# Linear Model with Fixed Effect Intercept

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## Description

This script will produce, and analyze a linear model with a fixed-effect subject-specific intercept, on the finalized data. It will first produce a single response-predictor model for seq variables, and then analyze the assumptions made for OLS modeling.

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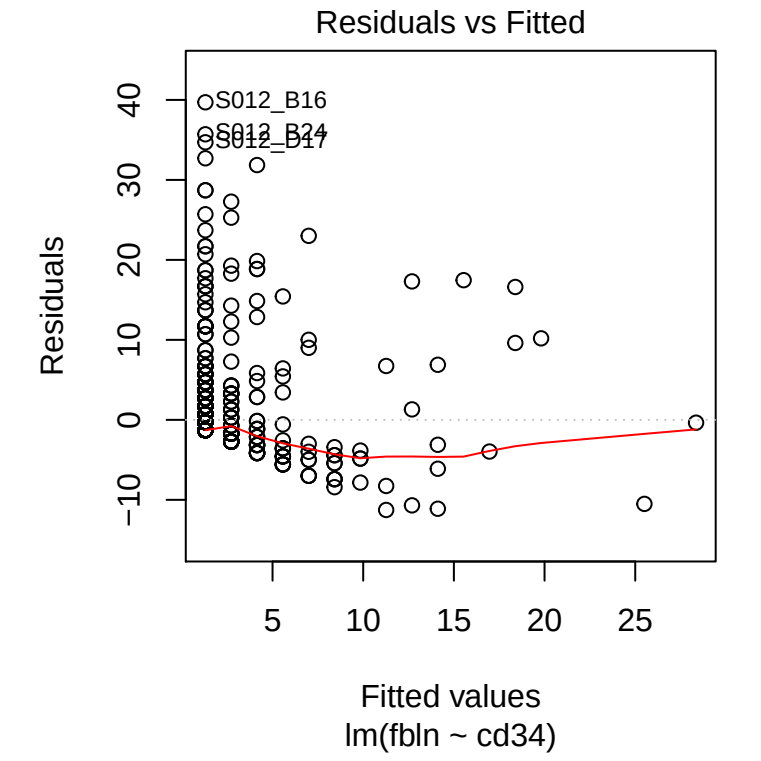
## Initial Models (Sequencing Variables)

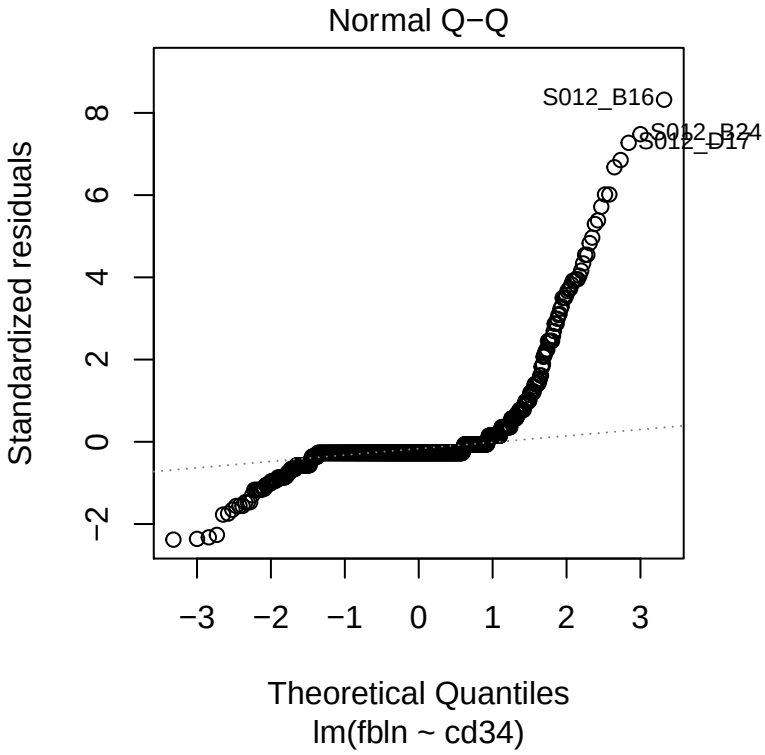
### Response = mala, Predictor = cd19

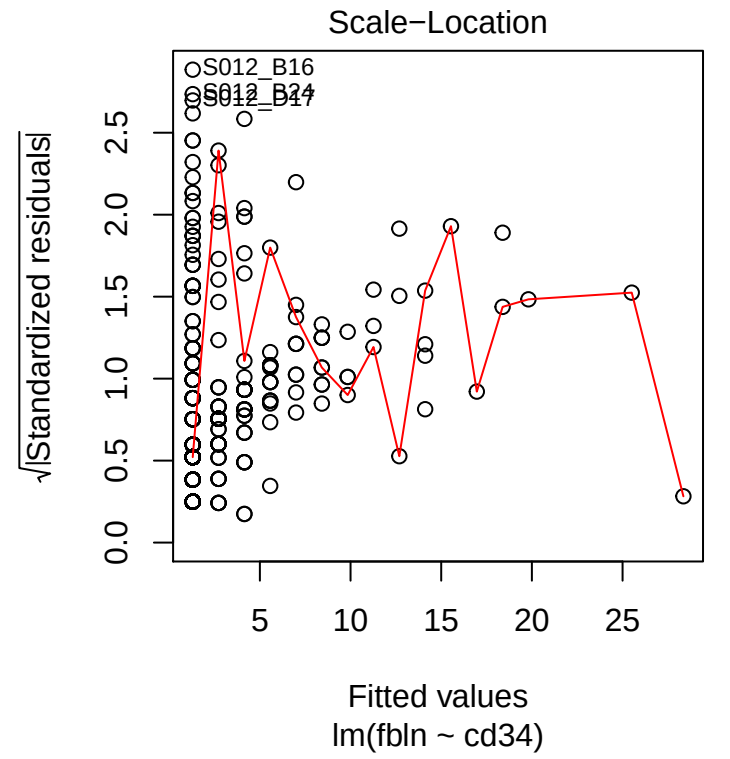
## Model 0

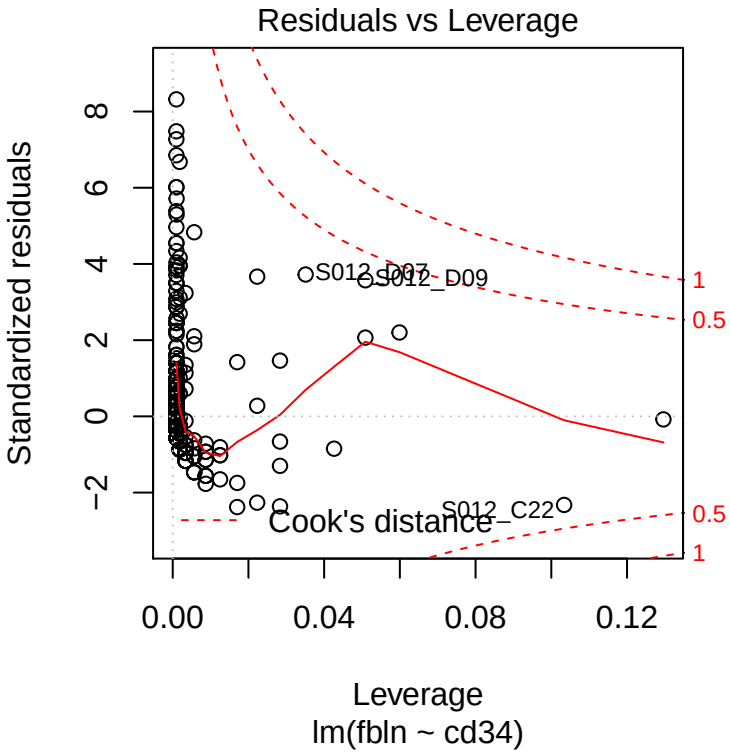
### Non-Transformed Model

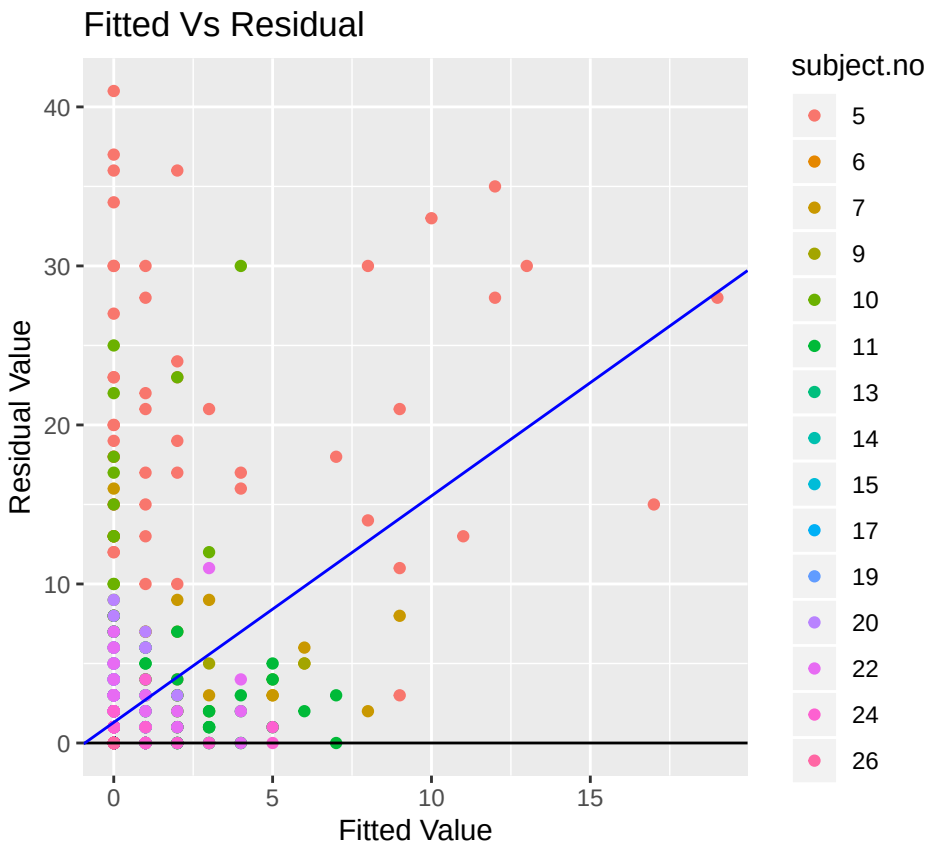
```
##
## Call:
## lm(formula = fbln ~ cd34, data = dat)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -11.266  -1.297  -1.297  -0.297  39.703
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  1.29700    0.14853   8.732   <2e-16 ***
## cd34         1.42410    0.09221  15.444   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.774 on 1108 degrees of freedom
## Multiple R-squared:  0.1771, Adjusted R-squared:  0.1764
## F-statistic: 238.5 on 1 and 1108 DF,  p-value: < 2.2e-16
```


Residuals vs Fitted
Residuals
Fitted values
lm(fbln ~ cd34)
S012_B16
S012_B24
S012_D17


Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(fbln ~ cd34)
S012_B16
S012_B24
S012_D17

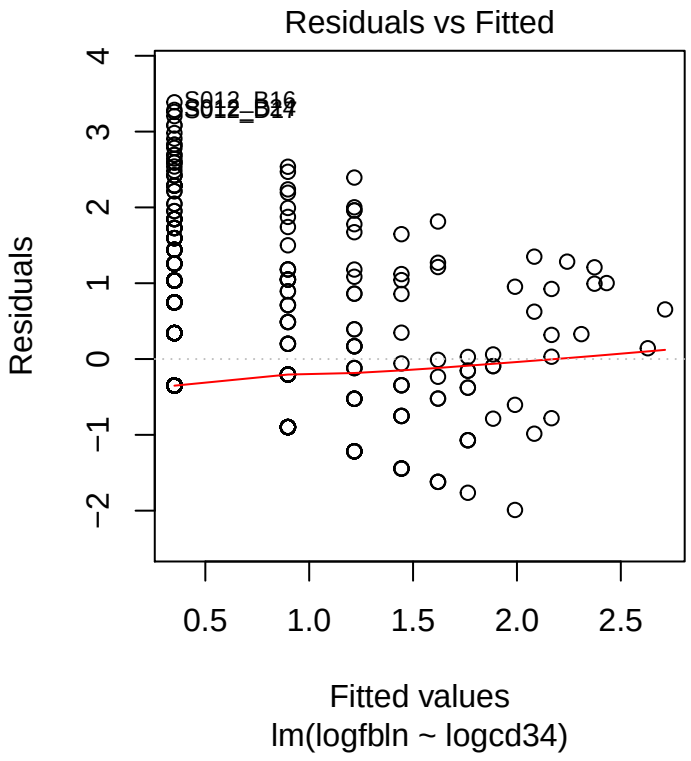

Scale−Location
S012_B16
S012_B24
S012_D17
√|Standardized residuals|
0.0
0.5
1.0
1.5
2.0
2.5
5
10
15
20
25
Fitted values
lm(fbln ~ cd34)

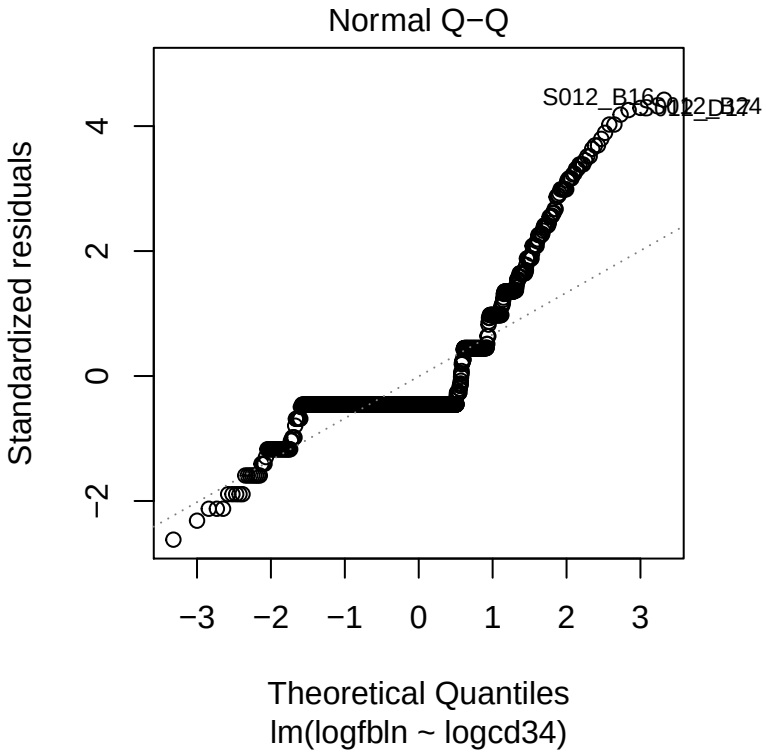

Residuals vs Leverage
Standardized residuals
−2
0
2
4
6
8
S012_D07
S012_D09
S012_C22
Cook's distance
1
0.5
0.5
1
0.00
0.04
0.08
0.12
Leverage
lm(fbln ~ cd34)

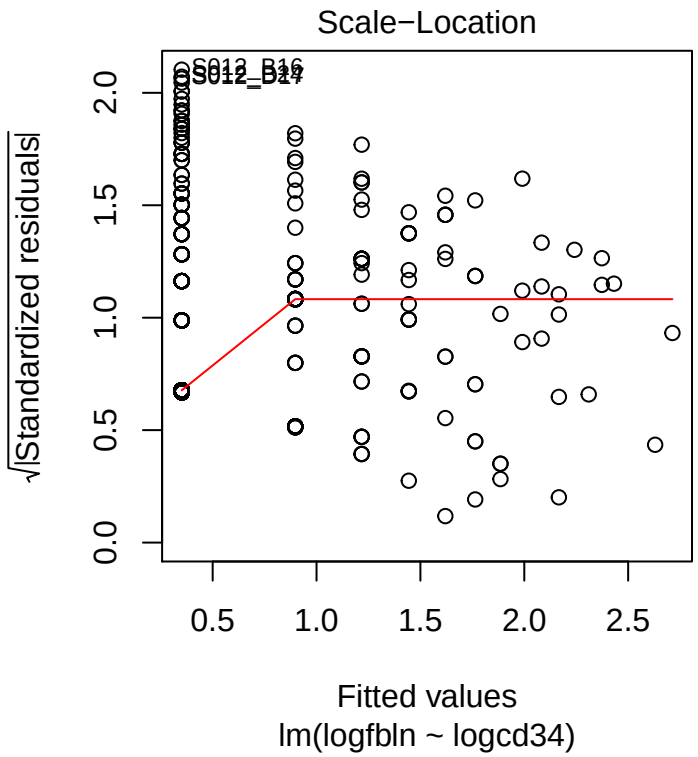


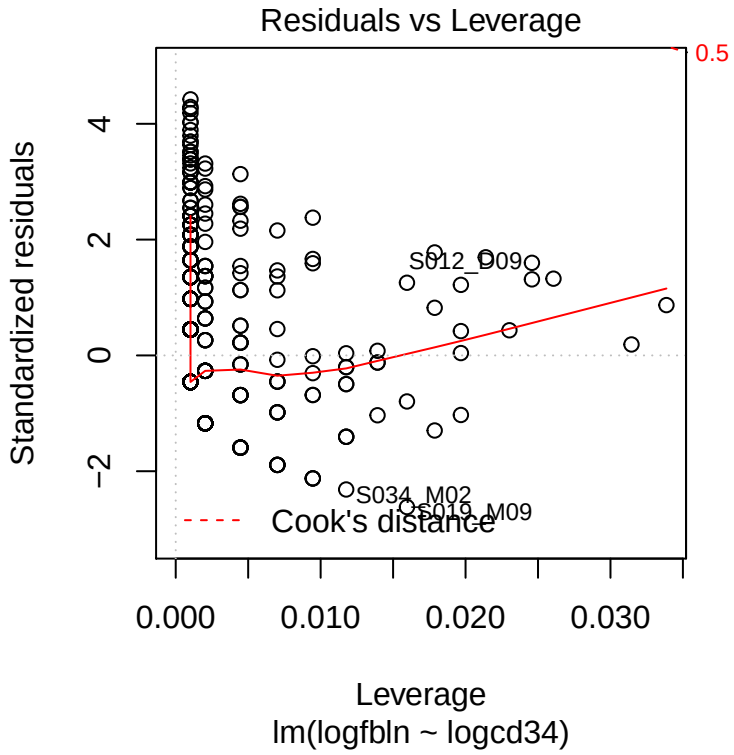

### Transformed Model

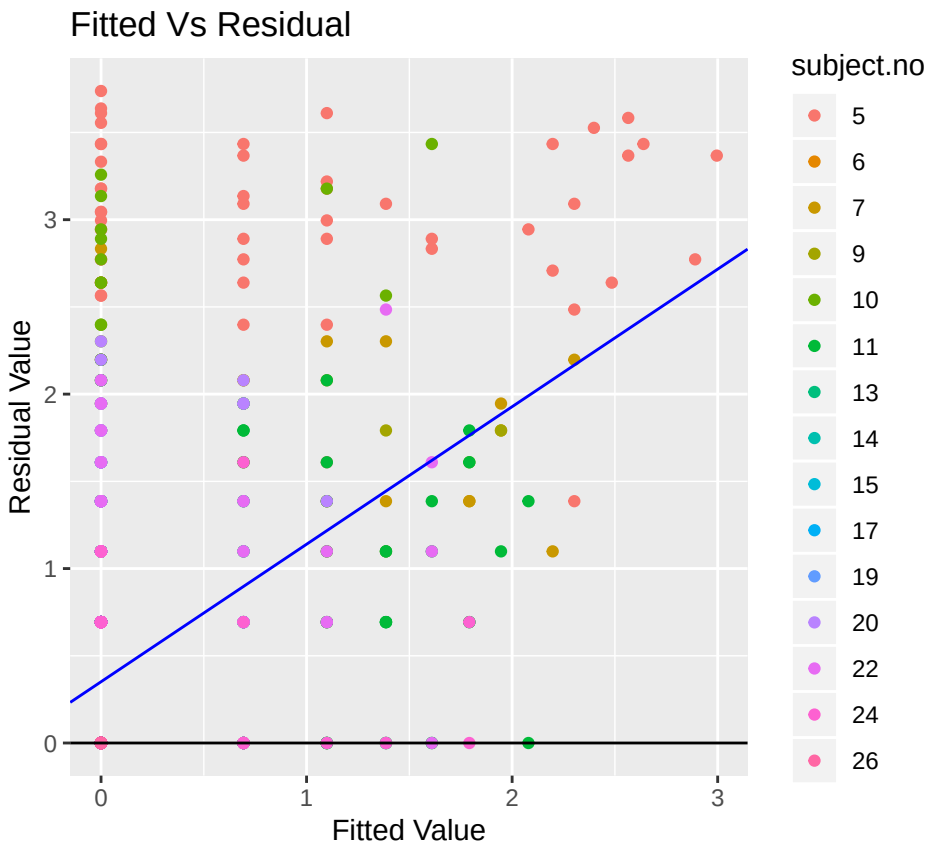
```
##
## Call:
## lm(formula = logfbln ~ logcd34, data = dat)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.9906 -0.3510 -0.3510  0.3421  3.3866
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.35105    0.02446   14.36   <2e-16 ***
## logcd34      0.78844    0.04921   16.02   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7662 on 1108 degrees of freedom
## Multiple R-squared:  0.1881, Adjusted R-squared:  0.1874
## F-statistic: 256.7 on 1 and 1108 DF,  p-value: < 2.2e-16
```


Residuals vs Fitted
Residuals
Fitted values
lm(logfbln ~ logcd34)


Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(logfbln ~ logcd34)


Scale−Location
√|Standardized residuals|
0.0
0.5
1.0
1.5
2.0
0.5
1.0
1.5
2.0
2.5
Fitted values
lm(logfbln ~ logcd34)


Residuals vs Leverage
Standardized residuals
−2
0
2
4
0.5
S012_D09
S034_M02
S019_M09
Cook's distance
0.000
0.010
0.020
0.030
Leverage
lm(logfbln ~ logcd34)

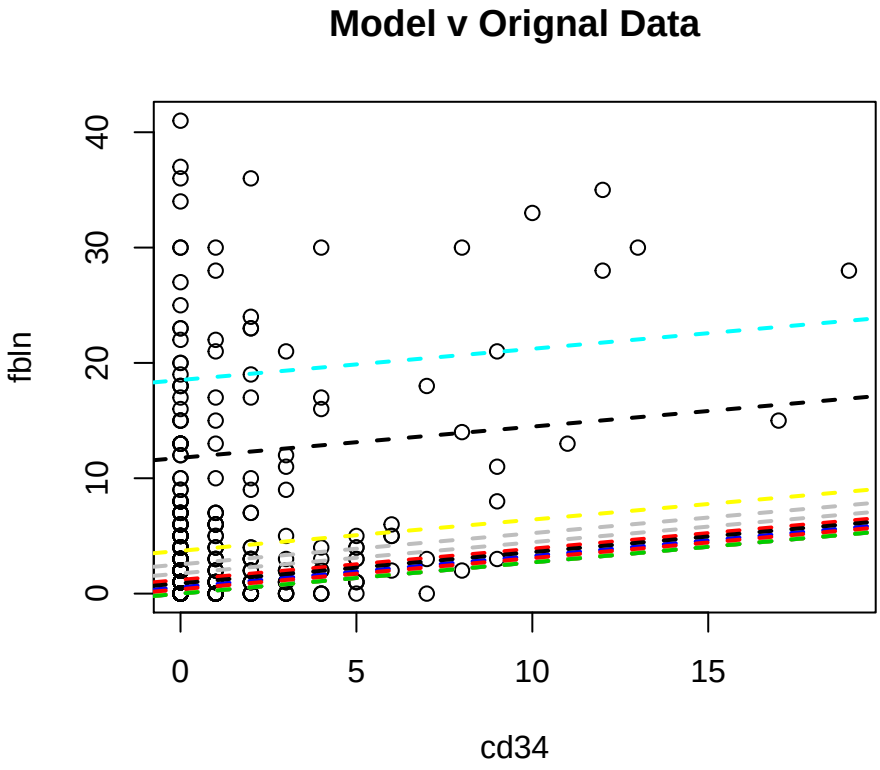


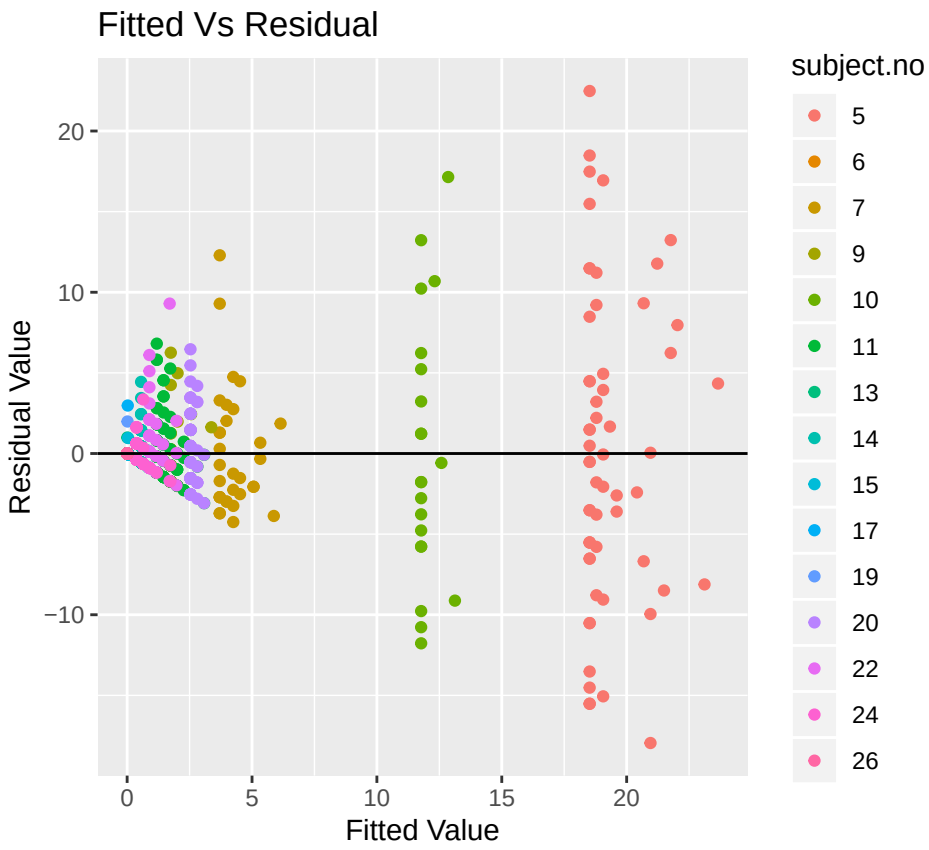

## Model 1

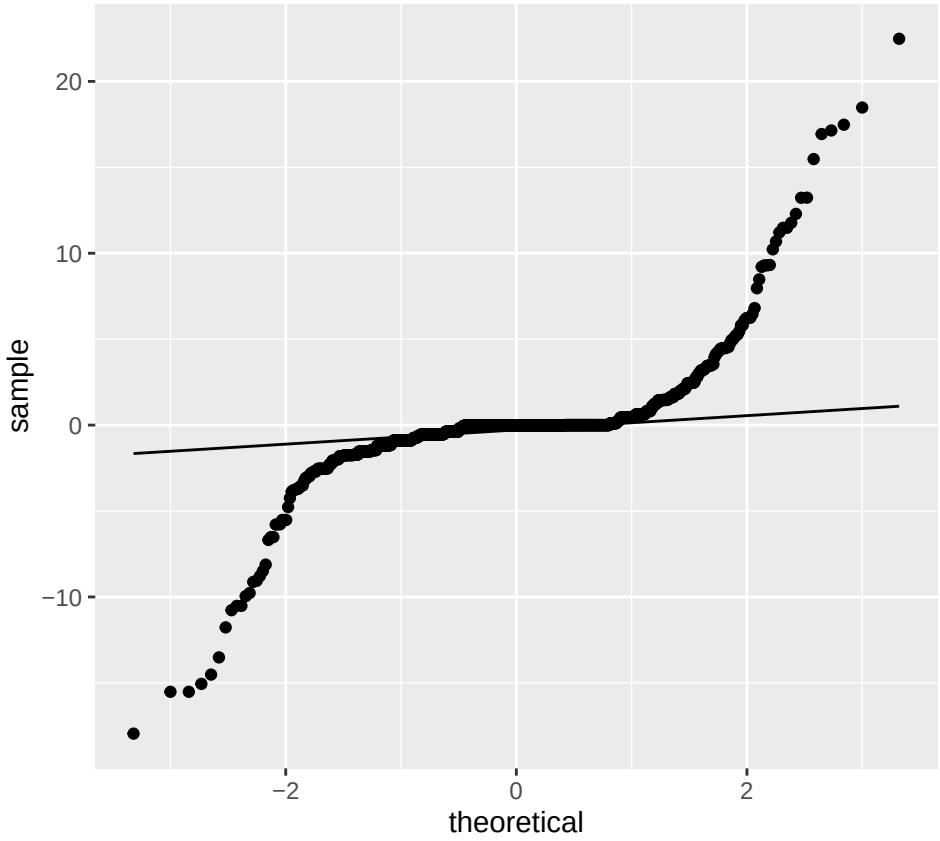
```
##
## Call:
## lm(formula = fbln ~ subject.no + cd34, data = dat)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -17.9540  -0.5592  -0.0157   0.0000  22.4808
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    18.51924    0.40669  45.537  < 2e-16 ***
## subject.no6  -18.51924    0.50340 -36.789  < 2e-16 ***
## subject.no7  -14.81030    0.60924 -24.309  < 2e-16 ***
## subject.no9  -16.77045    0.63245 -26.517  < 2e-16 ***
## subject.no10  -6.74722    0.71571  -9.427  < 2e-16 ***
## subject.no11 -17.33138    0.46261 -37.464  < 2e-16 ***
## subject.no13 -18.50990    0.48594 -38.091  < 2e-16 ***
## subject.no14 -17.96006    0.49008 -36.647  < 2e-16 ***
## subject.no15 -18.47924    0.68422 -27.008  < 2e-16 ***
## subject.no17 -18.49465    0.47690 -38.781  < 2e-16 ***
## subject.no19 -18.50350    0.47433 -39.009  < 2e-16 ***
## subject.no20 -15.98308    0.51203 -31.215  < 2e-16 ***
## subject.no22 -17.62713    0.49469 -35.632  < 2e-16 ***
## subject.no24 -18.14231    0.50484 -35.937  < 2e-16 ***
## subject.no26 -18.51924    0.55516 -33.358  < 2e-16 ***
```

```
## cd34           0.27053    0.06121   4.420 1.09e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.751 on 1094 degrees of freedom
## Multiple R-squared:  0.7302, Adjusted R-squared:  0.7265
## F-statistic: 197.4 on 15 and 1094 DF,  p-value: < 2.2e-16
```

```
## [1] 5414.643
```





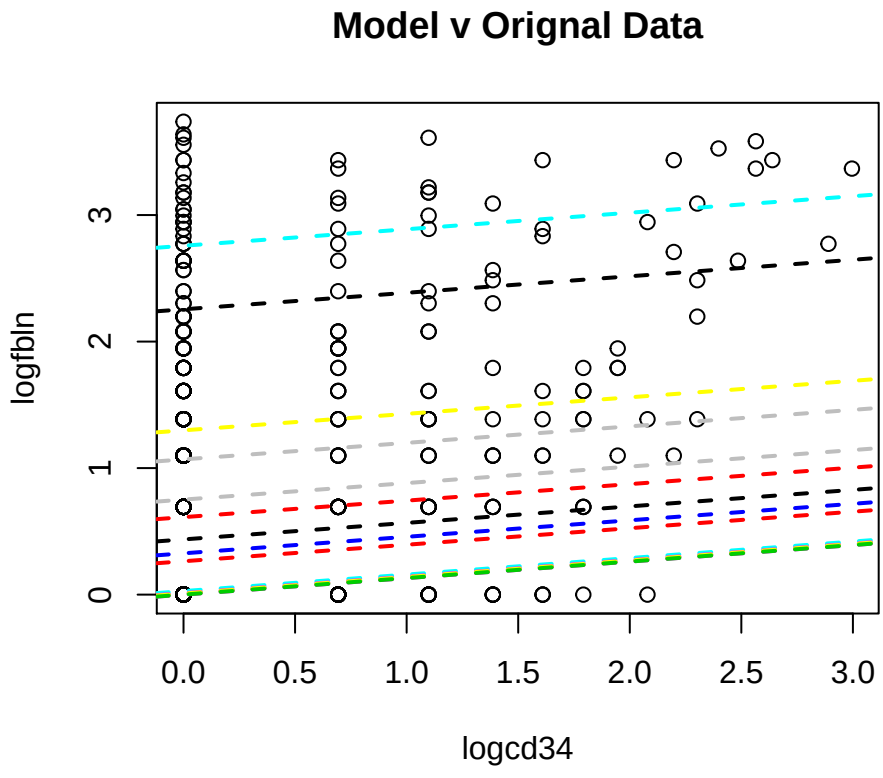



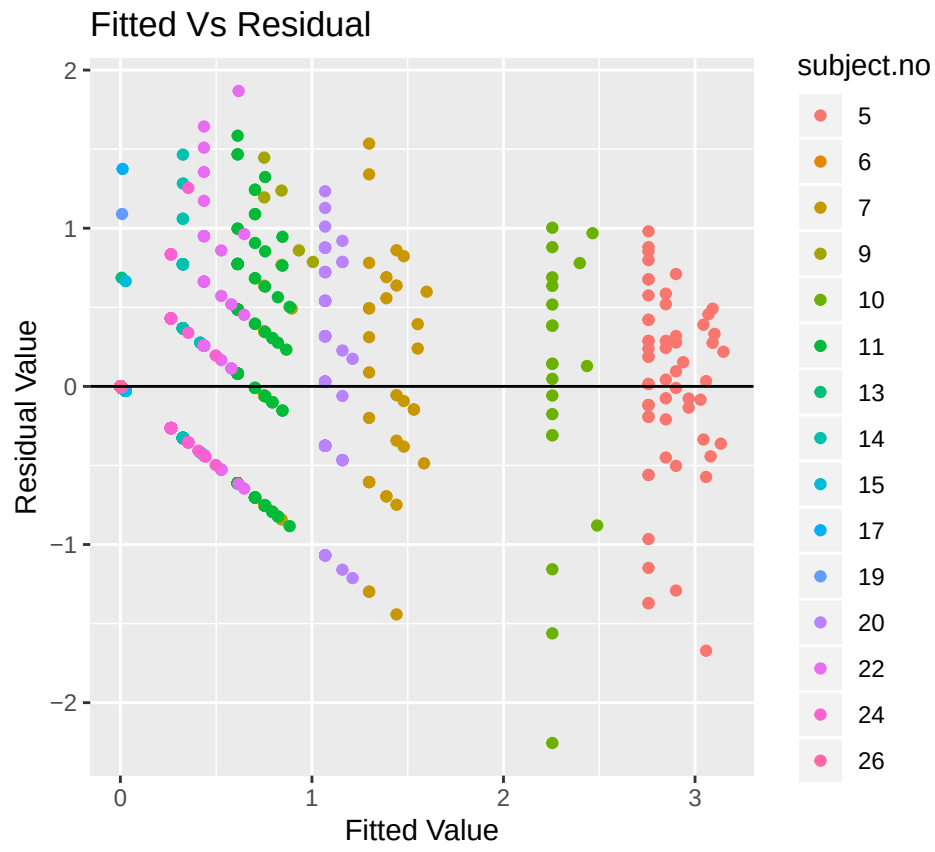

## Log-Model 1

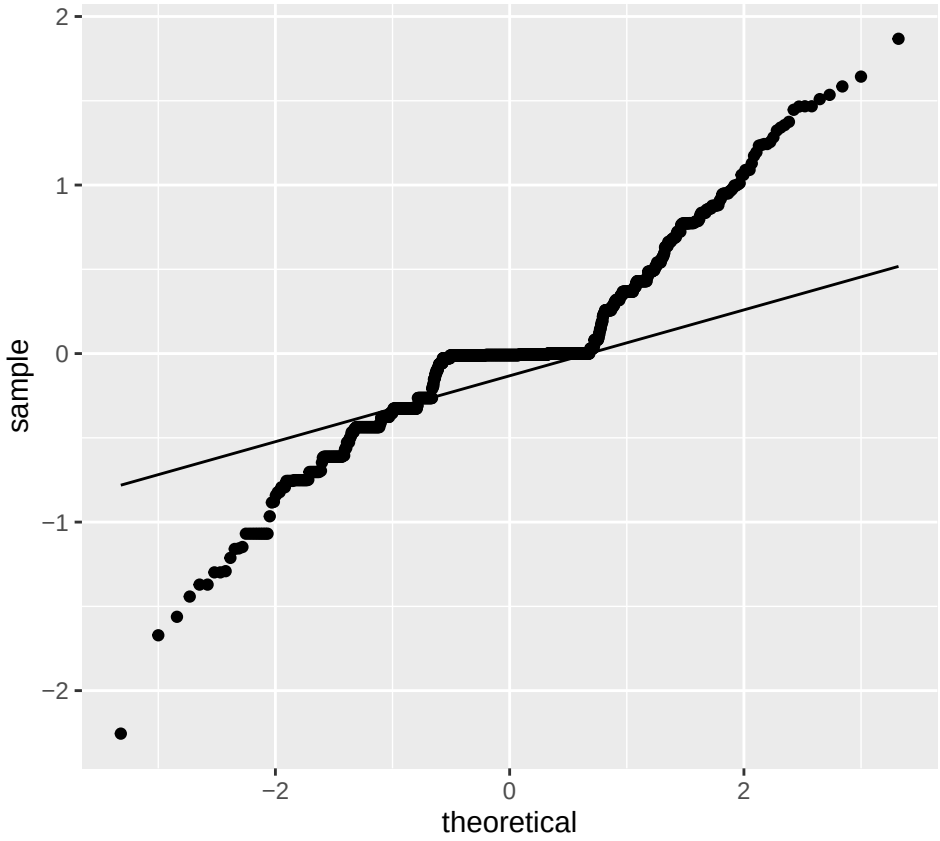
```
##
## Call:
```

```
## lm(formula = logfbln ~ subject.no + logcd34, data = dat)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.25503 -0.26374 -0.00865  0.00000  1.86771
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.75720    0.06518  42.304  < 2e-16 ***
## subject.no6  -2.75720    0.08082 -34.115  < 2e-16 ***
## subject.no7  -1.45891    0.09763 -14.944  < 2e-16 ***
## subject.no9  -2.00631    0.10107 -19.851  < 2e-16 ***
## subject.no10 -0.50217    0.11460  -4.382 1.29e-05 ***
## subject.no11 -2.14500    0.07295 -29.402  < 2e-16 ***
## subject.no13 -2.75073    0.07800 -35.266  < 2e-16 ***
## subject.no14 -2.43098    0.07847 -30.980  < 2e-16 ***
## subject.no15 -2.72948    0.11003 -24.807  < 2e-16 ***
## subject.no17 -2.74584    0.07654 -35.875  < 2e-16 ***
## subject.no19 -2.74855    0.07612 -36.107  < 2e-16 ***
## subject.no20 -1.68842    0.08149 -20.720  < 2e-16 ***
## subject.no22 -2.32100    0.07862 -29.522  < 2e-16 ***
## subject.no24 -2.49346    0.08040 -31.011  < 2e-16 ***
## subject.no26 -2.75720    0.08919 -30.915  < 2e-16 ***
## logcd34       0.13056    0.03420   3.818 0.000142 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4432 on 1094 degrees of freedom
## Multiple R-squared:  0.7318, Adjusted R-squared:  0.7281
## F-statistic:   199 on 15 and 1094 DF,  p-value: < 2.2e-16
```

```
## [1] 1361.589
```




Fitted Vs Residual
Residual Value
Fitted Value
subject.no
5
6
7
9
10
11
13
14
15
17
19
20
22
24
26


sample
theoretical