Basic Regression

Corina Geier

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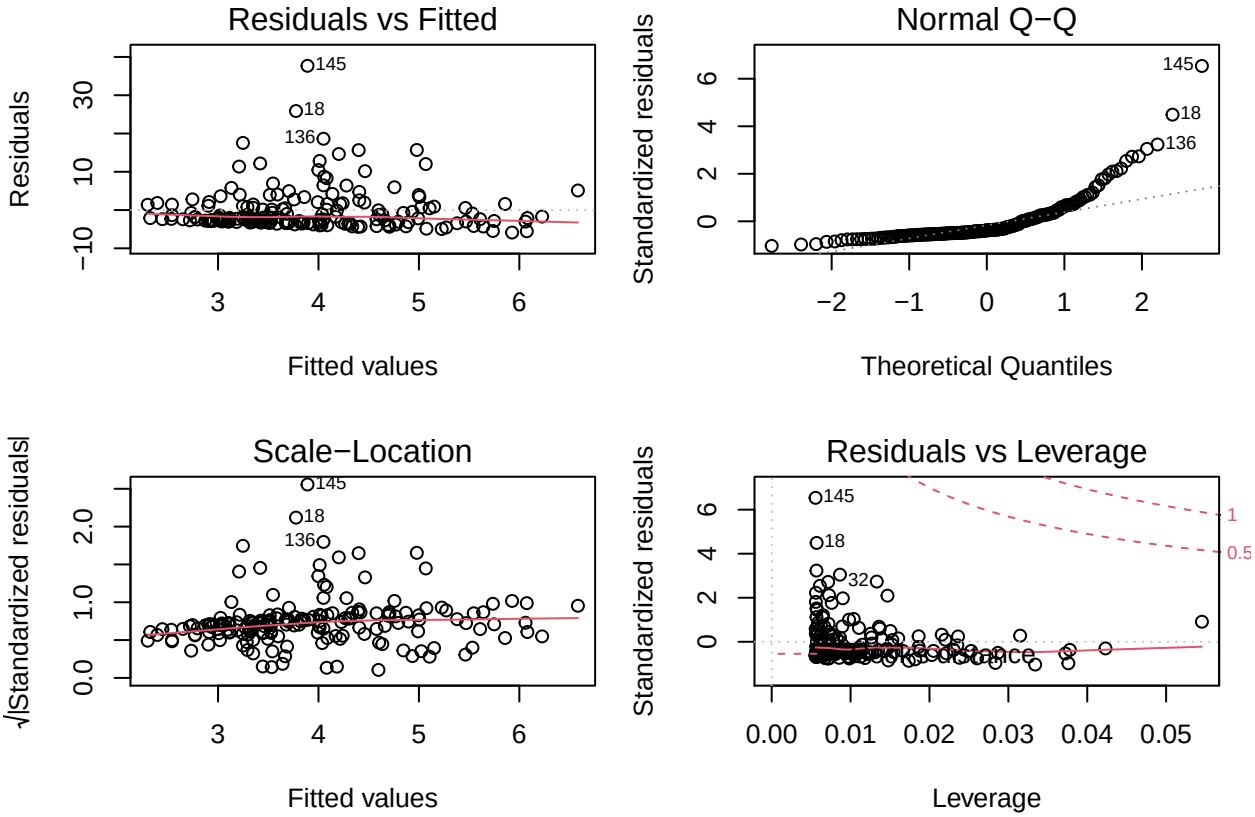
Question 1

Cases per capita with overall GHSI score

```
summary(lm(casepc ~ overall, data = sixmonth_data))$coef
```

```
##               Estimate Std. Error   t value   Pr(>|t|)
## (Intercept) 1.26832223 1.34301165 0.9443866 0.34625223
## overall     0.06365087 0.03055473 2.0831755 0.03866417
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))

plot(lm(casepc ~ overall, data = sixmonth_data))
```



Coefficient estimate: 0.0637

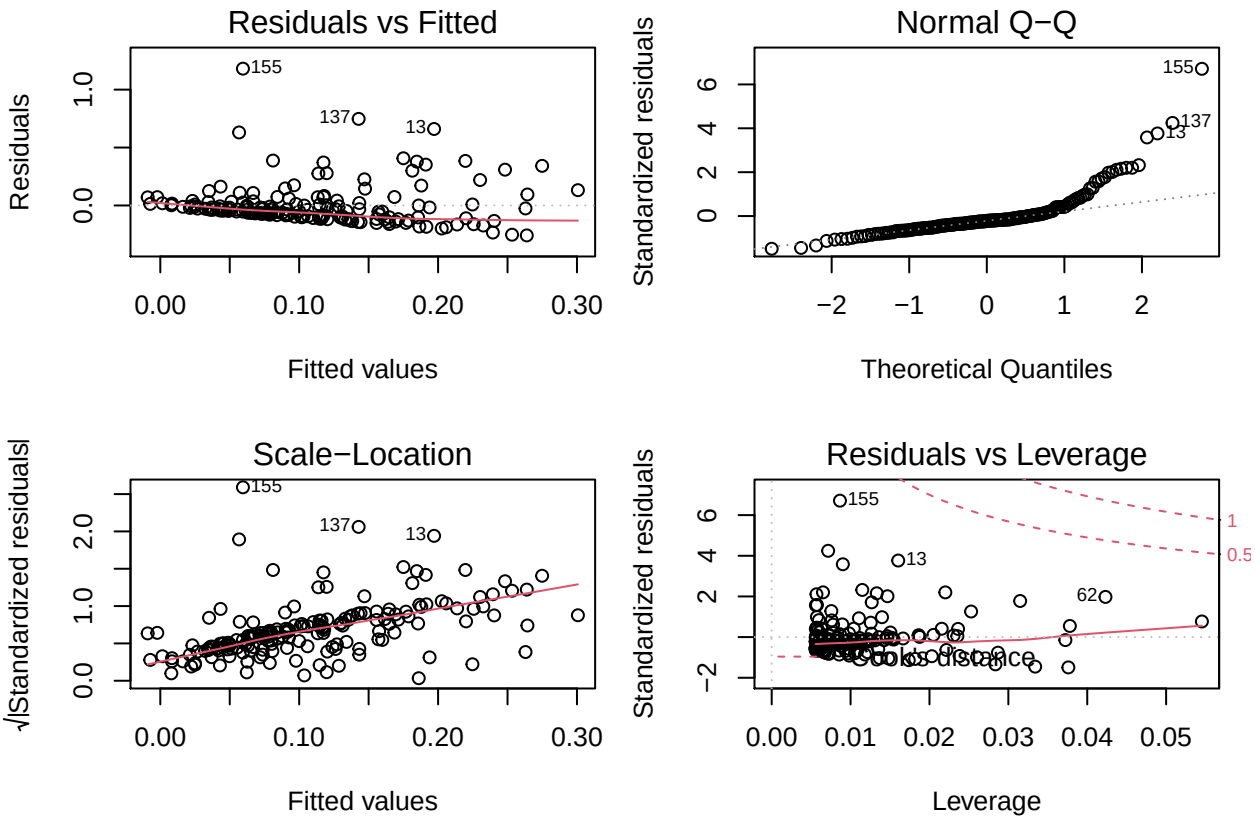
pvalue = 0.0387

Deaths per capita with overall GHSI score

```
summary(lm(deathpc ~ overall, data = sixmonth_data))$coef
```

```
##                 Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept) -0.083653939 0.0410561549 -2.037549 4.307536e-02
## overall      0.004602913 0.0009340648  4.927831 1.893029e-06
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))

plot(lm(deathpc ~ overall, data = sixmonth_data))
```



Coefficient estimate: 0.0046

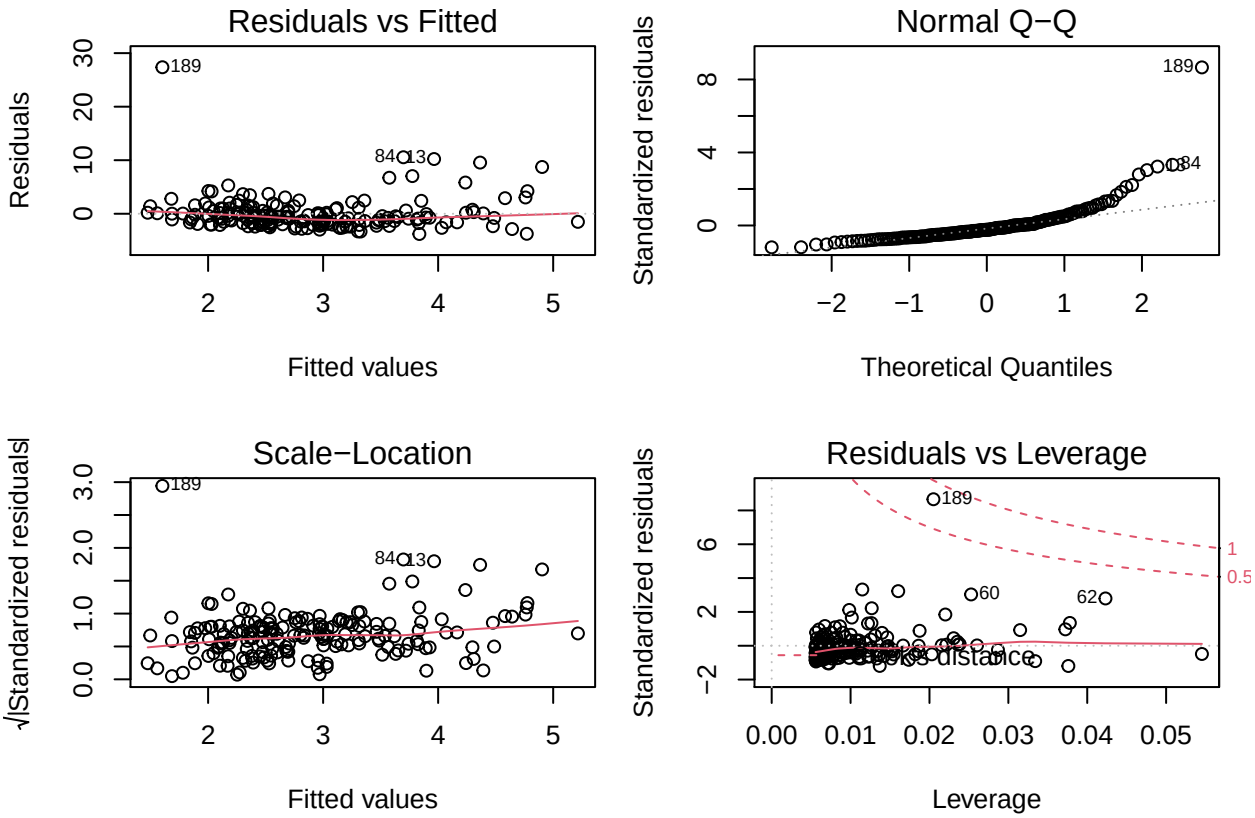
pvalue < .0001

Case Fatality Ratio with overall GHSI score

```
summary(lm(cfratio ~ overall, data = sixmonth_data))$coef
```

```
##                Estimate Std. Error   t value    Pr(>|t|)
## (Intercept) 0.57445540 0.74174998 0.7744596 0.439686538
## overall     0.05557677 0.01687549 3.2933435 0.001194315
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))

plot(lm(cfratio ~ overall, data = sixmonth_data))
```



Coefficient estimate: 0.0556

pvalue = .0012

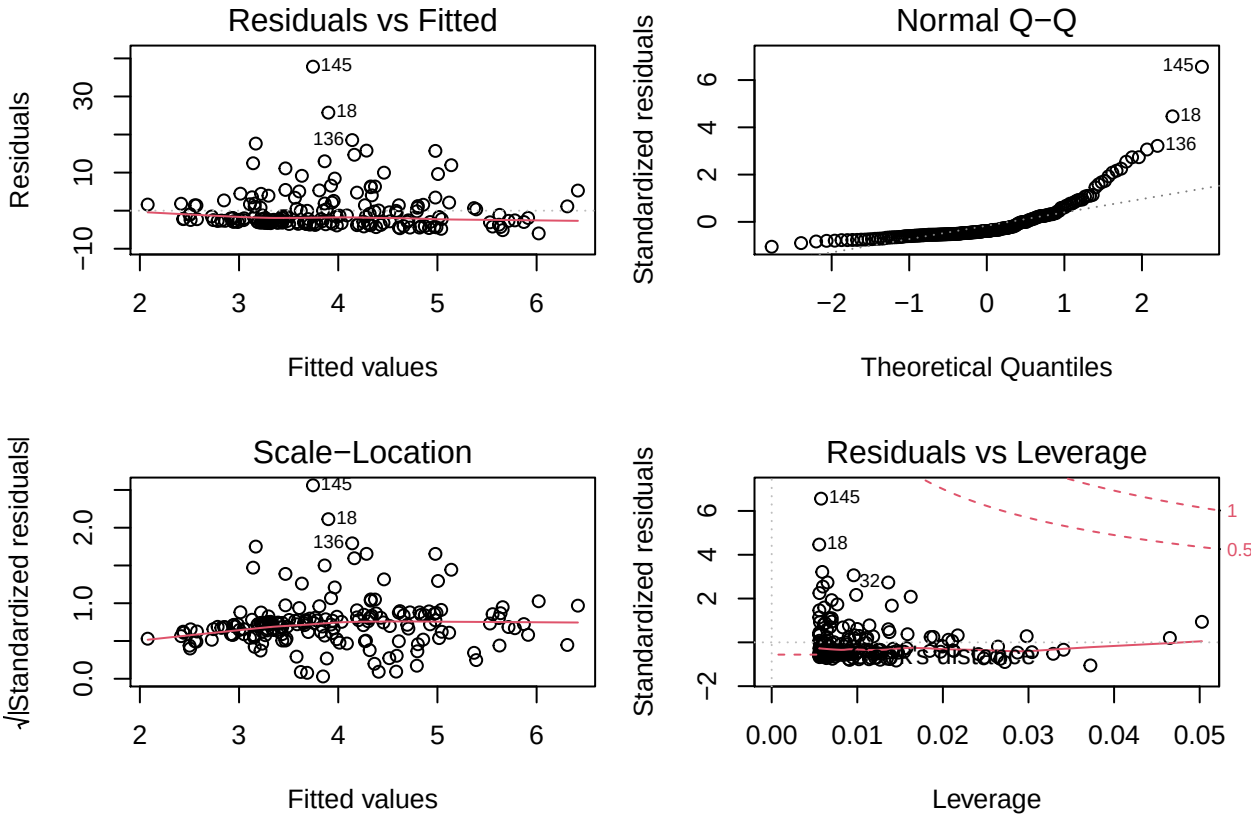
Question 2

Cases per capita with each subcomponent

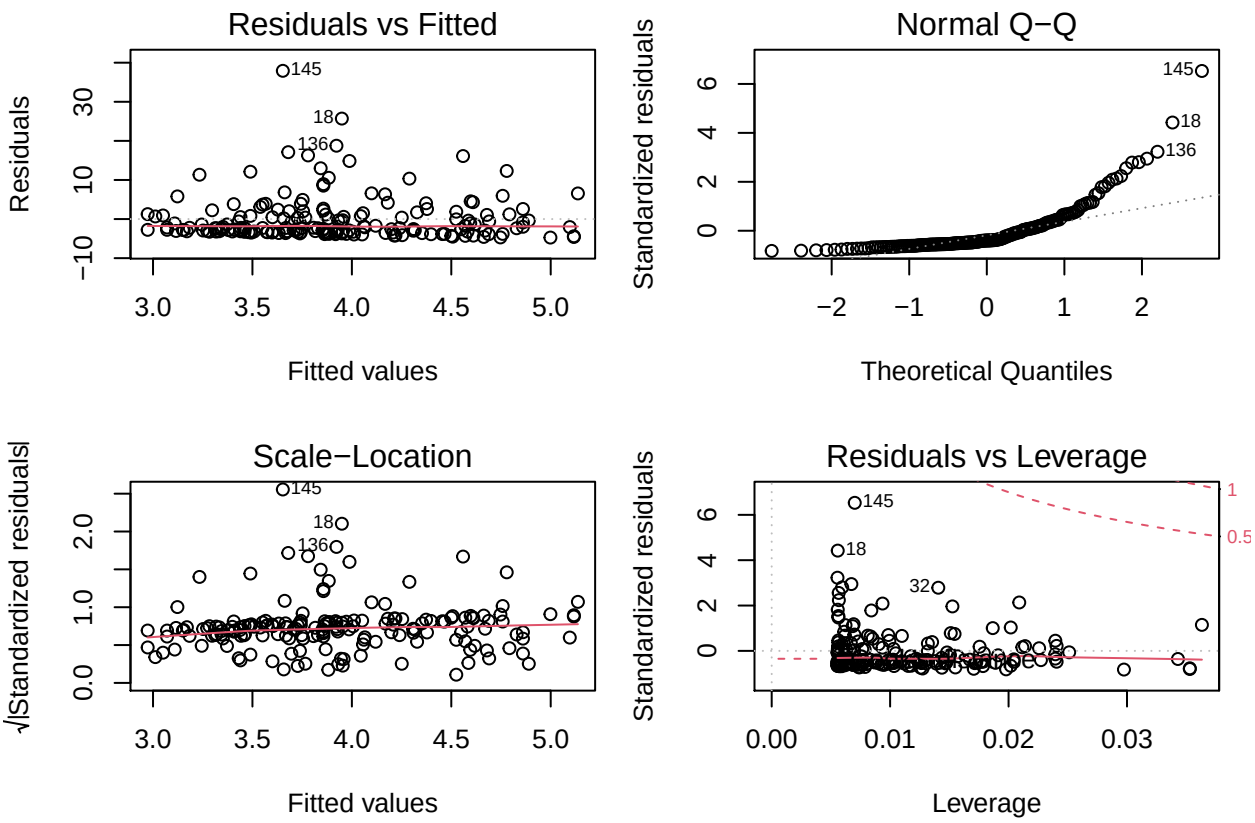
```
subcomponents <- c("prev_emergence_pathogens", "early_detection", "rapid_response", "robust_health_secto

for(i in 1:length(subcomponents)) {
  predictor_i <- (subcomponents)[i]
```

```
  print(predictor_i)
  print(summary(lm(casepc ~ ., data = sixmonth_data[,c("casepc",predictor_i)]))$coef)
  par(mfrow=c(2,2),mar=c(5,4,2,1))
  plot(lm(casepc ~ ., data = sixmonth_data[,c("casepc",predictor_i)]))
}
```

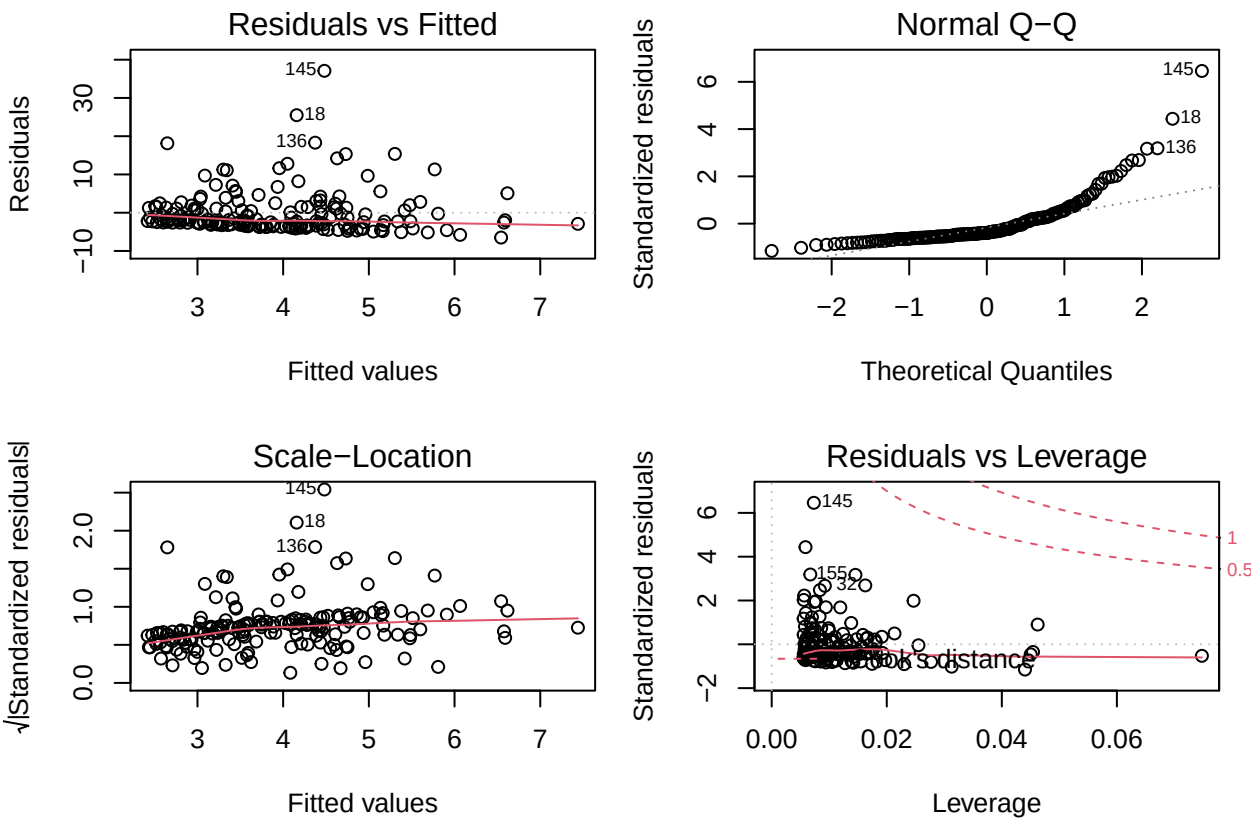
```
## [1] "prev_emergence_pathogens"
##                             Estimate Std. Error  t value   Pr(>|t|)
## (Intercept)                1.9774236 1.04314975 1.895628 0.05962979
## prev_emergence_pathogens 0.0534161 0.02614526 2.043051 0.04252163
```



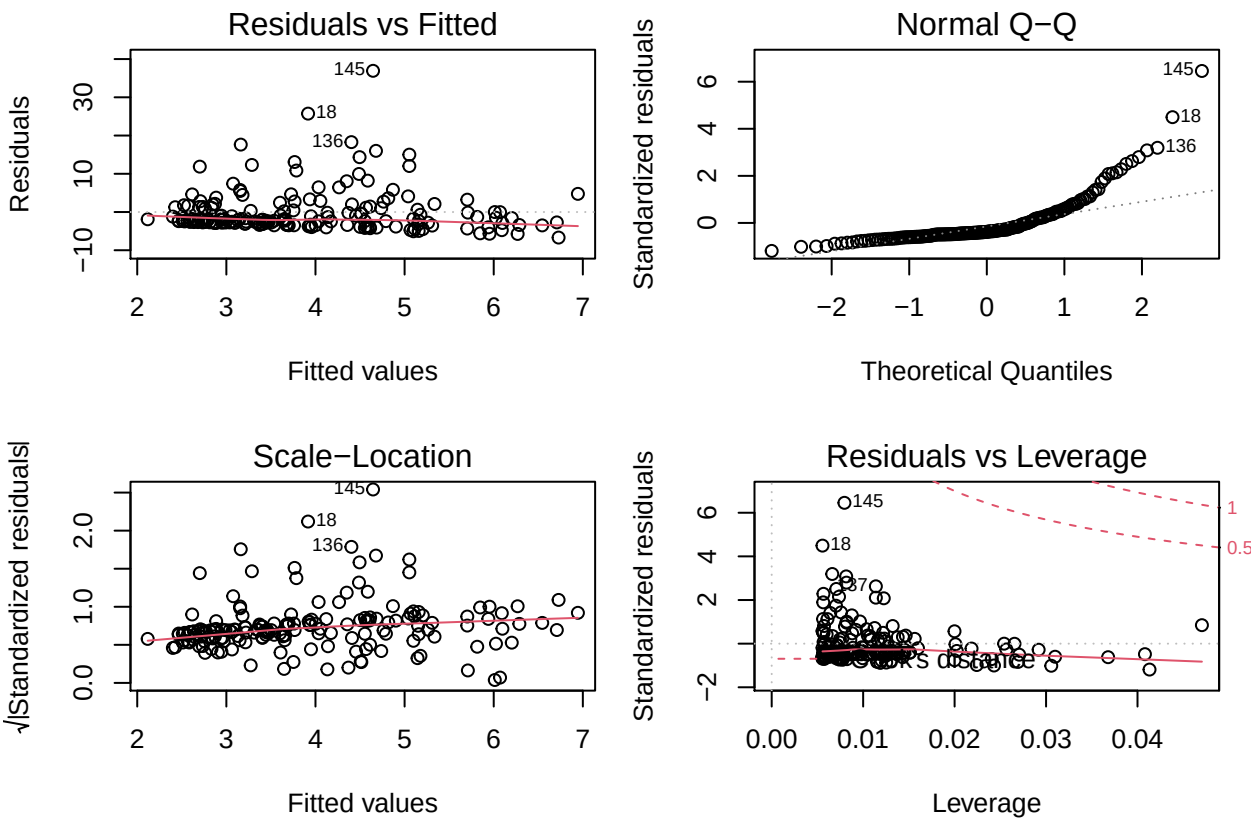

```
## [1] "early_detection"
##                     Estimate Std. Error  t value    Pr(>|t|)
## (Intercept)     2.91206836  0.9491363 3.068125 0.002490852
## early_detection 0.02265504  0.0190031 1.192176 0.234779211
```



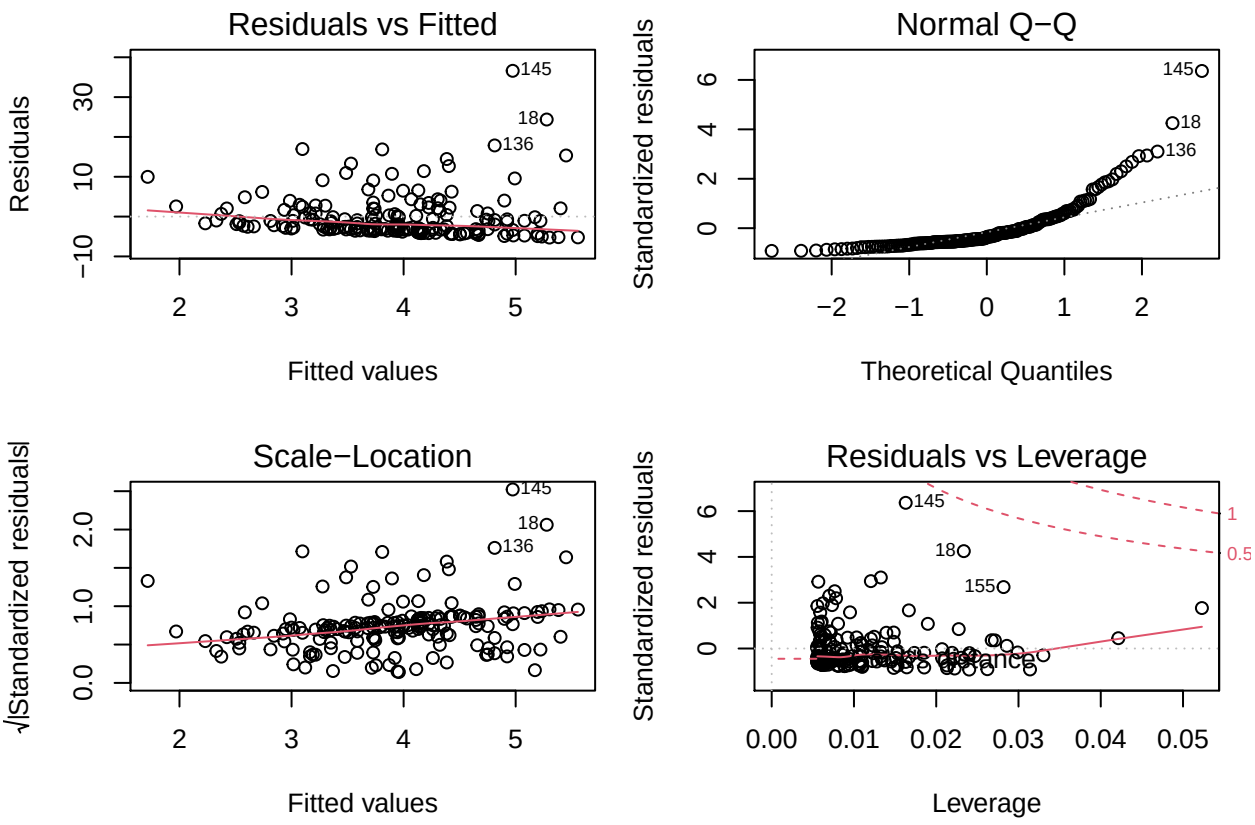

```
## [1] "rapid_response"
##                  Estimate Std. Error  t value  Pr(>|t|)
## (Intercept)    1.24644988 1.22812273 1.014923 0.3115201
## rapid_response 0.06739038 0.02902046 2.322167 0.0213557
```



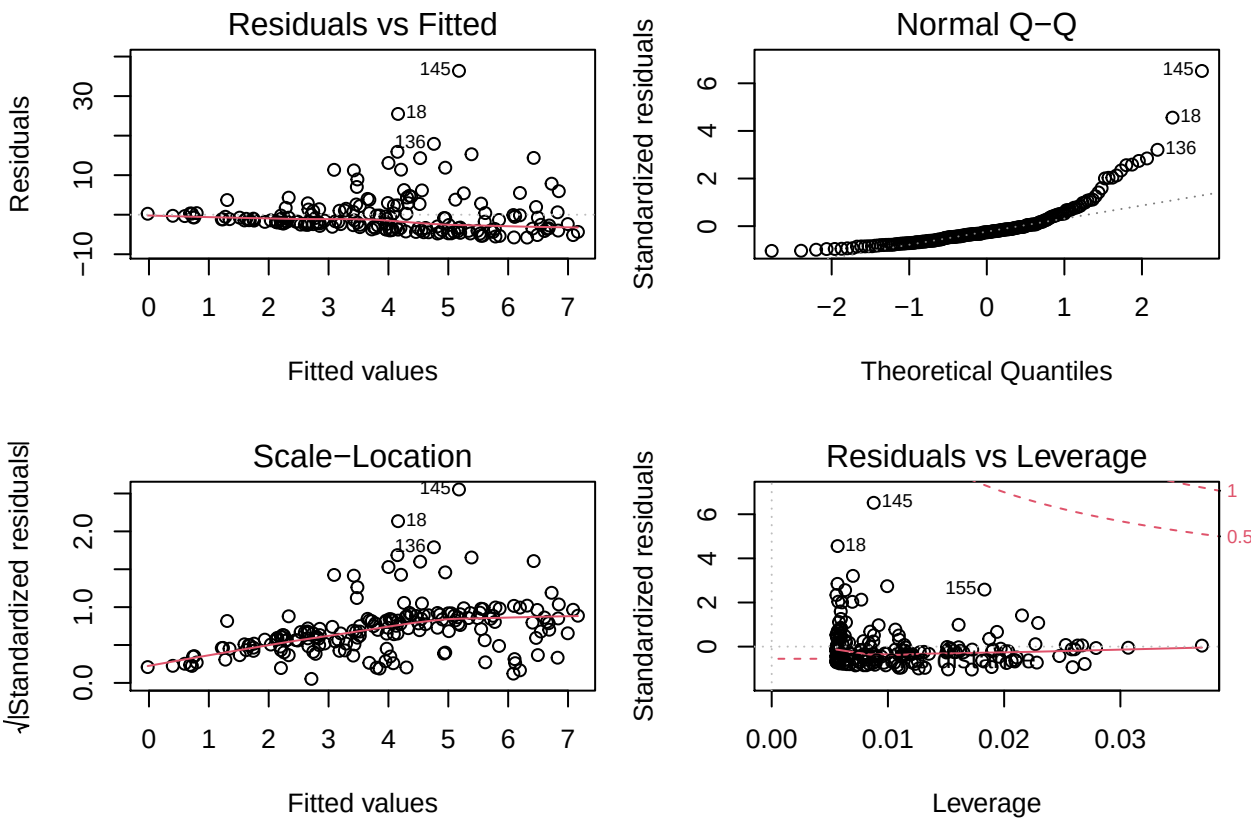

```
## [1] "robust_health_sector"
##                          Estimate Std. Error  t value   Pr(>|t|)
## (Intercept)           2.09776563  0.8236399 2.546945 0.01171365
## robust_health_sector 0.06567674  0.0253862 2.587104 0.01047683
```




```
## [1] "commitments"
##                Estimate Std. Error   t value     Pr(>|t|)
## (Intercept)  6.99834797 1.80672458  3.873500 0.0001505801
## commitments -0.06192332 0.03526691 -1.755848 0.0808343859
```



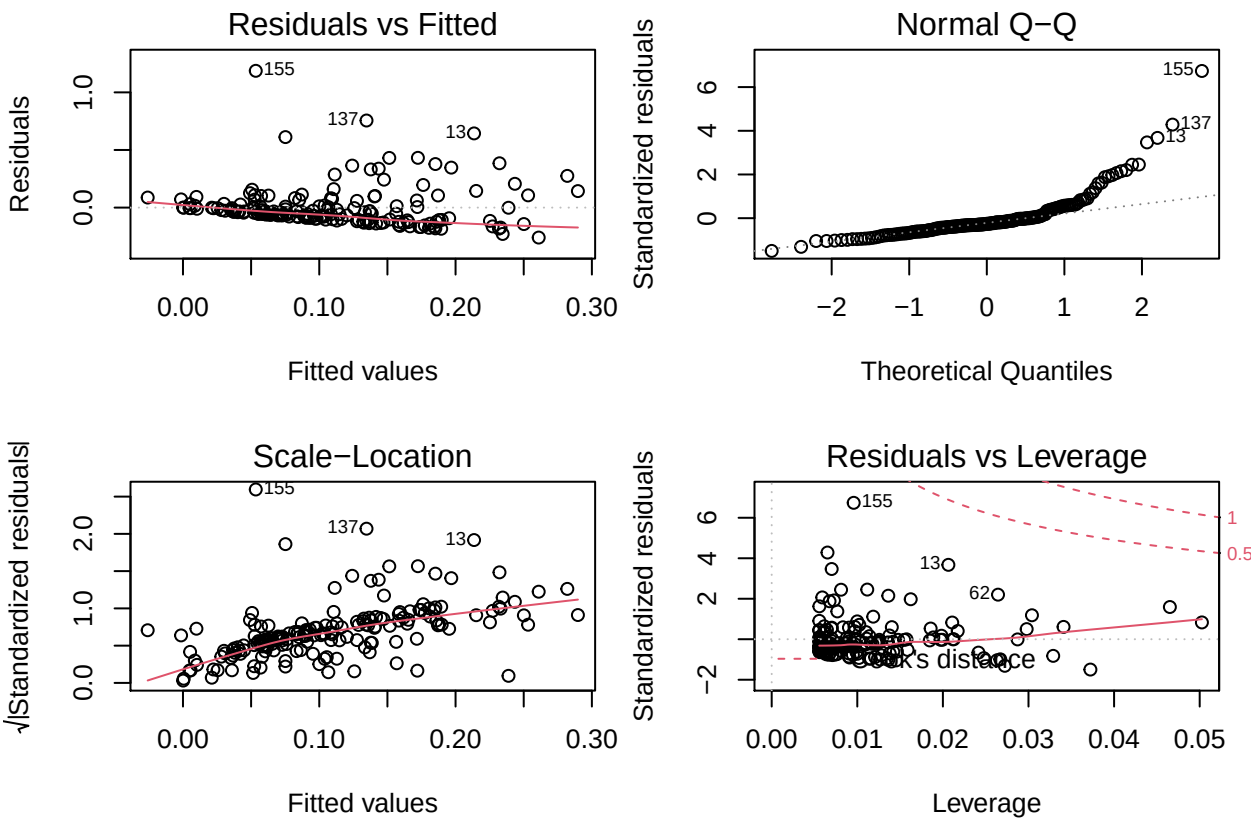

```
## [1] "risk_environment"
##                      Estimate Std. Error   t value    Pr(>|t|)
## (Intercept)      -1.60837779 1.45679154 -1.104055 0.271059596
## risk_environment  0.09981339 0.02520412  3.960202 0.000108168
```



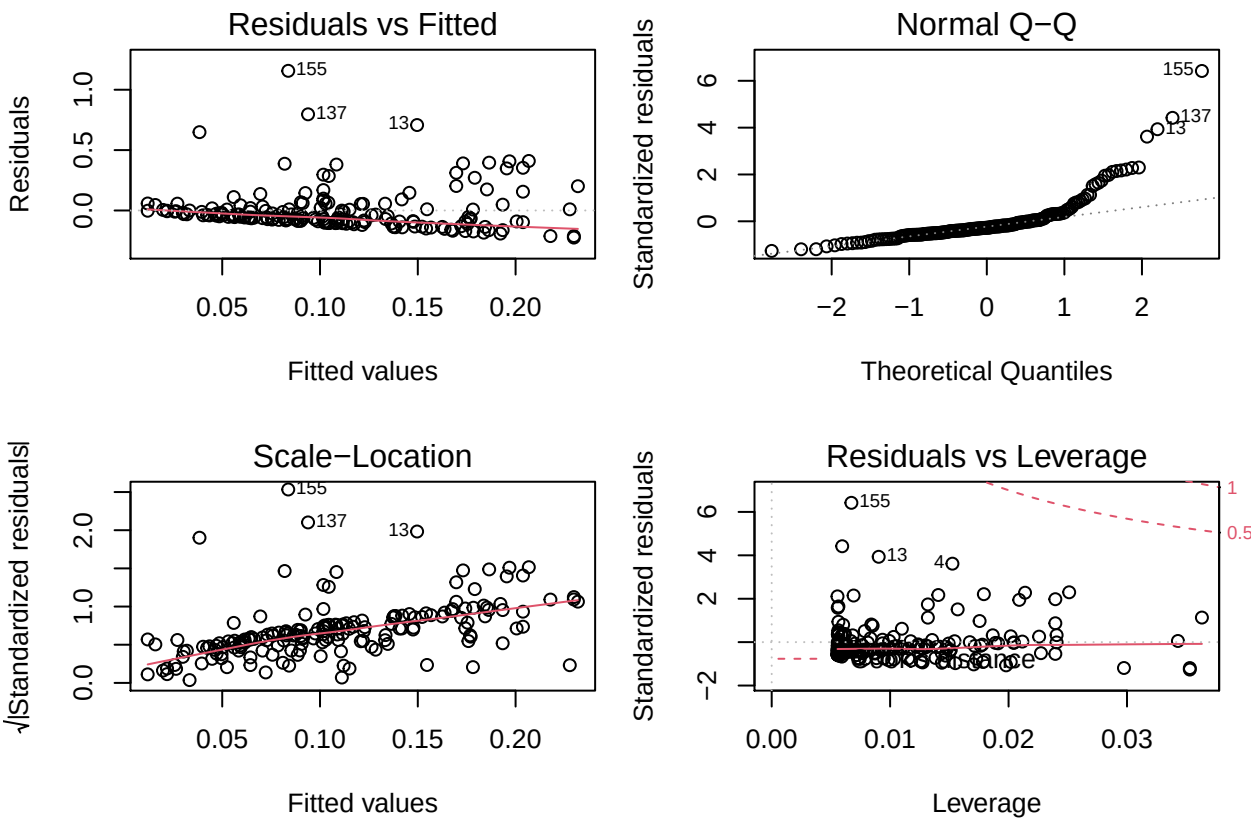
Deaths per capita with each subcomponent

```
subcomponents <- c("prev_emergence_pathogens", "early_detection", "rapid_response", "robust_health_secto

for(i in 1:length(subcomponents)) {
  predictor_i <- (subcomponents)[i]
  print(predictor_i)
  print(summary(lm(deathpc ~ ., data = sixmonth_data[,c("deathpc",predictor_i)]))$coef)
  par(mfrow=c(2,2),mar=c(5,4,2,1))
  plot(lm(deathpc ~ ., data = sixmonth_data[,c("deathpc",predictor_i)]))
}
```

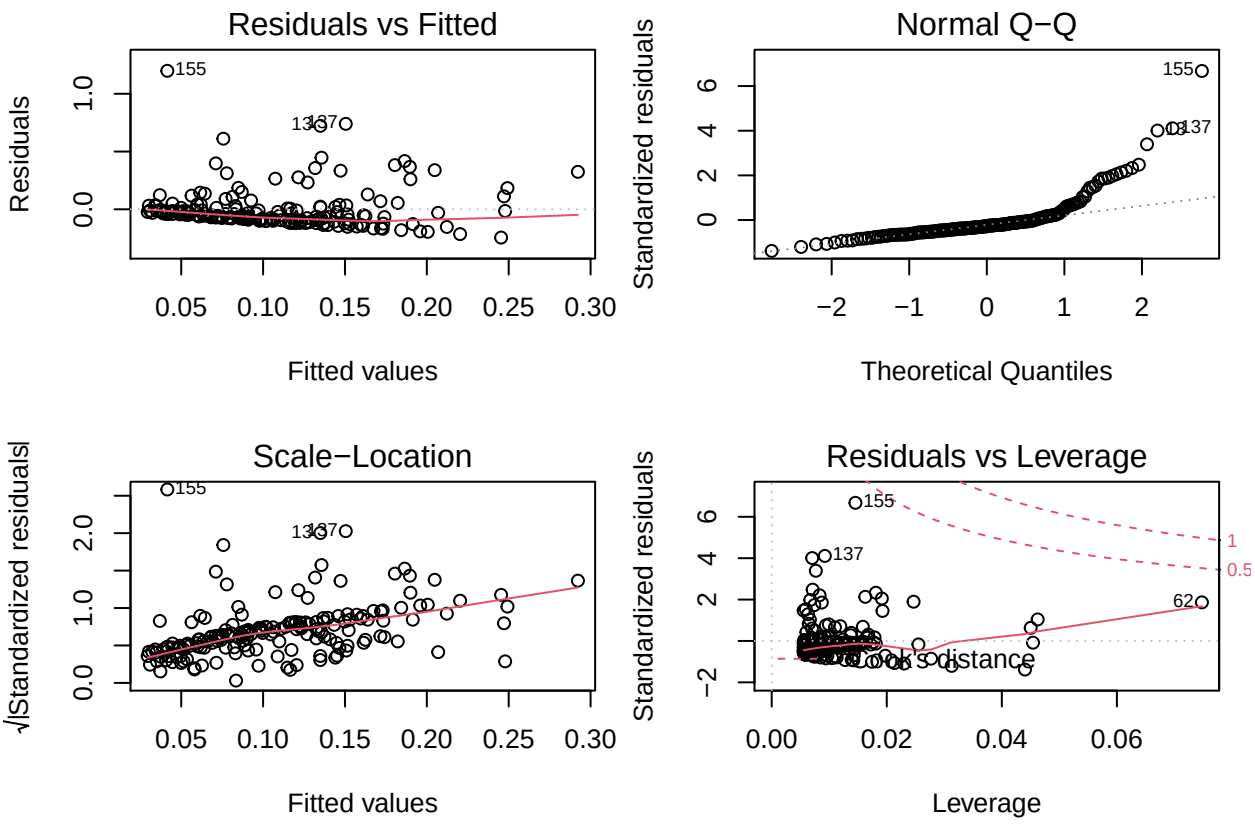
```
## [1] "prev_emergence_pathogens"
##                              Estimate  Std. Error   t value     Pr(>|t|)
## (Intercept)              -0.033258402 0.031929408 -1.041623 2.989993e-01
## prev_emergence_pathogens  0.003887092 0.000800271  4.857219 2.597143e-06
```



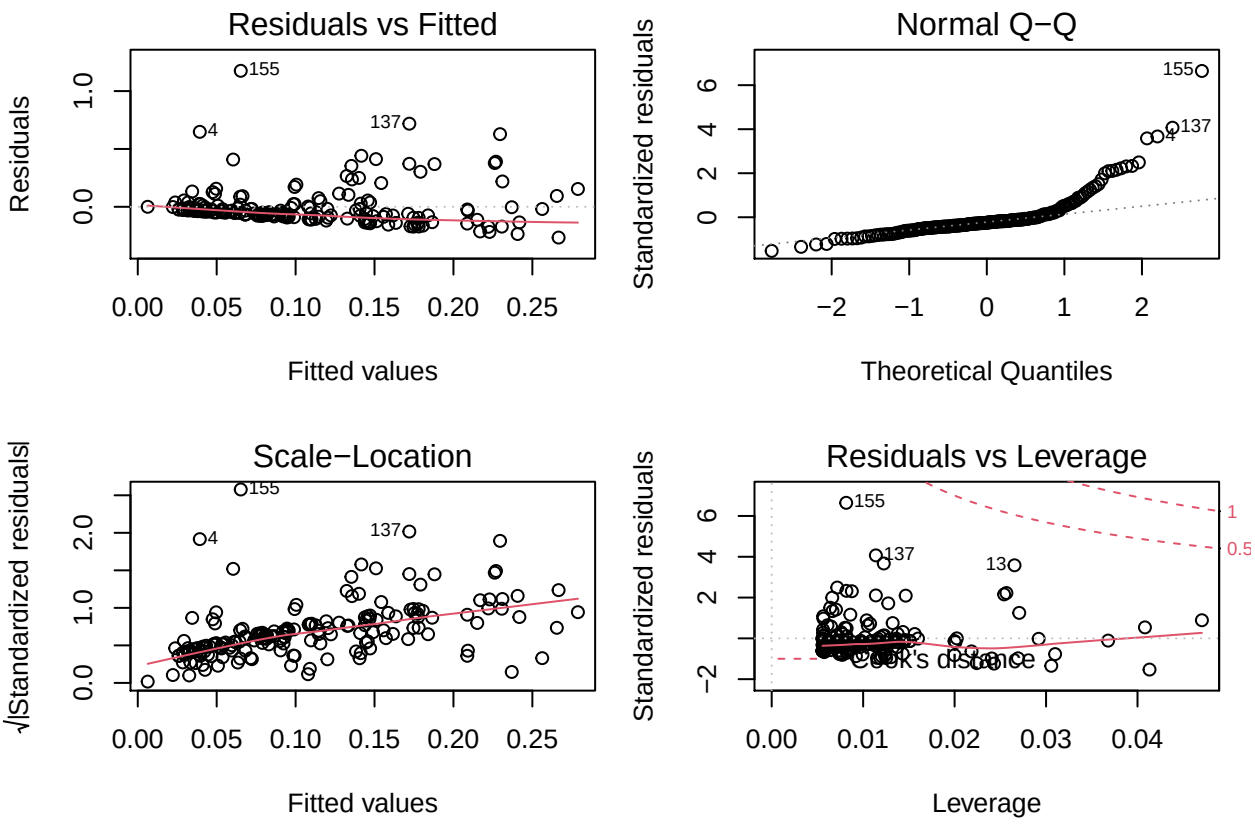

```
## [1] "early_detection"
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)     0.005673652 0.0294460011 0.1926799 0.8474293419
## early_detection 0.002303463 0.0005895522 3.9071398 0.0001325272
```



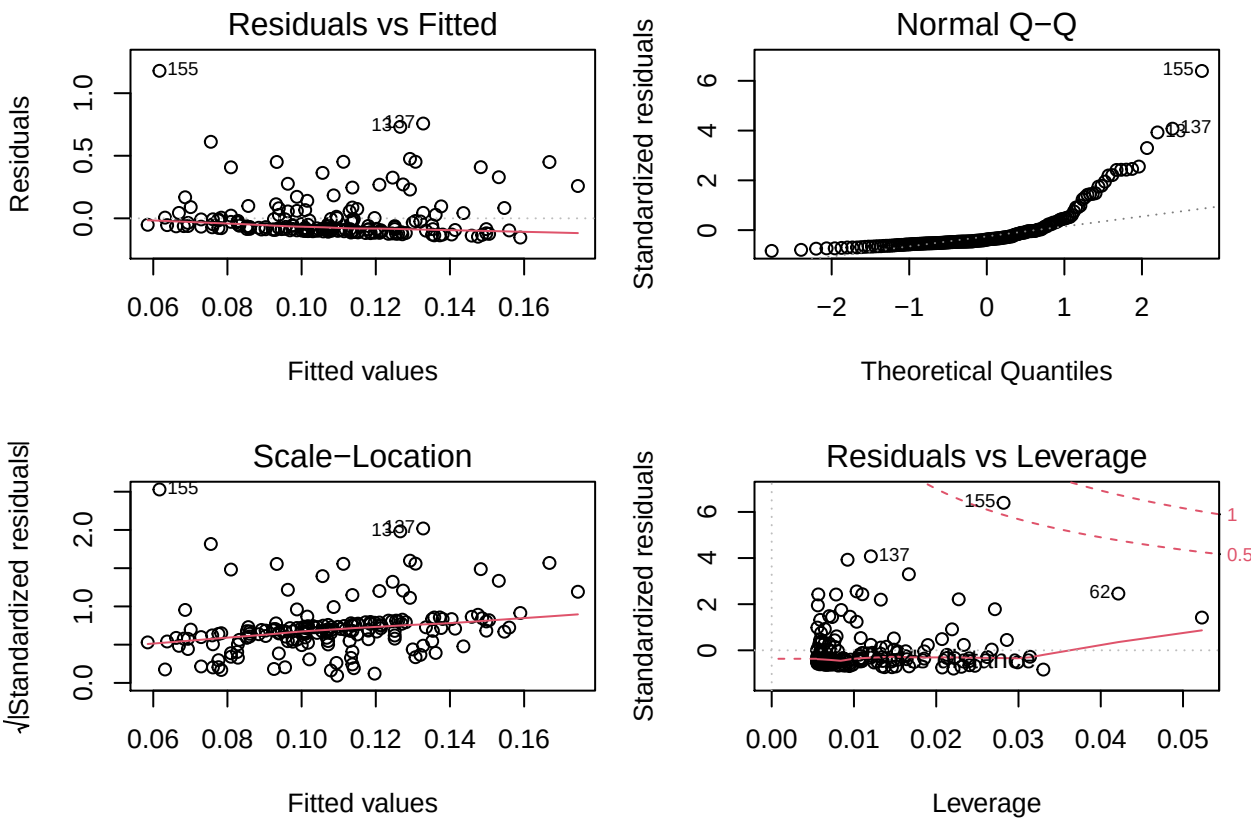

```
## [1] "rapid_response"
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)    -0.031860162 0.0385478241 -0.826510 0.4096213570
## rapid_response  0.003527019 0.0009108827  3.872089 0.0001513865
```



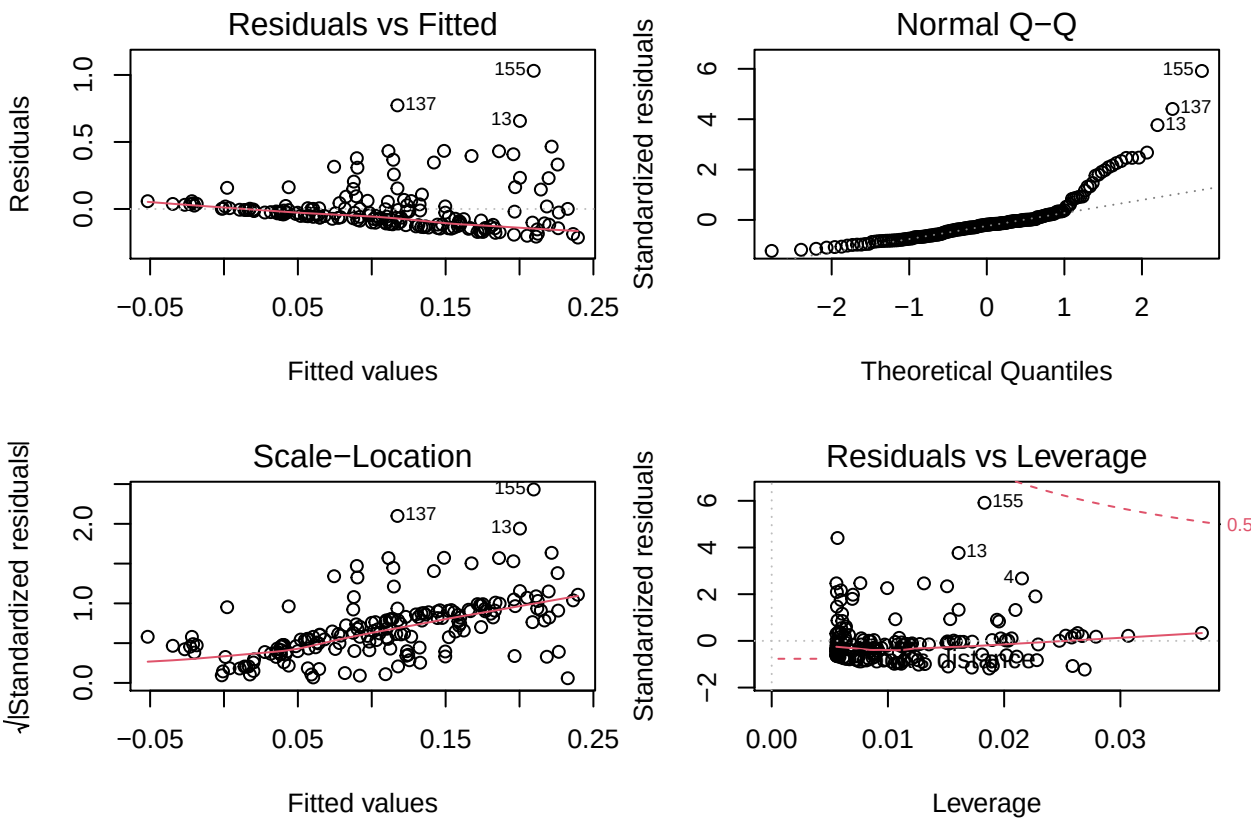

```
## [1] "robust_health_sector"
##                          Estimate   Std. Error  t value     Pr(>|t|)
## (Intercept)           0.005181214 0.0254643966 0.203469 8.390009e-01
## robust_health_sector 0.003708423 0.0007848626 4.724932 4.656551e-06
```




```
## [1] "commitments"
##                Estimate  Std. Error   t value  Pr(>|t|)
## (Intercept) 0.014908581 0.058234351 0.2560101 0.7982387
## commitments 0.001870904 0.001136723 1.6458747 0.1015541
```



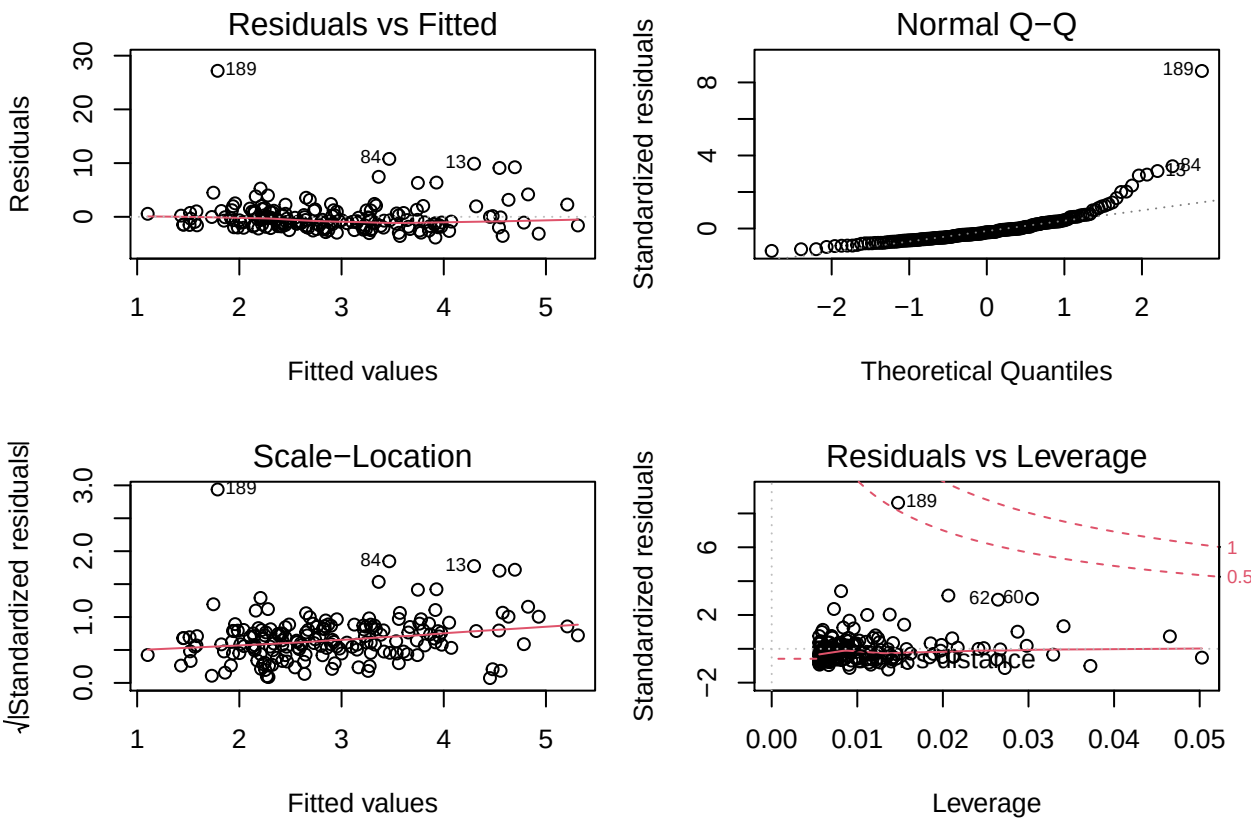

```
## [1] "risk_environment"
##                      Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)      -0.11593140 0.0456857947 -2.537581 1.202020e-02
## risk_environment  0.00404382 0.0007904152  5.116072 8.023942e-07
```



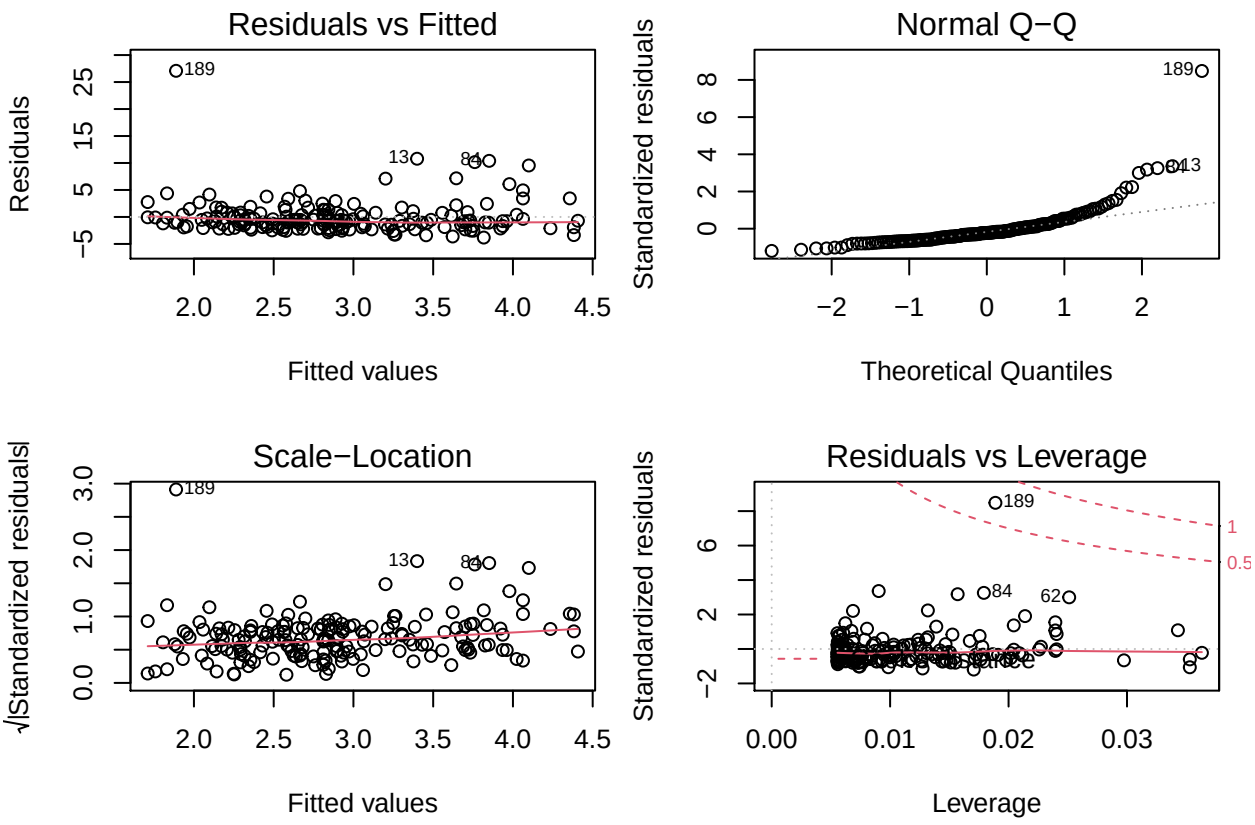
Case Fatality Ratio with each subcomponent

```
subcomponents <- c("prev_emergence_pathogens", "early_detection", "rapid_response", "robust_health_secto

for(i in 1:length(subcomponents)) {
  predictor_i <- (subcomponents)[i]
  print(predictor_i)
  print(summary(lm(cfratio ~ ., data = sixmonth_data[,c("cfratio",predictor_i)]))$coef)
  par(mfrow=c(2,2),mar=c(5,4,2,1))
  plot(lm(cfratio ~ ., data = sixmonth_data[,c("cfratio",predictor_i)]))
}
```

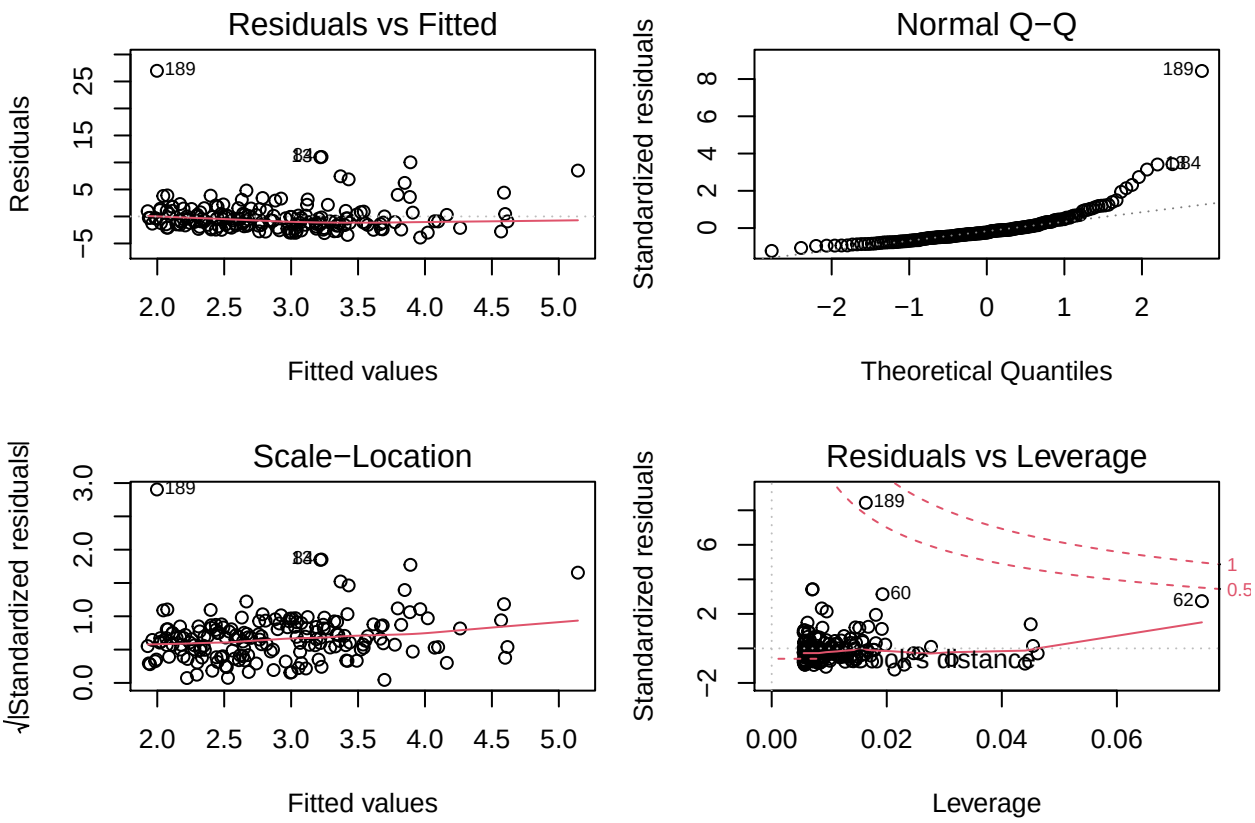
```
## [1] "prev_emergence_pathogens"
##                              Estimate Std. Error  t value     Pr(>|t|)
## (Intercept)                1.00461879 0.57254034 1.754669 0.0810365732
## prev_emergence_pathogens 0.05184188 0.01435001 3.612671 0.0003940994
```



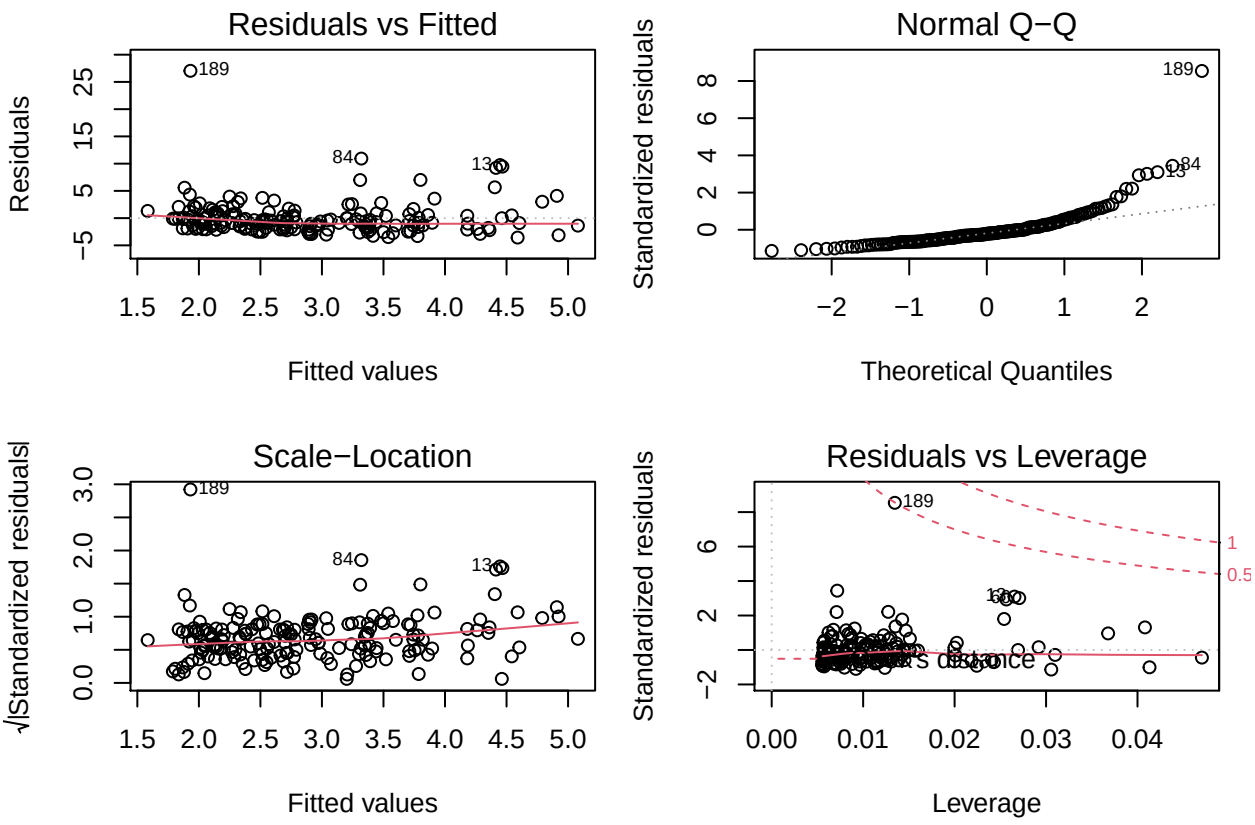

```
## [1] "early_detection"
##                    Estimate Std. Error  t value    Pr(>|t|)
## (Intercept)     1.63389503 0.52506783 3.111779 0.002166740
## early_detection 0.02824326 0.01051263 2.686603 0.007901996
```



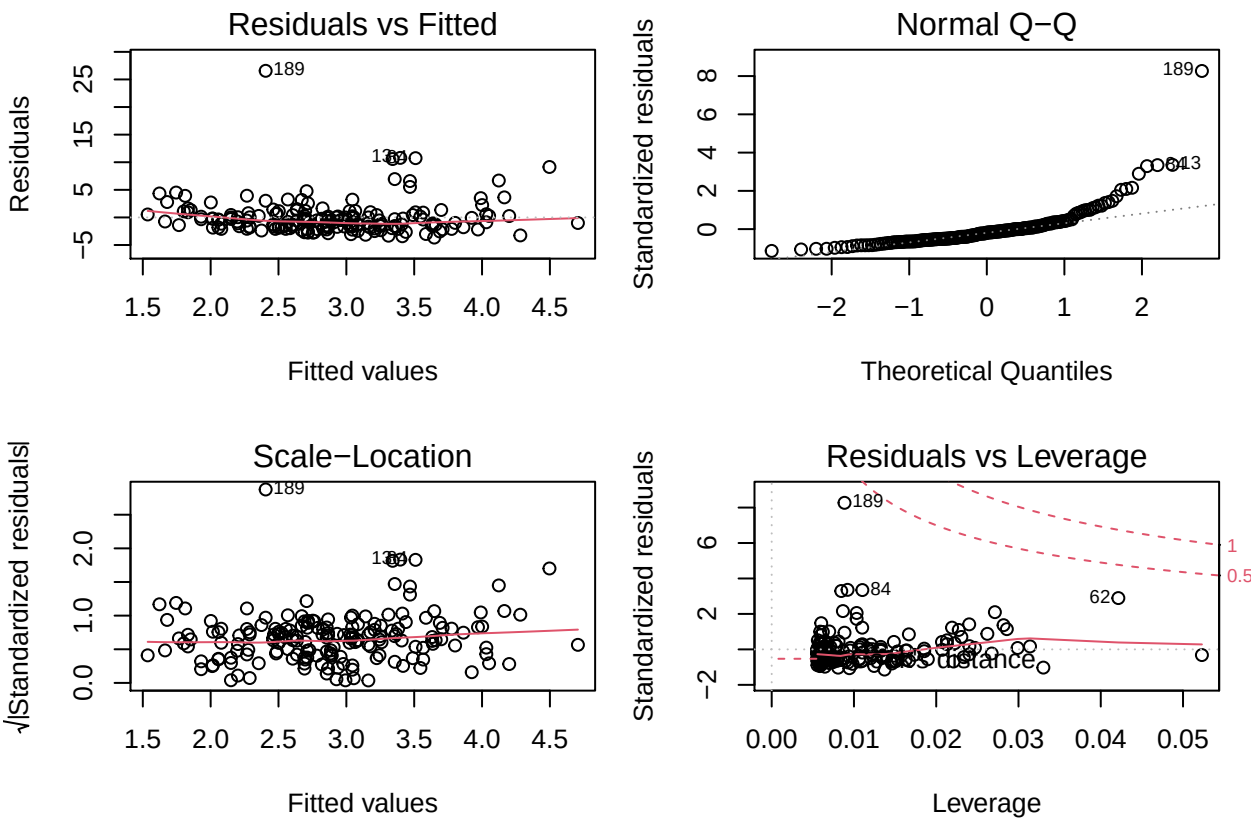

```
## [1] "rapid_response"
##                  Estimate Std. Error  t value   Pr(>|t|)
## (Intercept)    1.17780008 0.68717742 1.713968 0.08827534
## rapid_response 0.04314174 0.01623796 2.656845 0.00860465
```



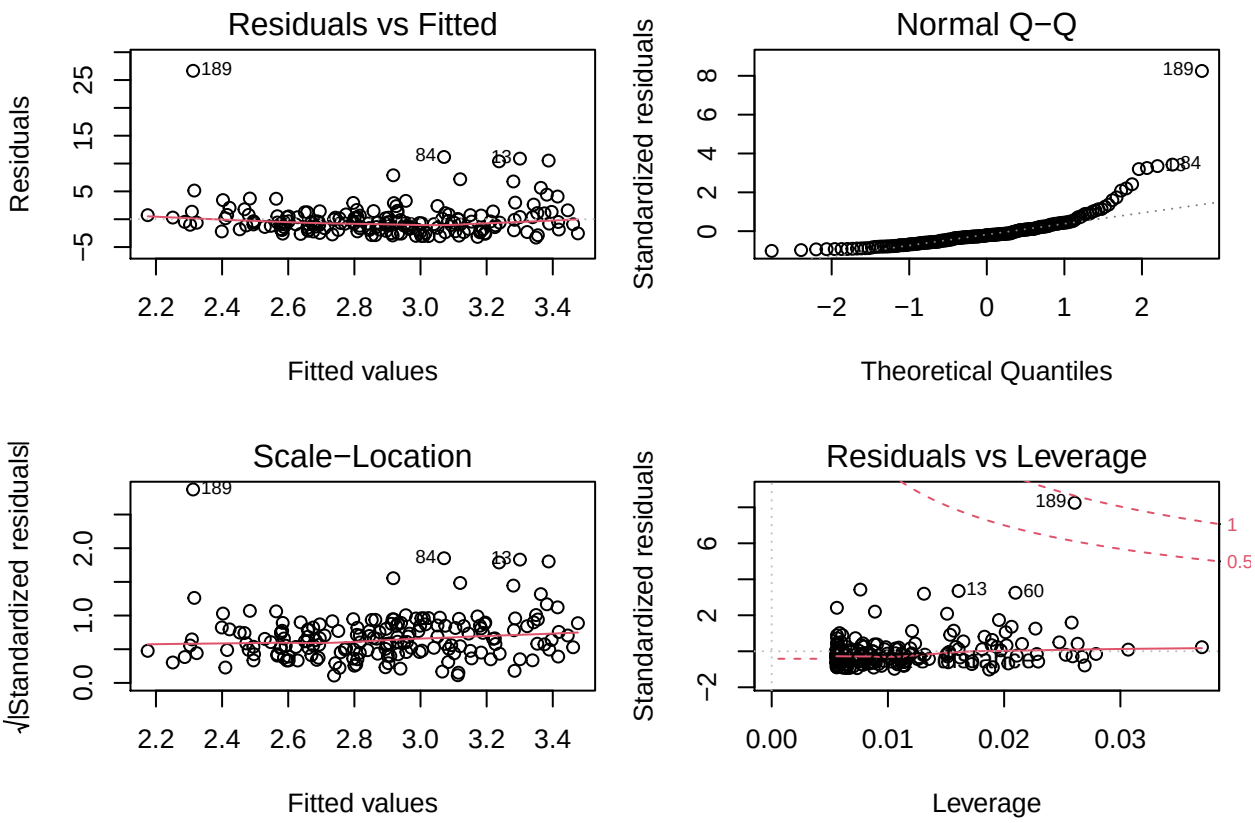

```
## [1] "robust_health_sector"
##                          Estimate Std. Error  t value     Pr(>|t|)
## (Intercept)           1.56981234 0.45716225 3.433819 0.0007403332
## robust_health_sector 0.04756391 0.01409064 3.375568 0.0009043641
```




```
## [1] "commitments"
##                Estimate Std. Error   t value    Pr(>|t|)
## (Intercept) 0.34460717 1.00526756 0.3428014 0.732152327
## commitments 0.05113562 0.01962262 2.6059522 0.009937809
```




```
## [1] "risk_environment"
##                     Estimate Std. Error  t value   Pr(>|t|)
## (Intercept)      1.88771324 0.85053662 2.219438 0.02772029
## risk_environment 0.01806908 0.01471523 1.227917 0.22109943
```


Residuals vs Fitted
Residuals
Fitted values
189
84
13
Normal Q−Q
Standardized residuals
Theoretical Quantiles
Scale−Location
√|Standardized residuals|
Residuals vs Leverage
Leverage
60
1
0.5