

# PUBH7485 Homework 1

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## Problem 1

### NHEFS data

##	Stratified by qsmk
##	No
## n	1201
## qsmk = Yes (%)	0 ( 0.0)
## Systolic Blood Pressure (mean (SD))	127.70 (18.77)
## Diastolic Blood Pressure (mean (SD))	77.36 (10.54)
## sex = Female (%)	639 (53.2)
## Age (mean (SD))	42.92 (11.89)
## race (%)	
## White	1024 (85.3)
## Black	177 (14.7)
## Other	0 ( 0.0)
## Income (mean (SD))	17.90 (2.71)
## marital (%)	
## Married	0 ( 0.0)
## Widowed	933 (80.7)
## Divorced	70 ( 6.1)
## Separated	76 ( 6.6)
## Never Married	77 ( 6.7)
## Years of School Completed (mean (SD))	11.12 (3.00)
## Education Level (%)	
## 1	218 (18.2)
## 2	273 (22.7)
## 3	495 (41.2)
## 4	96 ( 8.0)
## 5	119 ( 9.9)
## Height (mean (SD))	168.48 (9.00)
## Weight in 1971 (mean (SD))	70.49 (15.57)
## Weight in 1982 (mean (SD))	72.29 (15.65)
## Weight Change 1971-1982 (mean (SD))	1.98 (7.45)
## Birthplace (mean (SD))	31.95 (14.53)
## Cigarettes per Day (Current) (mean (SD))	21.18 (11.58)
## Cigarettes per Day Change 1971-1982 (mean (SD))	0.27 (10.35)
## Smoking Years (mean (SD))	24.25 (11.83)
## Asthma Diagnosis (mean (SD))	0.04 (0.20)
## Chronic Bronchitis (mean (SD))	0.08 (0.28)
## Tuberculosis (mean (SD))	0.01 (0.10)
## Heart Failure (mean (SD))	0.00 (0.07)

##	High Blood Pressure (mean (SD))	1.05 (0.96)	
##	Peptic Ulcer (mean (SD))	0.10 (0.30)	
##	Colitis (mean (SD))	0.04 (0.19)	
##	Hepatitis (mean (SD))	0.02 (0.13)	
##	Chronic Cough (mean (SD))	0.05 (0.22)	
##	Hay Fever (mean (SD))	0.09 (0.28)	
##	Diabetes (mean (SD))	0.99 (1.00)	
##	Polio (mean (SD))	0.01 (0.11)	
##	Tumor (mean (SD))	0.02 (0.15)	
##	Nervous Breakdown (mean (SD))	0.03 (0.18)	
##	Alcohol Use per Year (mean (SD))	0.88 (0.33)	
##	Alcohol Frequency (mean (SD))	1.91 (1.30)	
##	Type of Alcohol (mean (SD))	2.46 (1.21)	
##	Amount of Alcohol Consumed (mean (SD))	3.35 (3.13)	
##	Pica (mean (SD))	0.99 (1.00)	
##	Headache (mean (SD))	0.64 (0.48)	
##	Other Pain (mean (SD))	0.25 (0.43)	
##	Weak Heart (mean (SD))	0.02 (0.15)	
##	Allergies (mean (SD))	0.06 (0.24)	
##	Nervousness (mean (SD))	0.15 (0.36)	
##	Lack of Energy (mean (SD))	0.05 (0.23)	
##	On Hypertension Medication (mean (SD))	1.01 (0.99)	
##	Bowel Trouble (mean (SD))	1.04 (0.97)	
##	Weight Loss (mean (SD))	0.03 (0.17)	
##	Infection (mean (SD))	0.15 (0.36)	
##	Physically Active (%)		
##	0	547 (45.5)	
##	1	540 (45.0)	
##	2	114 ( 9.5)	
##	Exercise Level (%)		
##	0	247 (20.6)	
##	1	496 (41.3)	
##	2	458 (38.1)	
##	Birth Control (mean (SD))	1.04 (0.95)	
##	Number of Pregnancies (mean (SD))	3.67 (2.20)	
##	Cholesterol Level (mean (SD))	218.90 (45.13)	
##	High Cigarette Tax in 1982 (mean (SD))	0.16 (0.37)	
##	Price of Cigarettes in 1971 (mean (SD))	2.14 (0.23)	
##	Price of Cigarettes in 1982 (mean (SD))	1.81 (0.13)	
##	Cigarette Tax in 1971 (mean (SD))	1.06 (0.21)	
##	Cigarette Tax in 1982 (mean (SD))	0.51 (0.11)	
##	Price Change 1971-1982 (mean (SD))	0.33 (0.15)	
##	Tax Change 1971-1982 (mean (SD))	0.55 (0.15)	
##	Censored (mean (SD))	0.03 (0.18)	
##	Older Age Group (mean (SD))	0.28 (0.45)	
##		Stratified by qsmk	
##		Yes	SMD
##	n	428	
##	qsmk = Yes (%)	428 (100.0)	NaN
##	Systolic Blood Pressure (mean (SD))	131.69 (19.57)	0.208
##	Diastolic Blood Pressure (mean (SD))	78.88 (10.84)	0.143
##	sex = Female (%)	191 ( 44.6)	0.172
##	Age (mean (SD))	46.70 (12.52)	0.309
##	race (%)		0.182

##	White	390 ( 91.1)	
##	Black	38 ( 8.9)	
##	Other	0 ( 0.0)	
##	Income (mean (SD))	18.07 (2.52)	0.064
##	marital (%)		0.099
##	Married	0 ( 0.0)	
##	Widowed	346 ( 83.4)	
##	Divorced	27 ( 6.5)	
##	Separated	20 ( 4.8)	
##	Never Married	22 ( 5.3)	
##	Years of School Completed (mean (SD))	11.17 (3.32)	0.015
##	Education Level (%)		0.197
##	1	93 ( 21.7)	
##	2	78 ( 18.2)	
##	3	164 ( 38.3)	
##	4	30 ( 7.0)	
##	5	63 ( 14.7)	
##	Height (mean (SD))	169.48 (9.17)	0.110
##	Weight in 1971 (mean (SD))	72.63 (16.08)	0.135
##	Weight in 1982 (mean (SD))	76.88 (17.12)	0.280
##	Weight Change 1971-1982 (mean (SD))	4.53 (8.75)	0.313
##	Birthplace (mean (SD))	30.58 (14.39)	0.095
##	Cigarettes per Day (Current) (mean (SD))	18.79 (12.26)	0.200
##	Cigarettes per Day Change 1971-1982 (mean (SD))	-18.79 (12.26)	1.681
##	Smoking Years (mean (SD))	26.61 (13.03)	0.189
##	Asthma Diagnosis (mean (SD))	0.06 (0.24)	0.088
##	Chronic Bronchitis (mean (SD))	0.09 (0.29)	0.028
##	Tuberculosis (mean (SD))	0.02 (0.15)	0.097
##	Heart Failure (mean (SD))	0.00 (0.07)	0.005
##	High Blood Pressure (mean (SD))	1.04 (0.95)	0.013
##	Peptic Ulcer (mean (SD))	0.12 (0.32)	0.067
##	Colitis (mean (SD))	0.02 (0.15)	0.082
##	Hepatitis (mean (SD))	0.01 (0.12)	0.034
##	Chronic Cough (mean (SD))	0.06 (0.24)	0.053
##	Hay Fever (mean (SD))	0.10 (0.29)	0.029
##	Diabetes (mean (SD))	0.95 (1.00)	0.042
##	Polio (mean (SD))	0.02 (0.14)	0.050
##	Tumor (mean (SD))	0.02 (0.14)	0.021
##	Nervous Breakdown (mean (SD))	0.02 (0.14)	0.066
##	Alcohol Use per Year (mean (SD))	0.86 (0.35)	0.064
##	Alcohol Frequency (mean (SD))	1.95 (1.32)	0.032
##	Type of Alcohol (mean (SD))	2.52 (1.20)	0.054
##	Amount of Alcohol Consumed (mean (SD))	3.09 (2.53)	0.091
##	Pica (mean (SD))	0.95 (1.00)	0.040
##	Headache (mean (SD))	0.61 (0.49)	0.069
##	Other Pain (mean (SD))	0.25 (0.43)	0.003
##	Weak Heart (mean (SD))	0.02 (0.14)	0.032
##	Allergies (mean (SD))	0.07 (0.25)	0.032
##	Nervousness (mean (SD))	0.13 (0.34)	0.062
##	Lack of Energy (mean (SD))	0.04 (0.20)	0.056
##	On Hypertension Medication (mean (SD))	1.00 (0.98)	0.014
##	Bowel Trouble (mean (SD))	1.01 (0.97)	0.036
##	Weight Loss (mean (SD))	0.02 (0.14)	0.063
##	Infection (mean (SD))	0.14 (0.35)	0.039

##	Physically Active (%)		0.073
##	0	182 ( 42.5)	
##	1	198 ( 46.3)	
##	2	48 ( 11.2)	
##	Exercise Level (%)		0.112
##	0	70 ( 16.4)	
##	1	181 ( 42.3)	
##	2	177 ( 41.4)	
##	Birth Control (mean (SD))	1.20 (0.94)	0.164
##	Number of Pregnancies (mean (SD))	3.78 (2.22)	0.050
##	Cholesterol Level (mean (SD))	222.96 (46.22)	0.089
##	High Cigarette Tax in 1982 (mean (SD))	0.17 (0.38)	0.013
##	Price of Cigarettes in 1971 (mean (SD))	2.14 (0.23)	0.017
##	Price of Cigarettes in 1982 (mean (SD))	1.80 (0.13)	0.025
##	Cigarette Tax in 1971 (mean (SD))	1.06 (0.22)	0.008
##	Cigarette Tax in 1982 (mean (SD))	0.51 (0.11)	0.002
##	Price Change 1971-1982 (mean (SD))	0.33 (0.16)	0.003
##	Tax Change 1971-1982 (mean (SD))	0.55 (0.15)	0.013
##	Censored (mean (SD))	0.06 (0.23)	0.129
##	Older Age Group (mean (SD))	0.41 (0.49)	0.280

## Black Politicians Data Set

##		Stratified by leg_black	
##		No	
##	n	5229	
##	responded = Yes (%)	2222 (42.5)	
##	Total Population (mean (SD))	8.42 (10.86)	
##	Median Household Income (mean (SD))	4.43 (1.40)	
##	Black Median Household Income (mean (SD))	1.57 (1.02)	
##	White Median Household Income (mean (SD))	2.33 (0.77)	
##	Black Population Percent (mean (SD))	0.06 (0.10)	
##	State Squire Index (mean (SD))	0.19 (0.12)	
##	Non-Black, Non-White Population Percent (mean (SD))	0.05 (0.22)	
##	Urban Population Percent (mean (SD))	0.67 (0.32)	
##	leg_senator = Yes (%)	1390 (26.6)	
##	leg_democrat = Yes (%)	2618 (50.1)	
##	south = Yes (%)	1309 (25.0)	
##		Stratified by leg_black	
##		Yes	SMD
##	n	364	
##	responded = Yes (%)	143 (39.3)	0.065
##	Total Population (mean (SD))	10.43 (9.52)	0.197
##	Median Household Income (mean (SD))	3.33 (1.14)	0.867
##	Black Median Household Income (mean (SD))	1.37 (0.43)	0.259
##	White Median Household Income (mean (SD))	2.22 (0.65)	0.152
##	Black Population Percent (mean (SD))	0.52 (0.20)	2.869
##	State Squire Index (mean (SD))	0.21 (0.12)	0.175
##	Non-Black, Non-White Population Percent (mean (SD))	0.00 (0.00)	0.326
##	Urban Population Percent (mean (SD))	0.85 (0.25)	0.630
##	leg_senator = Yes (%)	86 (23.6)	0.068
##	leg_democrat = Yes (%)	356 (97.8)	1.296
##	south = Yes (%)	196 (53.8)	0.617

## Problem 2

### NHEFS data set

Average treatment effect, standard error, and 95% confidence interval of weight change, SBP, and DBP for whether the subject quit smoking:

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

## $Weight_Change_1971_1982
## $Weight_Change_1971_1982$ATE
## [1] 2.540581
##
## $Weight_Change_1971_1982$SE
## [1] 0.4874604
##
## $Weight_Change_1971_1982$CI_95
## [1] 1.585159 3.496004
##
##
## $Systolic_BP
## $Systolic_BP$ATE
## [1] 3.990689
##
## $Systolic_BP$SE
## [1] 1.130951
##
## $Systolic_BP$CI_95
## [1] 1.774026 6.207353
##
##
## $Diastolic_BP
## $Diastolic_BP$ATE
## [1] 1.52536
##
## $Diastolic_BP$SE
## [1] 0.6298152
##
## $Diastolic_BP$CI_95
## [1] 0.2909221 2.7597978
```

### Black Politicians Data Set

Average treatment effect, standard error, and 95% confidence interval of letter response rate for whether the politician is black:

```
## $ATE
## [1] -0.0320807
##
## $SE
## [1] 0.02649545
##
## $CI_95
## [1] -0.08401178 0.01985037
```