ANALYSIS OF CD4 COUNTS OF HIV PATIENTS:
FOCUSING ON GENDER, DRUG USE, ETHNICITY, AGE AND HOMELESSNESS

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BACKGROUND

- AIDS and HIV has claimed over 600,000 deaths in the United States (whitehouse.gov)

- Participants in this study are HIV-infected patients from a large urban AIDS clinic

- In reference to HIV patients "T-cell" and "CD4 cell" are used interchangeably

- HIV uses this particular receptor to latch on to the T-cell, making it a prime target for infection (aids.gov)

- Normal CD4 counts are between 500-1000, HIV treatment is recommended after it falls to 350

HYPOTHESIS

1. Test the relationship between CD4 counts for gender.

    $H_0: \mu_M = \mu_F$

    $H_A: \mu_M \neq \mu_F$

2. Test variable to see if there is interaction or confounding that results in an increase or decrease in CD4 counts.

VARIABLES

Age:

24-69

Gender:

Males and Females

Drug Use:

•in the last 6 months
•Scale of 0-100

Ethnicity:

•Black, White, Hispanic and other

Homeless

DATA STUDY DESIGN

- Cohort Study
  - urban AIDS clinic
  - Random sample
  - 45 minute Interview
    - Initial then second interview 6 months later
    - Data collection- questionnaires
  - Offered $20
  - 203 participants
    - 39 incomplete, result in lost of 16.96%

BREAKDOWN OF STUDY GROUP

- **<u>Gender</u>**

  121 males, 71 females

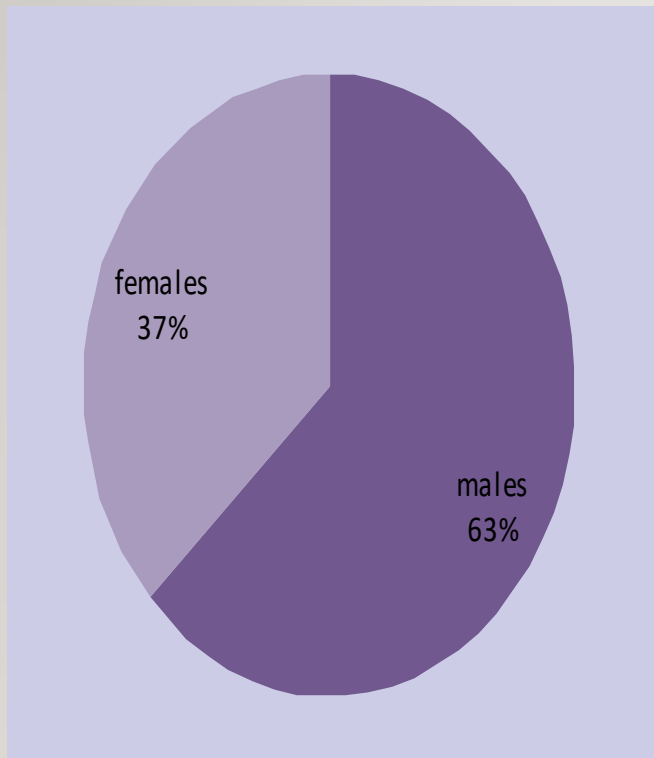- **<u>Ethnicity</u>**

  169 Black, 20 White, 2 Other

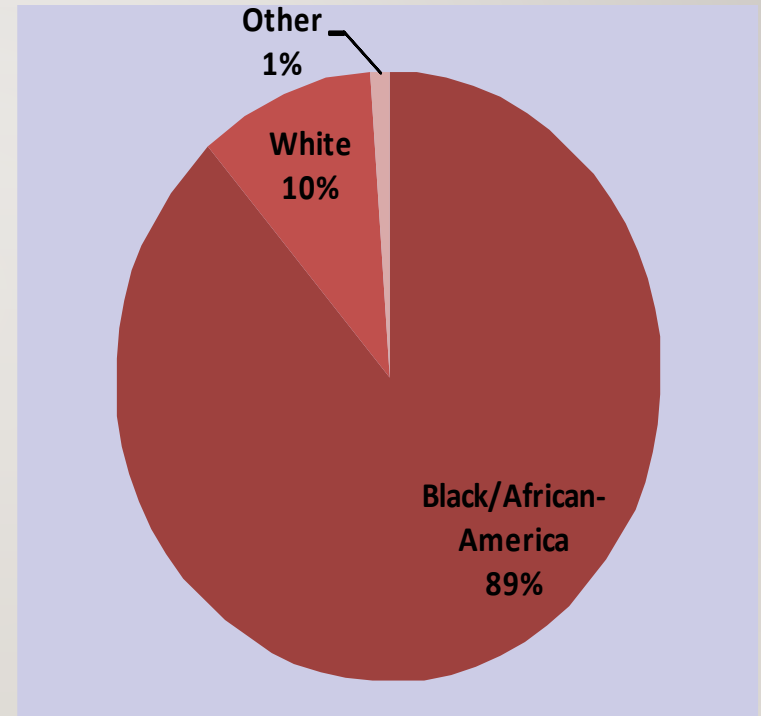- **<u>Homeless</u>**

  15 homeless

- **<u>Age</u>**

  Range from 24-69 years old

Gender
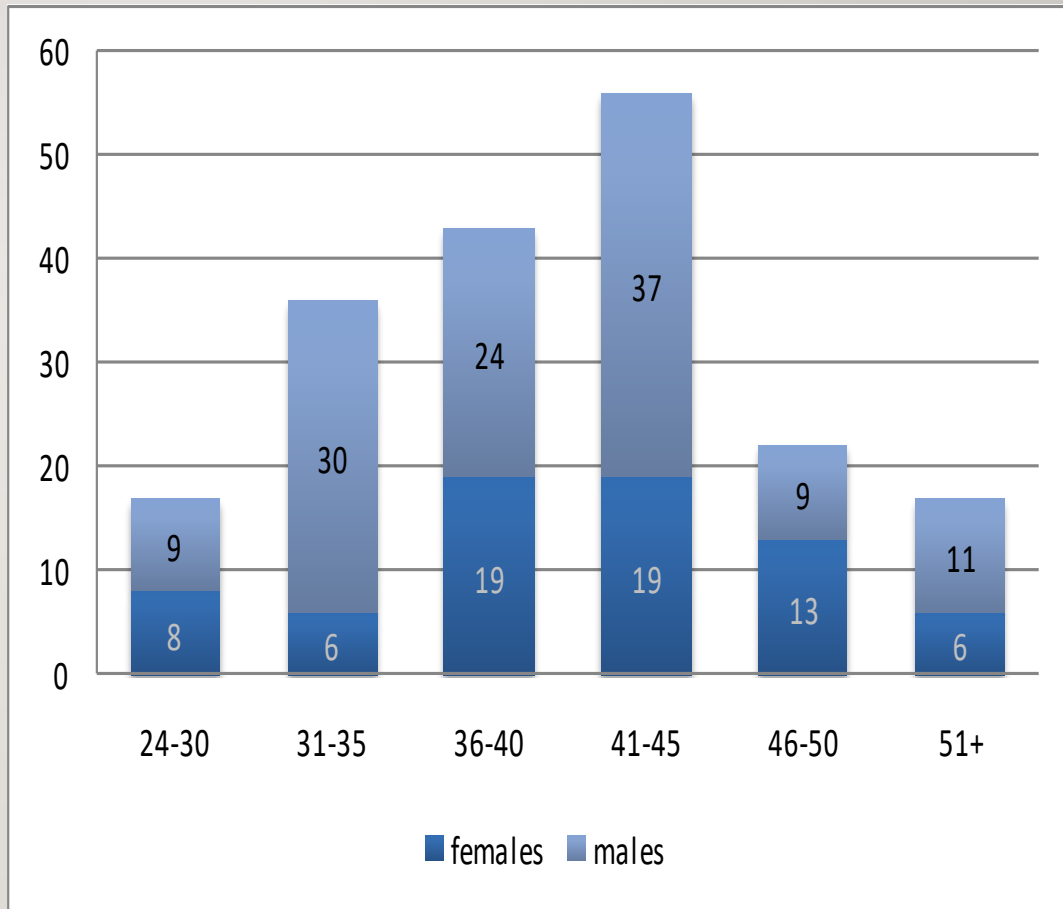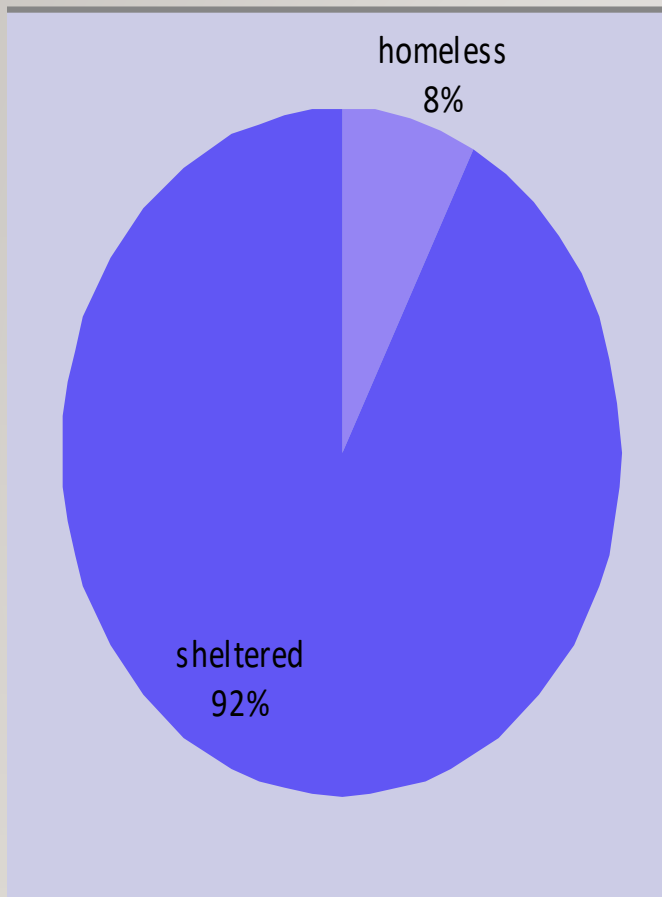
Ethnicity

Homelessness

by age

HYPOTHESIS 1 ANALYSIS PLAN

Test the relationship between CD4 counts for gender.

- Descriptive statistics
- Confidence Intervals
- Odd Ratio
- Chi-Square value

HYPOTHESIS 1 ANALYSIS RESULT

Test the relationship between CD4 counts for gender.

- Description Statistics
    - Male mean is 250.3, CI 217.7 to 282.8
    - Female mean is 369.1, CI 313.9 to 424.3
    - CD4 count ≥350; m- 71.2%, f- 44.7%
- Odd Ratio
    - Males are 3.1 times more likely to have a lower CD4 count; CI 1.684 to 3.5383

HYPOTHESIS 2

Test variable to see if there is interaction or confounding that results in an increase or decrease in CD4 counts.

- Compare Stratified Odds Ratios

- If there is no interaction found; we test for Confounding
  - For interaction, we multiply two variable together to form and new variable then test linear regression
  - For confounding, we tested all the variables simultaneously

ANALYSIS PLAN

- ## Interaction
  - Drug and Ethnicity
  - Drug and Age
  - Drugs and Homelessness
  - Drugs and Gender
  - Gender and Age
  - Homelessness and Age
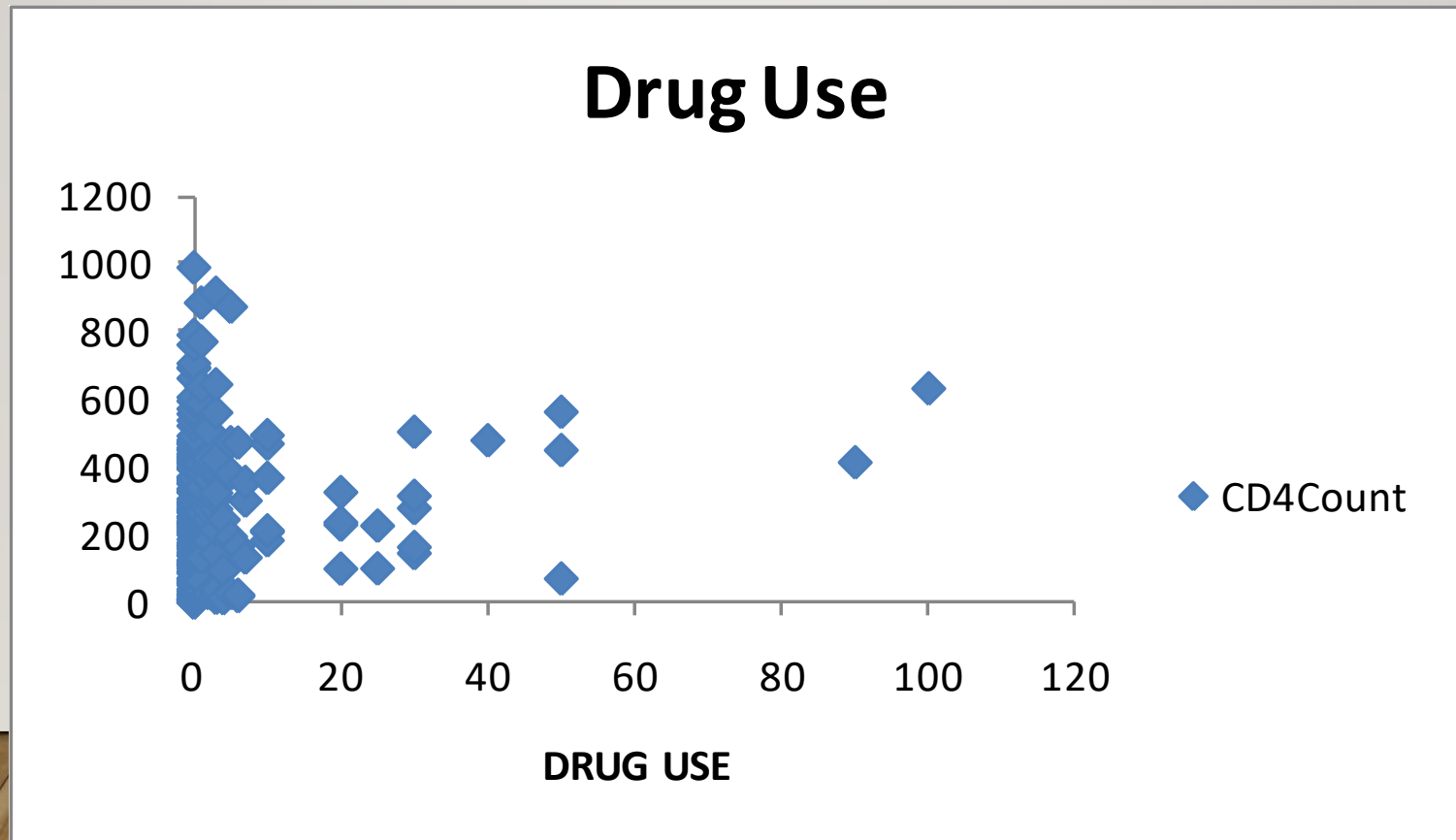 - Homelessness and Ethnicity

- ## Confounding
  - Drug Use
  - **Age**
  - **Ethnicity**
  - Gender
  - **Homelessness**

CONFOUNDING ANALYSIS WORK

- Gender and CD4 counts

  - Linear Regression- β=118.8, intercept=250, p-value <.001

  - which means for every female, their CD4 counts were 118.8 points higher than males

- Homeless (highest) and CD4 counts

  - β= 68.43, p-value= 0.25

- Ethnicity and CD4 counts

  - β= 3.36, p-value= 0.43

- Age (lowest) and CD4 counts
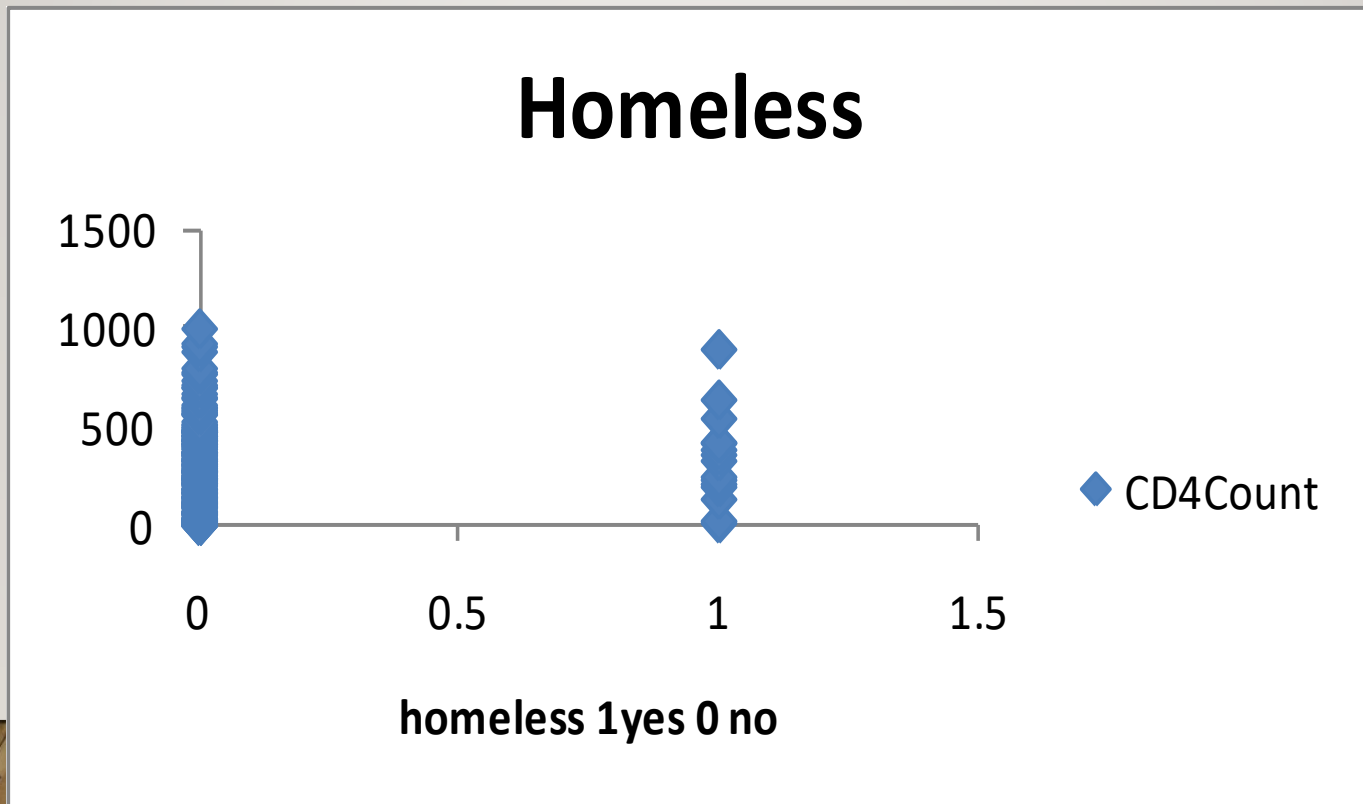
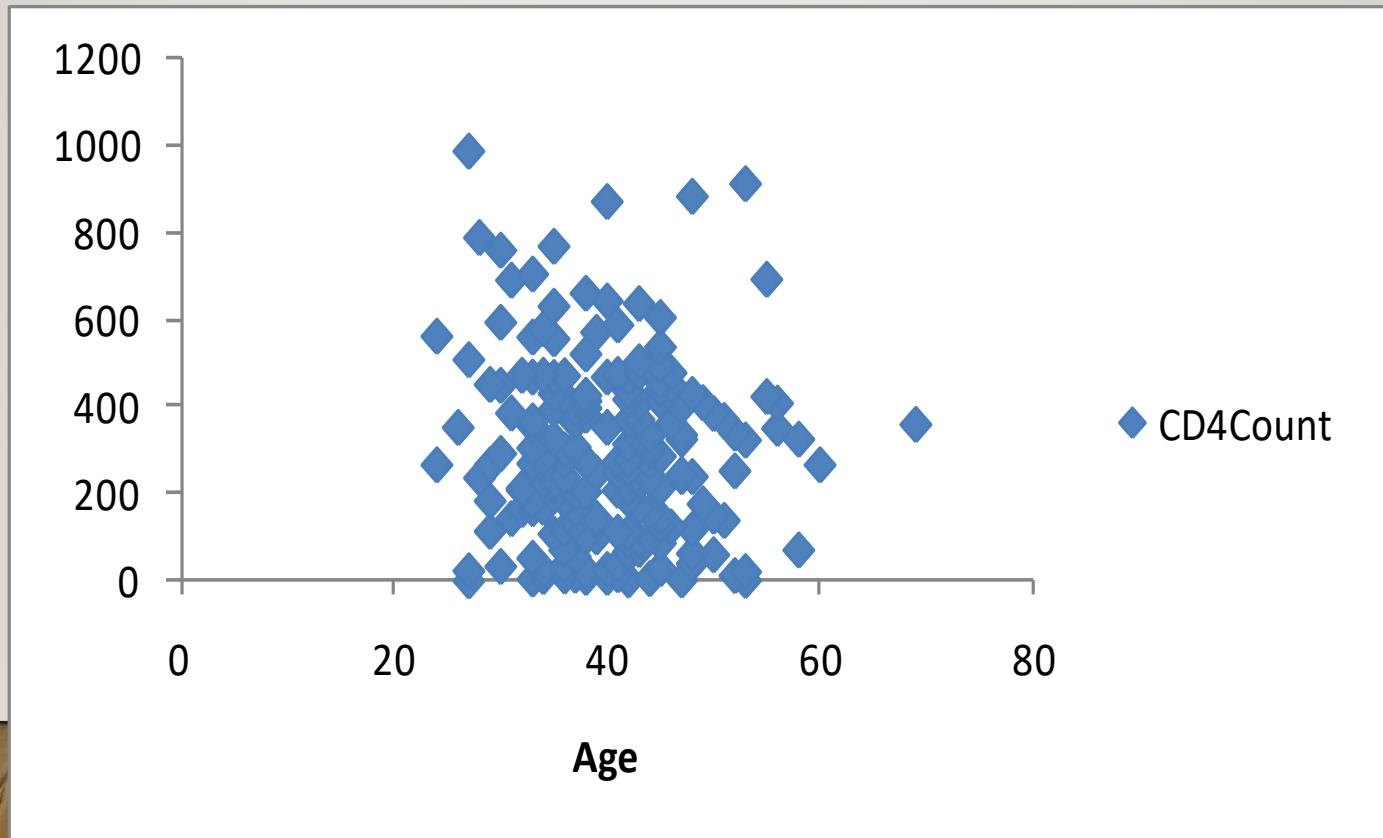 - β= -1.66, p-value= 0.41

ANALYSIS WORK

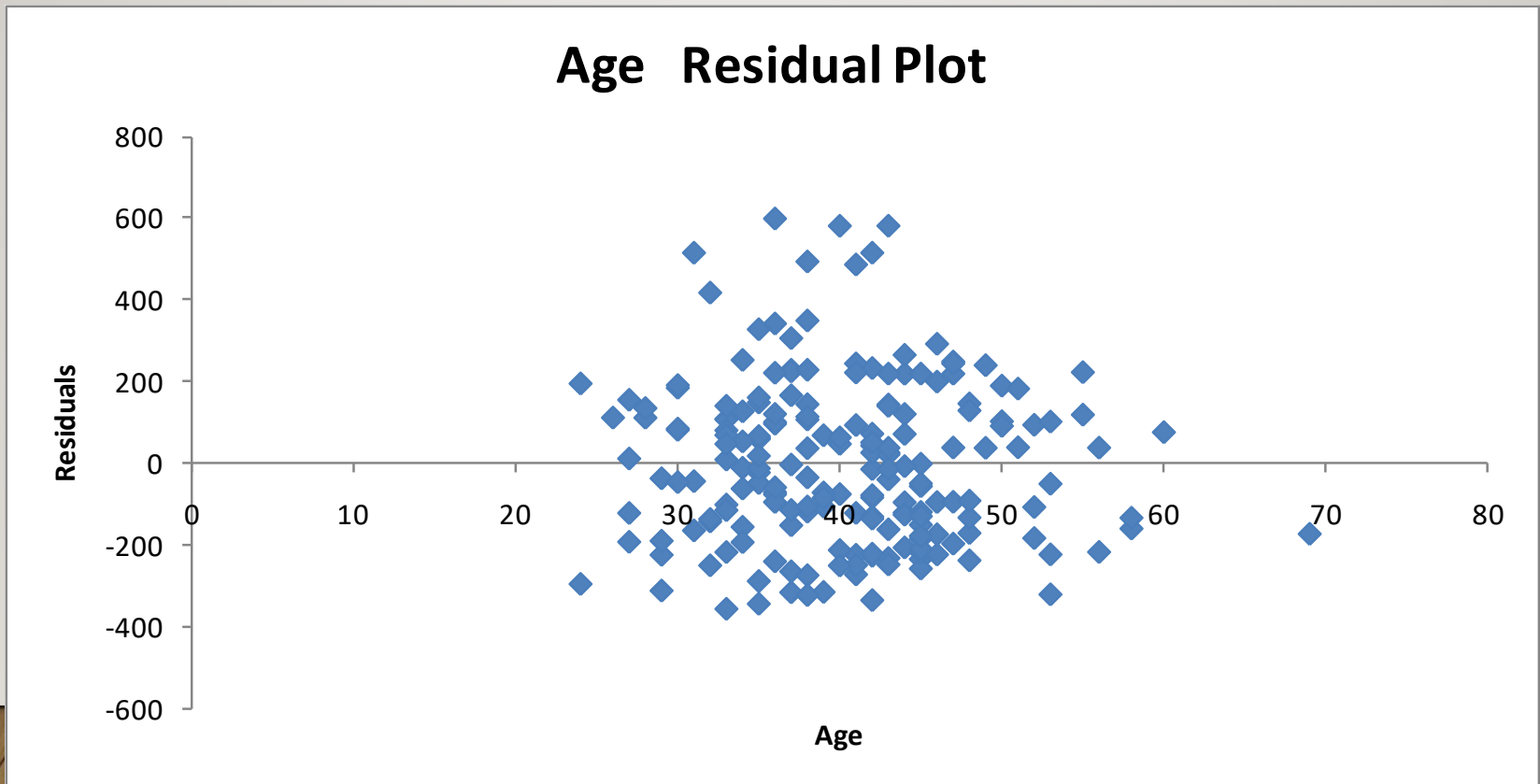- Drug use and CD4 counts

ANALYSIS WORK

- Homeless and CD4 counts

ANALYSIS WORK

- Age and CD4 counts

ANALYSIS WORK

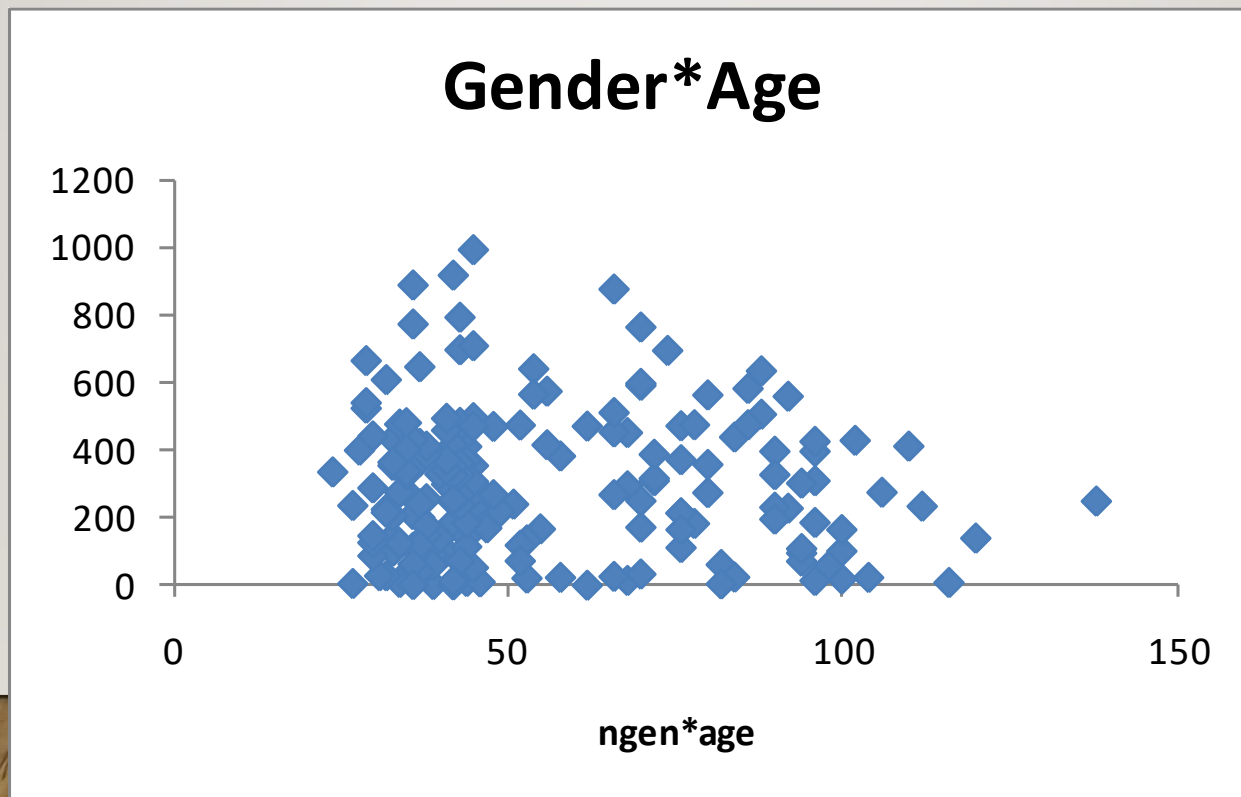- Age and CD4 counts, normal

Age   Residual Plot

INTERACTION ANALYSIS WORK

- Age and Gender
  - β= -0.37, p-value= 0.46
- Age and Drug Use
  - β= 0.04, p-value= 0.20
- Age and Homeless
  - β= 2.22, p-value= .14
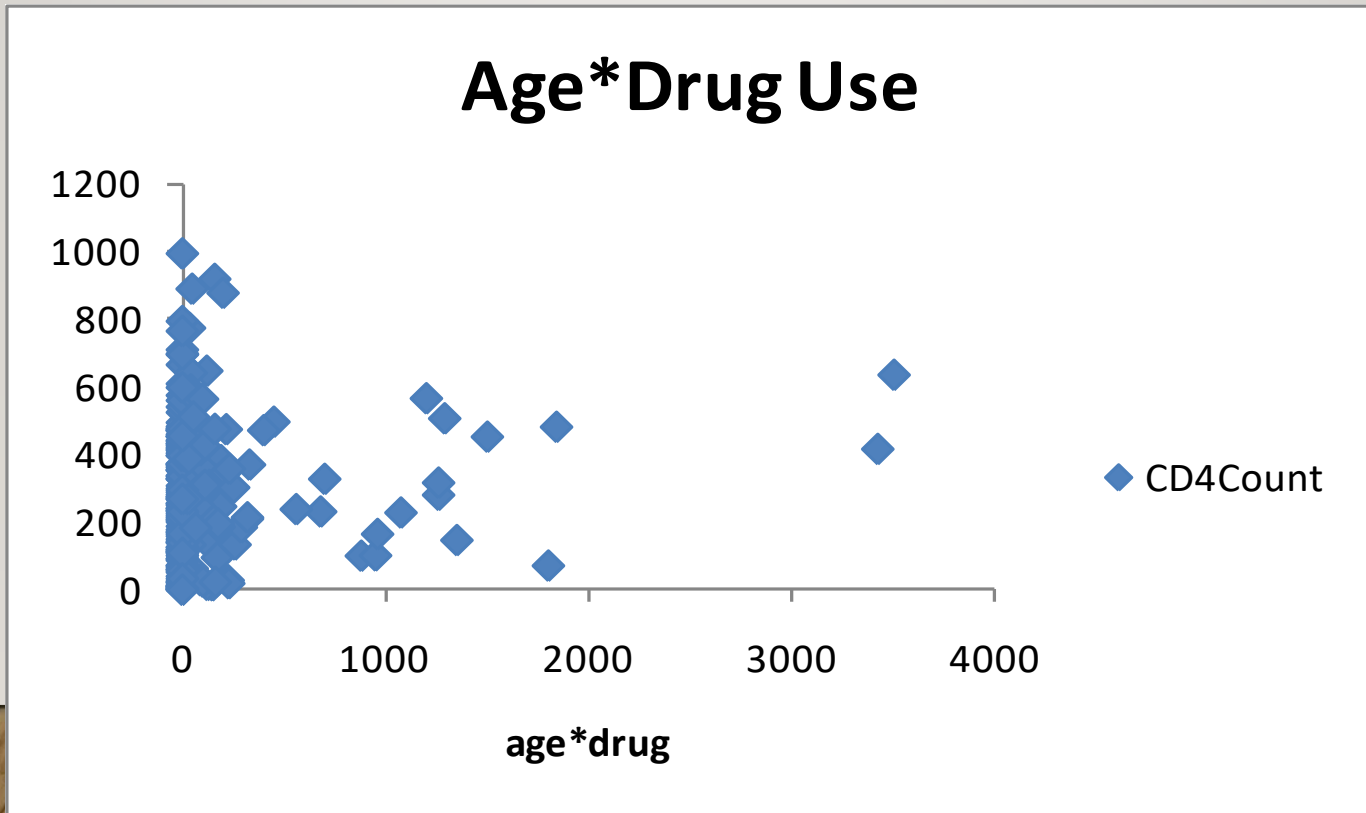- Ethnicity and Homeless
  - β= 80.57, p-value= 0.18

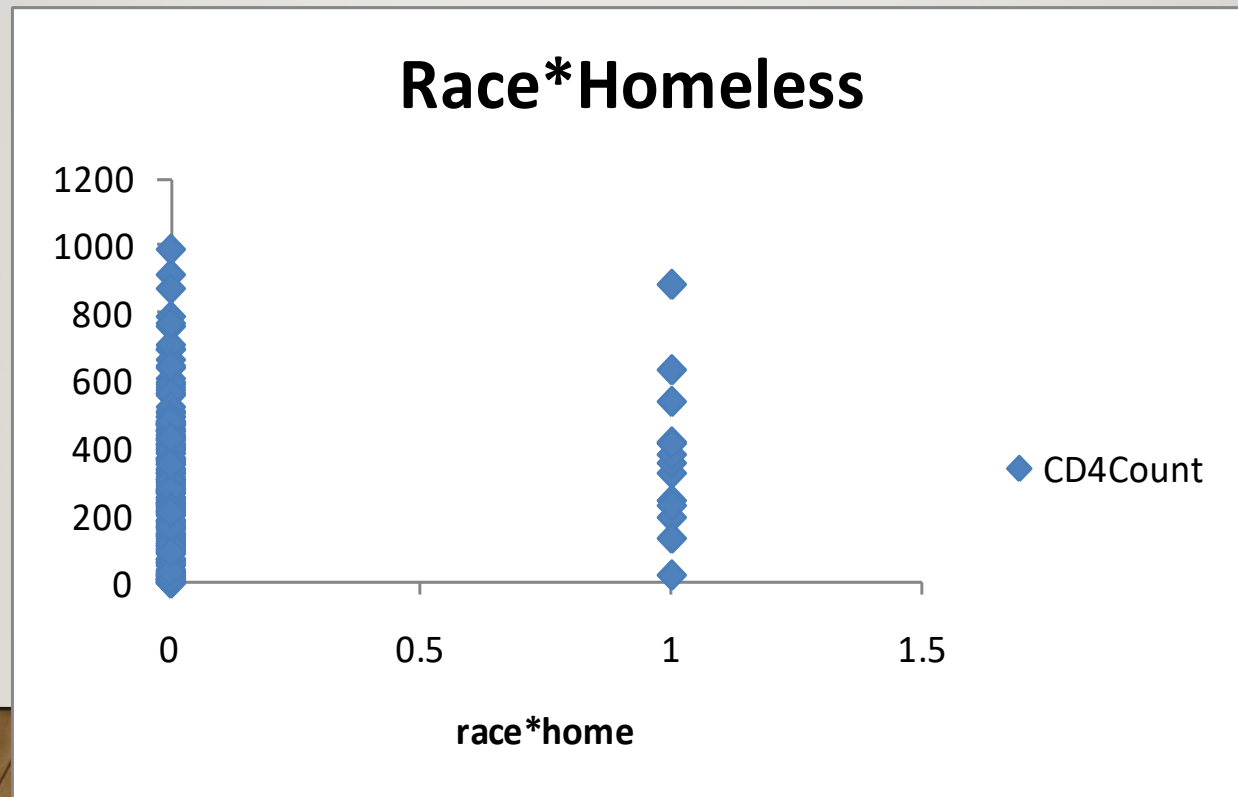# ANALYSIS WORK

- Gender and Age

Gender*Age

ANALYSIS WORK

- Age and Drug Use

ANALYSIS WORK

- Ethnicity and Homeless

RESULTS: RECALL HYPOTHESIS

1. Test the relationship between CD4 counts for gender.

    H_0: $\mu_M = \mu_F$

    H_A: $\mu_M \neq \mu_F$

2. Test variable to see if there is interaction or confounding that results in an increase or decrease in CD4 counts

RESULTS

1. Reject the hypothesis
   - Males are 3 times more likely to have a lower CD4 count

2. No interaction or confounding
   - p-values were significantly high (with the exception of gender)
   - Beta did not show a significant difference in CD4 counts

QUESTIONS FOR NEXT TIME

- More variables
  - How long they been diagnosed
  - If they are currently being treated
- Smaller CD4 count intervals
  - This study tested all CD4 counts, ≥350, and <350
- More concentration on male participants
  - They seem to be at a higher risk and require more research

ANY QUESTIONS?