The Effects of COVID-19 on Older Populations*

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Abstract

Toronto COVID-19 data was pulled from the City of Toronto Open Portal to analyze the effects of the pandemic on various age groups and find which age groups are most vulnerable to the COVID-19 virus. We noted that although the older populations have a lower number of cases, they have a higher number of deaths, which leads to a higher mortality rate. This information has been used by scientists and policy makers to outline public health guidelines for the city of Toronto.

```r
########################### Patchwork Plots ############
# 1. Age

# full sample
full_age <-
  data %>%
  ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
  geom_bar() +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))

# sub of sample if worked last week == Yes
emp_age <-
  data.emp %>%
  ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
  geom_bar() +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))


# if WLW == Yes, MS == Single
sing_age <-
  data.single %>%
  ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
  geom_bar() +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  theme(legend.position="none") +# add labels
  facet_wrap(vars(sex))
```

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*Code and data are available at: https://github.com/Saumya510/STA305GIT/tree/main/Paper1

```r
  # if WLW = Yes, MS = Livtog
  livtog_age <-
    data.livtog %>%
    ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
    geom_bar() +
    theme_minimal() +
    theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))


  # if WLW = Yes, MS = Married
  marr_age <-
    data.married%>%
    ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
    geom_bar() +
    theme_minimal() +
    theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))

  # if WLW = Yes, MS = Single, NC = Yes
  sing_age.nc <-
    data.single.nc%>%
    ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
    geom_bar() +
    theme_minimal() +
    theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
    theme(legend.position="none") +# add labels
    facet_wrap(vars(sex))

  # if WLW = Yes, MS = Livtog. NC = Yes
  livtog_age.nc <-
    data.livtog.nc %>%
    ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
    geom_bar() +
    theme_minimal() +
    theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))


  # if WLW = Yes, MS = Married, NC = Yes
  marr_age.nc <-
    data.married.nc%>%
    ggplot(mapping = aes(x = age_group, fill = future_children_intention)) +
    geom_bar() +
    theme_minimal() +
    theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
    theme() + # add labels
    facet_wrap(vars(sex))

(full_age + emp_age) / (sing_age + sing_age.nc) + plot_layout(guides = 'collect')
```
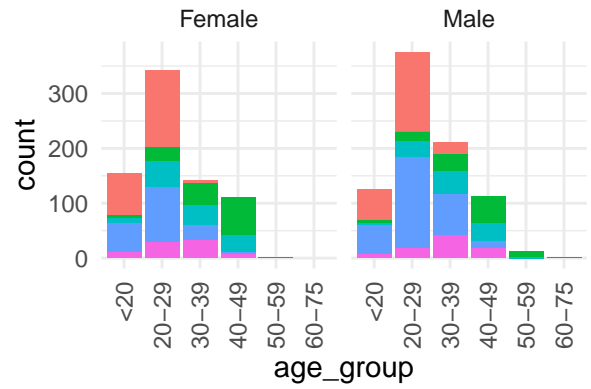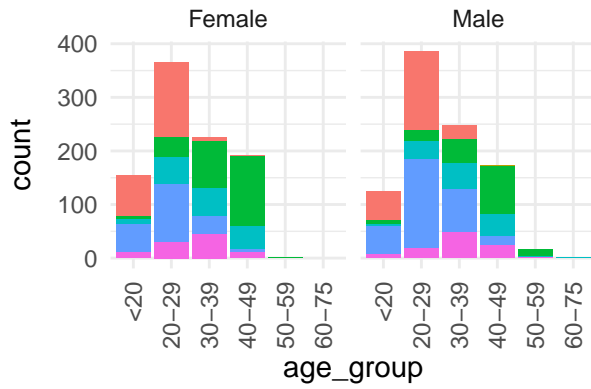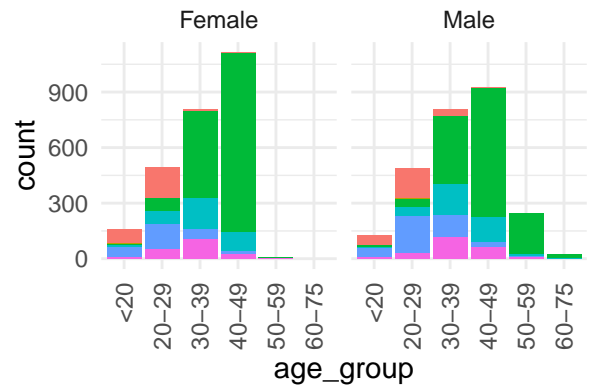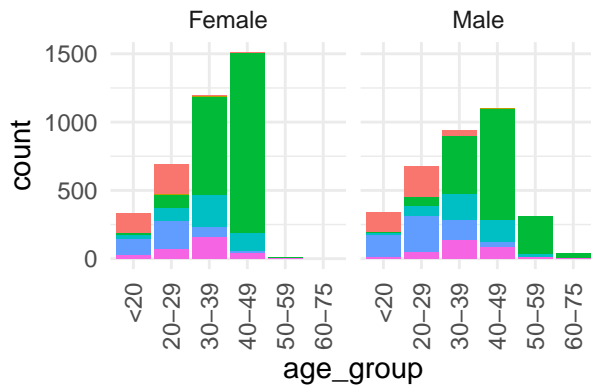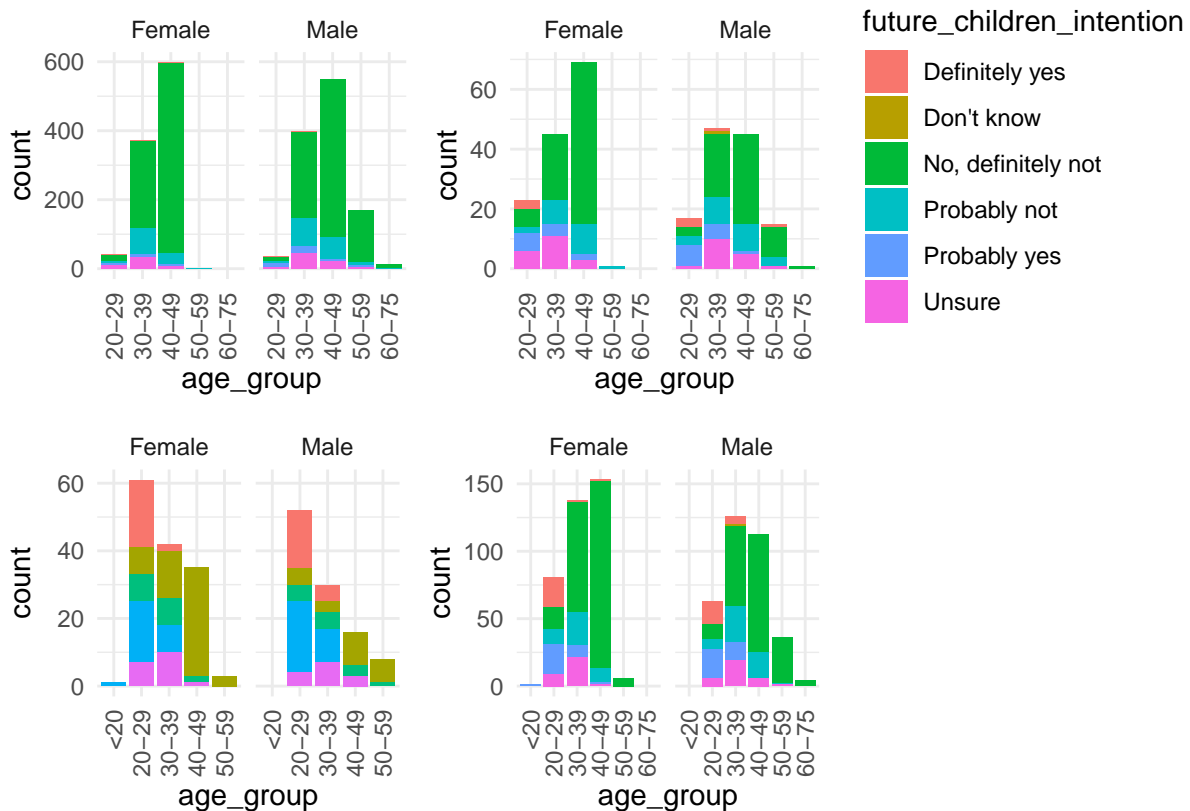
```
(marr_age + marr_age.nc) / (livtog_age.nc + livtog_age)
```

```
########################### Patchwork Plots ###########
  # 2. Household Type

  # full sample
  full_hht <-
    data %>%
    ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))

  # sub of sample if worked last week == Yes
  emp_hht <-
    data.emp %>%
    ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))


  # if WLW == Yes, MS == Single
  sing_hht <-
    data.single %>%
    ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") +# add labels
```

```
    facet_wrap(vars(sex))

# if WLW = Yes, MS = Livtog
livtog_hht <-
  data.livtog %>%
  ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))


# if WLW = Yes, MS = Married
marr_hht <-
  data.married%>%
  ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))

# if WLW = Yes, MS = Single, NC = Yes
sing_hht.nc <-
  data.single.nc%>%
  ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") +# add labels
  facet_wrap(vars(sex))

# if WLW = Yes, MS = Livtog. NC = Yes
livtog_hht.nc <-
  data.livtog.nc %>%
  ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))


# if WLW = Yes, MS = Married, NC = Yes
marr_hht.nc <-
  data.married.nc%>%
  ggplot(mapping = aes(x = hh_type, fill = future_children_intention)) +
  geom_bar() +
  theme() + # add labels
  facet_wrap(vars(sex))

(full_hht + emp_hht) /  (sing_hht + sing_hht.nc) / (marr_hht + marr_hht.nc) / (livtog_hht.nc + livtog_
```
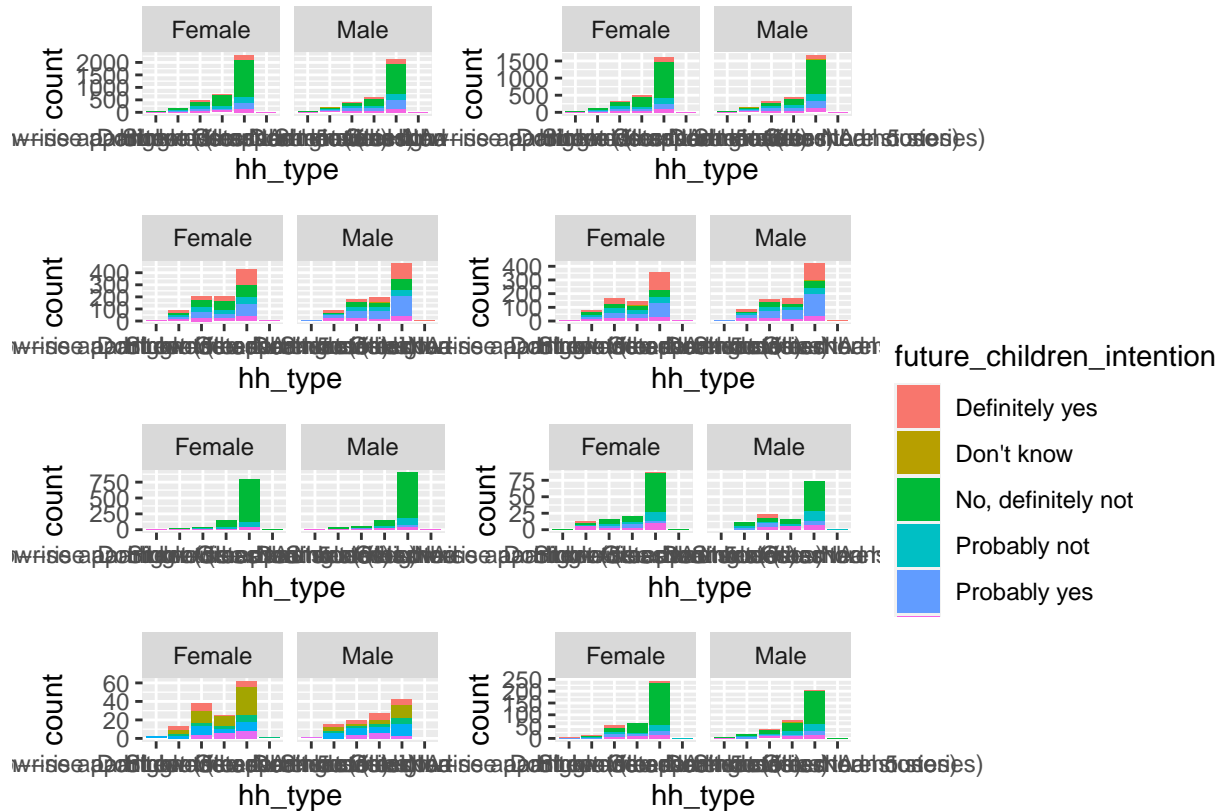
```
########################### Patchwork Plots ###########
  # 3. Education

  # full sample
  full_educ <-
    data %>%
    ggplot(mapping = aes(x = education, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))

  # sub of sample if worked last week == Yes
  emp_educ <-
    data.emp %>%
    ggplot(mapping = aes(x = education, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))

  # if WLW == Yes, MS == Single
  sing_educ <-
    data.single %>%
    ggplot(mapping = aes(x = education, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") +# add labels
    facet_wrap(vars(sex))
```

```r
# if WLW = Yes, MS = Livtog
livtog_educ <-
  data.livtog %>%
  ggplot(mapping = aes(x = education, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))


# if WLW = Yes, MS = Married
marr_educ <-
  data.married%>%
  ggplot(mapping = aes(x = education, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))

# if WLW = Yes, MS = Single, NC = Yes
sing_educ.nc <-
  data.single.nc%>%
  ggplot(mapping = aes(x = education, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") +# add labels
  facet_wrap(vars(sex))

# if WLW = Yes, MS = Livtog. NC = Yes
livtog_educ.nc <-
  data.livtog.nc %>%
  ggplot(mapping = aes(x = education, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))


# if WLW = Yes, MS = Married, NC = Yes
marr_educ.nc <-
  data.married.nc%>%
  ggplot(mapping = aes(x = education, fill = future_children_intention)) +
  geom_bar() +
  theme() + # add labels
  facet_wrap(vars(sex))

(full_educ + emp_educ) /  (sing_educ + sing_educ.nc) / (marr_educ + marr_educ.nc) / (livtog_educ.nc + 
```
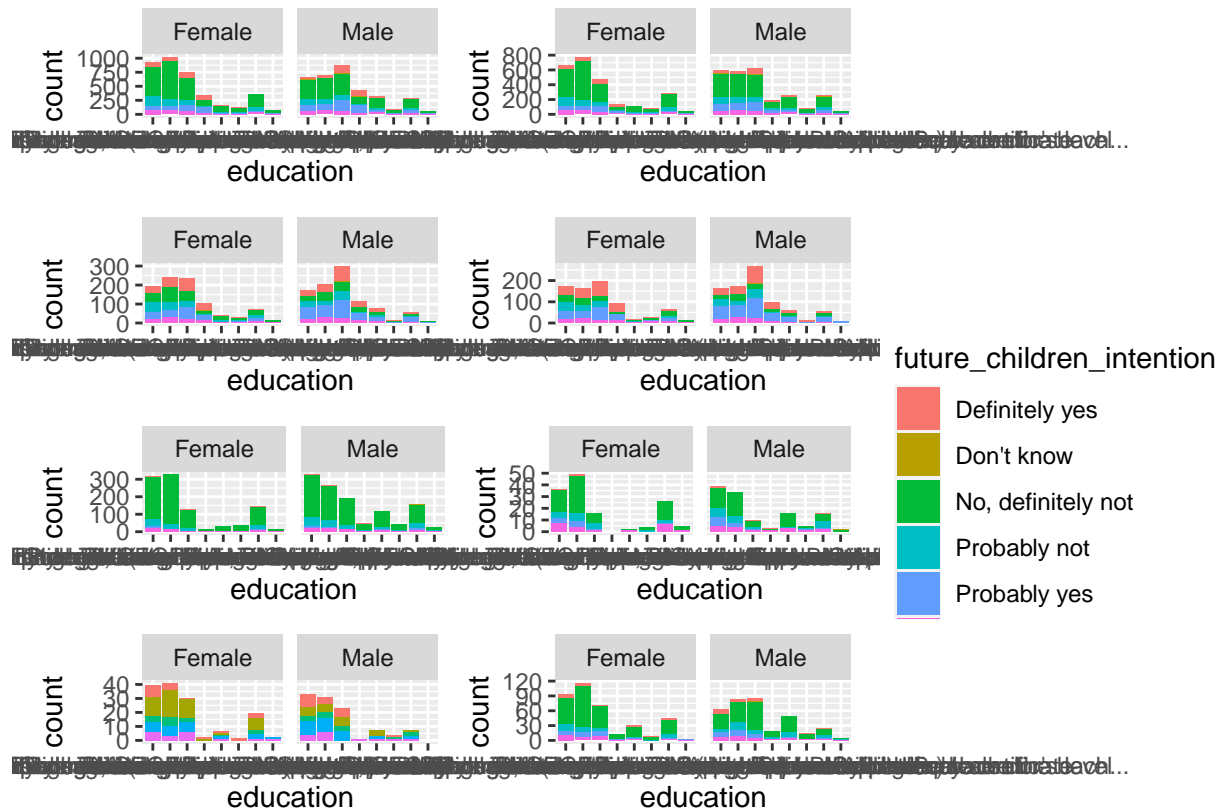
```
########################## Patchwork Plots ############
  # 4. Occupation

  # full sample
  full_occ <-
    data %>%
    ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))

  # sub of sample if worked last week == Yes
  emp_occ <-
    data.emp %>%
    ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") + # add labels
    facet_wrap(vars(sex))

  # if WLW == Yes, MS == Single
  sing_occ <-
    data.single %>%
    ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
    geom_bar() +
    theme(legend.position="none") +# add labels
    facet_wrap(vars(sex))
```

```r
# if WLW = Yes, MS = Livtog
livtog_occ <-
  data.livtog %>%
  ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))


# if WLW = Yes, MS = Married
marr_occ <-
  data.married%>%
  ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))

# if WLW = Yes, MS = Single, NC = Yes
sing_occ.nc <-
  data.single.nc%>%
  ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") +# add labels
  facet_wrap(vars(sex))

# if WLW = Yes, MS = Livtog. NC = Yes
livtog_occ.nc <-
  data.livtog.nc %>%
  ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
  geom_bar() +
  theme(legend.position="none") + # add labels
  facet_wrap(vars(sex))


# if WLW = Yes, MS = Married, NC = Yes
marr_occ.nc <-
  data.married.nc%>%
  ggplot(mapping = aes(x = occupation, fill = future_children_intention)) +
  geom_bar() +
  theme() + # add labels
  facet_wrap(vars(sex))

(full_occ + emp_occ) /  (sing_occ + sing_occ.nc) / (marr_occ + marr_occ.nc) / (livtog_occ.nc + livtog_o
```