

This is an R HTML document. When you click the **Knit HTML** button a web page will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
who <- read.csv("C:/Users/prera/Downloads/Life_Expectancy_Data.csv")
head(who)

##      Country Year      Status Life.expectancy Adult.Mortality infant.deaths
## 1 Afghanistan 2015 Developing           65.0           263           62
## 2 Afghanistan 2014 Developing           59.9           271           64
## 3 Afghanistan 2013 Developing           59.9           268           66
## 4 Afghanistan 2012 Developing           59.5           272           69
## 5 Afghanistan 2011 Developing           59.2           275           71
## 6 Afghanistan 2010 Developing           58.8           279           74
##      Alcohol percentage.expenditure Hepatitis.B Measles BMI under.five.deaths
## 1      0.01           71.279624           65      1154 19.1           83
## 2      0.01           73.523582           62      492 18.6           86
## 3      0.01           73.219243           64      430 18.1           89
## 4      0.01           78.184215           67     2787 17.6           93
## 5      0.01           7.097109           68     3013 17.2           97
## 6      0.01           79.679367           66     1989 16.7          102
##      Polio Total.expenditure Diphtheria HIV.AIDS GDP Population
## 1      6           8.16           65      0.1 584.25921 33736494
## 2     58           8.18           62      0.1 612.69651 327582
## 3     62           8.13           64      0.1 631.74498 31731688
## 4     67           8.52           67      0.1 669.95900 3696958
## 5     68           7.87           68      0.1 63.53723 2978599
## 6     66           9.20           66      0.1 553.32894 2883167
##      thinness..1.19.years thinness.5.9.years Income.composition.of.resources
## 1           17.2           17.3           0.479
## 2           17.5           17.5           0.476
## 3           17.7           17.7           0.470
## 4           17.9           18.0           0.463
## 5           18.2           18.2           0.454
## 6           18.4           18.4           0.448
##      Schooling
## 1          10.1
## 2          10.0
## 3           9.9
## 4           9.8
## 5           9.5
## 6           9.2

#####Dimesion of the dataset#####

dim(who)

## [1] 2938 22

##### TOP 10 DEVELOPED & DEVELOPING Countires #####

status.of.countries <- who[(who$Status %in% c("Developing") & who$Life.expectancy<55) | (who$Status %in% c("Developed") & who$Life.expectancy>80) ,]
dim(status.of.countries)

## [1] 509 22

View(status.of.countries)

class(status.of.countries)

## [1] "data.frame"

head(status.of.countries)

##      Country Year      Status Life.expectancy Adult.Mortality infant.deaths
## 16 Afghanistan 2000 Developing           54.8           321           88
## 49      Angola 2015 Developing           52.4           335           66
## 50      Angola 2014 Developing           51.7           348           67
## 51      Angola 2013 Developing           51.1           355           69
## 53      Angola 2011 Developing           51.0           361           75
## 54      Angola 2010 Developing           49.6           365           78
##      Alcohol percentage.expenditure Hepatitis.B Measles BMI under.five.deaths
## 16      0.01           10.42496           62     6532 12.2          122
## 49      NA           0.00000           64      118 23.3           98
## 50     8.33           23.96561           64    11699 22.7          101
## 51     8.10           35.95857           77     8523 22.1          105
## 53     8.06           239.89139           72     1449 21.0          115
## 54     7.80           191.65374           77     1190 2.4          121
##      Polio Total.expenditure Diphtheria HIV.AIDS GDP Population
## 16     24           8.20           24      0.1 114.5600 293756
## 49     7           NA           64      1.9 3695.7937 2785935
## 50     68           3.31           64      2.0 479.3122 2692466
## 51     67           4.26           77      2.3 484.6169 2599834
## 53     73           3.38           71      2.5 4299.1289 24218565
## 54     81           3.39           77      2.5 3529.5348 23369131
##      thinness..1.19.years thinness.5.9.years Income.composition.of.resources
## 16           2.3           2.5           0.338
## 49           8.3           8.2           0.531
## 50           8.5           8.3           0.527
```

```
## 51      8.6      8.5      0.523
## 53      8.9      8.8      0.495
## 54      9.1      9.0      0.488
## Schooling
## 16      5.5
## 49     11.4
## 50     11.4
## 51     11.4
## 53      9.4
## 54      9.0
```

```
#View(status.of.countries)
WHONew<-status.of.countries
#resting the index values
row.names(WHONew) <- NULL
#View(WHONew)
dim(WHONew)
```

```
## [1] 509 22
```

```
##### CLEANING THE DATA #####
# For 347 rows running the for loop for checking any NA values and replacing it with the mean of the
# particular country.
for(i in 1:347)
{
  if(is.na(WHONew$Alcohol[i]))
  {
    WHONew$Alcohol[i] <- with(WHONew, mean(WHONew$Alcohol[Country == WHONew$Country[i]], na.rm = TRUE))
  }
}
for(i in 1:347)
{
  if(is.na(WHONew$Hepatitis.B[i]))
  {
    WHONew$Hepatitis.B[i] <- with(WHONew, mean(WHONew$Hepatitis.B[Country == WHONew$Country[i]], na.rm = TRUE))
  }
}
for(i in 1:347)
{
  if(is.na(WHONew$Total.expenditure[i]))
  {
    WHONew$Total.expenditure[i] <- with(WHONew, mean(WHONew$Total.expenditure[Country == WHONew$Country[i]], na.rm = TRUE))
  }
}
dim(WHONew)
```

```
## [1] 509 22
```

```
#View(WHONew)

# Deleting the Empty rows where there is no data present.
new.life<- na.omit(WHONew)
dim(new.life)
```

```
## [1] 285 22
```

```
View(new.life)

##### Finding the summary or the distribution of the Dataset #####

g<-lm(Life.expectancy~Adult.Mortality + infant.deaths + Alcohol+percentage.expenditure+Hepatitis.B+
Measles+BMI+under.five.deaths+Polio+Total.expenditure+Diphtheria+HIV.AIDS+GDP+Population+
thinness..1.19.years+thinness.5.9.years+Income.composition.of.resources+Schooling, data=new.life)
summary(g)
```

```
##
## Call:
## lm(formula = Life.expectancy ~ Adult.Mortality + infant.deaths +
## Alcohol + percentage.expenditure + Hepatitis.B + Measles +
## BMI + under.five.deaths + Polio + Total.expenditure + Diphtheria +
## HIV.AIDS + GDP + Population + thinness..1.19.years + thinness.5.9.years +
## Income.composition.of.resources + Schooling, data = new.life)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -9.5068 -2.4042 -0.0747  2.5214 10.9258
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  3.984e+01  1.434e+00  27.779 < 2e-16 ***
## Adult.Mortality -6.817e-03  1.520e-03  -4.485 1.09e-05 ***
## infant.deaths -2.507e-01  7.892e-02  -3.176  0.00167 **
## Alcohol       3.287e-01  1.015e-01   3.238  0.00136 **
## percentage.expenditure 1.938e-04  2.051e-04   0.945  0.34555
## Hepatitis.B    -2.044e-03  1.184e-02  -0.173  0.86305
## Measles       2.249e-05  1.604e-05   1.402  0.16214
## BMI           5.654e-02  1.820e-02   3.106  0.00210 **
## under.five.deaths 1.522e-01  5.022e-02   3.030  0.00268 **
## Polio         2.062e-02  1.408e-02   1.464  0.14427
## Total.expenditure 9.466e-03  9.669e-02   0.098  0.92208
```

```
## Diphtheria          4.301e-02  1.517e-02   2.836  0.00493 **
## HIV.AIDS            -3.061e-01  2.488e-02 -12.301 < 2e-16 ***
## GDP                 -1.133e-05  3.235e-05  -0.350  0.72645
## Population          8.473e-09  1.163e-08   0.728  0.46714
## thinness..1.19.years -9.699e-02  1.487e-01  -0.652  0.51482
## thinness.5.9.years  -2.908e-01  1.446e-01  -2.012  0.04528 *
## Income.composition.of.resources 2.697e+01  3.473e+00  7.765  1.77e-13 ***
## Schooling           4.042e-01  1.724e-01   2.344  0.01979 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.874 on 266 degrees of freedom
## Multiple R-squared:  0.9451, Adjusted R-squared:  0.9414
## F-statistic: 254.4 on 18 and 266 DF,  p-value: < 2.2e-16
```

Trying to remove variables to check how the variation in p values change.

```
#REMOVING Hepatitis.B ,Total.expenditure,GDP
g1<-lm(Life.expectancy~Adult.Mortality + infant.deaths + Alcohol+percentage.expenditure+
Measles+BMI+under.five.deaths+Polio+Diphtheria+HIV.AIDS+Population+
thinness..1.19.years+thinness.5.9.years+Income.composition.of.resources+Schooling, data=new.life)
summary(g1)
```

```
##
## Call:
## lm(formula = Life.expectancy ~ Adult.Mortality + infant.deaths +
##     Alcohol + percentage.expenditure + Measles + BMI + under.five.deaths +
##     Polio + Diphtheria + HIV.AIDS + Population + thinness..1.19.years +
##     thinness.5.9.years + Income.composition.of.resources + Schooling,
##     data = new.life)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -9.5263 -2.4445 -0.0684  2.5559 10.8687
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   3.985e+01  1.309e+00   30.443 < 2e-16 ***
## Adult.Mortality -6.810e-03  1.506e-03  -4.522 9.18e-06 ***
## infant.deaths  -2.495e-01  7.832e-02  -3.185  0.00162 **
## Alcohol         3.280e-01  1.004e-01   3.266  0.00123 **
## percentage.expenditure 1.318e-04  9.429e-05   1.398  0.16335
## Measles        2.242e-05  1.590e-05   1.410  0.15984
## BMI            5.730e-02  1.796e-02   3.191  0.00159 **
## under.five.deaths 1.515e-01  4.984e-02   3.039  0.00261 **
## Polio          2.051e-02  1.396e-02   1.470  0.14281
## Diphtheria     4.216e-02  1.397e-02   3.018  0.00278 **
## HIV.AIDS       -3.054e-01  2.465e-02 -12.388 < 2e-16 ***
## Population     8.161e-09  1.152e-08   0.709  0.47914
## thinness..1.19.years -9.584e-02  1.478e-01  -0.649  0.51718
## thinness.5.9.years  -2.912e-01  1.437e-01  -2.027  0.04368 *
## Income.composition.of.resources 2.686e+01  3.397e+00  7.905  6.94e-14 ***
## Schooling      4.027e-01  1.677e-01   2.401  0.01701 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.853 on 269 degrees of freedom
## Multiple R-squared:  0.9451, Adjusted R-squared:  0.942
## F-statistic: 308.5 on 15 and 269 DF,  p-value: < 2.2e-16
```

```
# Furthur removing thinness..1.19.years and population.
g2<-lm(Life.expectancy~Adult.Mortality + infant.deaths + Alcohol+percentage.expenditure+
Measles+BMI+under.five.deaths+Polio+Diphtheria+HIV.AIDS+
+thinness.5.9.years+Income.composition.of.resources+Schooling, data=new.life)
summary(g2)
```

```
##
## Call:
## lm(formula = Life.expectancy ~ Adult.Mortality + infant.deaths +
##     Alcohol + percentage.expenditure + Measles + BMI + under.five.deaths +
##     Polio + Diphtheria + HIV.AIDS + +thinness.5.9.years + Income.composition.of.resources +
##     Schooling, data = new.life)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -9.3939 -2.4969 -0.0995  2.5959 10.8665
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   3.963e+01  1.282e+00   30.911 < 2e-16 ***
## Adult.Mortality -6.887e-03  1.500e-03  -4.592 6.74e-06 ***
## infant.deaths  -2.399e-01  7.751e-02  -3.095 0.002173 **
## Alcohol         3.329e-01  1.000e-01   3.328 0.000996 ***
## percentage.expenditure 1.319e-04  9.410e-05   1.401 0.162302
## Measles        2.265e-05  1.586e-05   1.428 0.154432
## BMI            5.915e-02  1.782e-02   3.320 0.001024 **
## under.five.deaths 1.460e-01  4.941e-02   2.955 0.003398 **
## Polio          2.085e-02  1.393e-02   1.497 0.135506
## Diphtheria     4.196e-02  1.394e-02   3.011 0.002847 **
## HIV.AIDS       -3.060e-01  2.459e-02 -12.443 < 2e-16 ***
## thinness.5.9.years -3.639e-01  8.363e-02  -4.352 1.92e-05 ***
## Income.composition.of.resources 2.710e+01  3.380e+00  8.019 3.23e-14 ***
## Schooling      3.974e-01  1.672e-01   2.376 0.018203 *
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.846 on 271 degrees of freedom
## Multiple R-squared:  0.9449, Adjusted R-squared:  0.9422
## F-statistic: 357.3 on 13 and 271 DF,  p-value: < 2.2e-16
```

```
# Furthur removing percentage.expenditure and Polio, Measles .
g3<-lm(Life.expectancy~Adult.Mortality + infant.deaths + Alcohol+
      +BMI+under.five.deaths+Diphtheria+HIV.AIDS+
      +thinness.5.9.years+Income.composition.of.resources+Schooling, data=new.life)
summary(g3)
```

```
##
## Call:
## lm(formula = Life.expectancy ~ Adult.Mortality + infant.deaths +
##     Alcohol + +BMI + under.five.deaths + Diphtheria + HIV.AIDS +
##     +thinness.5.9.years + Income.composition.of.resources + Schooling,
##     data = new.life)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -9.5333 -2.7459  0.0533  2.5279 10.4413
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    39.914810    1.244281   32.079 < 2e-16 ***
## Adult.Mortality    -0.007450    0.001486   -5.014 9.57e-07 ***
## infant.deaths     -0.279079    0.074309   -3.756 0.000211 ***
## Alcohol           0.375054    0.098635    3.802 0.000177 ***
## BMI              0.057549    0.017883    3.218 0.001446 **
## under.five.deaths  0.171609    0.047129    3.641 0.000324 ***
## Diphtheria        0.053859    0.011720    4.596 6.59e-06 ***
## HIV.AIDS          -0.301955    0.024430   -12.360 < 2e-16 ***
## thinness.5.9.years -0.369778    0.083761   -4.415 1.46e-05 ***
## Income.composition.of.resources 26.371759    3.268480    8.069 2.25e-14 ***
## Schooling         0.482145    0.161845    2.979 0.003151 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.867 on 274 degrees of freedom
## Multiple R-squared:  0.9436, Adjusted R-squared:  0.9416
## F-statistic: 458.7 on 10 and 274 DF,  p-value: < 2.2e-16
```

```
coefficients(g)
```

```
##              (Intercept)              Adult.Mortality
##      3.984424e+01              -6.816542e-03
##      infant.deaths              Alcohol
##     -2.506791e-01              3.287233e-01
##      percentage.expenditure              Hepatitis.B
##     1.938262e-04              -2.044282e-03
##      Measles              BMI
##     2.248900e-05              5.653589e-02
##      under.five.deaths              Polio
##     1.521782e-01              2.061924e-02
##      Total.expenditure              Diphtheria
##     9.466119e-03              4.300655e-02
##      HIV.AIDS              GDP
##     -3.060639e-01              -1.132937e-05
##      Population              thinness..1.19.years
##     8.472530e-09              -9.699313e-02
##      thinness.5.9.years Income.composition.of.resources
##     -2.908008e-01              2.697098e+01
##      Schooling
##     4.042154e-01
```

You can also embed plots, for example:

```
install.packages("corrplot")
```

```
## Installing package into 'C:/Users/prera/OneDrive/Documents/R/win-library/3.6'
## (as 'lib' is unspecified)
```

```
## Error in contrib.url(repos, "source"): trying to use CRAN without setting a mirror
```

```
library(corrplot)
```

```
## Warning: package 'corrplot' was built under R version 3.6.3
```

```
## corrplot 0.84 Loaded
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.6.3
```

```

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

#install.packages("FFally", Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
#Library(FFally)
#install.packages("GGally", Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
#Library(GGally)
install.packages("car")

## Installing package into 'C:/Users/prera/OneDrive/Documents/R/win-library/3.6'
## (as 'lib' is unspecified)

## Error in contrib.url(repos, "source"): trying to use CRAN without setting a mirror

library(car)

## Warning: package 'car' was built under R version 3.6.3

## Loading required package: carData

##
## Attaching package: 'car'

## The following object is masked from 'package:dplyr':
##
##   recode

#install.packages("MASS")
#Library(MASS)
#install.packages("relaimpo", Lib="/Library/Frameworks/R.framework/Versions/3.5/Resources/Library")
library(relaimpo)

## Warning: package 'relaimpo' was built under R version 3.6.3

## Loading required package: MASS

##
## Attaching package: 'MASS'

## The following object is masked from 'package:dplyr':
##
##   select

## Loading required package: boot

##
## Attaching package: 'boot'

## The following object is masked from 'package:car':
##
##   Logit

## Loading required package: survey

## Warning: package 'survey' was built under R version 3.6.3

## Loading required package: grid

## Loading required package: Matrix

## Loading required package: survival

##
## Attaching package: 'survival'

```

```
## The following object is masked from 'package:boot':
##
## aml
```

```
##
## Attaching package: 'survey'
```

```
## The following object is masked from 'package:graphics':
##
## dotchart
```

```
## Loading required package: mitools
```

```
## Warning: package 'mitools' was built under R version 3.6.3
```

```
## This is the global version of package relaimpo.
```

```
## If you are a non-US user, a version with the interesting additional metric pmvd is available
```

```
## from ULrike Groempings web site at prof.beuth-hochschule.de/groemping.
```

```
#Confidence interval of 95%
confint(g,level=0.95)
```

```
##                2.5 %      97.5 %
## (Intercept)    3.702013e+01  4.266835e+01
## Adult.Mortality -9.809068e-03 -3.824015e-03
## infant.deaths  -4.060615e-01 -9.529658e-02
## Alcohol         1.288321e-01  5.286145e-01
## percentage.expenditure -2.100440e-04  5.976965e-04
## Hepatitis.B     -2.535544e-02  2.126688e-02
## Measles         -9.097949e-06  5.407596e-05
## BMI             2.069517e-02  9.237661e-02
## under.five.deaths 5.329851e-02  2.510580e-01
## Polio          -7.104419e-03  4.834291e-02
## Total.expenditure -1.809108e-01  1.998430e-01
## Diphtheria      1.314478e-02  7.286832e-02
## HIV.AIDS        -3.550517e-01 -2.570762e-01
## GDP            -7.502176e-05  5.236302e-05
## Population     -1.443621e-08  3.138127e-08
## thinness..1.19.years -3.897921e-01  1.958058e-01
## thinness.5.9.years -5.754404e-01 -6.161144e-03
## Income.composition.of.resources 2.013248e+01  3.380948e+01
## Schooling       6.474909e-02  7.436818e-01
```

```
# This shows the Z value for each variable and there respective alpha/2 value.
#If the z-value is too big in magnitude i.e either too positive or too negative, it indicates that the corresponding true #regression coefficient is 0
```

```
# Predicted Values
fitted(g)
```

```
##      1      2      3      4      5      6      7      8
## 46.84184 57.02138 59.37992 59.51341 57.56166 56.52957 53.54491 55.59103
##      9     10     11     12     13     14     15     16
## 55.08862 51.75378 52.33331 51.80899 51.35069 53.43954 55.20681 53.05260
##     17     18     19     20     21     22     23     24
## 85.10116 87.02809 86.78216 86.70344 86.26832 85.88032 85.42839 85.51863
##     25     26     27     28     29     30     31     32
## 84.47453 85.48341 84.59353 81.30105 81.59011 81.66028 83.62390 81.98762
##     33     34     35     36     37     38     39     40
## 83.22299 82.35296 81.74715 81.33777 81.23301 81.76120 83.34623 84.34632
##     41     42     43     44     45     46     47     48
## 83.37151 82.67039 82.91544 59.57486 57.45756 56.11829 54.56409 49.99609
##     49     50     51     52     53     54     55     56
## 47.32142 48.29905 56.14772 45.07980 46.84460 46.84568 44.89673 40.07424
##     57     58     59     60     61     62     63     80
## 52.37057 50.79451 50.42446 49.69058 49.14444 48.83808 48.67605 54.35832
##     81     82     83     84     85     86     87     88
## 56.54428 55.63763 55.43797 54.97313 54.49010 54.22363 56.44102 55.81845
##     89     90     91     92     93     94     95     96
## 51.58534 48.92498 46.98609 48.31001 47.45026 46.41848 46.74579 46.16106
##     97     98     99    100    101    102    103    104
## 45.71667 48.19235 44.64208 43.94940 50.06074 49.29932 46.55974 48.72803
##    105    106    107    108    109    110    111    112
## 51.27141 50.64357 50.68203 48.97055 48.74056 49.20872 46.17495 49.48777
##    113    114    115    116    117    118    119    126
## 48.50068 51.46685 51.27872 50.86899 47.59307 48.07472 39.21653 75.74621
##    127    128    151    152    153    154    155    156
## 77.22561 80.08196 84.08246 83.77212 83.66102 80.51025 80.35370 84.13930
##    185    186    187    188    189    190    191    192
## 84.76797 84.49227 84.13757 81.71256 85.51608 84.62508 81.58597 81.76927
##    193    194    195    196    197    198    199    200
## 81.35519 82.77965 82.54052 82.29922 78.41414 81.49401 81.55658 81.20529
##    201    202    219    220    221    222    223    224
## 81.42302 81.36027 50.59230 50.47857 49.39396 49.73049 46.34809 47.82656
##    225    226    227    228    229    230    231    232
## 55.82257 54.59572 54.44882 54.60202 57.70150 54.61455 52.24061 48.45277
```

##	233	234	235	236	237	238	239	240
##	47.31401	45.31589	44.75435	41.33993	43.32327	48.77761	45.20338	45.86185
##	245	246	247	248	249	250	251	252
##	82.15176	80.71178	80.56090	79.59452	83.96030	81.81635	81.80418	54.32378
##	253	254	255	256	257	258	259	260
##	54.68463	51.09413	50.02347	48.27270	48.01505	50.39508	46.33182	45.71777
##	261	262	263	264	265	266	267	268
##	48.92876	43.06329	45.72869	52.42561	53.94989	53.34933	53.80754	55.14702
##	269	270	271	272	273	274	275	276
##	52.63772	80.34911	80.88253	80.17532	79.61632	79.98102	78.31293	77.71059
##	279	280	281	282	283	284	285	286
##	54.49281	52.64566	51.82045	51.93564	52.05215	48.39400	47.23440	46.70066
##	287	288	289	290	293	294	295	296
##	46.91363	46.18850	48.35322	44.76467	82.88642	80.29826	83.75149	80.51250
##	297	298	299	300	301	317	318	319
##	83.12164	83.01564	82.64003	84.29633	83.79133	52.47193	48.59756	54.58073
##	320	321	322	323	324	325	326	327
##	54.56115	52.77440	51.39152	51.00968	48.52265	56.19770	53.47295	44.08850
##	328	329	330	344	345	346	347	348
##	40.04214	45.08676	45.24493	81.64039	78.22387	78.00908	81.33200	81.20471
##	349	350	356	357	358	359	360	361
##	53.93007	55.73750	54.66031	57.57799	54.30784	55.09497	54.25392	53.77292
##	362	363	398	399	400	401	402	403
##	51.76675	53.27080	55.95653	55.04397	53.16039	51.72416	50.30585	48.11600
##	414	415	416	417	418	419	420	421
##	79.72989	83.06329	83.06156	83.36431	82.39174	82.54066	82.57871	81.50588
##	422	423	424	425	426	427	428	429
##	82.50005	78.54292	81.82108	55.48736	53.95236	48.84100	51.15196	46.18358
##	430	431	432	433	434	435	437	438
##	47.29160	46.66720	46.79441	42.94572	43.74044	44.96138	81.85405	81.76416
##	439	440	470	471	472	473	474	491
##	83.16448	83.25780	57.40842	54.46059	54.46121	57.43525	54.37121	51.05793
##	492	498	499	500	501	502	503	504
##	51.90389	55.22099	53.25294	49.72142	48.56056	51.15845	47.80419	43.62507
##	505	506	507	508	509			
##	42.48056	40.82864	49.47141	43.61479	40.25209			

residuals(g)

##	1	2	3	4	5	6
##	7.958164500	-4.621384921	-7.679920348	-8.413406568	-6.561664812	-6.929567795
##	7	8	9	10	11	12
##	-4.444908249	-6.891026156	-6.888616798	-4.053782836	-4.933308147	-4.708991952
##	13	14	15	16	17	18
##	-4.550688004	-6.939541450	-9.506810684	-7.752604175	-2.301160242	-4.328091627
##	19	20	21	22	23	24
##	-4.282161035	-4.403435046	-4.268323274	-3.980315777	-3.728394748	-4.218630032
##	25	26	27	28	29	30
##	-3.174529648	-4.283407753	-3.593526143	4.698952547	1.409890716	-0.160282004
##	31	32	33	34	35	36
##	-2.223901421	-0.887615174	4.777014612	5.647036551	2.252852505	0.662231360
##	37	38	39	40	41	42
##	2.766990891	-0.761201234	-2.246227394	4.653681543	3.628488523	0.329609096
##	43	44	45	46	47	48
##	0.084559064	-4.774860875	-5.757556357	-8.018288801	-8.164090869	-3.996092576
##	49	50	51	52	53	54
##	-0.621417340	-0.499046270	-1.847720895	8.220203777	5.555395570	4.754317034
##	55	56	57	58	59	60
##	6.103265720	10.925763183	2.429431409	3.305494440	2.975540384	2.909422453
##	61	62	63	80	81	82
##	2.755556359	2.661919950	2.623954901	0.441683145	-2.344275906	-2.037627645
##	83	84	85	86	87	88
##	-2.137966333	-2.173134214	-2.390104341	-2.423631832	-4.841020911	-4.318452739
##	89	90	91	92	93	94
##	-0.185341679	3.575018142	2.913911680	4.689991140	2.349735149	2.781523643
##	95	96	97	98	99	100
##	1.854207477	1.438937266	1.083331946	-1.892348378	1.257920611	1.750596798
##	101	102	103	104	105	106
##	-4.360736477	-3.699317224	-0.959744794	-2.728033498	1.828589743	1.956426024
##	107	108	109	110	111	112
##	1.517966624	2.829451709	2.859442481	1.991275442	3.425053810	-0.087770351
##	113	114	115	116	117	118
##	-0.000678958	-2.866845369	-2.778720011	-2.468993295	0.506926548	-0.074716901
##	119	126	127	128	151	152
##	8.383467783	9.253791256	5.774387666	0.918042765	-3.082458749	5.227884337
##	153	154	155	156	185	186
##	2.338979410	5.489750935	4.646295820	-3.139303922	-3.367966196	-3.292266261
##	187	188	189	190	191	192
##	-3.137569215	3.287437756	-1.516079052	1.374916186	1.114031931	0.730726441
##	193	194	195	196	197	198
##	0.944806139	-0.779647313	-0.540524173	-0.499218298	3.185863764	0.005992562
##	199	200	201	202	219	220
##	-0.256583724	-0.005294573	6.576977202	7.639726614	3.507699203	2.521433901
##	221	222	223	224	225	226
##	3.006039677	2.369510285	5.551913053	4.073437425	-2.122566323	-2.495722994
##	227	228	229	230	231	232
##	-2.348822713	-2.402016235	-5.401500997	-3.514554025	-2.840607036	-0.652765121
##	233	234	235	236	237	238
##	-1.114009515	-0.015893678	-0.254345837	3.460071551	2.176729710	-2.377614057
##	239	240	245	246	247	248
##	2.596619497	3.438154298	-0.151755076	0.988219845	0.839097028	1.505480139
##	249	250	251	252	253	254
##	4.039695454	4.183646694	1.195815181	-0.223783839	-1.784633402	0.405874980
##	255	256	257	258	259	260
##	-0.023466270	0.227302253	-0.915046425	-4.395076696	-1.231820163	-1.117766386

```
##          261          262          263          264          265          266
## -4.928759267 0.436709299 -2.628693970 1.874391049 -0.349890746 -0.549334210
##          267          268          269          270          271          272
## -1.807542781 -3.947018710 -2.837716070 1.350885367 0.517473039 0.924683591
##          273          274          275          276          279          280
## 1.383675876 7.018977916 4.687069591 4.289410115 0.307189895 1.654340553
##          281          282          283          284          285          286
## 2.179547298 1.864356160 1.147846487 3.705997533 3.965602963 7.299337631
##          287          288          289          290          293          294
## 4.086374542 3.611502300 1.146779948 4.235332226 -0.986421889 1.401741392
##          295          296          297          298          299          300
## -2.351485030 0.587498897 -2.021638001 4.984359993 3.359971849 -1.296327524
##          301          317          318          319          320          321
## -1.791325251 2.028069258 5.002442439 -1.380729646 -1.861147347 -0.474399643
##          322          323          324          325          326          327
## 0.608483797 0.590318008 1.277353697 -6.997697292 -4.972946366 4.011497278
##          328          329          330          344          345          346
## 7.65785169 2.313239858 1.855066094 -0.540389095 10.776127267 7.990920010
##          347          348          349          350          356          357
## 1.668000061 0.795288720 -0.530067494 -3.737497963 -6.560310895 -3.577992994
##          358          359          360          361          362          363
## -4.607838232 -6.194971976 -6.153924148 -6.672917623 -5.566754474 -7.970803114
##          398          399          400          401          402          403
## -1.456526988 -1.043972821 0.639608263 1.975840542 3.694153011 6.783996509
##          414          415          416          417          418          419
## 2.870113538 -0.663286070 -1.061558282 -1.264313778 -0.491741810 -0.940660263
##          420          421          422          423          424          425
## -1.278713173 7.494123845 5.499949095 2.457075178 -0.821082724 -1.887355767
##          426          427          428          429          430          431
## -1.352357390 2.559000097 -1.151958923 1.616424409 -1.291596407 -1.067202050
##          432          433          434          435          437          438
## -0.894405922 3.454278933 3.359563386 3.438616090 0.445946274 0.135844029
##          439          440          470          471          472          473
## -1.464475964 -1.557801613 -2.508417442 -1.260591451 -3.161211958 -6.435247456
##          474          491          492          498          499          500
## -5.571210304 1.542068273 -2.603887363 -0.320992415 -0.852944006 0.278583199
##          501          502          503          504          505          506
## -0.360556592 -4.558453733 -2.404189163 0.974926721 1.819444239 3.671359321
##          507          508          509
## -4.671413711 1.685214459 5.747914051
```

```
#we get the actual - estimated values
```

```
#Anova Table
anova(g)
```

```
## Analysis of Variance Table
##
## Response: Life.expectancy
##              Df Sum Sq Mean Sq  F value    Pr(>F)
## Adult.Mortality 1 29908.5 29908.5 1992.9582 < 2.2e-16 ***
## infant.deaths   1  5747.3  5747.3  382.9730 < 2.2e-16 ***
## Alcohol         1 18169.8 18169.8 1210.7480 < 2.2e-16 ***
## percentage.expenditure 1 1138.8 1138.8  75.8869 3.261e-16 ***
## Hepatitis.B     1  472.7  472.7  31.4974 5.011e-08 ***
## Measles         1  159.0  159.0  10.5977 0.0012790 **
## BMI             1  4012.2 4012.2 267.3545 < 2.2e-16 ***
## under.five.deaths 1  166.8  166.8  11.1139 0.0009786 ***
## Polio           1  341.6  341.6  22.7627 3.026e-06 ***
## Total.expenditure 1    4.8    4.8   0.3184 0.5730374
## Diphtheria      1  389.1  389.1  25.9299 6.710e-07 ***
## HIV.AIDS        1 3885.6 3885.6 258.9183 < 2.2e-16 ***
## GDP             1  158.6  158.6  10.5670 0.0012996 **
## Population      1    8.2    8.2   0.5455 0.4608286
## thinness..1.19.years 1 757.6 757.6 50.4808 1.103e-11 ***
## thinness.5.9.years 1 142.0 142.0  9.4610 0.0023177 **
## Income.composition.of.resources 1 3167.1 3167.1 211.0397 < 2.2e-16 ***
## Schooling       1   82.5   82.5   5.4965 0.0197900 *
## Residuals      266 3991.9  15.0
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
# sum of squares from diff variables is seen in anova
# We can also observe that the Total.expenditure and population are not significant.
# We can remove them one by one to check how the significance changes.
# This is done in the later steps below while comparing the models.
```

```
u=vcov(g)
head(u)
```

```
##              (Intercept) Adult.Mortality infant.deaths
## (Intercept) 2.0573389375 -5.447096e-04 3.017358e-02
## Adult.Mortality -0.0005447096 2.310036e-06 -1.944034e-05
## infant.deaths 0.0301735778 -1.944034e-05 6.227976e-03
## Alcohol 0.0376938855 1.262335e-05 1.550434e-03
## percentage.expenditure -0.0000026198 -3.978024e-09 -4.413099e-07
## Hepatitis.B -0.0048281917 3.120688e-07 -3.131143e-05
##              Alcohol percentage.expenditure Hepatitis.B
## (Intercept) 3.769389e-02 -2.619800e-06 -4.828192e-03
## Adult.Mortality 1.262335e-05 -3.978024e-09 3.120688e-07
## infant.deaths 1.550434e-03 -4.413099e-07 -3.131143e-05
## Alcohol 1.030695e-02 -2.129342e-06 -8.812770e-05
## percentage.expenditure -2.129342e-06 4.207524e-08 -7.252558e-08
## Hepatitis.B -8.812770e-05 -7.252558e-08 1.401750e-04
```



```
##
## (Intercept) Measles BMI under.five.deaths
## Adult.Mortality -1.975827e-07 1.420682e-03 -2.011208e-02
## infant.deaths 3.832000e-09 6.356172e-07 1.232765e-05
## Alcohol 3.706075e-07 2.253626e-04 -3.959481e-03
## percentage.expenditure -2.901374e-08 -5.128701e-05 -1.040633e-03
## Hepatitis.B -3.304684e-11 -1.963323e-07 2.761712e-07
## Polio Total.expenditure Diphtheria
## (Intercept) -3.935133e-03 -3.579131e-02 -6.057946e-04
## Adult.Mortality 1.489007e-06 1.206840e-05 -2.443596e-06
## infant.deaths 2.435565e-05 -5.690250e-05 -9.916741e-05
## Alcohol -1.746198e-04 6.921171e-04 -7.668151e-05
## percentage.expenditure 3.929255e-08 -1.783229e-06 9.220755e-08
## Hepatitis.B -1.142866e-05 -3.391369e-05 -6.522888e-05
## HIV.AIDS GDP Population
## (Intercept) 1.579233e-04 2.575086e-06 1.404661e-09
## Adult.Mortality -1.145347e-05 1.468177e-09 1.403458e-13
## infant.deaths -2.435049e-04 1.434009e-07 -9.958302e-11
## Alcohol 8.955913e-05 1.068512e-07 -7.708980e-11
## percentage.expenditure -3.944899e-08 -5.872791e-09 1.840433e-13
## Hepatitis.B 2.342872e-05 1.771942e-08 -4.437224e-12
## thinness..1.19.years thinness.5.9.years
## (Intercept) -3.796078e-02 -1.477681e-02
## Adult.Mortality -1.364003e-05 -2.703341e-05
## infant.deaths 8.562847e-04 -3.722237e-04
## Alcohol 9.854041e-05 -1.058195e-03
## percentage.expenditure -5.981797e-08 2.267857e-07
## Hepatitis.B 7.340878e-05 -5.934676e-05
## Income.composition.of.resources Schooling
## (Intercept) -1.864435e+00 1.406065e-02
## Adult.Mortality 7.492163e-04 -2.780684e-05
## infant.deaths -7.147600e-02 7.604053e-04
## Alcohol -7.843573e-02 -1.923968e-03
## percentage.expenditure 1.092345e-05 2.077375e-06
## Hepatitis.B 2.629962e-03 -1.002535e-04
```

```
v=head(cov2cor(vcov(g)))
head(v)
```

```
## (Intercept) Adult.Mortality infant.deaths Alcohol
## (Intercept) 1.000000000 -0.24986345 0.26656334 0.25885284
## Adult.Mortality -0.249863454 1.00000000 -0.16207683 0.08180885
## infant.deaths 0.266563339 -0.16207683 1.00000000 0.19351510
## Alcohol 0.258852845 0.08180885 0.19351510 1.00000000
## percentage.expenditure -0.008904345 -0.01275982 -0.02726195 -0.10225090
## Hepatitis.B -0.284312712 0.01734226 -0.03351153 -0.07331825
## percentage.expenditure Hepatitis.B Measles
## (Intercept) -0.008904345 -0.28431271 -0.008586515
## Adult.Mortality -0.012759823 0.01734226 0.157158156
## infant.deaths -0.027261947 -0.03351153 0.292726228
## Alcohol -0.102250896 -0.07331825 -0.017813923
## percentage.expenditure 1.000000000 -0.02986363 -0.010042401
## Hepatitis.B -0.029863630 1.00000000 0.030909764
## BMI under.five.deaths Polio
## (Intercept) 0.05441215 -0.27920643 -0.19484285
## Adult.Mortality 0.02297408 0.16150726 0.06957695
## infant.deaths 0.15687737 -0.99904742 0.02191817
## Alcohol -0.02775199 -0.20410511 -0.12215361
## percentage.expenditure -0.05258119 0.02680936 0.01360426
## Hepatitis.B 0.01908202 0.03681975 -0.06855481
## Total.expenditure Diphtheria HIV.AIDS GDP
## (Intercept) -0.258070855 -0.02784746 0.004425213 0.05549833
## Adult.Mortality 0.082121093 -0.10600666 -0.302878536 0.02986139
## infant.deaths -0.007457139 -0.08285307 -0.124015313 0.05617196
## Alcohol 0.070506456 -0.04980108 0.035455679 0.03253534
## percentage.expenditure -0.089910045 0.02963919 -0.007729716 -0.88505917
## Hepatitis.B -0.029624708 -0.36326011 0.079534267 0.04626530
## Population thinness..1.19.years thinness.5.9.years
## (Intercept) 0.084167834 -0.177967730 -0.071262474
## Adult.Mortality 0.007936291 -0.060348283 -0.123033852
## infant.deaths -0.108452426 0.072963183 -0.032625994
## Alcohol -0.065261845 0.006526921 -0.072099794
## percentage.expenditure 0.077114150 -0.001960999 0.007647783
## Hepatitis.B -0.032210951 0.041693828 -0.034673282
## Income.composition.of.resources Schooling
## (Intercept) -0.37425027 0.05685703
## Adult.Mortality 0.14192718 -0.10611433
## infant.deaths -0.26076812 0.05588607
## Alcohol -0.22244193 -0.10991692
## percentage.expenditure 0.01533255 0.05873993
## Hepatitis.B 0.06395609 -0.04911295
```

```
temp <- influence.measures(g) # the one with the stars
temp
```

```
## Influence measures of
## lm(formula = life expectancy ~ Adult.Mortality + infant.deaths + Alcohol + percentage.expenditure + Hepatitis.B + Measles + BMI + i
##
## dfb.1_ dfb.Ad.M dfb.inf. dfb.Alch dfb.prc. dfb.Hp.B dfb.Msls
## 1 3.00e-01 4.66e-02 5.36e-01 3.03e-02 -3.57e-02 1.11e-01 2.48e-01
## 2 -8.54e-02 2.37e-02 -1.13e-01 -5.98e-02 2.98e-02 -4.95e-04 1.66e-02
## 3 -7.67e-02 -3.04e-02 -2.08e-01 -1.78e-01 2.10e-03 3.86e-02 -7.19e-02
## 4 -2.96e-02 -2.55e-02 -1.77e-01 -1.69e-01 2.66e-03 -5.72e-03 -3.55e-02
## 5 -4.14e-02 -2.92e-02 -1.06e-01 -1.40e-01 2.85e-02 5.68e-03 3.58e-03
```

```
## 6 9.18e-04 -3.25e-02 -5.16e-02 -1.29e-01 1.52e-02 -2.87e-03 7.43e-03
## 7 -2.48e-02 -6.04e-02 -5.66e-02 -9.02e-02 2.35e-02 -7.69e-02 -2.36e-02
## 8 1.58e-03 -4.18e-02 -2.52e-02 -1.15e-01 3.37e-02 5.93e-04 2.37e-02
## 9 2.55e-02 -4.18e-02 -1.40e-02 -7.31e-02 2.17e-02 -1.01e-02 1.89e-02
## 10 -8.96e-03 -3.48e-02 -1.30e-02 -6.35e-02 1.06e-02 -6.56e-02 1.75e-03
## 11 -9.27e-02 -7.68e-02 6.76e-02 -4.07e-02 9.73e-03 -6.03e-02 1.52e-02
## 12 -1.29e-01 -1.32e-01 5.97e-02 -4.92e-02 1.09e-02 -1.50e-01 -3.20e-03
## 13 -1.15e-01 -1.32e-01 7.14e-02 -4.97e-02 2.00e-02 -1.50e-01 -8.12e-03
## 14 -1.20e-01 -1.94e-01 1.25e-01 8.92e-03 7.24e-03 -1.10e-01 -8.12e-02
## 15 -2.08e-01 7.72e-02 1.34e-01 4.63e-02 1.22e-02 -1.51e-01 -3.79e-02
## 16 -2.43e-01 9.40e-02 1.53e-01 3.88e-02 1.12e-02 -1.89e-01 4.04e-02
## 17 -1.60e-03 1.68e-05 -1.56e-02 -1.24e-02 3.05e-01 -2.42e-02 2.20e-02
## 18 5.35e-03 3.25e-02 -1.93e-02 5.87e-02 -1.40e-01 -1.83e-02 4.07e-02
## 19 -4.77e-04 4.95e-03 -9.52e-03 5.87e-02 -1.56e-01 -1.87e-02 4.03e-02
## 20 -1.10e-03 4.23e-03 -1.04e-02 5.37e-02 -1.59e-01 -1.71e-02 3.92e-02
## 21 5.94e-03 3.30e-03 -1.76e-02 3.32e-02 -1.47e-01 -2.15e-02 3.10e-02
## 22 9.69e-03 2.20e-03 -1.42e-02 1.32e-02 -9.51e-02 -1.93e-02 2.35e-02
## 23 1.60e-02 -1.37e-04 -1.07e-02 4.19e-04 -6.35e-02 -2.34e-02 1.52e-02
## 24 7.67e-03 9.37e-04 -1.51e-02 3.07e-03 -9.83e-02 -2.72e-02 2.12e-02
## 25 2.25e-02 4.75e-03 8.67e-03 -1.65e-02 -1.01e-02 -1.69e-02 1.47e-02
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## 28 -4.96e-02 -3.19e-02 -4.89e-02 7.25e-03 3.76e-02 1.99e-02 -3.95e-02
## 29 -1.05e-02 -8.41e-03 -1.25e-02 -1.25e-03 2.08e-02 6.26e-03 -1.27e-02
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## 114 -1.14e-01 4.18e-02 5.06e-02 2.88e-02 -4.66e-03 3.30e-02 3.10e-02
## 115 -1.04e-01 3.36e-02 4.42e-02 2.59e-02 -1.31e-03 2.65e-02 -2.26e-03
## 116 -9.53e-02 3.08e-02 2.36e-02 1.94e-02 5.96e-04 2.64e-02 -1.82e-02
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## 270 -1.17e-02 4.28e-04 5.71e-05 -3.87e-03 -6.71e-02 1.26e-02 8.29e-03
## 271 5.02e-03 -8.74e-04 2.25e-04 3.03e-03 2.77e-04 -3.56e-02 2.52e-03
## 272 -8.39e-03 -4.28e-04 -7.16e-04 2.20e-03 -1.75e-03 4.06e-03 5.52e-03
## 273 -1.40e-02 -1.37e-03 -2.38e-03 -4.62e-03 -1.90e-03 5.49e-03 8.31e-03
## 274 -3.89e-02 -1.03e-02 -5.94e-03 -8.40e-02 3.78e-02 -1.95e-02 2.28e-02
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## 282 4.83e-02 -7.48e-02 6.49e-02 -2.39e-02 5.74e-03 1.50e-04 -6.71e-03
## 283 3.32e-02 -4.10e-02 4.18e-02 -1.29e-02 3.59e-03 7.50e-04 -4.45e-03
## 284 6.07e-02 1.73e-02 9.60e-02 -3.73e-02 8.48e-03 7.47e-03 1.11e-02
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## 286 1.22e-01 3.67e-02 2.43e-01 -1.39e-02 -4.97e-03 9.26e-03 1.11e-01
## 287 7.89e-02 3.17e-02 1.71e-01 -2.57e-03 -1.17e-03 1.90e-03 1.54e-01
## 288 6.81e-02 1.98e-02 1.32e-01 1.26e-02 -3.40e-03 8.44e-03 5.36e-02
## 289 5.08e-02 -4.02e-02 5.25e-02 4.74e-03 1.03e-03 -4.59e-02 8.40e-03
## 290 1.44e-01 -1.21e-01 2.37e-01 2.42e-03 -1.49e-02 1.15e-01 7.37e-02
## 293 2.61e-03 2.56e-03 -3.58e-04 1.03e-02 8.99e-02 -1.11e-02 2.56e-03
## 294 -1.72e-02 -1.52e-02 -1.45e-02 -1.16e-01 -1.19e-01 2.32e-02 -5.22e-03
## 295 2.15e-04 1.19e-02 -1.35e-02 3.88e-03 2.08e-01 6.96e-02 -3.33e-03
```

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## 296 6.00e-03 -1.00e-03 -5.03e-03 4.31e-03 -5.44e-02 -5.01e-02 -7.10e-04
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## 300 -6.32e-03 -9.87e-04 -1.48e-04 8.40e-03 -5.77e-02 4.33e-02 2.41e-04
## 301 -8.51e-03 -5.43e-04 3.51e-04 9.46e-03 -6.89e-02 5.93e-02 -1.69e-04
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## 322 -8.31e-03 1.42e-03 6.01e-03 -2.18e-03 3.12e-03 -4.98e-03 -2.52e-02
## 323 -2.38e-02 1.93e-03 -8.95e-04 -5.08e-04 -1.26e-03 2.74e-03 -3.10e-02
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## 329 -8.27e-03 -9.95e-03 -6.51e-02 -1.73e-03 8.46e-03 1.14e-02 2.02e-01
## 330 -4.67e-02 1.37e-02 -3.38e-02 1.06e-03 -1.43e-02 2.78e-02 3.56e-01
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## 346 -6.18e-02 -6.13e-03 -7.18e-02 8.15e-02 -1.91e-02 4.74e-02 5.67e-03
## 347 -4.10e-03 2.14e-03 5.17e-03 3.99e-02 -5.39e-03 8.26e-03 -1.10e-03
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## 349 -1.76e-03 -4.18e-03 -1.14e-03 -1.08e-02 6.52e-04 -2.11e-03 1.73e-03
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## 400 -1.37e-02 -5.96e-04 5.27e-03 1.05e-02 -2.01e-03 2.75e-03 -2.46e-03
## 401 -5.08e-02 -8.30e-03 1.99e-02 9.88e-03 -4.48e-03 9.36e-03 -4.29e-03
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## 403 -8.64e-02 -5.97e-02 1.57e-01 1.16e-01 -1.60e-02 2.28e-01 2.01e-02
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## 419 -7.94e-05 -5.75e-04 -1.25e-03 -2.09e-03 -8.19e-03 -5.25e-03 -2.04e-04
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## 422 2.83e-02 8.28e-03 2.16e-02 8.97e-02 3.97e-02 2.60e-02 2.07e-03
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## 432 -2.20e-02 5.74e-02 -3.71e-03 -1.15e-02 -1.33e-03 5.28e-02 6.59e-03
## 433 -4.47e-02 1.54e-02 -3.10e-02 3.38e-02 -5.56e-03 4.72e-02 1.62e-02
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## 439 1.01e-02 -4.37e-04 7.27e-03 3.10e-02 -6.56e-02 4.20e-02 -5.54e-03
## 440 5.58e-03 1.40e-04 6.89e-03 3.36e-02 -7.59e-02 6.02e-02 -4.05e-03
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## 471 -1.15e-02 -1.91e-02 -1.60e-02 -5.59e-02 6.10e-03 8.23e-03 1.34e-02
## 472 -3.14e-02 -5.91e-02 -2.01e-02 -1.27e-01 7.55e-03 2.51e-02 4.70e-02
## 473 -1.68e-01 1.51e-01 -1.52e-01 -2.56e-01 2.00e-02 1.33e-01 -5.70e-02
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## 492 4.25e-02 -4.74e-02 3.12e-02 3.90e-02 -6.33e-03 -1.41e-02 8.59e-03
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## 499 -1.35e-02 -1.36e-02 -1.03e-02 -1.02e-02 -9.86e-04 5.14e-02 -6.20e-03
## 500 3.99e-04 5.15e-03 2.38e-03 2.57e-03 -2.59e-04 3.60e-04 1.28e-04
## 501 8.36e-04 -7.55e-03 -3.31e-04 2.10e-04 -4.07e-04 -1.04e-03 3.77e-04
## 502 -5.61e-02 1.81e-01 -3.06e-02 1.32e-02 -5.67e-03 -5.54e-03 5.52e-02
## 503 -4.37e-02 1.03e-01 -2.87e-02 -1.31e-02 2.10e-03 -5.85e-02 2.28e-02
## 504 -5.10e-03 2.35e-02 6.29e-04 8.18e-03 -1.80e-03 -7.96e-04 1.21e-03
## 505 -1.31e-02 4.30e-02 -5.42e-03 1.75e-02 -3.62e-03 5.29e-03 1.15e-03
## 506 6.57e-02 6.03e-02 -2.33e-02 6.51e-02 -1.27e-03 -1.72e-01 -1.52e-02
## 507 -1.27e-01 1.60e-01 4.29e-03 -3.15e-02 2.05e-03 -1.75e-02 4.90e-02
## 508 8.80e-03 4.79e-02 -2.33e-02 -1.39e-02 1.02e-03 1.22e-02 2.42e-03
## 509 -1.35e-01 4.98e-02 -8.92e-02 -9.33e-02 4.78e-03 5.34e-02 -1.04e-02
## dfb.BMI dfb.un. . dfb.Po11 dfb.Tt1. dfb.Dpht dfb.HIV. dfb.GDP
## 1 2.80e-02 -5.34e-01 -1.00e-01 2.26e-01 -2.12e-01 -1.29e-01 4.48e-02
## 2 1.66e-02 1.14e-01 2.68e-01 5.44e-02 -1.06e-01 7.17e-02 -1.82e-02
## 3 2.06e-02 2.12e-01 -1.47e-02 1.25e-01 5.58e-02 1.80e-01 2.89e-02
## 4 3.61e-02 1.79e-01 5.47e-02 9.82e-02 -2.58e-02 1.83e-01 3.05e-02
## 5 1.24e-02 1.09e-01 -2.64e-02 9.52e-02 3.40e-03 1.28e-01 -1.76e-02
## 6 1.72e-01 5.46e-02 -5.59e-02 8.85e-02 -1.56e-02 1.32e-01 1.16e-03
## 7 7.62e-03 6.00e-02 -1.33e-01 -3.21e-03 2.74e-01 8.74e-02 -1.44e-02
## 8 1.09e-02 2.51e-02 3.01e-03 5.37e-02 -2.82e-02 1.16e-01 -2.54e-02
## 9 2.81e-03 1.31e-02 -5.67e-02 7.93e-02 -2.46e-02 1.25e-01 -1.70e-02
## 10 5.30e-03 1.35e-02 3.83e-02 -9.35e-03 7.34e-02 5.73e-02 -2.89e-03
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## 11 4.35e-02 -6.65e-02 4.65e-02 1.48e-02 6.53e-02 6.41e-02 -2.35e-03
## 12 3.59e-02 -5.88e-02 1.30e-01 -3.64e-02 1.58e-01 -2.01e-02 1.01e-03
## 13 2.80e-02 -7.19e-02 1.22e-01 -3.45e-02 1.51e-01 -2.19e-02 -1.04e-02
## 14 4.51e-02 -1.25e-01 7.31e-02 1.63e-02 4.97e-02 -2.05e-03 1.59e-03
## 15 7.34e-02 -1.36e-01 7.24e-02 -6.62e-02 8.07e-02 -1.03e-01 8.64e-03
## 16 4.82e-02 -1.55e-01 3.06e-01 5.78e-02 -1.19e-02 -1.31e-01 -2.70e-03
## 17 -4.89e-02 1.58e-02 1.42e-02 -1.52e-02 3.09e-02 8.78e-03 -3.06e-01
## 18 -4.95e-02 1.81e-02 1.43e-02 1.81e-02 3.16e-02 1.09e-02 5.36e-02
## 19 -4.26e-02 9.93e-03 1.57e-02 2.32e-02 3.31e-02 1.48e-02 5.64e-02
## 20 -4.26e-02 1.08e-02 1.39e-02 2.20e-02 3.06e-02 1.46e-02 5.70e-02
## 21 -4.50e-02 1.65e-02 1.24e-02 1.61e-02 3.24e-02 1.46e-02 6.03e-02
## 22 -3.84e-02 1.34e-02 1.24e-02 4.12e-03 2.96e-02 1.43e-02 4.10e-02
## 23 -3.28e-02 9.98e-03 1.22e-02 -1.21e-02 2.94e-02 1.33e-02 3.27e-02
## 24 -3.87e-02 1.44e-02 1.29e-02 1.14e-02 3.12e-02 1.32e-02 4.53e-02
## 25 -1.86e-02 -8.76e-03 1.21e-02 -4.97e-03 2.25e-02 1.92e-02 4.58e-02
## 26 -2.65e-02 -1.85e-03 1.74e-02 2.55e-02 3.58e-02 2.53e-02 5.43e-02
## 27 -1.40e-02 -7.46e-03 1.74e-02 7.45e-03 3.10e-02 3.11e-02 5.56e-02
## 28 -3.28e-01 4.78e-02 -4.12e-02 1.91e-02 -3.59e-02 -3.79e-02 -1.08e-01
## 29 -9.56e-02 1.23e-02 -1.22e-02 -1.62e-04 -8.56e-03 -8.92e-03 -2.60e-02
## 30 -2.25e-03 7.80e-04 4.02e-04 -1.23e-03 9.96e-04 1.03e-05 -1.50e-02
## 31 -1.16e-02 3.45e-03 4.53e-06 -4.54e-02 7.74e-03 9.90e-04 3.89e-03
## 32 -1.51e-03 -1.63e-03 1.54e-03 -2.36e-02 3.69e-03 3.77e-03 1.03e-02
## 33 1.98e-02 -1.47e-02 -1.36e-02 1.02e-01 -2.05e-02 7.70e-03 -1.21e-02
## 34 5.62e-02 -1.69e-02 -4.12e-03 -2.29e-01 -3.89e-04 6.65e-04 -2.02e-02
## 35 1.03e-02 -7.11e-03 -1.02e-02 5.38e-02 -1.51e-02 -3.75e-04 9.57e-04
## 36 2.24e-03 -1.06e-03 -3.32e-03 1.54e-02 -4.48e-03 -3.71e-05 -3.87e-03
## 37 2.68e-02 -1.12e-02 -7.51e-03 -1.13e-01 -2.84e-03 2.75e-03 -8.87e-03
## 38 -6.72e-02 4.24e-03 2.27e-03 3.22e-02 -1.33e-04 -1.96e-03 2.39e-03
## 39 -3.42e-02 -1.03e-02 -6.06e-03 9.25e-02 -5.35e-03 8.41e-03 1.17e-02
## 40 8.82e-02 -3.97e-03 1.30e-02 -2.08e-01 9.40e-03 8.14e-04 1.25e-02
## 41 5.23e-02 1.42e-02 9.01e-03 -1.48e-01 9.76e-03 -1.19e-02 -4.73e-02
## 42 4.75e-03 2.10e-03 1.32e-03 -1.37e-02 1.12e-03 -1.20e-03 -4.36e-03
## 43 1.26e-03 3.49e-04 2.80e-04 -3.57e-03 3.14e-04 -1.11e-04 -1.07e-03
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## 48 -4.99e-03 -4.90e-02 -2.70e-02 5.97e-03 -9.98e-03 -6.11e-02 5.93e-03
## 49 2.07e-02 -1.20e-02 -3.53e-03 2.39e-03 -3.18e-03 -1.34e-02 1.41e-03
## 50 -8.26e-04 -6.19e-03 -3.73e-03 6.96e-03 -2.59e-03 -1.16e-02 -8.49e-04
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## 55 1.16e-01 1.63e-01 3.46e-02 -2.80e-02 5.33e-02 -6.70e-02 4.91e-02
## 56 1.51e-01 2.95e-01 -4.20e-02 1.25e-02 -6.24e-02 -2.04e-01 9.17e-02
## 57 1.14e-02 -3.44e-02 2.91e-02 -8.77e-02 3.76e-02 -5.48e-02 -8.62e-04
## 58 1.37e-03 -4.79e-02 3.01e-02 1.21e-01 2.40e-02 -7.01e-02 1.28e-02
## 59 1.71e-03 -3.72e-02 1.67e-02 8.13e-02 2.23e-02 -5.65e-02 1.10e-02
## 60 5.89e-03 -2.84e-02 8.23e-03 3.05e-02 2.74e-02 -4.91e-02 9.95e-03
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## 63 9.52e-03 -2.35e-02 1.13e-03 -5.20e-03 2.38e-02 -3.87e-02 1.07e-02
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## 84 -6.42e-03 2.02e-02 -9.00e-02 6.13e-03 1.50e-01 -5.09e-03 -8.08e-04
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## 87 8.50e-03 -1.43e-03 4.22e-03 3.18e-02 -2.20e-02 -1.30e-02 1.11e-02
## 88 8.69e-03 2.12e-02 9.99e-03 1.51e-02 -1.70e-02 -1.85e-02 9.00e-03
## 89 4.24e-03 -1.14e-03 7.07e-04 4.57e-05 -4.98e-04 1.07e-03 6.27e-04
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## 91 2.21e-02 -3.77e-02 -2.99e-02 -1.87e-02 -3.26e-02 -5.67e-02 -1.74e-03
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## 106 -1.64e-03 3.08e-02 3.96e-03 -1.92e-02 -1.15e-02 -3.31e-02 -6.97e-03
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## 108 1.38e-03 3.91e-02 7.82e-02 -2.83e-02 -9.86e-02 -5.79e-02 -5.24e-03
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## 110 4.82e-05 4.07e-02 2.42e-04 -2.62e-02 -5.49e-03 -2.94e-02 -1.70e-03
## 111 -3.20e-03 6.71e-02 -9.41e-02 -2.97e-02 7.14e-03 -3.90e-02 -1.74e-03
## 112 1.18e-04 -1.90e-03 6.62e-05 7.17e-04 8.11e-04 2.02e-04 9.02e-05
## 113 5.76e-07 -1.72e-05 -1.56e-05 4.05e-06 2.75e-05 2.71e-06 -1.60e-07
## 114 9.55e-03 -5.04e-02 8.37e-03 1.94e-02 2.31e-02 -2.66e-02 5.69e-03
## 115 1.43e-02 -4.34e-02 1.90e-02 -1.86e-02 3.15e-02 -2.58e-02 3.84e-03
## 116 8.70e-03 -2.27e-02 5.99e-03 -1.26e-02 2.95e-02 -1.79e-02 1.08e-03
## 117 -1.31e-03 6.15e-03 -3.22e-03 1.28e-02 -4.12e-03 -2.34e-03 2.03e-04
## 118 2.09e-04 -5.55e-04 8.04e-04 -1.28e-03 3.39e-04 2.69e-04 7.29e-06
## 119 1.30e-01 -5.45e-05 -3.49e-01 7.90e-03 1.75e-01 -1.01e-01 4.62e-02
## 126 -5.25e-01 1.95e-01 4.02e-02 6.08e-02 4.24e-02 -5.08e-03 -1.19e-01
## 127 8.97e-02 9.87e-02 7.65e-02 -1.43e-02 3.44e-02 -2.45e-02 -5.57e-02
## 128 1.13e-02 3.39e-03 4.54e-03 2.92e-03 2.47e-03 -1.34e-03 -6.38e-03
## 151 -3.30e-02 -6.21e-03 1.06e-02 -1.61e-03 4.31e-03 3.68e-04 -2.52e-01
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## 155 -2.88e-01 5.64e-02 -1.55e-02 -1.54e-01 2.49e-02 -7.91e-03 -1.06e-01
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## 193 1.08e-02 1.72e-03 2.30e-03 7.74e-03 -2.27e-03 -4.76e-03 -1.01e-02
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## 195 -5.10e-03 -6.16e-04 -1.32e-03 -1.68e-03 2.95e-04 1.88e-04 -5.89e-04
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## 225 -6.82e-03 -1.31e-02 1.57e-01 -1.56e-02 -9.14e-02 4.44e-03 5.44e-03
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## 229 1.74e-01 -2.39e-03 -3.06e-02 -1.60e-01 -3.45e-02 -1.25e-03 2.94e-02
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## 262 -3.32e-03 8.07e-03 2.19e-02 -1.26e-05 -3.65e-02 3.48e-03 -4.63e-06
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## 295 -2.97e-02 1.27e-02 -4.72e-03 -6.65e-02 -1.53e-02 8.08e-03 -2.11e-01
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## 300 -5.15e-03 2.21e-04 -5.96e-03 -6.39e-03 -1.67e-02 4.76e-03 3.35e-02
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## 330 2.73e-02 3.53e-02 4.87e-03 1.21e-02 -1.24e-02 -4.12e-04 1.81e-02
## 344 -6.81e-03 8.79e-04 -3.24e-04 6.94e-04 1.30e-03 3.09e-03 3.91e-03
## 345 -6.46e-01 1.16e-01 -2.88e-02 1.82e-01 -1.38e-02 -4.71e-02 -1.76e-01
## 346 -4.54e-01 7.10e-02 -1.68e-02 1.31e-01 -7.94e-03 -1.71e-02 -1.91e-02
## 347 1.61e-02 -5.29e-03 -1.14e-03 2.21e-02 -6.06e-03 -9.54e-03 -1.49e-02
## 348 1.29e-02 -4.39e-03 1.35e-03 -3.35e-02 7.60e-04 -3.10e-03 2.90e-04
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## 363 1.30e-01 1.18e-01 4.17e-03 2.70e-01 -5.47e-02 1.10e-01 3.44e-02
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## dfb.PpIt dfb.t..1 dfb.t.5. dfb.I... dfb.Schl dffit cov.r cook.d
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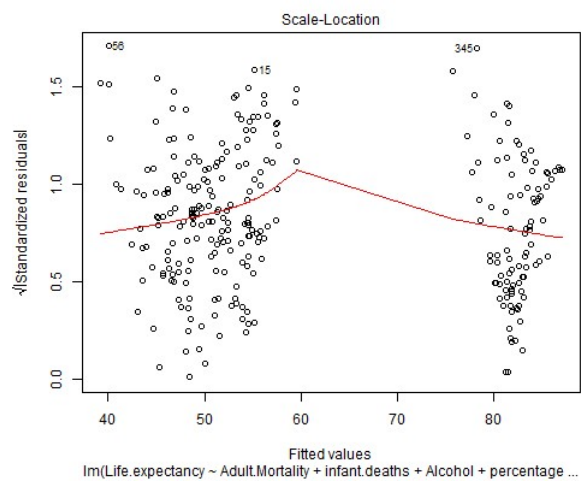
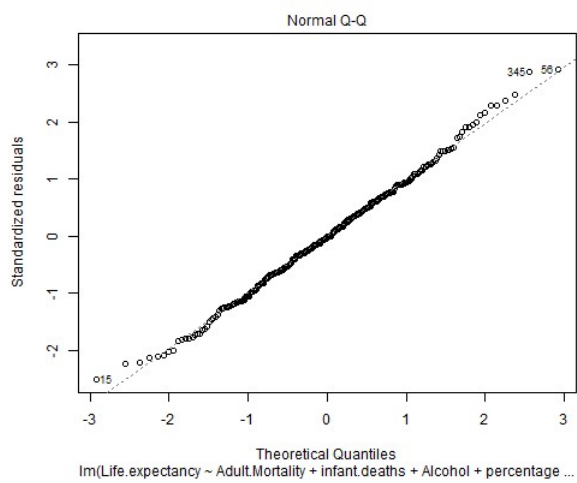
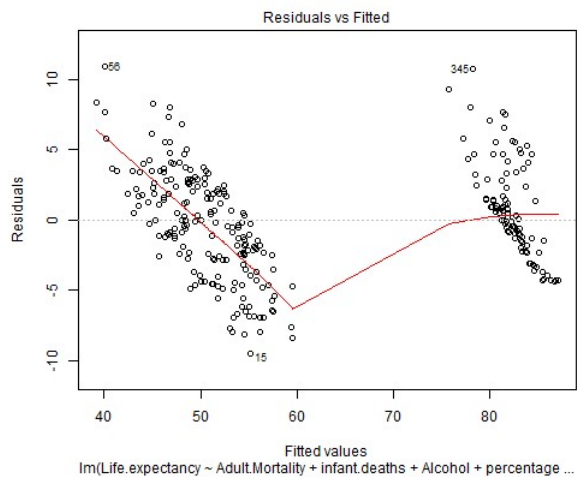
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## 417 -3.41e-02 -5.19e-04 4.21e-03 7.01e-03 -4.44e-03 -5.45e-02 1.095 1.57e-04
## 418 -1.34e-02 -7.09e-05 2.06e-03 -1.45e-04 -9.63e-05 -2.39e-02 1.110 3.02e-05
## 419 -2.45e-02 -7.54e-04 3.63e-03 4.74e-03 4.88e-04 -4.01e-02 1.098 8.49e-05
## 420 8.84e-03 -2.00e-03 3.20e-03 5.95e-03 2.79e-03 -4.50e-02 1.085 1.07e-04
## 421 -5.19e-02 5.11e-03 -3.40e-02 -7.25e-03 -1.95e-02 3.10e-01 0.835 5.00e-03
## 422 1.35e-01 2.92e-03 -2.74e-02 -4.13e-02 -1.55e-02 2.41e-01 0.952 3.04e-03
## 423 7.88e-02 -1.07e-02 -1.22e-02 3.19e-02 9.84e-03 1.98e-01 1.135 2.07e-03
## 424 -1.89e-02 -2.83e-04 4.40e-03 5.28e-03 3.81e-03 -3.56e-02 1.100 6.68e-05
## 425 5.09e-03 2.46e-03 5.94e-03 -5.80e-03 6.78e-03 -6.00e-02 1.072 1.90e-04
## 426 4.88e-03 -4.01e-03 1.64e-03 2.53e-04 4.10e-03 -7.81e-02 1.115 3.22e-04
## 427 -5.83e-04 -7.71e-03 -1.21e-02 1.10e-02 -1.92e-02 1.97e-01 1.124 2.04e-03
## 428 3.39e-03 -3.97e-03 1.51e-03 -9.91e-04 6.39e-03 -7.91e-02 1.138 3.30e-04
## 429 -5.36e-03 1.63e-03 -1.31e-02 2.07e-02 -2.78e-02 9.21e-02 1.110 4.48e-04
## 430 4.97e-03 -6.64e-03 2.87e-03 -1.09e-02 1.84e-02 -1.09e-01 1.169 6.25e-04
## 431 4.66e-03 -6.34e-03 2.46e-03 -9.97e-03 1.85e-02 -9.33e-02 1.179 4.60e-04
## 432 1.59e-03 -4.26e-03 -1.71e-03 -7.62e-03 1.54e-02 -1.01e-01 1.247 5.42e-04
## 433 -1.17e-02 1.49e-02 -2.48e-02 7.57e-02 -8.65e-02 2.33e-01 1.076 2.86e-03
## 434 -1.31e-02 1.79e-02 -2.18e-02 6.64e-02 -8.31e-02 2.25e-01 1.079 2.67e-03
## 435 -1.55e-02 2.24e-02 -1.69e-02 6.80e-02 -8.55e-02 2.22e-01 1.072 2.58e-03
## 437 -3.82e-03 1.44e-03 -3.65e-04 1.09e-02 -7.10e-03 2.42e-02 1.119 3.10e-05
## 438 -1.25e-03 2.88e-04 -1.42e-07 3.28e-03 -2.12e-03 7.35e-03 1.120 2.86e-06
## 439 -6.78e-04 -3.11e-03 -2.40e-03 -2.37e-02 2.07e-02 -1.13e-01 1.150 6.68e-04
## 440 -1.67e-03 -2.53e-03 -3.33e-03 -2.04e-02 1.66e-02 -1.31e-01 1.163 9.01e-04
## 470 3.26e-02 -6.13e-03 -7.81e-04 6.22e-02 -3.62e-02 -1.63e-01 1.103 1.40e-03
## 471 1.60e-02 4.67e-04 6.05e-03 3.06e-02 -2.09e-02 -7.98e-02 1.126 3.36e-04
## 472 -2.51e-02 4.50e-03 1.62e-02 9.61e-02 -8.39e-02 -2.04e-01 1.082 2.20e-03
## 473 8.74e-02 -2.58e-03 -4.44e-03 1.93e-01 -1.59e-01 -4.38e-01 0.926 1.00e-02
## 474 7.61e-02 2.34e-02 3.29e-02 7.38e-02 -5.09e-02 -4.62e-01 0.999 1.12e-02
## 491 1.09e-02 8.99e-04 -1.83e-04 -9.43e-03 3.96e-02 1.30e-01 1.164 8.91e-04
## 492 6.32e-03 -4.73e-03 6.76e-03 -4.55e-03 -2.06e-02 -9.68e-02 1.061 4.95e-04
## 498 -1.55e-03 -1.26e-03 1.22e-03 4.06e-03 -6.74e-04 -1.12e-02 1.093 6.65e-06
## 499 2.42e-03 -7.58e-04 1.88e-03 1.25e-02 -4.50e-03 -6.04e-02 1.146 1.93e-04
## 500 -1.26e-03 9.52e-04 -1.39e-03 -3.62e-03 2.19e-03 9.48e-03 1.092 4.75e-06
## 501 -2.22e-03 -9.26e-04 1.43e-03 3.04e-03 -2.32e-03 -1.28e-02 1.094 8.67e-06
## 502 1.54e-02 -2.95e-02 -1.54e-02 7.15e-02 -5.61e-02 -2.30e-01 1.005 2.78e-03
## 503 -8.17e-03 -2.08e-02 -6.66e-03 4.27e-02 -4.38e-02 -2.16e-01 1.156 2.45e-03
## 504 -4.86e-03 3.99e-03 -5.55e-03 -2.65e-03 -1.49e-04 4.09e-02 1.097 8.86e-05
## 505 8.69e-03 8.69e-03 -1.16e-02 2.88e-04 -4.97e-03 8.31e-02 1.089 3.64e-04
## 506 3.20e-02 7.99e-03 -1.81e-02 -4.26e-03 2.02e-02 3.51e-01 1.122 6.50e-03
## 507 1.03e-02 4.82e-02 5.39e-02 7.91e-02 -3.98e-02 -3.53e-01 1.036 6.55e-03
## 508 1.59e-02 -2.25e-02 -3.11e-02 -2.85e-03 1.37e-03 1.25e-01 1.140 8.28e-04
## 509 3.58e-02 3.80e-02 -7.13e-03 6.68e-02 -1.70e-02 3.20e-01 0.951 5.36e-03
## hat inf
## 1 0.1042
## 2 0.0718
## 3 0.0367
## 4 0.0296 *
## 5 0.0279
## 6 0.0364
## 7 0.0713
## 8 0.0254
## 9 0.0272
## 10 0.0353
## 11 0.1268
## 12 0.0816
## 13 0.0844
## 14 0.0508
## 15 0.0427 *
## 16 0.0723
## 17 0.2081 *
## 18 0.0630
## 19 0.0705
## 20 0.0677
```

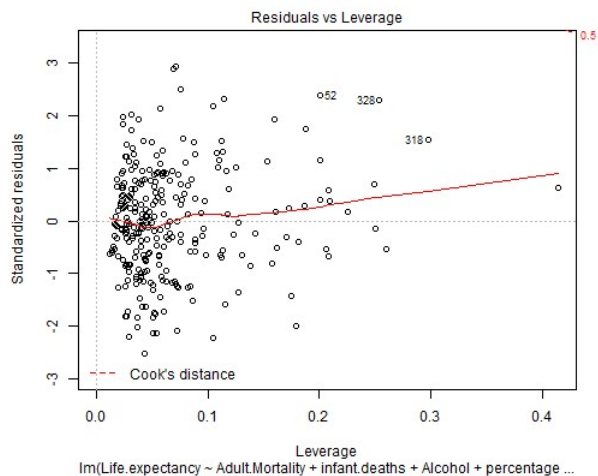
```
## 21 0.0591
## 22 0.0399
## 23 0.0290
## 24 0.0360
## 25 0.0303
## 26 0.0394
## 27 0.0449
## 28 0.1083
## 29 0.0975
## 30 0.1274 *
## 31 0.0352
## 32 0.0376
## 33 0.0335
## 34 0.0500
## 35 0.0344
## 36 0.0348
## 37 0.0528
## 38 0.0517
## 39 0.0476
## 40 0.0540
## 41 0.0478
## 42 0.0453
## 43 0.0472
## 44 0.0259
## 45 0.1149
## 46 0.0502
## 47 0.1046
## 48 0.0394
## 49 0.0571
## 50 0.0469
## 51 0.1617 *
## 52 0.2008 *
## 53 0.1127
## 54 0.1134
## 55 0.1878 *
## 56 0.0713 *
## 57 0.0514
## 58 0.0514
## 59 0.0434
## 60 0.0343
## 61 0.0375
## 62 0.0397
## 63 0.0398
## 80 0.0823
## 81 0.0144
## 82 0.0161
## 83 0.0139
## 84 0.0845
## 85 0.0120
## 86 0.0115
## 87 0.0192
## 88 0.0284
## 89 0.0266
## 90 0.0234
## 91 0.0406
## 92 0.0257
## 93 0.0241
## 94 0.0254
## 95 0.0239
## 96 0.0226
## 97 0.0216
## 98 0.0401
## 99 0.0220
## 100 0.0226
## 101 0.0418
## 102 0.0431
## 103 0.0752
## 104 0.0436
## 105 0.0238
## 106 0.0312
## 107 0.0286
## 108 0.0659
## 109 0.0484
## 110 0.0318
## 111 0.0536
## 112 0.0492
## 113 0.0727
## 114 0.0441
## 115 0.0448
## 116 0.0420
## 117 0.0606
## 118 0.0656
## 119 0.1149 *
## 126 0.0759 *
## 127 0.0781
## 128 0.0299
## 151 0.1382
## 152 0.0321
## 153 0.0314
## 154 0.0879
## 155 0.0883
## 156 0.0297
## 185 0.0285
## 186 0.0265
## 187 0.0266
## 188 0.0734
## 189 0.0294
```

190 0.0531
191 0.0264
192 0.0195
193 0.0235
194 0.0379
195 0.0412
196 0.0403
197 0.0599
198 0.0428
199 0.0158
200 0.0389
201 0.0317
202 0.0311
219 0.0681
220 0.0182
221 0.0189
222 0.0233
223 0.0869
224 0.0796
225 0.0883
226 0.1118
227 0.1111
228 0.0557
229 0.0572
230 0.0379
231 0.0241
232 0.0224
233 0.0677
234 0.0281
235 0.0289
236 0.1162
237 0.1186
238 0.0470
239 0.0232
240 0.0230
245 0.0438
246 0.1863 *
247 0.1730 *
248 0.0764
249 0.1536
250 0.0355
251 0.0402
252 0.0406
253 0.2603 *
254 0.0442
255 0.0417
256 0.0270
257 0.0361
258 0.0485
259 0.0328
260 0.0326
261 0.0506
262 0.1174 *
263 0.0348
264 0.0792
265 0.0638
266 0.0964
267 0.0608
268 0.0580
269 0.1575 *
270 0.0597
271 0.0936
272 0.0343
273 0.0342
274 0.0243
275 0.0274
276 0.0293
279 0.0514
280 0.0551
281 0.0581
282 0.0583
283 0.0510
284 0.0311
285 0.0341
286 0.0384
287 0.0576
288 0.0411
289 0.0760
290 0.1102
293 0.1230 *
294 0.2011 *
295 0.1304
296 0.2249 *
297 0.1128
298 0.0595
299 0.0621
300 0.0646
301 0.0540
317 0.2080 *
318 0.2977 *
319 0.1810 *
320 0.2062 *
321 0.2503 *
322 0.1605 *
323 0.1606 *
324 0.2088 *
325 0.1795 *

```
## 326 0.1752
## 327 0.2003 *
## 328 0.2536 *
## 329 0.2489 *
## 330 0.4139 *
## 344 0.0260
## 345 0.0687 *
## 346 0.0569
## 347 0.0307
## 348 0.0447
## 349 0.0227
## 350 0.0397
## 356 0.0518
## 357 0.0626
## 358 0.0509
## 359 0.0442
## 360 0.0414
## 361 0.0527
## 362 0.0392
## 363 0.0541
## 398 0.0398
## 399 0.1699 *
## 400 0.0474
## 401 0.0526
## 402 0.1252
## 403 0.1593 *
## 414 0.0852
## 415 0.0266
## 416 0.0165
## 417 0.0265
## 418 0.0332
## 419 0.0260
## 420 0.0180
## 421 0.0242
## 422 0.0271
## 423 0.0824
## 424 0.0268
## 425 0.0148
## 426 0.0457
## 427 0.0760
## 428 0.0624
## 429 0.0446
## 430 0.0887
## 431 0.0944
## 432 0.1422 *
## 433 0.0604
## 434 0.0597
## 435 0.0556
## 437 0.0409
## 438 0.0406
## 439 0.0759
## 440 0.0880
## 470 0.0565
## 471 0.0539
## 472 0.0559
## 473 0.0608
## 474 0.0858
## 491 0.0887
## 492 0.0200
## 498 0.0178
## 499 0.0659
## 500 0.0169
## 501 0.0183
## 502 0.0354
## 503 0.0984
## 504 0.0252
## 505 0.0296
## 506 0.1091
## 507 0.0735
## 508 0.0716
## 509 0.0424
```

```
#View(temp)
#diagnostic plots
plot(g)
```



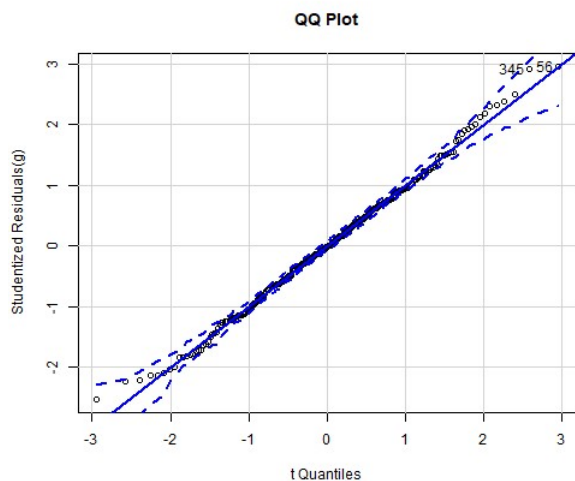


Here in the graph Normal Q-Q we can see the plot of standardized residuals against all the variables.
 #The graph of standardized residuals and Leverage is shown in which the country numbered (52,328,318) seen to be outliers.
 #The scale-Location gives the plot between sqrt of residuals and fitted values in which we can see two different groups #fromed which are for develop
 # Plot of residulas and the Leverage is also observed here.

```
# Assessing Outliers
outlierTest(g)
```

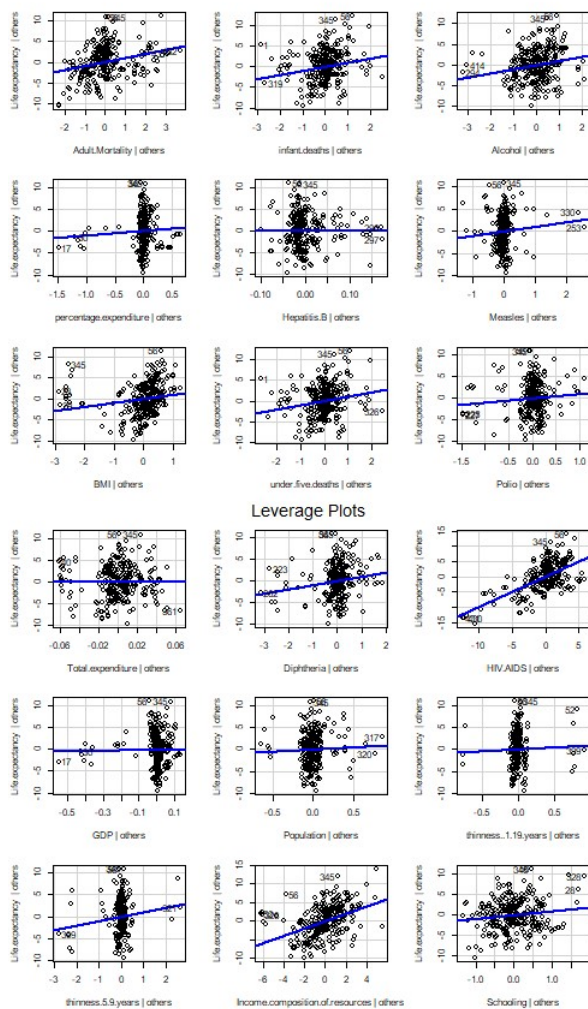
```
## No Studentized residuals with Bonferroni p < 0.05
## Largest |rstudent|:
##      rstudent unadjusted p-value Bonferroni p
## 56 2.969296      0.0032582      0.92859
```

```
qqPlot(g, main="QQ Plot")# it says that they have two sd diff
```

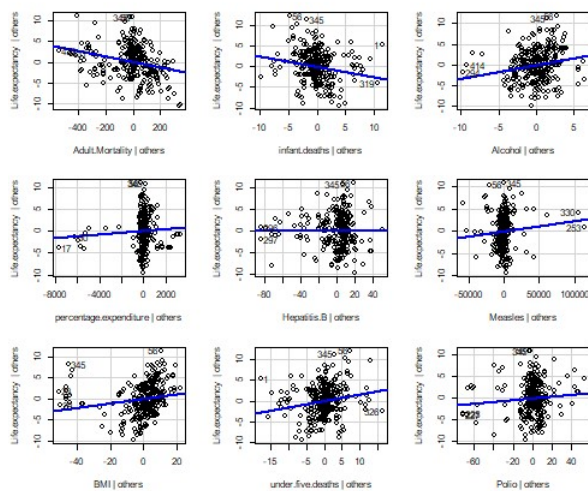


```
## 56 345
## 56 221
```

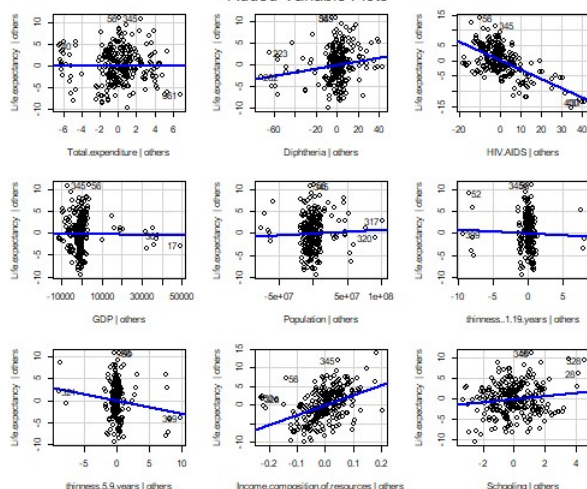
#As we can see in the QQplot that residuals are closer to the reference line and do not form a independent class.
 #As all the points falls approximately inside the reference line we can assume normality.
 leveragePlots(g) # Leverage plots



```
# Influential Observations
# added variable plots
avPlots(g)
```



Added-Variable Plots



shows for which quantity which are outliers

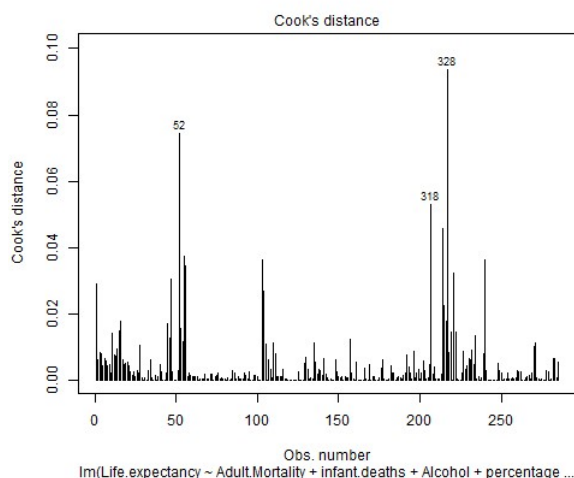
Cook's D plot

#Cook's D plot Data points with larger outliers and/or high Leverage may distort the outcome and accuracy of a regression

identify D values > 4/(n-k-1)

cutoff <- 4/((nrow(new.life)-length(g\$coefficients)-2))

plot(g, which=4, cook.levels=cutoff)



Influence Plot

influencePlot(g, id.method="identify", main="Influence Plot", sub="Circle size is proportional to Cook's Distance")

Warning in plot.window(...): "id.method" is not a graphical parameter

Warning in plot.xy(xy, type, ...): "id.method" is not a graphical parameter

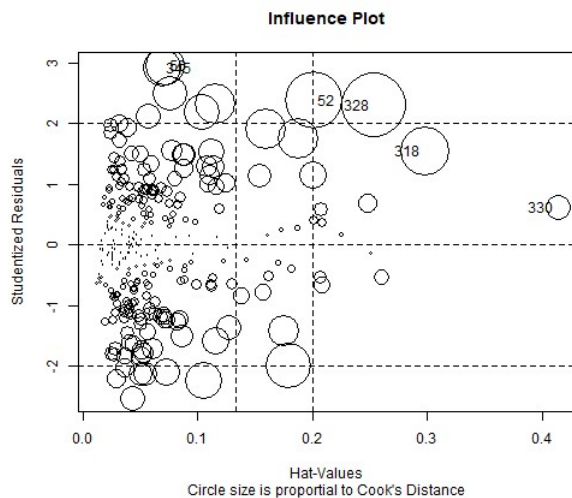
Warning in axis(side = side, at = at, labels = labels, ...): "id.method" is not a graphical parameter

Warning in axis(side = side, at = at, labels = labels, ...): "id.method" is not a graphical parameter

Warning in box(...): "id.method" is not a graphical parameter

Warning in title(...): "id.method" is not a graphical parameter

Warning in plot.xy(xy.coords(x, y), type = type, ...): "id.method" is not a graphical parameter



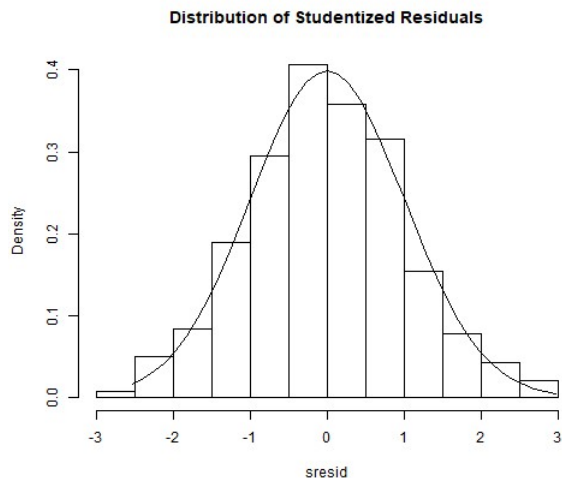
```
##      StudRes      Hat      CookD
## 52  2.3946982 0.20084826 0.07452890
## 56  2.9692956 0.07129332 0.03460551
## 318 1.5448744 0.29767286 0.05296323
## 328 2.3065975 0.25360043 0.09362061
## 330 0.6247611 0.41386476 0.01453890
## 345 2.9231727 0.06874829 0.03228517
```

*#Here we can observe that the country numbered 318 and 330 have high Leverage but is not an outlier.
#while 52 and 328 are #outliers with high Leverage.
#56 and 345 are outliers with acceptable Leverage.*

*# Normality of Residuals
distribution of studentized residuals*

```
sresid <- studres(g)
#We can say that most ideal values should fall between -1 and 1
```

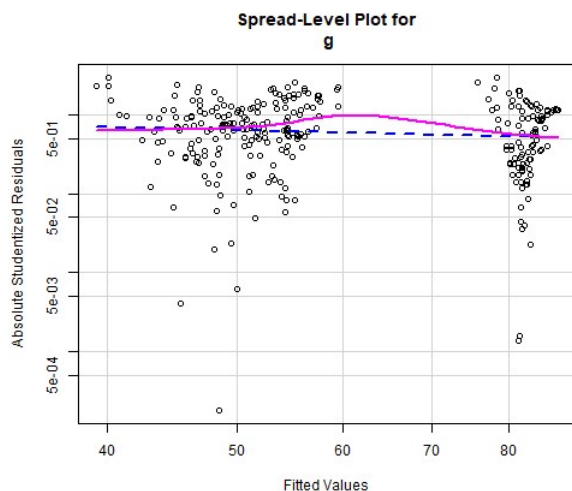
```
hist(sresid, freq=FALSE,
     main="Distribution of Studentized Residuals")
xfit<-seq(min(sresid),max(sresid),length=40)
yfit<-dnorm(xfit)
lines(xfit, yfit)
```



*#Non-constant Error Variance
Evaluate homoscedasticity
non-constant error variance test*
ncvTest(g)

```
## Non-constant Variance Score Test
## Variance formula: ~ fitted.values
## Chisquare = 1.184771, Df = 1, p = 0.27639
```

plot studentized residuals vs. fitted values
spreadLevelPlot(g)



```
##
## Suggested power transformation: 1.394282
```

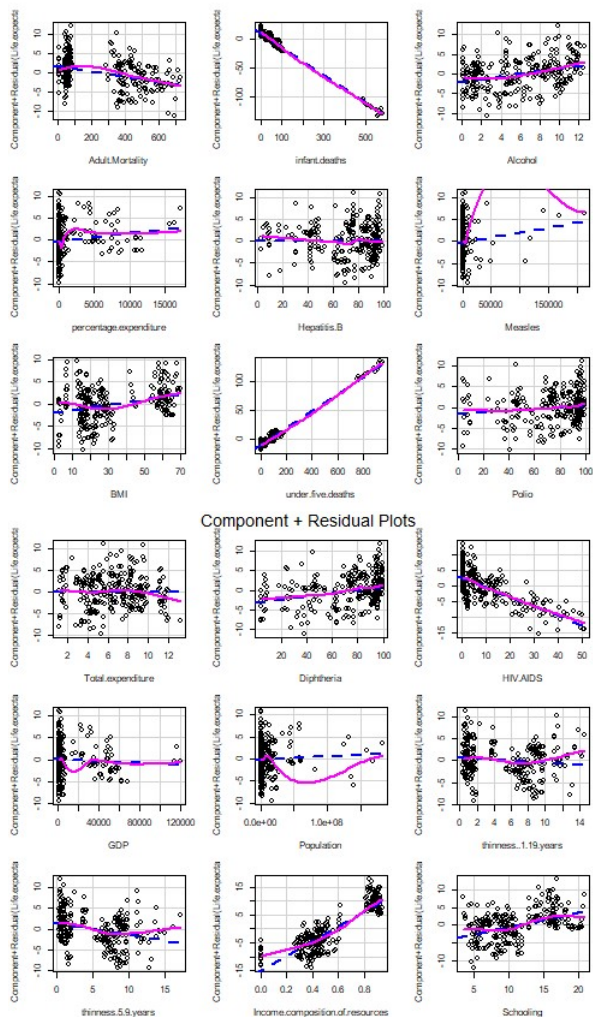
```
#Multi-collinearity
# Evaluate Collinearityssss
vif(g) # variance inflation factors
```

```
##          Adult.Mortality      infant.deaths
##          2.113581             1537.683221
##          Alcohol            percentage.expenditure
##          3.002014             7.212717
##          Hepatitis.B         Measles
##          1.708879             2.175613
##          BMI                 under.five.deaths
##          2.653872             1581.496364
##          Polio               Total.expenditure
##          2.625266             1.371317
##          Diphtheria          HIV.AIDS
##          3.180693             1.764380
##          GDP                 Population
##          7.982114             1.683772
##          thinness..1.19.years thinness.5.9.years
##          6.988954             6.926893
## Income.composition.of.resources Schooling
##          14.500298            10.967010
```

```
sqrt(vif(g)) > 2 # problem? # anytg more than 2 is a prob
```

```
##          Adult.Mortality      infant.deaths
##          FALSE              TRUE
##          Alcohol            percentage.expenditure
##          FALSE              TRUE
##          Hepatitis.B         Measles
##          FALSE              FALSE
##          BMI                 under.five.deaths
##          FALSE              TRUE
##          Polio               Total.expenditure
##          FALSE              FALSE
##          Diphtheria          HIV.AIDS
##          FALSE              FALSE
##          GDP                 Population
##          TRUE                FALSE
##          thinness..1.19.years thinness.5.9.years
##          TRUE                TRUE
## Income.composition.of.resources Schooling
##          TRUE                TRUE
```

```
#Nonlinearity
# component + residual plot
crPlots(g)
```



Component + Residual Plots

```
# Ceres plots
#ceresPlots(g)
# compare models
f1<-g
```

```
#After reviewing the anaova(g) we need to remove population and total expenditure one by one and
#then see the comparied analysis
```

```
# Removing population
l1<-lm(Life expectancy~Adult.Mortality + infant.deaths + Alcohol+percentage.expenditure+Hepatitis.B+
Measles+BMI+under.five.deaths+Polio+Total.expenditure+Diphtheria+HIV.AIDS+GDP+
thinness..1.19.years+thinness..5.9.years+Income.composition.of.resources+Schooling, data=new.life)
anova(l1)
```

Analysis of Variance Table

```
##
## Response: Life expectancy
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
## Adult.Mortality	1	29908.5	29908.5	1996.4707	< 2.2e-16 ***
## infant.deaths	1	5747.3	5747.3	383.6479	< 2.2e-16 ***
## Alcohol	1	18169.8	18169.8	1212.8819	< 2.2e-16 ***
## percentage.expenditure	1	1138.8	1138.8	76.0207	3.048e-16 ***
## Hepatitis.B	1	472.7	472.7	31.5529	4.869e-08 ***
## Measles	1	159.0	159.0	10.6164	0.0012661 **
## BMI	1	4012.2	4012.2	267.8257	< 2.2e-16 ***
## under.five.deaths	1	166.8	166.8	11.1335	0.0009683 ***
## Polio	1	341.6	341.6	22.8028	2.963e-06 ***
## Total.expenditure	1	4.8	4.8	0.3190	0.5726979
## Diphtheria	1	389.1	389.1	25.9756	6.552e-07 ***
## HIV.AIDS	1	3885.6	3885.6	259.3747	< 2.2e-16 ***
## GDP	1	158.6	158.6	10.5856	0.0012865 **
## thinness..1.19.years	1	749.5	749.5	50.0279	1.330e-11 ***
## thinness..5.9.years	1	140.2	140.2	9.3573	0.0024469 **
## Income.composition.of.resources	1	3179.0	3179.0	212.2066	< 2.2e-16 ***
## Schooling	1	80.7	80.7	5.3888	0.0210200 *
## Residuals	267	3999.8	15.0		

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#Removing Total Expenditure
l2<-lm(Life.expectancy~Adult.Mortality + infant.deaths + Alcohol+percentage.expenditure+Hepatitis.B+
      Measles+BMI+under.five.deaths+Polio+Diphtheria+HIV.AIDS+GDP+
      thinness..1.19.years+thinness.5.9.years+Income.composition.of.resources+Schooling, data=new.life)
anova(l2)
```

```
## Analysis of Variance Table
##
## Response: Life.expectancy
##
##      Df Sum Sq Mean Sq  F value    Pr(>F)
## Adult.Mortality      1 29908.5 29908.5 2003.8047 < 2.2e-16 ***
## infant.deaths        1  5747.3  5747.3  385.0573 < 2.2e-16 ***
## Alcohol               1 18169.8 18169.8 1217.3374 < 2.2e-16 ***
## percentage.expenditure 1  1138.8  1138.8   76.2999 2.690e-16 ***
## Hepatitis.B          1   472.7   472.7   31.6688 4.601e-08 ***
## Measles              1   159.0   159.0   10.6554 0.0012401 **
## BMI                  1  4012.2  4012.2  268.8095 < 2.2e-16 ***
## under.five.deaths     1   166.8   166.8   11.1744 0.0009475 ***
## Polio                1   341.6   341.6   22.8866 2.841e-06 ***
## Diphtheria           1   393.9   393.9   26.3911 5.374e-07 ***
## HIV.AIDS             1  3880.2  3880.2  259.9642 < 2.2e-16 ***
## GDP                  1   157.1   157.1   10.5278 0.0013252 **
## thinness..1.19.years  1   749.1   749.1   50.1881 1.232e-11 ***
## thinness.5.9.years    1   139.7   139.7    9.3570 0.0024464 **
## Income.composition.of.resources 1 3181.4 3181.4 213.1443 < 2.2e-16 ***
## Schooling            1    85.8    85.8    5.7494 0.0171785 *
## Residuals            268  4000.1    14.9
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
anova(f1, l2)
```

```
## Analysis of Variance Table
##
## Model 1: Life.expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##      percentage.expenditure + Hepatitis.B + Measles + BMI + under.five.deaths +
##      Polio + Total.expenditure + Diphtheria + HIV.AIDS + GDP +
##      Population + thinness..1.19.years + thinness.5.9.years +
##      Income.composition.of.resources + Schooling
## Model 2: Life.expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##      percentage.expenditure + Hepatitis.B + Measles + BMI + under.five.deaths +
##      Polio + Diphtheria + HIV.AIDS + GDP + thinness..1.19.years +
##      thinness.5.9.years + Income.composition.of.resources + Schooling
##      Res.Df  RSS Df Sum of Sq    F Pr(>F)
## 1      266 3991.9
## 2      268 4000.1 -2    -8.2438 0.2747    0.76
```

```
step <- stepAIC(g, direction="both")# step1 take corelation. step2 take highest corellation
```

```
## Start: AIC=790.27
## Life.expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##      percentage.expenditure + Hepatitis.B + Measles + BMI + under.five.deaths +
##      Polio + Total.expenditure + Diphtheria + HIV.AIDS + GDP +
##      Population + thinness..1.19.years + thinness.5.9.years +
##      Income.composition.of.resources + Schooling
##
##      Df Sum of Sq  RSS    AIC
## - Total.expenditure      1    0.14 3992.0 788.28
## - Hepatitis.B             1    0.45 3992.3 788.30
## - GDP                     1    1.84 3993.7 788.40
## - thinness..1.19.years    1    6.38 3998.3 788.72
## - Population              1    7.96 3999.8 788.83
## - percentage.expenditure  1   13.40 4005.3 789.22
## <none>                    3991.9 790.27
## - Measles                 1   29.49 4021.4 790.36
## - Polio                   1   32.18 4024.1 790.55
## - thinness.5.9.years      1   60.72 4052.6 792.57
## - Schooling               1   82.49 4074.4 794.10
## - Diphtheria              1  120.67 4112.6 796.75
## - under.five.deaths       1  137.80 4129.7 797.94
## - BMI                     1  144.76 4136.6 798.42
## - infant.deaths           1  151.42 4143.3 798.88
## - Alcohol                 1  157.34 4149.2 799.28
## - Adult.Mortality         1  301.86 4293.7 809.04
## - Income.composition.of.resources 1  904.95 4896.8 846.50
## - HIV.AIDS                1 2270.92 6262.8 916.62
##
## Step: AIC=788.28
## Life.expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##      percentage.expenditure + Hepatitis.B + Measles + BMI + under.five.deaths +
##      Polio + Diphtheria + HIV.AIDS + GDP + Population + thinness..1.19.years +
##      thinness.5.9.years + Income.composition.of.resources + Schooling
##
##      Df Sum of Sq  RSS    AIC
## - Hepatitis.B             1    0.43 3992.5 786.31
## - GDP                     1    1.88 3993.9 786.41
## - thinness..1.19.years    1    6.41 3998.4 786.73
## - Population              1    8.10 4000.1 786.85
## - percentage.expenditure  1   13.76 4005.8 787.26
## <none>                    3992.0 788.28
## - Measles                 1   29.35 4021.4 788.36
## - Polio                   1   32.43 4024.5 788.58
```

```

## + Total.expenditure          1      0.14 3991.9 790.27
## - thinness.5.9.years         1      60.66 4052.7 790.57
## - Schooling                   1      87.16 4079.2 792.43
## - Diphtheria                  1     122.50 4114.5 794.89
## - under.five.deaths          1     137.72 4129.7 795.94
## - BMI                         1     146.81 4138.8 796.57
## - infant.deaths              1     151.36 4143.4 796.88
## - Alcohol                     1     157.45 4149.5 797.30
## - Adult.Mortality             1     305.00 4297.0 807.26
## - Income.composition.of.resources 1     920.51 4912.5 845.41
## - HIV.AIDS                    1    2270.79 6262.8 914.62
##
## Step: AIC=786.31
## Life expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##   percentage.expenditure + Measles + BMI + under.five.deaths +
##   Polio + Diphtheria + HIV.AIDS + GDP + Population + thinness..1.19.years +
##   thinness.5.9.years + Income.composition.of.resources + Schooling
##
## Df Sum of Sq  RSS  AIC
## - GDP          1      1.80 3994.3 784.44
## - thinness..1.19.years 1      6.28 3998.7 784.75
## - Population    1      7.98 4000.4 784.88
## - percentage.expenditure 1     13.62 4006.1 785.28
## <none>          1     3992.5 786.31
## - Measles       1     29.62 4022.1 786.41
## - Polio         1     32.07 4024.5 786.59
## + Hepatitis.B   1      0.43 3992.0 788.28
## + Total.expenditure 1      0.13 3992.3 788.30
## - thinness.5.9.years 1     61.09 4053.6 788.64
## - Schooling     1     86.74 4079.2 790.43
## - Diphtheria    1    135.54 4128.0 793.82
## - under.five.deaths 1    138.48 4130.9 794.03
## - BMI           1    147.11 4139.6 794.62
## - infant.deaths 1    152.08 4144.5 794.96
## - Alcohol       1    157.07 4149.5 795.30
## - Adult.Mortality 1    304.66 4297.1 805.27
## - Income.composition.of.resources 1    927.67 4920.1 843.85
## - HIV.AIDS      1   2280.19 6272.6 913.07
##
## Step: AIC=784.44
## Life expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##   percentage.expenditure + Measles + BMI + under.five.deaths +
##   Polio + Diphtheria + HIV.AIDS + Population + thinness..1.19.years +
##   thinness.5.9.years + Income.composition.of.resources + Schooling
##
## Df Sum of Sq  RSS  AIC
## - thinness..1.19.years 1      6.25 4000.5 782.88
## - Population            1      7.46 4001.7 782.97
## <none>                   1     3994.3 784.44
## - percentage.expenditure 1     29.01 4023.3 784.50
## - Measles               1     29.50 4023.8 784.53
## - Polio                 1     32.07 4026.3 784.72
## + GDP                   1      1.80 3992.5 786.31
## + Hepatitis.B           1      0.35 3993.9 786.41
## + Total.expenditure     1      0.17 3994.1 786.42
## - thinness.5.9.years    1     60.99 4055.3 786.75
## - Schooling             1     85.63 4079.9 788.48
## - Diphtheria            1    135.29 4129.6 791.93
## - under.five.deaths     1    137.14 4131.4 792.06
## - infant.deaths         1    150.67 4144.9 792.99
## - BMI                   1    151.16 4145.4 793.02
## - Alcohol               1    158.37 4152.6 793.52
## - Adult.Mortality       1    303.66 4297.9 803.32
## - Income.composition.of.resources 1    927.83 4922.1 841.97
## - HIV.AIDS              1   2278.68 6272.9 911.08
##
## Step: AIC=782.88
## Life expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##   percentage.expenditure + Measles + BMI + under.five.deaths +
##   Polio + Diphtheria + HIV.AIDS + Population + thinness.5.9.years +
##   Income.composition.of.resources + Schooling
##
## Df Sum of Sq  RSS  AIC
## - Population            1      7.32 4007.8 781.40
## <none>                   1     4000.5 782.88
## - Measles               1     29.21 4029.7 782.95
## - percentage.expenditure 1     29.28 4029.8 782.96
## - Polio                 1     32.43 4032.9 783.18
## + thinness..1.19.years  1      6.25 3994.3 784.44
## + GDP                   1      1.77 3998.7 784.75
## + Hepatitis.B           1      0.24 4000.3 784.86
## + Total.expenditure     1      0.20 4000.3 784.87
## - Schooling             1     84.45 4085.0 786.83
## - under.five.deaths     1    133.50 4134.0 790.24
## - Diphtheria            1    135.50 4136.0 790.37
## - infant.deaths         1    146.95 4147.5 791.16
## - BMI                   1    155.62 4156.1 791.76
## - Alcohol               1    158.93 4159.4 791.98
## - thinness.5.9.years    1    283.92 4284.4 800.42
## - Adult.Mortality       1    310.34 4310.9 802.17
## - Income.composition.of.resources 1    941.41 4941.9 841.11
## - HIV.AIDS              1   2284.95 6285.5 909.65
##
## Step: AIC=781.4
## Life expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
##   percentage.expenditure + Measles + BMI + under.five.deaths +
##   Polio + Diphtheria + HIV.AIDS + thinness.5.9.years + Income.composition.of.resources +

```

```
##      Schooling
##
##              Df Sum of Sq    RSS    AIC
## <none>                                4007.8 781.40
## - percentage.expenditure             1    29.04 4036.9 781.46
## - Measles                             1    30.16 4038.0 781.54
## - Polio                               1    33.15 4041.0 781.75
## + Population                          1     7.32 4000.5 782.88
## + thinness..1.19.years                1     6.11 4001.7 782.97
## + GDP                                 1     1.26 4006.6 783.31
## + Total.expenditure                   1     0.34 4007.5 783.38
## + Hepatitis.B                         1     0.17 4007.7 783.39
## - Schooling                           1    83.48 4091.3 785.28
## - under.five.deaths                  1   129.17 4137.0 788.44
## - Diphtheria                         1   134.11 4141.9 788.78
## - infant.deaths                      1   141.68 4149.5 789.30
## - BMI                                1   162.99 4170.8 790.76
## - Alcohol                            1   163.80 4171.6 790.82
## - thinness.5.9.years                 1   280.07 4287.9 798.65
## - Adult.Mortality                    1   311.80 4319.6 800.75
## - Income.composition.of.resources    1   950.89 4958.7 840.08
## - HIV.AIDS                           1  2289.58 6297.4 908.19
```

```
step$anova # display results
```

```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## Life.expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
## percentage.expenditure + Hepatitis.B + Measles + BMI + under.five.deaths +
## Polio + Total.expenditure + Diphtheria + HIV.AIDS + GDP +
## Population + thinness..1.19.years + thinness.5.9.years +
## Income.composition.of.resources + Schooling
##
## Final Model:
## Life.expectancy ~ Adult.Mortality + infant.deaths + Alcohol +
## percentage.expenditure + Measles + BMI + under.five.deaths +
## Polio + Diphtheria + HIV.AIDS + thinness.5.9.years + Income.composition.of.resources +
## Schooling
##
##              Step Df  Deviance Resid.  Df Resid. Dev    AIC
## 1                                266   3991.885 790.2660
## 2 - Total.expenditure  1  0.1438365    267   3992.029 788.2763
## 3 - Hepatitis.B       1  0.4328875    268   3992.462 786.3072
## 4 - GDP               1  1.8040420    269   3994.266 784.4359
## 5 - thinness..1.19.years 1  6.2455791    270   4000.512 782.8812
## 6 - Population       1  7.3176359    271   4007.829 781.4020
```

```
#The step wise regression provides us with the final suitable model for multiple regression which include
#Adult.Mortality, infant.deaths,Alcohol,percentage.expenditure, Measles ,BMI ,under.five.deaths ,
#Polio , Diphtheria , HIV.AIDS , thinness.5.9.years,Income.composition.of.resources, Schooling
```

```
predict.lm(g, data.frame(Adult.Mortality=66, infant.deaths=1 ,Alcohol=10.62,percentage.expenditure=7172.275229,Hepatitis.B=94,
Measles=104,BMI=63.4,under.five.deaths= 1,Polio=92,Total.expenditure=9.5,Diphtheria=92,HIV.AIDS=0.1,GDP=42742.99898,Pt
thinness..1.19.years=0.7,thinness.5.9.years=0.6,Income.composition.of.resources=0.925,Schooling=19.1) )
```

```
##      1
## 85.42839
```

```
#Now finally we try to predict the output of the model using the predict functionn to see how well the model is.
#you can see from the above Step anova we get the best possible fit model. Therefore, applying the final
#model to predict the future values we get life expectancy of 85.42839
```