

# Socioeconomic and Socio-demographic patterns in smoking cessation behavior in the United States

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# 1 Methods

## 1.1 Variable Selection and Summary Statistics

### 1.1.1 *Installing R and Dependent packages*

Analyses was done using R version 4.0.4 (2021-02-15) – “Lost Library Book” Copyright (C) 2021 and Rstudio Version 1.4.1106 © 2009-2021 RStudio, PBC. Installers and instructions for R can be found at the [cran website link](#). To install Rstudio, please click this [R studio link](#). Analyses depends on installing the latest version of the following R packages:

- tidyverse; This package helps for wrangling data and working easily with data tables. Installing the tidyverse would avoid installing sub-packages like ggplot(for visualization), dplyr(wrangling data, sql/table joining competencies) and others
- survey; This package helps with working with survey data.
- knitr: In this analysis, knitr was used to make reports in HTML and pdf format. knitr can help with create slides, word documents and others if needed.
- lubridate: lubridate package helps with formatting dates to human readable format. In the analysis, the lubridate package was used to extract the dates smoking quitters actually quit smoking.
- broom: broom makes models cleaner and more human readable and tidy. I used broom in some cases to report coefficients of regression models.
- kableExtra: for designing good looking tables

To read the full documentations of any package please type `?packagename` to your R or R studio console. Run the code below on R or R studio to install needed packages;

```
# To install needed Libraries, please run the following code in R or Rstudio
installed_pkgs <- row.names(installed.packages())
pkgs <- c("tidverse", "survey", "knitr", "lubridate", "broom", "kableExtra")
for(p in pkgs){
  if(!(p %in% installed_pkgs)){
    install.packages(p, repos = "http://cran.us.r-project.org")
  }
}
```

### 1.1.2 *Selecting and Merging Data Sets*

The aim of this analysis is to investigate socio-economic and socio-demographic indicators of smoking cessation in the United States. To achieve this, we used cross-sectional survey data from the National Health Interview Statistics(NHIS) for the year 2018. The NHIS collects health related survey data from households in the United States. The data and documentation can be found [here](#). We extracted possible socio-economic and socio-demographic

variables from Household, Family, Person and Adult data files. The household data variables was merged with the family data variables using the “SRVY\_YR” and “HHX” columns. The resulting data set was merged with the adult data variables using “SRVY\_YR”, “HHX” and “FMX” columns. Finally, we merged the resulting data set with the person data variables using “SRVY\_YR”, “HHX”, “FMX” and “FPX” columns. It is important to follow the sequence of these joins to produce an optimal data set. The final merged data set had 75 variables and 25417 observations.

For regression modeling, we excluded observations where age was less than 25 years old. Also, we only included observations where the respondents identified as former or current smokers. The resulting data set had 9761 observations after adjusting for age and smoking status.

### 1.1.3 *Survey design using survey weights*

To make our analysis representative of the United States population, we created a survey design as specified by NHIS to account for sampling weights and stratification.

```
nhis18_design <- svydesign(id = ~PPSU, strata = ~PSTRAT, nest = TRUE,
                        weights = ~WTFA_SA, data = nhis18_modelling)
```

### 1.1.4 *Socio-demographic variables*

We included the following socio-demographic indicators in our analysis; Region, Gender, Age group, Race group, Sexual Orientation and Mental Health. Each individual in our sample self reported their age in years. We grouped the self reported age in 3 categories; 25-44, 45-65, 65 and older. The Region variable indicated what region in the United States each person resides. Participants came from the Midwest, Northeast, South or West Region.

Each person stated what best describes their sexual orientation. Participants identified as Gay/Lesbian, Straight, Bisexual or Something else. Individuals who identified as straight formed a group and individuals with other sexual identities were grouped as “Others”. Racial identity was classified as “White”, “Black/African American” and “Other”. “Other” covered Asian, Alaskan and Indian American, Hispanic and Multiple races.

We used depression and anxiety status to determine mental health. Participants were asked if they were depressed daily, weekly, monthly, a few times a year or Never. The same question was asked about anxiety. In our analysis, a person has a mental health problem if they affirmed to having depression or anxiety daily, weekly or monthly.

### 1.1.5 *Socio-economic variables*

In the NHIS survey, each person was asked about their highest level of education. Answers ranged from “Never attended/kindergarten only” to “Doctoral degree”. We classified educational level as “<HS Grad” if the person attained lower than an high school education,

“HS Grad” if the person graduated from high school or passed the GED, “<College Grad” if a person attended some college but did not attain a degree, and “College Grad+” if the person has a college diploma or higher.

NHIS survey collected data on the ratio of family income to Federal poverty level(FPL) for each individual. The ratio ranged from less than 0.50 to 5.0 and over. We classified individuals into 4 groups based on their ratio of family income to FPL; “<100%” for ratio of 1.0 or less, “100 - 200%” for ratios between 1.0 and 2.0, “200 - 400%” for ratios between 2.0 and 4.0, and “>400%” for ratio above 4.0. We also classified individuals based on their family income. We grouped family income as “\$0 - \$34,999”, “\$35,000 - \$74,999”, “\$75,000 - \$99,999” and “\$100,000 and over”.

We used House ownership as a proxy for wealth. We classified house ownership as “Yes” if the participant stated that they owned or bought the house they currently live and “No” if the house was rented or other arrangements were made.

Each person was asked 10 questions about their food security. For each question, answers of “often true”, “sometimes true” and “yes” was considered as an affirmation for having food security challenges. The total affirmative answers was used to create a food security score. In our model, a person’s food security is low if they scored at least 3, and high if they scored less than 3.

### **1.1.6 Outcome Variables**

Our first outcome of interest was smoking quit rates. Quit rate is defined as the number of people who quit smoking per total number of people in our sample. In the NHIS survey, a current or former smoker is a person who reports smoking at least a 100 cigarettes in their lifetime. This person is further asked if they now smoked cigarettes everyday, some days or not at all. A “current everyday smoker” is a person who has smoked at least a 100 cigarettes in their lifetime and still smokes everyday. A “current some day smoker” is a person who has smoked at least a 100 cigarettes in their life time and still smokes on some days. A “former smoker” is a person who has smoked a 100 cigarettes in their life time but does not smoke anymore. Former smokers were asked to report how long it has been since they quit smoking. Answers were reported in days, weeks, months and year(s) time period and the “number of units” for each time period. We use the time period and units to calculate the days since quit smoking, then we converted the days to months. For example, if a person reports that they quit smoking for weeks and the number of units is 3, then the person has quit smoking for 3 weeks or approximately a month. In our analysis, current smokers are current everyday and current someday smokers.

We looked at quit rate outcomes for different time periods; at less than a year (11 months and below), at least 6 months and at least a year (12 months and above). For each quit time period, we created smaller data sets that were a subset of our original data set. For quitting less than a year, we excluded those that quit smoking for more than a year. For quitting at least 6 months, we excluded those that quit smoking for less than 6 months. Finally, for quitting for at least a year, we excluded those who quit smoking for less than a year.

Our second outcome of interest was attempt to quit smoking. Each adult was asked “In the past 12 months, have you stopped smoking for more than one day because you were trying to quit smoking?”. A person has attempted to quit smoking if they answered “Yes”.

Table 1: Summary statistics of study sample

—	Freq	%
<b>Education</b>		
<HS Grad	1019	10.5
HS Grad	3098	31.8
<College Grad	3231	33.2
College Grad+	2381	24.5
<b>Sex</b>		
Men	5107	52.3
Women	4654	47.7
<b>Region</b>		
Midwest	2529	25.9
Northeast	1596	16.4
South	3555	36.4
West	2081	21.3
<b>Age</b>		
25-44	2670	27.4
45-64	3602	36.9
65+	3489	35.7
<b>Race</b>		
White	8135	83.5
Black/African American	964	9.9
Other	639	6.6
<b>Ratio of Income to FPL</b>		
<100%	1191	13.0
100 - 200 %	1844	20.1
200 - 400 %	2725	29.7
>400%	3428	37.3
<b>sexual orientation</b>		
Straight	9108	95.2
Other	458	4.8
<b>Mental Health Problem</b>		
No	7767	82.1
Yes	1696	17.9
<b>House Ownership</b>		
No	3405	34.9
Yes	6341	65.1
<b>Food Security</b>		
High	8575	87.8
Low	1186	12.2
<b>Income Group</b>		
\$0-34,999	3383	37.4
\$35,000 - 74,999	2780	30.7
\$75,000 - 99,999	1180	13.0
\$100,000 and over	1709	18.9
<b>Health insurance coverage</b>		
Private	5480	56.3
Medicaid (includes dual eligibles)	1292	13.3
Medicare Only	1115	11.5
Other Coverage	918	9.4
Uninsured	931	9.6

## 1.2 Statistical Analysis

The following multiple logistic regression formula was used to assess the relationship between socio-economic and socio-demographic indicators on quit outcomes.

$$P(Y = 1|X = x) = \frac{\exp(\beta_o + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n)}{1 + \exp(\beta_o + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n)}$$

X represents our independent variables(socio-economic and socio-demographic variables). Independent variables include Region, Age, Education, Income Ratio to FPL, sexual orientation, mental health problems, Race, House ownership, Family Income and Food security. We created a vector of dummies for each independent variable. We studied 4 smoking related quit outcomes; probability of quitting for less than a year, probability of quitting for at least 6 months, probability of quitting for at least a year, and the probability of attempting to quit smoking. For the first 3 outcomes, Y takes the value of “1” if a person quits smoking and the value of “0” if a person does not quit smoking in the different time periods. For attempt to quit smoking, Y takes the value of “1” if a person attempts to quit smoking for more than one day in the last year and “0” otherwise.

We estimated the adjusted odds ratio with a 95% confidence interval for quitting and attempts to quit for each comparison of our independent variables. For example, we estimated the odds of quitting smoking when food security is low compared versus high. All estimates in our analysis was weighted using NHIS recommendations as described earlier. Statistical significance was tested at a p-value of 0.1. The resulting model was used to estimate Adjusted Quit rates and Adjusted Quit attempts with a 95% confidence interval.



## 2 Results

### 2.1 Recent Successful Cessation

We defined a recent successful cessation as a person who smoked in the past year but has quit smoking for at least 6 months in the past year. The denominator includes all recent successful quits and current smokers. Generally, recent successful cessation rate was 6.4% (table 3). As education level increased, the recent successful cessation increased ranging from 3.4% among those with less than an High school degree to 12.1% among those with at least a college degree. Black people were less successful at recent cessation (4.7%) compared to white people (6.6%). People with higher income had more success at smoking cessation than people who had lower income (table 3). Uninsured people had the second lowest recent cessation rate (4.6%) and, people with private insurance had the highest (8.2%). Medicaid patients had the second lowest recent cessation rate (3.4%).

Table 2: Adjusted Odds Ratio estimates for Quit Smoking less than a Year

term	Adjusted odds ratio	statistic	p value
(Intercept)	0.06 ( 0.026 - 0.14 )	-6.514	0.000
REGIONNortheast	1.078 ( 0.637 - 1.824 )	0.279	0.781
REGIONSouth	1.063 ( 0.661 - 1.71 )	0.254	0.800
REGIONWest	1.02 ( 0.578 - 1.799 )	0.067	0.947
AGE45-64	0.428 ( 0.275 - 0.667 )	-3.758	0.000
AGE65+	0.957 ( 0.544 - 1.686 )	-0.151	0.880
SEXWomen	1.028 ( 0.734 - 1.439 )	0.158	0.875
EDUCATIONHS Grad	1.308 ( 0.631 - 2.709 )	0.722	0.471
EDUCATION<College Grad	1.583 ( 0.767 - 3.268 )	1.243	0.215
EDUCATIONCollege Grad+	2.587 ( 1.184 - 5.652 )	2.383	0.018
‘INCOME RATIO TO FPL’100 - 200 %	0.945 ( 0.485 - 1.84 )	-0.166	0.868
‘INCOME RATIO TO FPL’200 - 400 %	1.094 ( 0.501 - 2.386 )	0.225	0.822
‘INCOME RATIO TO FPL’>400%	0.985 ( 0.37 - 2.624 )	-0.031	0.975
‘SEXUAL ORIENTATION’Other	0.904 ( 0.48 - 1.704 )	-0.312	0.755
‘MENTAL HEALTH PROBLEM’Yes	1.365 ( 0.9 - 2.071 )	1.465	0.144
RACEBlack/African American	0.704 ( 0.359 - 1.378 )	-1.025	0.306
RACEOther	1.149 ( 0.668 - 1.974 )	0.502	0.616
HOUSEOWNYes	0.966 ( 0.635 - 1.47 )	-0.160	0.873
‘INCOME GROUP’\$35,000 - 74,999	0.91 ( 0.505 - 1.639 )	-0.314	0.754
‘INCOME GROUP’\$75,000 - 99,999	1.103 ( 0.466 - 2.61 )	0.223	0.824
‘INCOME GROUP’\$100,000 and over	1.607 ( 0.686 - 3.763 )	1.092	0.275
‘FOOD SECURITY’Low	0.759 ( 0.423 - 1.363 )	-0.923	0.356
COVERAGEMedicaid (includes dual eligibles)	0.604 ( 0.334 - 1.091 )	-1.670	0.096
COVERAGEMedicare Only	0.787 ( 0.336 - 1.842 )	-0.553	0.580
COVERAGEOther Coverage	0.939 ( 0.519 - 1.698 )	-0.208	0.835
COVERAGEUinsured	0.723 ( 0.401 - 1.303 )	-1.079	0.281

<sup>1</sup> Variables colored red are statistically significant at  $\alpha \leq 0.1$

Table 3: Adjusted and Unadjusted Quit Rates for Quitting Smoking less than a year

-	Unadjusted Quit Rate (%)	Adjusted Quit Rate (%)
Total	6.6 ( 5.8 - 7.4 )	6.4 ( 1.6 - 11.2 )
<b>Region</b>		
Midwest	6.6 ( 5.1 - 8.1 )	6.1 ( 1.4 - 10.8 )
Northeast	7.8 ( 5.6 - 10 )	7.1 ( 1.9 - 12.3 )
South	6 ( 4.8 - 7.2 )	6.1 ( 1.5 - 10.6 )
West	6.8 ( 5 - 8.6 )	6.9 ( 1.6 - 12.2 )
<b>Age</b>		
25-44	8.8 ( 7.4 - 10.2 )	8.7 ( 2.5 - 14.8 )
45-64	4.1 ( 3.1 - 5.1 )	3.7 ( 0.8 - 6.7 )
65+	7.7 ( 5.8 - 9.6 )	7.6 ( 1.4 - 13.8 )
<b>Sex</b>		
Men	6.7 ( 5.6 - 7.8 )	6.4 ( 1.6 - 11.2 )
Women	6.5 ( 5.4 - 7.6 )	6.4 ( 1.5 - 11.2 )
<b>Education</b>		
<HS Grad	3.1 ( 1.6 - 4.6 )	3.4 ( 0 - 6.8 )
HS Grad	5.7 ( 4.5 - 6.9 )	4.9 ( 1 - 8.7 )
<College Grad	6.9 ( 5.5 - 8.3 )	6.5 ( 1.7 - 11.4 )
College Grad+	11 ( 8.5 - 13.5 )	12.1 ( 3.9 - 20.2 )
<b>Ratio of Income to FPL</b>		
<100%	4.8 ( 3.2 - 6.4 )	4 ( 0.4 - 7.7 )
100 - 200 %	5.2 ( 3.7 - 6.7 )	4.9 ( 0.8 - 9.1 )
200 - 400 %	6.9 ( 5.4 - 8.4 )	6.8 ( 1.7 - 12 )
>400%	8.3 ( 6.6 - 10 )	8.9 ( 2.9 - 14.8 )
<b>Mental health problem</b>		
No	6.5 ( 5.6 - 7.4 )	6.2 ( 1.6 - 10.8 )
Yes	6.6 ( 4.9 - 8.3 )	6.9 ( 1.4 - 12.3 )
<b>Race</b>		
White	6.6 ( 5.7 - 7.5 )	6.7 ( 1.8 - 11.5 )
Black/African American	4.7 ( 2.8 - 6.6 )	4 ( 0.2 - 7.8 )
Other	9.5 ( 6.1 - 12.9 )	7.5 ( 1.2 - 13.7 )
<b>Home Ownership</b>		
No	6.1 ( 5 - 7.2 )	5.8 ( 1.2 - 10.5 )
Yes	7 ( 5.9 - 8.1 )	6.9 ( 1.9 - 11.9 )
<b>Income Group</b>		
\$0-34,999	5.1 ( 4.1 - 6.1 )	4.8 ( 0.7 - 8.9 )
\$35,000 - 74,999	6.2 ( 4.8 - 7.6 )	6.3 ( 1.6 - 11 )
\$75,000 - 99,999	8.6 ( 5.9 - 11.3 )	7.8 ( 2.3 - 13.4 )
\$100,000 and over	10 ( 7.2 - 12.8 )	11.3 ( 4.2 - 18.4 )
<b>Food Security</b>		
High	7.1 ( 6.2 - 8 )	7 ( 1.9 - 12.1 )
Low	4.5 ( 3 - 6 )	4 ( 0.3 - 7.6 )
<b>Sexual Orientation</b>		
Straight	6.5 ( 5.7 - 7.3 )	6.4 ( 1.6 - 11.1 )
Other	7.5 ( 4.1 - 10.9 )	6.5 ( 0.6 - 12.3 )
<b>Health insurance coverage</b>		
Private	8.1 ( 6.8 - 9.4 )	8.2 ( 2.6 - 13.8 )
Medicaid (includes dual eligibles)	4.9 ( 3.4 - 6.4 )	3.6 ( 0.4 - 6.9 )
Medicare Only	5.4 ( 2.7 - 8.1 )	6.4 ( 0.5 - 12.3 )
Other Coverage	6.8 ( 4.1 - 9.5 )	6 ( 0.9 - 11.1 )
Uninsured	4.8 ( 3.1 - 6.5 )	4.6 ( 0.6 - 8.6 )

## 2.2 Quit Smoking for at least 6 months

Table 4: Adjusted Odds Ratio estimates for Quitting Smoking at least 6 months

term	Adjusted odds ratio	statistic	p value
(Intercept)	0.548 ( 0.39 - 0.77 )	-3.469	0.001
REGIONNortheast	1.062 ( 0.88 - 1.283 )	0.626	0.531
REGIONSouth	1.003 ( 0.862 - 1.168 )	0.044	0.965
REGIONWest	1.395 ( 1.156 - 1.683 )	3.472	0.001
AGE45-64	1.406 ( 1.208 - 1.636 )	4.403	0.000
AGE65+	4.757 ( 3.897 - 5.807 )	15.326	0.000
SEXWomen	1.028 ( 0.91 - 1.162 )	0.447	0.655
EDUCATIONHS Grad	1.018 ( 0.827 - 1.254 )	0.171	0.865
EDUCATION<College Grad	1.247 ( 1.002 - 1.551 )	1.978	0.049
EDUCATIONCollege Grad+	2.399 ( 1.882 - 3.057 )	7.066	0.000
'INCOME RATIO TO FPL'100 - 200 %	1.078 ( 0.862 - 1.349 )	0.659	0.510
'INCOME RATIO TO FPL'200 - 400 %	1.036 ( 0.765 - 1.402 )	0.228	0.820
'INCOME RATIO TO FPL'>400%	0.98 ( 0.681 - 1.411 )	-0.110	0.913
'SEXUAL ORIENTATION'Other	0.915 ( 0.691 - 1.211 )	-0.622	0.534
'MENTAL HEALTH PROBLEM'Yes	0.788 ( 0.678 - 0.915 )	-3.133	0.002
RACEBlack/African American	0.727 ( 0.588 - 0.899 )	-2.942	0.003
RACEOther	0.886 ( 0.689 - 1.14 )	-0.942	0.347
HOUSEOWNYes	1.447 ( 1.263 - 1.658 )	5.323	0.000
'INCOME GROUP'\$35,000 - 74,999	1.141 ( 0.904 - 1.44 )	1.107	0.269
'INCOME GROUP'\$75,000 - 99,999	1.32 ( 0.976 - 1.785 )	1.800	0.073
'INCOME GROUP'\$100,000 and over	1.734 ( 1.267 - 2.371 )	3.442	0.001
'FOOD SECURITY'Low	0.789 ( 0.647 - 0.962 )	-2.343	0.020
COVERAGEMedicaid (includes dual eligibles)	0.576 ( 0.467 - 0.711 )	-5.144	0.000
COVERAGEMedicare Only	0.76 ( 0.593 - 0.975 )	-2.157	0.032
COVERAGEOther Coverage	0.867 ( 0.703 - 1.069 )	-1.336	0.182
COVERAGEUnsured	0.558 ( 0.446 - 0.7 )	-5.059	0.000

<sup>1</sup> Variables colored red are statistically significant at  $\alpha = 0.1$

Table 5: Adjusted and Unadjusted Quit Rates for Quitting Smoking at least 6 months

-	Unadjusted Quit Rate (%)	Adjusted Quit Rate (%)
Total	62.3 ( 61.3 - 63.3 )	62.3 ( 56.6 - 68.1 )
<b>Region</b>		
Midwest	60.9 ( 59 - 62.8 )	60.7 ( 55.1 - 66.4 )
Northeast	66.8 ( 64.5 - 69.1 )	65.4 ( 59.7 - 71.1 )
South	59.1 ( 57.5 - 60.7 )	59.2 ( 53.4 - 65.1 )
West	66.1 ( 64 - 68.2 )	67.5 ( 61.6 - 73.3 )
<b>Age</b>		
25-44	47.3 ( 45.4 - 49.2 )	47.2 ( 40.6 - 53.9 )
45-64	55.6 ( 54 - 57.2 )	56.2 ( 49.9 - 62.5 )
65+	80.4 ( 79.1 - 81.7 )	80.8 ( 76.3 - 85.4 )
<b>Sex</b>		
Men	62.8 ( 61.5 - 64.1 )	62.7 ( 57 - 68.5 )
Women	61.8 ( 60.4 - 63.2 )	61.9 ( 56.1 - 67.7 )
<b>Education</b>		
<HS Grad	49.3 ( 46.2 - 52.4 )	50.9 ( 44 - 57.9 )
HS Grad	55.8 ( 54 - 57.6 )	55 ( 48.9 - 61.1 )
<College Grad	61.6 ( 59.9 - 63.3 )	61 ( 55 - 67 )
College Grad+	77.4 ( 75.7 - 79.1 )	78.2 ( 73.7 - 82.8 )
<b>Ratio of Income to FPL</b>		
<100%	39.9 ( 37.1 - 42.7 )	40.7 ( 33.7 - 47.7 )
100 - 200 %	52.8 ( 50.5 - 55.1 )	54.5 ( 48 - 61.1 )
200 - 400 %	62.7 ( 60.9 - 64.5 )	63 ( 57 - 68.9 )
>400%	73.5 ( 72 - 75 )	73.2 ( 68.4 - 78.1 )
<b>Mental health problem</b>		
No	65 ( 63.9 - 66.1 )	65 ( 59.5 - 70.6 )
Yes	50.5 ( 48.1 - 52.9 )	50.2 ( 43.4 - 57 )
<b>Race</b>		
White	64.1 ( 63 - 65.2 )	64.2 ( 58.7 - 69.8 )
Black/African American	50.2 ( 47 - 53.4 )	48.6 ( 41.6 - 55.5 )
Other	58 ( 54.1 - 61.9 )	58.1 ( 50.7 - 65.6 )
<b>Home Ownership</b>		
No	47.5 ( 45.8 - 49.2 )	47.5 ( 40.7 - 54.3 )
Yes	70.1 ( 69 - 71.2 )	70.2 ( 65 - 75.4 )
<b>Income Group</b>		
\$0-34,999	51.2 ( 49.5 - 52.9 )	52.5 ( 46 - 59.1 )
\$35,000 - 74,999	62.5 ( 60.7 - 64.3 )	63.4 ( 57.7 - 69.1 )
\$75,000 - 99,999	68.2 ( 65.5 - 70.9 )	67.9 ( 62.2 - 73.5 )
\$100,000 and over	76.8 ( 74.8 - 78.8 )	75.6 ( 71.2 - 80.1 )
<b>Food Security</b>		
High	65.6 ( 64.6 - 66.6 )	65.5 ( 60 - 71.1 )
Low	38.6 ( 35.8 - 41.4 )	40 ( 32.7 - 47.3 )
<b>Sexual Orientation</b>		
Straight	62.9 ( 61.9 - 63.9 )	62.8 ( 57.2 - 68.5 )
Other	52.7 ( 48.1 - 57.3 )	52.7 ( 44.7 - 60.8 )
<b>Health insurance coverage</b>		
Private	68.7 ( 67.5 - 69.9 )	68.6 ( 63.3 - 73.9 )
Medicaid (includes dual eligibles)	40.5 ( 37.8 - 43.2 )	38.6 ( 31.6 - 45.7 )
Medicare Only	77.6 ( 75.1 - 80.1 )	78.4 ( 73.3 - 83.5 )
Other Coverage	64.9 ( 61.8 - 68 )	65.2 ( 58.8 - 71.7 )
Uninsured	33.9 ( 30.8 - 37 )	35.8 ( 28.6 - 43.1 )

## 2.3 Quit Smoking for at least a year

Table 6: Adjusted Odds Ratio estimates for Quitting Smoking at least a Year

term	Adjusted odds ratio	statistic	p value
(Intercept)	0.494 ( 0.35 - 0.698 )	-3.993	0.000
REGIONNortheast	1.052 ( 0.867 - 1.277 )	0.512	0.609
REGIONSouth	0.992 ( 0.849 - 1.16 )	-0.096	0.924
REGIONWest	1.409 ( 1.166 - 1.702 )	3.555	0.000
AGE45-64	1.525 ( 1.307 - 1.779 )	5.363	0.000
AGE65+	5.225 ( 4.274 - 6.389 )	16.119	0.000
SEXWomen	1.02 ( 0.9 - 1.157 )	0.316	0.752
EDUCATIONHS Grad	1.002 ( 0.811 - 1.239 )	0.021	0.983
EDUCATION<College Grad	1.222 ( 0.981 - 1.522 )	1.785	0.075
EDUCATIONCollege Grad+	2.357 ( 1.843 - 3.015 )	6.826	0.000
'INCOME RATIO TO FPL'100 - 200 %	1.094 ( 0.87 - 1.376 )	0.767	0.443
'INCOME RATIO TO FPL'200 - 400 %	1.03 ( 0.759 - 1.398 )	0.189	0.850
'INCOME RATIO TO FPL'>400%	0.973 ( 0.675 - 1.403 )	-0.148	0.882
'SEXUAL ORIENTATION'Other	0.927 ( 0.692 - 1.241 )	-0.509	0.611
'MENTAL HEALTH PROBLEM'Yes	0.755 ( 0.65 - 0.878 )	-3.652	0.000
RACEBlack/African American	0.724 ( 0.583 - 0.9 )	-2.908	0.004
RACEOther	0.864 ( 0.664 - 1.124 )	-1.088	0.277
HOUSEOWNYes	1.469 ( 1.279 - 1.688 )	5.430	0.000
'INCOME GROUP'\$35,000 - 74,999	1.165 ( 0.919 - 1.476 )	1.264	0.207
'INCOME GROUP'\$75,000 - 99,999	1.352 ( 0.998 - 1.83 )	1.948	0.052
'INCOME GROUP'\$100,000 and over	1.772 ( 1.293 - 2.429 )	3.557	0.000
'FOOD SECURITY'Low	0.788 ( 0.646 - 0.962 )	-2.341	0.020
COVERAGEMedicaid (includes dual eligibles)	0.575 ( 0.463 - 0.714 )	-4.999	0.000
COVERAGEMedicare Only	0.753 ( 0.587 - 0.966 )	-2.235	0.026
COVERAGEOther Coverage	0.862 ( 0.697 - 1.067 )	-1.362	0.174
COVERAGEUnsured	0.543 ( 0.431 - 0.684 )	-5.182	0.000

<sup>1</sup> Variables colored red are statistically significant at  $\alpha = 0.1$

Table 7: Adjusted and Unadjusted Quit Rates for Quitting Smoking at least a year

-	Unadjusted Quit Rate (%)	Adjusted Quit Rate (%)
Total	61.3 ( 60.3 - 62.3 )	61.4 ( 55.5 - 67.2 )
<b>Region</b>		
Midwest	59.8 ( 57.8 - 61.8 )	59.8 ( 54 - 65.5 )
Northeast	65.9 ( 63.5 - 68.3 )	64.5 ( 58.6 - 70.3 )
South	58 ( 56.3 - 59.7 )	58.1 ( 52.2 - 64 )
West	65.3 ( 63.2 - 67.4 )	66.7 ( 60.8 - 72.6 )
<b>Age</b>		
25-44	44.5 ( 42.5 - 46.5 )	44.5 ( 37.9 - 51.2 )
45-64	54.8 ( 53.1 - 56.5 )	55.4 ( 49 - 61.9 )
65+	80.1 ( 78.8 - 81.4 )	80.5 ( 75.9 - 85.2 )
<b>Sex</b>		
Men	61.8 ( 60.4 - 63.2 )	61.8 ( 55.9 - 67.6 )
Women	60.7 ( 59.3 - 62.1 )	60.9 ( 55.1 - 66.8 )
<b>Education</b>		
<HS Grad	48.5 ( 45.4 - 51.6 )	50.1 ( 43.2 - 57.1 )
HS Grad	54.6 ( 52.8 - 56.4 )	54 ( 47.8 - 60.1 )
<College Grad	60.5 ( 58.8 - 62.2 )	59.9 ( 53.8 - 66 )
College Grad+	76.8 ( 75.1 - 78.5 )	77.5 ( 72.8 - 82.2 )
<b>Ratio of Income to FPL</b>		
<100%	38 ( 35.2 - 40.8 )	39.1 ( 32.2 - 46.1 )
100 - 200 %	51.6 ( 49.3 - 53.9 )	53.5 ( 46.9 - 60 )
200 - 400 %	61.6 ( 59.7 - 63.5 )	61.9 ( 55.9 - 68 )
>400%	72.8 ( 71.3 - 74.3 )	72.5 ( 67.5 - 77.4 )
<b>Mental health problem</b>		
No	64.1 ( 63 - 65.2 )	64.2 ( 58.6 - 69.9 )
Yes	48.7 ( 46.2 - 51.2 )	48.4 ( 41.6 - 55.2 )
<b>Race</b>		
White	63.2 ( 62.1 - 64.3 )	63.3 ( 57.7 - 68.9 )
Black/African American	48.9 ( 45.7 - 52.1 )	47.4 ( 40.5 - 54.4 )
Other	56 ( 52 - 60 )	56.9 ( 49.3 - 64.5 )
<b>Home Ownership</b>		
No	45.6 ( 43.9 - 47.3 )	45.8 ( 38.9 - 52.7 )
Yes	69.4 ( 68.2 - 70.6 )	69.5 ( 64.2 - 74.9 )
<b>Income Group</b>		
\$0-34,999	49.9 ( 48.2 - 51.6 )	51.4 ( 44.8 - 58 )
\$35,000 - 74,999	61.6 ( 59.7 - 63.5 )	62.5 ( 56.7 - 68.3 )
\$75,000 - 99,999	67.2 ( 64.5 - 69.9 )	67 ( 61.2 - 72.8 )
\$100,000 and over	76.2 ( 74.1 - 78.3 )	74.8 ( 70.3 - 79.4 )
<b>Food Security</b>		
High	64.7 ( 63.7 - 65.7 )	64.6 ( 59 - 70.3 )
Low	36.8 ( 34 - 39.6 )	38.5 ( 31.2 - 45.8 )
<b>Sexual Orientation</b>		
Straight	61.9 ( 60.9 - 62.9 )	61.9 ( 56.1 - 67.6 )
Other	50.8 ( 46.1 - 55.5 )	51.3 ( 43.1 - 59.4 )
<b>Health insurance coverage</b>		
Private	67.8 ( 66.5 - 69.1 )	67.7 ( 62.3 - 73.1 )
Medicaid (includes dual eligibles)	38.6 ( 35.9 - 41.3 )	37.2 ( 30.2 - 44.2 )
Medicare Only	77.3 ( 74.8 - 79.8 )	78 ( 72.8 - 83.2 )
Other Coverage	64 ( 60.8 - 67.2 )	64.5 ( 58 - 71.1 )
Uninsured	31.7 ( 28.6 - 34.8 )	33.7 ( 26.5 - 40.9 )

## 2.4 Attempts to Quit Smoking

Table 8: Adjusted Odds Ratio estimates for Attempt to Quit Smoking

term	Adjusted odds ratio	statistic	p value
(Intercept)	0.672 ( 0.436 - 1.034 )	-1.806	0.072
REGIONNortheast	1.067 ( 0.812 - 1.401 )	0.463	0.644
REGIONSouth	1.193 ( 0.946 - 1.504 )	1.493	0.136
REGIONWest	1.466 ( 1.114 - 1.929 )	2.728	0.007
AGE45-64	0.944 ( 0.771 - 1.154 )	-0.564	0.573
AGE65+	0.779 ( 0.573 - 1.057 )	-1.605	0.109
SEXWomen	1.061 ( 0.886 - 1.269 )	0.642	0.521
EDUCATIONHS Grad	0.966 ( 0.732 - 1.275 )	-0.243	0.808
EDUCATION<College Grad	1.296 ( 0.986 - 1.704 )	1.858	0.064
EDUCATIONCollege Grad+	1.284 ( 0.895 - 1.844 )	1.356	0.176
‘INCOME RATIO TO FPL’100 - 200 %	0.979 ( 0.744 - 1.289 )	-0.148	0.883
‘INCOME RATIO TO FPL’200 - 400 %	0.991 ( 0.68 - 1.444 )	-0.046	0.963
‘INCOME RATIO TO FPL’>400%	0.853 ( 0.542 - 1.34 )	-0.691	0.490
‘SEXUAL ORIENTATION’Other	1.148 ( 0.792 - 1.666 )	0.729	0.466
‘MENTAL HEALTH PROBLEM’Yes	1.284 ( 1.031 - 1.599 )	2.234	0.026
RACEBlack/African American	1.547 ( 1.166 - 2.053 )	3.023	0.003
RACEOther	1.478 ( 1.025 - 2.132 )	2.093	0.037
HOUSEOWNYes	0.984 ( 0.804 - 1.203 )	-0.162	0.872
‘INCOME GROUP’\$35,000 - 74,999	1.006 ( 0.748 - 1.353 )	0.042	0.966
‘INCOME GROUP’\$75,000 - 99,999	0.762 ( 0.484 - 1.199 )	-1.175	0.241
‘INCOME GROUP’\$100,000 and over	1.088 ( 0.682 - 1.738 )	0.355	0.723
‘FOOD SECURITY’Low	1.128 ( 0.883 - 1.441 )	0.962	0.337
COVERAGEMedicaid (includes dual eligibles)	1.078 ( 0.822 - 1.413 )	0.541	0.588
COVERAGEMedicare Only	0.967 ( 0.658 - 1.422 )	-0.171	0.865
COVERAGEOther Coverage	0.962 ( 0.686 - 1.348 )	-0.225	0.822
COVERAGEUinsured	0.898 ( 0.686 - 1.176 )	-0.782	0.435

<sup>1</sup> Variables colored red are statistically significant at  $\alpha = 0.1$



Table 9: Adjusted and Unadjusted Quit Rates for Attempt to Quit Smoking

-	Unadjusted Quit Attempt (%)	Adjusted Quit Attempt (%)
Total	48.3 ( 46.7 - 49.9 )	47.9 ( 37.5 - 58.4 )
<b>Region</b>		
Midwest	46 ( 42.8 - 49.2 )	43.6 ( 33.5 - 53.8 )
Northeast	48.5 ( 44.2 - 52.8 )	45.5 ( 34.8 - 56.2 )
South	47.6 ( 45 - 50.2 )	48.9 ( 38.4 - 59.3 )
West	52.6 ( 48.9 - 56.3 )	54 ( 43.1 - 65 )
<b>Age</b>		
25-44	53 ( 50.3 - 55.7 )	50.4 ( 39.9 - 60.8 )
45-64	46.6 ( 44.1 - 49.1 )	47.9 ( 37.6 - 58.1 )
65+	42.6 ( 38.9 - 46.3 )	43 ( 31.9 - 54.2 )
<b>Sex</b>		
Men	47.5 ( 45.2 - 49.8 )	46.4 ( 36 - 56.8 )
Women	49.1 ( 46.7 - 51.5 )	49.6 ( 39 - 60.2 )
<b>Education</b>		
<HS Grad	46.4 ( 42 - 50.8 )	46.8 ( 35.5 - 58 )
HS Grad	45.9 ( 43.2 - 48.6 )	44.2 ( 34.1 - 54.3 )
<College Grad	51 ( 48.2 - 53.8 )	51.5 ( 41.2 - 61.8 )
College Grad+	50.5 ( 46.2 - 54.8 )	50 ( 38.8 - 61.3 )
<b>Ratio of Income to FPL</b>		
<100%	50.9 ( 47.2 - 54.6 )	51.9 ( 41 - 62.7 )
100 - 200 %	50.7 ( 47.3 - 54.1 )	49.3 ( 38.6 - 60 )
200 - 400 %	48.6 ( 45.5 - 51.7 )	48 ( 37.6 - 58.3 )
>400%	44.5 ( 41.2 - 47.8 )	43.7 ( 33.6 - 53.9 )
<b>Mental health problem</b>		
No	47 ( 45.1 - 48.9 )	46 ( 35.7 - 56.3 )
Yes	52.6 ( 49.2 - 56 )	54.2 ( 43.1 - 65.2 )
<b>Race</b>		
White	46.2 ( 44.4 - 48 )	45.7 ( 35.5 - 55.8 )
Black/African American	57.1 ( 52.6 - 61.6 )	57.3 ( 45.9 - 68.6 )
Other	55 ( 48.9 - 61.1 )	57.1 ( 44.2 - 69.9 )
<b>Home Ownership</b>		
No	51.2 ( 48.8 - 53.6 )	50.5 ( 39.8 - 61.2 )
Yes	45.7 ( 43.4 - 48 )	45.5 ( 35.3 - 55.8 )
<b>Income Group</b>		
\$0-34,999	49.9 ( 47.5 - 52.3 )	50.1 ( 39.3 - 60.9 )
\$35,000 - 74,999	49.7 ( 46.6 - 52.8 )	48 ( 37.7 - 58.2 )
\$75,000 - 99,999	40 ( 35 - 45 )	38.9 ( 28.7 - 49 )
\$100,000 and over	46.3 ( 41.3 - 51.3 )	47.8 ( 37.6 - 57.9 )
<b>Food Security</b>		
High	46.9 ( 45.1 - 48.7 )	46.4 ( 36.2 - 56.7 )
Low	53.9 ( 50.2 - 57.6 )	54 ( 42.7 - 65.4 )
<b>Sexual Orientation</b>		
Straight	48.2 ( 46.5 - 49.9 )	47.5 ( 37.2 - 57.8 )
Other	51 ( 44.2 - 57.8 )	55 ( 41.9 - 68 )
<b>Health insurance coverage</b>		
Private	47.3 ( 44.9 - 49.7 )	46.8 ( 36.8 - 56.8 )
Medicaid (includes dual eligibles)	51.7 ( 48.1 - 55.3 )	53.5 ( 42.7 - 64.2 )
Medicare Only	43.5 ( 37.3 - 49.7 )	42.7 ( 31.6 - 53.8 )
Other Coverage	48.1 ( 42.6 - 53.6 )	47.9 ( 36.1 - 59.7 )
Uninsured	49 ( 45 - 53 )	46.5 ( 35.8 - 57.1 )