

# Denis Ostroushko - PUBH 7440 - Final

## Section 1: Preliminaries

### 1.1

```
Race Deaths_f Pop_f Crute_rate_f Deaths_m  
1 American Indian or Alaska Native 12 30896 38.839979 19  
2 Asian or Pacific Islander 10 122644 8.153681 25  
3 Black or African American 10 147989 6.757259 29  
4 White 157 1997895 7.858271 559  
  
Pop_m Crute_rate_m  
1 30271 62.76634  
2 115259 21.69028  
3 154480 18.77266  
4 1955983 28.57898
```

### 1.2

### 1.3

### 1.4

total data: 696

non-missing data: 538, missingness: 23%

```
# A tibble: 3 x 2  
  Deaths      n  
  <chr>     <int>  
1 0          521  
2 10+        17  
3 Suppressed 158
```

## **Section 2: Fitting and Evaluating the Model**

### **2.1**

Iterations: 50,000

Initial values for Beta: log of mean of death rates for the combination of sex and race categories

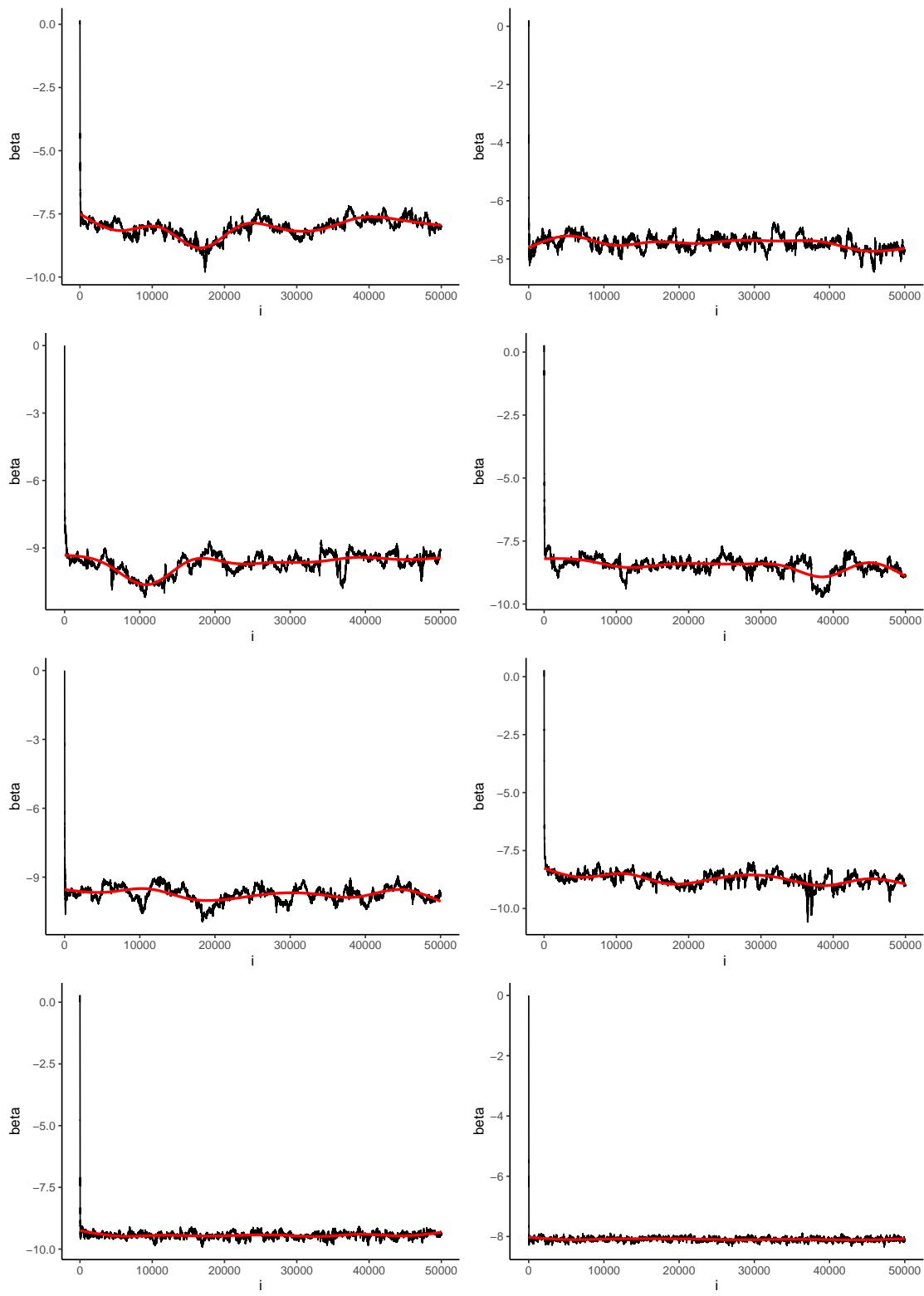
Sigma: 10

Tau: 10

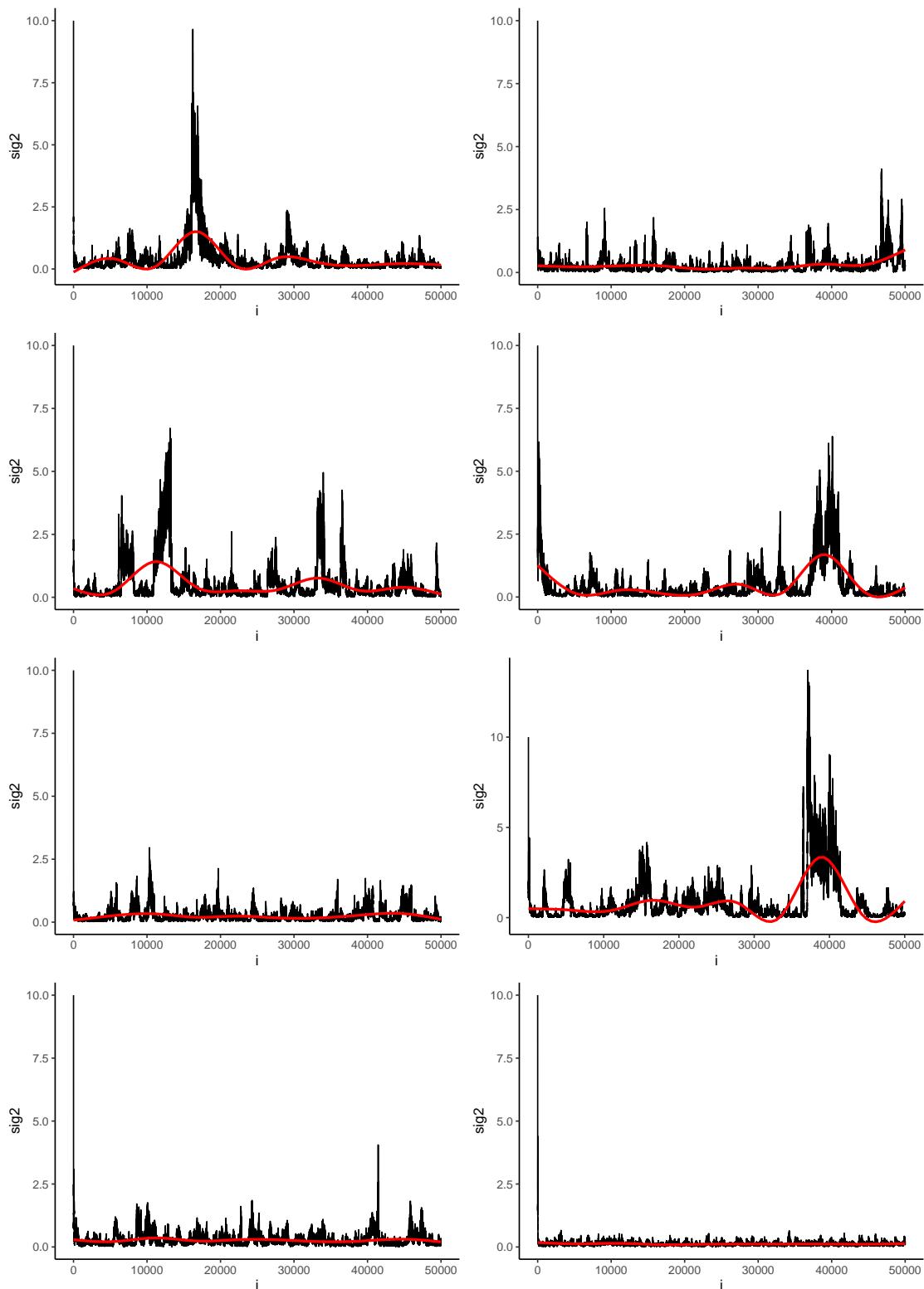
Random effects: set to 0, learn from data

### **2.2**

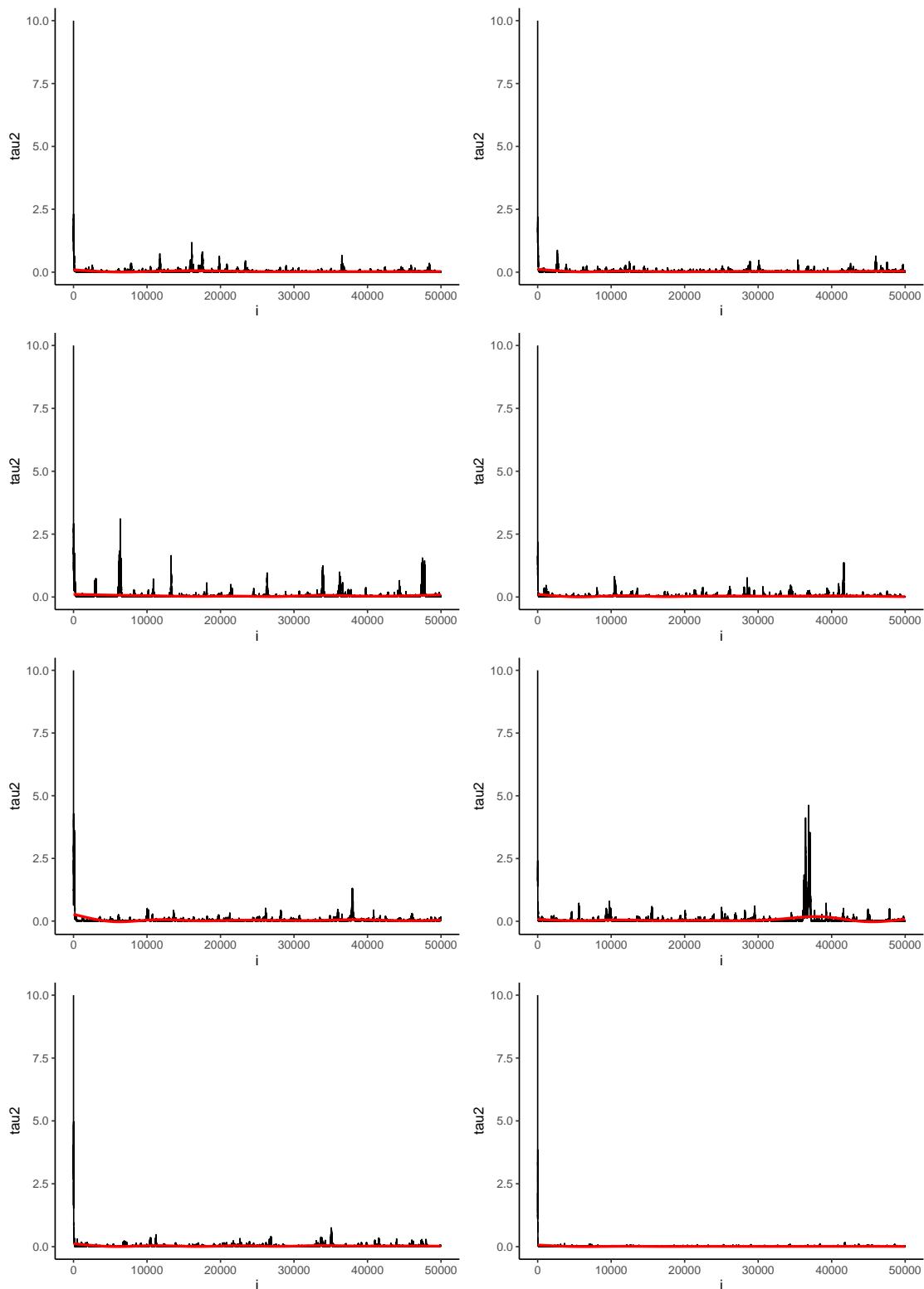
#### **Betas**



## Sigmas

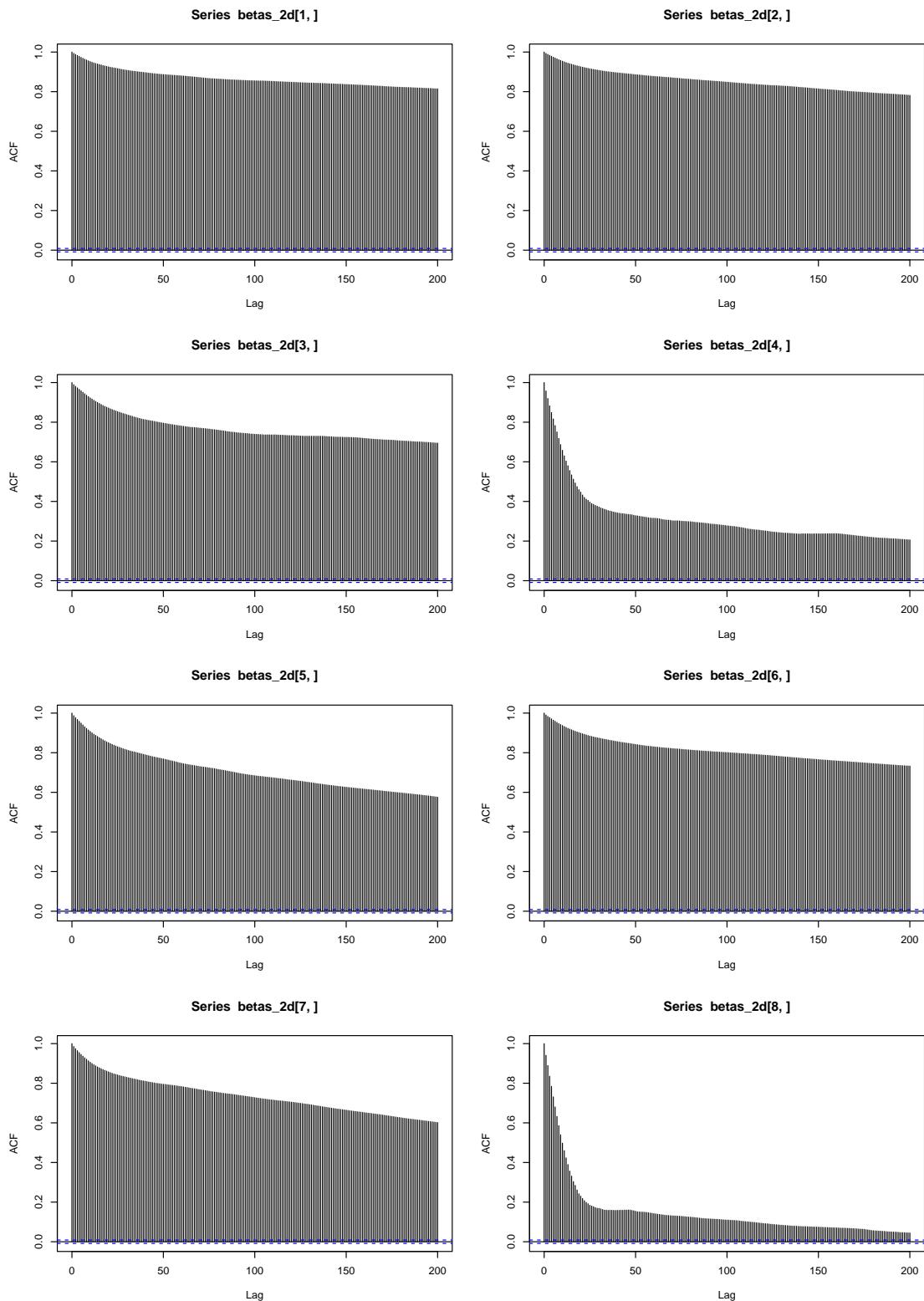


**Taus**



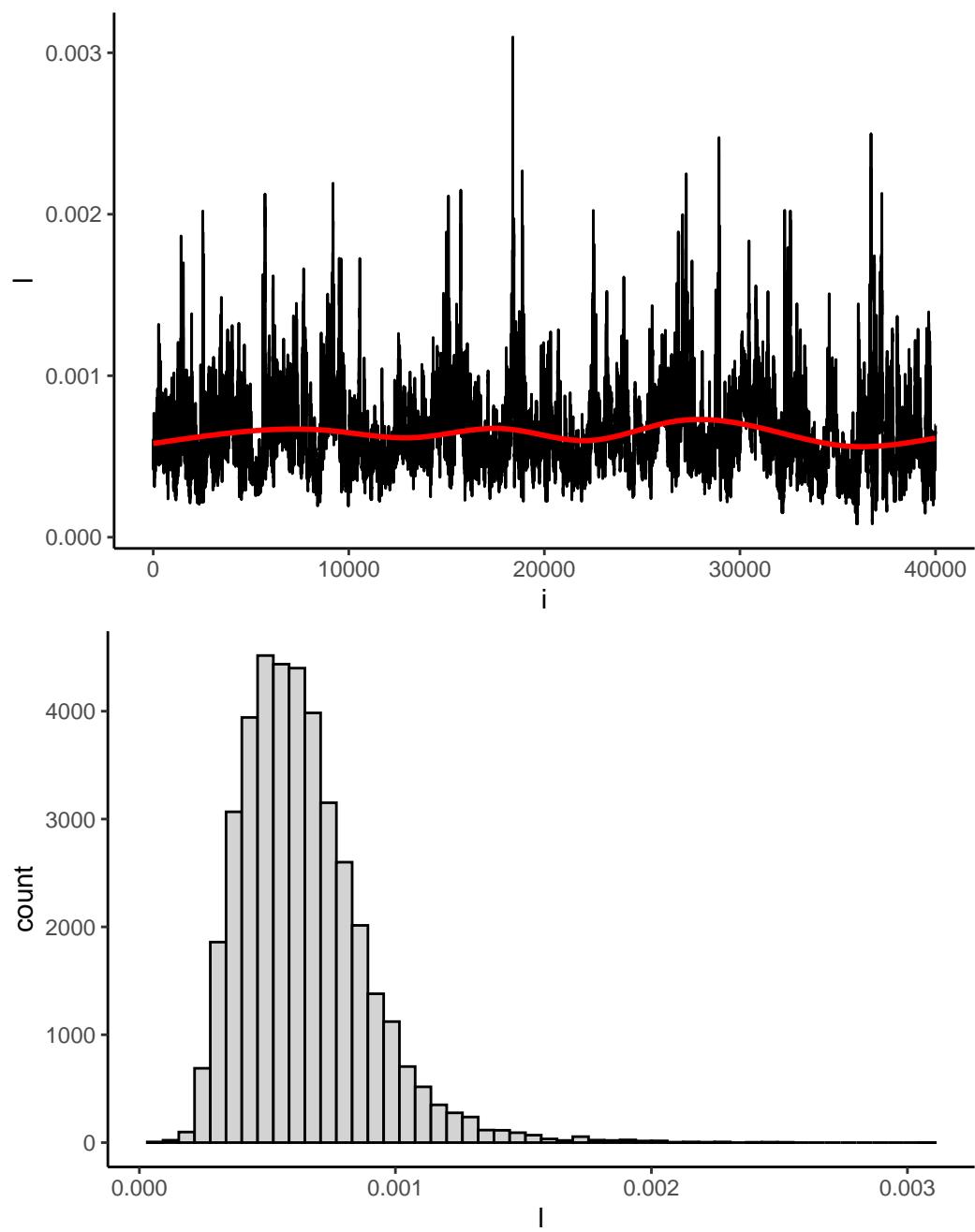


## 2.3

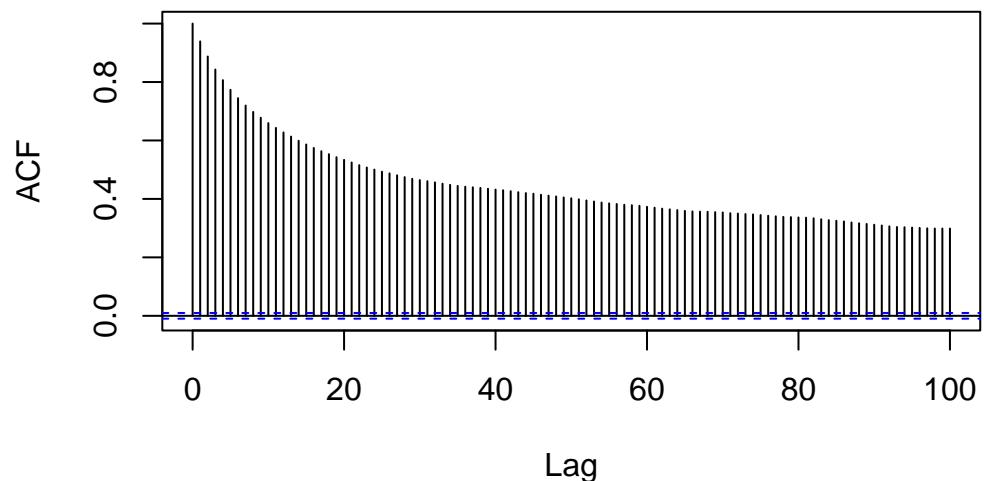


## 2.4

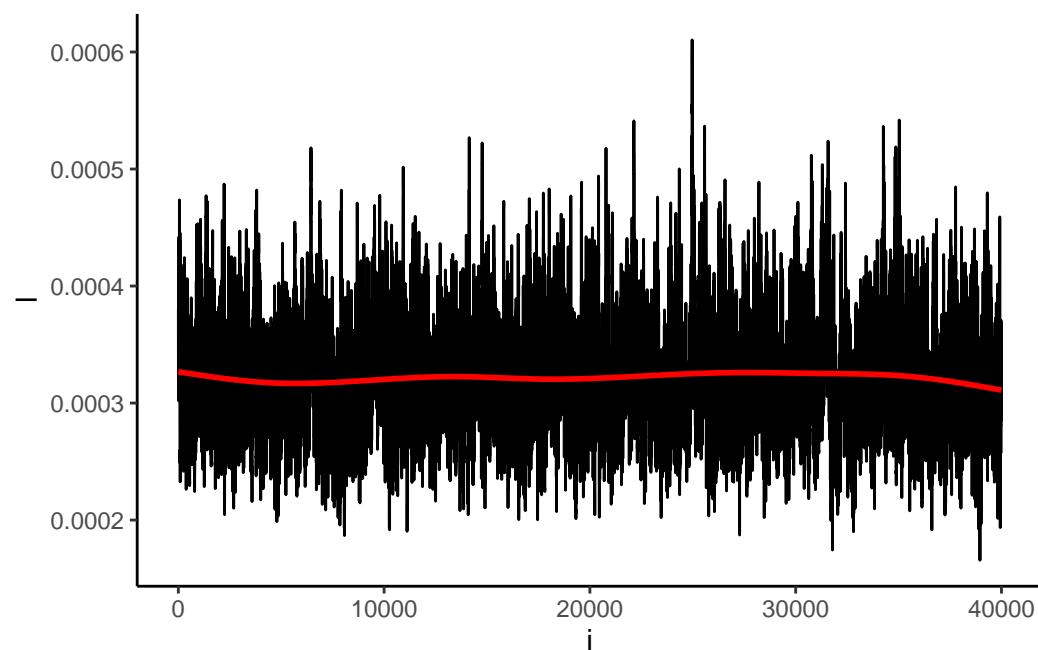
### American Indian / Alaska Native

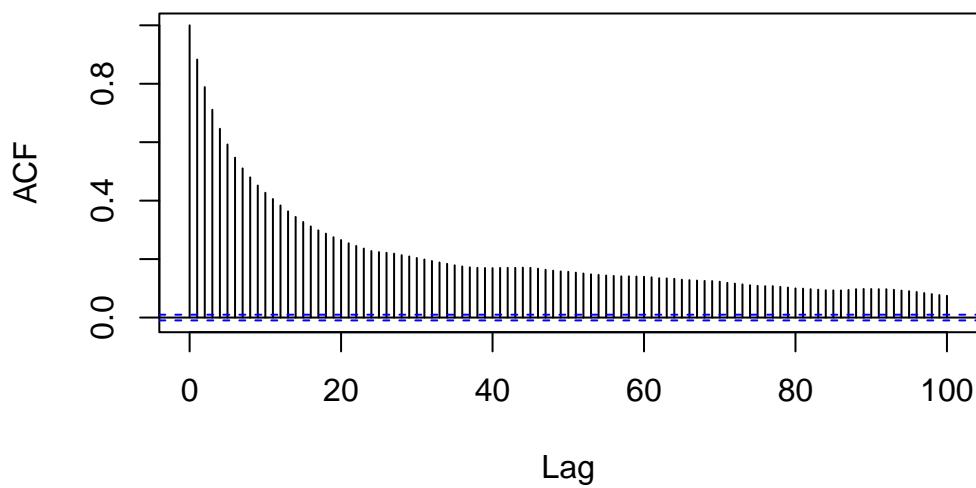
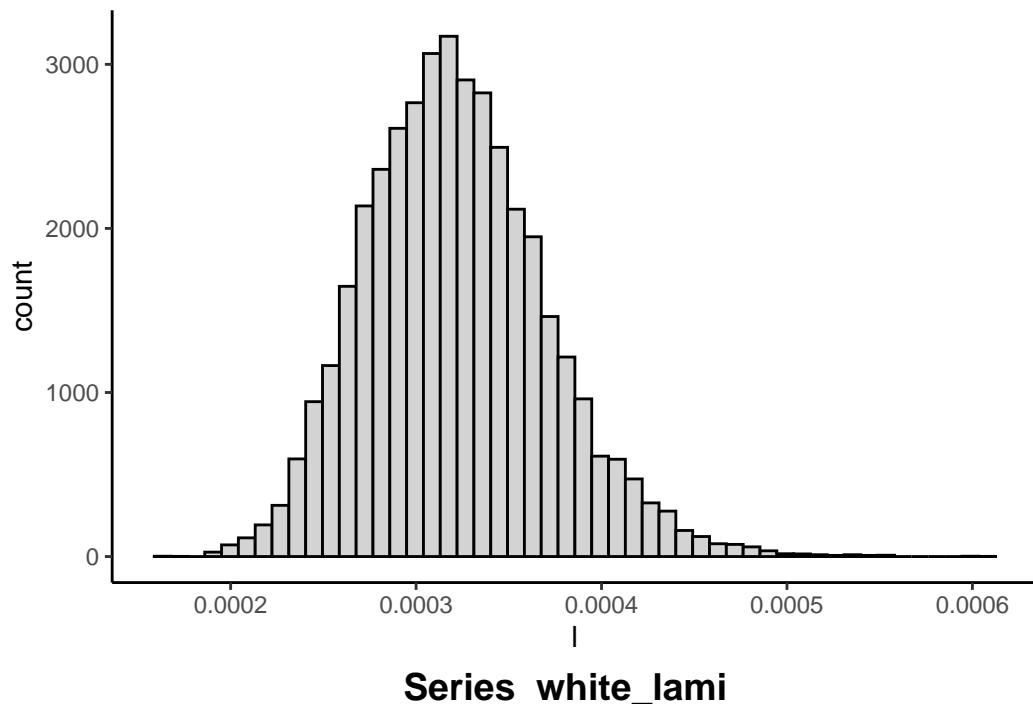


**Series ind\_lami**



**White**





## Section 3: Bayesian Inference

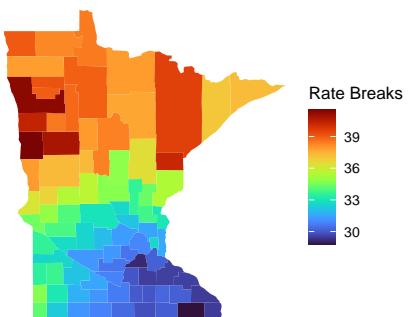
### 3.1

race	median_s1	median_s1_ci	median_s2	median_s1_ci.1	p_s2_gr_s1	Crute_rate
American Indian or Alaska Native	35.26	18.9, 64.5	60.29	36.9, 90.1	0.92	38.
Asian or Pacific Islander	7.44	3, 12.4	21.49	14, 31.1	1.00	8.
Black or African American	6.05	3.1, 10.5	18.43	12.3, 25.7	1.00	6.
White	7.76	6.5, 9.1	28.57	26.2, 31	1.00	7.

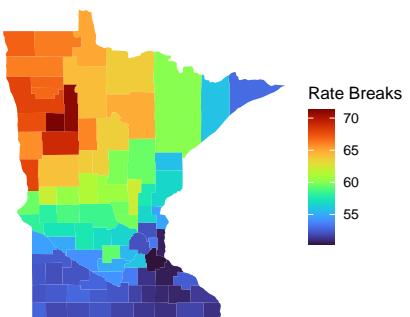


### 3.2

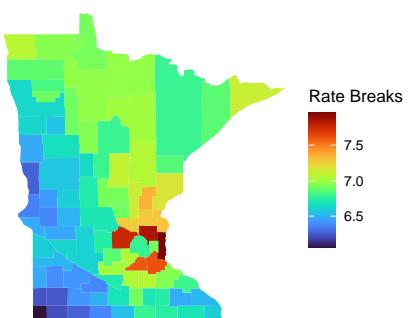
Race: American Indian or Alaska Native.  
Gender: Female



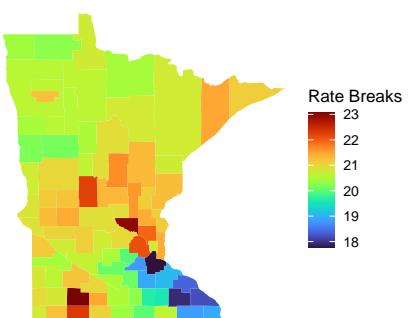
Race: American Indian or Alaska Native.  
Gender: Male



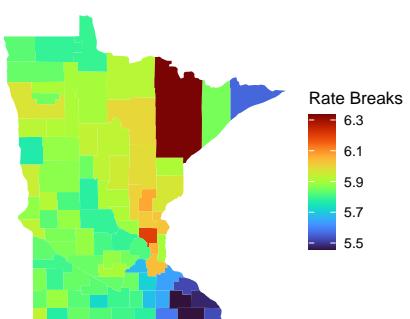
Race: Asian or Pacific Islander.  
Gender: Female



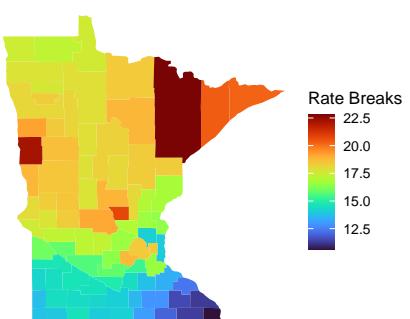
Race: Asian or Pacific Islander.  
Gender: Male



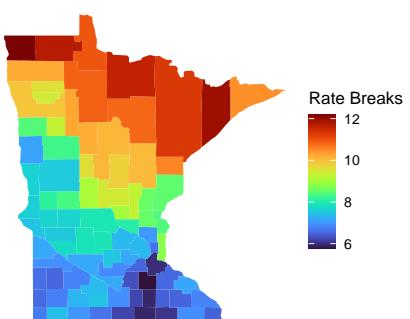
Race: Black or African American.  
Gender: Female



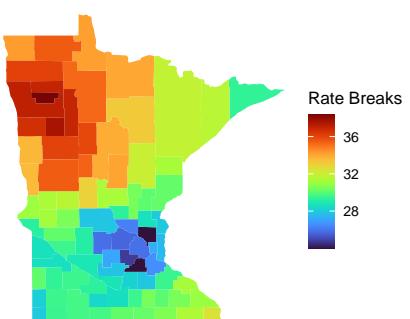
Race: Black or African American.  
Gender: Male



Race: White.  
Gender: Female



Race: White.  
Gender: Male



### 3.3

Race	Female		Male	
	Urban	Rural	Urban	Rural
American Indian or Alaska Native	0	0	0.0	0.0
Asian or Pacific Islander	0	0	10.7	0.0
Black or African American	0	0	10.7	0.0
White	6	0	26.2	6.6

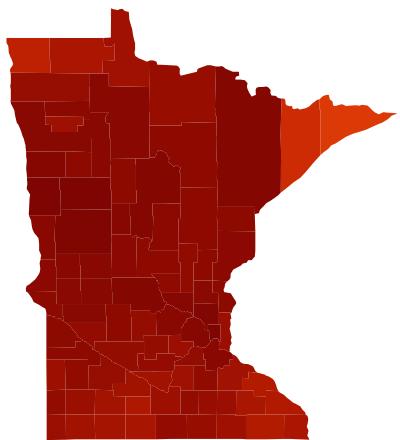
  

Race	Female				Male			
	Urban	Urban C.I.	Rural	Rural C.I.	Urban	Urban C.I.	Rural	Rural C.I.
American Indian or Alaska Native	31.7	11.5, 62.9	38.3	20.5, 68.8	53.3	31, 92.6	64.1	38, 97
Asian or Pacific Islander	7.3	3, 12.7	7.6	2.6, 13.1	21.6	13.9, 31.8	21.0	10.4, 34.5
Black or African American	6.0	3, 10.6	6.1	2.9, 11	18.0	11.4, 25.8	19.0	11.2, 36.7
White	7.2	5.7, 8.7	8.4	6.8, 10.2	26.4	23.4, 29.5	30.8	27.8, 34

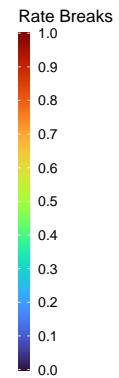
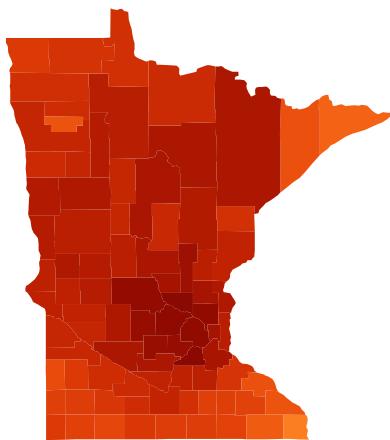


### 3.4

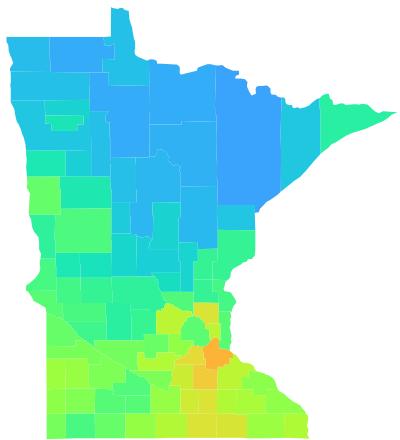
Race: AI/AN to White.  
Gender: Female



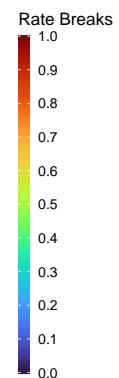
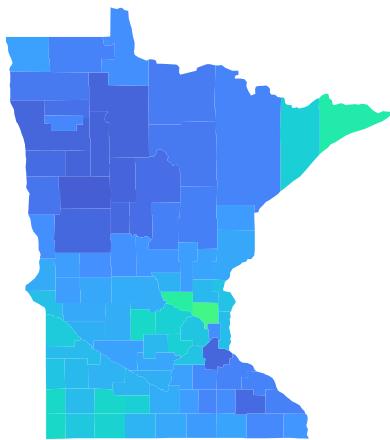
Race: AI/AN to White.  
Gender: Male



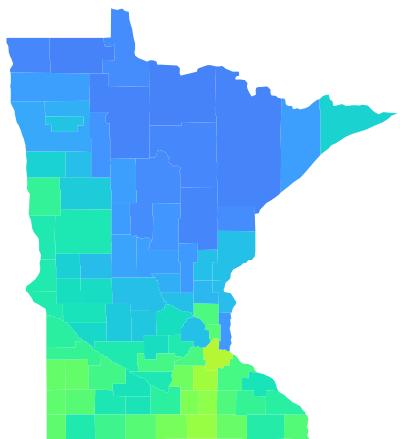
Race: Asian to White.  
Gender: Female



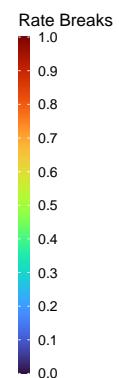
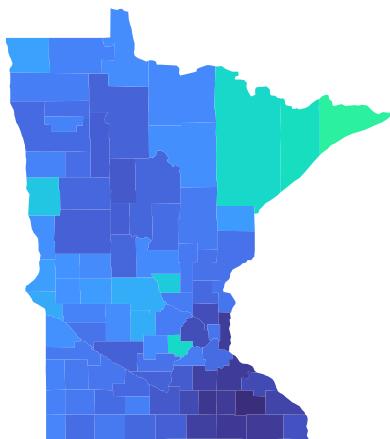
Race: Asian to White.  
Gender: Male



Race: Black to White.  
Gender: Female

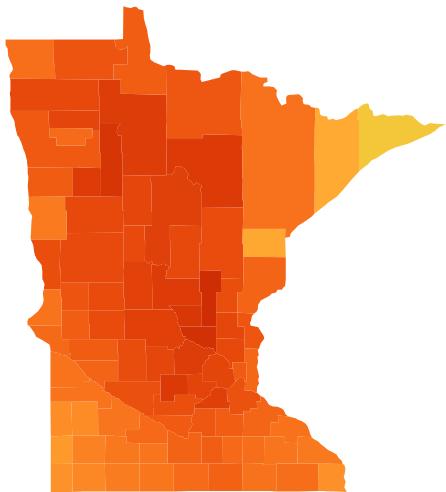


Race: Black to White.  
Gender: Male

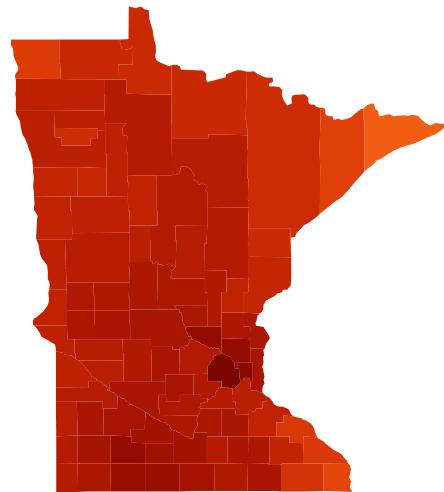


### 3.5

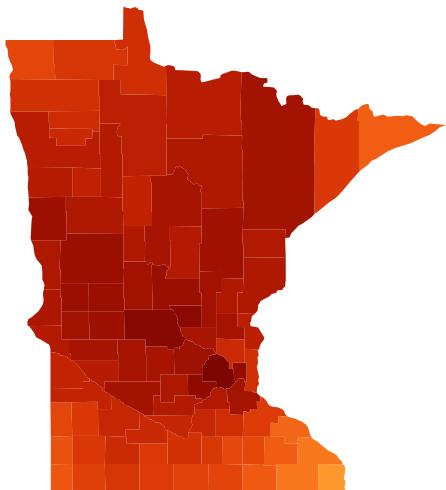
Race: AI/AN.  
Gender: Male to Female



Race: Asian.  
Gender: Male to Female



Race: Black.  
Gender: Male to Female



Race: White.  
Gender: Male to Female

