

Pattern of Smoking across different Sub-population

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To produce this report, The “tidyverse”, “survey”, “gridExtra”, “knitr” packages should be installed. Please run the following code in R or Rstudio;

```
# installed_pkgs <- row.names(installed.packages())
# pkgs <- c("dplyr", "gridExtra", "survey", "knitr")

# for(p in pkgs){
#   if(!(p %in% installed_pkgs)){
#     install.packages(p, repos = "http://cran.us.r-project.org")
#   }
# }
```

Building the survey design using survey weights

I created the survey design as specified by the summary documentation provided by the National Health Survey Interview Statistics. This document can be found at the NHIS website.

```
nhis19_design <- svydesign(id=~PPSU, strata=~PSTRAT, nest = TRUE,
                        weights = ~WTFA_A, data = nhis19)
summary(nhis19_design)
```

Exploratory Data Analysis

Smoking By Age and Sex

Smoking by Age

Table 1: Table Showing the Frequency of Smoking by Age and Type of Product

binned_age	Type of Smoke	No	Yes	Prevalence
18-29	Cigarette	44908225	6184912.0	12.1051717
30-49	Cigarette	67107080	13263784.6	16.5032250
50+	Cigarette	97567451	14611515.1	13.0251826
18-29	E-cigarette	46619211	4509194.7	8.8193532
30-49	E-cigarette	76137125	4310046.4	5.3576109
50+	E-cigarette	110323625	2041781.7	1.8170910

binmed_age	Type of Smoke	No	Yes	Prevalence
18-29	Cigar	48963671	2170486.4	4.2446898
30-49	Cigar	77086417	3318376.4	4.1270878
50+	Cigar	109037309	3233851.3	2.8803936
18-29	Pipe	50137444	996714.2	1.9492141
30-49	Pipe	79644171	758789.9	0.9437337
50+	Pipe	111626053	636395.4	0.5668818
18-29	Smokeless Tobacco	49720404	1424979.6	2.7861353
30-49	Smokeless Tobacco	77903791	2484657.9	3.0908146
50+	Smokeless Tobacco	110329744	1972974.5	1.7568359

Smoking by Sex

Table 2: Table Showing the Frequency of Smoking by Sex and Type of Product

SEX_A	Type of Smoke	No	Yes	Prevalence
female	Cigarette	109746903	16008097.7	12.7295914
male	Cigarette	99820165	18047379.2	15.3115765
female	E-cigarette	121534506	4422169.4	3.5108654
male	E-cigarette	111525032	6438853.4	5.4583260
female	Cigar	124544395	1336031.6	1.0613498
male	Cigar	110522580	7386682.4	6.2647177
female	Pipe	125265270	649778.0	0.5160447
male	Pipe	116121975	1742121.4	1.4780764
female	Smokeless Tobacco	125594039	348462.7	0.2766839
male	Smokeless Tobacco	112339478	5534149.3	4.6949852

Smoking by Race/Ethnicity

Table 3: Smoking Prevalence by Race and type of Smoke

RACEALLP_A	Type of Smoke	No	Yes	Prevalence
AIAN	Cigarette	1909617	426204.86	18.2464594
AIAN and other	Cigarette	1435820	523386.24	26.7142033
Asian	Cigarette	13414110	1035279.62	7.1648673
Black/African American	Cigarette	24882133	4327883.64	14.8164369
Other single/multiple	Cigarette	2676088	529317.13	16.5132657
White	Cigarette	150562484	25818161.97	14.6377523
AIAN	E-Cigarette	2249831	85991.61	3.6814276
AIAN and other	E-Cigarette	1795461	163745.02	8.3577238
Asian	E-Cigarette	14045608	389710.09	2.6996987
Black/African American	E-Cigarette	28263472	998335.33	3.4117350
Other single/multiple	E-Cigarette	2892747	312658.97	9.7541159
White	E-Cigarette	168066391	8541568.09	4.8364571
AIAN	Cigar	2268418	67404.00	2.8856649
AIAN and other	Cigar	1852671	106534.38	5.4376310
Asian	Cigar	14282747	166362.55	1.1513689
Black/African American	Cigar	27964390	1287072.30	4.4000272

RACEALLP_A	Type of Smoke	No	Yes	Prevalence
Other single/multiple	Cigar	3142874	49776.16	1.5590858
White	Cigar	169915609	6593544.60	3.7355256
AIAN	Pipe	2321275	14547.74	0.6228100
AIAN and other	Pipe	1920051	39155.35	1.9985318
Asian	Pipe	14307239	123441.59	0.8554107
Black/African American	Pipe	28940259	305685.78	1.0452245
Other single/multiple	Pipe	3075026	130379.89	4.0675008
White	Pipe	174807610	1686259.63	0.9554211
AIAN	Smokeless Tobacco	2232557	103265.21	4.4209362
AIAN and other	Smokeless Tobacco	1916228	42978.33	2.1936609
Asian	Smokeless Tobacco	14325456	105224.81	0.7291742
Black/African American	Smokeless Tobacco	29113369	148438.59	0.5072776
Other single/multiple	Smokeless Tobacco	3157873	47532.79	1.4828948
White	Smokeless Tobacco	171168686	5346305.90	3.0288112

Smoking by Education

Table 4: Smoking Prevalence by Education and type of Smoke

binned_EDUC	Type of Smoke	No	Yes	Prevalence
<College Grad	Cigarette	64852512	10637561.3	14.0913380
<HS Grad	Cigarette	27264980	8085785.4	22.8730140
College Grad+	Cigarette	66625283	4031012.9	5.7051008
HS Grad	Cigarette	49411116	11044362.3	18.2685880
<College Grad	E-Cigarette	71214262	4390148.5	5.8067359
<HS Grad	E-Cigarette	33966520	1460184.0	4.1217044
College Grad+	E-Cigarette	68870760	1867195.2	2.6395946
HS Grad	E-Cigarette	57403705	3070058.5	5.0766785
<College Grad	Cigar	72746109	2816942.0	3.7279358
<HS Grad	Cigar	34200354	1208949.6	3.4142146
College Grad+	Cigar	68379117	2326886.0	3.2909313
HS Grad	Cigar	58132204	2301399.7	3.8081458
<College Grad	Pipe	74752117	828116.9	1.0956792
<HS Grad	Pipe	34998272	415515.5	1.1733158
College Grad+	Pipe	70074655	584035.0	0.8265580
HS Grad	Pipe	59891230	564231.9	0.9333018
<College Grad	Smokeless Tobacco	73772095	1800431.2	2.3823886
<HS Grad	Smokeless Tobacco	34284930	1094619.9	3.0939338
College Grad+	Smokeless Tobacco	69798210	902969.7	1.2771636
HS Grad	Smokeless Tobacco	58427372	2057772.8	3.4021127

Smoking by Income Relative to Federal Poverty Level

Table 5: Smoking Prevalence by Ratio of Family Income to Federal Poverty Level

binned_RATCAT	Type of Smoke	No	Yes	Prevalence
<100%	Cigarette	20992045	6124962.3	22.5871621

binned_RATCAT	Type of Smoke	No	Yes	Prevalence
>400%	Cigarette	87871435	7710518.6	8.0669188
100 - 200 %	Cigarette	36322893	9001812.2	19.8607184
200 - 400 %	Cigarette	64396382	11222918.5	14.8413414
<100%	E-Cigarette	25727392	1428686.3	5.2610184
>400%	E-Cigarette	91899924	3766553.1	3.9371713
100 - 200 %	E-Cigarette	43371956	1995556.1	4.3986457
200 - 400 %	E-Cigarette	72080688	3670227.2	4.8451259
<100%	Cigar	26219710	944517.0	3.4770620
>400%	Cigar	91680568	3911456.4	4.0918230
100 - 200 %	Cigar	43819257	1544872.1	3.4054927
200 - 400 %	Cigar	73367863	2321868.5	3.0676136
<100%	Pipe	26881879	291177.1	1.0715656
>400%	Pipe	94832188	755280.1	0.7901456
100 - 200 %	Pipe	44777392	564000.8	1.2438982
200 - 400 %	Pipe	74916209	781441.4	1.0323192
<100%	Smokeless Tobacco	26576359	582341.7	2.1442176
>400%	Smokeless Tobacco	93127006	2502550.2	2.6169213
100 - 200 %	Smokeless Tobacco	44457004	925163.9	2.0386067
200 - 400 %	Smokeless Tobacco	73793570	1872556.2	2.4747616

Smoking by Sexual Orientation

Table 6: Smoking Prevalence by Sexual Orientation

ORIENT_A	Type of Smoke	No	Yes	Prevalence
Bisexual	Cigarette	2764295.3	710841.39	20.4550628
Don't know the answer	Cigarette	1947167.5	302929.53	13.4629541
Gay/Lesbian	Cigarette	2632263.9	574273.70	17.9094640
Something else	Cigarette	825023.1	161421.46	16.3639663
Straight	Cigarette	200189076.3	32155683.11	13.8396421
Bisexual	E-Cigarette	2921322.4	565172.66	16.2103386
Don't know the answer	E-Cigarette	2173379.7	76717.36	3.4095135
Gay/Lesbian	E-Cigarette	3008241.4	206825.34	6.4330029
Something else	E-Cigarette	858168.9	128275.69	13.0038420
Straight	E-Cigarette	222807297.8	9827356.73	4.2243735
Bisexual	Cigar	3314381.3	172113.81	4.9365855
Don't know the answer	Cigar	2164882.8	85214.19	3.7871339
Gay/Lesbian	Cigar	3075291.6	139775.15	4.3475039
Something else	Cigar	959816.8	26627.77	2.6993679
Straight	Cigar	224259485.8	8256819.23	3.5510711
Bisexual	Pipe	3348728.5	137766.61	3.9514357
Don't know the answer	Pipe	2225624.8	24472.18	1.0876055
Gay/Lesbian	Pipe	3199457.0	15609.73	0.4855181
Something else	Pipe	976334.0	10110.57	1.0249509
Straight	Pipe	230301820.6	2203940.33	0.9479078
Bisexual	Smokeless Tobacco	3450820.8	35674.30	1.0232139
Don't know the answer	Smokeless Tobacco	2245949.8	4147.26	0.1843147
Gay/Lesbian	Smokeless Tobacco	3191242.6	23824.16	0.7410159
Something else	Smokeless Tobacco	953543.6	32900.94	3.3353057
Straight	Smokeless Tobacco	226807961.4	5763265.13	2.4780646

Smoking by Mental Health status

Table 7: Prevalence of Smoking among people with Mental health Problems

Mental Health	Type of Smoke	No	Yes	Prevalence
Depression	Cigarette	29708781	8811011.945	22.8739856
Anxiety	Cigarette	26254613	8107231.627	23.5937029
Dementia	Cigarette	2077574	220225.275	9.5841816
Depression	E-cigarette	35447497	3129032.705	8.1112343
Anxiety	E-cigarette	31488724	2952025.711	8.5713166
Dementia	E-cigarette	2288228	14163.500	0.6151648
Depression	Pipe	38060499	501077.841	1.2994226
Anxiety	Pipe	33988975	437071.386	1.2695951
Dementia	Pipe	2287157	2479.361	0.1082862
Depression	Cigar	37072780	1444739.895	3.7508643
Anxiety	Cigar	33053454	1352243.611	3.9302897
Dementia	Cigar	2216444	68955.118	3.0172022
Depression	Smokeless Tobacco	37720488	868524.858	2.2507050
Anxiety	Smokeless Tobacco	33486347	966886.535	2.8063739
Dementia	Smokeless Tobacco	2258077	42861.284	1.8627743

Dual Smoking Status (Cigarette and other Products)

Table 8: Dual Prevalence of Cigarette and E-cigarette

binmed_age	Prevalence of cigarette	Prevalence of E-cigarette	Dual prevalence cigarette and e-cig
18-29	12.10517	8.819353	2.6913313
30-49	16.50323	5.357611	2.0826776
50+	13.02518	1.817091	0.8352174

Table 9: Dual Prevalence of Cigarette and Cigar

binmed_age	Prevalence of cigarette	Prevalence of Cigar	Dual prevalence cigarette and cigar
18-29	12.10517	4.244690	1.475671
30-49	16.50323	4.127088	1.405580
50+	13.02518	2.880394	1.036449

Table 10: Dual Prevalence of Cigarette and Pipe

binmed_age	Prevalence of cigarette	Prevalence of Pipe	Dual prevalence cigarette and pipe
18-29	12.10517	1.9492141	0.9341180
30-49	16.50323	0.9437337	0.4062357
50+	13.02518	0.5668818	0.2035092

Table 11: Dual Prevalence of Cigarette and Smokeless Tobacco

binned_age	Prevalence of cigarette	Prevalence of Smokeless Tobacco	Dual prevalence cigaratte and smokeless tobacco
18-29	12.10517	2.786135	0.7621266
30-49	16.50323	3.090815	0.7140862
50+	13.02518	1.756836	0.2146772