COVID 082020

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## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document 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:

library(DataExplorer)  
library(xlsx)  
library(tidyverse)

## -- Attaching packages --------------------------------------------------------------------------------------------------------------------------- tidyverse 1.3.0 --

## v ggplot2 3.3.0 v purrr 0.3.4  
## v tibble 3.0.1 v dplyr 0.8.5  
## v tidyr 1.0.3 v stringr 1.4.0  
## v readr 1.3.1 v forcats 0.5.0

## -- Conflicts ------------------------------------------------------------------------------------------------------------------------------ tidyverse\_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

library(lmtest)

## Loading required package: zoo

##   
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':  
##   
## as.Date, as.Date.numeric

library(sandwich)  
library(plm)

##   
## Attaching package: 'plm'

## The following objects are masked from 'package:dplyr':  
##   
## between, lag, lead

library(reshape2)

##   
## Attaching package: 'reshape2'

## The following object is masked from 'package:tidyr':  
##   
## smiths

library(Bolstad)

##   
## Attaching package: 'Bolstad'

## The following objects are masked from 'package:stats':  
##   
## IQR, sd, var

library(bdynsys)  
library(pglm)

## Loading required package: maxLik

## Loading required package: miscTools

##   
## Please cite the 'maxLik' package as:  
## Henningsen, Arne and Toomet, Ott (2011). maxLik: A package for maximum likelihood estimation in R. Computational Statistics 26(3), 443-458. DOI 10.1007/s00180-010-0217-1.  
##   
## If you have questions, suggestions, or comments regarding the 'maxLik' package, please use a forum or 'tracker' at maxLik's R-Forge site:  
## https://r-forge.r-project.org/projects/maxlik/

county\_data\_ <- read.xlsx("C:/Users/snlpt/Desktop/MSDS 692/datas/final\_data\_assemble08012020.xlsx", sheetName = "Sheet1")  
  
policy\_by\_countyt <- read.xlsx("C:/Users/snlpt/Desktop/MSDS 692/datas/policy\_by\_countyt.xlsx", "Sheet1")  
  
panel\_final <- read\_csv("C:/Users/snlpt/Desktop/MSDS 692/datas/panel\_final\_08182020.csv")

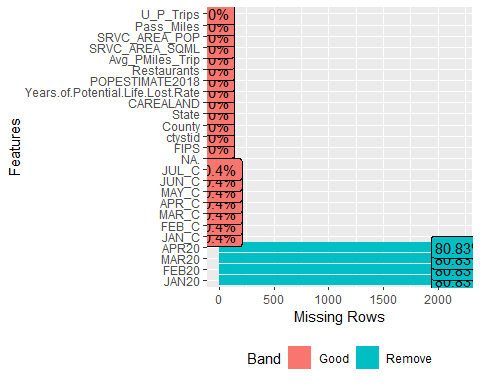
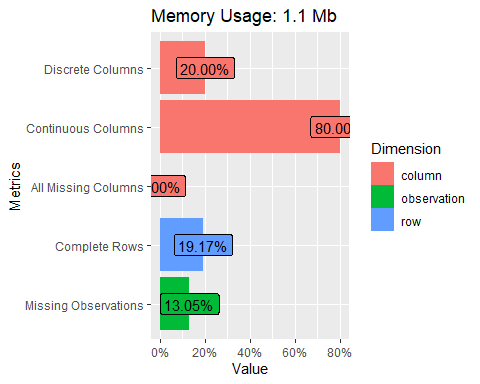
## Warning: Missing column names filled in: 'X1' [1]

## Parsed with column specification:  
## cols(  
## X1 = col\_double(),  
## FIPS = col\_character(),  
## ctystid = col\_character(),  
## CAREALAND = col\_double(),  
## Years.of.Potential.Life.Lost.Rate = col\_double(),  
## POPESTIMATE2018 = col\_double(),  
## Restaurants = col\_double(),  
## Avg\_PMiles\_Trip = col\_double(),  
## SRVC\_AREA\_SQML = col\_double(),  
## SRVC\_AREA\_POP = col\_double(),  
## Pass\_Miles = col\_double(),  
## U\_P\_Trips = col\_double(),  
## months = col\_character(),  
## cases = col\_double(),  
## days\_at\_home = col\_double()  
## )

panel\_final <- panel\_final %>% na.omit(FIPS)  
  
fill\_out\_fips <- function(x){  
   
 #x<-as.character(urban\_area\_to\_county$FIPS)  
 j <- 1  
 y <- vector(mode = "character", length = 0)  
   
   
 while (j <= length(x)){  
 fips\_hold <- x[j]  
 while (nchar(fips\_hold) < 5){  
 fips\_hold <- paste0("0", x[j])  
   
 }  
 y[j] <- fips\_hold  
 j <- j+1  
   
 }  
   
 y <- as.character(y)  
 return(y)  
   
}  
  
panel\_final$FIPS <- panel\_final$FIPS %>% fill\_out\_fips()

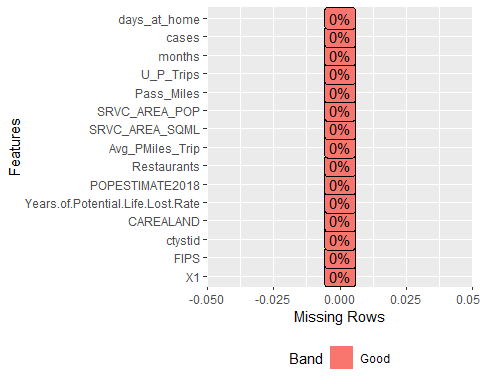
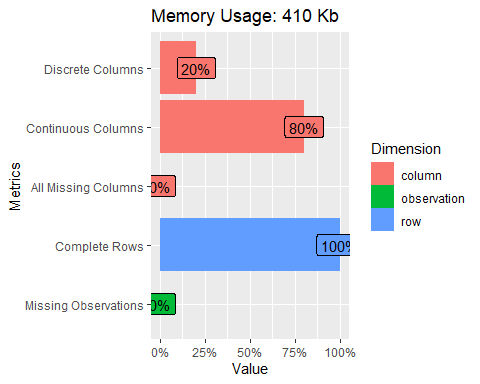
## rows columns discrete\_columns continuous\_columns all\_missing\_columns  
## 1 2728 25 5 20 0  
## total\_missing\_values complete\_rows total\_observations memory\_usage  
## 1 19922 523 68200 1126928

## rows columns discrete\_columns continuous\_columns all\_missing\_columns  
## 1 2728 25 5 20 0  
## total\_missing\_values complete\_rows total\_observations memory\_usage  
## 1 8897 523 68200 1126928



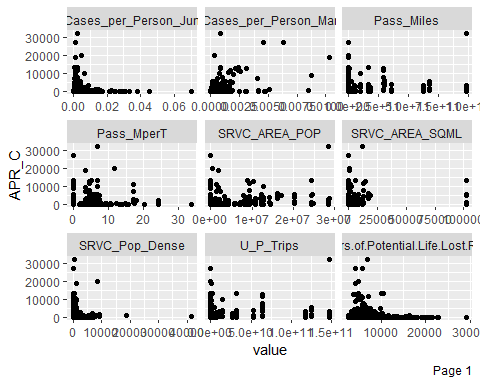
## # A tibble: 1 x 1  
## n  
## <int>  
## 1 2728

## # A tibble: 1 x 9  
## rows columns discrete\_columns continuous\_colu~ all\_missing\_col~  
## <int> <int> <int> <int> <int>  
## 1 2970 15 3 12 0  
## # ... with 4 more variables: total\_missing\_values <int>, complete\_rows <int>,  
## # total\_observations <int>, memory\_usage <dbl>

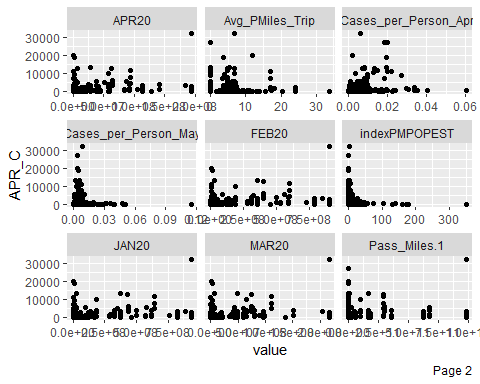


## # A tibble: 1 x 1  
## n  
## <int>  
## 1 2970

## Warning: Removed 99 rows containing missing values (geom\_point).



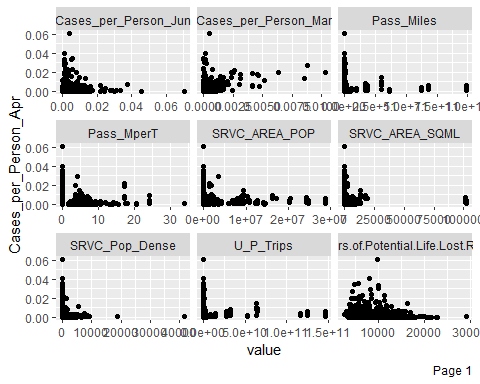
## Warning: Removed 8875 rows containing missing values (geom\_point).



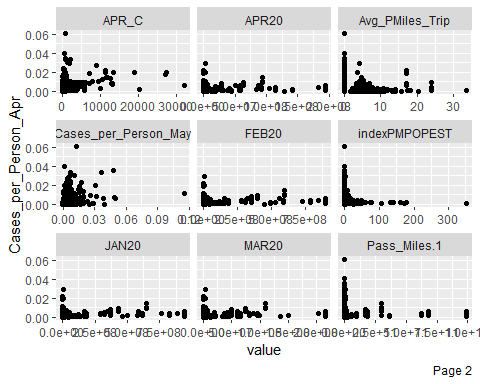
## Warning: Removed 44 rows containing missing values (geom\_point).



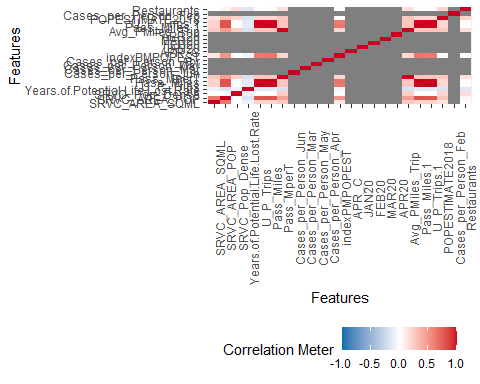
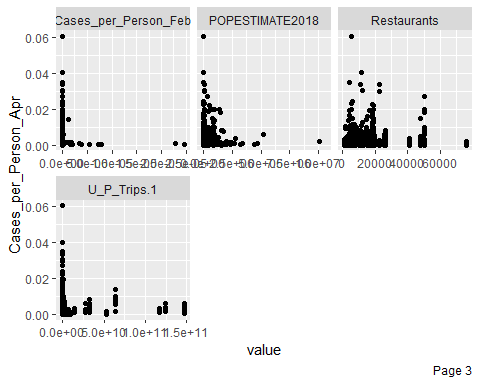
## Warning: Removed 99 rows containing missing values (geom\_point).



## Warning: Removed 8875 rows containing missing values (geom\_point).



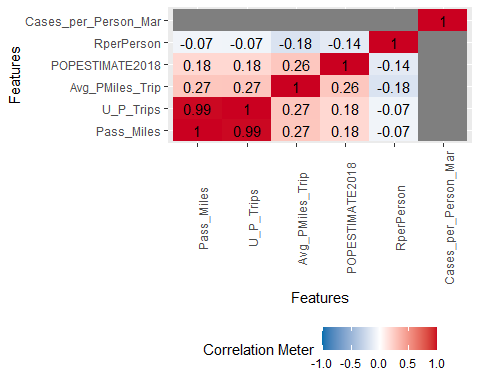
## Warning: Removed 44 rows containing missing values (geom\_point).



##   
## Call:  
## lm(formula = Cases\_per\_Person\_Mar ~ SRVC\_Pop\_Dense + POPESTIMATE2018 +   
## Avg\_PMiles\_Trip + Cases\_per\_Person\_Feb + +Years.of.Potential.Life.Lost.Rate +   
## Restaurants, data = scatter\_dat)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.0017555 -0.0001432 -0.0000869 0.0000105 0.0098834   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 2.924e-04 3.577e-05 8.172 4.59e-16 \*\*\*  
## SRVC\_Pop\_Dense -8.075e-09 8.056e-09 -1.002 0.316   
## POPESTIMATE2018 1.744e-10 2.755e-11 6.330 2.87e-10 \*\*\*  
## Avg\_PMiles\_Trip 1.474e-05 3.681e-06 4.005 6.36e-05 \*\*\*  
## Cases\_per\_Person\_Feb -8.247e+00 1.269e+01 -0.650 0.516   
## Years.of.Potential.Life.Lost.Rate -1.643e-08 3.660e-09 -4.488 7.48e-06 \*\*\*  
## Restaurants -3.305e-10 5.919e-10 -0.558 0.577   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.0004659 on 2710 degrees of freedom  
## (11 observations deleted due to missingness)  
## Multiple R-squared: 0.04196, Adjusted R-squared: 0.03984   
## F-statistic: 19.78 on 6 and 2710 DF, p-value: < 2.2e-16

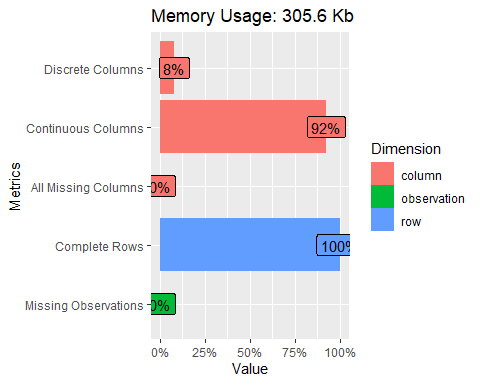
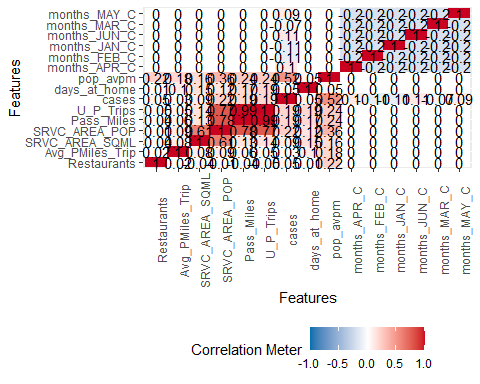
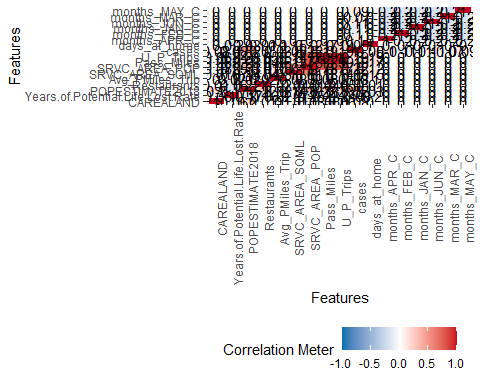
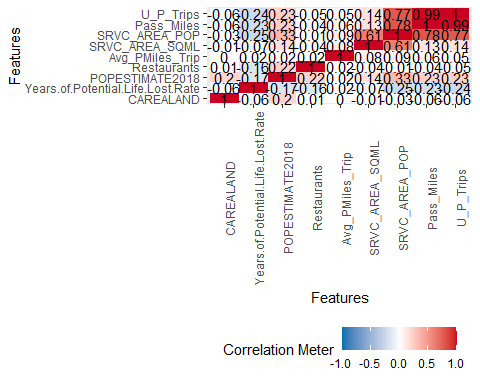
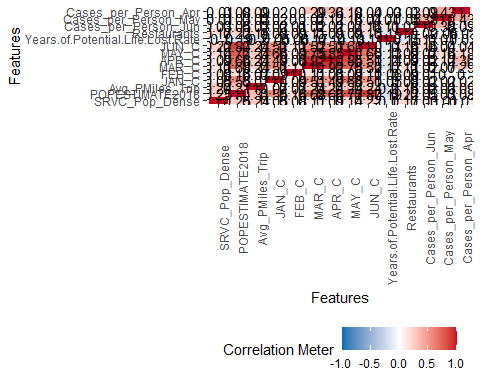
##   
## Call:  
## lm(formula = Cases\_per\_Person\_Apr ~ SRVC\_Pop\_Dense + POPESTIMATE2018 +   
## Avg\_PMiles\_Trip + Cases\_per\_Person\_Mar + +Years.of.Potential.Life.Lost.Rate +   
## Restaurants, data = county\_data\_)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.011110 -0.000815 -0.000523 -0.000008 0.058302   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 6.384e-04 2.095e-04 3.047 0.00233 \*\*   
## SRVC\_Pop\_Dense -8.175e-08 4.654e-08 -1.757 0.07908 .   
## POPESTIMATE2018 3.090e-10 1.605e-10 1.924 0.05441 .   
## Avg\_PMiles\_Trip 4.730e-05 2.134e-05 2.217 0.02673 \*   
## Cases\_per\_Person\_Mar 2.815e+00 1.111e-01 25.330 < 2e-16 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 2.813e-08 2.125e-08 1.324 0.18563   
## Restaurants -6.443e-09 3.418e-09 -1.885 0.05950 .   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.002696 on 2710 degrees of freedom  
## (11 observations deleted due to missingness)  
## Multiple R-squared: 0.206, Adjusted R-squared: 0.2043   
## F-statistic: 117.2 on 6 and 2710 DF, p-value: < 2.2e-16

## Warning: Removed 10 rows containing missing values (geom\_text).



##   
## Call:  
## lm(formula = Cases\_per\_Person\_Jun ~ SRVC\_Pop\_Dense + POPESTIMATE2018 +   
## Avg\_PMiles\_Trip + Cases\_per\_Person\_May + Years.of.Potential.Life.Lost.Rate +   
## Restaurants, data = testme)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.027706 -0.001226 -0.000693 0.000288 0.068103   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.317e-04 2.301e-04 -0.572 0.5671   
## SRVC\_Pop\_Dense 7.170e-08 5.146e-08 1.393 0.1637   
## POPESTIMATE2018 4.529e-10 1.782e-10 2.541 0.0111 \*   
## Avg\_PMiles\_Trip 2.584e-05 2.367e-05 1.092 0.2750   
## Cases\_per\_Person\_May 2.983e-01 1.412e-02 21.128 < 2e-16 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.668e-07 2.342e-08 7.120 1.38e-12 \*\*\*  
## Restaurants 7.687e-09 3.786e-09 2.030 0.0424 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.002977 on 2699 degrees of freedom  
## Multiple R-squared: 0.16, Adjusted R-squared: 0.1581   
## F-statistic: 85.68 on 6 and 2699 DF, p-value: < 2.2e-16

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.3169e-04 3.2546e-04 -0.4046 0.6857736   
## SRVC\_Pop\_Dense 7.1696e-08 5.2613e-08 1.3627 0.1730889   
## POPESTIMATE2018 4.5292e-10 1.6977e-10 2.6678 0.0076817 \*\*   
## Avg\_PMiles\_Trip 2.5841e-05 2.3850e-05 1.0835 0.2786888   
## Cases\_per\_Person\_May 2.9828e-01 8.3300e-02 3.5808 0.0003485 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.6676e-07 3.5021e-08 4.7617 2.021e-06 \*\*\*  
## Restaurants 7.6872e-09 3.5680e-09 2.1545 0.0312897 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1



## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index  
  
## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index  
  
## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index

## Oneway (time) effect Random Effect Model   
## (Swamy-Arora's transformation)  
##   
## Call:  
## plm(formula = cases ~ Restaurants + Avg\_PMiles\_Trip + POPESTIMATE2018 +   
## days\_at\_home, data = panel\_final, effect = "time", model = "random",   
## index = c("FIPS", "months"))  
##   
## Balanced Panel: n = 495, T = 6, N = 2970  
##   
## Effects:  
## var std.dev share  
## idiosyncratic 1912776.3 1383.0 0.92  
## time 167238.2 408.9 0.08  
## theta: 0.8497  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -9007.386 -333.925 -78.406 244.248 31760.951   
##   
## Coefficients:  
## Estimate Std. Error z-value Pr(>|z|)   
## (Intercept) -2.0560e+02 1.8864e+02 -1.0899 0.27574   
## Restaurants -7.6404e-03 1.7894e-03 -4.2699 1.956e-05 \*\*\*  
## Avg\_PMiles\_Trip 9.8025e+00 9.1660e+00 1.0694 0.28487   
## POPESTIMATE2018 1.8293e-03 5.2806e-05 34.6423 < 2.2e-16 \*\*\*  
## days\_at\_home 3.2669e+00 1.3719e+00 2.3812 0.01726 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 8016900000  
## Residual Sum of Squares: 5671400000  
## R-Squared: 0.29257  
## Adj. R-Squared: 0.29162  
## Chisq: 1226.23 on 4 DF, p-value: < 2.22e-16

## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index  
  
## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index

## Oneway (time) effect Within Model  
##   
## Call:  
## plm(formula = cases ~ FIPS, data = panel\_final, effect = "time",   
## model = "within", index = c("FIPS", "months"))  
##   
## Balanced Panel: n = 495, T = 6, N = 2970  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -14665.334 -345.067 -45.798 280.984 30380.742   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## FIPS01003 23.5000 814.5758 0.0288 0.9769871   
## FIPS01009 -55.3333 814.5758 -0.0679 0.9458476   
## FIPS01033 -28.0000 814.5758 -0.0344 0.9725819   
## FIPS01051 47.3333 814.5758 0.0581 0.9536673   
## FIPS01073 619.6667 814.5758 0.7607 0.4468951   
## FIPS01077 -21.0000 814.5758 -0.0258 0.9794347   
## FIPS01079 -72.8333 814.5758 -0.0894 0.9287613   
## FIPS01083 -22.0000 814.5758 -0.0270 0.9784556   
## FIPS01089 84.6667 814.5758 0.1039 0.9172257   
## FIPS01097 520.0000 814.5758 0.6384 0.5232927   
## FIPS01101 549.8333 814.5758 0.6750 0.4997431   
## FIPS01103 71.3333 814.5758 0.0876 0.9302246   
## FIPS01115 -39.5000 814.5758 -0.0485 0.9613285   
## FIPS01117 89.5000 814.5758 0.1099 0.9125189   
## FIPS04005 224.3333 814.5758 0.2754 0.7830328   
## FIPS04013 8028.3333 814.5758 9.8558 < 2.2e-16 \*\*\*  
## FIPS04019 1244.0000 814.5758 1.5272 0.1268455   
## FIPS04021 505.6667 814.5758 0.6208 0.5348063   
## FIPS04027 948.0000 814.5758 1.1638 0.2446192   
## FIPS06001 907.5000 814.5758 1.1141 0.2653547   
## FIPS06013 432.0000 814.5758 0.5303 0.5959257   
## FIPS06017 -59.3333 814.5758 -0.0728 0.9419397   
## FIPS06053 183.6667 814.5758 0.2255 0.8216283   
## FIPS06061 24.3333 814.5758 0.0299 0.9761712   
## FIPS06067 447.0000 814.5758 0.5488 0.5832254   
## FIPS06095 125.5000 814.5758 0.1541 0.8775688   
## FIPS06097 107.5000 814.5758 0.1320 0.8950184   
## FIPS06111 397.6667 814.5758 0.4882 0.6254596   
## FIPS06113 -2.1667 814.5758 -0.0027 0.9978779   
## FIPS08001 607.5000 814.5758 0.7458 0.4558671   
## FIPS08005 777.0000 814.5758 0.9539 0.3402425   
## FIPS08013 140.6667 814.5758 0.1727 0.8629116   
## FIPS08014 -40.3333 814.5758 -0.0495 0.9605133   
## FIPS08031 1091.8333 814.5758 1.3404 0.1802482   
## FIPS08035 68.5000 814.5758 0.0841 0.9329894   
## FIPS08059 357.0000 814.5758 0.4383 0.6612326   
## FIPS08101 -24.6667 814.5758 -0.0303 0.9758449   
## FIPS08123 377.0000 814.5758 0.4628 0.6435359   
## FIPS09001 2693.8333 814.5758 3.3070 0.0009564 \*\*\*  
## FIPS09003 1853.6667 814.5758 2.2756 0.0229539 \*   
## FIPS09005 158.5000 814.5758 0.1946 0.8457379   
## FIPS09007 127.6667 814.5758 0.1567 0.8754722   
## FIPS09009 1969.8333 814.5758 2.4182 0.0156680 \*   
## FIPS09013 62.6667 814.5758 0.0769 0.9386841   
## FIPS09015 12.0000 814.5758 0.0147 0.9882475   
## FIPS10003 754.1667 814.5758 0.9258 0.3546197   
## FIPS10005 690.1667 814.5758 0.8473 0.3969261   
## FIPS12001 109.6667 814.5758 0.1346 0.8929151   
## FIPS12011 2514.0000 814.5758 3.0863 0.0020493 \*\*   
## FIPS12015 39.3333 814.5758 0.0483 0.9614915   
## FIPS12019 29.1667 814.5758 0.0358 0.9714400   
## FIPS12031 944.6667 814.5758 1.1597 0.2462815   
## FIPS12033 235.3333 814.5758 0.2889 0.7726799   
## FIPS12057 1702.0000 814.5758 2.0894 0.0367710 \*   
## FIPS12069 127.0000 814.5758 0.1559 0.8761172   
## FIPS12073 95.6667 814.5758 0.1174 0.9065181   
## FIPS12081 386.1667 814.5758 0.4741 0.6354913   
## FIPS12085 252.5000 814.5758 0.3100 0.7566044   
## FIPS12095 1628.8333 814.5758 1.9996 0.0456518 \*   
## FIPS12097 247.8333 814.5758 0.3042 0.7609643   
## FIPS12105 549.3333 814.5758 0.6744 0.5001331   
## FIPS12109 68.5000 814.5758 0.0841 0.9329894   
## FIPS12113 9.1667 814.5758 0.0113 0.9910223   
## FIPS12115 157.0000 814.5758 0.1927 0.8471797   
## FIPS12117 338.0000 814.5758 0.4149 0.6782220   
## FIPS12119 -32.1667 814.5758 -0.0395 0.9685038   
## FIPS13013 -2.3333 814.5758 -0.0029 0.9977147   
## FIPS13015 25.0000 814.5758 0.0307 0.9755186   
## FIPS13029 -68.3333 814.5758 -0.0839 0.9331521   
## FIPS13045 27.5000 814.5758 0.0338 0.9730713   
## FIPS13047 -37.8333 814.5758 -0.0464 0.9629590   
## FIPS13051 130.1667 814.5758 0.1598 0.8730542   
## FIPS13057 129.1667 814.5758 0.1586 0.8740212   
## FIPS13063 233.5000 814.5758 0.2867 0.7744026   
## FIPS13067 723.0000 814.5758 0.8876 0.3748539   
## FIPS13077 21.6667 814.5758 0.0266 0.9787820   
## FIPS13083 -78.3333 814.5758 -0.0962 0.9233977   
## FIPS13085 -66.1667 814.5758 -0.0812 0.9352669   
## FIPS13095 227.8333 814.5758 0.2797 0.7797344   
## FIPS13097 63.0000 814.5758 0.0773 0.9383586   
## FIPS13103 -65.8333 814.5758 -0.0808 0.9355923   
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## FIPS13135 1257.0000 814.5758 1.5431 0.1229263   
## FIPS13139 441.1667 814.5758 0.5416 0.5881494   
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## FIPS13157 -28.3333 814.5758 -0.0348 0.9722556   
## FIPS13177 -24.8333 814.5758 -0.0305 0.9756818   
## FIPS13217 10.1667 814.5758 0.0125 0.9900429   
## FIPS13223 7.1667 814.5758 0.0088 0.9929810   
## FIPS13231 -74.6667 814.5758 -0.0917 0.9269730   
## FIPS13247 -13.0000 814.5758 -0.0160 0.9872682   
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## FIPS15009 -68.6667 814.5758 -0.0843 0.9328268   
## FIPS17007 7.6667 814.5758 0.0094 0.9924913   
## FIPS17019 54.3333 814.5758 0.0667 0.9468248   
## FIPS17031 14999.3333 814.5758 18.4137 < 2.2e-16 \*\*\*  
## FIPS17037 5.6667 814.5758 0.0070 0.9944501   
## FIPS17043 1416.0000 814.5758 1.7383 0.0822776 .   
## FIPS17063 -62.6667 814.5758 -0.0769 0.9386841   
## FIPS17073 -75.5000 814.5758 -0.0927 0.9261603   
## FIPS17077 -34.5000 814.5758 -0.0424 0.9662205   
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## FIPS17113 -46.5000 814.5758 -0.0571 0.9544822   
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## FIPS17143 -8.8333 814.5758 -0.0108 0.9913487   
## FIPS17161 67.8333 814.5758 0.0833 0.9336401   
## FIPS17167 -18.1667 814.5758 -0.0223 0.9822089   
## FIPS17179 -68.5000 814.5758 -0.0841 0.9329894   
## FIPS17197 1024.3333 814.5758 1.2575 0.2086896   
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## FIPS18011 -16.6667 814.5758 -0.0205 0.9836776   
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## FIPS18097 1818.5000 814.5758 2.2325 0.0256745 \*   
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## FIPS18105 -48.6667 814.5758 -0.0597 0.9523637   
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## FIPS18163 -20.1667 814.5758 -0.0248 0.9802506   
## FIPS18173 -56.8333 814.5758 -0.0698 0.9443820   
## FIPS19015 -67.3333 814.5758 -0.0827 0.9341281   
## FIPS19155 25.8333 814.5758 0.0317 0.9747028   
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## FIPS19169 26.6667 814.5758 0.0327 0.9738871   
## FIPS20015 -79.8333 814.5758 -0.0980 0.9219355   
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## FIPS23001 -9.3333 814.5758 -0.0115 0.9908590   
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## FIPS24003 762.8333 814.5758 0.9365 0.3491181   
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## FIPS24015 -10.0000 814.5758 -0.0123 0.9902061   
## FIPS24017 142.5000 814.5758 0.1749 0.8611429   
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## FIPS24027 333.8333 814.5758 0.4098 0.6819701   
## FIPS24031 2372.6667 814.5758 2.9128 0.0036146 \*\*   
## FIPS24033 3087.1667 814.5758 3.7899 0.0001543 \*\*\*  
## FIPS24035 -51.3333 814.5758 -0.0630 0.9497569   
## FIPS24039 -75.1667 814.5758 -0.0923 0.9264854   
## FIPS24045 88.0000 814.5758 0.1080 0.9139793   
## FIPS25003 9.5000 814.5758 0.0117 0.9906958   
## FIPS25005 1280.8333 814.5758 1.5724 0.1159875   
## FIPS25009 2591.3333 814.5758 3.1812 0.0014848 \*\*   
## FIPS25013 1039.3333 814.5758 1.2759 0.2021039   
## FIPS25015 70.3333 814.5758 0.0863 0.9312004   
## FIPS25017 3903.6667 814.5758 4.7923 1.747e-06 \*\*\*  
## FIPS25021 1437.6667 814.5758 1.7649 0.0776996 .   
## FIPS25023 1357.3333 814.5758 1.6663 0.0957791 .   
## FIPS25025 3213.3333 814.5758 3.9448 8.209e-05 \*\*\*  
## FIPS25027 1968.3333 814.5758 2.4164 0.0157473 \*   
## FIPS26005 -37.8333 814.5758 -0.0464 0.9629590   
## FIPS26017 -24.1667 814.5758 -0.0297 0.9763344   
## FIPS26027 -65.3333 814.5758 -0.0802 0.9360804   
## FIPS26037 -52.3333 814.5758 -0.0642 0.9487795   
## FIPS26045 -35.1667 814.5758 -0.0432 0.9655681   
## FIPS26049 365.6667 814.5758 0.4489 0.6535400   
## FIPS26065 80.0000 814.5758 0.0982 0.9217730   
## FIPS26075 259.0000 814.5758 0.3180 0.7505445   
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## FIPS26139 84.6667 814.5758 0.1039 0.9172257   
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## FIPS27027 4.0000 814.5758 0.0049 0.9960824   
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## FIPS28045 -69.3333 814.5758 -0.0851 0.9321762   
## FIPS28047 30.3333 814.5758 0.0372 0.9702981   
## FIPS28049 262.0000 814.5758 0.3216 0.7477528   
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## FIPS28089 111.1667 814.5758 0.1365 0.8914594   
## FIPS28121 46.0000 814.5758 0.0565 0.9549711   
## FIPS29019 -26.1667 814.5758 -0.0321 0.9743765   
## FIPS29043 -82.0000 814.5758 -0.1007 0.9198239   
## FIPS29077 -35.3333 814.5758 -0.0434 0.9654050   
## FIPS30063 -75.5000 814.5758 -0.0927 0.9261603   
## FIPS30111 -60.8333 814.5758 -0.0747 0.9404746   
## FIPS31025 -78.6667 814.5758 -0.0966 0.9230727   
## FIPS31055 1115.8333 814.5758 1.3698 0.1708634   
## FIPS31109 198.0000 814.5758 0.2431 0.8079704   
## FIPS31153 104.5000 814.5758 0.1283 0.8979318   
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## FIPS33011 455.8333 814.5758 0.5596 0.5758058   
## FIPS33015 155.8333 814.5758 0.1913 0.8483015   
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## FIPS34005 777.6667 814.5758 0.9547 0.3398284   
## FIPS34007 1137.3333 814.5758 1.3962 0.1627714   
## FIPS34011 405.8333 814.5758 0.4982 0.6183774   
## FIPS34015 340.8333 814.5758 0.4184 0.6756778   
## FIPS34019 99.1667 814.5758 0.1217 0.9031146   
## FIPS34031 2748.0000 814.5758 3.3735 0.0007535 \*\*\*  
## FIPS34033 38.6667 814.5758 0.0475 0.9621437   
## FIPS34041 117.6667 814.5758 0.1445 0.8851558   
## FIPS35001 267.1667 814.5758 0.3280 0.7429527   
## FIPS35043 31.3333 814.5758 0.0385 0.9693194   
## FIPS36007 29.3333 814.5758 0.0360 0.9712768   
## FIPS36027 611.1667 814.5758 0.7503 0.4531526   
## FIPS36029 1125.3333 814.5758 1.3815 0.1672514   
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## FIPS36063 115.6667 814.5758 0.1420 0.8870946   
## FIPS36067 383.6667 814.5758 0.4710 0.6376811   
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## FIPS42043 250.8333 814.5758 0.3079 0.7581606   
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## FIPS42085 -66.6667 814.5758 -0.0818 0.9347788   
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## FIPS42133 162.5000 814.5758 0.1995 0.8418956   
## FIPS44001 -47.5000 814.5758 -0.0583 0.9535044   
## FIPS44003 109.8333 814.5758 0.1348 0.8927533   
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## FIPS45021 -64.1667 814.5758 -0.0788 0.9372195   
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## FIPS45045 745.0000 814.5758 0.9146 0.3604981   
## FIPS45055 20.8333 814.5758 0.0256 0.9795978   
## FIPS45057 -10.5000 814.5758 -0.0129 0.9897165   
## FIPS45063 255.3333 814.5758 0.3135 0.7539610   
## FIPS45071 -46.8333 814.5758 -0.0575 0.9541562   
## FIPS45077 49.6667 814.5758 0.0610 0.9513861   
## FIPS45079 496.3333 814.5758 0.6093 0.5423717   
## FIPS45083 178.1667 814.5758 0.2187 0.8268837   
## FIPS45085 86.5000 814.5758 0.1062 0.9154400   
## FIPS45091 110.6667 814.5758 0.1359 0.8919446   
## FIPS47001 -72.1667 814.5758 -0.0886 0.9294116   
## FIPS47009 -60.8333 814.5758 -0.0747 0.9404746   
## FIPS47047 -44.3333 814.5758 -0.0544 0.9566009   
## FIPS47065 330.8333 814.5758 0.4061 0.6846736   
## FIPS47093 71.3333 814.5758 0.0876 0.9302246   
## FIPS47105 -46.0000 814.5758 -0.0565 0.9549711   
## FIPS47113 -47.6667 814.5758 -0.0585 0.9533414   
## FIPS47129 -85.8333 814.5758 -0.1054 0.9160893   
## FIPS47145 -82.3333 814.5758 -0.1011 0.9194990   
## FIPS47147 39.6667 814.5758 0.0487 0.9611654   
## FIPS47149 331.3333 814.5758 0.4068 0.6842227   
## FIPS47153 -85.3333 814.5758 -0.1048 0.9165763   
## FIPS47155 11.5000 814.5758 0.0141 0.9887372   
## FIPS47157 1581.3333 814.5758 1.9413 0.0523359 .   
## FIPS47165 146.1667 814.5758 0.1794 0.8576077   
## FIPS47187 79.0000 814.5758 0.0970 0.9227478   
## FIPS47189 40.0000 814.5758 0.0491 0.9608393   
## FIPS48027 111.5000 814.5758 0.1369 0.8911360   
## FIPS48039 288.1667 814.5758 0.3538 0.7235468   
## FIPS48055 -33.8333 814.5758 -0.0415 0.9668728   
## FIPS48061 292.6667 814.5758 0.3593 0.7194110   
## FIPS48071 -42.0000 814.5758 -0.0516 0.9588830   
## FIPS48099 -34.1667 814.5758 -0.0419 0.9665466   
## FIPS48113 3466.3333 814.5758 4.2554 2.165e-05 \*\*\*  
## FIPS48121 384.1667 814.5758 0.4716 0.6372429   
## FIPS48157 540.3333 814.5758 0.6633 0.5071805   
## FIPS48167 458.8333 814.5758 0.5633 0.5732962   
## FIPS48181 5.3333 814.5758 0.0065 0.9947765   
## FIPS48199 -51.3333 814.5758 -0.0630 0.9497569   
## FIPS48201 5147.0000 814.5758 6.3186 3.120e-10 \*\*\*  
## FIPS48209 379.8333 814.5758 0.4663 0.6410449   
## FIPS48215 569.1667 814.5758 0.6987 0.4847880   
## FIPS48245 208.0000 814.5758 0.2553 0.7984759   
## FIPS48281 -86.6667 814.5758 -0.1064 0.9152777   
## FIPS48303 288.8333 814.5758 0.3546 0.7229336   
## FIPS48309 69.5000 814.5758 0.0853 0.9320135   
## FIPS48339 265.5000 814.5758 0.3259 0.7445000   
## FIPS48361 -54.5000 814.5758 -0.0669 0.9466620   
## FIPS48439 1967.3333 814.5758 2.4152 0.0158004 \*   
## FIPS48453 1497.8333 814.5758 1.8388 0.0660662 .   
## FIPS48473 -64.0000 814.5758 -0.0786 0.9373822   
## FIPS48479 166.3333 814.5758 0.2042 0.8382170   
## FIPS48491 281.6667 814.5758 0.3458 0.7295351   
## FIPS49005 152.1667 814.5758 0.1868 0.8518290   
## FIPS50007 11.5000 814.5758 0.0141 0.9887372   
## FIPS51003 -23.1667 814.5758 -0.0284 0.9773134   
## FIPS51009 -83.6667 814.5758 -0.1027 0.9181999   
## FIPS51013 323.1667 814.5758 0.3967 0.6916009   
## FIPS51019 -70.1667 814.5758 -0.0861 0.9313630   
## FIPS51023 -69.5000 814.5758 -0.0853 0.9320135   
## FIPS51031 -82.3333 814.5758 -0.1011 0.9194990   
## FIPS51041 392.8333 814.5758 0.4823 0.6296675   
## FIPS51053 -66.0000 814.5758 -0.0810 0.9354296   
## FIPS51059 2218.3333 814.5758 2.7233 0.0065088 \*\*   
## FIPS51061 -19.8333 814.5758 -0.0243 0.9805770   
## FIPS51075 -69.6667 814.5758 -0.0855 0.9318509   
## FIPS51085 -18.3333 814.5758 -0.0225 0.9820457   
## FIPS51087 341.8333 814.5758 0.4196 0.6747807   
## FIPS51095 -45.8333 814.5758 -0.0563 0.9551341   
## FIPS51107 576.6667 814.5758 0.7079 0.4790525   
## FIPS51121 -65.6667 814.5758 -0.0806 0.9357550   
## FIPS51145 -76.0000 814.5758 -0.0933 0.9256727   
## FIPS51149 -50.1667 814.5758 -0.0616 0.9508973   
## FIPS51153 1124.3333 814.5758 1.3803 0.1676289   
## FIPS51155 -82.3333 814.5758 -0.1011 0.9194990   
## FIPS51161 -47.3333 814.5758 -0.0581 0.9536673   
## FIPS51165 30.6667 814.5758 0.0376 0.9699719   
## FIPS51179 75.0000 814.5758 0.0921 0.9266479   
## FIPS51199 -70.6667 814.5758 -0.0868 0.9308751   
## FIPS53005 227.5000 814.5758 0.2793 0.7800484   
## FIPS53007 -34.0000 814.5758 -0.0417 0.9667097   
## FIPS53011 50.5000 814.5758 0.0620 0.9505715   
## FIPS53015 -60.1667 814.5758 -0.0739 0.9411257   
## FIPS53017 -50.1667 814.5758 -0.0616 0.9508973   
## FIPS53021 206.1667 814.5758 0.2531 0.8002144   
## FIPS53033 1609.6667 814.5758 1.9761 0.0482569 \*   
## FIPS53035 -52.8333 814.5758 -0.0649 0.9482908   
## FIPS53053 391.1667 814.5758 0.4802 0.6311213   
## FIPS53061 580.0000 814.5758 0.7120 0.4765153   
## FIPS53063 140.8333 814.5758 0.1729 0.8627508   
## FIPS53067 -46.0000 814.5758 -0.0565 0.9549711   
## FIPS53071 -61.1667 814.5758 -0.0751 0.9401490   
## FIPS53073 13.6667 814.5758 0.0168 0.9866154   
## FIPS54011 -68.6667 814.5758 -0.0843 0.9328268   
## FIPS54039 -36.8333 814.5758 -0.0452 0.9639374   
## FIPS54051 -82.8333 814.5758 -0.1017 0.9190119   
## FIPS54061 -60.5000 814.5758 -0.0743 0.9408001   
## FIPS54069 -73.8333 814.5758 -0.0906 0.9277858   
## FIPS54079 -80.3333 814.5758 -0.0986 0.9214481   
## FIPS54099 -71.5000 814.5758 -0.0878 0.9300620   
## FIPS55015 -72.0000 814.5758 -0.0884 0.9295742   
## FIPS55031 -85.6667 814.5758 -0.1052 0.9162517   
## FIPS55055 -50.6667 814.5758 -0.0622 0.9504085   
## FIPS55059 160.8333 814.5758 0.1974 0.8434961   
## FIPS55079 1809.5000 814.5758 2.2214 0.0264141 \*   
## FIPS55087 -10.6667 814.5758 -0.0131 0.9895533   
## FIPS55089 -49.0000 814.5758 -0.0602 0.9520378   
## FIPS55101 271.8333 814.5758 0.3337 0.7386256   
## FIPS55131 -27.8333 814.5758 -0.0342 0.9727451   
## FIPS55133 109.8333 814.5758 0.1348 0.8927533   
## FIPS55139 21.6667 814.5758 0.0266 0.9787820   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 8007300000  
## Residual Sum of Squares: 4916800000  
## R-Squared: 0.38596  
## Adj. R-Squared: 0.26191  
## F-statistic: 3.14283 on 494 and 2470 DF, p-value: < 2.22e-16

## Joining, by = "FIPS"

## Oneway (time) effect Random Effect Model   
## (Swamy-Arora's transformation)  
##   
## Call:  
## plm(formula = cases ~ RperPerson + indexPMPOPEST + Years.of.Potential.Life.Lost.Rate +   
## Avg\_PMiles\_Trip + SRVC\_Pop\_Dense + POPESTIMATE2018 + FIPS,   
## data = panel\_percapitax, effect = "time", model = "random",   
## index = c("FIPS", "months"))  
##   
## Balanced Panel: n = 2717, T = 6, N = 16302  
##   
## Effects:  
## var std.dev share  
## idiosyncratic 5.271e-06 2.296e-03 0.859  
## time 8.641e-07 9.296e-04 0.141  
## theta: 0.9527  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -2.1678e-02 -7.0128e-04 -6.4845e-05 5.2256e-04 9.2171e-02   
##   
## Coefficients: (6 dropped because of singularities)  
## Estimate Std. Error z-value Pr(>|z|)  
## (Intercept) 1.2732e-02 3.6124e-02 0.3525 0.7245  
## RperPerson -5.1618e-02 1.3356e-01 -0.3865 0.6991  
## indexPMPOPEST 3.4223e-01 1.0592e+00 0.3231 0.7466  
## Years.of.Potential.Life.Lost.Rate -2.5586e-08 6.1952e-07 -0.0413 0.9671  
## Avg\_PMiles\_Trip 1.8862e-03 5.1870e-03 0.3636 0.7161  
## SRVC\_Pop\_Dense 4.0284e-05 1.2682e-04 0.3176 0.7508  
## POPESTIMATE2018 -3.7798e-07 1.1577e-06 -0.3265 0.7441  
## FIPS01003 5.3388e-02 1.7164e-01 0.3111 0.7558  
## FIPS01005 1.6995e-02 4.4630e-02 0.3808 0.7034  
## FIPS01007 1.7192e-02 4.7842e-02 0.3593 0.7193  
## FIPS01009 -1.5535e-02 4.1481e-02 -0.3745 0.7080  
## FIPS01011 4.1321e-02 9.5635e-02 0.4321 0.6657  
## FIPS01013 2.2824e-02 5.3126e-02 0.4296 0.6675  
## FIPS01015 3.5069e-02 1.1297e-01 0.3104 0.7562  
## FIPS01017 1.6430e-02 4.3206e-02 0.3803 0.7037  
## FIPS01019 1.4996e-02 4.5089e-02 0.3326 0.7394  
## FIPS01021 1.5102e-02 4.6627e-02 0.3239 0.7460  
## FIPS01023 2.9583e-02 7.5304e-02 0.3928 0.6944  
## FIPS01025 1.7056e-02 4.5872e-02 0.3718 0.7100  
## FIPS01027 2.6736e-02 7.1759e-02 0.3726 0.7095  
## FIPS01029 2.3239e-02 6.4181e-02 0.3621 0.7173  
## FIPS01031 1.6815e-02 5.0686e-02 0.3318 0.7401  
## FIPS01033 -1.2356e-03 3.5101e-03 -0.3520 0.7248  
## FIPS01035 3.0898e-02 7.7853e-02 0.3969 0.6915  
## FIPS01037 3.4039e-02 9.0747e-02 0.3751 0.7076  
## FIPS01039 1.4994e-02 4.4161e-02 0.3395 0.7342  
## FIPS01041 2.6477e-02 6.8665e-02 0.3856 0.6998  
## FIPS01043 2.5217e-02 7.9939e-02 0.3155 0.7524  
## FIPS01045 1.5959e-02 4.9882e-02 0.3199 0.7490  
## FIPS01047 1.7293e-02 4.6478e-02 0.3721 0.7098  
## FIPS01049 2.2124e-02 6.8624e-02 0.3224 0.7472  
## FIPS01051 3.9754e-03 1.3286e-02 0.2992 0.7648  
## FIPS01053 1.4758e-02 4.4541e-02 0.3313 0.7404  
## FIPS01055 3.1658e-02 1.0040e-01 0.3153 0.7525  
## FIPS01057 2.1524e-02 5.8339e-02 0.3690 0.7122  
## FIPS01059 1.8076e-02 4.2520e-02 0.4251 0.6708  
## FIPS01061 1.4820e-02 4.4267e-02 0.3348 0.7378  
## FIPS01063 4.8102e-02 1.1967e-01 0.4019 0.6877  
## FIPS01065 2.6647e-02 6.5927e-02 0.4042 0.6861  
## FIPS01067 2.1123e-02 5.5813e-02 0.3785 0.7051  
## FIPS01069 3.2048e-02 1.0148e-01 0.3158 0.7521  
## FIPS01071 1.6403e-02 5.2186e-02 0.3143 0.7533  
## FIPS01073 1.7495e-01 5.4043e-01 0.3237 0.7461  
## FIPS01075 2.5849e-02 6.9665e-02 0.3710 0.7106  
## FIPS01077 8.8950e-03 3.5524e-02 0.2504 0.8023  
## FIPS01079 3.7480e-03 1.4932e-02 0.2510 0.8018  
## FIPS01081 5.3335e-02 1.6459e-01 0.3241 0.7459  
## FIPS01083 -4.0368e-02 1.2320e-01 -0.3277 0.7432  
## FIPS01085 4.3774e-02 9.9615e-02 0.4394 0.6604  
## FIPS01087 2.0229e-02 5.4689e-02 0.3699 0.7115  
## FIPS01089 -1.0643e-01 3.3701e-01 -0.3158 0.7521  
## FIPS01091 2.0571e-02 5.3074e-02 0.3876 0.6983  
## FIPS01093 1.4916e-02 4.3172e-02 0.3455 0.7297  
## FIPS01095 3.1096e-02 9.2721e-02 0.3354 0.7373  
## FIPS01097 1.2790e-02 3.5930e-02 0.3560 0.7219  
## FIPS01099 1.8225e-02 4.9904e-02 0.3652 0.7150  
## FIPS01101 3.5463e-02 1.0652e-01 0.3329 0.7392  
## FIPS01103 2.5671e-02 8.2893e-02 0.3097 0.7568  
## FIPS01105 4.2249e-02 1.0831e-01 0.3901 0.6965  
## FIPS01107 1.9101e-02 5.0121e-02 0.3811 0.7031  
## FIPS01109 1.5506e-02 4.2772e-02 0.3625 0.7170  
## FIPS01111 1.6965e-02 4.6608e-02 0.3640 0.7159  
## FIPS01113 1.8466e-02 5.6940e-02 0.3243 0.7457  
## FIPS01115 -3.4715e-03 4.2524e-03 -0.8164 0.4143  
## FIPS01117 3.8336e-02 1.2247e-01 0.3130 0.7543  
## FIPS01119 3.1099e-02 7.6567e-02 0.4062 0.6846  
## FIPS01121 2.3881e-02 7.7429e-02 0.3084 0.7578  
## FIPS01123 1.6165e-02 4.5039e-02 0.3589 0.7197  
## FIPS01125 7.0171e-02 2.1614e-01 0.3247 0.7454  
## FIPS01127 2.0972e-02 6.4184e-02 0.3267 0.7439  
## FIPS01129 2.1974e-02 5.9848e-02 0.3672 0.7135  
## FIPS01131 3.7893e-02 9.1698e-02 0.4132 0.6794  
## FIPS01133 1.6922e-02 4.5941e-02 0.3683 0.7126  
## FIPS04001 2.7635e-02 7.4992e-02 0.3685 0.7125  
## FIPS04003 4.0412e-02 1.2562e-01 0.3217 0.7477  
## FIPS04005 -1.5992e-01 5.0586e-01 -0.3161 0.7519  
## FIPS04007 1.8755e-02 5.9659e-02 0.3144 0.7532  
## FIPS04009 1.6269e-02 4.8794e-02 0.3334 0.7388  
## FIPS04011 4.7332e-02 1.2366e-01 0.3828 0.7019  
## FIPS04012 2.3532e-02 6.1951e-02 0.3799 0.7041  
## FIPS04013 1.5114e+00 4.6251e+00 0.3268 0.7438  
## FIPS04015 7.0120e-02 2.1874e-01 0.3206 0.7485  
## FIPS04017 3.9641e-02 1.1183e-01 0.3545 0.7230  
## FIPS04019 3.6185e-01 1.1131e+00 0.3251 0.7451  
## FIPS04021 -6.0693e-01 1.8789e+00 -0.3230 0.7467  
## FIPS04023 2.2774e-02 5.0060e-02 0.4549 0.6492  
## FIPS04025 7.8015e-02 2.4270e-01 0.3214 0.7479  
## FIPS04027 -1.0681e-03 1.2288e-02 -0.0869 0.9307  
## FIPS05001 5.6069e-01 1.7256e+00 0.3249 0.7452  
## FIPS05003 9.3151e-03 2.7862e-02 0.3343 0.7381  
## FIPS05005 9.8654e-03 3.3903e-02 0.2910 0.7711  
## FIPS05007 9.3134e-02 2.8552e-01 0.3262 0.7443  
## FIPS05009 9.0694e-03 3.1068e-02 0.2919 0.7703  
## FIPS05011 1.7546e-02 4.7471e-02 0.3696 0.7117  
## FIPS05013 4.1297e-02 1.1051e-01 0.3737 0.7086  
## FIPS05015 8.8837e-03 2.7519e-02 0.3228 0.7468  
## FIPS05017 1.9837e-02 5.0865e-02 0.3900 0.6965  
## FIPS05019 8.6843e-03 2.6905e-02 0.3228 0.7469  
## FIPS05021 1.2169e-02 3.4870e-02 0.3490 0.7271  
## FIPS05023 8.4937e-03 2.6915e-02 0.3156 0.7523  
## FIPS05025 2.5170e-02 6.7491e-02 0.3729 0.7092  
## FIPS05027 8.6035e-03 2.6047e-02 0.3303 0.7412  
## FIPS05029 8.9285e-03 2.7518e-02 0.3245 0.7456  
## FIPS05031 3.1718e-02 1.0065e-01 0.3151 0.7527  
## FIPS05033 1.6192e-02 5.3481e-02 0.3028 0.7621  
## FIPS05035 -3.5463e-02 1.0856e-01 -0.3267 0.7439  
## FIPS05037 1.1099e-02 3.2283e-02 0.3438 0.7310  
## FIPS05039 2.8486e-02 7.6294e-02 0.3734 0.7089  
## FIPS05041 1.6365e-02 4.5949e-02 0.3562 0.7217  
## FIPS05043 9.9752e-03 2.9865e-02 0.3340 0.7384  
## FIPS05045 3.7469e-02 1.1841e-01 0.3164 0.7517  
## FIPS05047 9.8523e-03 3.1136e-02 0.3164 0.7517  
## FIPS05049 1.4626e-02 4.1786e-02 0.3500 0.7263  
## FIPS05051 2.8200e-02 9.1937e-02 0.3067 0.7591  
## FIPS05053 9.7262e-03 2.8315e-02 0.3435 0.7312  
## FIPS05055 1.1117e-02 3.7952e-02 0.2929 0.7696  
## FIPS05057 8.7006e-03 2.6717e-02 0.3257 0.7447  
## FIPS05059 1.0516e-02 3.0381e-02 0.3462 0.7292  
## FIPS05061 1.4178e-02 3.8132e-02 0.3718 0.7100  
## FIPS05063 9.2384e-03 3.1304e-02 0.2951 0.7679  
## FIPS05065 1.3027e-02 3.7992e-02 0.3429 0.7317  
## FIPS05067 1.0435e-02 3.1835e-02 0.3278 0.7431  
## FIPS05069 1.9060e-02 6.0170e-02 0.3168 0.7514  
## FIPS05071 9.2627e-03 2.6610e-02 0.3481 0.7278  
## FIPS05073 3.1377e-02 8.2944e-02 0.3783 0.7052  
## FIPS05075 1.1395e-02 3.2225e-02 0.3536 0.7236  
## FIPS05077 3.3407e-02 5.8731e-02 0.5688 0.5695  
## FIPS05079 2.5913e-02 3.7604e-02 0.6891 0.4908  
## FIPS05081 1.4847e-02 4.1121e-02 0.3611 0.7181  
## FIPS05083 8.6620e-03 2.7029e-02 0.3205 0.7486  
## FIPS05085 1.9389e-02 6.4208e-02 0.3020 0.7627  
## FIPS05087 1.2325e-02 3.2868e-02 0.3750 0.7077  
## FIPS05089 1.0251e-02 3.1545e-02 0.3250 0.7452  
## FIPS05091 1.0742e-02 3.7080e-02 0.2897 0.7721  
## FIPS05093 1.0503e-02 3.6407e-02 0.2885 0.7730  
## FIPS05095 3.0246e-02 8.5005e-02 0.3558 0.7220  
## FIPS05097 2.1511e-02 5.7470e-02 0.3743 0.7082  
## FIPS05099 2.5492e-02 6.4223e-02 0.3969 0.6914  
## FIPS05101 2.5535e-02 6.8557e-02 0.3725 0.7096  
## FIPS05103 8.2017e-03 2.7197e-02 0.3016 0.7630  
## FIPS05105 1.8245e-02 4.9073e-02 0.3718 0.7100  
## FIPS05107 1.0925e-02 3.2037e-02 0.3410 0.7331  
## FIPS05109 1.7213e-02 4.6654e-02 0.3689 0.7122  
## FIPS05111 8.4638e-03 2.8489e-02 0.2971 0.7664  
## FIPS05113 9.3276e-03 2.7247e-02 0.3423 0.7321  
## FIPS05115 1.7065e-02 5.3660e-02 0.3180 0.7505  
## FIPS05117 2.4796e-02 6.6253e-02 0.3743 0.7082  
## FIPS05119 1.3750e-01 4.2564e-01 0.3230 0.7467  
## FIPS05121 1.0023e-02 3.0907e-02 0.3243 0.7457  
## FIPS05123 1.3238e-02 2.7594e-02 0.4797 0.6314  
## FIPS05125 3.6003e-02 1.1485e-01 0.3135 0.7539  
## FIPS05127 1.8121e-02 5.1270e-02 0.3534 0.7238  
## FIPS05129 2.4992e-02 6.7699e-02 0.3692 0.7120  
## FIPS05131 3.8539e-02 1.2245e-01 0.3147 0.7530  
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## FIPS05135 1.0370e-02 3.1018e-02 0.3343 0.7381  
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## FIPS53067 -3.4541e-02 1.0691e-01 -0.3231 0.7466  
## FIPS53071 -1.3369e-02 3.7531e-02 -0.3562 0.7217  
## FIPS53073 5.6993e-02 1.7772e-01 0.3207 0.7484  
## FIPS53075 2.2600e-02 6.5956e-02 0.3427 0.7319  
## FIPS53077 -2.2899e-01 7.3371e-01 -0.3121 0.7550  
## FIPS54001 4.2195e-03 1.5228e-02 0.2771 0.7817  
## FIPS54003 3.3895e-02 1.0878e-01 0.3116 0.7554  
## FIPS54005 3.8374e-03 1.7093e-02 0.2245 0.8224  
## FIPS54007 4.9797e-03 1.7559e-02 0.2836 0.7767  
## FIPS54009 3.6122e-03 1.4333e-02 0.2520 0.8010  
## FIPS54011 -1.0476e-02 2.2250e-02 -0.4708 0.6378  
## FIPS54013 1.3702e-02 3.7842e-02 0.3621 0.7173  
## FIPS54015 1.0716e-02 3.1590e-02 0.3392 0.7345  
## FIPS54019 8.0784e-03 3.1155e-02 0.2593 0.7954  
## FIPS54021 1.1954e-02 3.2656e-02 0.3661 0.7143  
## FIPS54023 6.7076e-03 1.9601e-02 0.3422 0.7322  
## FIPS54025 5.8245e-03 2.2090e-02 0.2637 0.7920  
## FIPS54027 3.9558e-03 1.5737e-02 0.2514 0.8015  
## FIPS54029 4.5146e-03 1.8422e-02 0.2451 0.8064  
## FIPS54031 5.5617e-03 1.6597e-02 0.3351 0.7375  
## FIPS54033 1.5739e-02 5.4260e-02 0.2901 0.7718  
## FIPS54035 5.1129e-03 1.7577e-02 0.2909 0.7711  
## FIPS54037 1.2604e-02 4.1636e-02 0.3027 0.7621  
## FIPS54039 3.9077e-02 1.2940e-01 0.3020 0.7627  
## FIPS54041 4.4690e-03 1.7242e-02 0.2592 0.7955  
## FIPS54043 3.7390e-03 1.7161e-02 0.2179 0.8275  
## FIPS54045 5.3154e-03 2.3859e-02 0.2228 0.8237  
## FIPS54047 4.0175e-03 1.9931e-02 0.2016 0.8403  
## FIPS54049 1.1907e-02 4.1461e-02 0.2872 0.7740  
## FIPS54051 -4.8234e-02 1.4635e-01 -0.3296 0.7417  
## FIPS54053 4.1775e-03 1.8358e-02 0.2276 0.8200  
## FIPS54055 1.2939e-02 4.7177e-02 0.2743 0.7839  
## FIPS54057 4.3432e-03 1.6244e-02 0.2674 0.7892  
## FIPS54059 3.9199e-03 1.8152e-02 0.2159 0.8290  
## FIPS54061 1.1569e-02 3.9731e-02 0.2912 0.7709  
## FIPS54063 5.4510e-03 1.7179e-02 0.3173 0.7510  
## FIPS54065 4.0479e-03 1.5788e-02 0.2564 0.7976  
## FIPS54067 3.8442e-03 1.6216e-02 0.2371 0.8126  
## FIPS54069 -6.1561e-02 1.8736e-01 -0.3286 0.7425  
## FIPS54071 1.4794e-02 4.0658e-02 0.3639 0.7160  
## FIPS54073 1.3066e-02 3.5440e-02 0.3687 0.7124  
## FIPS54075 1.1435e-02 3.1567e-02 0.3622 0.7172  
## FIPS54077 5.6992e-03 2.0792e-02 0.2741 0.7840  
## FIPS54079 -4.2075e-03 5.3967e-03 -0.7796 0.4356  
## FIPS54081 1.8080e-02 6.2980e-02 0.2871 0.7741  
## FIPS54083 5.1866e-03 1.7374e-02 0.2985 0.7653  
## FIPS54085 8.6942e-03 2.5258e-02 0.3442 0.7307  
## FIPS54087 5.2913e-03 1.8962e-02 0.2790 0.7802  
## FIPS54089 5.7332e-03 1.9443e-02 0.2949 0.7681  
## FIPS54091 4.1149e-03 1.4304e-02 0.2877 0.7736  
## FIPS54093 1.4695e-02 4.0131e-02 0.3662 0.7142  
## FIPS54095 1.0321e-02 2.9646e-02 0.3481 0.7277  
## FIPS54097 3.7992e-03 1.4866e-02 0.2556 0.7983  
## FIPS54099 -1.6405e-02 4.2647e-02 -0.3847 0.7005  
## FIPS54101 1.1191e-02 3.2772e-02 0.3415 0.7328  
## FIPS54103 4.5649e-03 1.6246e-02 0.2810 0.7787  
## FIPS54105 1.8928e-02 5.0469e-02 0.3750 0.7076  
## FIPS54107 2.1559e-02 7.2360e-02 0.2979 0.7657  
## FIPS54109 3.6888e-03 1.6320e-02 0.2260 0.8212  
## FIPS55001 2.7789e-02 7.6035e-02 0.3655 0.7148  
## FIPS55003 3.5748e-02 9.6072e-02 0.3721 0.7098  
## FIPS55005 1.9261e-02 5.7566e-02 0.3346 0.7379  
## FIPS55007 3.7069e-02 9.8626e-02 0.3759 0.7070  
## FIPS55009 9.1292e-02 2.7847e-01 0.3278 0.7430  
## FIPS55011 4.2830e-02 1.1254e-01 0.3806 0.7035  
## FIPS55013 3.6272e-02 9.7481e-02 0.3721 0.7098  
## FIPS55015 -9.6939e-03 3.0451e-02 -0.3183 0.7502  
## FIPS55017 2.2192e-02 6.8076e-02 0.3260 0.7444  
## FIPS55019 1.9951e-02 5.7059e-02 0.3497 0.7266  
## FIPS55021 2.0881e-02 6.3624e-02 0.3282 0.7428  
## FIPS55023 3.4486e-02 9.1510e-02 0.3769 0.7063  
## FIPS55025 -1.3122e-01 4.2367e-01 -0.3097 0.7568  
## FIPS55027 2.9040e-02 8.8842e-02 0.3269 0.7438  
## FIPS55029 2.2024e-02 6.0466e-02 0.3642 0.7157  
## FIPS55031 -1.6818e-02 5.3281e-02 -0.3156 0.7523  
## FIPS55033 1.9249e-02 5.7093e-02 0.3372 0.7360  
## FIPS55035 3.3619e-02 1.0460e-01 0.3214 0.7479  
## FIPS55039 3.3284e-02 1.0296e-01 0.3233 0.7465  
## FIPS55041 6.5201e-02 1.7111e-01 0.3811 0.7032  
## FIPS55043 2.0197e-02 5.9590e-02 0.3389 0.7347  
## FIPS55045 1.9644e-02 5.5711e-02 0.3526 0.7244  
## FIPS55047 2.9800e-02 8.0135e-02 0.3719 0.7100  
## FIPS55049 2.4408e-02 6.6114e-02 0.3692 0.7120  
## FIPS55053 2.7710e-02 7.5254e-02 0.3682 0.7127  
## FIPS55055 -5.6146e-01 1.7358e+00 -0.3235 0.7463  
## FIPS55057 2.2559e-02 6.2860e-02 0.3589 0.7197  
## FIPS55059 -7.7290e-02 2.4564e-01 -0.3147 0.7530  
## FIPS55061 2.8000e-02 7.4546e-02 0.3756 0.7072  
## FIPS55063 3.8310e-02 1.1859e-01 0.3231 0.7467  
## FIPS55065 3.4124e-02 8.9466e-02 0.3814 0.7029  
## FIPS55067 2.9079e-02 7.8198e-02 0.3719 0.7100  
## FIPS55069 2.1820e-02 6.1227e-02 0.3564 0.7216  
## FIPS55071 2.5877e-02 8.0653e-02 0.3208 0.7483  
## FIPS55073 4.3684e-02 1.3631e-01 0.3205 0.7486  
## FIPS55075 1.9298e-02 5.6681e-02 0.3405 0.7335  
## FIPS55077 3.6268e-02 9.7230e-02 0.3730 0.7091  
## FIPS55078 1.3155e-01 3.4557e-01 0.3807 0.7034  
## FIPS55079 2.5991e-01 7.9468e-01 0.3271 0.7436  
## FIPS55081 1.9437e-02 5.8126e-02 0.3344 0.7381  
## FIPS55083 1.9454e-02 5.6372e-02 0.3451 0.7300  
## FIPS55085 1.9558e-02 5.6841e-02 0.3441 0.7308  
## FIPS55087 -1.2959e-02 3.9606e-02 -0.3272 0.7435  
## FIPS55089 -5.3433e-01 1.6526e+00 -0.3233 0.7464  
## FIPS55091 8.0809e-02 2.0997e-01 0.3849 0.7003  
## FIPS55093 1.9262e-02 5.5926e-02 0.3444 0.7305  
## FIPS55095 1.9255e-02 5.7145e-02 0.3369 0.7362  
## FIPS55097 2.3836e-02 7.2468e-02 0.3289 0.7422  
## FIPS55099 4.1826e-02 1.1057e-01 0.3783 0.7052  
## FIPS55101 -1.9750e-01 6.1234e-01 -0.3225 0.7470  
## FIPS55103 3.2166e-02 8.6145e-02 0.3734 0.7089  
## FIPS55105 5.4155e-02 1.6732e-01 0.3237 0.7462  
## FIPS55107 3.9594e-02 1.0453e-01 0.3788 0.7049  
## FIPS55109 2.8958e-02 8.9359e-02 0.3241 0.7459  
## FIPS55111 2.2272e-02 6.8239e-02 0.3264 0.7441  
## FIPS55113 3.3928e-02 9.1982e-02 0.3688 0.7122  
## FIPS55115 1.9376e-02 5.6860e-02 0.3408 0.7333  
## FIPS55117 3.7083e-02 1.1562e-01 0.3207 0.7484  
## FIPS55119 2.7592e-02 7.4343e-02 0.3711 0.7105  
## FIPS55121 2.1667e-02 5.9767e-02 0.3625 0.7170  
## FIPS55123 2.0695e-02 5.8184e-02 0.3557 0.7221  
## FIPS55125 2.5973e-02 7.1951e-02 0.3610 0.7181  
## FIPS55127 3.3973e-02 1.0382e-01 0.3272 0.7435  
## FIPS55129 3.5077e-02 9.3512e-02 0.3751 0.7076  
## FIPS55131 -3.3077e-01 1.0216e+00 -0.3238 0.7461  
## FIPS55135 2.0054e-02 6.0248e-02 0.3329 0.7392  
## FIPS55137 2.4015e-02 6.5879e-02 0.3645 0.7155  
## FIPS55141 2.4219e-02 7.5741e-02 0.3198 0.7492  
## FIPS56001 3.9465e-03 1.6380e-02 0.2409 0.8096  
## FIPS56003 -1.9153e-03 2.9310e-03 -0.6535 0.5135  
## FIPS56005 6.5690e-03 2.4581e-02 0.2672 0.7893  
## FIPS56007 -1.9750e-03 2.5527e-03 -0.7737 0.4391  
## FIPS56009 -1.9658e-03 3.0724e-03 -0.6398 0.5223  
## FIPS56011 -3.4071e-04 1.1839e-03 -0.2878 0.7735  
## FIPS56013 5.7590e-03 2.0739e-02 0.2777 0.7812  
## FIPS56015 -2.2784e-03 3.9614e-03 -0.5751 0.5652  
## FIPS56017 4.8841e-03 1.4023e-02 0.3483 0.7276  
## FIPS56019 -7.8898e-04 1.6370e-03 -0.4820 0.6298  
## FIPS56021 2.6007e-02 8.4402e-02 0.3081 0.7580  
## FIPS56023 -1.4672e-03 1.6189e-03 -0.9063 0.3648  
## FIPS56025 1.8498e-02 6.1973e-02 0.2985 0.7653  
## FIPS56029 1.1466e-03 7.2908e-03 0.1573 0.8750  
## FIPS56031 -1.1859e-03 1.7394e-03 -0.6818 0.4954  
## FIPS56033 1.3186e-03 9.0340e-03 0.1460 0.8840  
## FIPS56035 -1.7276e-03 3.3578e-03 -0.5145 0.6069  
## FIPS56037 5.6971e-03 2.2282e-02 0.2557 0.7982  
##   
## Total Sum of Squares: 0.098653  
## Residual Sum of Squares: 0.071612  
## R-Squared: 0.2741  
## Adj. R-Squared: 0.12897  
## Chisq: 5129.63 on 2716 DF, p-value: < 2.22e-16

## Warning in model.matrix.default(mt, mf, contrasts): non-list contrasts argument  
## ignored

##   
## Call:  
## bayes.lm(formula = Cases\_per\_Person\_Jun ~ Cases\_per\_Person\_Mar +   
## Cases\_per\_Person\_Apr + Cases\_per\_Person\_May + RperPerson +   
## Years.of.Potential.Life.Lost.Rate + Avg\_PMiles\_Trip + SRVC\_Pop\_Dense +   
## POPESTIMATE2018, data = county\_data\_)  
##   
## Residuals:   
## Min 1Q Median 3Q Max   
## -0.030121 -0.001218 -0.000700 0.000292 0.067958   
##   
## Coefficients:  
## Posterior Mean Std. Error t value   
## (Intercept) 2.032e-03 3.234e-09 6.284e+05  
## Cases\_per\_Person\_Mar 1.659e-01 1.895e-02 8.752e+00  
## Cases\_per\_Person\_Apr -1.052e-01 5.525e-04 -1.904e+02  
## Cases\_per\_Person\_May 3.281e-01 2.448e-04 1.340e+03  
## RperPerson -1.760e-06 2.123e-09 -8.289e+02  
## Years.of.Potential.Life.Lost.Rate 1.623e-07 5.430e-16 2.990e+08  
## Avg\_PMiles\_Trip 3.282e-05 5.584e-10 5.878e+04  
## SRVC\_Pop\_Dense 7.604e-08 2.596e-15 2.929e+07  
## POPESTIMATE2018 5.194e-10 3.068e-20 1.693e+10  
## ---  
##   
## Note: No prior given (Using flat prior).

##   
## Call:  
## bayes.lm(formula = Cases\_per\_Person\_Jun ~ Cases\_per\_Person\_Mar +   
## Cases\_per\_Person\_Apr + Cases\_per\_Person\_May + RperPerson +   
## Years.of.Potential.Life.Lost.Rate + Avg\_PMiles\_Trip + SRVC\_Pop\_Dense +   
## POPESTIMATE2018, data = county\_data\_)  
##   
##   
## Coefficients:  
## (Intercept) Cases\_per\_Person\_Mar   
## 2.032e-03 1.659e-01   
## Cases\_per\_Person\_Apr Cases\_per\_Person\_May   
## -1.052e-01 3.281e-01   
## RperPerson Years.of.Potential.Life.Lost.Rate   
## -1.760e-06 1.623e-07   
## Avg\_PMiles\_Trip SRVC\_Pop\_Dense   
## 3.282e-05 7.604e-08   
## POPESTIMATE2018   
## 5.194e-10

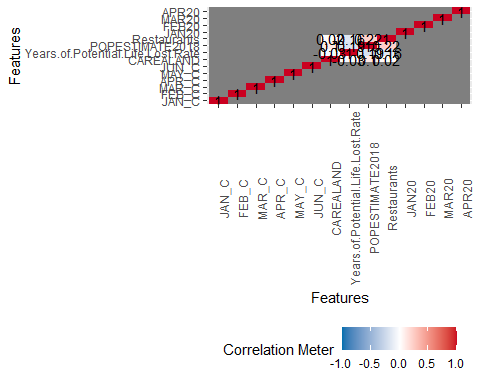
## Warning in model.matrix.default(mt, mf, contrasts): non-list contrasts argument  
## ignored

##   
## Call:  
## bayes.lm(formula = JUN\_C ~ MAY\_C + APR\_C + (APR\_C \* MAY\_C) +   
## Restaurants + POPESTIMATE2018 + Years.of.Potential.Life.Lost.Rate +   
## Avg\_PMiles\_Trip + SRVC\_Pop\_Dense + POPESTIMATE2018 + Pop\_Dense +   
## Pass\_Miles + U\_P\_Trips, data = county\_data\_)  
##   
## Residuals:   
## Min 1Q Median 3Q Max   
## -6691.7 -36.8 38.2 100.1 20690.3   
##   
## Coefficients:  
## Posterior Mean Std. Error t value   
## (Intercept) 2.963e+02 1.756e+02 1.687e+00  
## MAY\_C 4.795e-01 1.478e-03 3.244e+02  
## APR\_C -1.590e-01 2.328e-04 -6.830e+02  
## Restaurants -1.319e-03 7.789e-07 -1.694e+03  
## POPESTIMATE2018 3.752e-03 4.916e-09 7.632e+05  
## Years.of.Potential.Life.Lost.Rate 2.037e-02 2.996e-05 6.797e+02  
## Avg\_PMiles\_Trip -1.050e+01 3.187e+01 -3.293e-01  
## SRVC\_Pop\_Dense 2.243e-03 1.450e-04 1.547e+01  
## Pop\_Dense -6.685e+05 3.444e+09 -1.941e-04  
## Pass\_Miles 3.247e-10 1.846e-18 1.759e+08  
## U\_P\_Trips -1.219e-08 7.119e-17 -1.712e+08  
## MAY\_C:APR\_C -1.126e-05 1.285e-12 -8.769e+06  
## ---  
##   
## Note: No prior given (Using flat prior).

##   
## Call:  
## bayes.lm(formula = JUN\_C ~ MAY\_C + APR\_C + (APR\_C \* MAY\_C) +   
## Restaurants + POPESTIMATE2018 + Years.of.Potential.Life.Lost.Rate +   
## Avg\_PMiles\_Trip + SRVC\_Pop\_Dense + POPESTIMATE2018 + Pop\_Dense +   
## Pass\_Miles + U\_P\_Trips, data = county\_data\_)  
##   
##   
## Coefficients:  
## (Intercept) MAY\_C   
## 2.963e+02 4.795e-01   
## APR\_C Restaurants   
## -1.590e-01 -1.319e-03   
## POPESTIMATE2018 Years.of.Potential.Life.Lost.Rate   
## 3.752e-03 2.037e-02   
## Avg\_PMiles\_Trip SRVC\_Pop\_Dense   
## -1.050e+01 2.243e-03   
## Pop\_Dense Pass\_Miles   
## -6.685e+05 3.247e-10   
## U\_P\_Trips MAY\_C:APR\_C   
## -1.219e-08 -1.126e-05

## Warning in dummify(data, maxcat = maxcat): Ignored all discrete features since  
## `maxcat` set to 20 categories!

## Warning: Removed 170 rows containing missing values (geom\_text).



##   
## Call:  
## lm(formula = JUN\_C ~ POPESTIMATE2018 + Avg\_PMiles\_Trip + MAY\_C +   
## Years.of.Potential.Life.Lost.Rate + Restaurants + days\_at\_home +   
## Pop\_Dense + U\_P\_Trips + SRVC\_AREA\_SQML, data = county\_data\_)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -6832.2 -58.3 14.7 88.1 22154.3   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -3.507e+01 7.034e+01 -0.499 0.61808   
## POPESTIMATE2018 3.972e-03 7.201e-05 55.165 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip -6.365e+00 5.767e+00 -1.104 0.26985   
## MAY\_C -8.083e-02 1.871e-02 -4.320 1.63e-05 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.655e-02 5.784e-03 2.862 0.00425 \*\*   
## Restaurants -2.398e-03 9.448e-04 -2.538 0.01122 \*   
## days\_at\_home -3.560e+00 8.156e-01 -4.365 1.32e-05 \*\*\*  
## Pop\_Dense -6.545e+05 6.366e+04 -10.281 < 2e-16 \*\*\*  
## U\_P\_Trips -1.196e-09 1.114e-09 -1.073 0.28318   
## SRVC\_AREA\_SQML -1.013e-02 2.315e-03 -4.376 1.26e-05 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 656.5 on 2465 degrees of freedom  
## (253 observations deleted due to missingness)  
## Multiple R-squared: 0.6807, Adjusted R-squared: 0.6795   
## F-statistic: 583.9 on 9 and 2465 DF, p-value: < 2.2e-16

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -3.5073e+01 8.7365e+01 -0.4015 0.68812   
## POPESTIMATE2018 3.9723e-03 9.5699e-04 4.1508 3.425e-05 \*\*\*  
## Avg\_PMiles\_Trip -6.3651e+00 1.1620e+01 -0.5478 0.58390   
## MAY\_C -8.0829e-02 1.0724e-01 -0.7537 0.45107   
## Years.of.Potential.Life.Lost.Rate 1.6554e-02 6.9685e-03 2.3755 0.01760 \*   
## Restaurants -2.3976e-03 2.6516e-03 -0.9042 0.36597   
## days\_at\_home -3.5600e+00 9.0302e-01 -3.9423 8.294e-05 \*\*\*  
## Pop\_Dense -6.5448e+05 3.8833e+05 -1.6853 0.09205 .   
## U\_P\_Trips -1.1960e-09 1.6642e-09 -0.7187 0.47242   
## SRVC\_AREA\_SQML -1.0131e-02 5.0120e-03 -2.0213 0.04335 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

##   
## Call:  
## lm(formula = MAY\_C ~ POPESTIMATE2018 + Avg\_PMiles\_Trip + APR\_C +   
## Years.of.Potential.Life.Lost.Rate + Restaurants + days\_at\_home +   
## Pop\_Dense + U\_P\_Trips + SRVC\_AREA\_SQML, data = county\_data\_)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -7437.9 -52.1 4.8 69.8 19159.0   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.046e+02 6.201e+01 -1.687 0.09180 .   
## POPESTIMATE2018 1.523e-03 5.553e-05 27.431 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip -1.018e+01 5.081e+00 -2.003 0.04530 \*   
## APR\_C 3.893e-01 1.117e-02 34.861 < 2e-16 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.597e-02 5.086e-03 3.140 0.00171 \*\*   
## Restaurants -4.234e-03 8.292e-04 -5.106 3.55e-07 \*\*\*  
## days\_at\_home 8.532e-02 7.208e-01 0.118 0.90579   
## Pop\_Dense -2.601e+05 6.107e+04 -4.259 2.13e-05 \*\*\*  
## U\_P\_Trips 1.867e-08 9.229e-10 20.230 < 2e-16 \*\*\*  
## SRVC\_AREA\_SQML -1.105e-02 2.044e-03 -5.406 7.07e-08 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 578.4 on 2465 degrees of freedom  
## (253 observations deleted due to missingness)  
## Multiple R-squared: 0.7194, Adjusted R-squared: 0.7184   
## F-statistic: 702.1 on 9 and 2465 DF, p-value: < 2.2e-16

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.0459e+02 8.0726e+01 -1.2956 0.1952207   
## POPESTIMATE2018 1.5233e-03 4.0245e-04 3.7850 0.0001573 \*\*\*  
## Avg\_PMiles\_Trip -1.0176e+01 1.0850e+01 -0.9379 0.3484067   
## APR\_C 3.8933e-01 1.4779e-01 2.6343 0.0084849 \*\*   
## Years.of.Potential.Life.Lost.Rate 1.5970e-02 9.2296e-03 1.7303 0.0837064 .   
## Restaurants -4.2336e-03 1.2879e-03 -3.2873 0.0010259 \*\*   
## days\_at\_home 8.5319e-02 5.9496e-01 0.1434 0.8859831   
## Pop\_Dense -2.6009e+05 4.4499e+05 -0.5845 0.5589408   
## U\_P\_Trips 1.8671e-08 4.9265e-09 3.7898 0.0001544 \*\*\*  
## SRVC\_AREA\_SQML -1.1052e-02 6.6029e-03 -1.6738 0.0943030 .   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

##   
## Call:  
## lm(formula = APR\_C ~ POPESTIMATE2018 + Avg\_PMiles\_Trip + MAR\_C +   
## Years.of.Potential.Life.Lost.Rate + Restaurants + days\_at\_home +   
## Pop\_Dense + U\_P\_Trips + SRVC\_AREA\_SQML, data = county\_data\_)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -11398.1 -57.7 8.1 63.4 11913.2   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -2.436e+02 6.041e+01 -4.033 5.68e-05 \*\*\*  
## POPESTIMATE2018 6.284e-04 5.279e-05 11.904 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip -1.190e+01 4.956e+00 -2.400 0.016453 \*   
## MAR\_C 2.892e+00 3.752e-02 77.080 < 2e-16 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.577e-02 4.965e-03 3.177 0.001508 \*\*   
## Restaurants -2.484e-03 8.103e-04 -3.065 0.002198 \*\*   
## days\_at\_home 2.377e+00 7.024e-01 3.384 0.000727 \*\*\*  
## Pop\_Dense 1.316e+06 5.545e+04 23.734 < 2e-16 \*\*\*  
## U\_P\_Trips 7.897e-09 9.008e-10 8.767 < 2e-16 \*\*\*  
## SRVC\_AREA\_SQML 1.783e-03 1.997e-03 0.893 0.371968   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 564.8 on 2465 degrees of freedom  
## (253 observations deleted due to missingness)  
## Multiple R-squared: 0.8508, Adjusted R-squared: 0.8503   
## F-statistic: 1562 on 9 and 2465 DF, p-value: < 2.2e-16

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -2.4361e+02 8.6202e+01 -2.8260 0.0047512 \*\*   
## POPESTIMATE2018 6.2840e-04 3.8622e-04 1.6271 0.1038486   
## Avg\_PMiles\_Trip -1.1897e+01 1.2672e+01 -0.9388 0.3479065   
## MAR\_C 2.8924e+00 5.0282e-01 5.7522 9.897e-09 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.5771e-02 7.0781e-03 2.2282 0.0259567 \*   
## Restaurants -2.4839e-03 1.0363e-03 -2.3970 0.0166024 \*   
## days\_at\_home 2.3768e+00 7.2050e-01 3.2988 0.0009847 \*\*\*  
## Pop\_Dense 1.3160e+06 2.7716e+05 4.7480 2.172e-06 \*\*\*  
## U\_P\_Trips 7.8970e-09 3.6294e-09 2.1758 0.0296622 \*   
## SRVC\_AREA\_SQML 1.7835e-03 3.9928e-03 0.4467 0.6551476   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

##   
## Call:  
## lm(formula = JUN\_C ~ POPESTIMATE2018 + Avg\_PMiles\_Trip + MAY\_C +   
## Years.of.Potential.Life.Lost.Rate + Restaurants + days\_at\_home +   
## Pop\_Dense + U\_P\_Trips + SRVC\_AREA\_SQML, data = county\_data\_)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -6832.2 -58.3 14.7 88.1 22154.3   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -3.507e+01 7.034e+01 -0.499 0.61808   
## POPESTIMATE2018 3.972e-03 7.201e-05 55.165 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip -6.365e+00 5.767e+00 -1.104 0.26985   
## MAY\_C -8.083e-02 1.871e-02 -4.320 1.63e-05 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.655e-02 5.784e-03 2.862 0.00425 \*\*   
## Restaurants -2.398e-03 9.448e-04 -2.538 0.01122 \*   
## days\_at\_home -3.560e+00 8.156e-01 -4.365 1.32e-05 \*\*\*  
## Pop\_Dense -6.545e+05 6.366e+04 -10.281 < 2e-16 \*\*\*  
## U\_P\_Trips -1.196e-09 1.114e-09 -1.073 0.28318   
## SRVC\_AREA\_SQML -1.013e-02 2.315e-03 -4.376 1.26e-05 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 656.5 on 2465 degrees of freedom  
## (253 observations deleted due to missingness)  
## Multiple R-squared: 0.6807, Adjusted R-squared: 0.6795   
## F-statistic: 583.9 on 9 and 2465 DF, p-value: < 2.2e-16

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -3.5073e+01 8.7365e+01 -0.4015 0.68812   
## POPESTIMATE2018 3.9723e-03 9.5699e-04 4.1508 3.425e-05 \*\*\*  
## Avg\_PMiles\_Trip -6.3651e+00 1.1620e+01 -0.5478 0.58390   
## MAY\_C -8.0829e-02 1.0724e-01 -0.7537 0.45107   
## Years.of.Potential.Life.Lost.Rate 1.6554e-02 6.9685e-03 2.3755 0.01760 \*   
## Restaurants -2.3976e-03 2.6516e-03 -0.9042 0.36597   
## days\_at\_home -3.5600e+00 9.0302e-01 -3.9423 8.294e-05 \*\*\*  
## Pop\_Dense -6.5448e+05 3.8833e+05 -1.6853 0.09205 .   
## U\_P\_Trips -1.1960e-09 1.6642e-09 -0.7187 0.47242   
## SRVC\_AREA\_SQML -1.0131e-02 5.0120e-03 -2.0213 0.04335 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index

## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index  
  
## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index

## Oneway (time) effect Random Effect Model   
## (Swamy-Arora's transformation)  
##   
## Call:  
## plm(formula = cases ~ POPESTIMATE2018 + Avg\_PMiles\_Trip + Years.of.Potential.Life.Lost.Rate +   
## Restaurants + days\_at\_home + +U\_P\_Trips + SRVC\_AREA\_SQML,   
## data = panel\_final, effect = "time", model = "random", index = c("FIPS",   
## "months"))  
##   
## Balanced Panel: n = 495, T = 6, N = 2970  
##   
## Effects:  
## var std.dev share  
## idiosyncratic 1901213 1379 0.919  
## time 167262 409 0.081  
## theta: 0.8502  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -9321.747 -319.184 -74.398 258.145 31446.246   
##   
## Coefficients:  
## Estimate Std. Error z-value Pr(>|z|)   
## (Intercept) -3.9253e+02 2.2502e+02 -1.7444 0.0810876 .   
## POPESTIMATE2018 1.7807e-03 5.4974e-05 32.3921 < 2.2e-16 \*\*\*  
## Avg\_PMiles\_Trip 8.0121e+00 9.1728e+00 0.8735 0.3824083   
## Years.of.Potential.Life.Lost.Rate 2.3846e-02 1.4404e-02 1.6555 0.0978130 .   
## Restaurants -6.3303e-03 1.8219e-03 -3.4746 0.0005117 \*\*\*  
## days\_at\_home 2.5689e+00 1.4223e+00 1.8061 0.0708963 .   
## U\_P\_Trips 4.1675e-09 9.2593e-10 4.5009 6.768e-06 \*\*\*  
## SRVC\_AREA\_SQML 6.1615e-05 2.0053e-03 0.0307 0.9754884   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 8016800000  
## Residual Sum of Squares: 5631400000  
## R-Squared: 0.29755  
## Adj. R-Squared: 0.29589  
## Chisq: 1254.69 on 7 DF, p-value: < 2.22e-16

##   
## Call:  
## lm(formula = Cases\_per\_Person ~ Res\_per\_Person + Years.of.Potential.Life.Lost.Rate +   
## Avg\_PMiles\_Trip + +POPESTIMATE2018 + FIPS + days\_at\_home,   
## data = panel\_final)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.0062321 -0.0007390 -0.0001931 0.0004257 0.0233791   
##   
## Coefficients: (5 not defined because of singularities)  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 1.383e-03 5.659e-03 0.244 0.8069   
## Res\_per\_Person 1.585e-02 4.437e-02 0.357 0.7210   
## Years.of.Potential.Life.Lost.Rate 7.658e-07 5.354e-07 1.430 0.1528   
## Avg\_PMiles\_Trip -1.879e-03 3.199e-03 -0.587 0.5571   
## POPESTIMATE2018 3.871e-09 1.043e-08 0.371 0.7106   
## FIPS01003 6.504e-03 1.358e-02 0.479 0.6319   
## FIPS01009 1.254e-03 7.029e-03 0.178 0.8584   
## FIPS01033 6.661e-03 1.450e-02 0.460 0.6459   
## FIPS01051 2.598e-04 1.921e-03 0.135 0.8924   
## FIPS01073 1.837e-03 8.059e-03 0.228 0.8197   
## FIPS01077 8.379e-03 1.739e-02 0.482 0.6299   
## FIPS01079 -4.895e-03 5.156e-03 -0.949 0.3425   
## FIPS01083 1.870e-03 5.297e-03 0.353 0.7241   
## FIPS01089 1.221e-03 5.580e-03 0.219 0.8269   
## FIPS01097 2.810e-03 8.584e-03 0.327 0.7434   
## FIPS01101 1.113e-03 3.208e-03 0.347 0.7287   
## FIPS01103 3.530e-04 3.677e-03 0.096 0.9235   
## FIPS01115 2.992e-03 9.351e-03 0.320 0.7490   
## FIPS01117 6.608e-03 1.210e-02 0.546 0.5849   
## FIPS04005 -2.896e-05 1.409e-03 -0.021 0.9836   
## FIPS04013 -1.221e-02 3.787e-02 -0.322 0.7472   
## FIPS04019 -2.807e-04 4.465e-03 -0.063 0.9499   
## FIPS04021 2.119e-03 4.194e-03 0.505 0.6134   
## FIPS04027 1.694e-02 2.264e-02 0.748 0.4545   
## FIPS06001 -2.401e-03 1.120e-02 -0.214 0.8303   
## FIPS06013 3.903e-04 5.987e-03 0.065 0.9480   
## FIPS06017 -1.336e-03 8.537e-03 -0.156 0.8757   
## FIPS06053 3.024e-03 4.730e-03 0.639 0.5227   
## FIPS06061 1.763e-03 3.664e-03 0.481 0.6304   
## FIPS06067 -1.726e-03 8.808e-03 -0.196 0.8447   
## FIPS06095 1.073e-02 1.792e-02 0.599 0.5495   
## FIPS06097 -3.758e-03 8.639e-03 -0.435 0.6636   
## FIPS06111 3.304e-03 5.876e-03 0.562 0.5740   
## FIPS06113 -7.625e-04 7.325e-03 -0.104 0.9171   
## FIPS08001 3.849e-03 6.642e-03 0.580 0.5623   
## FIPS08005 4.200e-03 6.332e-03 0.663 0.5072   
## FIPS08013 5.389e-03 8.423e-03 0.640 0.5224   
## FIPS08014 3.981e-03 5.192e-03 0.767 0.4433   
## FIPS08031 3.497e-03 5.669e-03 0.617 0.5374   
## FIPS08035 5.631e-03 8.650e-03 0.651 0.5151   
## FIPS08059 3.833e-03 6.673e-03 0.574 0.5658   
## FIPS08101 -3.396e-03 2.044e-03 -1.661 0.0968 .  
## FIPS08123 4.995e-03 7.822e-03 0.639 0.5231   
## FIPS09001 1.817e-03 4.180e-03 0.435 0.6638   
## FIPS09003 5.558e-03 8.016e-03 0.693 0.4881   
## FIPS09005 4.606e-03 7.629e-03 0.604 0.5460   
## FIPS09007 8.719e-03 1.420e-02 0.614 0.5393   
## FIPS09009 -1.176e-03 5.519e-03 -0.213 0.8313   
## FIPS09013 7.364e-03 1.202e-02 0.613 0.5401   
## FIPS09015 5.431e-04 2.557e-03 0.212 0.8318   
## FIPS10003 1.743e-03 4.354e-03 0.400 0.6889   
## FIPS10005 4.017e-02 6.700e-02 0.600 0.5489   
## FIPS12001 -3.588e-03 6.364e-03 -0.564 0.5729   
## FIPS12011 -1.460e-04 1.065e-02 -0.014 0.9891   
## FIPS12015 -1.716e-03 3.576e-03 -0.480 0.6314   
## FIPS12019 3.460e-04 2.578e-03 0.134 0.8932   
## FIPS12031 -1.144e-03 4.582e-03 -0.250 0.8028   
## FIPS12033 -1.493e-03 2.020e-03 -0.739 0.4599   
## FIPS12057 -6.399e-04 7.491e-03 -0.085 0.9319   
## FIPS12069 3.220e-03 7.199e-03 0.447 0.6547   
## FIPS12073 -3.375e-03 6.155e-03 -0.548 0.5835   
## FIPS12081 -4.362e-07 1.998e-03 0.000 0.9998   
## FIPS12085 3.277e-03 3.930e-03 0.834 0.4045   
## FIPS12095 1.854e-03 6.984e-03 0.265 0.7907   
## FIPS12097 3.855e-03 6.732e-03 0.573 0.5669   
## FIPS12105 3.847e-04 3.783e-03 0.102 0.9190   
## FIPS12109 2.197e-03 3.568e-03 0.616 0.5382   
## FIPS12113 -1.038e-03 3.382e-03 -0.307 0.7588   
## FIPS12115 -1.145e-04 2.149e-03 -0.053 0.9575   
## FIPS12117 4.278e-03 7.142e-03 0.599 0.5493   
## FIPS12119 1.395e-03 4.756e-03 0.293 0.7693   
## FIPS13013 1.938e-03 4.197e-03 0.462 0.6443   
## FIPS13015 2.886e-03 5.851e-03 0.493 0.6219   
## FIPS13029 -1.053e-02 2.145e-02 -0.491 0.6233   
## FIPS13045 2.358e-03 6.053e-03 0.389 0.6969   
## FIPS13047 -5.568e-03 1.027e-02 -0.542 0.5878   
## FIPS13051 -4.817e-03 5.901e-03 -0.816 0.4144   
## FIPS13057 5.728e-03 9.613e-03 0.596 0.5513   
## FIPS13063 3.467e-03 8.400e-03 0.413 0.6798   
## FIPS13067 4.752e-03 7.870e-03 0.604 0.5461   
## FIPS13077 4.561e-03 8.038e-03 0.567 0.5705   
## FIPS13083 -1.961e-02 4.807e-02 -0.408 0.6833   
## FIPS13085 -6.249e-03 1.987e-02 -0.314 0.7532   
## FIPS13095 -4.951e-04 2.515e-03 -0.197 0.8439   
## FIPS13097 3.990e-03 7.569e-03 0.527 0.5981   
## FIPS13103 -8.072e-03 1.362e-02 -0.593 0.5534   
## FIPS13113 4.878e-03 7.523e-03 0.648 0.5168   
## FIPS13115 -2.565e-03 2.801e-03 -0.916 0.3599   
## FIPS13117 6.766e-03 1.028e-02 0.658 0.5106   
## FIPS13135 4.859e-03 7.341e-03 0.662 0.5081   
## FIPS13139 6.636e-03 8.890e-03 0.747 0.4554   
## FIPS13151 4.290e-03 8.761e-03 0.490 0.6244   
## FIPS13157 2.246e-03 4.023e-03 0.558 0.5768   
## FIPS13177 -5.051e-03 1.844e-02 -0.274 0.7842   
## FIPS13217 2.615e-03 5.918e-03 0.442 0.6586   
## FIPS13223 4.595e-03 8.464e-03 0.543 0.5873   
## FIPS13231 -9.429e-03 3.062e-02 -0.308 0.7581   
## FIPS13247 2.479e-03 5.066e-03 0.489 0.6247   
## FIPS13255 -1.255e-03 2.995e-03 -0.419 0.6753   
## FIPS13295 -7.353e-03 1.091e-02 -0.674 0.5004   
## FIPS13297 1.992e-03 5.024e-03 0.397 0.6917   
## FIPS15009 1.108e-02 2.056e-02 0.539 0.5899   
## FIPS17007 -3.174e-03 1.364e-02 -0.233 0.8160   
## FIPS17019 -4.451e-03 7.836e-03 -0.568 0.5701   
## FIPS17031 -1.132e-02 4.218e-02 -0.268 0.7883   
## FIPS17037 3.561e-03 4.793e-03 0.743 0.4575   
## FIPS17043 5.576e-03 7.409e-03 0.753 0.4518   
## FIPS17063 -1.083e-03 9.569e-03 -0.113 0.9099   
## FIPS17073 -7.931e-03 1.926e-02 -0.412 0.6806   
## FIPS17077 1.223e-02 1.937e-02 0.632 0.5278   
## FIPS17089 7.080e-03 8.671e-03 0.817 0.4143   
## FIPS17091 6.785e-03 1.071e-02 0.634 0.5264   
## FIPS17093 5.500e-03 6.413e-03 0.858 0.3912   
## FIPS17097 6.198e-03 7.439e-03 0.833 0.4048   
## FIPS17111 5.786e-03 8.858e-03 0.653 0.5137   
## FIPS17113 -2.538e-03 4.624e-03 -0.549 0.5831   
## FIPS17115 -5.977e-03 9.640e-03 -0.620 0.5353   
## FIPS17143 1.181e-03 4.472e-03 0.264 0.7917   
## FIPS17161 -2.748e-03 5.412e-03 -0.508 0.6117   
## FIPS17167 -2.522e-03 2.771e-03 -0.910 0.3629   
## FIPS17179 1.479e-03 3.775e-03 0.392 0.6953   
## FIPS17197 5.143e-03 7.694e-03 0.669 0.5039   
## FIPS17199 1.303e-02 2.171e-02 0.600 0.5483   
## FIPS17201 -4.822e-04 1.535e-03 -0.314 0.7535   
## FIPS17203 -4.954e-03 1.777e-02 -0.279 0.7804   
## FIPS18011 1.748e-03 2.311e-03 0.757 0.4493   
## FIPS18029 1.549e-04 2.477e-03 0.063 0.9501   
## FIPS18035 -4.651e-03 3.673e-03 -1.266 0.2056   
## FIPS18039 4.901e-03 7.337e-03 0.668 0.5042   
## FIPS18057 4.172e-03 6.221e-03 0.671 0.5026   
## FIPS18059 1.745e-03 2.739e-03 0.637 0.5241   
## FIPS18063 3.824e-03 5.559e-03 0.688 0.4916   
## FIPS18067 -3.573e-03 3.053e-03 -1.170 0.2419   
## FIPS18081 2.779e-03 4.939e-03 0.563 0.5737   
## FIPS18089 3.583e-03 8.257e-03 0.434 0.6644   
## FIPS18095 4.053e-05 3.579e-03 0.011 0.9910   
## FIPS18097 -1.041e-03 4.321e-03 -0.241 0.8096   
## FIPS18103 -4.111e-03 9.565e-03 -0.430 0.6674   
## FIPS18105 -3.458e-03 4.905e-03 -0.705 0.4808   
## FIPS18109 8.390e-05 1.761e-03 0.048 0.9620   
## FIPS18127 4.762e-03 9.705e-03 0.491 0.6237   
## FIPS18129 -7.035e-03 1.623e-02 -0.433 0.6647   
## FIPS18135 -1.020e-02 1.901e-02 -0.536 0.5918   
## FIPS18145 -8.542e-04 4.143e-03 -0.206 0.8367   
## FIPS18157 -2.679e-03 3.502e-03 -0.765 0.4443   
## FIPS18159 -1.216e-02 3.000e-02 -0.405 0.6852   
## FIPS18163 -2.631e-03 1.526e-03 -1.724 0.0847 .  
## FIPS18173 -1.997e-03 3.967e-03 -0.503 0.6148   
## FIPS19015 -5.095e-03 1.158e-02 -0.440 0.6601   
## FIPS19155 -7.122e-04 1.563e-03 -0.456 0.6486   
## FIPS19163 -7.475e-04 1.415e-03 -0.528 0.5975   
## FIPS19169 -1.960e-03 4.925e-03 -0.398 0.6907   
## FIPS20015 3.783e-03 9.352e-03 0.405 0.6858   
## FIPS20045 -2.839e-03 3.812e-03 -0.745 0.4565   
## FIPS20087 -3.457e-03 6.659e-03 -0.519 0.6038   
## FIPS20191 1.171e-03 3.938e-03 0.297 0.7662   
## FIPS21015 4.112e-03 8.426e-03 0.488 0.6256   
## FIPS21019 -1.874e-03 2.185e-03 -0.858 0.3911   
## FIPS21037 1.893e-03 6.926e-03 0.273 0.7846   
## FIPS21059 1.021e-02 2.029e-02 0.503 0.6148   
## FIPS21067 1.125e-03 4.306e-03 0.261 0.7940   
## FIPS21089 -1.651e-03 1.764e-03 -0.936 0.3494   
## FIPS21093 2.942e-02 5.350e-02 0.550 0.5824   
## FIPS21101 -3.769e-03 3.833e-03 -0.983 0.3255   
## FIPS21113 -9.759e-04 1.530e-03 -0.638 0.5236   
## FIPS21117 1.915e-03 7.535e-03 0.254 0.7995   
## FIPS21163 2.614e-02 4.615e-02 0.567 0.5711   
## FIPS21209 -3.871e-04 1.903e-03 -0.203 0.8389   
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## FIPS23031 1.677e-02 3.137e-02 0.534 0.5931   
## FIPS24003 3.511e-03 6.244e-03 0.562 0.5740   
## FIPS24005 4.511e-03 8.897e-03 0.507 0.6122   
## FIPS24013 4.049e-03 7.529e-03 0.538 0.5907   
## FIPS24015 -9.369e-05 3.041e-03 -0.031 0.9754   
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## FIPS24021 4.015e-03 6.130e-03 0.655 0.5126   
## FIPS24027 8.838e-03 1.321e-02 0.669 0.5036   
## FIPS24031 4.738e-03 5.635e-03 0.841 0.4005   
## FIPS24033 4.427e-03 5.195e-03 0.852 0.3942   
## FIPS24035 4.049e-03 6.901e-03 0.587 0.5574   
## FIPS24039 2.983e-02 5.089e-02 0.586 0.5578   
## FIPS24045 3.653e-02 6.353e-02 0.575 0.5653   
## FIPS25003 8.499e-03 1.580e-02 0.538 0.5907   
## FIPS25005 1.602e-03 2.401e-03 0.667 0.5049   
## FIPS25009 2.799e-03 2.993e-03 0.935 0.3498   
## FIPS25013 -8.517e-05 1.930e-03 -0.044 0.9648   
## FIPS25015 2.339e-04 8.777e-04 0.267 0.7898   
## FIPS25017 4.479e-04 9.211e-03 0.049 0.9612   
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## FIPS25023 2.748e-03 2.627e-03 1.046 0.2956   
## FIPS25025 3.709e-03 3.071e-03 1.208 0.2273   
## FIPS25027 1.685e-03 3.258e-03 0.517 0.6050   
## FIPS26005 -2.889e-04 1.096e-03 -0.264 0.7921   
## FIPS26017 3.072e-03 6.575e-03 0.467 0.6404   
## FIPS26027 -8.290e-04 4.239e-03 -0.196 0.8449   
## FIPS26037 -2.298e-03 6.237e-03 -0.368 0.7125   
## FIPS26045 -2.829e-03 4.618e-03 -0.613 0.5403   
## FIPS26049 2.448e-03 8.232e-03 0.297 0.7662   
## FIPS26065 -2.595e-03 2.752e-03 -0.943 0.3458   
## FIPS26075 -2.532e-03 4.570e-03 -0.554 0.5795   
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## FIPS26125 3.399e-03 6.864e-03 0.495 0.6205   
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## FIPS26147 3.411e-03 8.223e-03 0.415 0.6783   
## FIPS26155 -4.624e-03 8.517e-03 -0.543 0.5872   
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## FIPS26161 6.267e-03 1.009e-02 0.621 0.5346   
## FIPS26163 -1.509e-03 9.388e-03 -0.161 0.8723   
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## FIPS27109 1.634e-03 1.694e-03 0.965 0.3348   
## FIPS27137 -7.106e-04 1.753e-03 -0.405 0.6852   
## FIPS28033 2.289e-03 6.469e-03 0.354 0.7235   
## FIPS28045 8.350e-03 1.735e-02 0.481 0.6305   
## FIPS28047 8.221e-03 1.880e-02 0.437 0.6619   
## FIPS28049 -5.254e-03 5.225e-03 -1.006 0.3147   
## FIPS28059 8.911e-03 1.921e-02 0.464 0.6427   
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## FIPS32031 1.793e-03 4.489e-03 0.399 0.6896   
## FIPS33011 1.696e-03 3.803e-03 0.446 0.6556   
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## FIPS33017 7.900e-03 1.659e-02 0.476 0.6340   
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## FIPS34019 3.723e-03 3.553e-03 1.048 0.2947   
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## FIPS36007 -4.261e-03 8.477e-03 -0.503 0.6153   
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## FIPS36053 -8.542e-03 2.556e-02 -0.334 0.7382   
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## FIPS36071 2.735e-02 3.918e-02 0.698 0.4853   
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## FIPS37037 -1.780e-03 7.745e-03 -0.230 0.8182   
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## FIPS37057 -2.394e-03 2.151e-03 -1.113 0.2660   
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## FIPS37087 -7.335e-03 1.194e-02 -0.615 0.5389   
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## FIPS37155 -4.230e-03 3.768e-03 -1.123 0.2617   
## FIPS37169 -7.807e-03 1.462e-02 -0.534 0.5933   
## FIPS37175 -1.022e-02 2.237e-02 -0.457 0.6478   
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## FIPS39129 -1.571e-05 1.192e-02 -0.001 0.9989   
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## FIPS39151 -3.667e-04 2.964e-03 -0.124 0.9015   
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## FIPS39155 -2.738e-03 1.735e-03 -1.578 0.1147   
## FIPS39159 -4.006e-03 1.116e-02 -0.359 0.7195   
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## FIPS42007 -2.023e-03 2.060e-03 -0.982 0.3263   
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## FIPS42013 -3.155e-03 4.128e-03 -0.764 0.4447   
## FIPS42017 2.042e-03 3.508e-03 0.582 0.5606   
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## FIPS42127 -5.868e-03 1.541e-02 -0.381 0.7035   
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## FIPS44001 4.027e-03 5.940e-03 0.678 0.4979   
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## FIPS47155 -3.150e-03 2.903e-03 -1.085 0.2779   
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## FIPS47165 4.528e-03 8.792e-03 0.515 0.6066   
## FIPS47187 6.581e-03 1.027e-02 0.641 0.5217   
## FIPS47189 4.336e-03 8.492e-03 0.511 0.6096   
## FIPS48027 2.784e-03 5.968e-03 0.466 0.6409   
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## FIPS48245 -5.083e-03 7.755e-03 -0.655 0.5122   
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## FIPS51061 7.393e-04 2.107e-03 0.351 0.7257   
## FIPS51075 -1.089e-03 1.398e-02 -0.078 0.9379   
## FIPS51085 6.510e-03 1.091e-02 0.597 0.5507   
## FIPS51087 7.360e-03 1.269e-02 0.580 0.5620   
## FIPS51095 -4.033e-03 7.951e-03 -0.507 0.6121   
## FIPS51107 5.544e-03 6.233e-03 0.889 0.3739   
## FIPS51121 -1.175e-03 2.298e-03 -0.511 0.6091   
## FIPS51145 5.625e-04 8.806e-03 0.064 0.9491   
## FIPS51149 3.018e-03 5.632e-03 0.536 0.5921   
## FIPS51153 5.304e-03 5.404e-03 0.982 0.3264   
## FIPS51155 -1.213e-02 2.222e-02 -0.546 0.5851   
## FIPS51161 1.849e-03 4.229e-03 0.437 0.6620   
## FIPS51165 -3.626e-03 8.810e-03 -0.412 0.6807   
## FIPS51179 3.404e-03 4.867e-03 0.699 0.4844   
## FIPS51199 -3.603e-03 8.487e-03 -0.425 0.6712   
## FIPS53005 1.381e-02 2.222e-02 0.622 0.5343   
## FIPS53007 1.238e-02 1.937e-02 0.639 0.5229   
## FIPS53011 2.499e-04 1.824e-03 0.137 0.8910   
## FIPS53015 -2.587e-03 1.999e-03 -1.294 0.1957   
## FIPS53017 1.080e-02 1.434e-02 0.753 0.4517   
## FIPS53021 1.502e-02 1.996e-02 0.753 0.4518   
## FIPS53033 -1.147e-04 1.237e-02 -0.009 0.9926   
## FIPS53035 5.182e-03 9.981e-03 0.519 0.6037   
## FIPS53053 3.108e-03 7.128e-03 0.436 0.6629   
## FIPS53061 4.562e-03 7.840e-03 0.582 0.5607   
## FIPS53063 1.227e-04 2.464e-03 0.050 0.9603   
## FIPS53067 8.176e-03 1.512e-02 0.541 0.5887   
## FIPS53071 1.012e-02 1.628e-02 0.622 0.5342   
## FIPS53073 -5.510e-04 1.164e-03 -0.473 0.6359   
## FIPS54011 -3.681e-03 5.838e-03 -0.631 0.5284   
## FIPS54039 -2.235e-03 4.830e-03 -0.463 0.6435   
## FIPS54051 -2.253e-03 1.599e-03 -1.409 0.1590   
## FIPS54061 -3.507e-03 3.992e-03 -0.878 0.3798   
## FIPS54069 -3.270e-03 2.050e-03 -1.595 0.1108   
## FIPS54079 1.272e-03 6.361e-03 0.200 0.8415   
## FIPS54099 -1.456e-03 4.895e-03 -0.297 0.7662   
## FIPS55015 1.193e-03 3.008e-03 0.397 0.6917   
## FIPS55031 -3.258e-03 7.470e-03 -0.436 0.6628   
## FIPS55055 -1.634e-03 2.856e-03 -0.572 0.5673   
## FIPS55059 -1.805e-04 9.699e-04 -0.186 0.8524   
## FIPS55079 -3.466e-03 6.838e-03 -0.507 0.6123   
## FIPS55087 3.139e-03 5.867e-03 0.535 0.5926   
## FIPS55089 -1.342e-04 2.182e-03 -0.061 0.9510   
## FIPS55101 NA NA NA NA   
## FIPS55131 NA NA NA NA   
## FIPS55133 NA NA NA NA   
## FIPS55139 NA NA NA NA   
## days\_at\_home NA NA NA NA   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.001772 on 2475 degrees of freedom  
## Multiple R-squared: 0.2064, Adjusted R-squared: 0.04796   
## F-statistic: 1.303 on 494 and 2475 DF, p-value: 4.402e-05

## [1] FALSE

## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index  
  
## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index  
  
## Warning in Ops.pseries(y, bX): indexes of pseries have same length but not same  
## content: result was assigned first operand's index

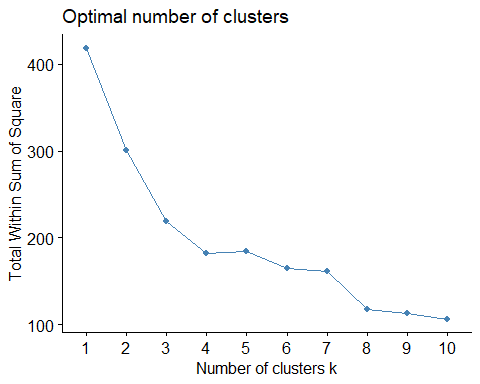
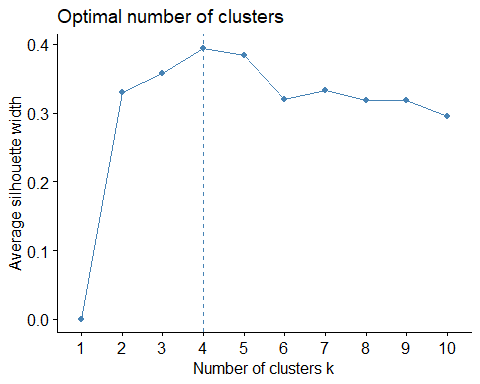
## [1] TRUE

## [1] TRUE

##   
## Durbin-Watson test for serial correlation in panel models  
##   
## data: Cases\_per\_Person ~ Res\_per\_Person + Years.of.Potential.Life.Lost.Rate + Avg\_PMiles\_Trip + POPESTIMATE2018 + FIPS + days\_at\_home  
## DW = 2.2209, p-value = 0.7947  
## alternative hypothesis: serial correlation in idiosyncratic errors

## Oneway (time) effect Random Effect Model   
## (Swamy-Arora's transformation)  
##   
## Call:  
## plm(formula = Cases\_per\_Person ~ Res\_per\_Person + Years.of.Potential.Life.Lost.Rate +   
## Avg\_PMiles\_Trip + POPESTIMATE2018 + FIPS + days\_at\_home,   
## data = panel\_final, effect = "time", model = "random", index = c("FIPS",   
## "months"))  
##   
## Balanced Panel: n = 495, T = 6, N = 2970  
##   
## Effects:  
## var std.dev share  
## idiosyncratic 2.176e-06 1.475e-03 0.693  
## time 9.645e-07 9.821e-04 0.307  
## theta: 0.9326  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -5.5400e-03 -6.7380e-04 -8.5267e-05 4.4477e-04 2.2591e-02   
##   
## Coefficients: (5 dropped because of singularities)  
## Estimate Std. Error z-value Pr(>|z|)   
## (Intercept) 1.3832e-03 4.7275e-03 0.2926 0.76983   
## Res\_per\_Person 1.5847e-02 3.6937e-02 0.4290 0.66790   
## Years.of.Potential.Life.Lost.Rate 7.6582e-07 4.4569e-07 1.7183 0.08574 .  
## Avg\_PMiles\_Trip -1.8785e-03 2.6631e-03 -0.7054 0.48057   
## POPESTIMATE2018 3.8713e-09 8.6839e-09 0.4458 0.65574   
## FIPS01003 6.5039e-03 1.1301e-02 0.5755 0.56494   
## FIPS01009 1.2538e-03 5.8507e-03 0.2143 0.83031   
## FIPS01033 6.6614e-03 1.2066e-02 0.5521 0.58089   
## FIPS01051 2.5984e-04 1.5993e-03 0.1625 0.87094   
## FIPS01073 1.8370e-03 6.7085e-03 0.2738 0.78422   
## FIPS01077 8.3792e-03 1.4472e-02 0.5790 0.56259   
## FIPS01079 -4.8950e-03 4.2921e-03 -1.1405 0.25409   
## FIPS01083 1.8699e-03 4.4093e-03 0.4241 0.67150   
## FIPS01089 1.2208e-03 4.6451e-03 0.2628 0.79270   
## FIPS01097 2.8104e-03 7.1450e-03 0.3933 0.69407   
## FIPS01101 1.1126e-03 2.6701e-03 0.4167 0.67692   
## FIPS01103 3.5297e-04 3.0607e-03 0.1153 0.90819   
## FIPS01115 2.9922e-03 7.7836e-03 0.3844 0.70066   
## FIPS01117 6.6085e-03 1.0070e-02 0.6562 0.51167   
## FIPS04005 -2.8958e-05 1.1729e-03 -0.0247 0.98030   
## FIPS04013 -1.2211e-02 3.1527e-02 -0.3873 0.69851   
## FIPS04019 -2.8075e-04 3.7167e-03 -0.0755 0.93979   
## FIPS04021 2.1190e-03 3.4908e-03 0.6070 0.54385   
## FIPS04027 1.6940e-02 1.8849e-02 0.8987 0.36881   
## FIPS06001 -2.4006e-03 9.3204e-03 -0.2576 0.79674   
## FIPS06013 3.9028e-04 4.9835e-03 0.0783 0.93758   
## FIPS06017 -1.3358e-03 7.1065e-03 -0.1880 0.85090   
## FIPS06053 3.0241e-03 3.9375e-03 0.7680 0.44247   
## FIPS06061 1.7635e-03 3.0503e-03 0.5781 0.56317   
## FIPS06067 -1.7260e-03 7.3316e-03 -0.2354 0.81388   
## FIPS06095 1.0728e-02 1.4920e-02 0.7190 0.47212   
## FIPS06097 -3.7576e-03 7.1913e-03 -0.5225 0.60131   
## FIPS06111 3.3042e-03 4.8913e-03 0.6755 0.49933   
## FIPS06113 -7.6246e-04 6.0975e-03 -0.1250 0.90049   
## FIPS08001 3.8494e-03 5.5290e-03 0.6962 0.48629   
## FIPS08005 4.1998e-03 5.2705e-03 0.7968 0.42554   
## FIPS08013 5.3888e-03 7.0114e-03 0.7686 0.44215   
## FIPS08014 3.9810e-03 4.3218e-03 0.9211 0.35699   
## FIPS08031 3.4967e-03 4.7185e-03 0.7411 0.45866   
## FIPS08035 5.6312e-03 7.2002e-03 0.7821 0.43416   
## FIPS08059 3.8329e-03 5.5549e-03 0.6900 0.49019   
## FIPS08101 -3.3956e-03 1.7015e-03 -1.9956 0.04598 \*  
## FIPS08123 4.9955e-03 6.5109e-03 0.7672 0.44294   
## FIPS09001 1.8169e-03 3.4791e-03 0.5222 0.60151   
## FIPS09003 5.5581e-03 6.6722e-03 0.8330 0.40483   
## FIPS09005 4.6062e-03 6.3503e-03 0.7254 0.46824   
## FIPS09007 8.7192e-03 1.1820e-02 0.7376 0.46073   
## FIPS09009 -1.1760e-03 4.5940e-03 -0.2560 0.79796   
## FIPS09013 7.3640e-03 1.0003e-02 0.7362 0.46164   
## FIPS09015 5.4312e-04 2.1283e-03 0.2552 0.79857   
## FIPS10003 1.7433e-03 3.6241e-03 0.4810 0.63050   
## FIPS10005 4.0167e-02 5.5771e-02 0.7202 0.47139   
## FIPS12001 -3.5883e-03 5.2973e-03 -0.6774 0.49816   
## FIPS12011 -1.4601e-04 8.8617e-03 -0.0165 0.98685   
## FIPS12015 -1.7159e-03 2.9769e-03 -0.5764 0.56434   
## FIPS12019 3.4599e-04 2.1458e-03 0.1612 0.87191   
## FIPS12031 -1.1442e-03 3.8141e-03 -0.3000 0.76418   
## FIPS12033 -1.4931e-03 1.6816e-03 -0.8879 0.37458   
## FIPS12057 -6.3990e-04 6.2352e-03 -0.1026 0.91826   
## FIPS12069 3.2199e-03 5.9921e-03 0.5374 0.59102   
## FIPS12073 -3.3755e-03 5.1236e-03 -0.6588 0.51002   
## FIPS12081 -4.3622e-07 1.6635e-03 -0.0003 0.99979   
## FIPS12085 3.2768e-03 3.2712e-03 1.0017 0.31649   
## FIPS12095 1.8539e-03 5.8135e-03 0.3189 0.74981   
## FIPS12097 3.8554e-03 5.6034e-03 0.6880 0.49142   
## FIPS12105 3.8471e-04 3.1492e-03 0.1222 0.90277   
## FIPS12109 2.1965e-03 2.9701e-03 0.7395 0.45958   
## FIPS12113 -1.0384e-03 2.8150e-03 -0.3689 0.71221   
## FIPS12115 -1.1450e-04 1.7892e-03 -0.0640 0.94898   
## FIPS12117 4.2775e-03 5.9451e-03 0.7195 0.47183   
## FIPS12119 1.3954e-03 3.9591e-03 0.3524 0.72450   
## FIPS13013 1.9376e-03 3.4932e-03 0.5547 0.57912   
## FIPS13015 2.8857e-03 4.8702e-03 0.5925 0.55350   
## FIPS13029 -1.0534e-02 1.7852e-02 -0.5901 0.55514   
## FIPS13045 2.3577e-03 5.0387e-03 0.4679 0.63985   
## FIPS13047 -5.5675e-03 8.5498e-03 -0.6512 0.51492   
## FIPS13051 -4.8168e-03 4.9117e-03 -0.9807 0.32675   
## FIPS13057 5.7278e-03 8.0020e-03 0.7158 0.47412   
## FIPS13063 3.4670e-03 6.9925e-03 0.4958 0.62002   
## FIPS13067 4.7515e-03 6.5509e-03 0.7253 0.46826   
## FIPS13077 4.5609e-03 6.6912e-03 0.6816 0.49547   
## FIPS13083 -1.9615e-02 4.0016e-02 -0.4902 0.62401   
## FIPS13085 -6.2490e-03 1.6540e-02 -0.3778 0.70557   
## FIPS13095 -4.9515e-04 2.0933e-03 -0.2365 0.81301   
## FIPS13097 3.9902e-03 6.3003e-03 0.6333 0.52652   
## FIPS13103 -8.0721e-03 1.1336e-02 -0.7120 0.47643   
## FIPS13113 4.8775e-03 6.2619e-03 0.7789 0.43602   
## FIPS13115 -2.5652e-03 2.3319e-03 -1.1001 0.27130   
## FIPS13117 6.7664e-03 8.5602e-03 0.7904 0.42927   
## FIPS13135 4.8593e-03 6.1108e-03 0.7952 0.42650   
## FIPS13139 6.6362e-03 7.3997e-03 0.8968 0.36982   
## FIPS13151 4.2895e-03 7.2924e-03 0.5882 0.55638   
## FIPS13157 2.2457e-03 3.3488e-03 0.6706 0.50248   
## FIPS13177 -5.0512e-03 1.5349e-02 -0.3291 0.74209   
## FIPS13217 2.6150e-03 4.9261e-03 0.5309 0.59552   
## FIPS13223 4.5946e-03 7.0458e-03 0.6521 0.51433   
## FIPS13231 -9.4293e-03 2.5487e-02 -0.3700 0.71141   
## FIPS13247 2.4788e-03 4.2168e-03 0.5879 0.55663   
## FIPS13255 -1.2546e-03 2.4929e-03 -0.5033 0.61479   
## FIPS13295 -7.3534e-03 9.0832e-03 -0.8096 0.41819   
## FIPS13297 1.9923e-03 4.1820e-03 0.4764 0.63380   
## FIPS15009 1.1083e-02 1.7113e-02 0.6476 0.51722   
## FIPS17007 -3.1737e-03 1.1353e-02 -0.2795 0.77983   
## FIPS17019 -4.4513e-03 6.5231e-03 -0.6824 0.49499   
## FIPS17031 -1.1325e-02 3.5110e-02 -0.3225 0.74704   
## FIPS17037 3.5613e-03 3.9897e-03 0.8926 0.37206   
## FIPS17043 5.5760e-03 6.1674e-03 0.9041 0.36594   
## FIPS17063 -1.0835e-03 7.9652e-03 -0.1360 0.89180   
## FIPS17073 -7.9307e-03 1.6036e-02 -0.4946 0.62092   
## FIPS17077 1.2230e-02 1.6121e-02 0.7586 0.44806   
## FIPS17089 7.0800e-03 7.2175e-03 0.9809 0.32662   
## FIPS17091 6.7855e-03 8.9151e-03 0.7611 0.44659   
## FIPS17093 5.4997e-03 5.3382e-03 1.0303 0.30289   
## FIPS17097 6.1985e-03 6.1926e-03 1.0009 0.31685   
## FIPS17111 5.7859e-03 7.3737e-03 0.7847 0.43265   
## FIPS17113 -2.5380e-03 3.8490e-03 -0.6594 0.50965   
## FIPS17115 -5.9767e-03 8.0240e-03 -0.7448 0.45637   
## FIPS17143 1.1809e-03 3.7223e-03 0.3172 0.75106   
## FIPS17161 -2.7476e-03 4.5053e-03 -0.6099 0.54195   
## FIPS17167 -2.5216e-03 2.3067e-03 -1.0932 0.27431   
## FIPS17179 1.4788e-03 3.1425e-03 0.4706 0.63794   
## FIPS17197 5.1433e-03 6.4041e-03 0.8031 0.42191   
## FIPS17199 1.3033e-02 1.8067e-02 0.7213 0.47071   
## FIPS17201 -4.8217e-04 1.2779e-03 -0.3773 0.70593   
## FIPS17203 -4.9543e-03 1.4788e-02 -0.3350 0.73762   
## FIPS18011 1.7485e-03 1.9235e-03 0.9090 0.36335   
## FIPS18029 1.5492e-04 2.0617e-03 0.0751 0.94010   
## FIPS18035 -4.6509e-03 3.0578e-03 -1.5210 0.12827   
## FIPS18039 4.9009e-03 6.1077e-03 0.8024 0.42231   
## FIPS18057 4.1717e-03 5.1785e-03 0.8056 0.42048   
## FIPS18059 1.7450e-03 2.2798e-03 0.7654 0.44401   
## FIPS18063 3.8244e-03 4.6276e-03 0.8264 0.40856   
## FIPS18067 -3.5734e-03 2.5413e-03 -1.4062 0.15968   
## FIPS18081 2.7789e-03 4.1115e-03 0.6759 0.49911   
## FIPS18089 3.5826e-03 6.8729e-03 0.5213 0.60218   
## FIPS18095 4.0527e-05 2.9795e-03 0.0136 0.98915   
## FIPS18097 -1.0411e-03 3.5968e-03 -0.2895 0.77223   
## FIPS18103 -4.1105e-03 7.9622e-03 -0.5163 0.60568   
## FIPS18105 -3.4584e-03 4.0829e-03 -0.8470 0.39697   
## FIPS18109 8.3895e-05 1.4656e-03 0.0572 0.95435   
## FIPS18127 4.7624e-03 8.0781e-03 0.5895 0.55549   
## FIPS18129 -7.0346e-03 1.3509e-02 -0.5208 0.60254   
## FIPS18135 -1.0198e-02 1.5827e-02 -0.6443 0.51936   
## FIPS18145 -8.5421e-04 3.4487e-03 -0.2477 0.80437   
## FIPS18157 -2.6790e-03 2.9148e-03 -0.9191 0.35805   
## FIPS18159 -1.2163e-02 2.4970e-02 -0.4871 0.62619   
## FIPS18163 -2.6310e-03 1.2700e-03 -2.0717 0.03829 \*  
## FIPS18173 -1.9968e-03 3.3022e-03 -0.6047 0.54539   
## FIPS19015 -5.0947e-03 9.6406e-03 -0.5285 0.59718   
## FIPS19155 -7.1215e-04 1.3007e-03 -0.5475 0.58403   
## FIPS19163 -7.4746e-04 1.1781e-03 -0.6345 0.52578   
## FIPS19169 -1.9601e-03 4.0997e-03 -0.4781 0.63258   
## FIPS20015 3.7834e-03 7.7845e-03 0.4860 0.62696   
## FIPS20045 -2.8394e-03 3.1733e-03 -0.8948 0.37091   
## FIPS20087 -3.4567e-03 5.5433e-03 -0.6236 0.53290   
## FIPS20191 1.1712e-03 3.2780e-03 0.3573 0.72086   
## FIPS21015 4.1119e-03 7.0134e-03 0.5863 0.55768   
## FIPS21019 -1.8741e-03 1.8188e-03 -1.0304 0.30282   
## FIPS21037 1.8929e-03 5.7653e-03 0.3283 0.74267   
## FIPS21059 1.0208e-02 1.6886e-02 0.6046 0.54548   
## FIPS21067 1.1247e-03 3.5844e-03 0.3138 0.75370   
## FIPS21089 -1.6514e-03 1.4687e-03 -1.1244 0.26083   
## FIPS21093 2.9424e-02 4.4532e-02 0.6607 0.50878   
## FIPS21101 -3.7688e-03 3.1902e-03 -1.1814 0.23746   
## FIPS21113 -9.7595e-04 1.2735e-03 -0.7663 0.44349   
## FIPS21117 1.9145e-03 6.2726e-03 0.3052 0.76020   
## FIPS21163 2.6144e-02 3.8415e-02 0.6806 0.49614   
## FIPS21209 -3.8710e-04 1.5844e-03 -0.2443 0.80699   
## FIPS23001 -2.9095e-03 2.6872e-03 -1.0827 0.27893   
## FIPS23005 1.4493e-02 2.0879e-02 0.6942 0.48759   
## FIPS23031 1.6766e-02 2.6116e-02 0.6420 0.52090   
## FIPS24003 3.5111e-03 5.1979e-03 0.6755 0.49937   
## FIPS24005 4.5112e-03 7.4059e-03 0.6091 0.54244   
## FIPS24013 4.0493e-03 6.2673e-03 0.6461 0.51821   
## FIPS24015 -9.3686e-05 2.5316e-03 -0.0370 0.97048   
## FIPS24017 6.0159e-03 9.0422e-03 0.6653 0.50585   
## FIPS24021 4.0147e-03 5.1024e-03 0.7868 0.43138   
## FIPS24027 8.8382e-03 1.0999e-02 0.8036 0.42165   
## FIPS24031 4.7383e-03 4.6909e-03 1.0101 0.31244   
## FIPS24033 4.4266e-03 4.3243e-03 1.0237 0.30600   
## FIPS24035 4.0491e-03 5.7440e-03 0.7049 0.48086   
## FIPS24039 2.9827e-02 4.2359e-02 0.7041 0.48134   
## FIPS24045 3.6533e-02 5.2878e-02 0.6909 0.48964   
## FIPS25003 8.4995e-03 1.3152e-02 0.6462 0.51812   
## FIPS25005 1.6015e-03 1.9988e-03 0.8012 0.42300   
## FIPS25009 2.7990e-03 2.4912e-03 1.1236 0.26120   
## FIPS25013 -8.5166e-05 1.6063e-03 -0.0530 0.95771   
## FIPS25015 2.3393e-04 7.3058e-04 0.3202 0.74881   
## FIPS25017 4.4791e-04 7.6674e-03 0.0584 0.95342   
## FIPS25021 2.8252e-03 2.4058e-03 1.1743 0.24027   
## FIPS25023 2.7482e-03 2.1867e-03 1.2568 0.20883   
## FIPS25025 3.7091e-03 2.5567e-03 1.4507 0.14685   
## FIPS25027 1.6853e-03 2.7120e-03 0.6214 0.53431   
## FIPS26005 -2.8886e-04 9.1219e-04 -0.3167 0.75150   
## FIPS26017 3.0720e-03 5.4734e-03 0.5613 0.57462   
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## FIPS51087 7.3600e-03 1.0565e-02 0.6967 0.48601   
## FIPS51095 -4.0326e-03 6.6188e-03 -0.6093 0.54234   
## FIPS51107 5.5441e-03 5.1887e-03 1.0685 0.28530   
## FIPS51121 -1.1753e-03 1.9129e-03 -0.6144 0.53895   
## FIPS51145 5.6248e-04 7.3305e-03 0.0767 0.93884   
## FIPS51149 3.0181e-03 4.6882e-03 0.6438 0.51973   
## FIPS51153 5.3037e-03 4.4980e-03 1.1791 0.23835   
## FIPS51155 -1.2134e-02 1.8499e-02 -0.6559 0.51187   
## FIPS51161 1.8490e-03 3.5200e-03 0.5253 0.59939   
## FIPS51165 -3.6258e-03 7.3338e-03 -0.4944 0.62102   
## FIPS51179 3.4036e-03 4.0509e-03 0.8402 0.40079   
## FIPS51199 -3.6031e-03 7.0647e-03 -0.5100 0.61005   
## FIPS53005 1.3809e-02 1.8494e-02 0.7467 0.45525   
## FIPS53007 1.2377e-02 1.6125e-02 0.7676 0.44274   
## FIPS53011 2.4993e-04 1.5180e-03 0.1646 0.86923   
## FIPS53015 -2.5868e-03 1.6636e-03 -1.5549 0.11997   
## FIPS53017 1.0796e-02 1.1938e-02 0.9043 0.36582   
## FIPS53021 1.5019e-02 1.6612e-02 0.9041 0.36596   
## FIPS53033 -1.1474e-04 1.0301e-02 -0.0111 0.99111   
## FIPS53035 5.1819e-03 8.3085e-03 0.6237 0.53283   
## FIPS53053 3.1078e-03 5.9336e-03 0.5238 0.60044   
## FIPS53061 4.5619e-03 6.5258e-03 0.6990 0.48452   
## FIPS53063 1.2266e-04 2.0509e-03 0.0598 0.95231   
## FIPS53067 8.1764e-03 1.2586e-02 0.6496 0.51592   
## FIPS53071 1.0122e-02 1.3551e-02 0.7469 0.45510   
## FIPS53073 -5.5096e-04 9.6871e-04 -0.5688 0.56952   
## FIPS54011 -3.6811e-03 4.8595e-03 -0.7575 0.44874   
## FIPS54039 -2.2354e-03 4.0203e-03 -0.5560 0.57819   
## FIPS54051 -2.2525e-03 1.3310e-03 -1.6924 0.09057 .  
## FIPS54061 -3.5068e-03 3.3230e-03 -1.0553 0.29128   
## FIPS54069 -3.2697e-03 1.7064e-03 -1.9161 0.05535 .  
## FIPS54079 1.2723e-03 5.2952e-03 0.2403 0.81011   
## FIPS54099 -1.4557e-03 4.0747e-03 -0.3572 0.72091   
## FIPS55015 1.1932e-03 2.5039e-03 0.4765 0.63370   
## FIPS55031 -3.2578e-03 6.2178e-03 -0.5240 0.60031   
## FIPS55055 -1.6339e-03 2.3775e-03 -0.6872 0.49193   
## FIPS55059 -1.8047e-04 8.0731e-04 -0.2235 0.82311   
## FIPS55079 -3.4661e-03 5.6917e-03 -0.6090 0.54255   
## FIPS55087 3.1395e-03 4.8837e-03 0.6428 0.52032   
## FIPS55089 -1.3418e-04 1.8166e-03 -0.0739 0.94112   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.0074072  
## Residual Sum of Squares: 0.0053859  
## R-Squared: 0.27287  
## Adj. R-Squared: 0.12774  
## Chisq: 928.812 on 494 DF, p-value: < 2.22e-16

## Welcome! Want to learn more? See two factoextra-related books at https://goo.gl/ve3WBa



## Length Class Mode   
## cluster 2728 -none- numeric  
## centers 99 -none- numeric  
## totss 1 -none- numeric  
## withinss 9 -none- numeric  
## tot.withinss 1 -none- numeric  
## betweenss 1 -none- numeric  
## size 9 -none- numeric  
## iter 1 -none- numeric  
## ifault 1 -none- numeric

## Length Class Mode   
## cluster 2728 -none- numeric  
## centers 77 -none- numeric  
## totss 1 -none- numeric  
## withinss 7 -none- numeric  
## tot.withinss 1 -none- numeric  
## betweenss 1 -none- numeric  
## size 7 -none- numeric  
## iter 1 -none- numeric  
## ifault 1 -none- numeric

## Length Class Mode   
## cluster 2728 -none- numeric  
## centers 44 -none- numeric  
## totss 1 -none- numeric  
## withinss 4 -none- numeric  
## tot.withinss 1 -none- numeric  
## betweenss 1 -none- numeric  
## size 4 -none- numeric  
## iter 1 -none- numeric  
## ifault 1 -none- numeric

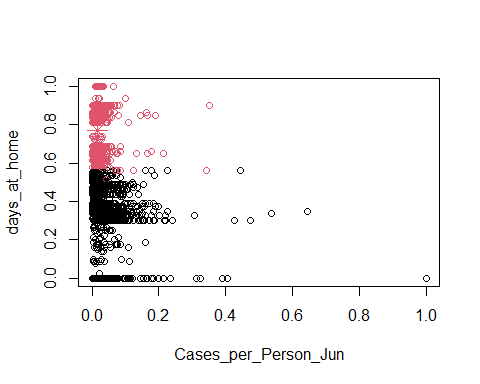
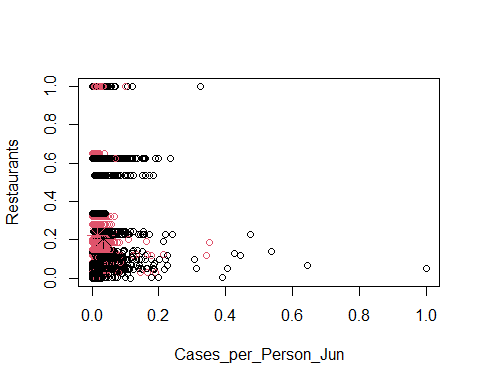
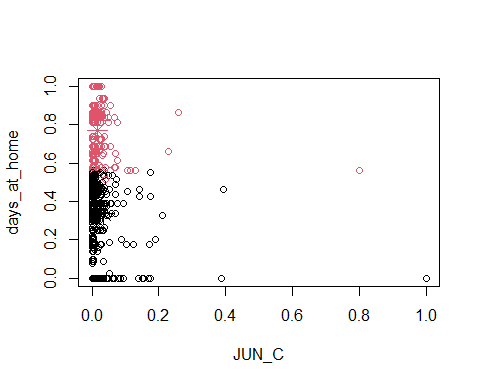
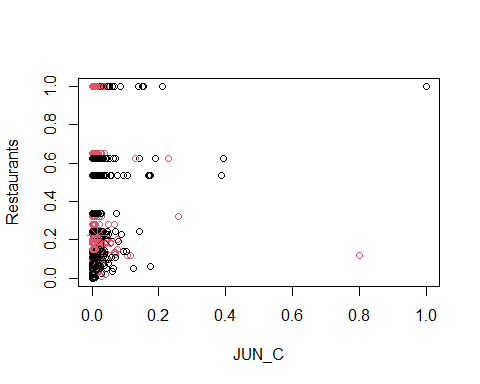
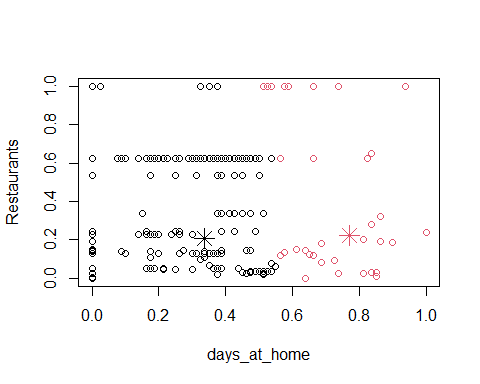
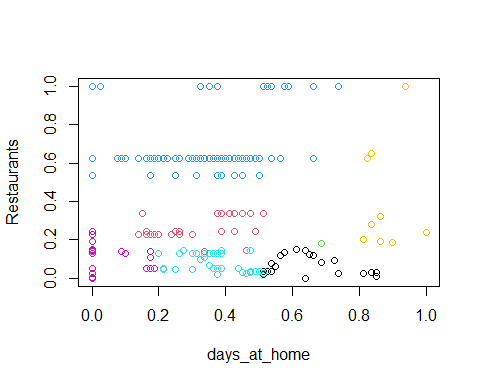
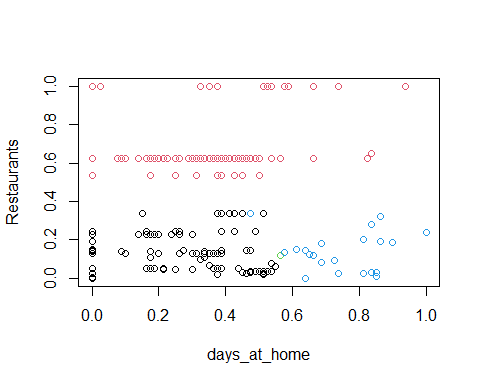
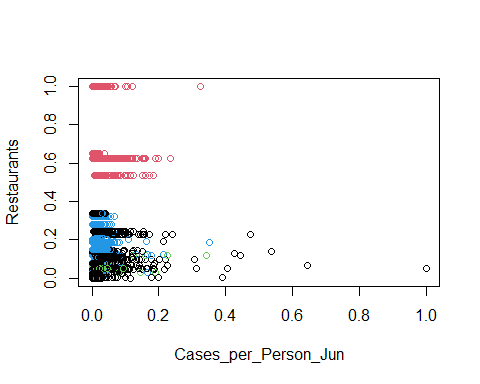
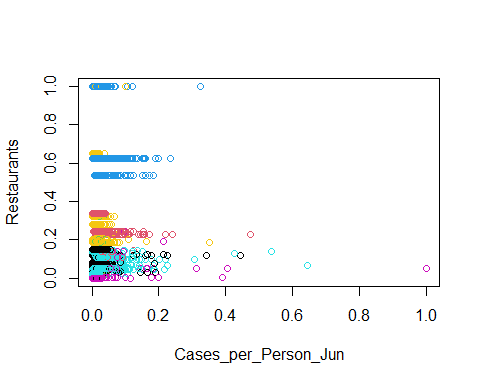
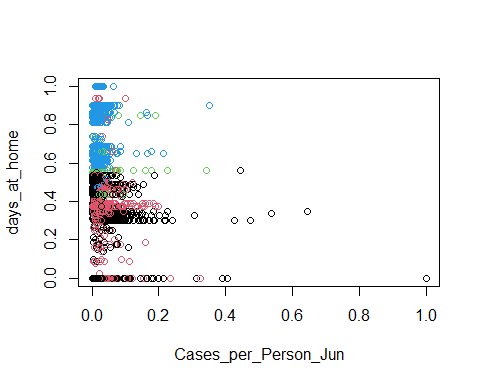
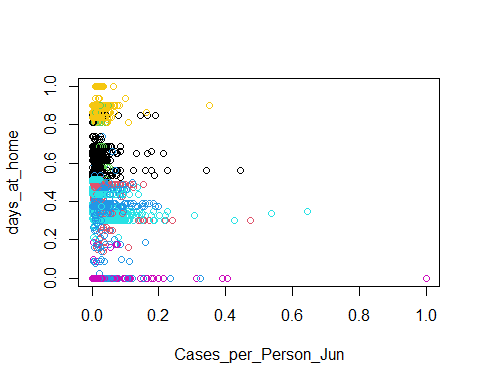
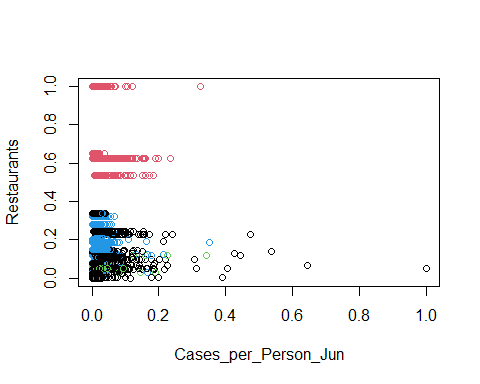
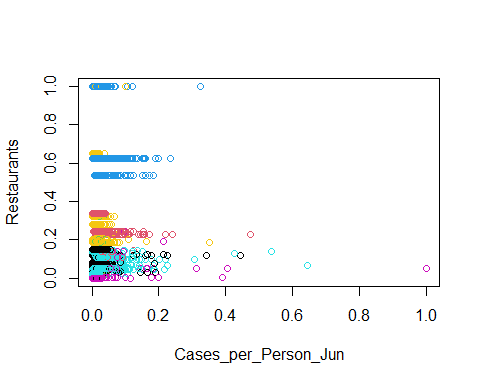
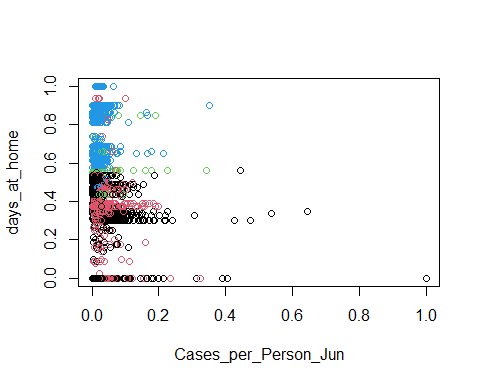
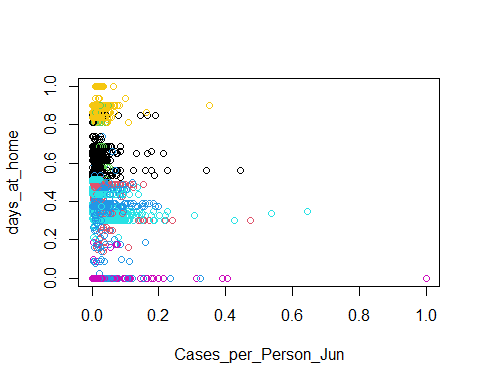
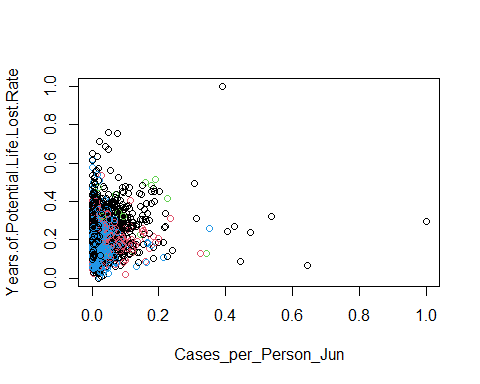
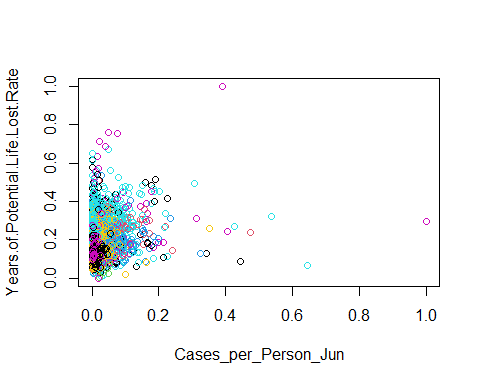
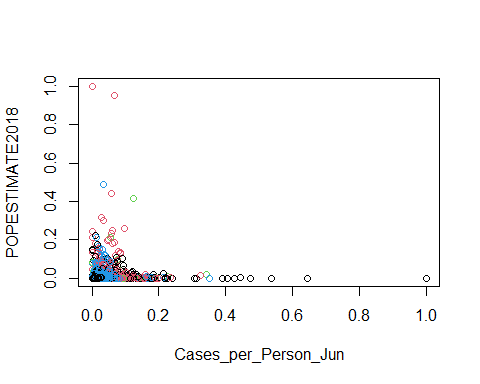
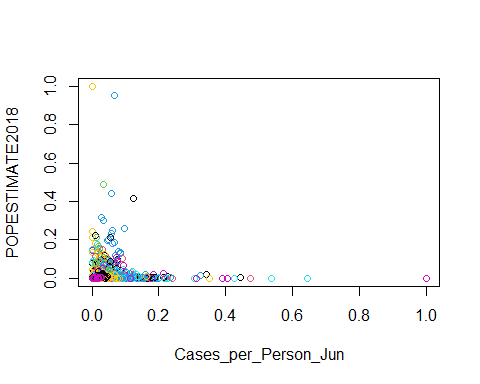
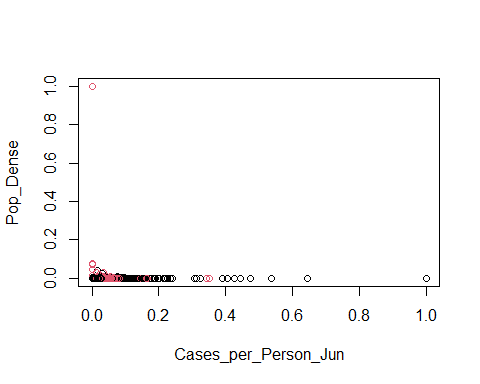
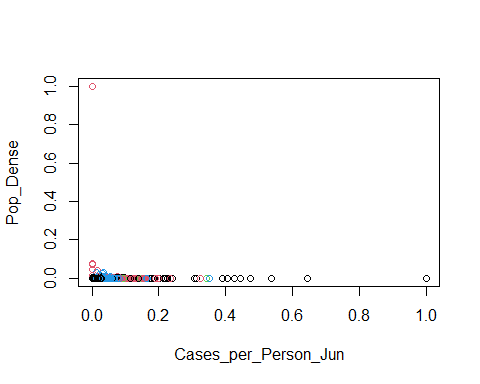
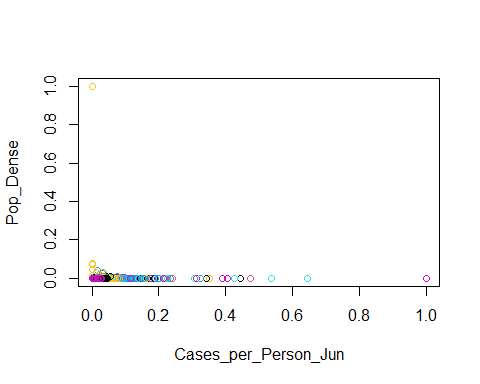
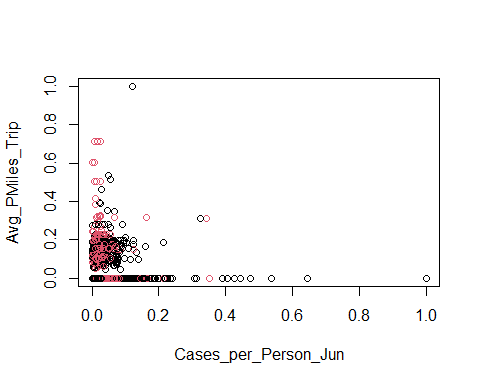
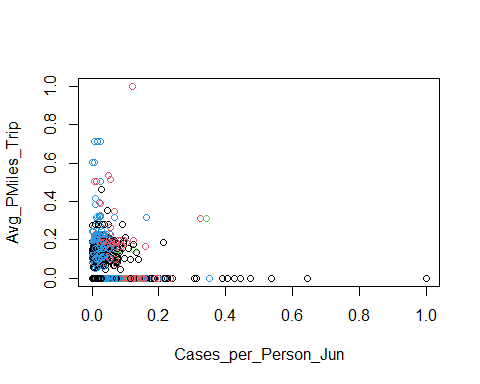
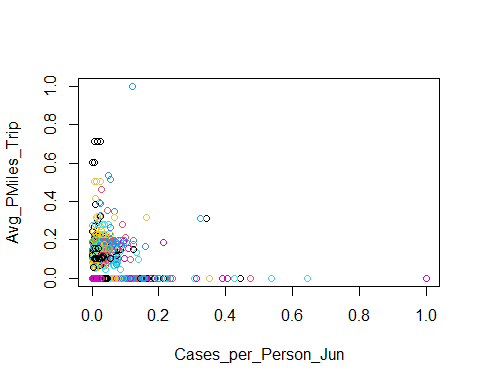
## Length Class Mode   
## cluster 2728 -none- numeric  
## centers 22 -none- numeric  
## totss 1 -none- numeric  
## withinss 2 -none- numeric  
## tot.withinss 1 -none- numeric  
## betweenss 1 -none- numeric  
## size 2 -none- numeric  
## iter 1 -none- numeric  
## ifault 1 -none- numeric

## K-means clustering with 4 clusters of sizes 1455, 396, 53, 824  
##   
## Cluster means:  
## Cases\_per\_Person\_Jun Pop\_Dense days\_at\_home U\_P\_Trips SRVC\_AREA\_POP  
## 1 0.03350465 2.741052e-04 0.3398625 0.003330884 0.01146298  
## 2 0.03428374 3.709364e-03 0.4030303 0.001865139 0.01899706  
## 3 0.04853901 6.410089e-05 0.6214623 0.002802727 0.01986617  
## 4 0.01650777 6.694250e-04 0.7656553 0.035945432 0.04997397  
## SRVC\_AREA\_SQML Avg\_PMiles\_Trip Restaurants POPESTIMATE2018 CAREALAND  
## 1 0.00249902 0.02234350 0.11609419 0.006196742 0.03915642  
## 2 0.00343235 0.04343462 0.66646424 0.027950924 0.05709225  
## 3 0.00484322 0.02386733 0.07390305 0.022023260 0.36221868  
## 4 0.01787330 0.04541581 0.17760629 0.011746890 0.03347478  
## Years.of.Potential.Life.Lost.Rate  
## 1 0.2381543  
## 2 0.1962797  
## 3 0.2525422  
## 4 0.1933050  
##   
## Clustering vector:  
## [1] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [38] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 3 3 3 3 4 3  
## [75] 3 3 3 3 3 1 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [112] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [149] 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [186] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1  
## [223] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [260] 1 1 4 4 4 4 4 4 4 4 4 4 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [297] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [334] 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [371] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [408] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [445] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [482] 1 1 1 1 1 1 1 1 1 1 1 1 4 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 1 1  
## [519] 1 1 3 1 1 1 1 3 1 1 1 1 1 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [556] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [593] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [630] 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [667] 1 1 1 1 1 1 1 1 1 1 4 1 1 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 4 1 1 1 1 1 1 1  
## [704] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [741] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [778] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [815] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [852] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [889] 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [926] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [963] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
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## [1037] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
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## [2258] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
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## [2702] 4 4 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
##   
## Within cluster sum of squares by cluster:  
## [1] 77.237540 47.399408 4.165431 83.894931  
## (between\_SS / total\_SS = 49.1 %)  
##   
## Available components:  
##   
## [1] "cluster" "centers" "totss" "withinss" "tot.withinss"  
## [6] "betweenss" "size" "iter" "ifault"

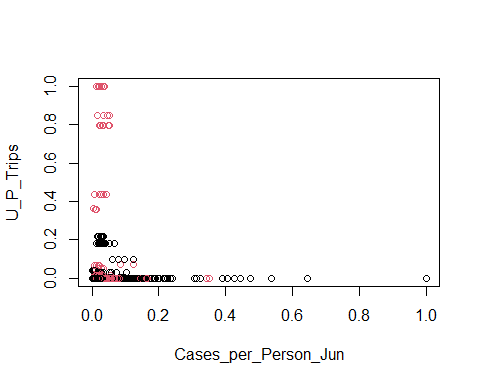
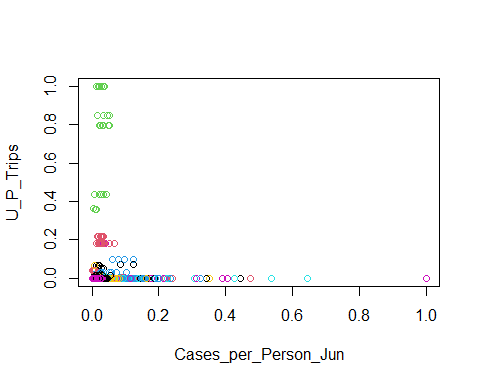
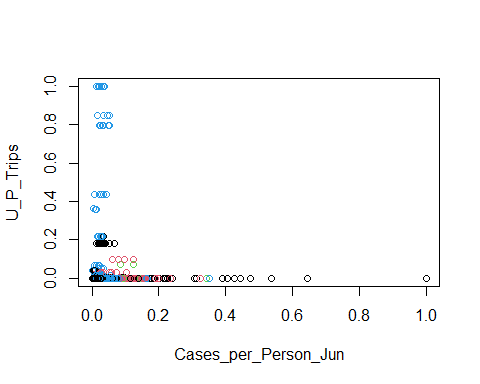
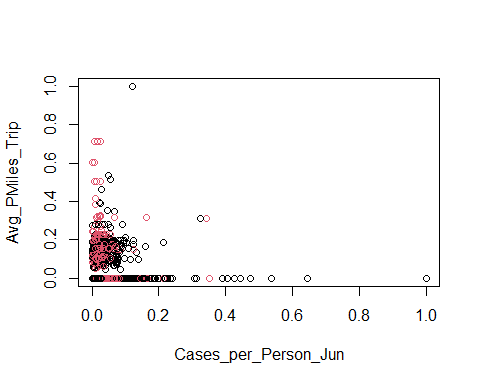
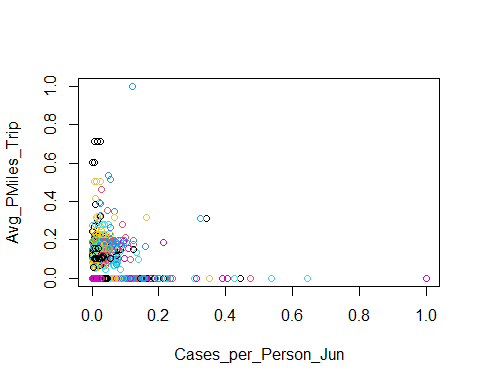
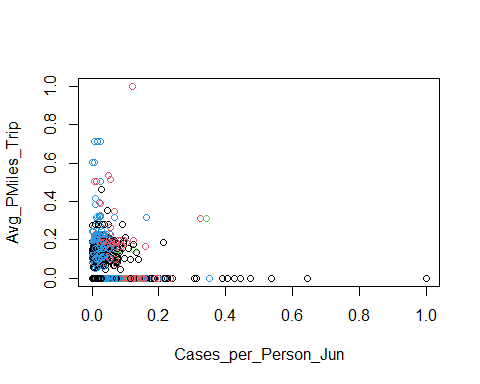
## K-means clustering with 7 clusters of sizes 533, 340, 44, 330, 823, 203, 455  
##   
## Cluster means:  
## Cases\_per\_Person\_Jun Pop\_Dense days\_at\_home U\_P\_Trips SRVC\_AREA\_POP  
## 1 0.02036081 0.0003371388 0.642940901 2.230493e-03 0.013302182  
## 2 0.03719950 0.0005749362 0.385294118 1.632385e-02 0.040998280  
## 3 0.02514055 0.0034204740 0.770170455 5.882665e-01 0.670217933  
## 4 0.03911735 0.0006003089 0.314962121 2.210077e-03 0.021274590  
## 5 0.03203538 0.0001812126 0.381272783 1.118781e-05 0.001049241  
## 6 0.03903238 0.0002926976 0.006096059 2.225270e-03 0.013764126  
## 7 0.01471836 0.0032756111 0.860219780 3.383868e-03 0.011506830  
## SRVC\_AREA\_SQML Avg\_PMiles\_Trip Restaurants POPESTIMATE2018 CAREALAND  
## 1 0.0033970010 0.02920884 0.09324387 0.008950750 0.06653617  
## 2 0.0091911370 0.05620983 0.24673946 0.009593255 0.02265582  
## 3 0.2659363186 0.17680600 0.19815105 0.066327509 0.03121941  
## 4 0.0037422625 0.04255615 0.66521262 0.024238862 0.06114892  
## 5 0.0003441774 0.01136616 0.08707025 0.004785798 0.04233901  
## 6 0.0021226434 0.01480264 0.04548012 0.007947901 0.06398029  
## 7 0.0030630477 0.04293531 0.30852932 0.014131140 0.03035025  
## Years.of.Potential.Life.Lost.Rate  
## 1 0.2128975  
## 2 0.2295302  
## 3 0.1211653  
## 4 0.2078714  
## 5 0.2387409  
## 6 0.2441235  
## 7 0.1877470  
##   
## Clustering vector:  
## [1] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  
## [38] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 1 1 1 1 1 1 1  
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## [149] 6 6 6 6 6 6 6 6 6 4 4 4 4 4 7 4 4 4 4 4 4 4 4 4 4 4 4 4 7 4 4 4 4 4 4 4 4  
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## [260] 2 5 1 1 1 1 1 1 1 1 1 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
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## [334] 4 4 4 4 4 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
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## [519] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 3 7 7 3 7 7 3 7  
## [556] 7 7 7 7 7 7 7 7 3 7 7 7 7 7 7 7 7 7 7 7 7 3 7 3 7 3 7 7 7 7 7 7 3 7 7 7 7  
## [593] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 3  
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## [667] 5 5 5 5 5 5 2 5 5 5 3 5 5 2 1 5 5 2 5 5 2 5 5 5 5 5 5 5 5 3 2 5 5 5 5 5 5  
## [704] 5 2 5 5 5 5 5 5 2 5 5 5 5 5 5 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  
## [741] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  
## [778] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  
## [815] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 6 5 5 5 6 5 5 5 5 5 5 6 5 5 5 5 5 5 5  
## [852] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 6 5 5 5 5 6 5 5 6 5 5 5 6 5 6 5 5 5 5 5 5  
## [889] 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [926] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [963] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1000] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 1 1 1 3 1 1 1 3 1  
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## [1185] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1222] 1 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  
## [1259] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  
## [1296] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 6 5 5 5 5 5 5 5 5 5 5 5 6 5 5 5  
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## [1444] 5 5 5 5 5 1 5 1 1 5 5 1 5 1 1 5 5 5 5 1 1 1 1 5 5 5 1 5 5 1 5 5 1 5 5 5 5  
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## [1703] 2 6 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 6 6 6 6 6 6 6 6 6  
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## [1777] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [1814] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 1 1 1 1 1 1 1  
## [1851] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1888] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
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## [2110] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 6 5 5 5 5 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  
## [2147] 5 5 5 5 5 5 5 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 6 5 5 5 5 5 5 5 5 5 5 2 2 5  
## [2184] 5 5 6 5 5 5 2 5 5 5 5 5 5 5 5 5 5 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [2221] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [2258] 7 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [2295] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [2332] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
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## [2406] 4 4 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 6 5 5 5 5 5 5 5 6 5 5 1 1 1  
## [2443] 1 1 1 1 1 1 1 1 1 1 1 7 7 7 7 7 7 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [2480] 3 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 3 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [2517] 7 7 7 7 7 7 3 7 7 7 7 7 7 7 7 7 7 7 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [2554] 7 7 7 7 7 7 3 3 7 7 7 7 7 7 7 7 3 7 7 7 3 7 7 7 7 7 7 6 5 6 5 5 5 5 5 5 5  
## [2591] 5 5 5 5 5 5 5 5 5 6 5 5 5 5 5 5 1 5 5 5 5 1 5 5 5 5 5 5 5 5 1 5 5 5 5 5 5  
## [2628] 5 5 5 5 5 5 5 5 5 1 1 1 1 1 1 1 1 1 1 1 1 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2665] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2702] 1 1 1 1 1 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6  
##   
## Within cluster sum of squares by cluster:  
## [1] 23.834102 12.775879 15.136219 27.982089 18.960404 8.441825 22.232086  
## (between\_SS / total\_SS = 69.1 %)  
##   
## Available components:  
##   
## [1] "cluster" "centers" "totss" "withinss" "tot.withinss"  
## [6] "betweenss" "size" "iter" "ifault"

## K-means clustering with 9 clusters of sizes 298, 67, 36, 460, 8, 199, 822, 36, 802  
##   
## Cluster means:  
## Cases\_per\_Person\_Jun Pop\_Dense days\_at\_home U\_P\_Trips SRVC\_AREA\_POP  
## 1 0.03919345 4.764165e-04 0.360192953 2.441397e-03 0.02172542  
## 2 0.04339734 6.281045e-05 0.676119403 2.231803e-03 0.01654252  
## 3 0.03829594 1.877966e-03 0.009722222 6.100469e-05 0.01623858  
## 4 0.01451548 3.230356e-03 0.859211957 3.825450e-03 0.01212369  
## 5 0.01871982 2.057841e-03 0.812500000 1.228087e-02 0.85219371  
## 6 0.03893909 2.744990e-04 0.002638191 2.267589e-03 0.01369573  
## 7 0.03870839 2.532965e-04 0.338245134 5.218260e-03 0.01234608  
## 8 0.02656737 3.723281e-03 0.760763889 7.162633e-01 0.62977887  
## 9 0.01893291 3.860946e-04 0.570152743 2.605057e-03 0.01287457  
## SRVC\_AREA\_SQML Avg\_PMiles\_Trip Restaurants POPESTIMATE2018 CAREALAND  
## 1 0.003905558 0.03325248 0.63052352 0.018639731 0.04610414  
## 2 0.003998792 0.02199015 0.06630141 0.019416322 0.32148639  
## 3 0.002085388 0.11937973 0.98955982 0.078678316 0.18288996  
## 4 0.003206288 0.04498387 0.29654978 0.013561352 0.03004542  
## 5 0.995673410 0.19885416 0.20310434 0.057065160 0.03095430  
## 6 0.002119091 0.01377158 0.04417711 0.007402156 0.06442114  
## 7 0.002682637 0.02325604 0.12588062 0.005743430 0.03696859  
## 8 0.103772521 0.17190641 0.19705032 0.068385809 0.03127832  
## 9 0.003328937 0.02791546 0.12187321 0.007347609 0.03253957  
## Years.of.Potential.Life.Lost.Rate  
## 1 0.2112309  
## 2 0.2512456  
## 3 0.1610207  
## 4 0.1890054  
## 5 0.1686311  
## 6 0.2434211  
## 7 0.2448472  
## 8 0.1106173  
## 9 0.2111637  
##   
## Clustering vector:  
## [1] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [38] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 2 2 2 2 2 9 2  
## [75] 2 2 2 2 2 9 2 2 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6  
## [112] 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6  
## [149] 6 6 6 6 6 6 6 6 6 3 1 3 3 1 1 3 1 3 3 3 3 3 3 3 1 3 3 3 1 3 1 3 3 3 1 3 1  
## [186] 3 1 3 3 1 1 3 3 3 3 3 1 3 1 1 3 3 1 1 3 1 3 3 3 3 1 1 1 6 7 6 7 7 6 6 7 7  
## [223] 7 7 9 6 7 7 7 7 7 7 7 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 9 7 7 7 7 7 7 7 7 7  
## [260] 7 7 9 9 9 9 9 9 9 9 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [297] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
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## [408] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [445] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [482] 7 7 7 7 7 7 7 7 7 7 7 7 2 9 4 9 9 9 9 9 9 6 9 9 9 9 9 9 9 9 9 9 9 9 2 9 9  
## [519] 9 9 9 9 9 9 9 2 9 9 9 9 9 9 9 4 4 4 4 4 4 4 4 4 4 4 4 4 4 8 4 4 8 4 4 8 4  
## [556] 4 4 4 4 4 4 4 4 8 4 4 4 4 4 4 4 4 4 4 4 4 8 4 8 4 8 4 4 4 4 4 4 8 4 4 4 4  
## [593] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 8  
## [630] 4 4 4 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 7 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [667] 9 9 9 9 9 7 9 9 9 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 8 9 9 9 9 9 9 9  
## [704] 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [741] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [778] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [815] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 6 7 7 7 6 7 7 7 7 7 7 6 7 7 7 7 7 7 7  
## [852] 7 7 7 7 7 7 7 7 7 7 7 9 7 7 7 7 6 7 7 9 7 7 7 7 6 7 7 7 6 7 6 7 7 7 7 7 7  
## [889] 7 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
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## [963] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [1000] 9 9 9 9 9 9 9 9 9 9 9 2 9 9 9 9 9 9 9 2 2 9 2 9 2 9 9 8 9 9 9 8 9 9 9 8 9  
## [1037] 9 9 9 8 8 9 9 9 9 9 9 9 9 9 8 9 8 9 9 9 8 9 8 8 8 8 4 4 4 4 4 4 4 4 4 4 4  
## [1074] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 5 4 4 5 4 5  
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## [1148] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [1185] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 2 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
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## [1259] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [1296] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 6 7 7 7 7 7 7 7 7 7 7 7 6 7 7 7  
## [1333] 6 7 7 7 7 7 7 7 7 7 7 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7 6 7 7 7 7 7 7 7 7 7 7  
## [1370] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 6 7 6 7 7 6 7 7 7 7 6 7 7 7 7 7  
## [1407] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [1444] 7 7 7 7 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [1481] 9 9 9 9 9 9 9 9 9 9 9 9 9 7 9 9 9 2 2 9 2 2 2 2 9 9 2 2 2 2 9 9 9 9 9 9 8  
## [1518] 9 8 4 9 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 2 2 4 2 2 2 2 2 2 4  
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## [1814] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 9 9 9 9 9 9 9  
## [1851] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [1888] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [1925] 9 9 2 2 2 9 9 9 9 2 2 2 9 9 2 9 9 9 9 9 9 9 9 9 9 9 9 9 7 9 7 9 9 9 7 9 7  
## [1962] 7 9 9 9 9 9 7 7 7 9 9 7 9 7 7 9 9 9 9 9 9 7 7 7 7 9 7 9 9 9 9 9 9 9 9 9 9  
## [1999] 9 7 9 7 9 7 9 9 9 9 9 9 7 7 7 9 7 9 9 9 8 9 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [2036] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 6 6 6 6 6 6  
## [2073] 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 7 7  
## [2110] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [2147] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7  
## [2184] 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2221] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2258] 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2295] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2332] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 1 1 1 1 1 1 1 1 1 1 1  
## [2369] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2406] 1 1 1 1 1 1 1 1 1 7 2 7 7 7 7 7 2 7 7 7 7 2 9 6 2 7 7 9 2 7 9 6 7 7 9 9 9  
## [2443] 9 9 9 9 9 9 9 9 9 9 9 4 4 4 4 4 4 8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [2480] 8 8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 8 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [2517] 4 4 4 4 4 4 8 4 4 4 4 4 4 4 4 4 4 4 8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [2554] 4 4 4 4 4 4 8 8 4 4 4 4 4 2 4 4 8 4 4 4 8 4 4 4 4 4 4 6 9 6 9 9 9 9 9 9 9  
## [2591] 9 9 9 9 9 9 9 9 9 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [2628] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [2665] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9  
## [2702] 9 9 9 9 9 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6  
##   
## Within cluster sum of squares by cluster:  
## [1] 16.6608084 5.3054909 4.3554556 21.5378681 0.0606871 8.2156265 23.4493815  
## [8] 6.2552412 27.0715448  
## (between\_SS / total\_SS = 73.0 %)  
##   
## Available components:  
##   
## [1] "cluster" "centers" "totss" "withinss" "tot.withinss"  
## [6] "betweenss" "size" "iter" "ifault"

## K-means clustering with 2 clusters of sizes 1804, 924  
##   
## Cluster means:  
## Cases\_per\_Person\_Jun Pop\_Dense days\_at\_home U\_P\_Trips SRVC\_AREA\_POP  
## 1 0.03476985 0.0003431326 0.3365161 0.00369301 0.01392442  
## 2 0.01707337 0.0019520818 0.7693317 0.03105024 0.04471134  
## SRVC\_AREA\_SQML Avg\_PMiles\_Trip Restaurants POPESTIMATE2018 CAREALAND  
## 1 0.002857745 0.02553712 0.2093390 0.009436842 0.04868739  
## 2 0.016043509 0.04581011 0.2223525 0.015051334 0.04169900  
## Years.of.Potential.Life.Lost.Rate  
## 1 0.2335756  
## 2 0.1899771  
##   
## Clustering vector:  
## [1] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [38] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1  
## [75] 2 1 1 2 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [112] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [149] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1 1 1 1 1 1 1 2 1 1 1 2 1 2 1 1 1 2 1 1  
## [186] 1 2 1 1 2 2 1 1 1 1 1 2 1 2 2 1 1 2 2 1 2 1 1 1 1 2 2 2 1 1 1 1 1 1 1 1 1  
## [223] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [260] 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [297] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [334] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [371] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [408] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [445] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [482] 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [519] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [556] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [593] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [630] 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [667] 1 1 1 1 1 1 1 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1  
## [704] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [741] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [778] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [815] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [852] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [889] 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [926] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [963] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1000] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1037] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1074] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1111] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1148] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1185] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1222] 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1259] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1296] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1333] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1370] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1407] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1444] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1481] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2  
## [1518] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1555] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1592] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1629] 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1666] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1703] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1740] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1777] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [1814] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1  
## [1851] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1888] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2  
## [1925] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1  
## [1962] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [1999] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2036] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2073] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2110] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2147] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2184] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2221] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1  
## [2258] 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2295] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2332] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2369] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2406] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2  
## [2443] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [2480] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [2517] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [2554] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1  
## [2591] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [2628] 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [2665] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
## [2702] 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
##   
## Within cluster sum of squares by cluster:  
## [1] 184.6168 116.1808  
## (between\_SS / total\_SS = 28.1 %)  
##   
## Available components:  
##   
## [1] "cluster" "centers" "totss" "withinss" "tot.withinss"  
## [6] "betweenss" "size" "iter" "ifault"



## Cases\_per\_Person\_Jun Pop\_Dense days\_at\_home U\_P\_Trips SRVC\_AREA\_POP  
## 1 0.03476985 0.0003431326 0.3365161 0.00369301 0.01392442  
## 2 0.01707337 0.0019520818 0.7693317 0.03105024 0.04471134  
## SRVC\_AREA\_SQML Avg\_PMiles\_Trip Restaurants POPESTIMATE2018 CAREALAND  
## 1 0.002857745 0.02553712 0.2093390 0.009436842 0.04868739  
## 2 0.016043509 0.04581011 0.2223525 0.015051334 0.04169900  
## Years.of.Potential.Life.Lost.Rate  
## 1 0.2335756  
## 2 0.1899771



Hold for overnight run: pglm(cases ~ RperPerson + indexPMPOPEST + Years.of.Potential.Life.Lost.Rate + Avg\_PMiles\_Trip + SRVC\_Pop\_Dense + POPESTIMATE2018 + FIPS, data = panel\_percapitax, model=“random”, effect = “time”, family = “poisson”, index = c(“FIPS”, “months”))

Time for Random Forest

## randomForest 4.6-14

## Type rfNews() to see new features/changes/bug fixes.

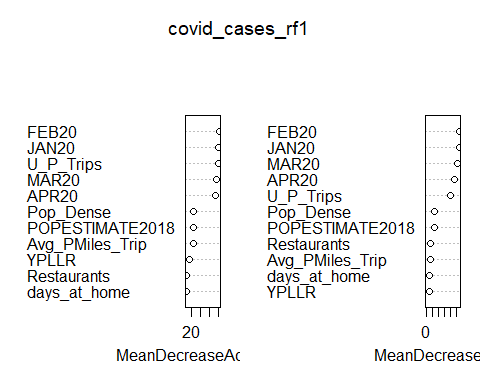
##   
## Attaching package: 'randomForest'

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

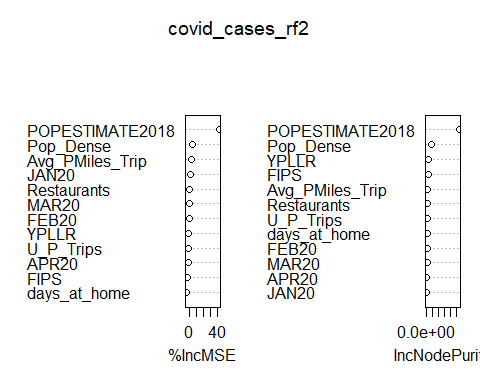
## The following object is masked from 'package:ggplot2':  
##   
## margin

## Joining, by = "FIPS"

##   
## Call:  
## randomForest(formula = ~Restaurants + YPLLR + Avg\_PMiles\_Trip + POPESTIMATE2018 + days\_at\_home + JAN20 + FEB20 + MAR20 + APR20 + U\_P\_Trips + Pop\_Dense, data = panel\_final, ntree = 100, mtry = 10, importance = TRUE)   
## Type of random forest: unsupervised  
## Number of trees: 100  
## No. of variables tried at each split: 10

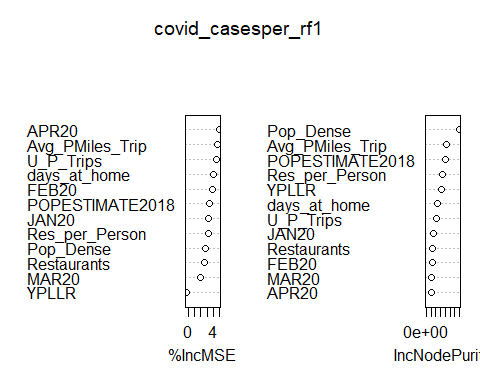


##   
## Call:  
## randomForest(formula = cases ~ Restaurants + YPLLR + Avg\_PMiles\_Trip + POPESTIMATE2018 + days\_at\_home + JAN20 + FEB20 + MAR20 + APR20 + U\_P\_Trips + Pop\_Dense + FIPS, data = panel\_final, ntree = 1000, mtry = 11, importance = TRUE)   
## Type of random forest: regression  
## Number of trees: 1000  
## No. of variables tried at each split: 11  
##   
## Mean of squared residuals: 2571293  
## % Var explained: 9.42

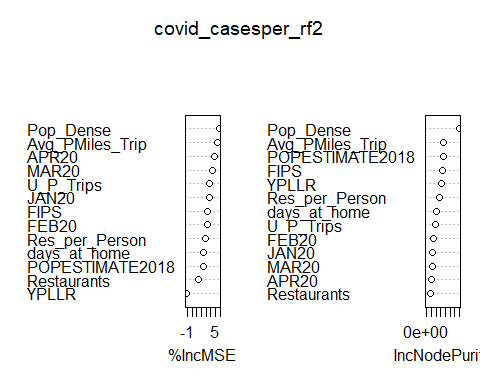


## %IncMSE IncNodePurity  
## Restaurants 0.56133417 103581137  
## YPLLR -1.23970288 143925661  
## Avg\_PMiles\_Trip 2.31972897 110104119  
## POPESTIMATE2018 42.71251122 2760159325  
## days\_at\_home -4.31819896 60656442  
## JAN20 0.84471376 36290861  
## FEB20 0.08912884 44822997  
## MAR20 0.42336483 42830090  
## APR20 -1.73549243 39615448  
## U\_P\_Trips -1.65720722 73135914  
## Pop\_Dense 4.36408183 408539457  
## FIPS -2.40202298 134858828

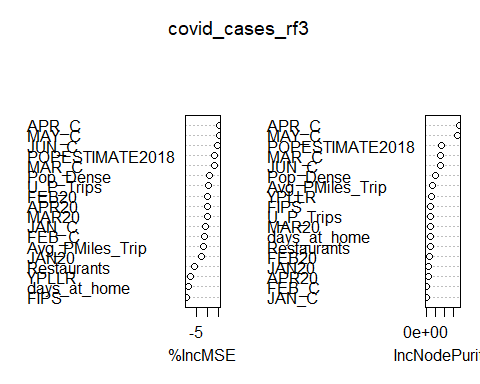
##   
## Call:  
## randomForest(formula = Cases\_per\_Person ~ Restaurants + YPLLR + Avg\_PMiles\_Trip + POPESTIMATE2018 + days\_at\_home + JAN20 + FEB20 + MAR20 + APR20 + U\_P\_Trips + Pop\_Dense + Res\_per\_Person, data = panel\_final, ntree = 100, mtry = 10, importance = TRUE)   
## Type of random forest: regression  
## Number of trees: 100  
## No. of variables tried at each split: 10  
##   
## Mean of squared residuals: 3.7804e-06  
## % Var explained: -14.64



##   
## Call:  
## randomForest(formula = Cases\_per\_Person ~ Restaurants + YPLLR + Avg\_PMiles\_Trip + POPESTIMATE2018 + days\_at\_home + JAN20 + FEB20 + MAR20 + APR20 + U\_P\_Trips + Pop\_Dense + Res\_per\_Person + FIPS, data = panel\_final, ntree = 100, mtry = 10, importance = TRUE)   
## Type of random forest: regression  
## Number of trees: 100  
## No. of variables tried at each split: 10  
##   
## Mean of squared residuals: 3.769942e-06  
## % Var explained: -14.32

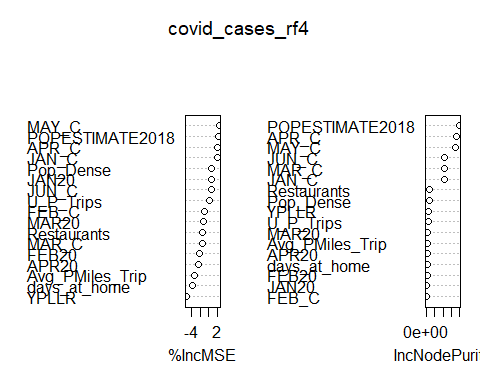


##   
## Call:  
## randomForest(formula = Cases\_per\_Person ~ Restaurants + YPLLR + Avg\_PMiles\_Trip + POPESTIMATE2018 + days\_at\_home + JAN20 + FEB20 + MAR20 + APR20 + U\_P\_Trips + Pop\_Dense + FIPS + JAN\_C + FEB\_C + MAR\_C + APR\_C + MAY\_C + JUN\_C, data = panel\_final, ntree = 100, mtry = 10, importance = TRUE)   
## Type of random forest: regression  
## Number of trees: 100  
## No. of variables tried at each split: 10  
##   
## Mean of squared residuals: 3.806659e-06  
## % Var explained: -15.43



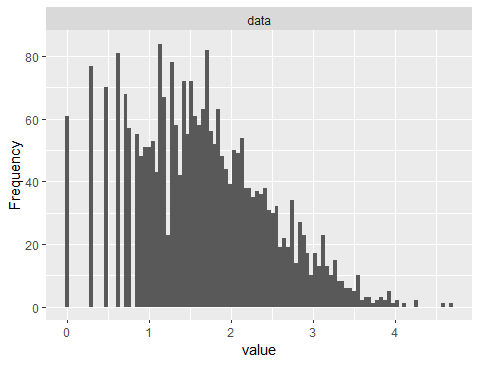
## %IncMSE IncNodePurity  
## Restaurants -5.7070636 8.388778e-05  
## YPLLR -7.6034182 1.079778e-04  
## Avg\_PMiles\_Trip -1.7427383 1.304573e-04  
## POPESTIMATE2018 3.2544965 3.344473e-04  
## days\_at\_home -8.3374904 8.494039e-05  
## JAN20 -2.7547577 5.054297e-05  
## FEB20 0.1648269 5.567283e-05  
## MAR20 0.1061966 8.870466e-05  
## APR20 0.1448379 4.506872e-05  
## U\_P\_Trips 0.5957834 9.115354e-05  
## Pop\_Dense 1.0780492 2.052713e-04  
## FIPS -9.2947592 9.639575e-05  
## JAN\_C -0.7406897 1.375142e-07  
## FEB\_C -1.1433944 3.607373e-06  
## MAR\_C 3.1348781 3.046036e-04  
## APR\_C 5.5572072 7.235383e-04  
## MAY\_C 5.4366237 6.733587e-04  
## JUN\_C 4.7420292 3.005708e-04

##   
## Call:  
## randomForest(formula = cases ~ Restaurants + YPLLR + Avg\_PMiles\_Trip + POPESTIMATE2018 + days\_at\_home + JAN20 + FEB20 + MAR20 + APR20 + U\_P\_Trips + Pop\_Dense + JAN\_C + FEB\_C + MAR\_C + APR\_C + MAY\_C + JUN\_C, data = panel\_final, ntree = 100, mtry = 10, importance = TRUE)   
## Type of random forest: regression  
## Number of trees: 100  
## No. of variables tried at each split: 10  
##   
## Mean of squared residuals: 2693016  
## % Var explained: 5.13



## %IncMSE IncNodePurity  
## Restaurants -1.48781829 73808633  
## YPLLR -5.26639610 42640056  
## Avg\_PMiles\_Trip -3.32382645 34207844  
## POPESTIMATE2018 2.23758991 791453177  
## days\_at\_home -3.97154774 18577287  
## JAN20 0.67603682 11381934  
## FEB20 -2.26775897 11594108  
## MAR20 -1.22391363 34426259  
## APR20 -2.40819705 31268972  
## U\_P\_Trips 0.09290684 37207069  
## Pop\_Dense 0.68760762 72081209  
## JAN\_C 1.93084979 432059085  
## FEB\_C -1.04413560 8487511  
## MAR\_C -1.49730760 439890119  
## APR\_C 1.97786264 728172289  
## MAY\_C 2.46912907 689966536  
## JUN\_C 0.55062735 440811433

After experimenting with the data it has been determined that while time series is the ‘correct’ way to analyze this data the series is too narrow to properly do a panel analysis. There are several approaches we could take, but given the lack of time the best analysis will probably be a month by month analysis of cases using GLM. As we look at each month there will hopefully be a



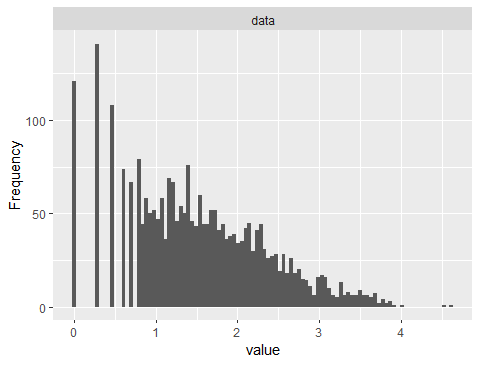
##   
## Call:  
## glm(formula = test\_formula, family = "poisson", data = county\_data\_)  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -139.711 -12.764 -8.613 -1.859 126.931   
##   
## Coefficients:  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 6.234e+00 7.234e-03 861.801 < 2e-16 \*\*\*  
## A 3.385e-04 1.438e-06 235.391 < 2e-16 \*\*\*  
## B 4.614e-06 7.501e-07 6.151 7.68e-10 \*\*\*  
## Years.of.Potential.Life.Lost.Rate -1.167e-04 6.862e-07 -169.992 < 2e-16 \*\*\*  
## Restaurants 1.037e-05 7.290e-08 142.260 < 2e-16 \*\*\*  
## U\_P\_Trips -2.247e-12 6.746e-14 -33.314 < 2e-16 \*\*\*  
## Pop\_Dense 3.304e+02 2.374e+00 139.203 < 2e-16 \*\*\*  
## POPESTIMATE2018 5.335e-07 1.927e-09 276.827 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip 1.153e-01 3.499e-04 329.432 < 2e-16 \*\*\*  
## CAREALAND 5.033e-11 2.239e-13 224.767 < 2e-16 \*\*\*  
## days\_at\_home -1.999e-02 8.186e-05 -244.178 < 2e-16 \*\*\*  
## A:B -9.904e-09 3.490e-11 -283.741 < 2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for poisson family taken to be 1)  
##   
## Null deviance: 2302766 on 2474 degrees of freedom  
## Residual deviance: 736704 on 2463 degrees of freedom  
## (253 observations deleted due to missingness)  
## AIC: 750282  
##   
## Number of Fisher Scoring iterations: 6

## Analysis of Deviance Table  
##   
## Model: poisson, link: log  
##   
## Response: X  
##   
## Terms added sequentially (first to last)  
##   
##   
## Df Deviance Resid. Df Resid. Dev Pr(>Chi)  
## NULL 2474 2302766   
## A 1 299923 2473 2002843 < 2.2e-16  
## B 1 14508 2472 1988336 < 2.2e-16  
## Years.of.Potential.Life.Lost.Rate 1 147927 2471 1840409 < 2.2e-16  
## Restaurants 1 87897 2470 1752512 < 2.2e-16  
## U\_P\_Trips 1 45 2469 1752467 2.075e-11  
## Pop\_Dense 1 122067 2468 1630399 < 2.2e-16  
## POPESTIMATE2018 1 656382 2467 974017 < 2.2e-16  
## Avg\_PMiles\_Trip 1 77887 2466 896129 < 2.2e-16  
## CAREALAND 1 41797 2465 854332 < 2.2e-16  
## days\_at\_home 1 49506 2464 804827 < 2.2e-16  
## A:B 1 68122 2463 736704 < 2.2e-16  
##   
## NULL   
## A \*\*\*  
## B \*\*\*  
## Years.of.Potential.Life.Lost.Rate \*\*\*  
## Restaurants \*\*\*  
## U\_P\_Trips \*\*\*  
## Pop\_Dense \*\*\*  
## POPESTIMATE2018 \*\*\*  
## Avg\_PMiles\_Trip \*\*\*  
## CAREALAND \*\*\*  
## days\_at\_home \*\*\*  
## A:B \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## Warning: In lm.fit(x, y, offset = offset, singular.ok = singular.ok, ...) :  
## extra argument 'family' will be disregarded

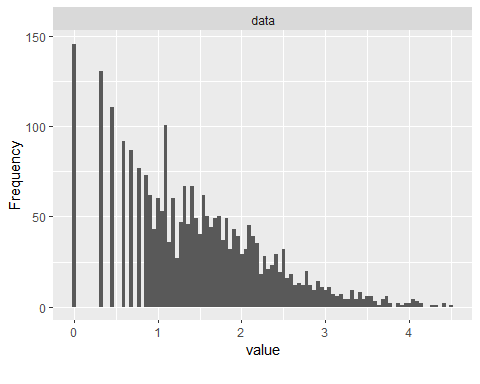
##   
## Call:  
## lm(formula = test\_formula, data = county\_data\_, family = "poisson")  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -6379.8 -51.4 29.5 100.8 21428.7   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.222e+02 6.856e+01 -1.783 0.07471 .   
## A 3.240e-01 3.627e-02 8.934 < 2e-16 \*\*\*  
## B -1.399e-01 1.486e-02 -9.414 < 2e-16 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.740e-02 5.575e-03 3.121 0.00182 \*\*   
## Restaurants -9.029e-04 9.159e-04 -0.986 0.32435   
## U\_P\_Trips -5.934e-09 1.113e-09 -5.331 1.06e-07 \*\*\*  
## Pop\_Dense -5.131e+05 7.017e+04 -7.313 3.51e-13 \*\*\*  
## POPESTIMATE2018 3.669e-03 7.380e-05 49.718 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip -1.494e+01 5.484e+00 -2.723 0.00651 \*\*   
## CAREALAND 1.770e-08 4.053e-09 4.368 1.31e-05 \*\*\*  
## days\_at\_home -3.480e+00 7.887e-01 -4.412 1.07e-05 \*\*\*  
## A:B -9.652e-06 1.033e-06 -9.343 < 2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 632.5 on 2463 degrees of freedom  
## (253 observations deleted due to missingness)  
## Multiple R-squared: 0.7038, Adjusted R-squared: 0.7025   
## F-statistic: 532.2 on 11 and 2463 DF, p-value: < 2.2e-16

## Warning in is.data.table(data): NaNs produced



## Warning: In lm.fit(x, y, offset = offset, singular.ok = singular.ok, ...) :  
## extra argument 'family' will be disregarded

##   
## Call:  
## lm(formula = test\_formula, data = county\_data\_, family = "poisson")  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -6379.8 -51.4 29.5 100.8 21428.7   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.222e+02 6.856e+01 -1.783 0.07471 .   
## A 3.240e-01 3.627e-02 8.934 < 2e-16 \*\*\*  
## B -1.399e-01 1.486e-02 -9.414 < 2e-16 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.740e-02 5.575e-03 3.121 0.00182 \*\*   
## Restaurants -9.029e-04 9.159e-04 -0.986 0.32435   
## U\_P\_Trips -5.934e-09 1.113e-09 -5.331 1.06e-07 \*\*\*  
## Pop\_Dense -5.131e+05 7.017e+04 -7.313 3.51e-13 \*\*\*  
## POPESTIMATE2018 3.669e-03 7.380e-05 49.718 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip -1.494e+01 5.484e+00 -2.723 0.00651 \*\*   
## CAREALAND 1.770e-08 4.053e-09 4.368 1.31e-05 \*\*\*  
## days\_at\_home -3.480e+00 7.887e-01 -4.412 1.07e-05 \*\*\*  
## A:B -9.652e-06 1.033e-06 -9.343 < 2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 632.5 on 2463 degrees of freedom  
## (253 observations deleted due to missingness)  
## Multiple R-squared: 0.7038, Adjusted R-squared: 0.7025   
## F-statistic: 532.2 on 11 and 2463 DF, p-value: < 2.2e-16



##   
## Call:  
## lm(formula = test\_formula, data = county\_data\_)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -11415.0 -58.0 7.7 64.1 11867.3   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -2.437e+02 6.083e+01 -4.007 6.34e-05 \*\*\*  
## A 2.889e+00 3.759e-02 76.857 < 2e-16 \*\*\*  
## B -1.236e+02 2.907e+01 -4.250 2.22e-05 \*\*\*  
## Years.of.Potential.Life.Lost.Rate 1.556e-02 4.948e-03 3.145 0.001684 \*\*   
## Restaurants -2.357e-03 8.113e-04 -2.905 0.003704 \*\*   
## U\_P\_Trips 7.860e-09 8.990e-10 8.744 < 2e-16 \*\*\*  
## Pop\_Dense 1.313e+06 5.611e+04 23.406 < 2e-16 \*\*\*  
## POPESTIMATE2018 6.754e-04 5.571e-05 12.124 < 2e-16 \*\*\*  
## Avg\_PMiles\_Trip -1.092e+01 4.860e+00 -2.247 0.024705 \*   
## CAREALAND -1.384e-09 3.602e-09 -0.384 0.700790   
## days\_at\_home 2.410e+00 6.998e-01 3.444 0.000582 \*\*\*  
## A:B -7.511e-03 5.966e-02 -0.126 0.899815   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 562.6 on 2463 degrees of freedom  
## (253 observations deleted due to missingness)  
## Multiple R-squared: 0.8521, Adjusted R-squared: 0.8514   
## F-statistic: 1290 on 11 and 2463 DF, p-value: < 2.2e-16

##   
## Call:  
## glm(formula = test\_formula, family = "poisson", data = county\_data\_)  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -141.425 -12.770 -8.889 -2.949 184.238   
##   
## Coefficients:  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 5.128e+00 8.272e-03 619.86 <2e-16 \*\*\*  
## A 3.498e-04 5.933e-07 589.55 <2e-16 \*\*\*  
## B 1.288e-01 1.662e-03 77.52 <2e-16 \*\*\*  
## Years.of.Potential.Life.Lost.Rate -1.490e-04 7.261e-07 -205.16 <2e-16 \*\*\*  
## Restaurants -8.210e-06 1.055e-07 -77.85 <2e-16 \*\*\*  
## U\_P\_Trips 4.068e-12 4.115e-14 98.86 <2e-16 \*\*\*  
## Pop\_Dense 5.658e+02 1.045e+00 541.48 <2e-16 \*\*\*  
## POPESTIMATE2018 8.940e-07 1.632e-09 547.88 <2e-16 \*\*\*  
## Avg\_PMiles\_Trip 1.179e-01 3.042e-04 387.41 <2e-16 \*\*\*  
## CAREALAND -3.795e-11 4.939e-13 -76.84 <2e-16 \*\*\*  
## days\_at\_home 1.842e-02 8.561e-05 215.11 <2e-16 \*\*\*  
## A:B -7.448e-04 2.311e-06 -322.34 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for poisson family taken to be 1)  
##   
## Null deviance: 3150259 on 2474 degrees of freedom  
## Residual deviance: 897023 on 2463 degrees of freedom  
## (253 observations deleted due to missingness)  
## AIC: 909069  
##   
## Number of Fisher Scoring iterations: 6

## Analysis of Deviance Table  
##   
## Model: poisson, link: log  
##   
## Response: X  
##   
## Terms added sequentially (first to last)  
##   
##   
## Df Deviance Resid. Df Resid. Dev Pr(>Chi)  
## NULL 2474 3150259   
## A 1 1055113 2473 2095146 < 2.2e-16  
## B 1 18784 2472 2076362 < 2.2e-16  
## Years.of.Potential.Life.Lost.Rate 1 185030 2471 1891332 < 2.2e-16  
## Restaurants 1 18 2470 1891315 2.68e-05  
## U\_P\_Trips 1 255924 2469 1635390 < 2.2e-16  
## Pop\_Dense 1 303262 2468 1332129 < 2.2e-16  
## POPESTIMATE2018 1 160148 2467 1171981 < 2.2e-16  
## Avg\_PMiles\_Trip 1 142907 2466 1029074 < 2.2e-16  
## CAREALAND 1 502 2465 1028572 < 2.2e-16  
## days\_at\_home 1 33551 2464 995021 < 2.2e-16  
## A:B 1 97999 2463 897023 < 2.2e-16  
##   
## NULL   
## A \*\*\*  
## B \*\*\*  
## Years.of.Potential.Life.Lost.Rate \*\*\*  
## Restaurants \*\*\*  
## U\_P\_Trips \*\*\*  
## Pop\_Dense \*\*\*  
## POPESTIMATE2018 \*\*\*  
## Avg\_PMiles\_Trip \*\*\*  
## CAREALAND \*\*\*  
## days\_at\_home \*\*\*  
## A:B \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1