

# Statistical Analysis Report

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## Data Summary

### Variables included in the analysis

```
## 'data.frame': 132 obs. of 30 variables:
## $ Pid : Factor w/ 66 levels "1","2","3","4",...: 1 2 3 4 5 6 7 8 9 10 ...
## $ Gender : Factor w/ 3 levels "Male","Female",...: 3 1 1 1 2 2 1 1 1 1 ...
## $ Age : int 36 32 35 19 41 39 24 48 21 18 ...
## $ Education : Factor w/ 2 levels "Educated","Uneducated": 2 2 2 2 2 2 2 1 2 2 ...
## $ Employment : Factor w/ 2 levels "Employed","Unemployed": 1 2 1 1 2 2 1 1 1 2 ...
## $ Marital_Status: Factor w/ 3 levels "Married","Unmarried",...: 2 2 1 1 1 1 2 2 2 2 ...
## $ Cause : Factor w/ 3 levels "Sex","Shared needles",...: 1 2 3 1 1 1 1 3 1 1 ...
## $ Group : Factor w/ 2 levels "Usual care","Intervention": 1 2 1 2 1 2 1 2 1 2 ...
## $ Time : Factor w/ 2 levels "Pre","Post": 1 1 1 1 1 1 1 1 1 1 ...
## $ CD4_Count : int 154 129 361 30 402 203 38 876 687 45 ...
## $ A1 : Factor w/ 4 levels "Not at all sure",...: 2 2 3 2 2 4 1 1 2 3 ...
## $ A2 : Factor w/ 4 levels "Not at all sure",...: 3 3 3 2 2 4 1 2 2 1 ...
## $ A3 : Factor w/ 4 levels "Not at all sure",...: 2 3 3 2 2 4 1 2 2 1 ...
## $ B1 : Factor w/ 4 levels "Very dissatisfied",...: 1 2 3 4 2 2 1 2 2 1 ...
## $ B2 : Factor w/ 4 levels "Very dissatisfied",...: 1 4 3 4 2 4 1 2 2 2 ...
## $ C1 : Factor w/ 4 levels "Never","Rarely",...: 2 3 2 1 1 1 1 1 1 1 ...
## $ C2 : Factor w/ 4 levels "Never","Rarely",...: 2 1 2 2 1 1 4 2 1 1 ...
## $ C3 : Factor w/ 4 levels "Never","Rarely",...: 3 1 1 1 1 1 4 1 1 1 ...
## $ C4 : Factor w/ 4 levels "Never","Rarely",...: 1 1 1 1 1 1 4 3 1 3 ...
## $ C5 : Factor w/ 4 levels "Never","Rarely",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ C6 : Factor w/ 4 levels "Never","Rarely",...: 3 1 1 1 1 1 4 1 1 4 ...
## $ C7 : Factor w/ 4 levels "Never","Rarely",...: 2 1 1 1 1 1 4 1 1 1 ...
## $ C8 : Factor w/ 4 levels "Never","Rarely",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ C9 : Factor w/ 4 levels "Never","Rarely",...: 2 1 3 2 1 1 4 4 1 1 ...
## $ C10 : Factor w/ 4 levels "Never","Rarely",...: 1 1 1 1 1 1 4 1 1 1 ...
## $ C11 : Factor w/ 4 levels "Never","Rarely",...: 2 1 4 2 1 1 4 1 1 3 ...
## $ C12 : Factor w/ 4 levels "Never","Rarely",...: 1 1 2 1 1 1 4 1 1 1 ...
## $ C13 : Factor w/ 4 levels "Never","Rarely",...: 1 1 3 1 1 1 4 1 1 1 ...
## $ C14 : Factor w/ 4 levels "Never","Rarely",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ D : Factor w/ 6 levels "Never","Past week",...: 5 6 3 6 1 1 2 5 1 4 ...
```

## Sociodemographic Characteristics

| Group        | Characteristic | Levels                | Mean  | SD    | N  | Percentage |
|--------------|----------------|-----------------------|-------|-------|----|------------|
| Usual care   |                |                       |       |       | 33 |            |
| Intervention |                |                       |       |       | 33 |            |
| Usual care   | Age            |                       | 31.39 | 9.53  |    |            |
| Intervention | Age            |                       | 36.18 | 12.24 |    |            |
| Usual care   | Gender         | Male                  |       |       | 18 | 54.55      |
| Usual care   | Gender         | Female                |       |       | 10 | 30.3       |
| Usual care   | Gender         | Transgender           |       |       | 5  | 15.15      |
| Intervention | Gender         | Male                  |       |       | 23 | 69.7       |
| Intervention | Gender         | Female                |       |       | 10 | 30.3       |
| Usual care   | Education      | Educated              |       |       | 6  | 18.18      |
| Usual care   | Education      | Uneducated            |       |       | 27 | 81.82      |
| Intervention | Education      | Educated              |       |       | 6  | 18.18      |
| Intervention | Education      | Uneducated            |       |       | 27 | 81.82      |
| Usual care   | Employment     | Employed              |       |       | 15 | 45.45      |
| Usual care   | Employment     | Unemployed            |       |       | 18 | 54.55      |
| Intervention | Employment     | Employed              |       |       | 10 | 30.3       |
| Intervention | Employment     | Unemployed            |       |       | 23 | 69.7       |
| Usual care   | Marital Status | Married               |       |       | 18 | 54.55      |
| Usual care   | Marital Status | Unmarried             |       |       | 14 | 42.42      |
| Usual care   | Marital Status | Divorced              |       |       | 1  | 3.03       |
| Intervention | Marital Status | Married               |       |       | 21 | 63.64      |
| Intervention | Marital Status | Unmarried             |       |       | 11 | 33.33      |
| Intervention | Marital Status | Divorced              |       |       | 1  | 3.03       |
| Usual care   | Cause          | Sex                   |       |       | 23 | 69.7       |
| Usual care   | Cause          | Shared needles        |       |       | 5  | 15.15      |
| Usual care   | Cause          | Other                 |       |       | 5  | 15.15      |
| Intervention | Cause          | Sex                   |       |       | 25 | 75.76      |
| Intervention | Cause          | Shared needles        |       |       | 5  | 15.15      |
| Intervention | Cause          | Other                 |       |       | 3  | 9.09       |
| Usual care   | B1             | Very dissatisfied     |       |       | 7  | 21.21      |
| Usual care   | B1             | Somewhat dissatisfied |       |       | 10 | 30.3       |
| Usual care   | B1             | Somewhat satisfied    |       |       | 13 | 39.39      |
| Usual care   | B1             | Very satisfied        |       |       | 3  | 9.09       |
| Intervention | B1             | Very dissatisfied     |       |       | 5  | 15.15      |
| Intervention | B1             | Somewhat dissatisfied |       |       | 8  | 24.24      |
| Intervention | B1             | Somewhat satisfied    |       |       | 14 | 42.42      |
| Intervention | B1             | Very satisfied        |       |       | 6  | 18.18      |
| Usual care   | B2             | Very dissatisfied     |       |       | 9  | 27.27      |
| Usual care   | B2             | Somewhat dissatisfied |       |       | 8  | 24.24      |
| Usual care   | B2             | Somewhat satisfied    |       |       | 7  | 21.21      |
| Usual care   | B2             | Very satisfied        |       |       | 9  | 27.27      |
| Intervention | B2             | Very dissatisfied     |       |       | 4  | 12.12      |
| Intervention | B2             | Somewhat dissatisfied |       |       | 9  | 27.27      |
| Intervention | B2             | Somewhat satisfied    |       |       | 10 | 30.3       |
| Intervention | B2             | Very satisfied        |       |       | 10 | 30.3       |

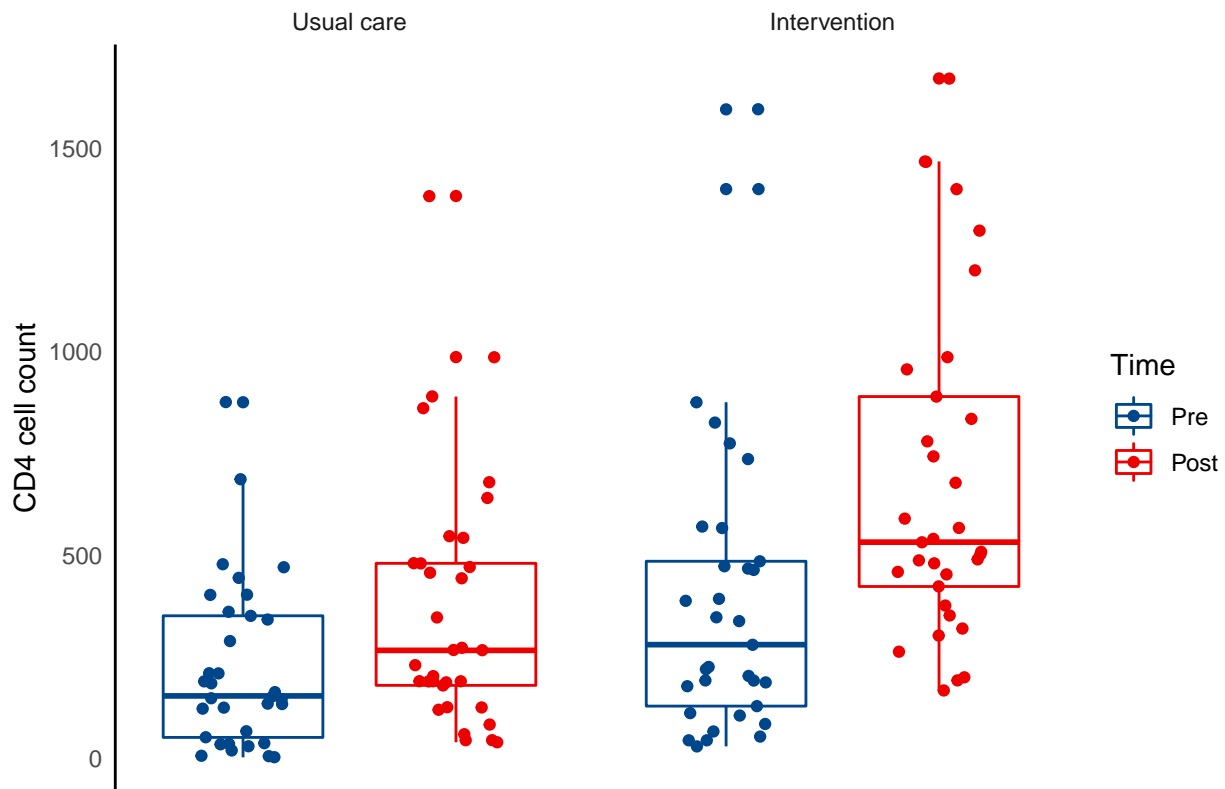
B1 and B2 correspond to the following questions from the AACTG instrument:

1. In general, how satisfied are you with the overall support you get from your friends and family members?
2. To what extent do your friends or family members help you remember to take your medication?

# Primary Outcome 1 (CD4 Cell Count)

## Data Visualisation

Following figure shows the box plots of the CD4 cell count for the two groups before and after the intervention.



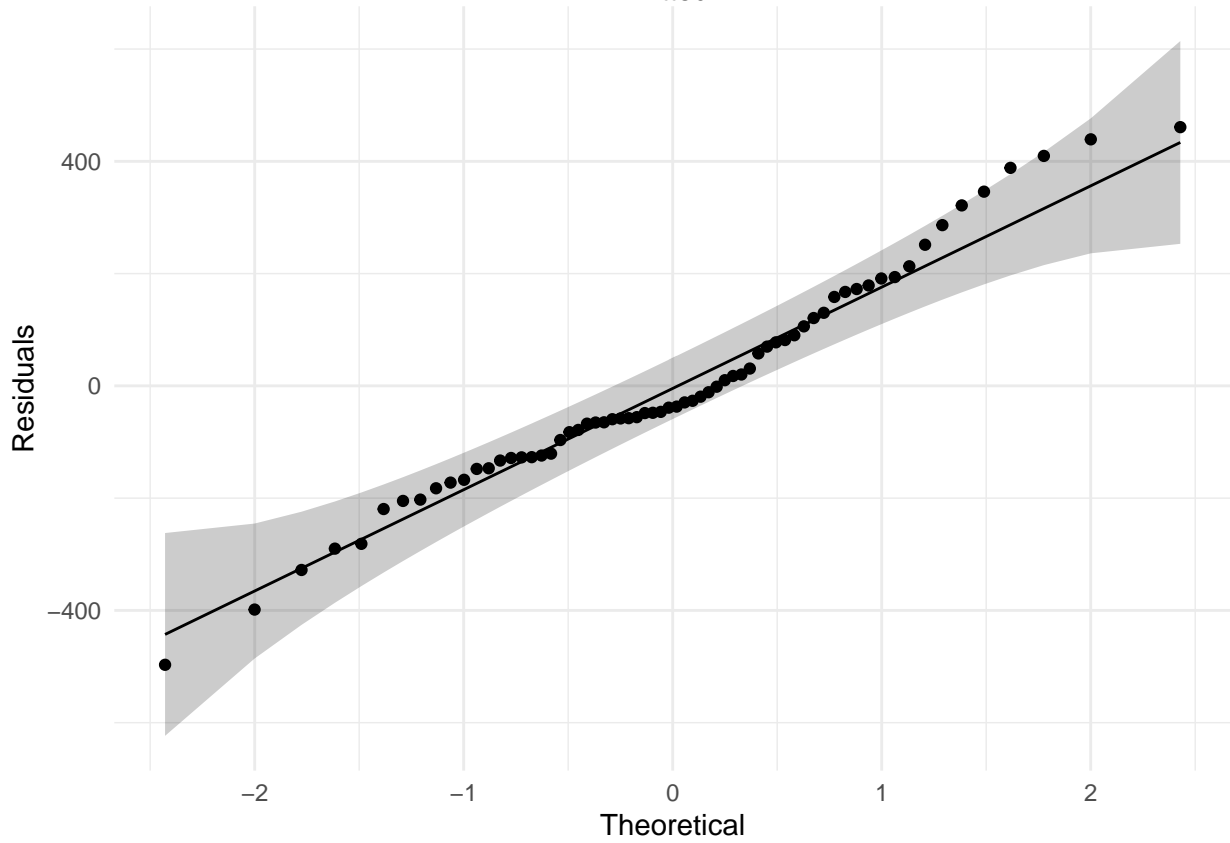
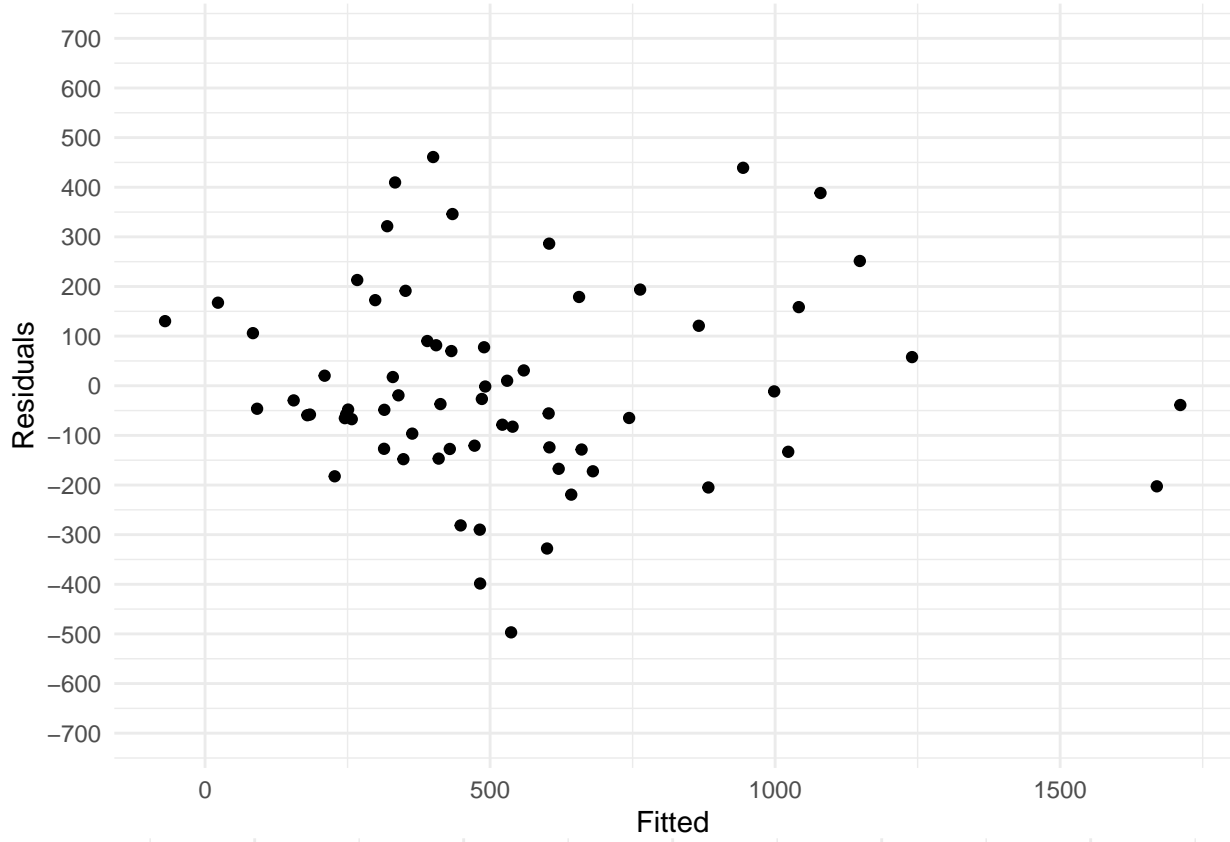
## Means and Standard Deviations

| Group        | Time | Mean     | SD       |
|--------------|------|----------|----------|
| Usual care   | Pre  | 221.7879 | 207.0415 |
| Usual care   | Post | 370.3030 | 313.9302 |
| Intervention | Pre  | 395.4848 | 372.2863 |
| Intervention | Post | 684.1818 | 411.8971 |

## Statistical Model

```
lmModel <- lm(CD4_Count ~ CountPre + Group +  
  B1 + B2 +  
  Education + Employment + Marital_Status + Age + Gender + Cause,  
  data = modelData)
```

# Model Diagnostics



### ANOVA Table and Group Differences

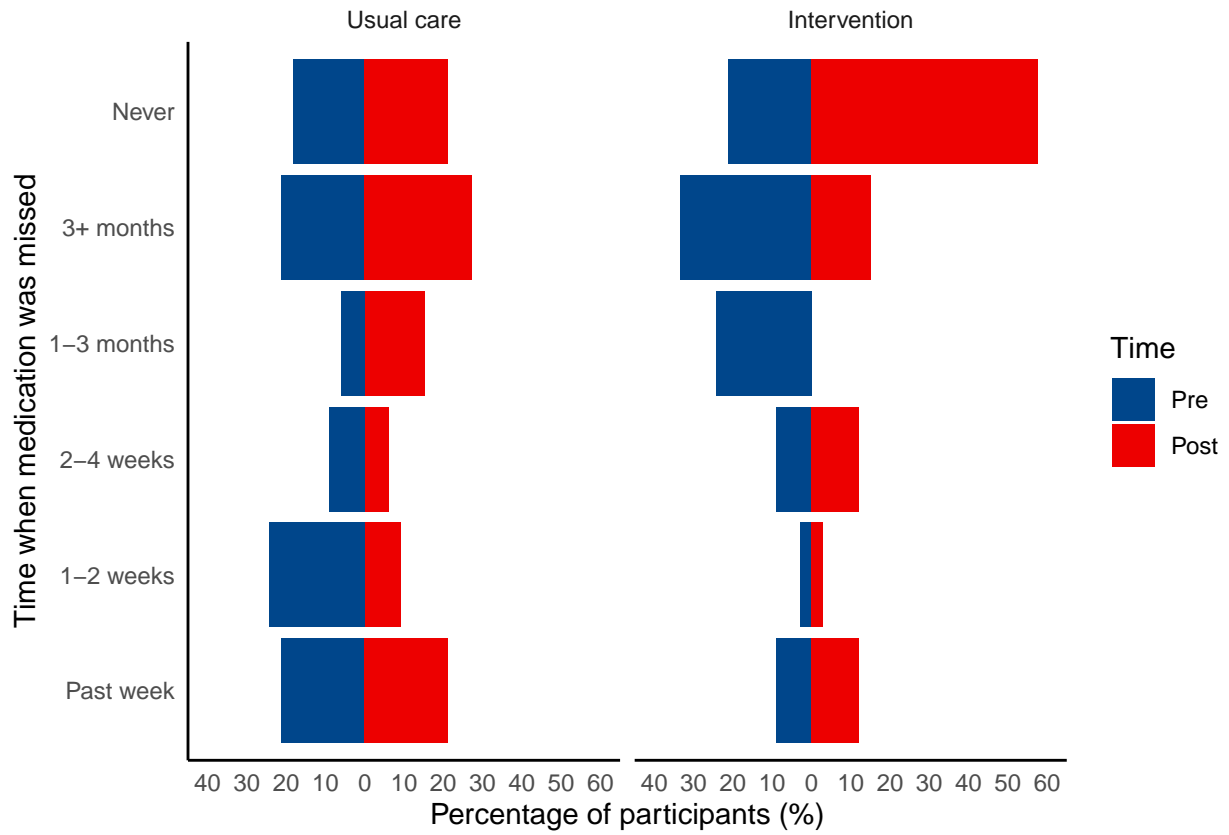
| Variable       | Sum Sq      | Df | F value | Pr(>F) |
|----------------|-------------|----|---------|--------|
| CountPre       | 4182377.009 | 1  | 80.3311 | 0      |
| Group          | 441517.280  | 1  | 8.4802  | 0.0054 |
| B1             | 179067.009  | 3  | 1.1464  | 0.3399 |
| B2             | 115008.692  | 3  | 0.7363  | 0.5355 |
| Education      | 9602.158    | 1  | 0.1844  | 0.6695 |
| Employment     | 5048.905    | 1  | 0.097   | 0.7568 |
| Marital_Status | 47795.184   | 2  | 0.459   | 0.6347 |
| Age            | 102636.689  | 1  | 1.9713  | 0.1667 |
| Gender         | 187908.397  | 2  | 1.8046  | 0.1755 |
| Cause          | 15855.773   | 2  | 0.1523  | 0.8592 |
| Residuals      | 2499084.393 | 48 |         |        |

| Contrast                  | Estimate | SE      | DF | T-value | P-value | 95% CI lower | 95% CI upper |
|---------------------------|----------|---------|----|---------|---------|--------------|--------------|
| Intervention - Usual care | 199.6693 | 68.5658 | 48 | 2.9121  | 0.0054  | 61.8086      | 337.53       |

# Primary Outcome 2 (Self-reported Drug Adherence)

## AACTG Section D: Time When Medication was Missed

### Data Visualisation



## Statistical Model

```

modelData$Response <- fct_relevel(modelData$Response,
  c("Past week", "1-2 weeks", "2-4 weeks",
    "1-3 months", "3+ months", "Never"))

modelData$ResponsePre <- fct_relevel(modelData$ResponsePre,
  c("Past week", "1-2 weeks", "2-4 weeks",
    "1-3 months", "3+ months", "Never"))

polrModel <- polr(Response ~ ResponsePre + Group +
  B1 + B2 +
  Education + Employment + Marital_Status + Age + Gender + Cause,
  data = modelData,
  Hess = TRUE,
  method = "logistic")

```

## ANOVA Table and Odds Ratio

| Variable       | LR Chisq | Df | Pr(>Chisq) |
|----------------|----------|----|------------|
| ResponsePre    | 21.9854  | 5  | 0.0005     |
| Group          | 7.5834   | 1  | 0.0059     |
| B1             | 4.9145   | 3  | 0.1782     |
| B2             | 8.4443   | 3  | 0.0377     |
| Education      | 2.2449   | 1  | 0.1341     |
| Employment     | 1.2330   | 1  | 0.2668     |
| Marital_Status | 3.0879   | 2  | 0.2135     |
| Age            | 0.1053   | 1  | 0.7455     |
| Gender         | 3.3261   | 2  | 0.1896     |
| Cause          | 9.1520   | 2  | 0.0103     |

| Contrast                                    | Odds Ratio | SE     | Z-value | P-value | 95% CI lower | 95% CI upper |
|---------------------------------------------|------------|--------|---------|---------|--------------|--------------|
| Intervention/Usual care                     | 5.9569     | 0.6794 | 2.6268  | 0.0086  | 1.5730       | 22.5582      |
| B2: Somewhat dissatisfied/Very dissatisfied | 0.1830     | 1.3279 | -1.2789 | 0.2009  | 0.0136       | 2.4704       |
| B2: Somewhat satisfied/Very dissatisfied    | 0.0560     | 1.4973 | -1.9245 | 0.0543  | 0.0030       | 1.0546       |
| B2: Very satisfied/Very dissatisfied        | 0.8516     | 1.4340 | -0.1120 | 0.9108  | 0.0512       | 14.1541      |
| Shared needles/Sex                          | 0.7230     | 0.9463 | -0.3427 | 0.7318  | 0.1131       | 4.6200       |
| Other/Sex                                   | 23.1431    | 1.1807 | 2.6609  | 0.0078  | 2.2878       | 234.1154     |

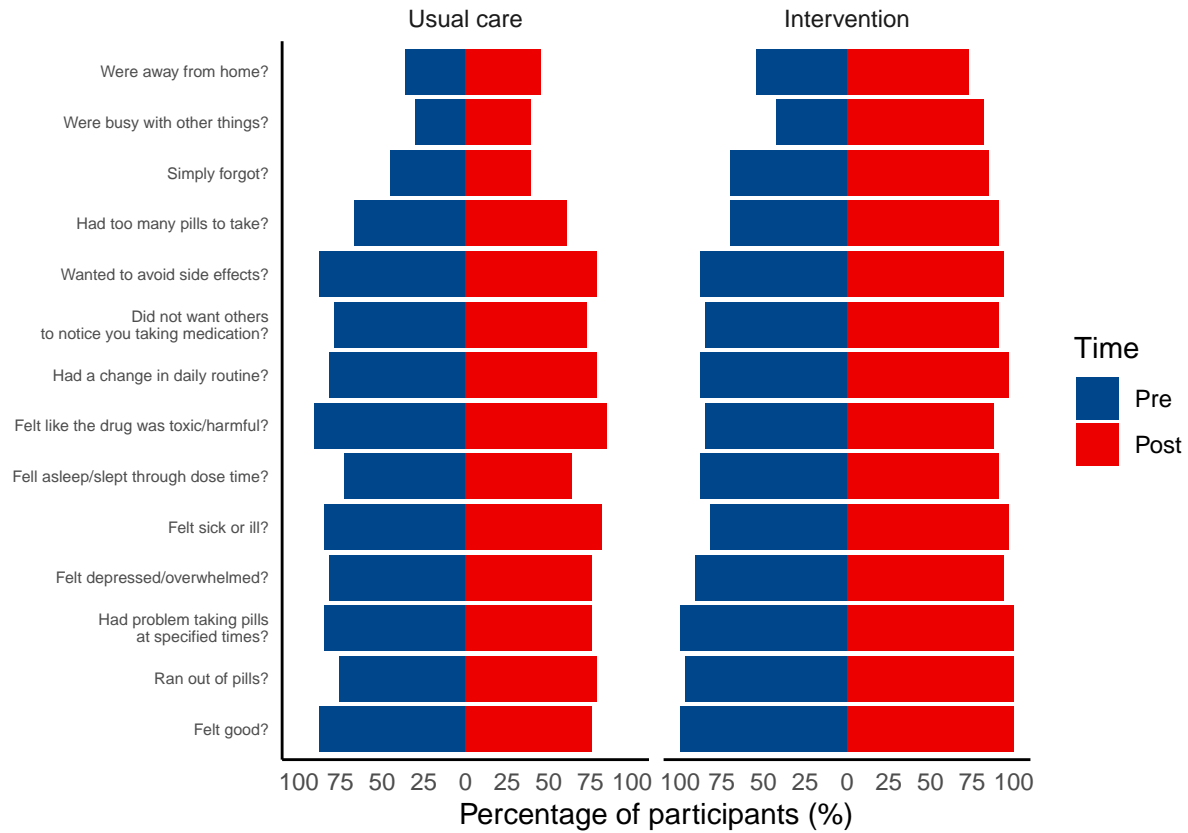
**Note:** Z and P values were obtained on the log odds ratio scale.

# Secondary Outcomes (Self-reported Drug Adherence)

## AACTG Section C: Reasons for Missed Medication

### Data Visualisation

Percentage of participants across groups pre and post-intervention who said they never missed a medication for reasons C1 (Away from home) to C14 (Felt good).





## Statistical Model

```

modelData$Response <- fct_relevel(modelData$Response,
                                c("Often", "Sometimes", "Rarely", "Never"))

modelData$ResponsePre <- fct_relevel(modelData$ResponsePre,
                                     c("Often", "Sometimes", "Rarely", "Never"))

polrModel <- polr(Response ~ ResponsePre + Question + Group +
                 B1 + B2 +
                 Education + Employment + Marital_Status + Age + Gender + Cause,
                 data = modelData,
                 Hess = TRUE,
                 method = "logistic")

```

## ANOVA Table and Odds Ratio

| Variable       | LR Chisq | Df | Pr(>Chisq) |
|----------------|----------|----|------------|
| ResponsePre    | 109.1533 | 3  | 0.0000     |
| Question       | 30.7439  | 13 | 0.0037     |
| Group          | 73.8569  | 1  | 0.0000     |
| B1             | 3.5565   | 3  | 0.3135     |
| B2             | 1.8192   | 3  | 0.6108     |
| Education      | 1.0948   | 1  | 0.2954     |
| Employment     | 2.6299   | 1  | 0.1049     |
| Marital_Status | 10.7104  | 2  | 0.0047     |
| Age            | 0.0966   | 1  | 0.7560     |
| Gender         | 16.8254  | 2  | 0.0002     |
| Cause          | 27.3178  | 2  | 0.0000     |

| Contrast                | Odds Ratio | SE     | Z-value | P-value | 95% CI lower | 95% CI upper |
|-------------------------|------------|--------|---------|---------|--------------|--------------|
| Intervention/Usual care | 7.7414     | 0.2571 | 7.9595  | 0.0000  | 4.6769       | 12.8141      |
| Unmarried/Married       | 2.8751     | 0.3304 | 3.1960  | 0.0014  | 1.5045       | 5.4945       |
| Divorced/Married        | 0.8765     | 0.6334 | -0.2081 | 0.8352  | 0.2533       | 3.0333       |
| Female/Male             | 1.7393     | 0.3625 | 1.5267  | 0.1268  | 0.8546       | 3.5395       |
| Transgender/Male        | 0.2257     | 0.3884 | -3.8328 | 0.0001  | 0.1054       | 0.4832       |
| Shared needles/Sex      | 1.8916     | 0.3528 | 1.8067  | 0.0708  | 0.9474       | 3.7769       |
| Other/Sex               | 7.8715     | 0.4608 | 4.4779  | 0.0000  | 3.1905       | 19.4203      |

**Note:** Z and P values were obtained on the log odds ratio scale.

## AACTG Section A: Adherence Self-efficacy and Medication Beliefs

How sure are you that:

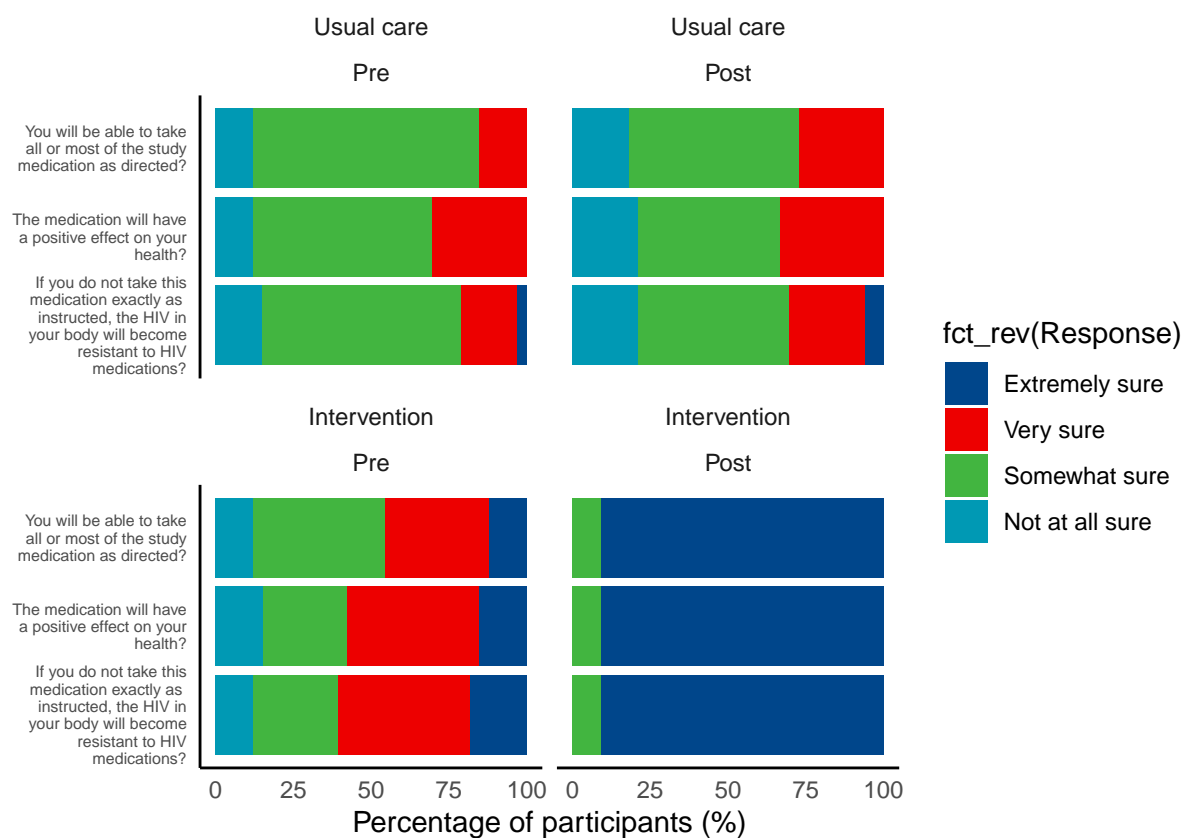
A1: You will be able to take all or most of the study medication as directed?

A2: The medication will have a positive effect on your health?

A3: If you do not take this medication exactly as instructed, the HIV in your body will become resistant to HIV medications?

### Data Visualisation

Percentage of participants across groups pre and post-intervention who gave a particular response to the above three questions.



### Statistical Model

We failed to setup a model to fit the data corresponding to adherence self-efficacy and medication beliefs as some of the categories were empty. The results are presented in the above figure overwhelmingly support the intervention group.