Group Assignment 4A Task 5

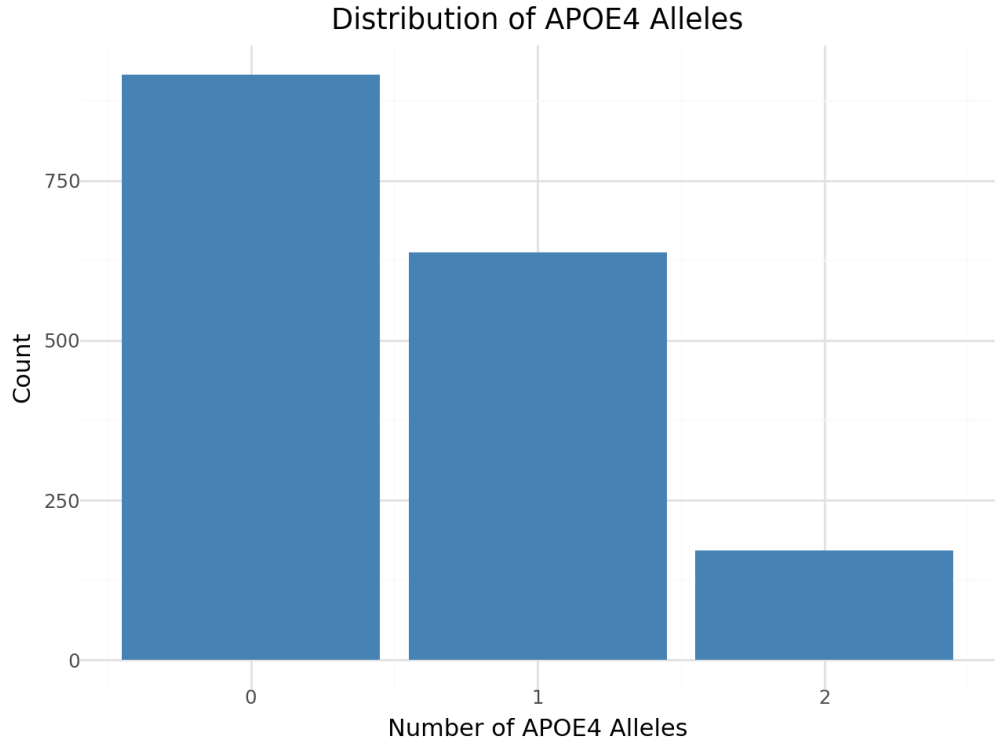
Team Members:

Isaac Walker, Andrew Dahlstrom, Po-Han Chen, Manuel Duran, Raul Hernandez

Hypothesis 1:

Is your APOE4 level associated with risk of Alzheimer's disease?

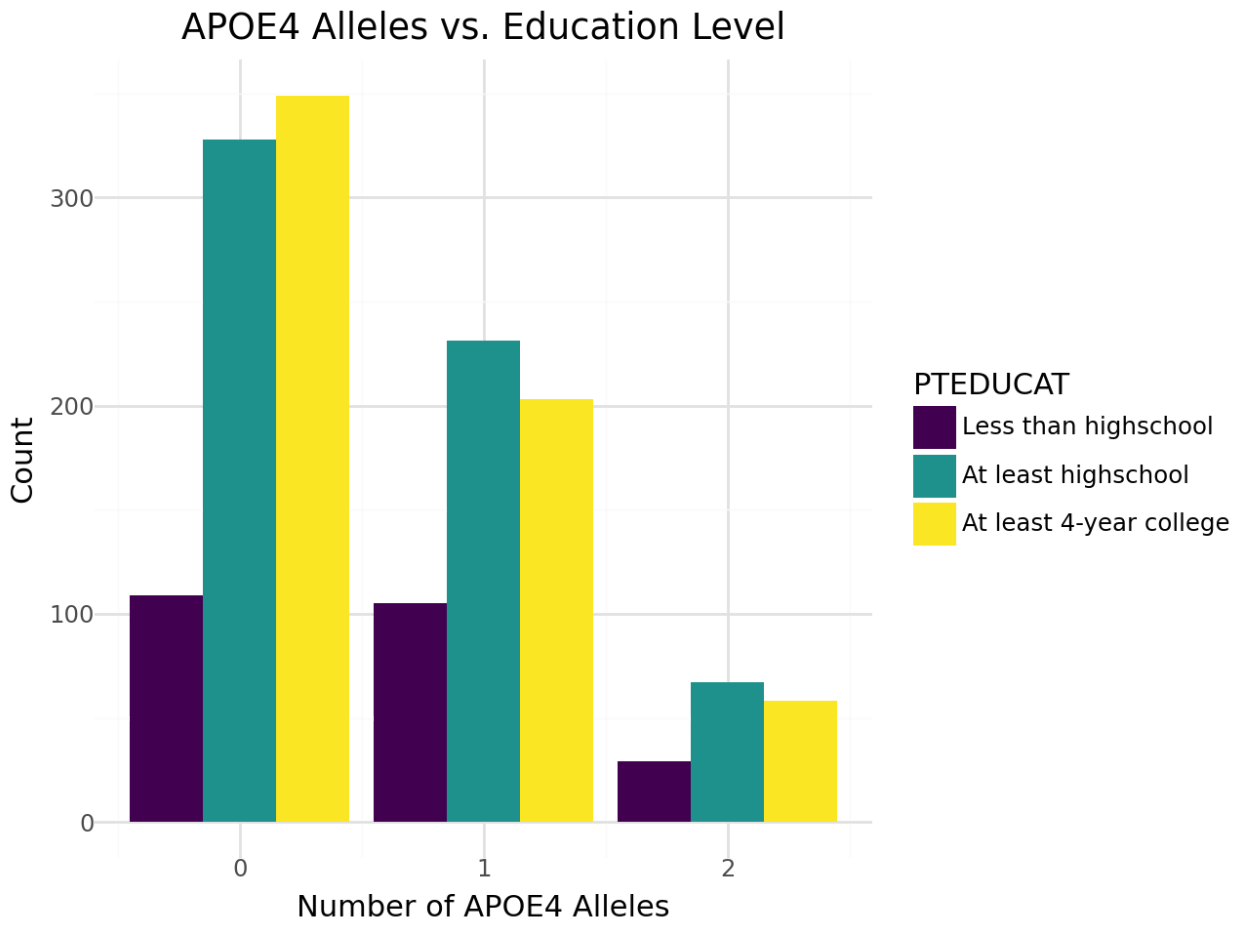
```
# Plot the distribution of APOE4 alleles
(ggplot(Pat_data, aes(x='APOE4')) +
 geom_bar(fill='steelblue') +
 labs(title='Distribution of APOE4 Alleles', x='Number of APOE4 Alleles',
y='Count') +
 theme_minimal())
```



Comparing with education

```
# Bar plot showing the relationship between APOE4 and Education (DX)
(ggplot(PatDataSimple, aes(x='APOE4', fill='PTEDUCAT')) +
```

```
 geom_bar(position='dodge') +
 labs(title='APOE4 Alleles vs. Diagnosis of Alzheimer\'s', x='Number of
APOE4 Alleles', y='Count') +
 theme_minimal())
```

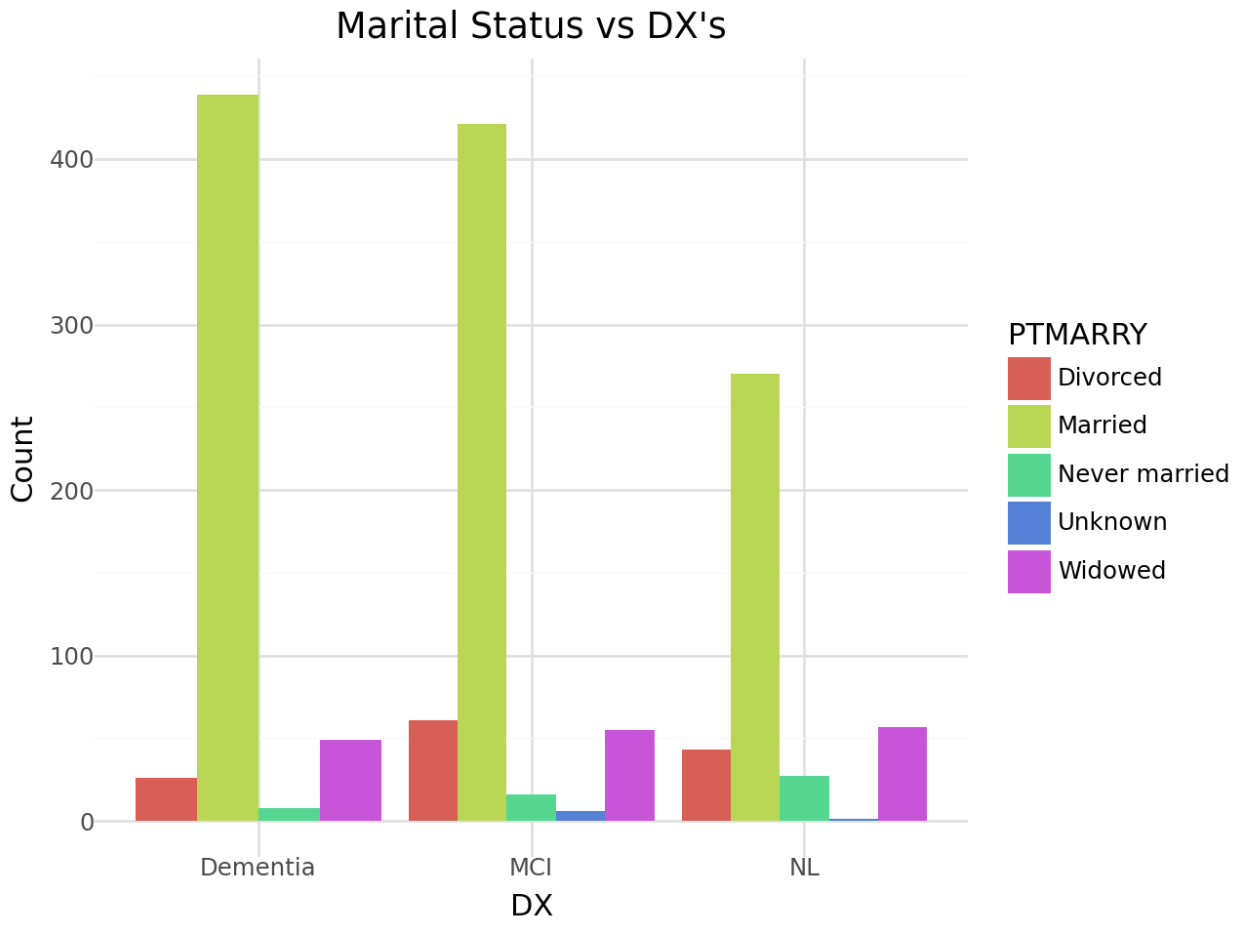


It seems that it's more common overall to have no APOE4 alleles and there does seem to be some correlation to education in that people without an APOE4 allele are about equally likely to have less than a high school education or at least a high school education. For the other categories the number of alleles decreases with high education.

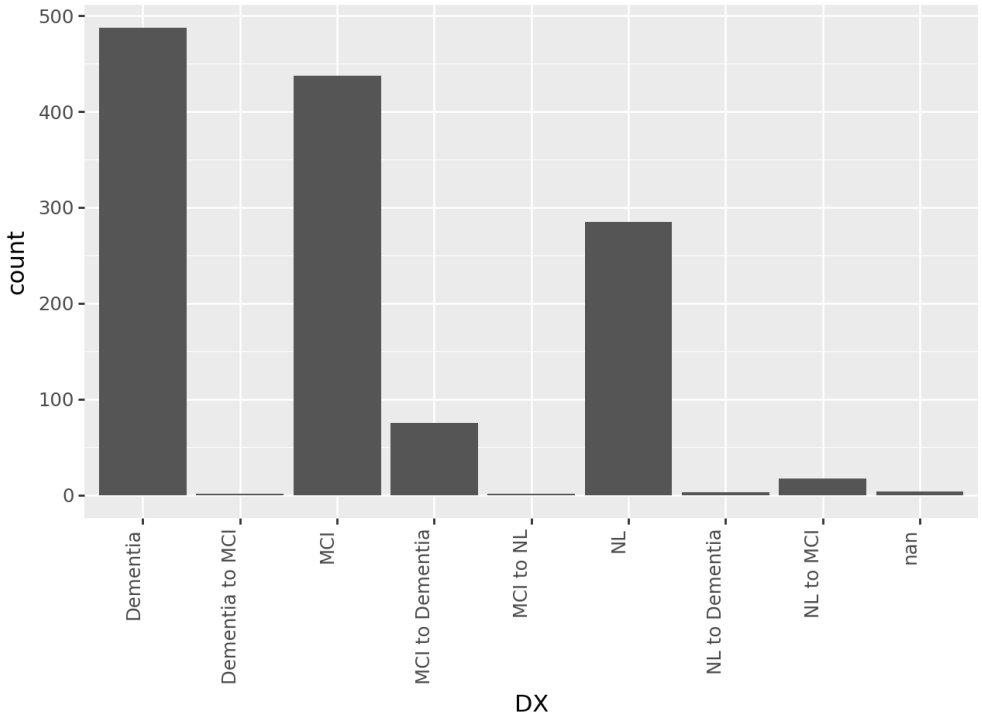
Hypothesis 2:

Does marital status have an effect on the risk for Alzheimer's?

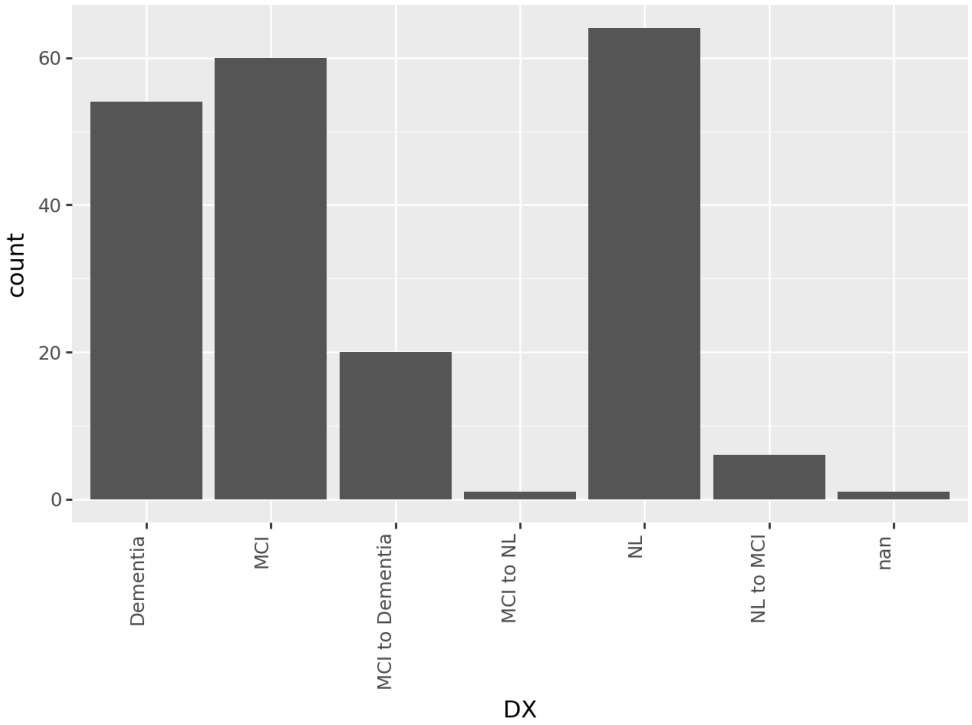
• Null hypothesis: Marital status has no effect on risk of Alzheimers.


Marital Status vs DX's
Count
400
300
200
100
0
Dementia
MCI
NL
DX
PTMARRY
Divorced
Married
Never married
Unknown
Widowed

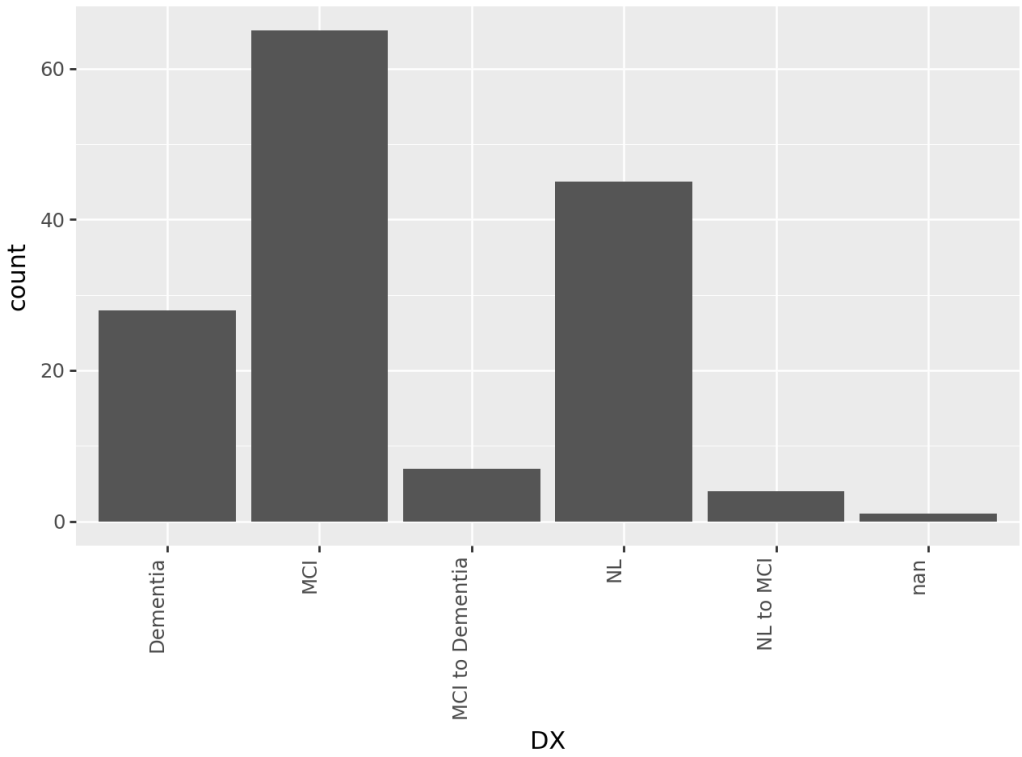
Married:



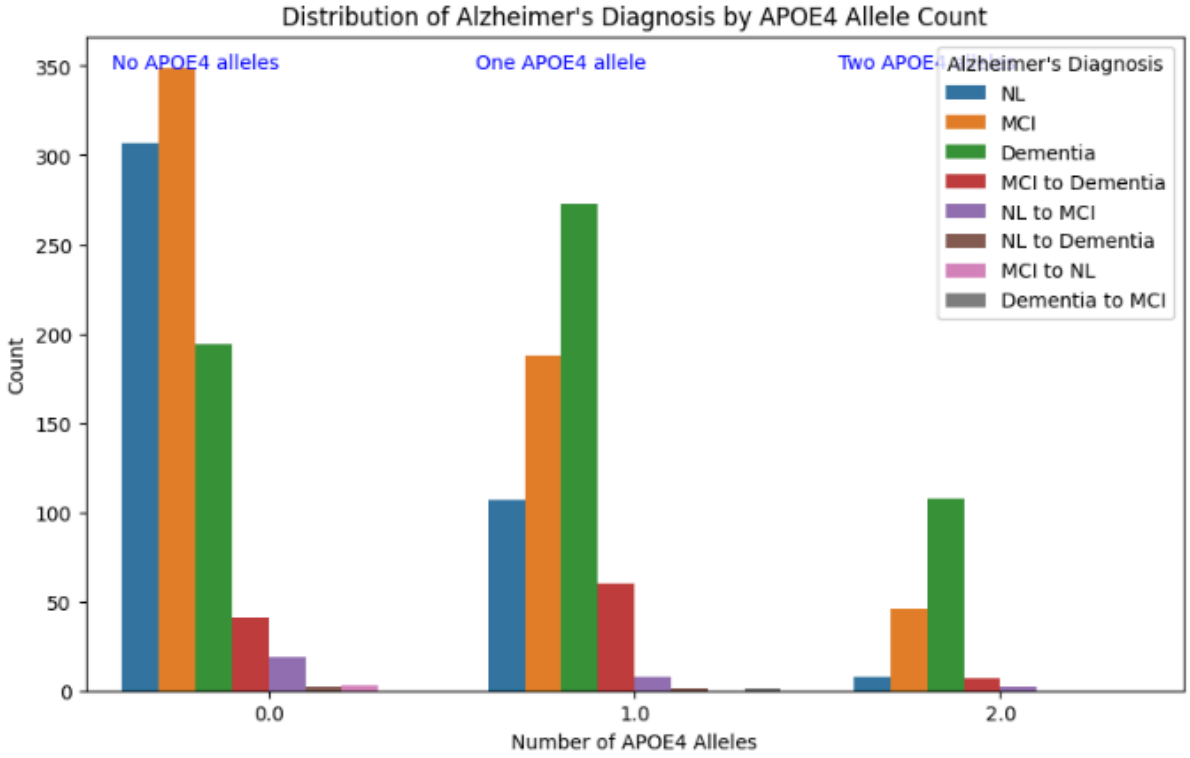
Widowed:



Divorced:


count
60
40
20
0
Dementia
MCI
MCI to Dementia
NL
NL to MCI
nan
DX

Hypothesis 3: Are genetics the highest cause of alzheimer?



The diagram highlights a potential genetic connection between the number of APOE4 alleles and the risk of developing Alzheimer's disease. It shows that individuals with one or two copies of the APOE4 allele tend to have higher rates of Alzheimer's and dementia diagnoses. As the number of APOE4 alleles increases from zero to two, the prevalence of these diagnoses also rises, suggesting that APOE4 might play a significant role as a genetic factor.