources: CDC, 2016; CMMS, 2020; Miller, 1999



*estimates are adjusted for inflation

Table 4. Alternative purchases that could be made with amount spent on direct medical expenditures attributable to smoking, 2024

Sources: UA, 2024; USCB, 2024

Alternative Purchase	Number
Full-tuition four-year scholarships to the University of Alabama*	173,050
Salaried jobs at \$51,679** each	152,427

*Based on 2024-25 semester tuition rates for residents and excluding the cost of other enrollment fees and of room and board.

**Median salary in Alabama without benefits.

Direct Medical Expenditures Attributable to Smoking

In Alabama, smoking was likely responsible for more than \$7.8 billion in excess adult medical expenditures in 2024 related to ambulatory care (56.3%), hospital care (24.4%), prescription drugs (10.4%), nursing home care (4.0%), and other personal health care expenditures (4.8%) for adults. Though smoking prevalence has significantly declined in Alabama since last report (Dunlap & McCallum, 2019), overall healthcare costs have continued to increase, resulting in greater smoking-attributable healthcare expenditures in Alabama, despite the drop in prevalence.

These expenditures, paid by residents and the state government, are equivalent to costs of:

- \$1,515 for every man, woman, and child in Alabama
- \$4,000 per household
- \$9,958 per smoker in Alabama

Alternative purchases- Table 4
The cost of smoking attributable healthcare in Alabama could better contribute to education and worker salaries, were it not expended for combating preventable illness. For \$7.87 billion the state could provide:

- Over 173,000 full-tuition four-year college scholarships to the University of Alabama
- Over 152,000 salaried jobs could be provided at the state's median income level of \$51,679

Smoking-attributable
Productivity Losses- Fig. 21

Productivity losses account for a significant portion of the economic burden of tobacco in Alabama. Productivity losses include (1) those due to illness for former smokers, (2) those due to illness for current smokers, and (3) those due to deaths of current smokers.

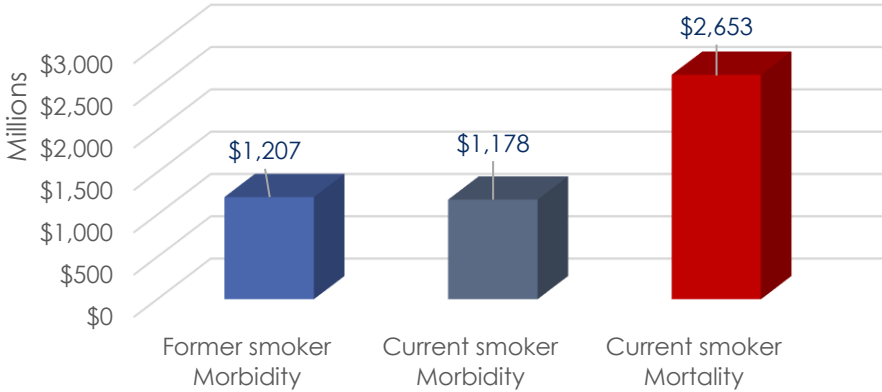
Productivity loss due to illness is derived by comparing smokers, former smokers, and non-smokers for time missed from work, unproductive time at work, inability to work, and household productivity losses (Shrestha et al., 2022). In 2024, former smokers were responsible for over \$1.2 billion and current smokers for more than \$1.1 billion in productivity losses due to smoking attributable illnesses. Current smoker productivity loss due to premature death amounted to \$2.6 billion, for a total of over \$5 billion in economic productivity lost.

Secondhand Smoke
Expenditures-Table 5

Exposure to secondhand smoke is also linked to premature death and disease. It is estimated that secondhand smoke was responsible for \$143.3 million in medical costs due to excess morbidity and \$134.7 million in productivity losses due to excess mortality and disability in 2024.

Figure 21. Monetary Morbidity- and Mortality-Related Productivity Losses Due to Tobacco Use in Alabama, 2024

Sources: CDC BRFSS, 2023; AECF, 2023; Rumberger, 2010; Shrestha, 2022



Total Productivity Losses = \$5,038,309,086

Table 5. Medical expenditures attributable to secondhand smoke in Alabama, 2024*

Source: Behan et al., 2005

Category	Morbidity	Direct Medical Cost of Excess Morbidity	Cost of Excess Mortality and Disability
Cancer	Lung cancer	\$5,486,390	\$13,479,097
	Cervical cancer	\$397,343	\$3,163,462
Respiratory system	Asthma	\$22,220,643	\$4,630,574
	Otitis media	\$1,528,242	\$0
Chronic pulmonary disease		\$34,935,619	\$25,475,799
Cardiovascular system	Coronary heart disease	\$70,513,100	\$79,147,669
Peri/Post-natal manifestations	Low birth weight	\$8,160,814	\$8,772,111
	Miscarriage		
	SIDS		
Subtotal		\$143,272,716	\$134,668,712
Total Cost*			\$277,941,428

*estimates are adjusted for inflation

Table 6. Total smoking-attributable economic costs in Alabama, 2024*

Sources: CMMS, 2020; Miller et al., 1999; Adams et al., 2002; U.S. BLS, 2024; Bunn et al., 2006; Behan et al., 2006; CDC BRFSS, 2023; AECF, 2023; Rumberger, 2010; Shrestha, 2022

Smoking-attributable Costs	Total
Direct Costs	
Adult healthcare expenditures	
Ambulatory care	\$4,433,170,230
Hospital care	\$1,924,028,270
Prescription drugs	\$822,720,710
Nursing care	\$315,911,900
Other care	\$381,426,790
Total Direct Costs	\$7,877,257,900
Indirect Costs	
Productivity losses due to smoking	
Losses due to premature mortality	\$2,653,323,821
Losses due to illness	\$2,384,985,265
Subtotal productivity losses	\$5,038,309,086
Secondhand smoke	
Healthcare expenditures	\$143,272,716
Productivity losses	\$134,668,712
Subtotal secondhand smoke	\$277,941,428
Total Indirect Costs	\$5,316,250,514
Total Economic Costs	\$13,193,508,414

*estimates are adjusted for inflation

Total Economic Costs-
Table 6

The total economic impact of tobacco in Alabama is estimated at over \$13 billion.

Direct costs

Adult personal health care expenditures account for 60 percent (\$7.88 billion) of the total economic cost of tobacco in Alabama.

Indirect costs

Productivity losses to smokers, due to premature death and to illness attributed to smoking, account for 38 percent (\$5.04 billion) of the total economic cost of tobacco in Alabama.

The indirect costs of secondhand smoke, including healthcare expenditures and productivity losses among non-smokers caused by secondhand smoke exposure, accounted for two percent (\$277.9 million) of the total economic costs of smoking in Alabama.

Methodology and Limitations

Smoking Prevalence

Smoking prevalence data were taken from CDC's Behavioral Risk Factor Surveillance System (BRFSS) from the year 2023 (CDC, 2023). BRFSS categorizes smokers using two questions: (1) "Have you smoked at least 100 cigarettes in your entire life?" and (2) "Do you now smoke cigarettes every day, some days, or not at all?" Current smokers are those who reported ever smoking 100 cigarettes *and* who currently smoke every day or some days. Former smokers are those who reported ever smoking 100 cigarettes but who currently do not smoke. Never smokers are those who reported never having smoked 100 cigarettes in their lifetime. In order to increase accuracy, respondents who refused to answer or answered "don't know" to question (1) were excluded from the analysis. The BRFSS data are also weighted to account for problems of non-coverage and non-response among segments of the population.

Smoking Attributable Fraction (SAF) and Smoking-Attributable Mortality (SAM) Estimates

The Smoking-Attributable Fraction (SAF) is defined as the proportion of deaths for a particular disease that are attributed to smoking. The number of deaths for each disease category is multiplied by the corresponding SAF to produce estimates of Smoking-Attributable Mortality (SAM). SAM estimates were derived using the number of deaths for specific disease categories (ACHS, 2022; WHO, 2018) and a smoking-attributable fraction SAF formula (CDC, 2024; Lilienfeld & Lilienfeld, 1980):

$$SAF = [(p0 + p1(RR1) + p2(RR2)) - 1] / [p0 + p1(RR1) + p2(RR2)]$$

$$SAM = \text{Number of deaths} \times SAF$$

	Adult SAF	Neonatal SAF
p0	Percentage of adult never smokers in study group	Percentage of maternal nonsmokers in study group
p1	Percentage of adult current smokers in study group	Percentage of maternal smokers in study group
p2	Percentage of adult former smokers in study group	Not applicable
RR1	Relative risk of death for adult current smokers relative to adult never smokers	Relative risk of death for infants of maternal smokers relative to infants of maternal nonsmokers
RR2	Relative risk of death for adult former smokers relative to adult never smokers	Not applicable

Years of Potential Life Lost (YPLL)

Estimates for Years of Potential Life Lost (YPLL) attributed to smoking were produced using data from Islami et al., (2022), who estimated the smoking-attributable cancer YPLL for each state. Total deaths and proportions of deaths caused by each smoking-attributable disease (ACHS, 2022) in Alabama were calculated and applied to these estimates to derive the YPLL to each disease for each gender.

Smoking-Attributable Healthcare Expenditures

Direct medical costs of smoking-attributable adult healthcare were calculated based on National Health Expenditure Accounts (NHEA) data available from the Centers for Medicare and Medicaid Services (CMMS, 2020). These data include official estimates of total health care spending in the U.S., listed by state and service category. Five major expenditure categories are used for its estimates: ambulatory care, hospital care, prescription drugs, nursing home care, and other care. Other care includes home health, nonprescription drugs, and nondurable medical products.

Smoking-attributable fractions (SAF) for each expenditure category, developed and published by Miller et al. (1999) were applied to NHEA data for Alabama to estimate the SAF of medical costs for the state in 2020, the most recent data available. The SAFs are equal to the proportion of annual personal health care expenditures that would be avoided if smoking did not occur within the population. These amounts were adjusted for inflation to 2024 dollars using the U.S. Bureau of Labor Statistics inflation calculator (U.S. BLS, 2025).

This procedure allowed the recreation of estimates comparable to those presented in the previous version of this report (Dunlap & McCallum, 2019) which were similarly calculated with earlier, published estimates. Such costs are referred to as smoking-attributable expenditures (SAE) and are defined as the excess personal health care costs of smokers and former smokers compared with those of individuals who have never smoked.

Smoking-attributable neonatal healthcare expenditures were sourced from Adams et al. (2002) who estimated these costs for each state based on data available from the CDC's Pregnancy Risk Assessment Monitoring System (PRAMS) database. These estimates were also adjusted to 2024 dollars.

Fire-related Deaths

Deaths caused by smoking-related fires were estimated using the national percentage of fire deaths caused annually by smoking materials (NFPA, 2024) and the number of total deaths caused by fire in Alabama in 2022 (ACHS, 2022).

Secondhand Smoke (SHS)

Mortality Estimates

Estimates for mortality due to secondhand smoke exposure in Alabama were calculated using national estimates from the CDC (2020) of annual deaths attributable to SHS in two disease categories: Ischemic heart disease and lung cancer. The Alabama estimate was produced by multiplying the total number of secondhand smoking-attributable deaths in the U.S. by the proportion of the U.S. smoking population that resides in Alabama. The population estimates used to derive this proportion came from U.S. Census Bureau data for 2024 (USCB, 2024).

Economic Costs

The economic costs of secondhand smoke were derived using national estimates from Behan et al. (Behan, Eriksen, & Lin, 2005). Behan et al. used data on U.S. population exposure to secondhand smoke and disease-specific relative risk estimates to measure excess morbidity in the United States. Average total costs were assigned to each disease category in the model and the average cost per disease was then multiplied by the excess number of cases per disease to estimate the annual direct medical cost of exposure to secondhand smoke for each disease.

In order to derive estimates for Alabama, the estimated excess economic costs of morbidity and of mortality and disability were multiplied by the proportion of the U.S. population that resides in Alabama. The population estimates were taken from the U.S. Census bureau (USCB, 2024). Finally, the estimates were adjusted for inflation to 2024.

Productivity Losses

Mortality

Productivity losses resulting from smoking-attributable mortality were calculated using Bureau of Labor Statistics estimates of smokers and former smokers in the workforce in Alabama (U.S. BLS, 2024) and dollar amount estimates of workforce productivity lost per smoker and former smoker compared to non-smokers developed by Penn State University (Rumberger et al, 2010). Estimates were then adjusted to 2024 dollars (U.S. BLS, 2024).

Morbidity (Illness)

In order to calculate losses in workplace productivity due to morbidity, data were taken from research conducted by Bunn et al. (Bunn et al., 2006). Bunn et al. studied the negative economic impact of cigarettes in the workplace and determined the cost of health-related productivity losses through a large cross-sectional study of employees throughout the United States. Calculations for productivity loss are derived by observing the time missed from work (absenteeism) and unproductive time at work due to illness (presenteeism) among smokers, former smokers, and non-smokers. Bunn et al. found that the annual average costs of lost productivity for current smokers and former smokers above that of non-smokers, were \$1807 and \$623 respectively. Labor force data for employed workers in Alabama again came from the Bureau of Labor Statistics (U.S. BLS, 2024). The smoking prevalence rate for the year 2023 was taken from BRFSS data and the percentages of current and former smokers were 14.2 percent and 23.9 percent respectively, as estimated by the CDC (2023). The following equation was used to calculate losses in workplace productivity due to illness:

$$\# \text{ of smokers in the workforce} \times \text{Net loss per smoker} = \text{Total productivity loss}$$

This equation is used separately for current smokers and former smokers. Estimates were adjusted for inflation to 2024.

Limitations

Fire-related Deaths

- Estimates for fire-related deaths were derived from the national estimates as state-level data were not available for Alabama.

Productivity losses due to Illness

- In the study by Bunn et al., the figure used in the model for hourly compensation was higher than the national average.
- The labor force data taken from the BLS does not account for part-time workers.

Secondhand Smoke

- Mortality and economic impact estimates due to secondhand smoke were derived from national estimates because specific population attributable risk (PAR) figures were not available for Alabama. Estimates were only produced for a limited number of disease categories.

Glossary

Absenteeism

Time missed at work due to smoking-related illness.

Behavioral Risk Factor Surveillance System (BRFSS)

A nationwide health survey system which operates in all fifty U.S. states tracking health conditions and risk behaviors.

Current Adult Smokers

Individuals who have smoked over 100 cigarettes in their lifetime *and* who currently smoke every day or some days.

Former Smoker

Individuals who have smoked over 100 cigarettes during their lifetime *and* who currently do not smoke.

Maternal Smoker

A mother who indicated having smoked during her pregnancy.

Never Smokers

Individuals who have never smoked 100 cigarettes during their lifetime.

Perinatal healthcare expenditures

Healthcare expenditures relating to the time, usually a number of weeks, immediately before and after birth

Presenteeism

Unproductive time at work due to smoking-related health conditions.

Productivity losses due to illness

The present value of losses in future earnings and unpaid household production, forgone due to smoking-attributable illness.

Productivity losses due to premature death

The present value of losses in future earnings and unpaid household production, forgone due to smoking-attributable premature death.

Smoking-Attributable Mortality (SAM)

The number of deaths attributable to cigarette smoking within 19 disease categories for which smoking has been causally linked.

Smoking-Attributable Mortality, Morbidity, and Economic Costs (SAMMEC)

Monetary amounts representing the health and economic impact of smoking within selected populations.

Smoking prevalence

The percentage of current smokers within a selected population.

Years of Potential Life Lost (YPLL)

The difference between average life expectancy and actual years lived among residents who died prematurely from smoking-attributable illnesses.

Youth Risk Behavior Survey (YRBS)

A state survey which gathers data from middle and high school students regarding their use of tobacco, smoking cessation, knowledge and attitudes about tobacco, exposure to secondhand smoke, and familiarity to media messages.

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Appendix

Table A. Total deaths, SAM deaths, and YPLL among Alabama adults by disease type and gender, 2023*

Sources: CDC, 2023; ACHS, 2022; U.S. DHHS, 2014; Islami et al 2022

Disease Category	Female			Male			Total		
	Deaths 2022	SAM 2022	YPPL 2023	Deaths 2022	SAM 2022	YPPL 2023	Deaths 2022	SAM 2022	YPPL 2023
Malignant Neoplasms									
Lip, Oral Cavity, Pharynx	73	15	675	153	31	1,414	226	46	2,089
Esophagus	42	9	388	192	39	1,774	234	48	2,162
Stomach	80	16	739	109	22	1,007	189	39	1,747
Pancreas	364	75	3,364	385	79	3,558	749	154	6,922
Larynx	16	3	148	61	13	564	77	16	712
Trachea, Lung, Bronchus	1,116	229	10,314	1,392	286	12,864	2,508	515	23,178
Cervix, Uteri	102	21	943	0	0	0	102	21	943
Kidney and Renal Pelvis	85	17	785	145	30	1,340	230	47	2,126
Urinary Bladder	80	16	739	206	42	1,904	286	59	2,643
Subtotal	1,958	944	18,095	2,643	542	24,426	4,601	944	42,520
Cardiovascular Diseases									
Ischemic Heart Disease	1,939	398	17,919	2,995	615	27,678	4,934	1,013	45,598
Other Heart Disease	3,728	765	34,452	4,061	833	37,530	7,789	1,598	71,982
Cerebrovascular Disease	1,826	375	16,875	1,459	299	13,484	3,285	674	30,359
Atherosclerosis	42	9	388	41	8	379	83	17	767
Aortic Aneurysm	53	11	490	91	19	841	144	30	1,331
Other Arterial Disease	77	16	712	83	17	767	160	33	1,479
Subtotal	7,702	2,388	70,836	8,730	1,792	80,678	16,395	3,365	151,515
Respiratory Diseases									
Pneumonia, Influenza	458	94	4,233	496	102	4,584	954	196	8,816
Bronchitis, Emphysema	60	12	554	71	15	656	131	27	1,210
Other Lower Respiratory	1,604	329	14,823	1,366	280	12,624	2,970	610	27,447
Subtotal									
Diabetes Mellitus	704	144	6,506	934	192	8,632	1,638	336	15,138
Total	12,449	2,555	115,047	14,240	2,922	131,600	26,689	5,477	246,647

*Death statistics and SAM estimates are based on 2022 data while YPLL estimates are based on tobacco use data from 2023