GDP_Analysis

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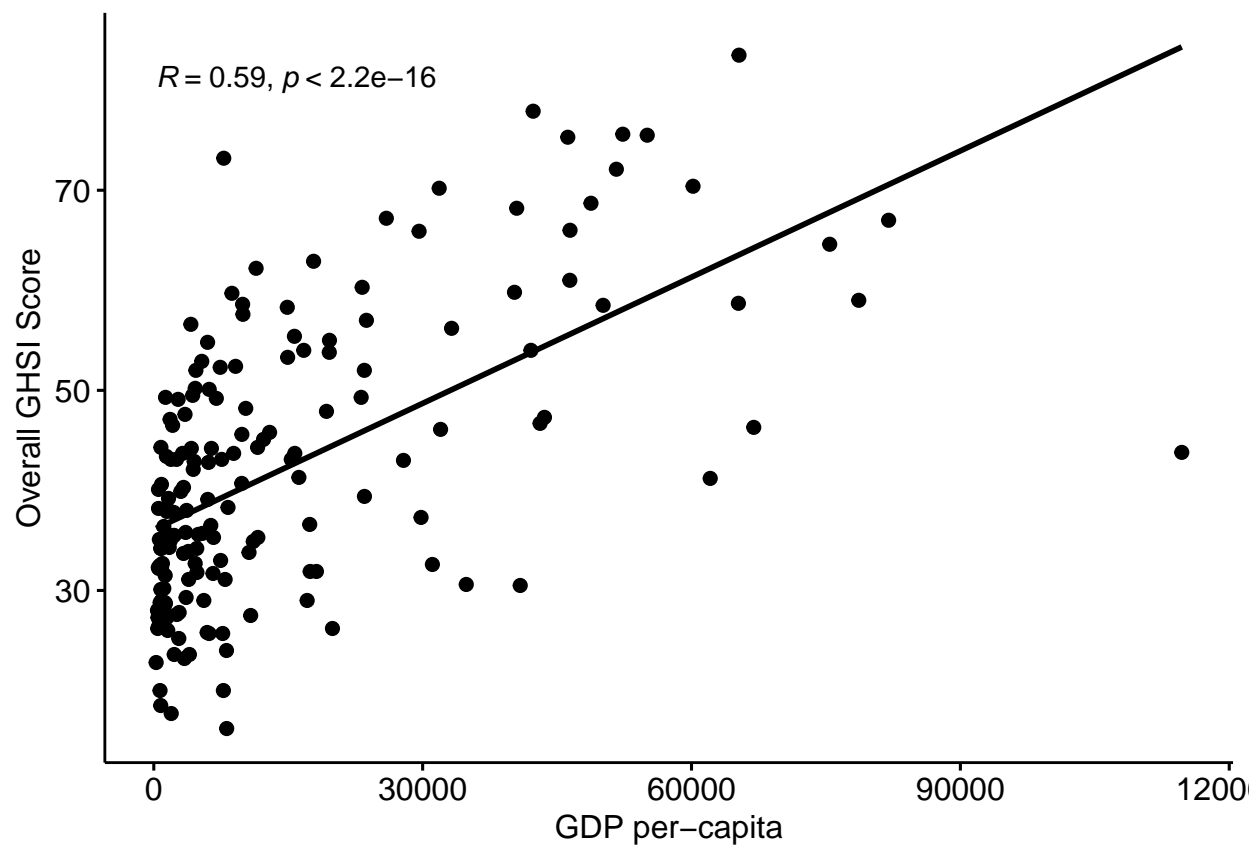2/21/2021

Imports & Pre-processing

```r
# import libraries
library(tidyverse)
library(lubridate)
library(ggpubr)
library(dplyr)

# load sixmonth data, omitting NA values
sixmonth_data = na.omit(read.csv(".\\prepped_data\\sixmonth.csv", check.names = FALSE))

# add gdp_pc quartile
sixmonth_data$gdp_pc_quartile <- ntile(sixmonth_data$gdp_pc, 4)
```

Correlation between GDP per-capita and overall GHSI index

```
ggscatter(sixmonth_data,x='gdp_pc' ,y='overall',
          add='reg.line',cor.coef=TRUE,cor.method='pearson',
          xlab='GDP per-capita',ylab='Overall GHSI Score')
```
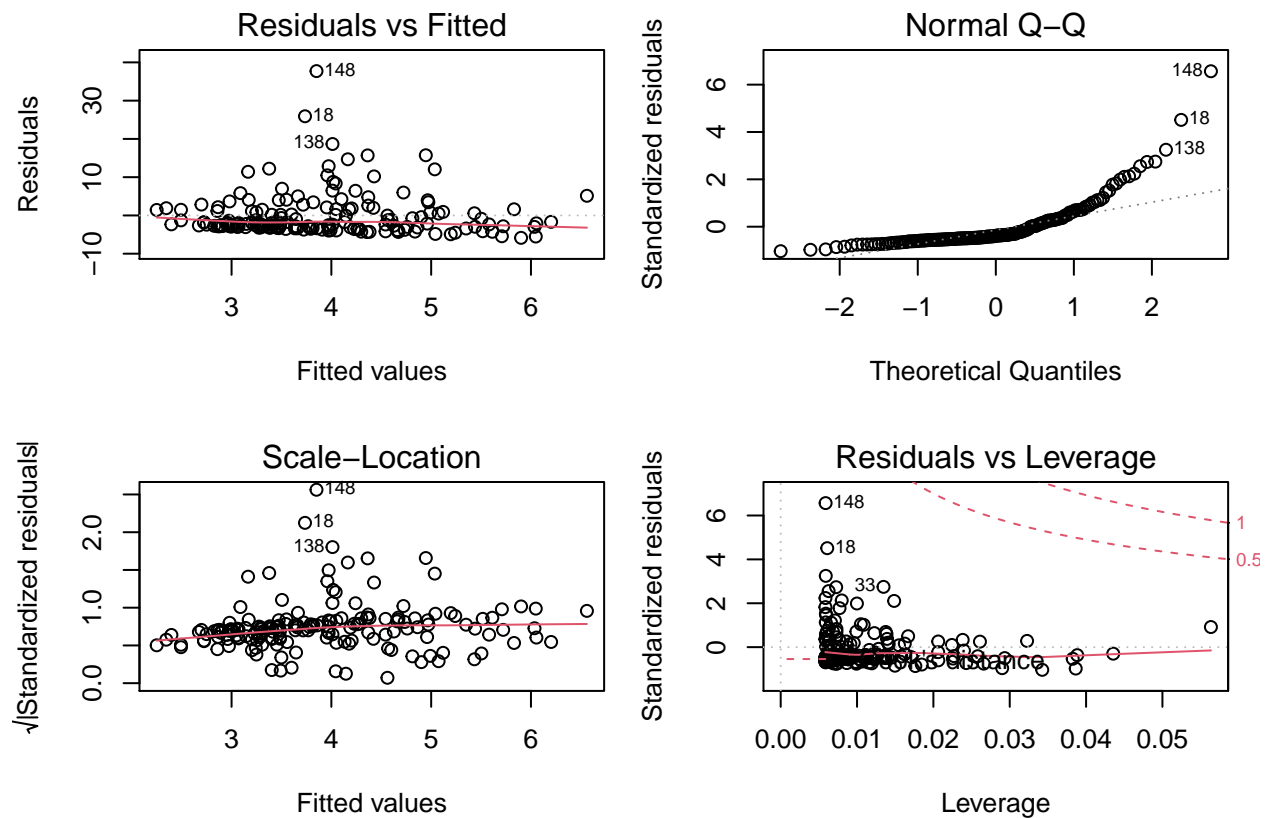
Baseline: Outcomes vs overall GHSI

Cases per-capita vs overall GHSI

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

```
##               Estimate Std. Error   t value    Pr(>|t|)
## (Intercept) 1.21187052 1.40027022 0.8654548 0.38801614
## overall     0.06405954 0.03142626 2.0384078 0.04306759
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(casepc ~ overall, data = sixmonth_data))
```
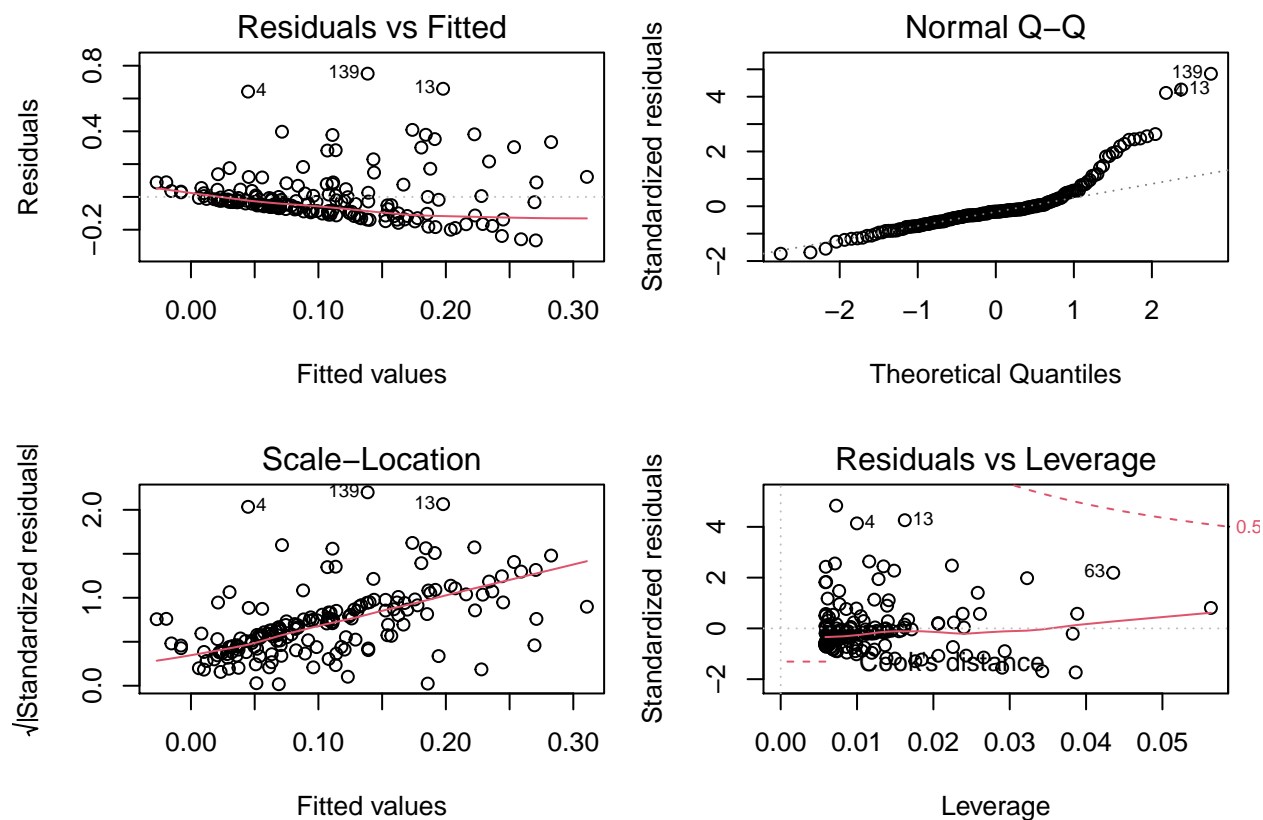
Deaths per-capita vs overall GHSI

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

```
##                  Estimate    Std. Error   t value     Pr(>|t|)
## (Intercept) -0.108134228 0.0379110729 -2.852313 4.882255e-03
## overall      0.005015641 0.0008508381  5.894941 1.983611e-08
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(deathpc ~ overall, data = sixmonth_data))
```
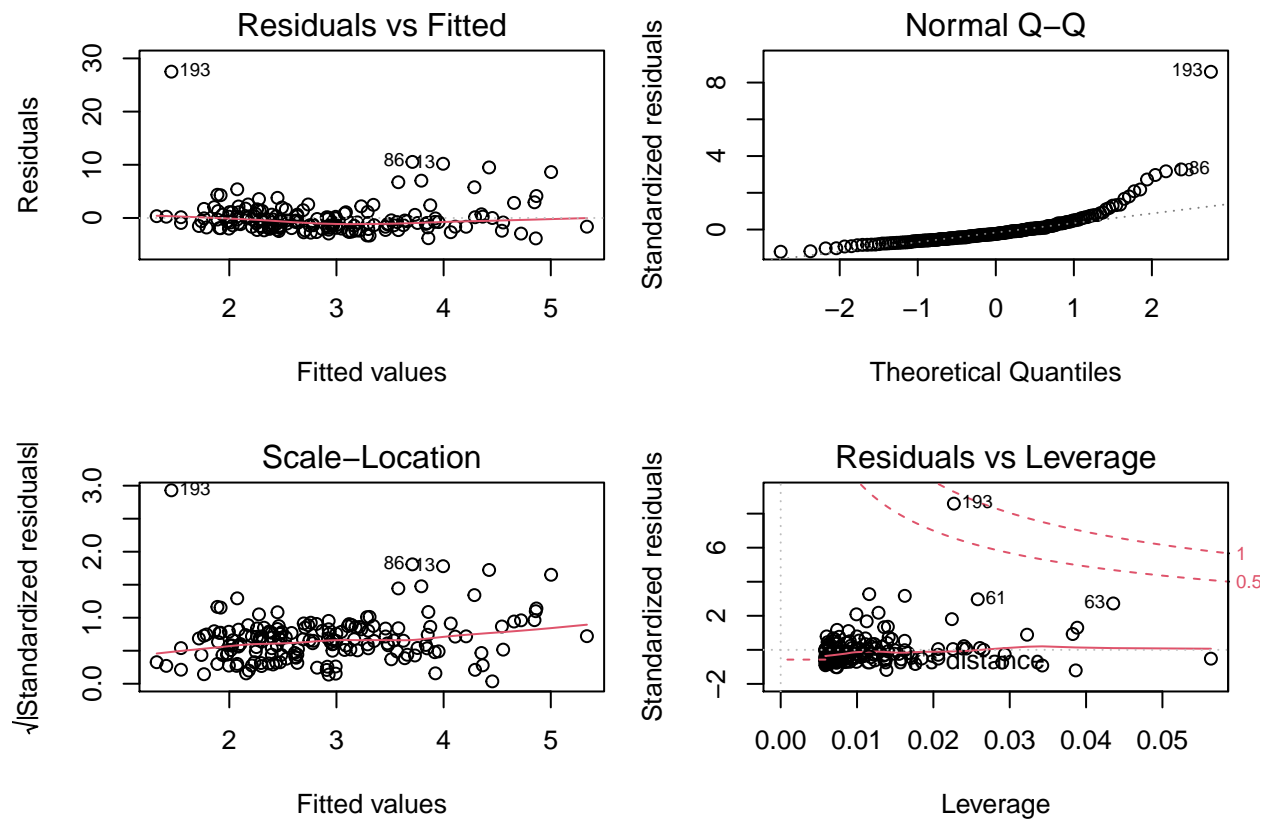
Case-fatality ratio vs overall GHSI

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

```
##                Estimate Std. Error  t value      Pr(>|t|)
## (Intercept) 0.35619156 0.78762500 0.452235 0.6516796540
## overall     0.05965234 0.01767667 3.374637 0.0009167863
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(cfratio ~ overall, data = sixmonth_data))
```
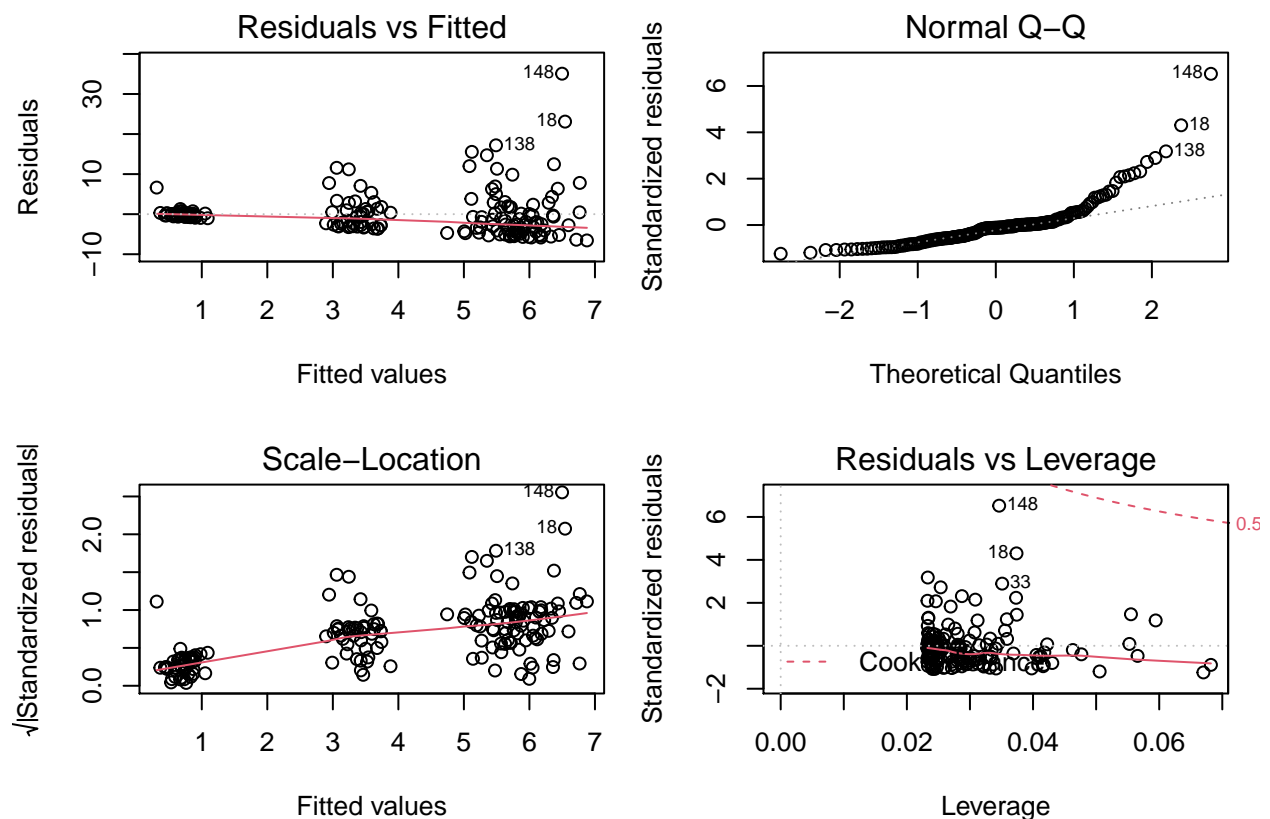
Confounding GDP per-capita (quartiles): Outcomes vs overall GHSI

Cases per-capita vs overall GHSI & GDP per-capita quartiles

```
summary(lm(casepc ~ overall + factor(gdp_pc_quartile), data = sixmonth_data))$coefficients
```

```
##                             Estimate Std. Error    t value      Pr(>|t|)
## (Intercept)               1.55776251 1.50561734   1.034634 3.023449e-01
## overall                  -0.02527216 0.03787453  -0.667260 5.055326e-01
## factor(gdp_pc_quartile)2  2.76984317 1.19249030   2.322739 2.140674e-02
## factor(gdp_pc_quartile)3  5.03675100 1.23358525   4.083018 6.897863e-05
## factor(gdp_pc_quartile)4  5.98175241 1.47560607   4.053760 7.731597e-05
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(casepc ~ overall + factor(gdp_pc_quartile), data = sixmonth_data))
```
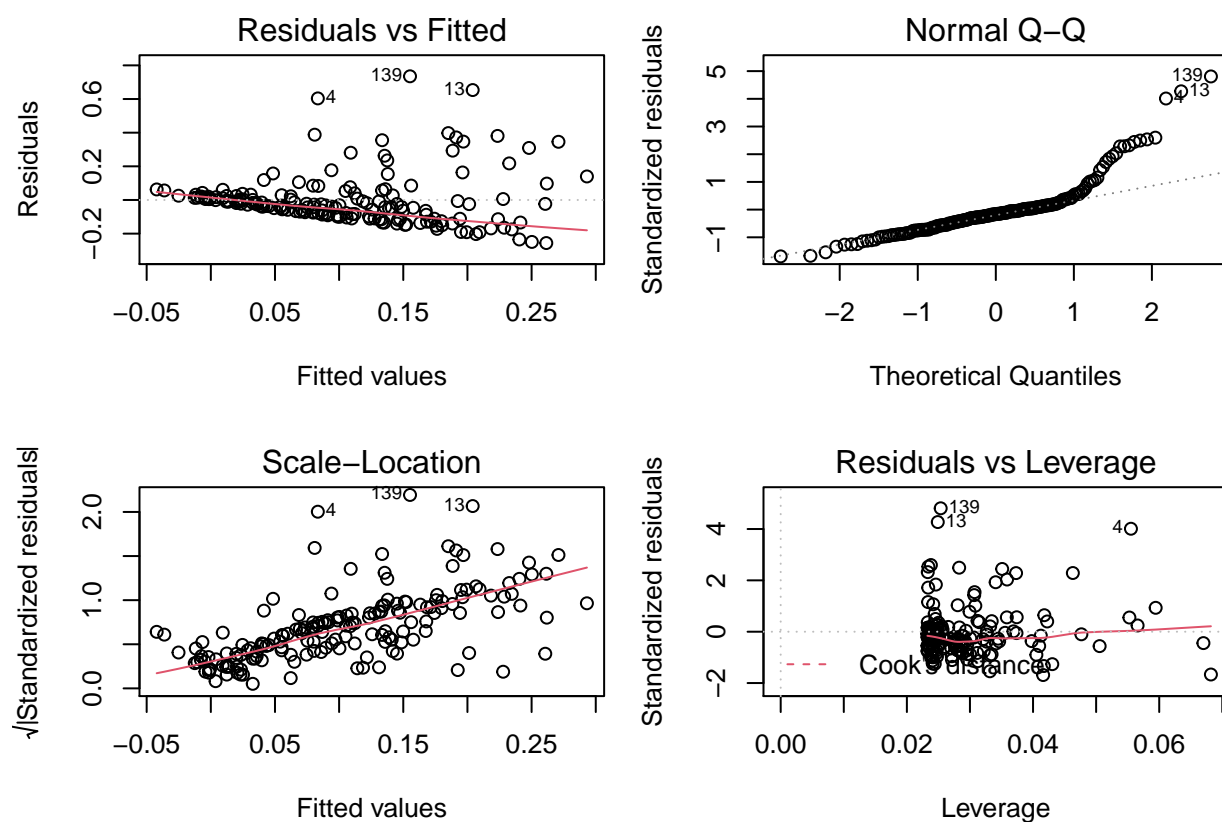

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Deaths per-capita vs overall GHSI & GDP per-capita quartiles

```
summary(lm(deathpc ~ overall + factor(gdp_pc_quartile), data = sixmonth_data))$coefficients
```

```
##                            Estimate  Std. Error   t value       Pr(>|t|)
## (Intercept)             -0.115369404 0.042609873 -2.707574 0.0074872119
## overall                  0.003956551 0.001071872  3.691254 0.0003023344
## factor(gdp_pc_quartile)2 0.054665989 0.033748191  1.619820 0.1071691733
## factor(gdp_pc_quartile)3 0.075954095 0.034911202  2.175637 0.0309963860
## factor(gdp_pc_quartile)4 0.078097574 0.041760536  1.870129 0.0632266298
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(deathpc ~ overall + factor(gdp_pc_quartile), data = sixmonth_data))
```
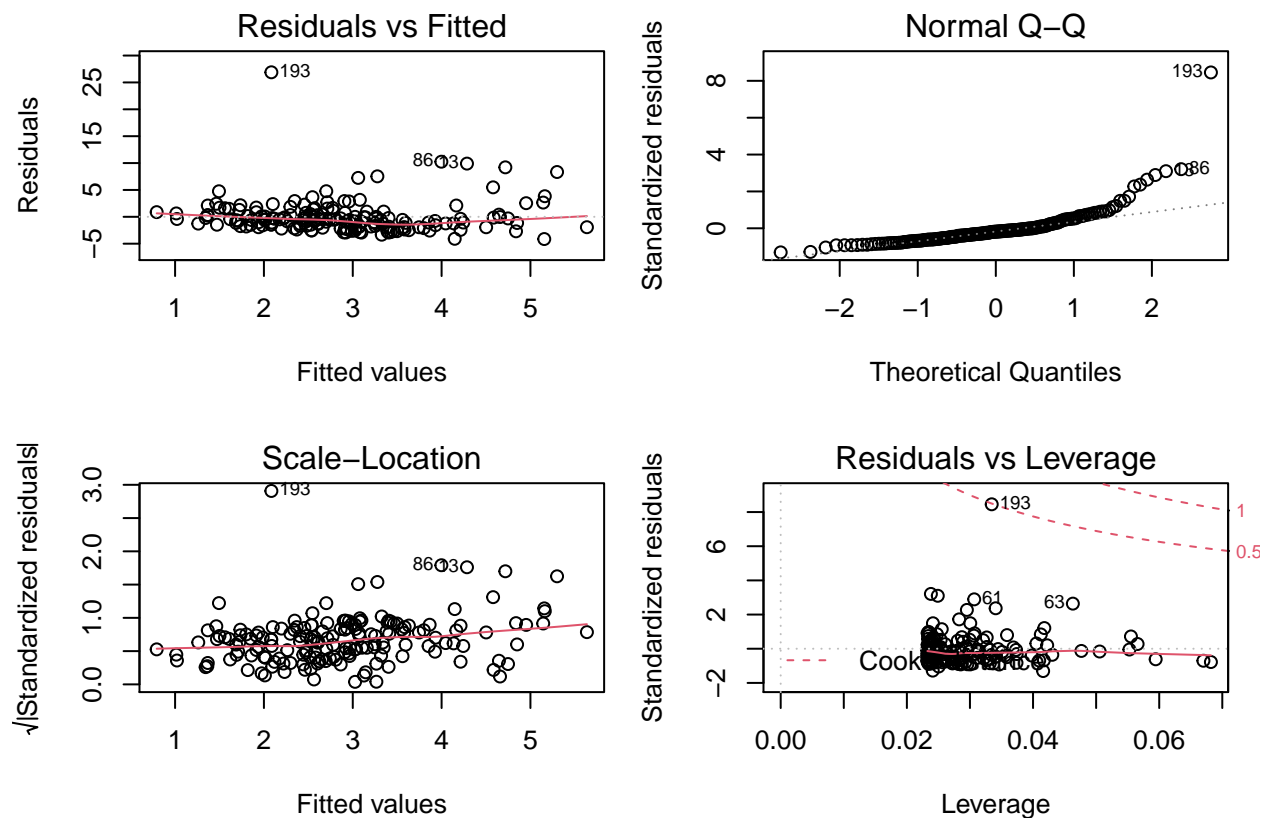
Case-fatality ratio vs overall GHSI & GDP per-capita quartiles

```
summary(lm(cfratio ~ overall + factor(gdp_pc_quartile), data = sixmonth_data))$coefficients
```

```
##                            Estimate Std. Error    t value     Pr(>|t|)
## (Intercept)               0.97370161 0.88994222   1.094118 0.275488399
## overall                   0.06000638 0.02238692   2.680421 0.008094517
## factor(gdp_pc_quartile)2 -1.02194884 0.70485869  -1.449863 0.148983314
## factor(gdp_pc_quartile)3 -1.15292749 0.72914914  -1.581196 0.115736788
## factor(gdp_pc_quartile)4 -0.34845304 0.87220312  -0.399509 0.690031701
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(cfratio ~ overall + factor(gdp_pc_quartile), data = sixmonth_data))
```
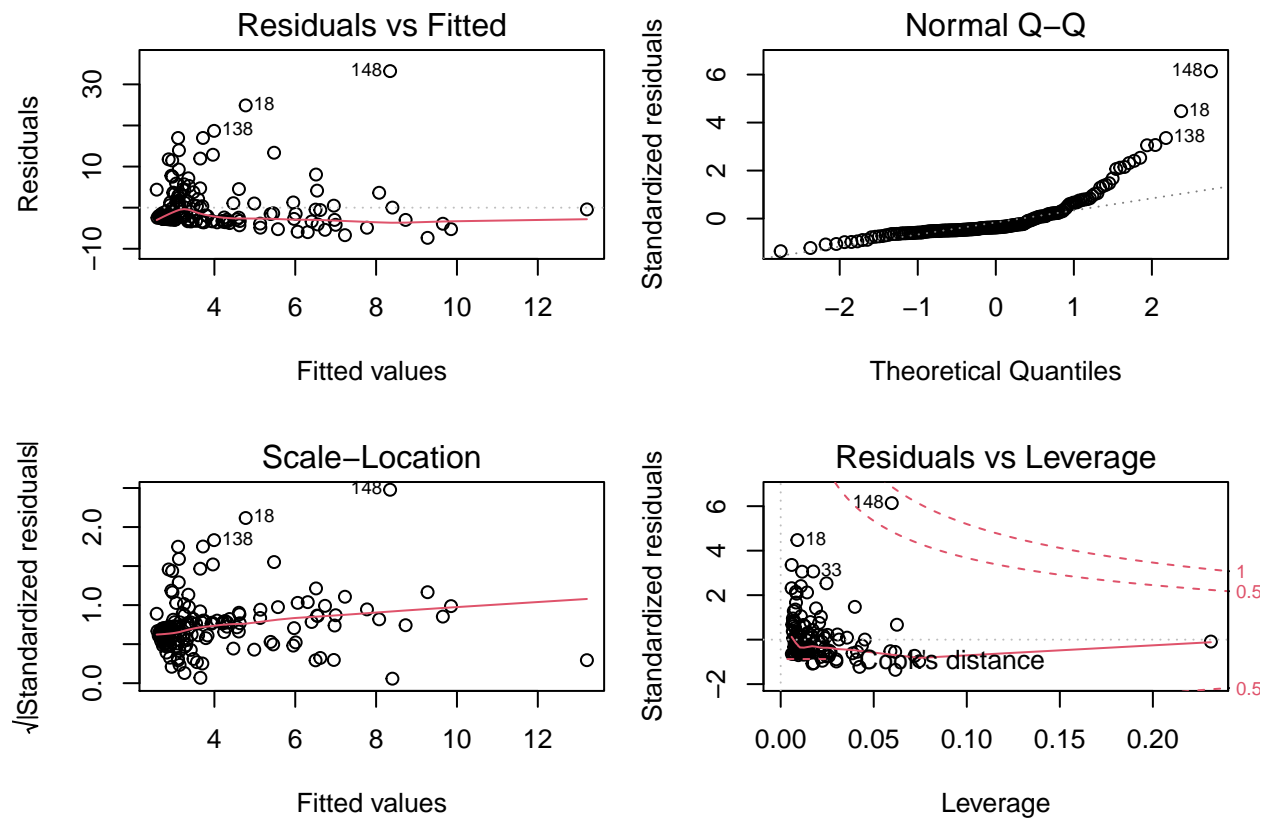

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Confounding GDP per-capita (raw): Outcomes vs overall GHSI

Cases per-capita vs overall GHSI & GDP per-capita

```
summary(lm(casepc ~ overall + gdp_pc, data = sixmonth_data))$coefficients
```

```
##                  Estimate    Std. Error    t value      Pr(>|t|)
## (Intercept)  3.114038e+00  1.463130e+00  2.1283401  0.0347669521
## overall     -1.345746e-02  3.775897e-02 -0.3564043  0.7219849758
## gdp_pc       9.319766e-05  2.684985e-05  3.4710685  0.0006589819
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(casepc ~ overall + gdp_pc, data = sixmonth_data))
```
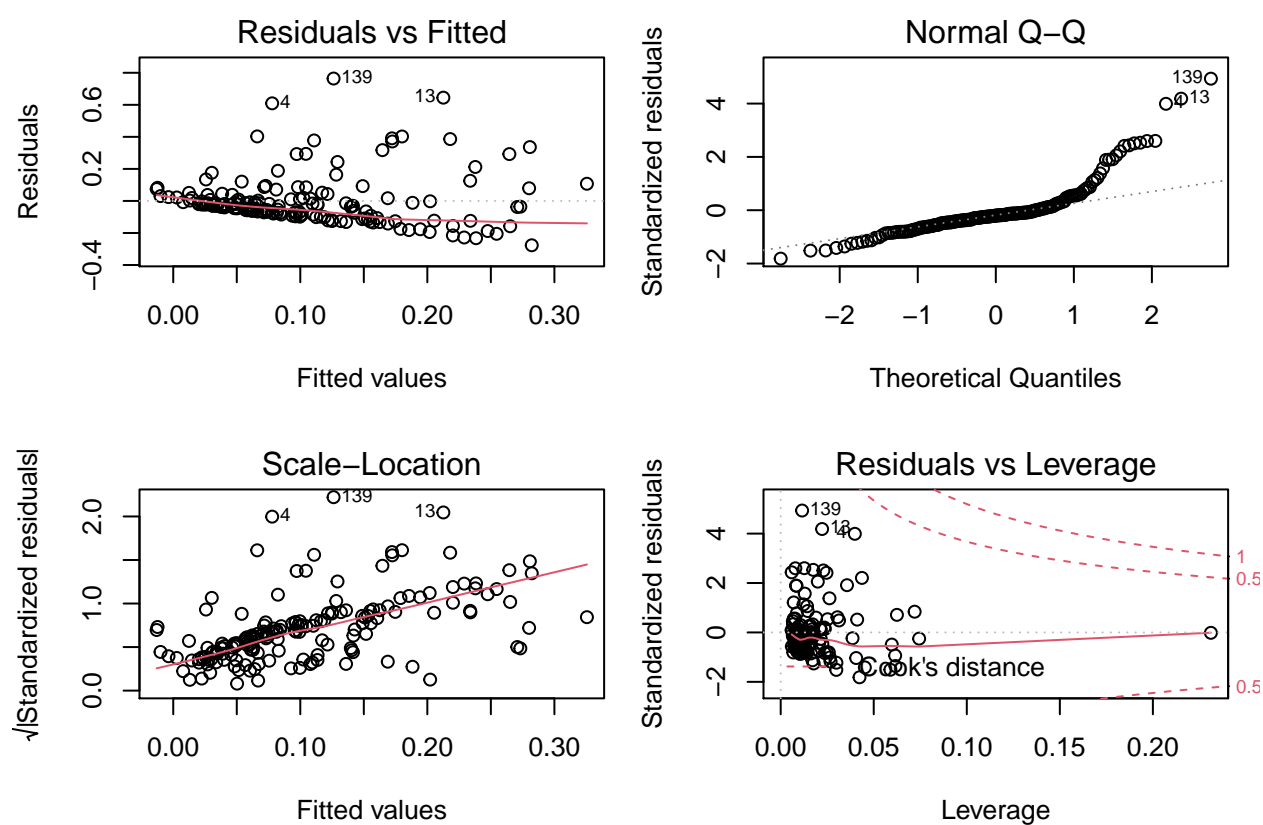
Deaths per-capita vs overall GHSI & GDP per-capita

```
summary(lm(deathpc ~ overall + gdp_pc, data = sixmonth_data))$coefficients
```

```
##                  Estimate   Std. Error   t value      Pr(>|t|)
## (Intercept) -8.938251e-02 4.082648e-02 -2.189327 0.0299521394
## overall      4.251472e-03 1.053608e-03  4.035155 0.0000827173
## gdp_pc       9.187497e-07 7.492053e-07  1.226299 0.2218021894
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(deathpc ~ overall + gdp_pc, data = sixmonth_data))
```

Case-fatality ratio vs overall GHSI & GDP per-capita

```
summary(lm(cfratio ~ overall + gdp_pc, data = sixmonth_data))$coefficients
```

```
##                  Estimate    Std. Error  t value   Pr(>|t|)
## (Intercept) 4.552971e-01 0.8517375017 0.534551 0.59366711
## overall     5.561360e-02 0.0219807700 2.530102 0.01232255
## gdp_pc      4.855726e-06 0.0000156302 0.310663 0.75644192
```

```
par(mfrow=c(2,2),mar=c(5,4,2,1))
plot(lm(cfratio ~ overall + gdp_pc, data = sixmonth_data))
```