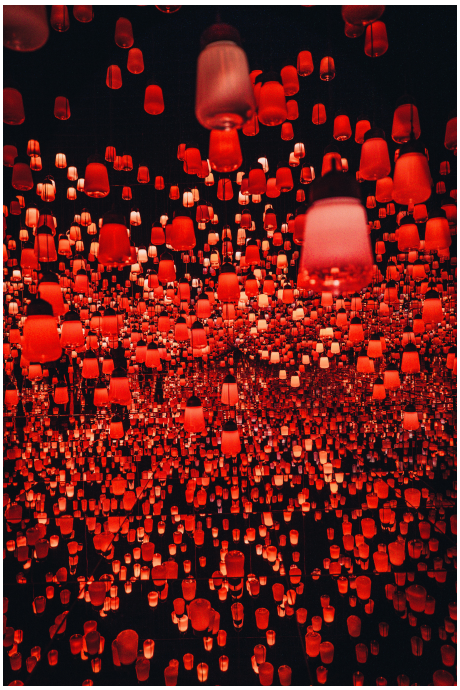

Corona Virus Report

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Reports XXXX
XXX

XXX XXX
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Report for
Australian Government COVID19

21 May 2020

Our consultancy
add names &
add names

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Country Singapore and United States of America"

```
covid <- read.csv(file = here::here("Data/worldwidecases.csv"))
options(digits = 2) # format decimal places to 2
```

```
sgp_usa <- covid %>%
  mutate(date = dmy(dateRep),
         yday = yday(date)) %>%
  rename(country = countriesAndTerritories) %>%
  filter(countryterritoryCode %in% c("SGP", "USA"),
         month %in% c(3:5))
```

```
sgp_usa <- sgp_usa %>%
  group_by(country, yday) %>%
  mutate(cases_per_mil = (cases * (1000000 / popData2018)),
         deaths_per_mil = (deaths * (1000000 / popData2018)))
```

```
sgp_usa %>%
  ggplot() +
  geom_histogram(
    stat = "identity",
    width = 0.3,
    position = "dodge",
    aes(x = date, y = cases_per_mil, colour = country),
    fill = "white"
  ) +
  ylab("New Cases and Deaths (per million)") +
  scale_color_brewer(palette="Dark2") +
  geom_line(aes(
    x = date,
    y = deaths_per_mil,
    colour = country,
    group = country
```

```
  )) +
  theme(legend.position = "bottom")
```

```
## Warning: Ignoring unknown parameters: binwidth, bins, pad
```

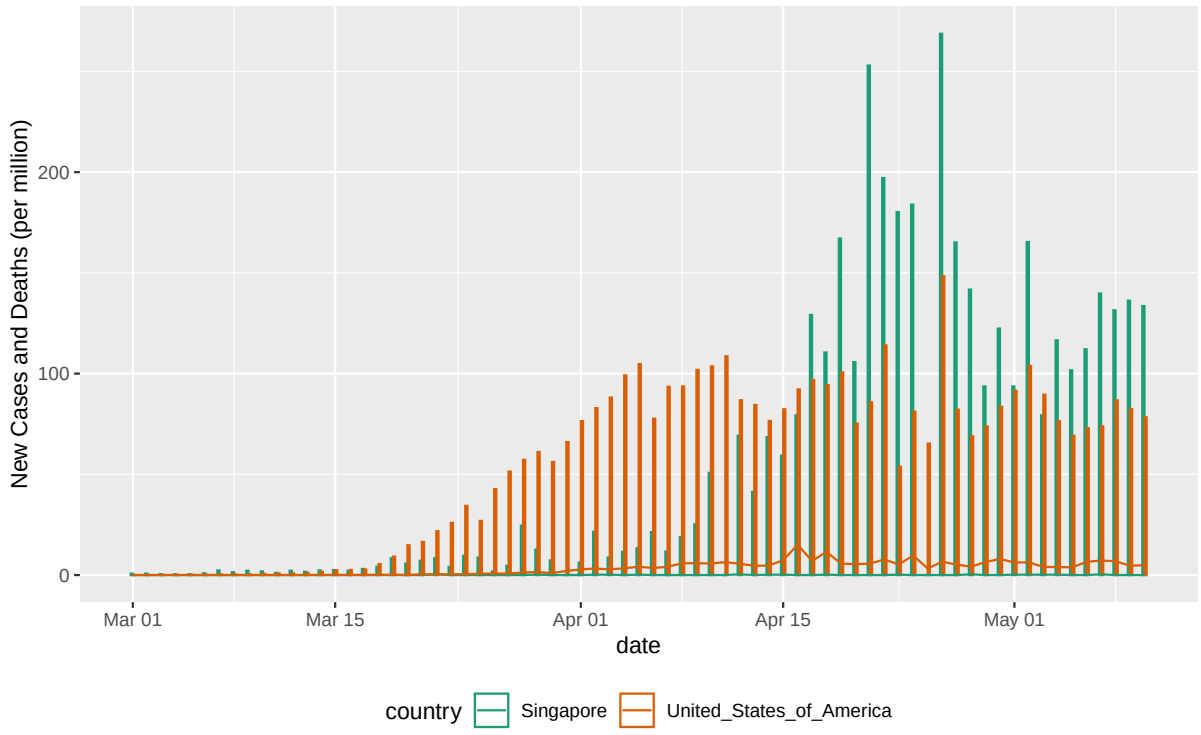

Figure 1: *Total Deaths and Cases in SGP and USA from 01/03/2020 to 10/05/20*

```
sgp_usa_week <- sgp_usa %>%
  mutate(week = week(date) - 8,
         deaths_prop = deaths_per_mil/cases_per_mil*100) %>%
  select(date, month,  week, country, cases_per_mil, deaths_per_mil, deaths_prop, yday) %>%
  arrange(date)
```

```
summary_sgp_usa_week <- sgp_usa_week %>%
  group_by(country, week, month) %>%
  summarise(cases_per_week = sum(cases_per_mil),
            deaths_per_week = sum(deaths_per_mil),
            deaths_prop = mean(deaths_prop, na.rm = TRUE)) # % of deaths per week
```

Table 1: *Total Cases and Deaths, and Proportion of Deaths per week*

country	week	month	cases_per_week	deaths_per_week	deaths_prop
Singapore	1	3	1.77	0.00	0.00
Singapore	2	3	9.22	0.00	0.00
Singapore	3	3	14.72	0.00	0.00
Singapore	4	3	47.17	0.35	0.61
Singapore	5	3	59.41	0.18	0.23
Singapore	6	4	94.17	0.53	0.60
Singapore	7	4	273.65	0.53	0.13
Singapore	8	4	903.76	0.35	0.07
Singapore	9	4	1136.61	0.53	0.06
Singapore	10	4	216.01	0.00	0.00
Singapore	10	5	556.34	0.71	0.13
Singapore	11	5	652.99	0.35	0.05
United_States_of_America	1	3	0.11	0.02	22.30
United_States_of_America	2	3	1.99	0.06	4.53
United_States_of_America	3	3	11.94	0.18	1.46
United_States_of_America	4	3	127.71	1.54	1.21
United_States_of_America	5	3	361.22	7.89	2.15
United_States_of_America	6	4	622.24	23.90	3.85
United_States_of_America	7	4	655.32	38.70	5.92
United_States_of_America	8	4	627.07	57.74	9.18
United_States_of_America	9	4	613.44	41.89	7.19
United_States_of_America	10	4	157.28	14.43	9.15
United_States_of_America	10	5	430.13	24.35	5.62
United_States_of_America	11	5	394.01	30.14	7.71

```
kable(summary_sgp_usa_week, caption = "Total Cases and Deaths, and Proportion of Deaths per wee
  kable_styling(bootstrap_options = c("striped", "hover"))
```

1 Analysis

This report examines the confirmed COVID-19 cases and deaths recorded in Singapore and the United States (*US*) from the start of March to 10 May 2020. Due to the significant difference in population size, the cases and deaths are scaled to per million people of each country's population for better comparison.

Figure 1 displays the number of new cases in Singapore and *US*. The x-axis shows the number of new cases and deaths on a given day and the y-axis represents each date. It is manifest that confirmed cases in both countries started to pick up in mid-March 2020. There was a gradual increase in new cases in *US* in the last two weeks of March, where it stayed relatively constant to mid-May. In

Singapore, an exponential increase in confirmed cases can be observed in mid-April', where the new confirmed cases overtook the US in relative terms (*i.e.* per 1 million). Although the confirmed cases were higher in Singapore, the death rates in the *US* were evidently greater, with Singapore staying relatively constant at 0%.

To investigate further, we observe the start dates of the lockdown policy in each country. In Singapore, the lockdown started at the end of the first week of April, 07/04/2020 (Wong and Tan (2020)). In USA, the effective dates were different in each state, California was the first to enforce it on 19/03/2020 while South Carolina was the last to carry it out on 07/04/2020 (Fowler et al. (2020)).

Based on Table 1, Singapore's cases increased by a staggering 1103.91% from the first week to the last week of April although lockdown and social distancing protocols were in effect. This surge is attributed to the surge in infections among migrant worker population staying in dormitories, which accounted for most of the confirmed cases (Sim and Kok (2020)).

On the other hand, *US* cases nearly doubled (0.72%) from approximately the end of March to the start of April. In contrary to Singapore's cases, confirmed cases in *US* seemed to subside at the end of April 2020 after all states implemented lockdown policies. However, Table 1 demonstrated that the proportion of death rates in *US* was not proportionate to the decrease in the cases per week.

Country XX2 and YY2

Country XX3 and YY3

References

Fowler, JH, SJ Hill, R Levin, and N Obradovich (2020). The effect of stay-at-home orders on COVID-19 infections in the United States. *arXiv preprint arXiv:2004.06098*.

Sim, D and X Kok (2020). How did migrant worker dormitories become Singapore's biggest coronavirus cluster? *The South China Morning Post*.

Wong, C and C Tan (2020). Coronavirus: Empty trains and quiet streets as Singapore enters day 1 of 'circuit breaker' mode. *The Straits Time*.