

excessILI vignette

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```
source("../R/functions.R")
source("../R/aux_functions.R")
```

Overview

The goal for this package is to facilitate the formatting of line list data from syndromic surveillance datasets into time series and then the analysis of these data to detect increases above the seasonal baseline. For US data, there is an option to automatically adjust the data for state-specific flu activity (using data from NREVSS) and/or state-specific RSV activity (based on Google search volume). The user can either start with line list data or formatted time series data

In this example, we will analyze ILINet data with a simple seasonal baseline, adjusting for flu and year-to-year variations. The model is fit through end-of-February 2020 and then extrapolated forward based on the time of year and the amount of influenza activity. Influenza activity is captured by using the proportion of tests that were positive from the NREVSS system (log transformed in model)

Download the data

```
ili.data <- ilinet(region = c("state"))

ili.data$state <- state.abb[match(ili.data$region, state.name)]
ili.data <- ili.data[, c("state", "week_start", "ilitotal", "total_patients")]
ili.data <- ili.data[!is.na(ili.data$total_patients),]
ili.data.spl <- split(ili.data, ili.data$state)
min <- sapply(ili.data.spl, function(x) min(x$total_patients))
min

##      AK      AL      AR      AZ      CA      CO      CT      DE      GA      HI      IA      ID
##      43    2097    244   7949  14858         0      15         0   3151    665    149     34
##      IL      IN      KS      KY      LA      MA      MD      ME      MI      MN      MO      MS
## 24448   1783    866   1034   1169   6273    472   2095   4301    842    680   5045
##      MT      NC      ND      NE      NH      NJ      NM      NV      NY      OH      OK      OR
##      439   2177    106    595   1018   1286    958   2629   1638   5406         0    676
##      PA      RI      SC      SD      TN      TX      UT      VA      VT      WA      WI      WV
##   5436   1845    841         0   3427  11851         0  15389    359    344    594   3141
##      WY
##   1141

state.select <- names(min)[which(min > 0)]
ili.data <- ili.data[ili.data$state %in% state.select,]
```

Run the main analysis function, adjust for flu using NREVSS data

```
excess_cases1 <-
  excessCases(ds = ili.data,
```

```

datevar      = "week_start",
statevar     = "state",
denom.var    = "total_patients",
use.syndromes = c("ilitotal"),
rsv.import   = F,
flu.import   = T,
extrapolation.date = "2020-03-01",
time.res='week')

```

Plot the results in an interactive dashboard

```
#dashboardPlot(excess_cases1)
```

Extract the quantities of interest

```

dates <-
  excess_cases1[[1]][[1]][[1]]$date

unexplained.cases <-
  excessExtract(ds = excess_cases1,
    syndrome = "ilitotal",
    extract.quantity = "unexplained.cases")

unexplained.log.rr <-
  excessExtract(ds = excess_cases1,
    syndrome = "ilitotal",
    extract.quantity = "resid1")

denom <-
  excessExtract(ds = excess_cases1,
    syndrome = "ilitotal",
    extract.quantity = "denom")

upi <-
  excessExtract(ds = excess_cases1,
    syndrome = "ilitotal",
    extract.quantity = "upi")

lpi <-
  excessExtract(ds = excess_cases1,
    syndrome = "ilitotal",
    extract.quantity = "lpi")

obs <-
  excessExtract(ds = excess_cases1,
    syndrome = "ilitotal",
    extract.quantity = "y")

pred<- excessExtract(ds = excess_cases1,

```

```

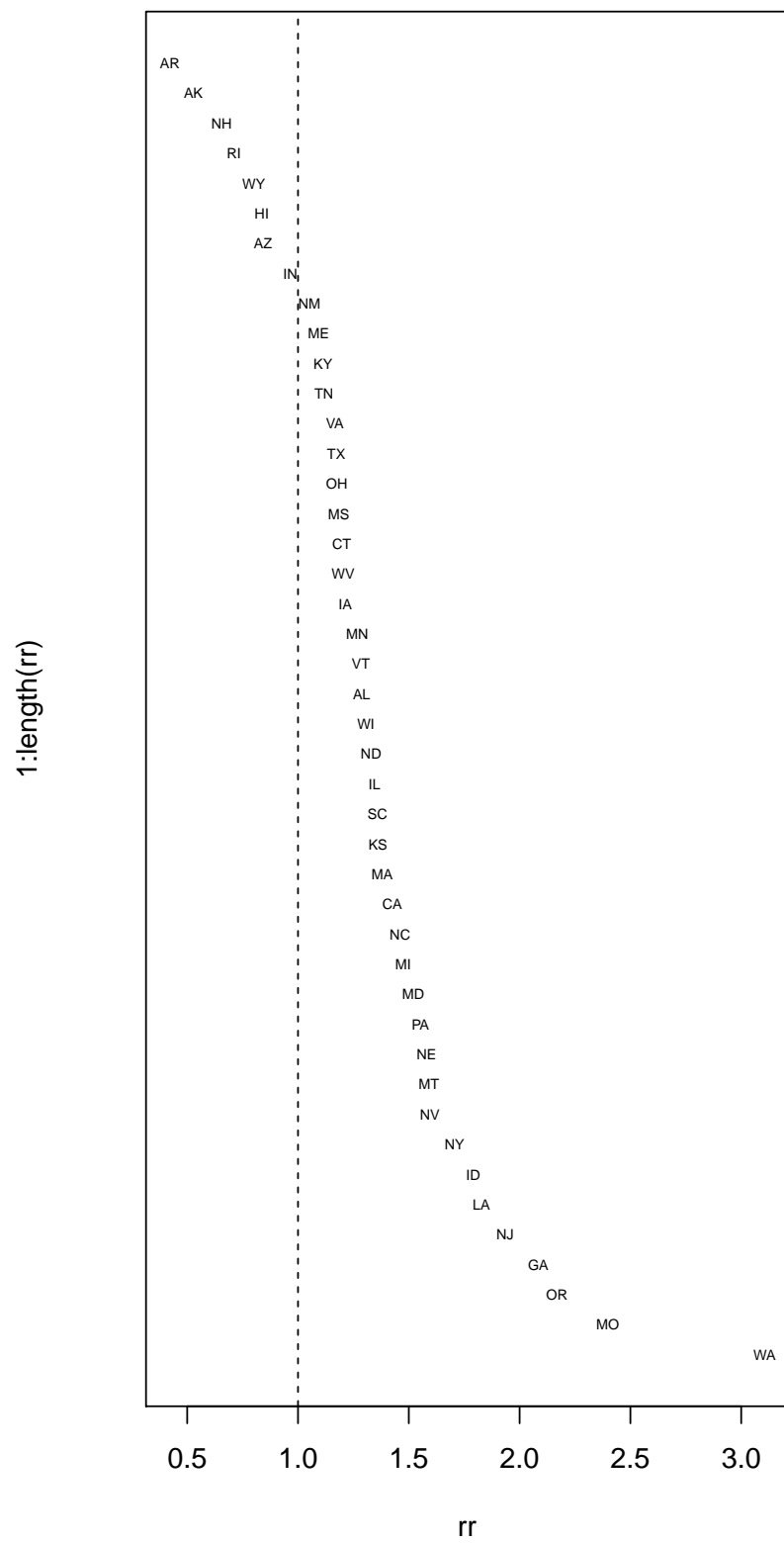
        syndrome = "ilitotal",
        extract.quantity = "pred")

result.object<-list('dates'=dates, 'obs'=obs[, ,1], 'pred'=pred[, ,1], 'unexplained.cases'=unexplained.cases)

saveRDS(result.object, 'extracted.output.ilinet.rds')

rr<-sort(exp(unexplained.log.rr[232, ,1]), decreasing=T)
par(mfrow=c(1,1))
plot(y=1:length(rr), x=rr, yaxt='n', col='white')
abline(v=1, lty=2)
text(y=1:length(rr), x=rr, names(rr), yaxt='n', cex=0.5)

```



```

par(mfrow=c(4,4), mar=c(2,2,1,1))
dates<-result.object$dates
states<-dimnames(pred)[[2]]
for(i in 1:dim(pred)[2]){
plot(dates[180:233],pred[180:233,i,1]/denom[180:233,i,1], type='l', col='red', bty='l', main=states[i])
points(dates[180:233],obs[180:233,i,1]/denom[180:233,i,1], type='l', col='black')
polygon(c(dates[180:233], rev(dates[180:233])), c(lpi[180:233,i,1]/denom[180:233,i,1],
rev(upi[180:233,i,1]/denom[180:233,i,1])), col = rgb(1, 0, 0, alpha = 0.1), border =
}

```

