BIOST 515-Project

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We are interested in changes in plasma lipid biomarkers for coronary heart disease (CHD) after hormone replacementtherapy in a sample of 2,763 womenfrom the Heart and Estrogen/progestin Replacement Study (HERS). HERS wasa randomized, double-blind, placebo-controlled trial designed to test the efficacy and safety of estrogen plus progestin therapy for prevention of recurrent coronary heart disease (CHD) events in women.

Questions of interest to be answered

The data tobe analyzed for this projectis a subset of the data collected from the 2,763 women in the Heart and Estrogen/progestin Replacement Study (HERS) clinical trial of hormone therapy.The questions to be addressed are:

1.

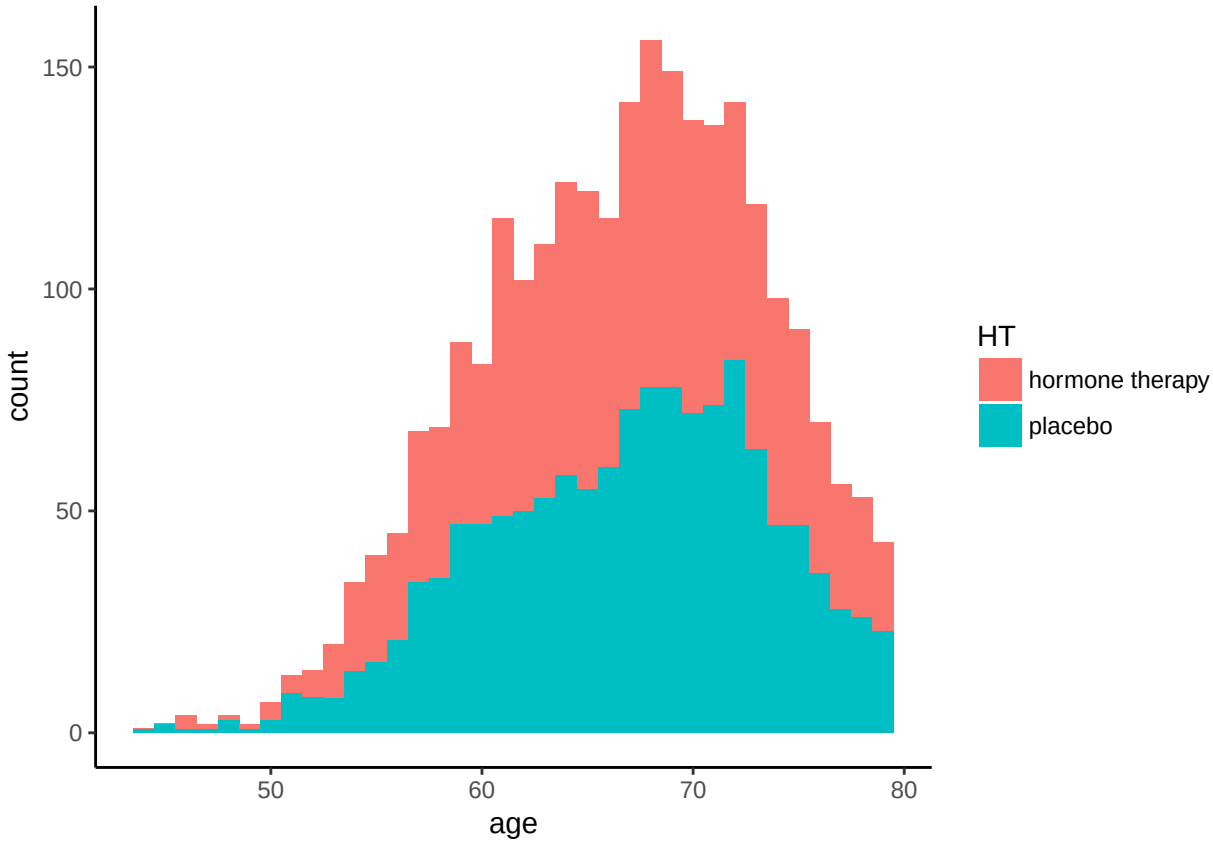
What associations exist between the plasma lipid biomarkers for CHD at baseline (i.e., prior to randomized treatment assignment) and the available data on participant demographics (age, race, BMI), behavior (smoking, alcohol consumption, physical activity), and available clinical and laboratory measures of organ system functioning (e.g, glucose, blood pressure)?

univariate

2.

Is there any evidence of hormone therapy treatment effects on the plasma lipid biomarkers after one year of treatment?

Profile of subjects studied



BMI Profile of subjects studied by Control/Treatment

HT	n	meanBMI	sdBMI	meanBMI.1	sdBMI.1
hormone therapy	1274	28.59735	5.434025	28.22312	5.509812
placebo	1306	28.52488	5.495672	28.45959	5.605677

HT	n	meanLDL	sdLDL	meanLDL.1	sdLDL.1
hormone therapy	1274	144.9907	38.26348	124.6372	36.95654
placebo	1306	144.6530	37.39339	139.8992	39.67142

3.

Is there any attenuation of the hormone therapy treatment effects after adjustment for known risk factors for CHD?

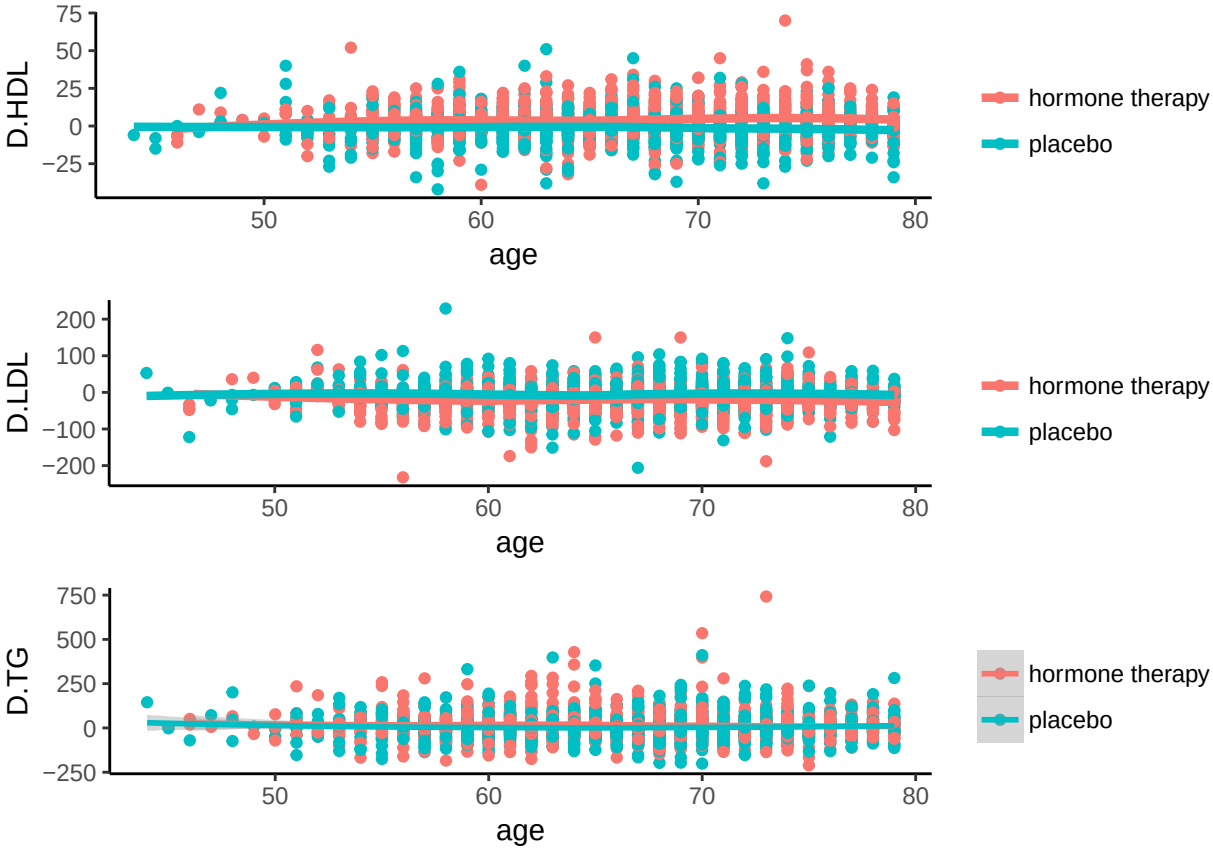
4.

Do any of the hormone therapy treatment effects identified above for the plasma lipid biomarkers differ according to race/ethnicity, statin medication use,smoking behavior, or alcohol consumption.

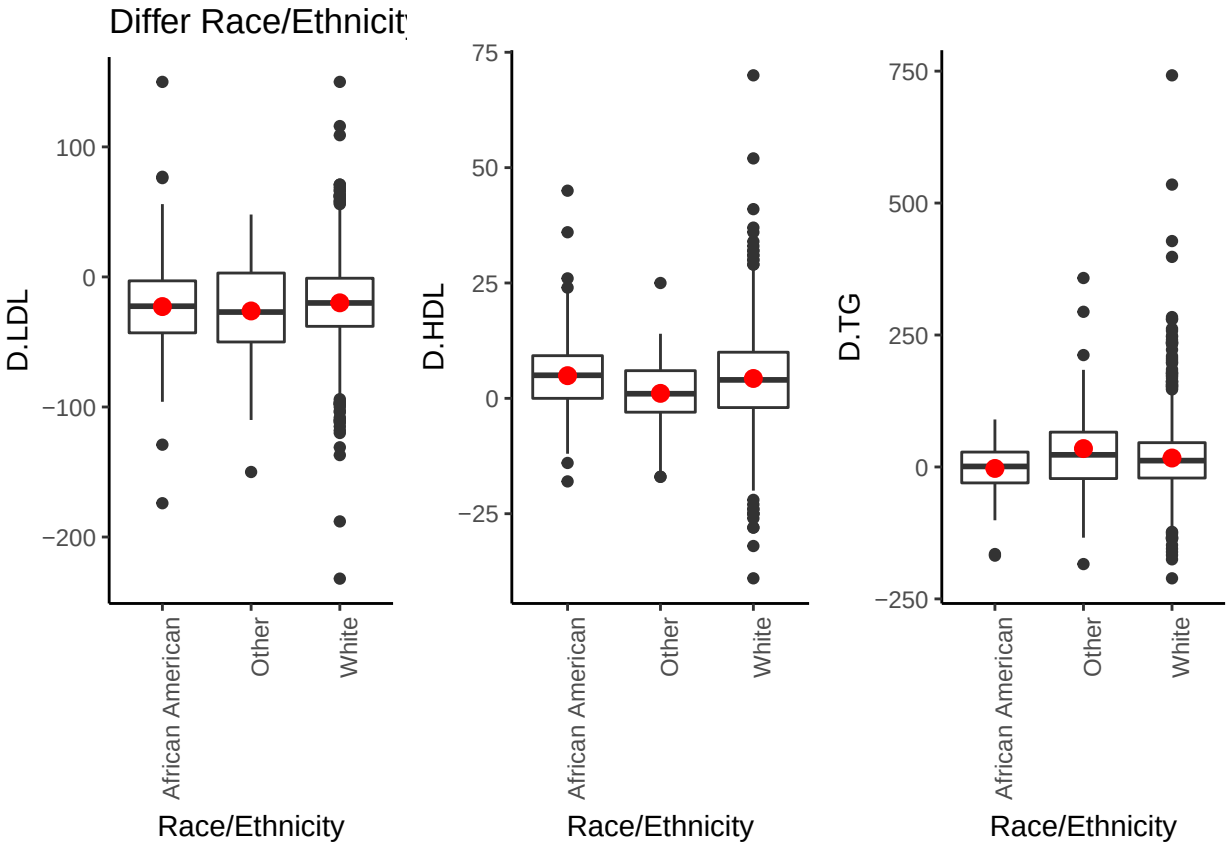
Show the distribution by biomarkers between Placebo and Treatment

```
## Warning: Removed 5 rows containing missing values (geom_smooth).
```

```
## Warning: Removed 5 rows containing missing values (geom_smooth).
```



Checking by Race



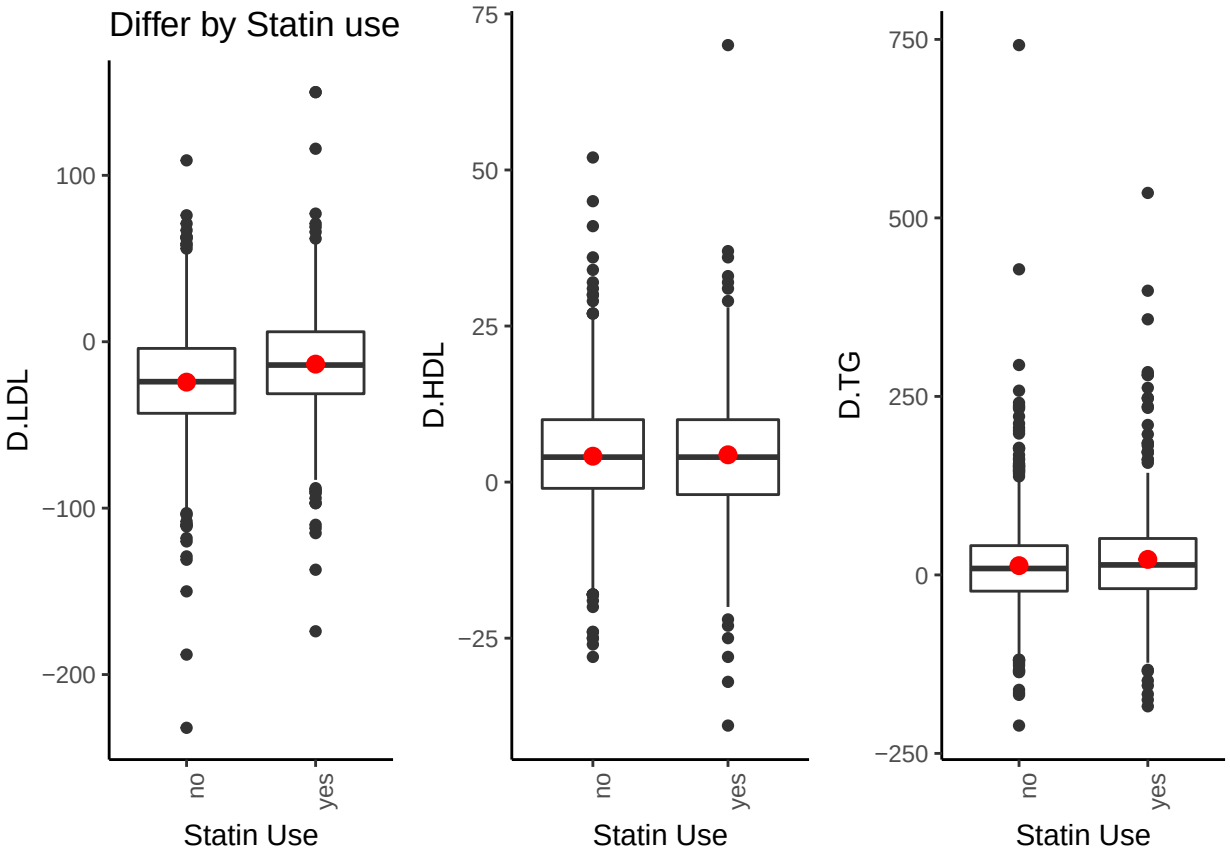
By looking at the boxplots(SE-Max, Mean, SE-Min), we could hypothesize that TG might be affected by race. We could do an ANOVA to confirm that.

```
## Analysis of Deviance Table
##
## Model 1: D.LDL ~ raceth + age + smoking + drinkany + exercise + statins +
##     diabetes
## Model 2: D.LDL ~ age + smoking + drinkany + exercise + statins + diabetes
##   Resid. Df Resid. Dev Df Deviance Pr(>Chi)
## 1      2571    3087210
## 2      2573    3087299 -2  -89.093   0.9636
```

For LDL, the effect is found to be not significant(p-value 0.96), but for TG and HDL, the effect do differ by race/ethnicity(p-value 0.01, and p-value < 0.001 respectively). The analysis was facilitated by ANOVA where null model included demograhics(excluding BMI),diabetic indicator and behavior. Race/Ethnicity was omitted in the null model.

```
## Analysis of Deviance Table
##
## Model 1: D.LDL ~ HT * raceth
## Model 2: D.LDL ~ age + smoking + drinkany + exercise + statins + diabetes
##   Resid. Df Resid. Dev Df Deviance Pr(>Chi)
## 1      2574    2955598
## 2      2573    3087299  1  -131701
```

Checking by Statin Use

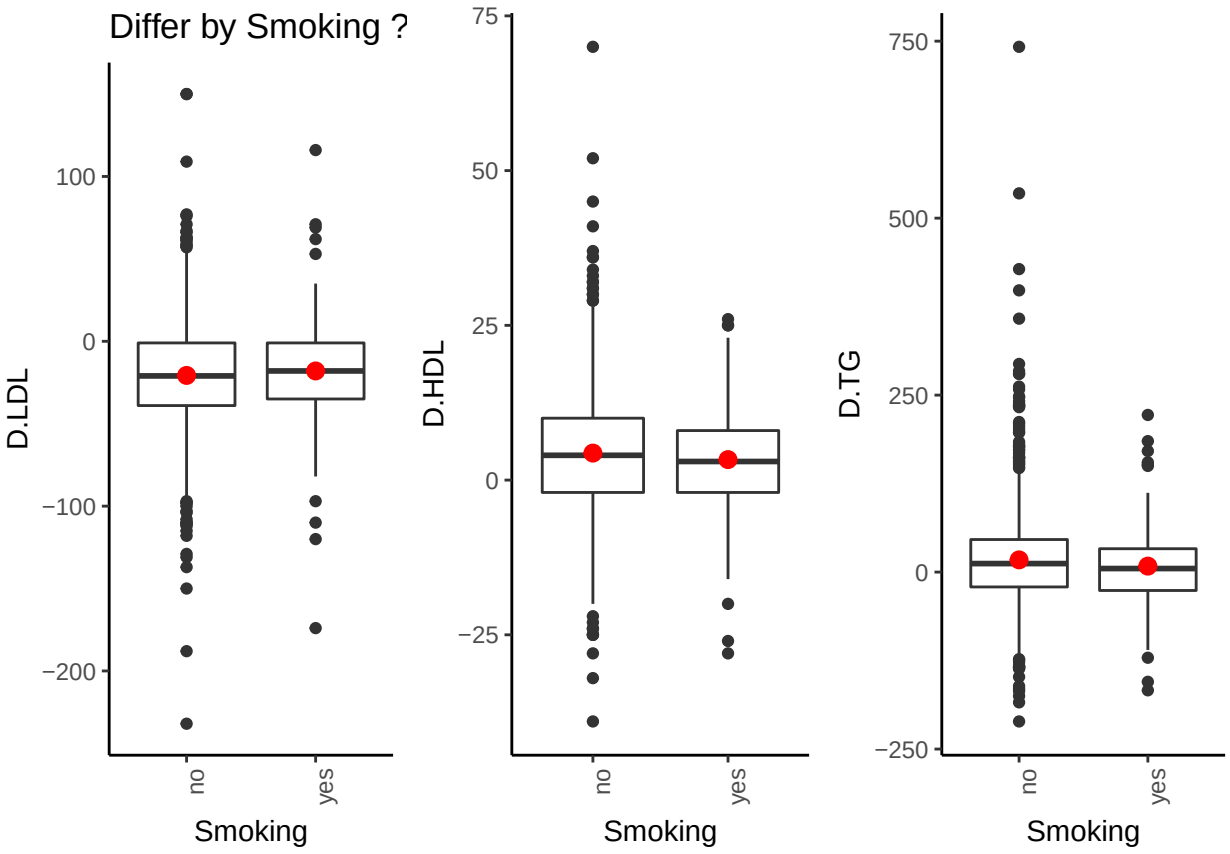


By looking at the boxplots(SE-Max, Mean, SE-Min), we could hypothesize that LDL might be affected by statin use We could do an ANOVA to confirm that.

```
## Analysis of Deviance Table
##
## Model 1: D.LDL ~ raceth + age + smoking + drinkany + exercise + statins +
##     diabetes
## Model 2: D.LDL ~ raceth + age + smoking + drinkany + exercise + diabetes
##   Resid. Df Resid. Dev Df Deviance  Pr(>Chi)
## 1      2571    3087210
## 2      2572    3112096 -1   -24886 5.302e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

For TG,and HDL the effect is found to be not significant(p-value = 0.21, and p-value =0.97 respectively), but for LDL, the effect do differ by statin use(p-value < 0.001). The analysis was facilitated by ANOVA where null model included demograhics(excluding BMI),diabetic indicator and behavior. Statin use was omitted in the null model.

Smoking Behavior

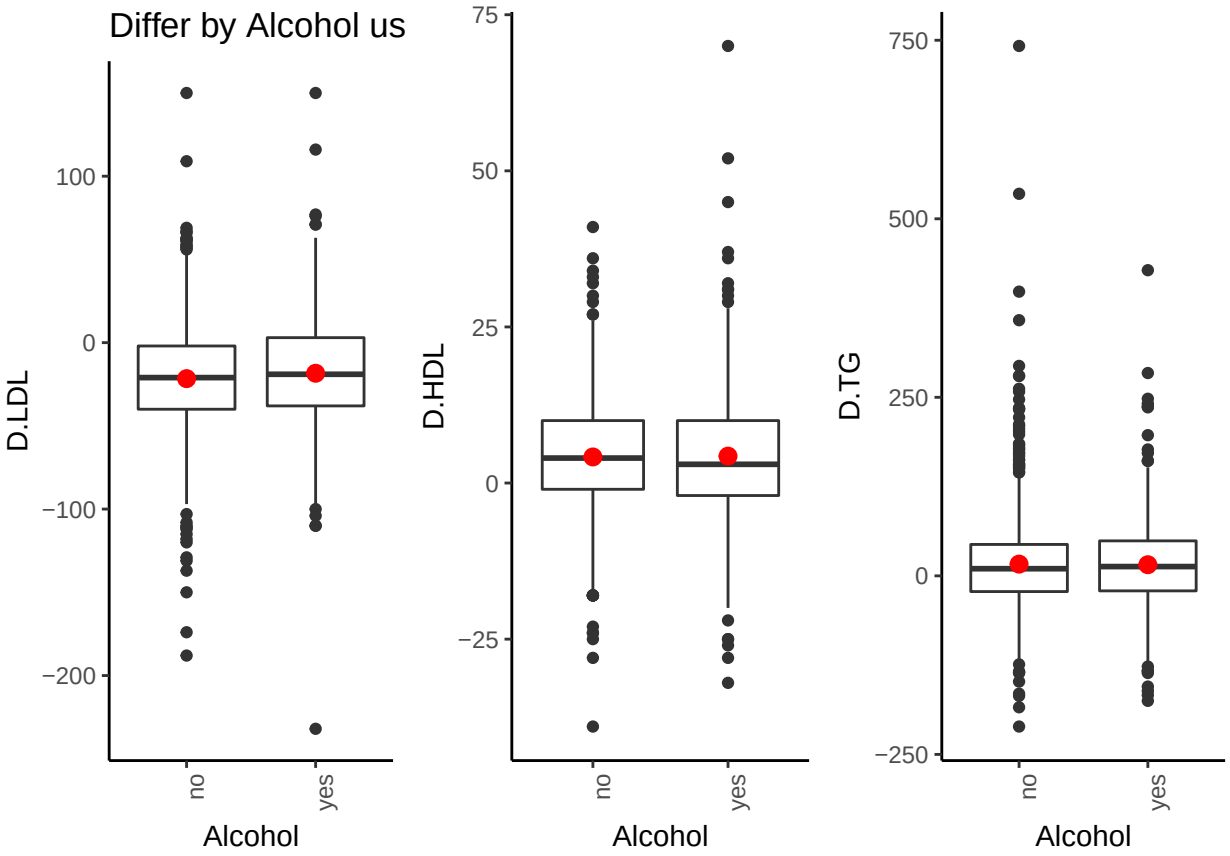


By looking at the boxplots(SE-Max, Mean, SE-Min), we could not really hypothesize the affects by smoking behavior. We could do an ANOVA to confirm which ones are significant

```
## Analysis of Deviance Table
##
## Model 1: D.TG ~ raceth + age + smoking + drinkany + exercise + statins +
##     diabetes
## Model 2: D.TG ~ raceth + age + drinkany + exercise + statins + diabetes
##   Resid. Df Resid. Dev Df Deviance Pr(>Chi)
## 1      2571   11564115
## 2      2572   11569098 -1  -4983.4   0.2925
```

For TG,LDL,HDL the effect is found to be not significant(p-value = 0.29, p-value = 0.42, and p-value = 0.99 respectively). The analysis was facilitated by ANOVA where null model included demograhics(excluding BMI),diabetic indicator and behavior. Smoking indicator was omitted in the null model.

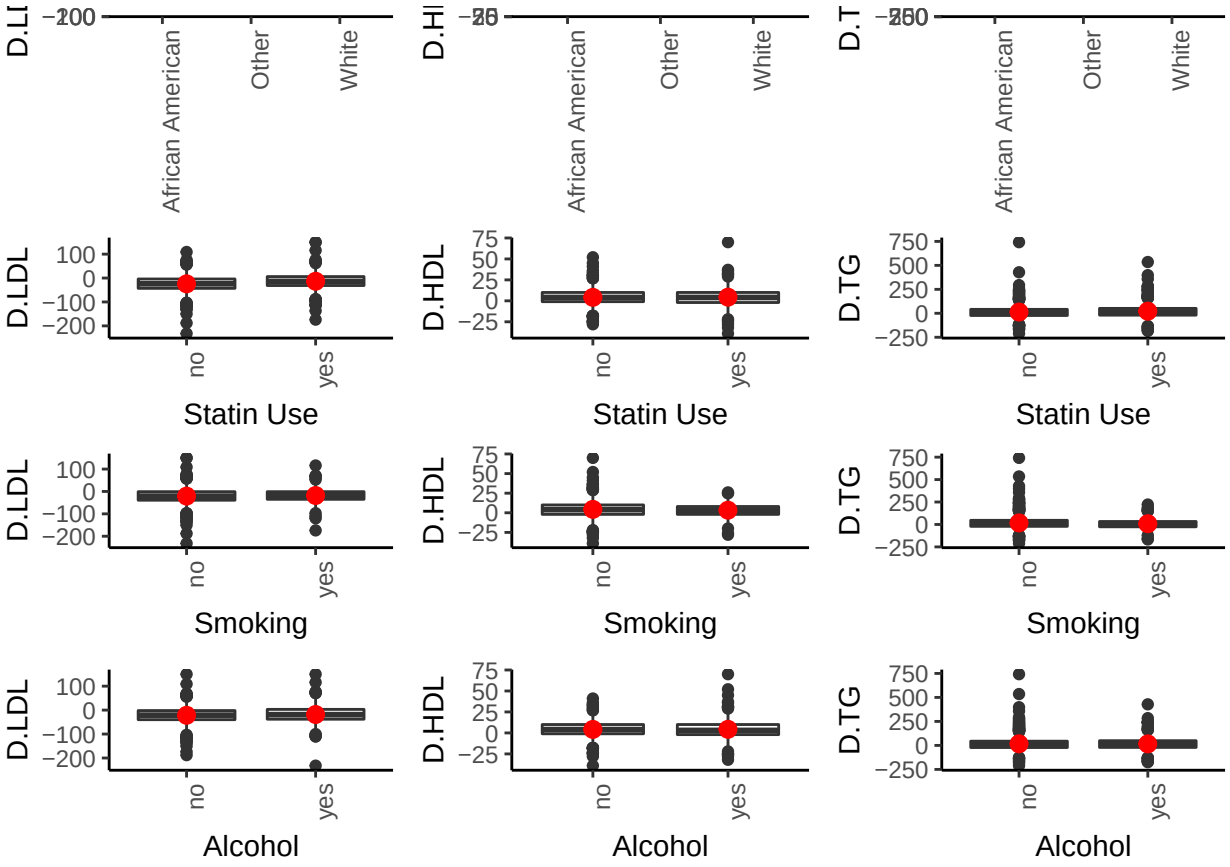
Alcohol use



By looking at the boxplots(SE-Max, Mean, SE-Min), we could not really hypothesize the affects by alcohol use. We could do an ANOVA to confirm which ones are significant

```
## Analysis of Deviance Table
##
## Model 1: D.TG ~ raceth + age + smoking + drinkany + exercise + statins +
##     diabetes
## Model 2: D.TG ~ raceth + age + smoking + exercise + statins + diabetes
##   Resid. Df Resid. Dev Df Deviance Pr(>Chi)
## 1      2571   11564115
## 2      2572   11564115 -1 -0.01827   0.9984
```

For TG,LDL,HDL the effect is found to be not significant(p-value = 0.99, p-value = 0.13, and p-value = 0.24 respectively). The analysis was facilitated by ANOVA where null model included demograhics(excluding BMI),diabetic indicator and behavior. Drinking indicator was omitted in the null model.

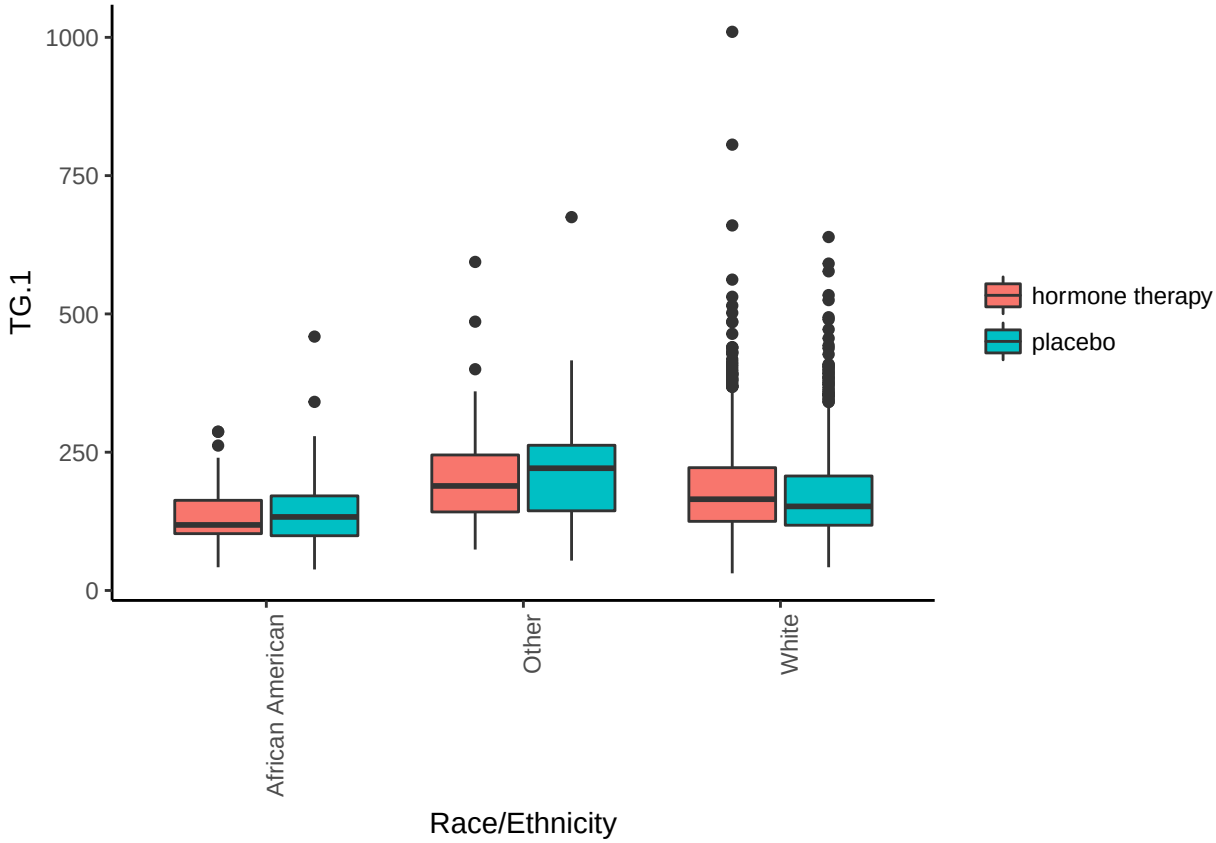


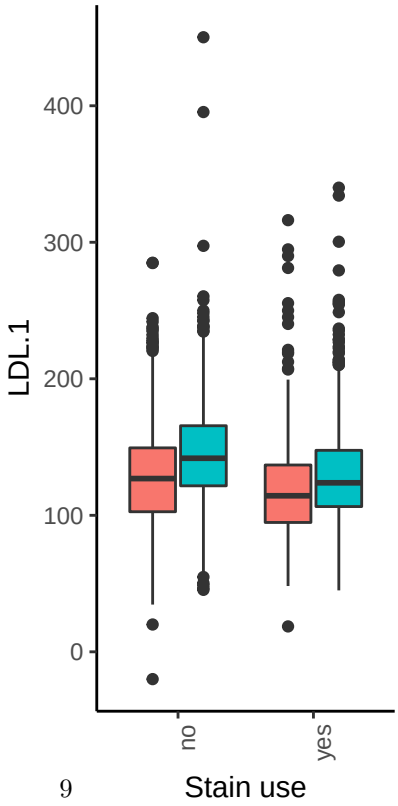
Changing direction

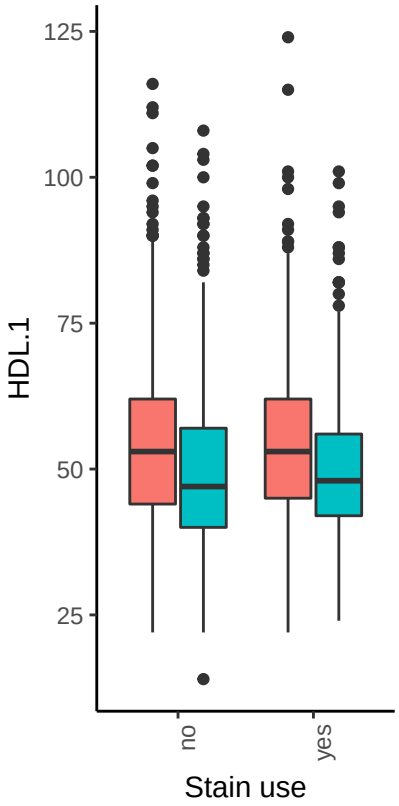
Methods : We tested the

final figures

TG Treatment vs Placebo - Endpoint



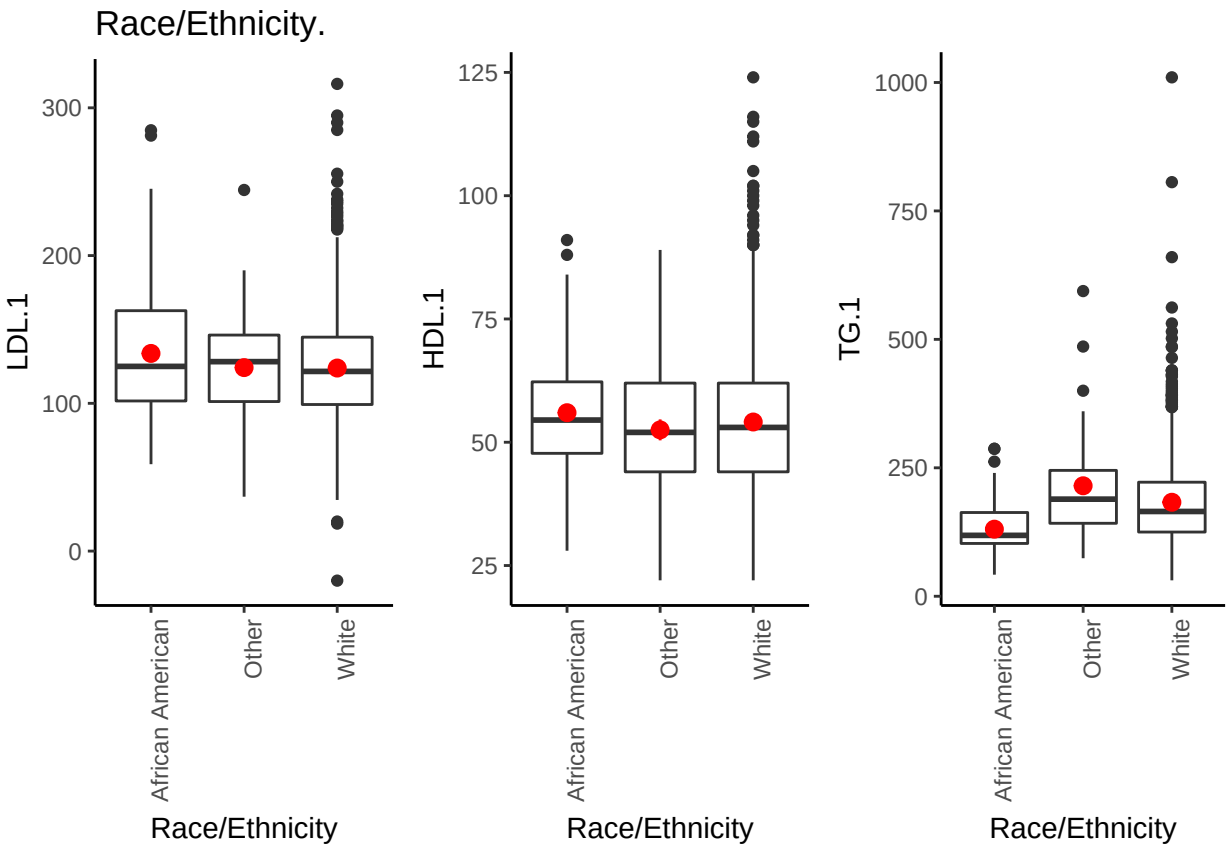




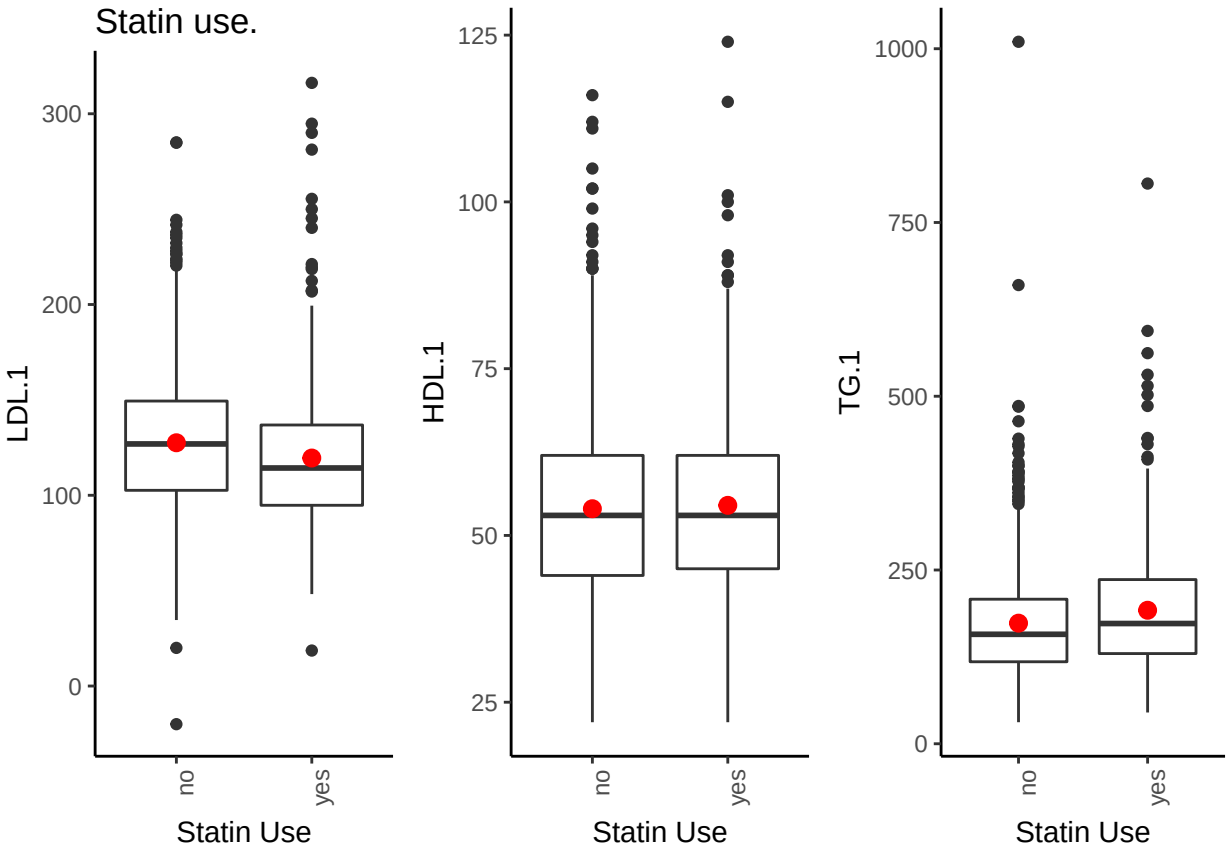
TG.1

Statin use Treatment vs Placebo - Endpoint

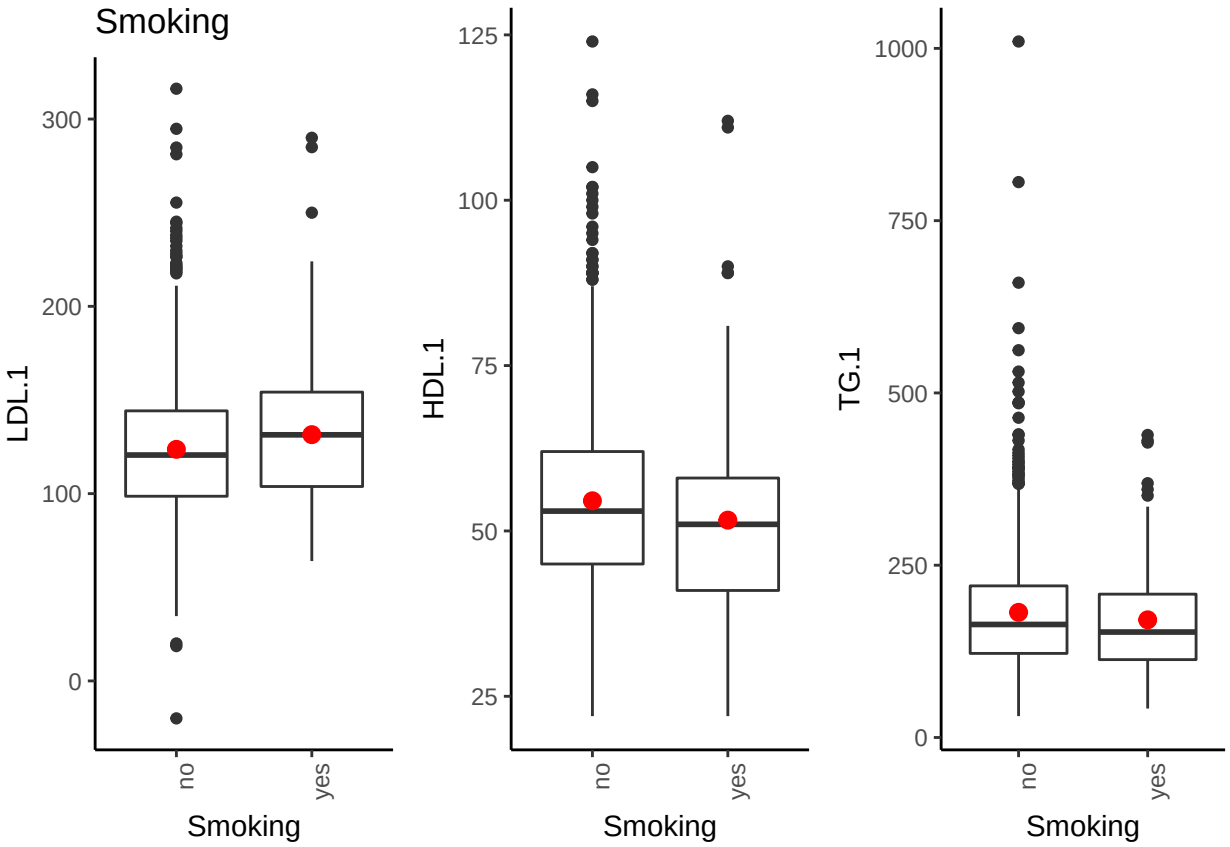
Checking by Race



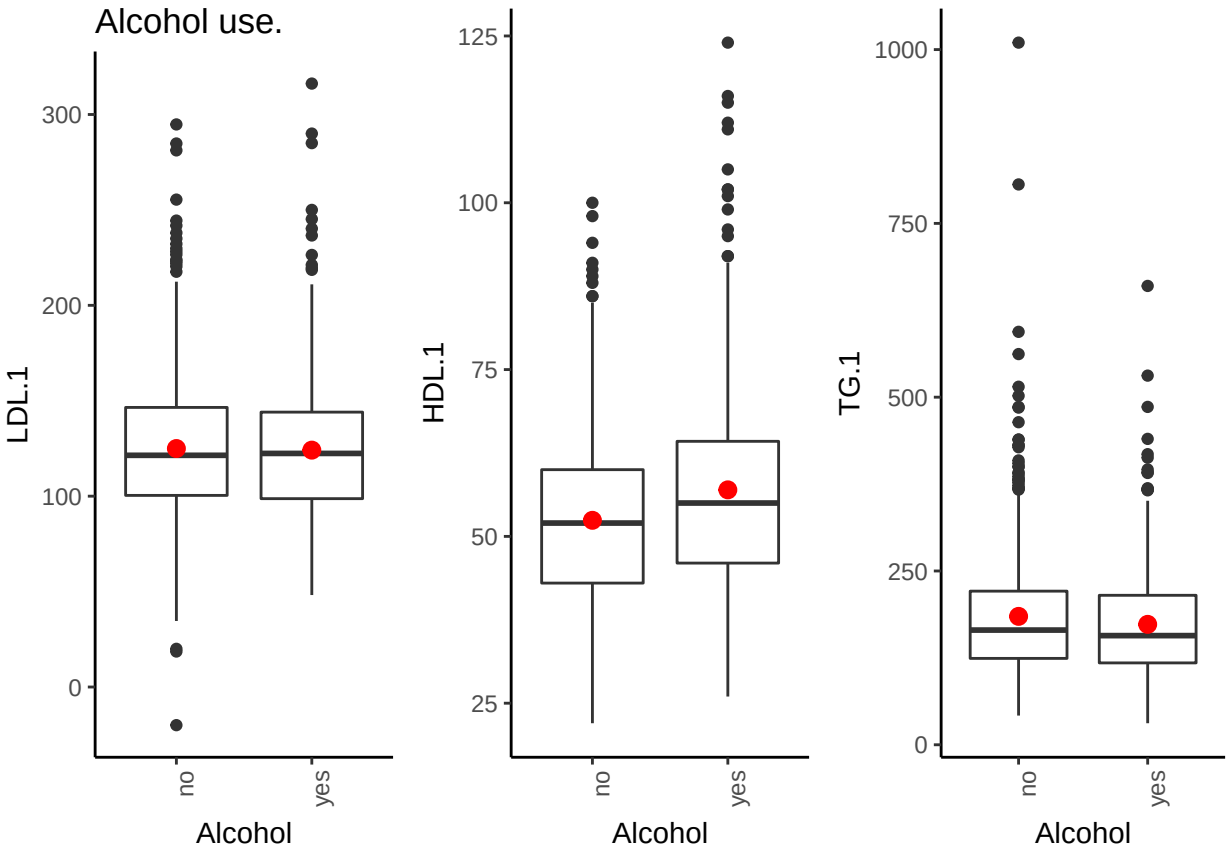
Checking by Statin Use



Smoking Behavior



Alcohol use


Alcohol use.
LDL.1
300
200
100
0
no
yes
Alcohol
HDL.1
125
100
75
50
25
no
yes
Alcohol
TG.1
1000
750
500
250
0
no
yes
Alcohol