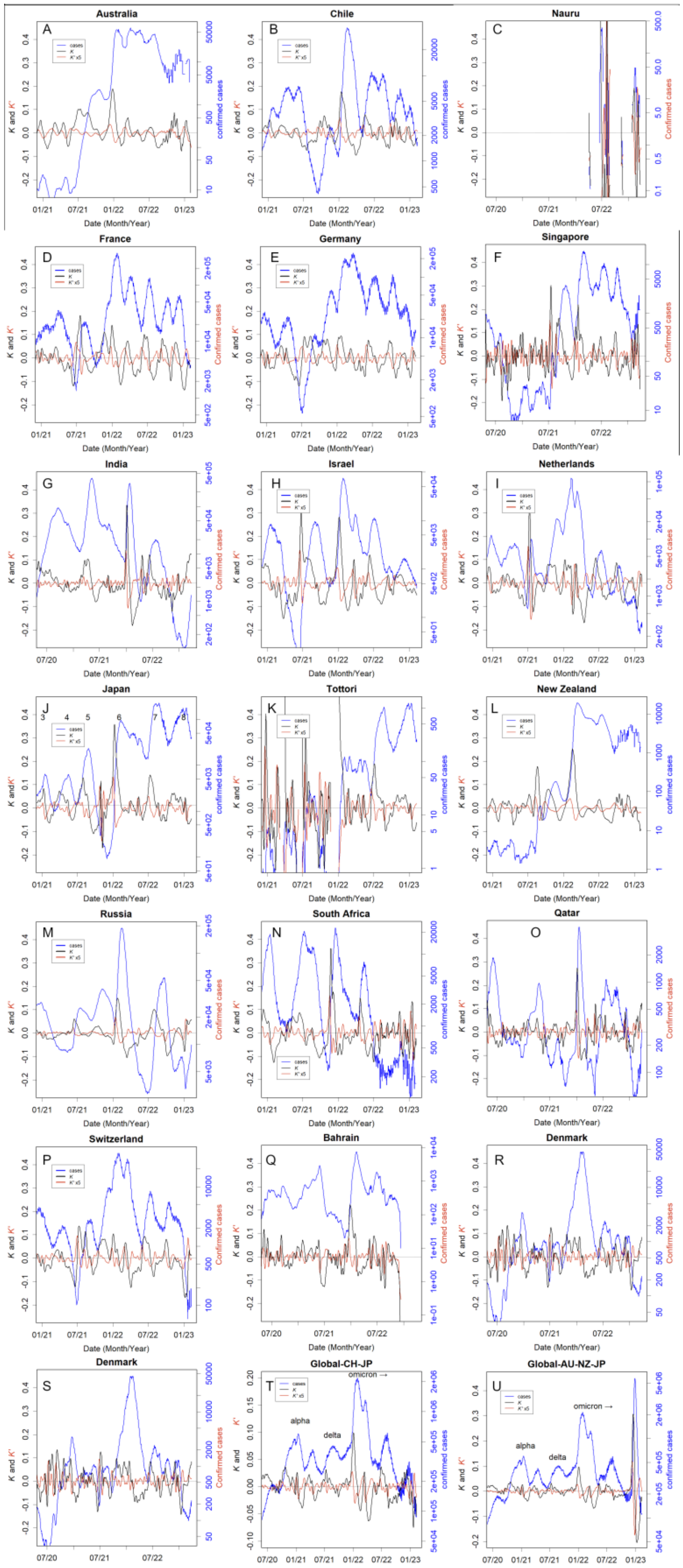
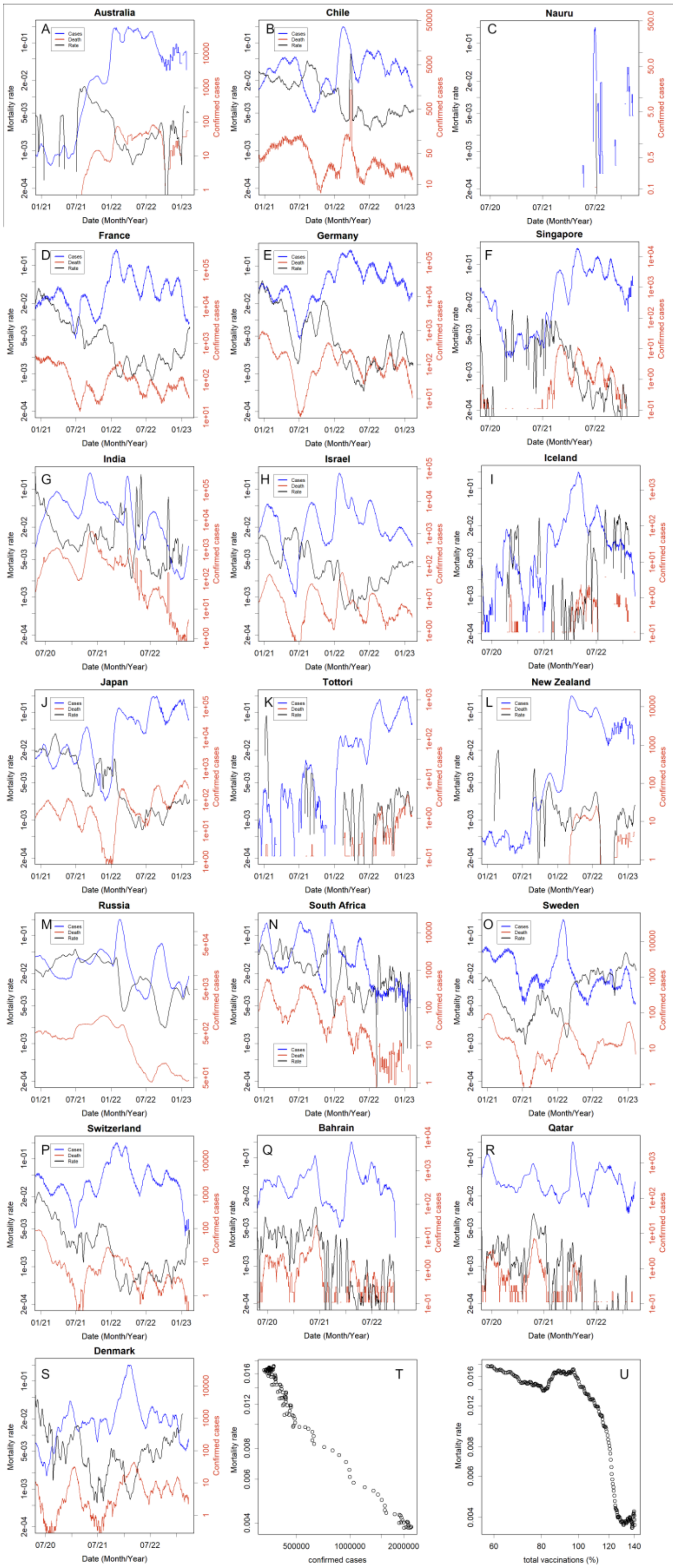

Australia
Chile
Nauru
France
Germany
Singapore
India
Israel
Netherlands
Japan
Tottori
New Zealand
Russia
South Africa
Qatar
Switzerland
Bahrain
Denmark
Denmark
Global-CH-JP
Global-AU-NZ-JP
alpha
delta
omicron →
K and K'
confirmed cases
Date (Month/Year)

Fig. S1: Confirmed cases (blue), K (black), and K' (red). (A) Australia, (B) Chile, (C) Nauru, (D) France, (E) Germany, (F) Singapore, (G), India, (H) Israel, (I) Netherland, (J) Japan, (K) Tottori Prefecture, Japan (L) New Zealand, and (M) Russia, (N) South Africa, (O) Quatar, (P) Switzerland, (Q) Bahrain, (R)Denmark, (S) Denmark, (T) Global data without China and Japan. The third wave of Omicron became small. (U) Global data without Australia, New Zealand, and Japan. The second wave of Omicron became reduced.



A Australia
B Chile
C Nauru
D France
E Germany
F Singapore
G India
H Israel
I Iceland
J Japan
K Tottori
L New Zealand
M Russia
N South Africa
O Sweden
P Switzerland
Q Bahrain
R Qatar
S Denmark
T
U
Cases
Death
Rate
Mortality rate
Confirmed cases
Date (Month/Year)
confirmed cases
total vaccinations (%)

Fig. S2: Confirmed cases (blue), number of death (red), and mortality rate (black). (A) Australia, (B) Chile, (C) Nauru, (D) France, (E) Germany, (F) Singapore, (G), India, (H) Israel, (I) Iceland, (J) Japan, (K) Tottori Prefecture, Japan (L) New Zealand, and (M) Russia, (N) South Africa, (O) Quatar, (S) Denmark. (T) Confirmed cases vs mortality rate. (U) Vaccination vs mortality rate.

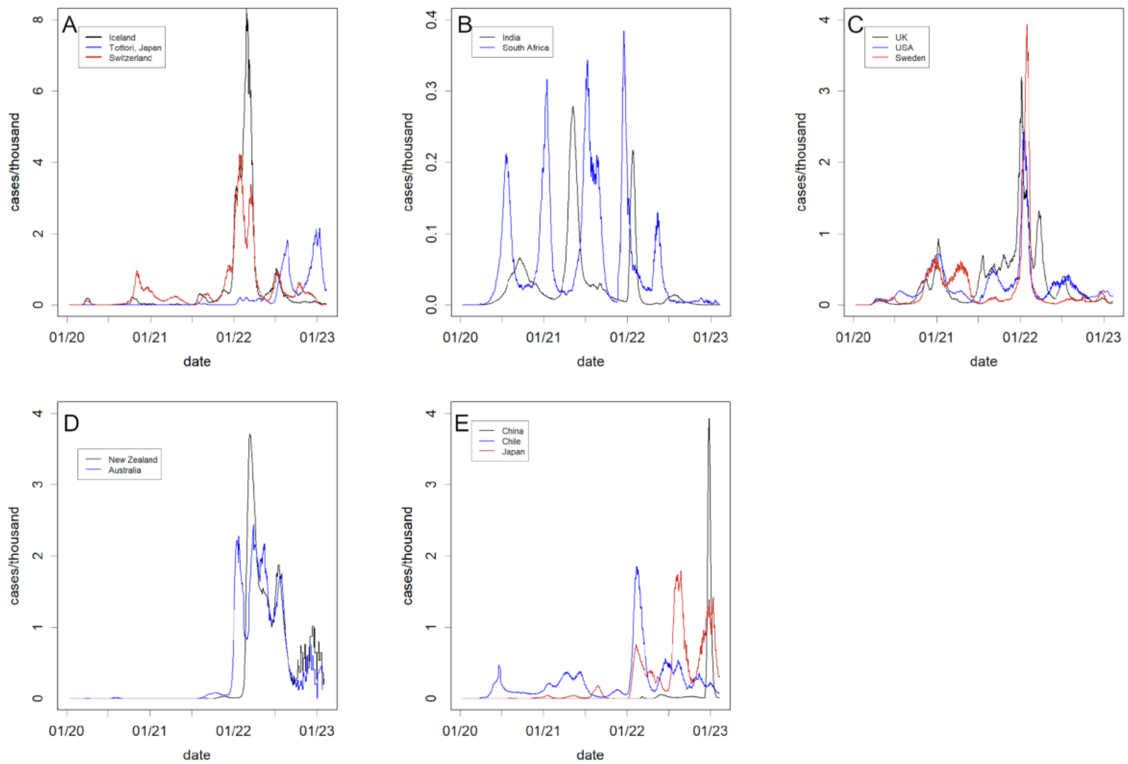


Fig. S3: Confirmed cases / 1000 people in an antilogarithm axis. (A) Iceland, Switzerland, and Tottori. Even in the successful countries, this could be as large as eight. (B) India and South Africa. The figures were quite low, indicating the small coverage of the survey. There have been no major epidemics in these countries for a while now. Probably many people in these countries are already infected once and hence immune, and another major epidemic is unlikely. (C) Sweden, UK, and USA. Omicron has caused a major epidemic and many people are probably immune. (D) Countries in Oceania. Very similar trends. (E) China, Chile, and Japan. The Omicron epidemic progressed slowly in three separate outbreaks in Japan and Chile because of self-defence. In China, by contrast, it spread quickly after the lockdown was lifted.

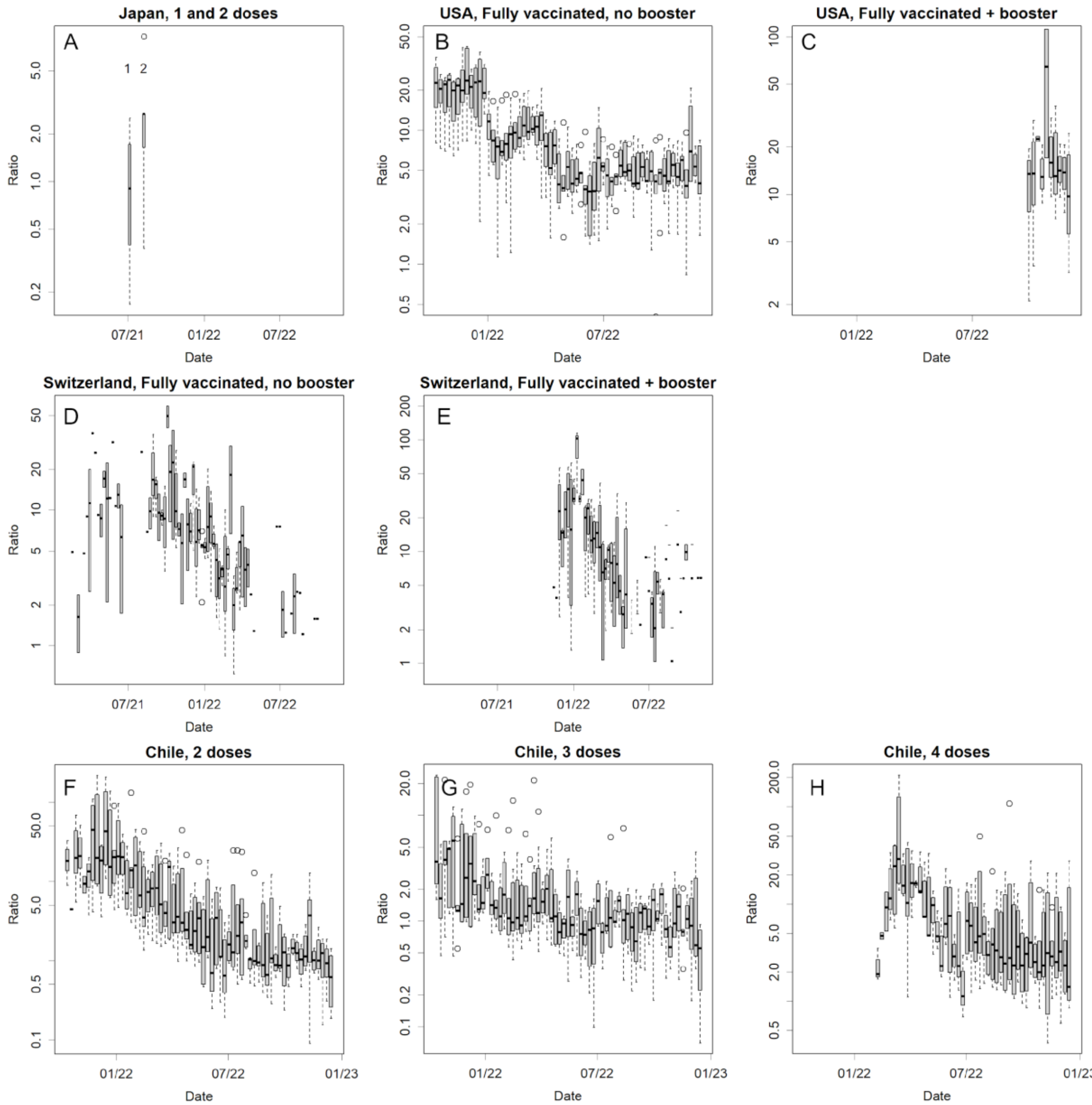


Fig. S4: Comparison of mortality rates with and without vaccination. (A) Japan: the data was published only once when Delta caused an epidemic. (B) and (C) USA: without and with booster, respectively. (D) and (E) Switzerland: Owing to the small number of deaths and lack of calculations, box plots have not been formed for recent data. (F, G, H) Chile: ratios between the indicated doses and (0 or 1) doses.

Table S1: Mortality rate and Infection rate. The mortality rate and number of deaths per infected person were calculated as the geometric mean from 2021/9/1 to 2023/2/1. Geometric mean was used because the mortality rate was log-normally distributed (Fig. 2B). The logarithm was taken and the z-scores were calculated and sorted. The infection rate is defined as the number of infected people per population. This was very low in many countries, probably because of the small number of tests conducted. A linear regression was estimated by excluding these countries. The Z-scores were calculated using the slope and intercept of the regression line.

Table S2: Total vaccinations per 100 people at the presented date, total infected (%), and death (%) on 2023/02/10. The infection and death rates were recorded for the entire population. Infections in South Africa and India were very low; however, it was assumed that many people in these countries became immune (Fig. S3B). This indicates that the survey was limited and probably not a random sample; therefore, the low mortality rates in these countries cannot be compared with other countries. China has stopped publishing deaths; therefore, this level should be considered up to the end of 2022. The value for Japan is at least six times higher.

R- codes

```
############  Japan

# data uptake
 JP <- read.table(file="JP.txt", sep="\t", header=TRUE)
   JP<- as.matrix(JP)
   number_patients <- as.numeric(JP[,5])
   dates<- as.Date(JP[,1])

plot(dates, number_patients)

   number_patients_av<- number_patients+NA
   for(i in 5:1131){
   number_patients_av[i] <- mean(number_patients[-4:4+i]) }

#### population: 1.257E8 (2021)

  japan<- number_patients_av/1.257E8*1e4

 as.numeric(JP[1135,6])/1.257E8
[1] 0.2615722

 as.numeric(JP[1135,8])/1.257E8*1e3
[1] 0.5583532

# finding the values
#### K
   K <- number_patients_av+NA
   K[1:1128+4] <- (log2(number_patients_av[1:1128+7] )- log2( number_patients_av[1:1128]))/7
   K[is.nan(K)] <- NA
   K[is.infinite(K)] <- NA
   K_av <- K*NA

for(i in 5:1131){
  K_av[i] <- mean(K[-4:4+i], na.rm=T) }

   dKdt<- number_patients+NA
   dKdt[1:1128+4]<- (K_av[1:1128+7]-K_av[1:1128])/7
```

```
# dKdt
   dKdt_av<- dKdt*0
   for(i in 5:1131){
   dKdt_av[i] <- mean(dKdt[-4:4+i], na.rm=T) }

max(dKdt_av, na.rm=T)
min(dKdt_av, na.rm=T)

max(K_av, na.rm=T)
min(K_av, na.rm=T)

#death
   number_death <- as.numeric(JP[,7])

   number_death_av<- number_death+NA  # moving average

   for(i in 5:1131){
   number_death_av[i] <- mean(number_death[-4:4+i]) }

# death rate
  death_rate <- number_death*NA

   for(i in 1:1117+18){   # change the range of i appropriately
   death_rate[i] <- mean((number_death_av[1:1117+18]/number_patients_av[1:1117])[-4:4+i],
na.rm=T) }

#### making figures

## K
    ylim=c(quantile(number_patients_av, 0.1, na.rm=T), quantile(number_patients_av, 1,
na.rm=T))+0.1

  png(width=1000, height=1000, pointsize = 36,  file="Japan.png")
            par(lwd=2, mex=0.7, cex=1, mai=c(2,2,1,2))

   plot(dates+3.5 ,  number_patients_av, pch=NA, xlim=c(as.Date("2021-01-01"), as.Date("2023-
02-5")), type="l", col="blue",lty=1, axes=F, ylab="", xlab="Date (Month/Year)", main="Japan" ,
ylim=ylim, log="y")
   axis.Date(1, at = c("2020-01-01", "2020-07-01","2021-01-01","2021-07-01","2022-01-
01","2022-07-01","2023-01-01"),format = "%m/%y")
```

```
  par(new=T)
  box()
  #abline(v=as.Date("2021-07-23"), lwd=2, col="green3")
  axis(4, col.axis="blue")
  par(new=T)
  mtext("Confirmed cases", side=4, line=2.5, col="#d3381c")
  par(new=T)

  plot(dates+3.5, dKdt_av*5, axes=F, type="l", col="#d3381c", xlab="", ylab="",
xlim=c(as.Date("2021-01-01"), as.Date("2023-02-5")), ylim=c(-0.25, +0.45))
  axis(2, col.axis="black")
  #abline(h=0, col="red")

  par(new=T)

  plot(dates+3.5 ,   K_av, type="l", xlim=c(as.Date("2021-01-01"), as.Date("2023-02-5")),
ylim=c(-0.25, +0.45), axes=F, xlab="",ylab="")

  mtext(expression(paste(italic(K), " and " )), side=2, line=3,  at=0.05)
  mtext(expression(paste(  italic(K), "'")), side=2, line=3, at=0.12, col="#d3381c")

  abline(h=0, lty=3, lwd=1)

  legend(as.Date("2021-02-20"), 0.4, legend=c(  "cases",
expression(italic(K)) ,expression(paste(italic(K), "' x5"))),lty=c( 1,1),lwd=4, col=c(  "blue",
"black" ,"#d3381c" ), cex=.6, box.lwd = 1)
 dev.off()


## death
  ylim=c(quantile(number_death_av, 0.1, na.rm=T), quantile(number_patients_av, 1,
na.rm=T))+0.1

 png(width=1000, height=1000, pointsize = 36,  file="JapanD.png")
         par(lwd=2, mex=0.7, cex=1, mai=c(2,2,1,2))

  plot(dates+3.5 ,  number_patients_av, pch=NA, xlim=c(as.Date("2021-01-01"), as.Date("2023-
02-5")), type="l", col="blue",lty=1, axes=F, ylab="", xlab="Date (Month/Year)", main="Japan" ,
ylim=ylim, log="y")
```

```
  par(new=T)

  plot(dates+3.5 ,  number_death_av, pch=NA, xlim=c(as.Date("2021-01-01"), as.Date("2023-02-5")), type="l", col="#d3381c",lty=1, axes=F, ylab="", xlab="Date (Month/Year)", main="Japan" , ylim=ylim, log="y")
  axis.Date(1, at = c("2020-01-01", "2020-07-01","2021-01-01","2021-07-01","2022-01-01","2022-07-01","2023-01-01"),format = "%m/%y")

  axis(4, col.axis="#d3381c")
  mtext("Confirmed cases", side=4, line=2.5, col="#d3381c")

  par(new=T)
  plot(dates[1:1:1117+18]+3.5 , death_rate[1:1:1117], pch=NA, xlim=c(as.Date("2021-01-01"), as.Date("2023-02-5")), type="l", col="black",lty=1, axes=F, ylab="", xlab="", main="" , log="y", ylim=c(2E-4, 0.2))

  axis(2)
  mtext("Mortality rate", side=2, line=3,  at=6e-3)
  legend(as.Date("2021-02-20"), 0.19, legend=c(  "Cases", "Death","Rate"),lty=c( 1,1),lwd=4, col=c(  "blue", "#d3381c" ,"black" ), cex=.6, box.lwd = 1)
  box()

 dev.off()
```