

```
getwd()
list.files()
```

```
"/content"
'sample_data' · 'snap_timeliness_wide.csv.csv'
```

```
library(tidyverse)

snap <- read_csv("/content/snap_timeliness_wide.csv.csv", show_col_types = FALSE)

glimpse(snap)
summary(snap)
```

```
Rows: 51
Columns: 11
$ state <chr> "Alabama", "Alaska", "Arizona", "Arkansas", "California", "Colo...
$ `2023` <dbl> 94.30, 38.98, 91.47, 67.38, 82.07, 74.91, 93.81, 89.72, 48.13, ...
$ `2022` <dbl> 89.68, 93.51, 90.46, 75.20, 79.84, 74.22, 93.07, 79.41, 42.86, ...
$ `2019` <dbl> 89.39, 96.11, 93.80, 88.96, 93.08, 87.36, 95.03, 93.88, 93.84, ...
$ `2018` <dbl> 92.75, 91.21, 90.37, 87.03, 94.79, 90.15, 96.47, 93.01, 93.79, ...
$ `2017` <dbl> 97.25, 82.65, 93.49, 82.47, 93.22, 97.37, 97.95, 96.32, 86.34, ...
$ `2016` <dbl> 92.81, 79.15, 93.69, 88.56, 91.47, 98.18, 97.52, 85.26, 93.09, ...
$ `2015` <dbl> 95.60, 73.54, 92.93, 93.26, 89.64, 94.13, 94.35, 75.00, 95.08, ...
$ `2014` <dbl> 84.91, 85.66, 91.92, 92.42, 86.82, 91.91, 80.21, 73.93, 94.53, ...
$ `2013` <dbl> 85.88, 87.88, 91.21, 90.57, 86.57, 94.94, 57.36, 85.51, 97.62, ...
$ `2012` <dbl> 78.65, 93.08, 93.07, 85.98, 84.71, 91.64, 56.71, 84.62, 96.41, ...

  state      2023      2022      2019
Length:51      Min.   :38.98      Min.   : 42.86      Min.   :75.82
Class :character 1st Qu.:76.90      1st Qu.: 79.62      1st Qu.:88.76
Mode  :character Median :85.32      Median : 88.89      Median :92.54
              Mean  :82.27      Mean  : 85.62      Mean  :91.86
              3rd Qu.:91.83      3rd Qu.: 92.90      3rd Qu.:95.44
              Max.   :98.15      Max.   :100.00      Max.   :99.71

      2018      2017      2016      2015
Min.   :69.63 Min.   :81.12 Min.   :71.89 Min.   :73.54
1st Qu.:88.83 1st Qu.:89.23 1st Qu.:88.75 1st Qu.:86.58
Median :92.75 Median :93.20 Median :92.39 Median :91.25
Mean   :91.43 Mean   :92.39 Mean   :91.36 Mean   :90.10
3rd Qu.:95.09 3rd Qu.:95.97 3rd Qu.:94.70 3rd Qu.:94.38
Max.   :99.19 Max.   :99.66 Max.   :98.58 Max.   :99.13
NA's   :1

      2014      2013      2012
Min.   :63.36 Min.   :57.36 Min.   :56.71
1st Qu.:84.42 1st Qu.:84.64 1st Qu.:82.36
Median :89.10 Median :90.57 Median :88.63
Mean   :86.93 Mean   :87.71 Mean   :86.66
3rd Qu.:92.17 3rd Qu.:92.44 3rd Qu.:93.03
Max.   :99.61 Max.   :98.98 Max.   :99.28
```

```
library(GGally)
library(scales)
snap_long <- snap %>%
  pivot_longer(~state, names_to = "year", values_to = "rate") %>%
  mutate(year = as.integer(year))
summary(snap)
colSums(is.na(snap)) # check missing values per year

snap_long %>%
  group_by(year) %>%
  summarise(
    mean_rate = mean(rate, na.rm = TRUE),
    min_rate = min(rate, na.rm = TRUE),
    max_rate = max(rate, na.rm = TRUE),
    sd_rate = sd(rate, na.rm = TRUE)
  )
```

state	2023	2022	2019
Length:51	Min. :38.98	Min. : 42.86	Min. :75.82
Class :character	1st Qu.:76.90	1st Qu.: 79.62	1st Qu.:88.76
Mode :character	Median :85.32	Median : 88.89	Median :92.54
	Mean :82.27	Mean : 85.62	Mean :91.86
	3rd Qu.:91.83	3rd Qu.: 92.90	3rd Qu.:95.44
	Max. :98.15	Max. :100.00	Max. :99.71

2018	2017	2016	2015
Min. :69.63	Min. :81.12	Min. :71.89	Min. :73.54
1st Qu.:88.83	1st Qu.:89.23	1st Qu.:88.75	1st Qu.:86.58
Median :92.75	Median :93.20	Median :92.39	Median :91.25
Mean :91.43	Mean :92.39	Mean :91.36	Mean :90.10
3rd Qu.:95.09	3rd Qu.:95.97	3rd Qu.:94.70	3rd Qu.:94.38
Max. :99.19	Max. :99.66	Max. :98.58	Max. :99.13
			NA's :1

2014	2013	2012
Min. :63.36	Min. :57.36	Min. :56.71
1st Qu.:84.42	1st Qu.:84.64	1st Qu.:82.36
Median :89.10	Median :90.57	Median :88.63
Mean :86.93	Mean :87.71	Mean :86.66
3rd Qu.:92.17	3rd Qu.:92.44	3rd Qu.:93.03
Max. :99.61	Max. :98.98	Max. :99.28

state: 0 2023: 0 2022: 0 2019: 0 2018: 0 2017: 0 2016: 0 2015: 1 2014: 0 2013: 0 2012: 0

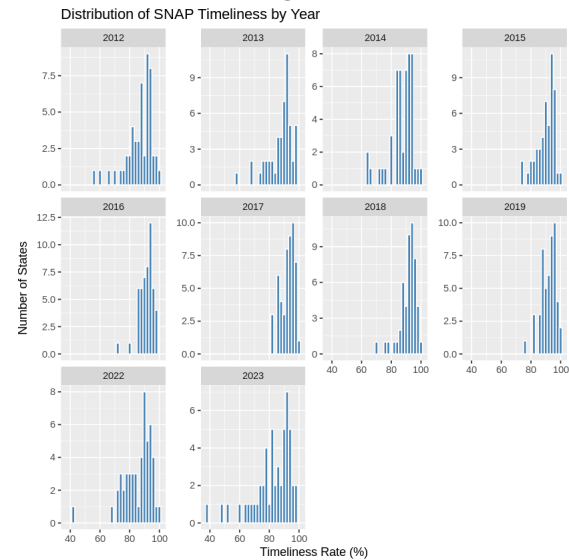
A tibble: 10 x 5

year	mean_rate	min_rate	max_rate	sd_rate
<int>	<dbl>	<dbl>	<dbl>	<dbl>
2012	86.66020	56.71	99.28	9.126523
2013	87.70843	57.36	98.98	8.484084
2014	86.92784	63.36	99.61	8.006183
2015	90.10240	73.54	99.13	5.909207
2016	91.36412	71.89	98.58	4.841059
2017	92.39078	81.12	99.66	4.598852
2018	91.43412	69.63	99.19	5.840895
2019	91.86255	75.82	99.71	4.955646
2022	85.61647	42.86	100.00	10.023351
2023	82.26627	38.98	98.15	12.888650

```
# -----
# 1. Distribution per year
# -----
ggplot(snap_long, aes(x = rate)) +
  geom_histogram(binwidth = 2, fill = "steelblue", color = "white") +
  facet_wrap(~year, scales = "free_y") +
  labs(title = "Distribution of SNAP Timeliness by Year",
       x = "Timeliness Rate (%)", y = "Number of States")
```

Warning message:

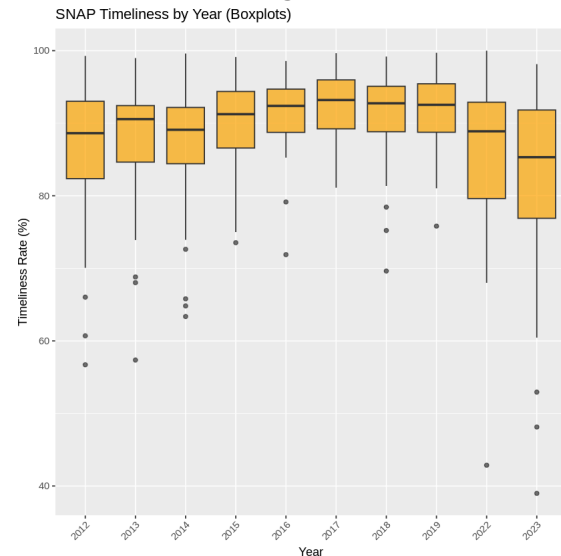
"Removed 1 row containing non-finite outside the scale range (`stat_bin()`)."



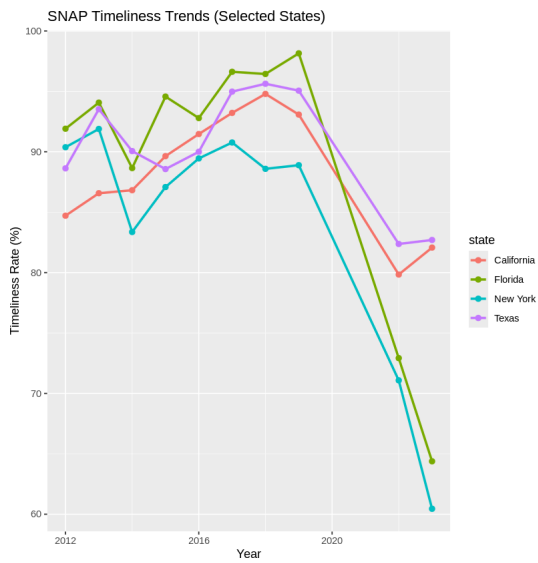
```
# -----  
# 2. Boxplots over time  
# -----  
ggplot(snap_long, aes(x = factor(year), y = rate)) +  
  geom_boxplot(fill = "orange", alpha = 0.7) +  
  labs(title = "SNAP Timeliness by Year (Boxplots)",  
       x = "Year", y = "Timeliness Rate (%)") +  
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```

Warning message:

"Removed 1 row containing non-finite outside the scale range (`stat_boxplot()`)."

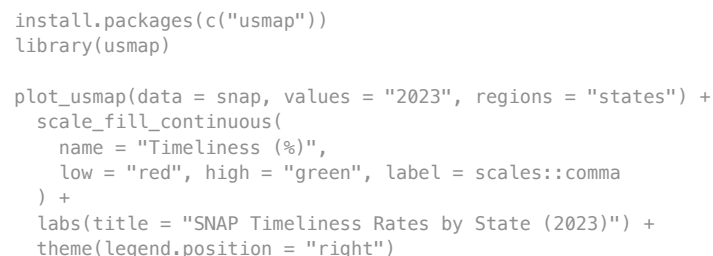


```
# -----  
# 3. Trends for selected states  
# -----  
states_focus <- c("California", "Texas", "New York", "Florida")  
snap_long %>%  
  filter(state %in% states_focus) %>%  
  ggplot(aes(x = year, y = rate, color = state, group = state)) +  
    geom_line(linewidth = 1) +  
    geom_point(size = 2) +  
    labs(title = "SNAP Timeliness Trends (Selected States)",  
         x = "Year", y = "Timeliness Rate (%)")
```



```
# -----  
# 4. Correlation between years  
# -----  
snap %>%  
  select(-state) %>%  
  ggpairs(title = "Correlation of Timeliness Across Years")
```

Correlation of Timeliness Across Years

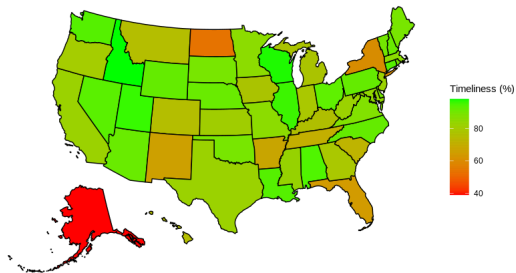


```
plot_usmap(data = snap, values = "2019", regions = "states") +
  scale_fill_continuous(
    name = "Timeliness (%)",
    low = "red", high = "green", label = scales::comma
  ) +
  labs(title = "SNAP Timeliness Rates by State (2019)") +
  theme(legend.position = "right")
```

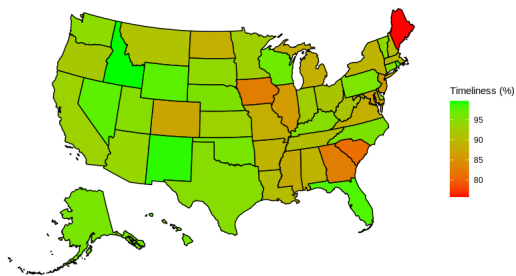
Installing package into '/usr/local/lib/R/site-library'
(as 'lib' is unspecified)

also installing the dependencies 'proxy', 'e1071', 'wk', 'classInt', 's2', 'units', 'sf', 'usmapdata'

SNAP Timeliness Rates by State (2023)

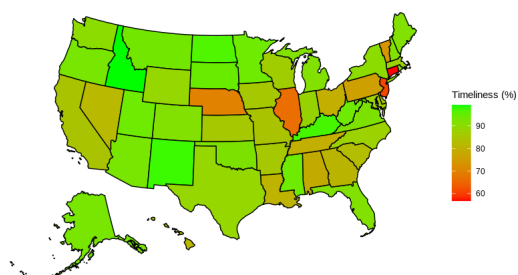


SNAP Timeliness Rates by State (2019)

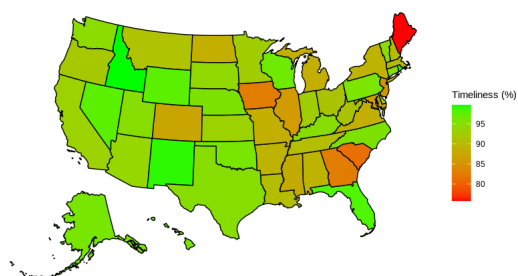


```
for (yr in c("2012", "2019", "2023")) {
  p <- plot_usmap(data = snap, values = yr, regions = "states") +
    scale_fill_continuous(
      name = "Timeliness (%)",
      low = "red", high = "green", label = scales::comma
    ) +
    labs(title = paste("SNAP Timeliness Rates by State (", yr, ")", sep="")) +
    theme(legend.position = "right")
  print(p)
}
```

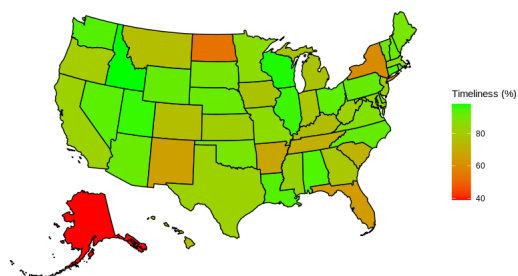
SNAP Timeliness Rates by State (2012)



SNAP Timeliness Rates by State (2019)



SNAP Timeliness Rates by State (2023)



```
library(ggplot2)
library(patchwork)

years_to_plot <- c("2012", "2019", "2023")

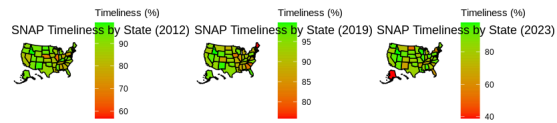
plots <- lapply(years_to_plot, function(yr) {
  plot_usmap(data = snap, values = yr, regions = "states") +
    scale_fill_continuous(low = "red", high = "green", name="Timeliness (%)") +
    labs(title = paste("SNAP Timeliness by State (", yr, ")", sep="")) +
```

```

    theme(legend.position="right")
  })

wrap_plots(plots)

```

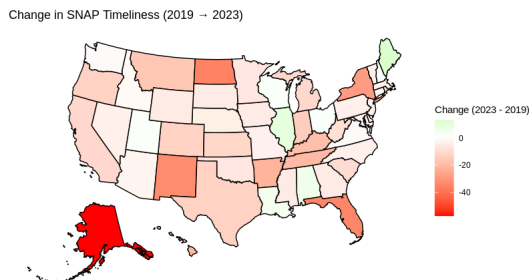


```

snap$diff_23_19 <- snap$`2023` - snap$`2019`

plot_usmap(data = snap, values = "diff_23_19", regions = "states") +
  scale_fill_gradient2(
    low = "red", mid = "white", high = "green", midpoint = 0,
    name = "Change (2023 - 2019)"
  ) +
  labs(title = "Change in SNAP Timeliness (2019 → 2023)") +
  theme(legend.position = "right")

```



```

library(dplyr)
library(tidyr)
library(readr)

wide <- read_csv("/content/snap_timeliness_wide.csv.csv")

long <- wide %>%
  pivot_longer(~state, names_to = "year", values_to = "rate") %>%
  mutate(year = as.integer(year))
drops <- wide %>%
  mutate(drop = `2023` - `2019`) %>%
  select(state, drop)

long <- long %>%
  left_join(drops, by = "state") %>%

```



```
mutate(
  treat = ifelse(drop <= -15, 1, 0), # treatment = states with ≥15% drop
  post = ifelse(year >= 2022, 1, 0) # post-COVID years
)
```

Rows: 51 Columns: 11

— Column specification —

Delimiter: ","

chr (1): state

dbl (10): 2023, 2022, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012

i Use `spec()` to retrieve the full column specification for this data.

i Specify the column types or set `show_col_types = FALSE` to quiet this message.

```
install.packages("fixest", repos = "https://cloud.r-project.org")
library(fixest)
```

```
did_model <- feols(rate ~ treat * post | state + year, data = long)
summary(did_model)
```

Installing package into ‘/usr/local/lib/R/site-library’
(as ‘lib’ is unspecified)

also installing the dependencies ‘zoo’, ‘Formula’, ‘numDeriv’, ‘sandwich’, ‘dreamerr’, ‘stringmagic’