Monte Carlo Results

```
In [ ]:  setwd("/home/leoKraushaar/Documents/School/Year 3/Semester 2/STAT 413/Project/protests/")
         library(dplyr)
```

```
In [ ]:  data <- read.csv("data/montecarlo/2030.csv")[, -1]
         head(data)
```

A data.frame: 6 × 4

	prov	season	retail	protests
	<chr>	<chr>	<dbl>	<int>
1	Alberta	Spring	10574094	9
2	British Columbia	Spring	11371951	16
3	Manitoba	Spring	3225536	9
4	New Brunswick	Spring	4129786	3
5	Newfoundland and Labrador	Spring	3186605	3
6	Northwest Territories	Spring	2056920	0

```
In [ ]:  floor(nrow(data)/143)
```

8391

```
In [ ]:  nrow(data)
```

1200000

```
In [ ]:  iterations <- rep(1:8392, each=143)

         data$iter <- iterations[1:nrow(data)]

         data[, c("season", "retail")] <- NULL

         head(data)
```

A data.frame: 6 × 3

	prov	protests	iter
	<chr>	<int>	<int>
1	Alberta	9	1
2	British Columbia	16	1
3	Manitoba	9	1
4	New Brunswick	3	1
5	Newfoundland and Labrador	3	1
6	Northwest Territories	0	1

```
In [ ]:  interval <- function(X, alpha=0.05) {
             quantiles <- quantile(X, probs = c(alpha/2, 1/2, 1-(alpha/2)))
             return(quantiles)
         }
```

```
In [ ]:  interval_low <- function(X, alpha=0.05) {
             quantiles <- quantile(X, probs = c(alpha/2, 1/2, 1-(alpha/2)))
             return(as.numeric(quantiles[1]))
         }

         interval_high <- function(X, alpha=0.05) {
             quantiles <- quantile(X, probs = c(alpha/2, 1/2, 1-(alpha/2)))
             return(quantiles)
             return(as.numeric(quantiles[2]))
         }
```

```
In [ ]:  total_protests <- data %>% group_by(prov, iter) %>% summarise(total = sum(protests))
```

`summarise()` has grouped output by 'prov'. You can override using the
`.groups` argument.

```
In [ ]:  intervals <- aggregate(total ~ prov, data=total_protests, FUN=interval)$total
         provs <- aggregate(total ~ prov, data=total_protests, FUN=interval)$prov
```

```
In [ ]:  results <- as.data.frame(cbind(prov=provs, intervals))
         results
```

A data.frame: 13 × 4

prov	2.5%	50%	97.5%
<chr>	<chr>	<chr>	<chr>
Alberta	102	117	133
British Columbia	190	219	250
Manitoba	62	72	82
New Brunswick	37	43	49
Newfoundland and Labrador	25	30	35
Northwest Territories	0	1	3
Nova Scotia	42	49	55
Nunavut	2	5	7
Ontario	661	761	863
Prince Edward Island	11	13	15
Quebec	246	284	323
Saskatchewan	33	38	44
Yukon	11	13	15

In [ ]:

In [ ]:
```r
init_data <- read.csv("data/merged_data.csv") |> subset(year==2023)
init_data <- init_data[, c("month", "GEO", "protests")]

init_tot <- aggregate(protests ~ GEO, data=init_data, sum)

results <- cbind("2023"=init_tot$protests, results)
results <- subset(results, select=c(2,1,3,4,5))


results[, "50%"] <- as.numeric(results[, "50%"])

results$pred.effect <- ifelse(results$`50%` > results$"2023", "inc.", "dec.")

results
```

A data.frame: 13 × 6

	prov	2023	2.5%	50%	97.5%	pred.effect
	<chr>	<int>	<chr>	<dbl>	<chr>	<chr>
1	Alberta	139	102	117	133	dec.
2	British Columbia	284	190	219	250	dec.
3	Manitoba	118	62	72	82	dec.
4	New Brunswick	61	37	43	49	dec.
5	Newfoundland and Labrador	61	25	30	35	dec.
6	Northwest Territories	6	0	1	3	dec.
7	Nova Scotia	85	42	49	55	dec.
8	Nunavut	11	2	5	7	dec.
9	Ontario	627	661	761	863	inc.
10	Prince Edward Island	29	11	13	15	dec.
11	Quebec	270	246	284	323	inc.
12	Saskatchewan	56	33	38	44	dec.
13	Yukon	18	11	13	15	dec.

In [ ]:
```r
library(xtable)
```

In [ ]:
```r
print(xtable(results, caption="95% Prediction Intervals for Total Yearly Protests by Province, 2030", label="tab:to
```