

Srishti_Lab2

```
library(tidyverse)
```

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

```
## v ggplot2 3.3.2    v purrr  0.3.4
## v tibble  3.0.4    v dplyr  1.0.2
## v tidyr   1.1.2    v stringr 1.4.0
## v readr   1.4.0    v forcats 0.5.0
```

```
## -- Conflicts ----- tidyverse_conflicts() --
```

```
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(dplyr)
```

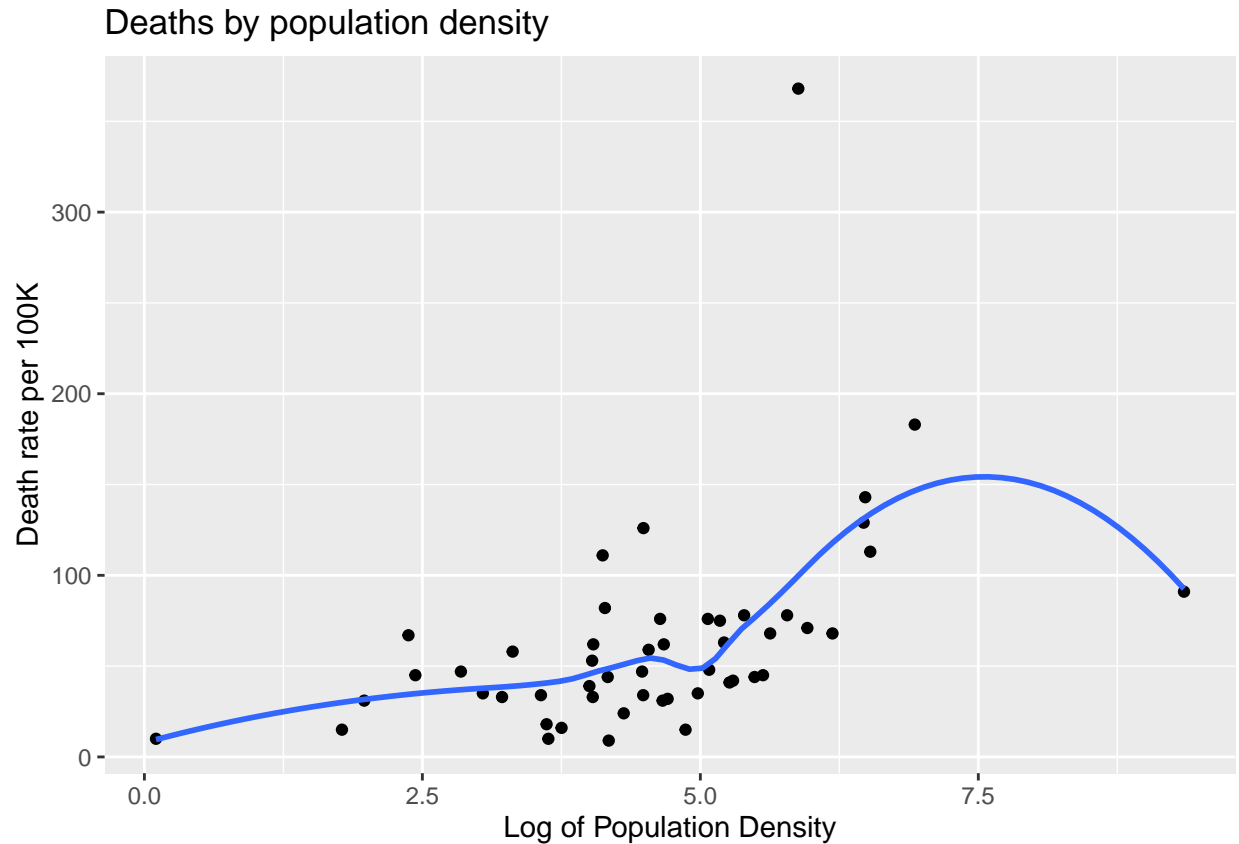
```
covid_data<-read.csv("covid-19.csv",skip=1)
covid_masks_policies_data<-read.csv("covid policies masks.csv")
```

```
covid_joined_data<-left_join(
  covid_data,
  covid_masks_policies_data,
  by=c("State"))
```

```
covid_data_renamed <- covid_joined_data %>%
  rename(
    total_deaths = "Total.Deaths",
    death_in_last_7 = "Deaths.in.Last.7.Days",
    death_rate = "Death.Rate.per.100000",
    death_rate_in_last_7 = "Death.Rate.per.100K.in.Last.7.Days",
    mask_mandated = 'Mandate.face.mask.use.by.all.individuals.in.public.spaces.y',
    mask_enforced_by_fines = 'Face.mask.mandate.enforced.by.fines',
    mask_enforced_by_charge = 'Face.mask.mandate.enforced.by.criminal.charge.citation',
    no_legal_mask_enforcement = 'No.legal.enforcement.of.face.mask.mandate.y',
    public_facing_employee_mask = 'Mandate.face.mask.use.by.employees.in.public.facing.businesses.y',
    population_density = 'Population.density.per.square.miles',
    stay_at_home_begin = 'Stay.at.home..shelter.in.place',
    stay_at_home_end = 'End.stay.at.home.shelter.in.place',
    retail_mobility_change = 'Retail...recreation',
    grocery_pharm_mobility_change='Grocery...pharmacy',
    parks_mobility_change='Parks',
    transit_mobility_change = 'Transit.stations',
    workplaces_mobility_change = 'Workplaces',
    residential_mobility_change = 'Residential')
```

```
ggplot(covid_data_renamed, aes(x = log(population_density), y = death_rate)) +geom_point()+
  geom_smooth(se = FALSE) +
  labs(title = "Deaths by population density", x = "Log of Population Density", y = "Death rate per 100K")
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```



```
covid_data_renamed$mask_mandate_rank<-ifelse(covid_data_renamed$mask_mandated==0,60,rank(as.Date.factor
```

```
data.frame(covid_data_renamed$State,covid_data_renamed$mask_mandate_rank,covid_data_renamed$mask_mandat
```

```
## covid_data_renamed.State covid_data_renamed.mask_mandate_rank
## 1 Alabama 26.5
## 2 Alaska 8.0
## 3 Arizona 60.0
## 4 Arkansas 28.0
## 5 California 17.0
## 6 Colorado 26.5
## 7 Connecticut 7.0
## 8 Delaware 10.0
## 9 District of Columbia 3.5
## 10 Florida 60.0
## 11 Georgia 60.0
## 12 Hawaii 38.0
## 13 Idaho 60.0
```

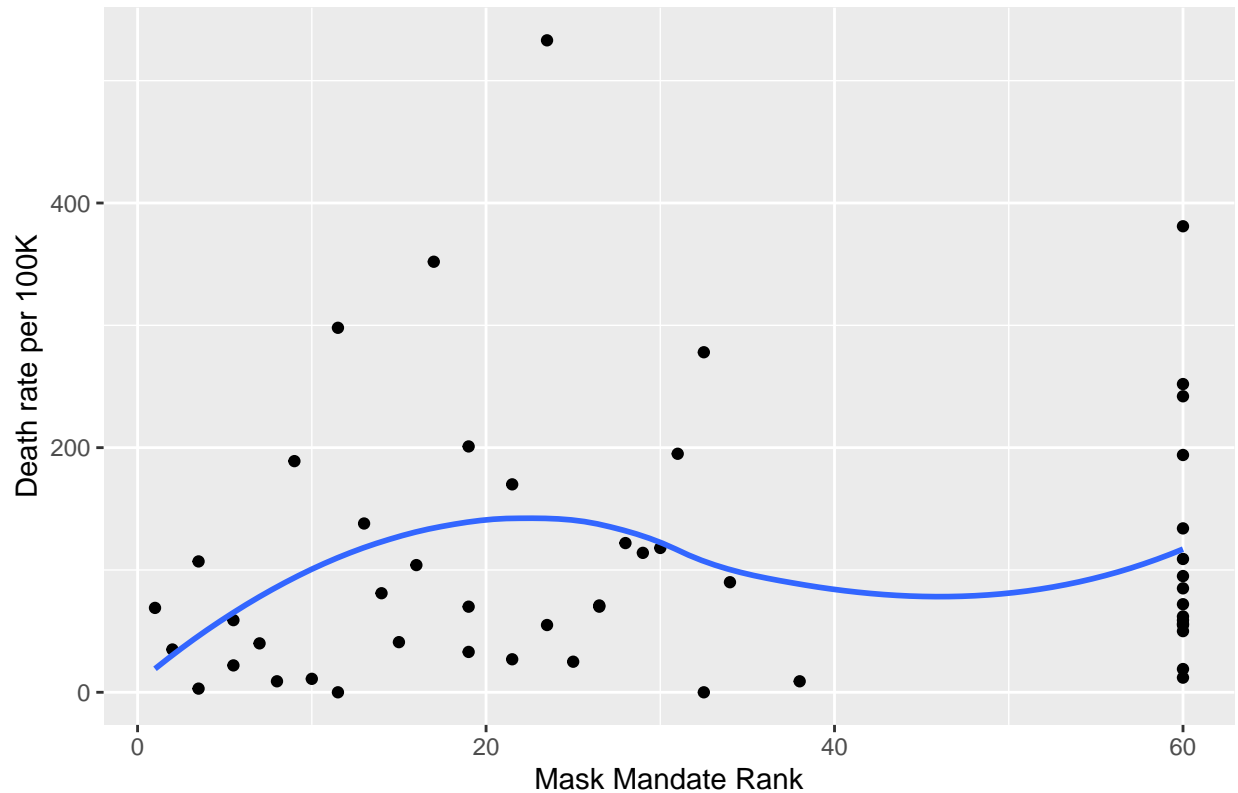
## 14	Illinois	11.5
## 15	Indiana	31.0
## 16	Iowa	60.0
## 17	Kansas	23.5
## 18	Kentucky	14.0
## 19	Louisiana	60.0
## 20	Maine	11.5
## 21	Maryland	5.5
## 22	Massachusetts	13.0
## 23	Michigan	9.0
## 24	Minnesota	30.0
## 25	Mississippi	34.0
## 26	Missouri	60.0
## 27	Montana	60.0
## 28	Nebraska	60.0
## 29	Nevada	19.0
## 30	New Hampshire	60.0
## 31	New Jersey	1.0
## 32	New Mexico	15.0
## 33	New York	3.5
## 34	North Carolina	19.0
## 35	North Dakota	60.0
## 36	Ohio	29.0
## 37	Oklahoma	60.0
## 38	Oregon	21.5
## 39	Pennsylvania	21.5
## 40	Rhode Island	5.5
## 41	South Carolina	60.0
## 42	South Dakota	60.0
## 43	Tennessee	60.0
## 44	Texas	23.5
## 45	Utah	2.0
## 46	Vermont	32.5
## 47	Virginia	16.0
## 48	Washington	19.0
## 49	West Virginia	25.0
## 50	Wisconsin	32.5
## 51	Wyoming	60.0
##	covid_data_renamed.mask_mandated	
## 1	7/16/20	
## 2	4/24/20	
## 3	0	
## 4	7/20/20	
## 5	6/18/20	
## 6	7/16/20	
## 7	4/20/20	
## 8	4/28/20	
## 9	4/17/20	
## 10	0	
## 11	0	
## 12	1/0/1900	
## 13	0	
## 14	5/1/20	
## 15	7/27/20	

```
## 16          0
## 17         7/3/20
## 18        5/11/20
## 19          0
## 20         5/1/20
## 21        4/18/20
## 22         5/6/20
## 23        4/27/20
## 24        7/24/20
## 25         8/5/20
## 26          0
## 27          0
## 28          0
## 29        6/26/20
## 30          0
## 31         4/8/20
## 32        5/15/20
## 33        4/17/20
## 34        6/26/20
## 35          0
## 36        7/23/20
## 37          0
## 38        7/1/20
## 39        7/1/20
## 40        4/18/20
## 41          0
## 42          0
## 43          0
## 44         7/3/20
## 45        4/10/20
## 46         8/1/20
## 47        5/29/20
## 48        6/26/20
## 49        7/7/20
## 50        8/1/20
## 51          0
```

```
ggplot(covid_data_renamed, aes(x = mask_mandate_rank, y = death_in_last_7)) +
  geom_point() +
  geom_smooth(se = FALSE) +
  labs(title = "Deaths by Mask Mandate Rank", x = "Mask Mandate Rank", y = "Death rate per 100K")
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

Deaths by Mask Mandate Rank



```
ggplot(covid_data_renamed, aes(x = mask_enforced_by_fines+mask_enforced_by_charge , y = death_rate)) +
  geom_point() +
  geom_smooth(se = FALSE) +
  labs(title = "Deaths by Mask Enforcement", x = "Mask Enforcement", y = "Death rate per 100K")
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

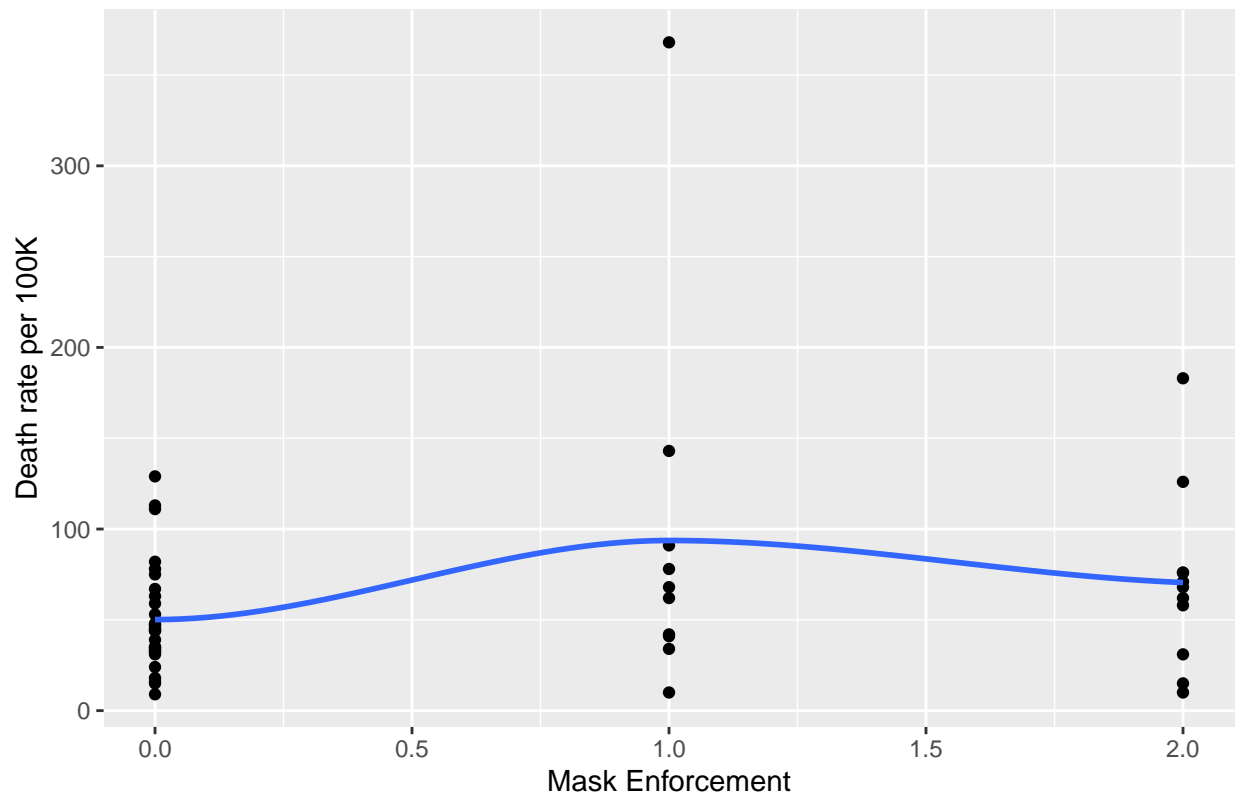
```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : pseudoinverse used at -0.01
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : neighborhood radius 1.01
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : reciprocal condition number 0
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : There are other near singularities as well. 4.0401
```

Deaths by Mask Enforcement



```
covid_data_renamed$stay_at_home_length<-ifelse(covid_data_renamed$stay_at_home_begin==0,
                                                0,
                                                ifelse(covid_data_renamed$stay_at_home_begin==0,
                                                         difftime(Sys.Date(), as.Date.factor(covid_data_renamed$stay_at_home_begin)),
                                                         difftime(as.Date.factor(covid_data_renamed$stay_at_home_end), as.Date.factor(covid_data_renamed$stay_at_home_begin))
                                                )
```

```
covid_data_renamed$stay_at_home_length
```

```
## [1] 26 27 46 0 NA 32 0 69 58 45 28 67 37 69 54 0 35 0 53 59 46 55 69 51 24
## [26] 28 29 0 39 80 80 NA 97 53 0 57 0 88 65 42 27 0 27 0 0 52 60 70 42 49
## [51] 0
```

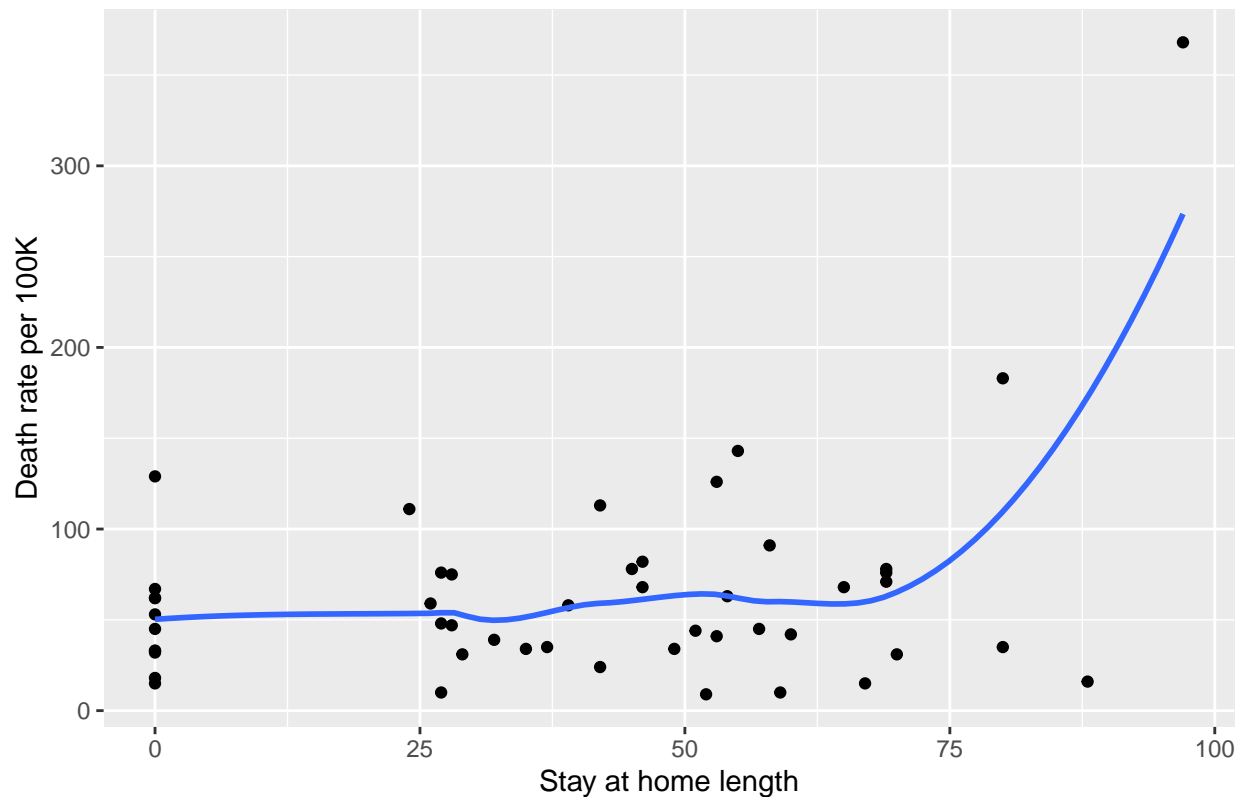
```
ggplot(covid_data_renamed, aes(x = stay_at_home_length , y = death_rate)) +
  geom_point() +
  geom_smooth(se = FALSE) +
  labs(title = "Deaths by Stay at home length", x = "Stay at home length", y = "Death rate per 100K")
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

```
## Warning: Removed 2 rows containing non-finite values (stat_smooth).
```

```
## Warning: Removed 2 rows containing missing values (geom_point).
```

Deaths by Stay at home length



```
covid_data_renamed$all_mobility_changes <- covid_data_renamed$retail_mobility_change+
covid_data_renamed$grocery_pharm_mobility_change+
covid_data_renamed$parks_mobility_change+
covid_data_renamed$transit_mobility_change+
covid_data_renamed$workplaces_mobility_change+
covid_data_renamed$residential_mobility_change
```

```
covid_data_renamed$mobility_population_dens <- covid_data_renamed$population_density*covid_data_renamed
```

```
covid_data_renamed$mobility_with_mask <- covid_data_renamed$mask_mandate_rank*covid_data_renamed$all_mo
```

```
ggplot(covid_data_renamed, aes(x = log(mobility_population_dens) , y = death_rate)) +
  geom_point() +
  geom_smooth(se = FALSE) +
  labs(title = "Deaths by Stay at home length", x = "Mobility with Population", y = "Death rate per 100K")
```

```
## Warning in log(mobility_population_dens): NaNs produced
```

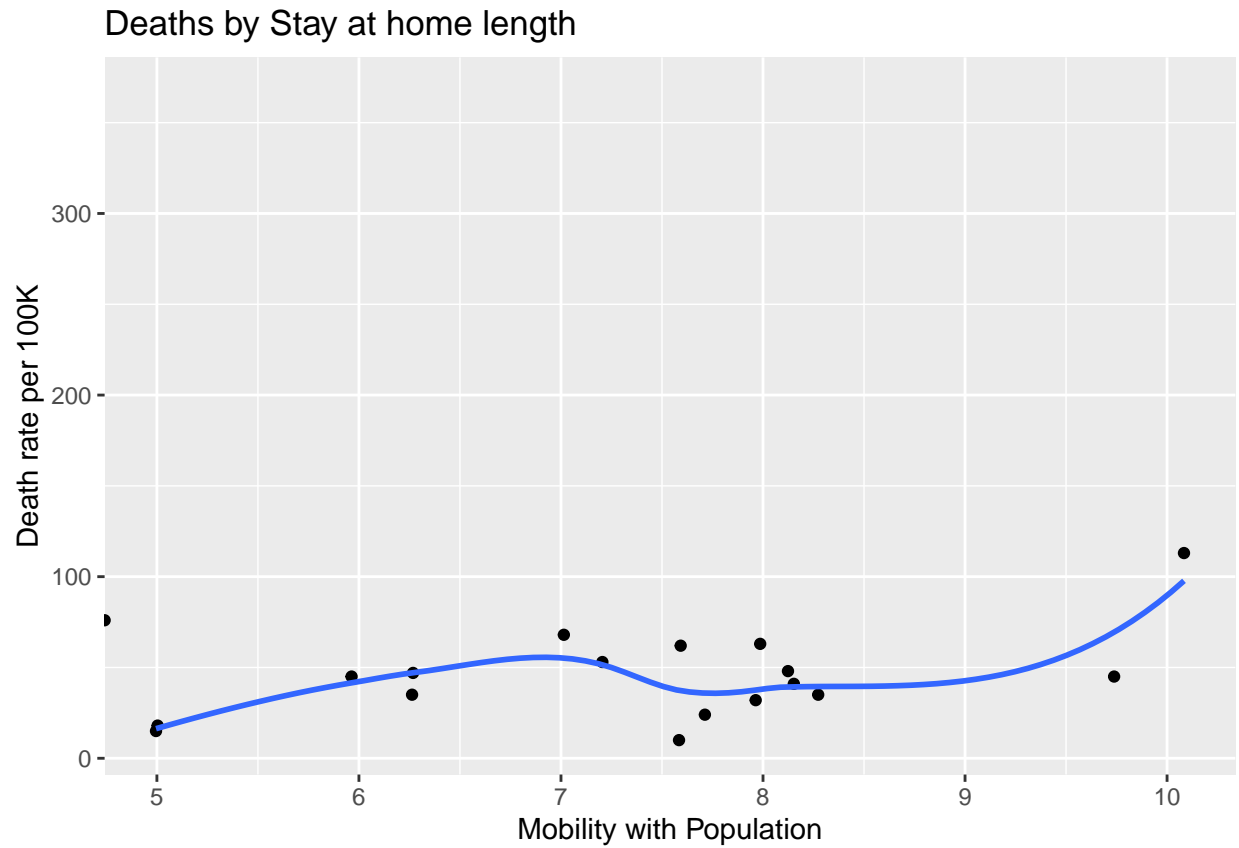
```
## Warning in log(mobility_population_dens): NaNs produced
```

```
## Warning in log(mobility_population_dens): NaNs produced
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

```
## Warning: Removed 34 rows containing non-finite values (stat_smooth).
```

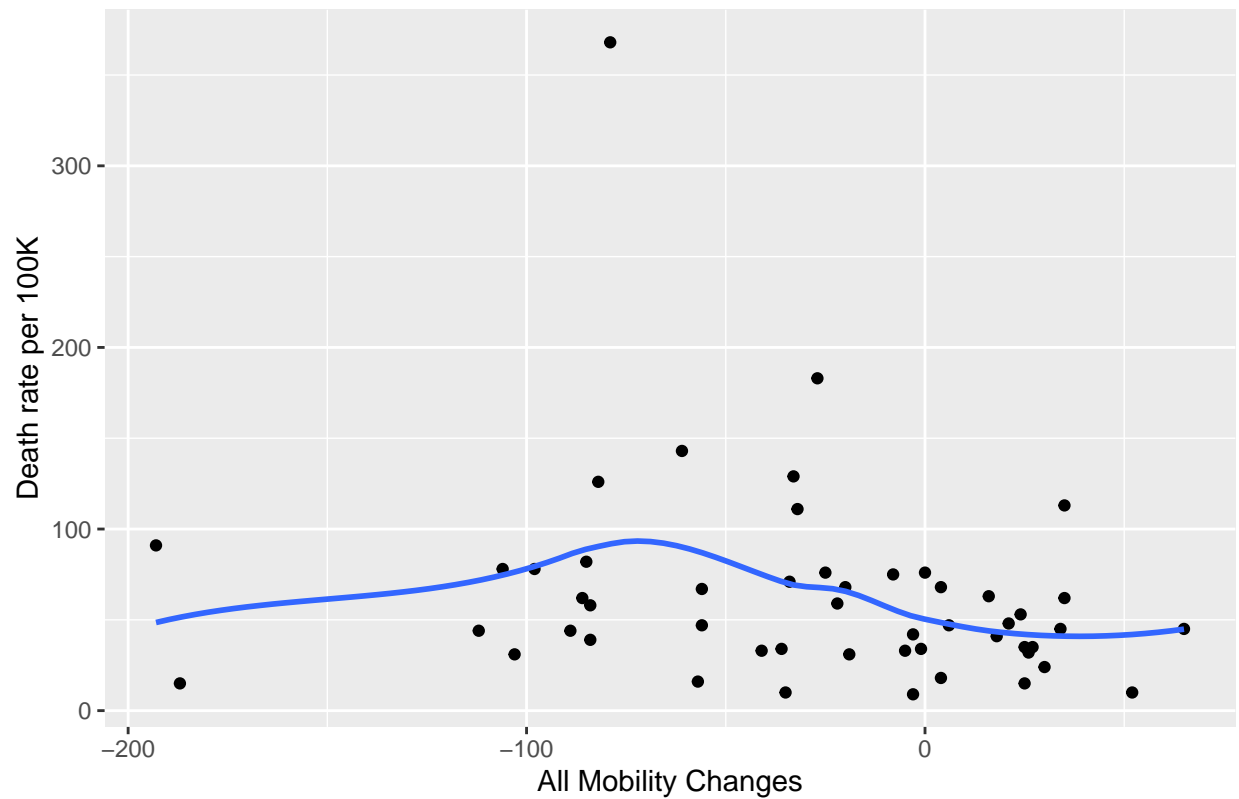
```
## Warning: Removed 33 rows containing missing values (geom_point).
```



```
ggplot(covid_data_renamed, aes(x = all_mobility_changes , y = death_rate)) +  
  geom_point() +  
  geom_smooth(se = FALSE) +  
  labs(title = "Deaths by Stay at home length", x = "All Mobility Changes", y = "Death rate per 100K")
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

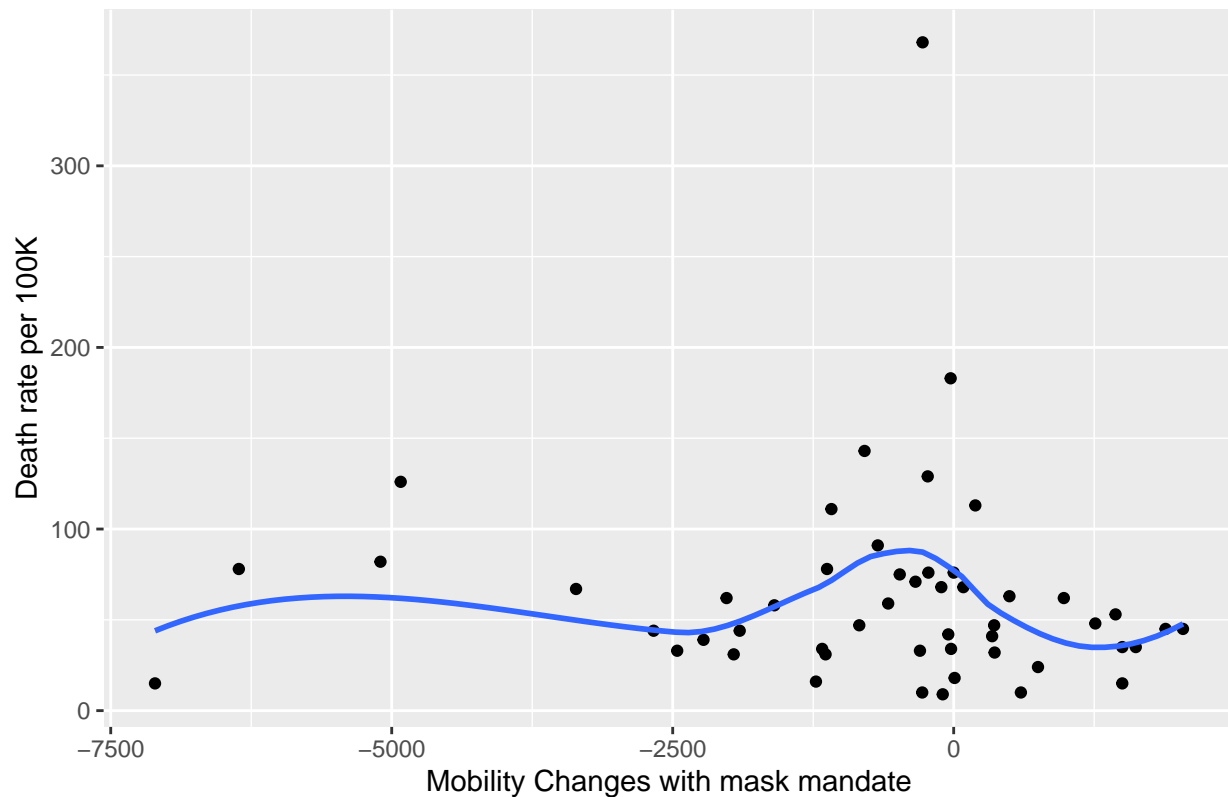

Deaths by Stay at home length



```
ggplot(covid_data_renamed, aes(x = mobility_with_mask , y = death_rate)) +  
  geom_point() +  
  geom_smooth(se = FALSE) +  
  labs(title = "Deaths by Stay at home length", x = "Mobility Changes with mask mandate", y = "Death rate per 100K")
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

Deaths by Stay at home length



```
mobility_changes_dataset <- covid_data_renamed[c("State","death_rate",
          "retail_mobility_change","grocery_pharm_mobility_change",
          "parks_mobility_change","transit_mobility_change",
          "workplaces_mobility_change","residential_mobility_change")]
mobility_changes_pivoted <- mobility_changes_dataset %>%
  pivot_longer(!c(State,death_rate), names_to = "mobility_type", values_to = "mobility_change")

ggplot(mobility_changes_pivoted, aes(x = mobility_change , y = death_rate,color=mobility_type)) +
  #geom_point() +
  geom_smooth(se = FALSE) +
  labs(title = "Deaths by Mobility Change", x = "Mobility Change", y = "Death rate per 100K")

## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

