Covid-19 Update: Mask Use in the Covid-19 Pandemic

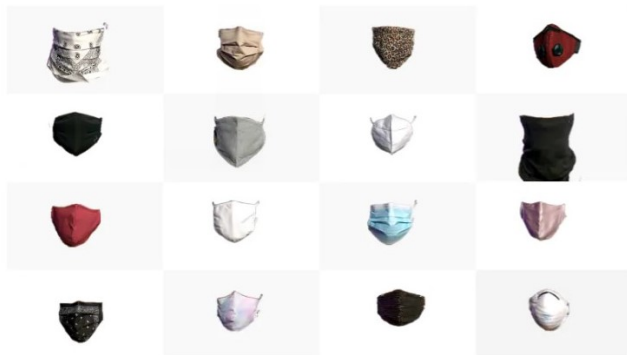Elizabeth O'Meara   Aigerim Madiyeva

Math 747, Nov 19, 2020

Progression of Mask Requirements in Canada

- When the pandemic first started, experts advised against the use of face masks for the following reasons:
  - potential risks, for example self contamination, could outweigh the potential benefits
  - public use would deplete the supply needed for health care workers[1]
- Not long after this changed when experts considered the fact that mask wearing could protect others against Covid-19.
- On July 18th, Quebec became the first province to make masks mandatory indoors, with the other provinces following suit not long after.[2]
- To date, masks are mandatory indoors or wherever social distancing is not possible across all public health units in Ontario.[3]

CBC Marketplace Tests Different Types of Masks

- CBC Marketplace compared over 20 different masks to the N95.
- They used National Institute for Occupational Safety and Health standard test, which measures filtration efficiency.
- The tests pulls a constant breath of air containing salt particles, which are similar size of those particles expelled by an infected person's cough or breath.
- Finally, samples of air inside and outside of the mask are compared to determine effectiveness.

Types of Masks Tested by CBC Marketplace

Results of CBC Marketplace's Tests

- Best Performers:
  - 3-layer masks
    - blue surgical type
    - white cotton with inner layer melt-blown non-woven polypropylene
  - These performed as well as the N95 masks
- Good Performers
  - 2-layer masks
    - 100%, 680 thread count
    - 100% cotton, 600 thread count
    - 100% polyester with inner layer of 100% polyurethane
    - Cotton fabric with an inner polypropylene non-woven filter layer (specifics about cotton and polypropylene unknown)

Results of CBC Marketplace's Tests

- Fair Performers
  - 2 layers of 100% silk
  - 3 layers of 100% pleated cotton
- Worst Performers
  - 2 layers of 100% rayon
  - 2 layers: sequin outer with a lining of 95% cotton and 5% elastane
  - 2 layers: outer of 100% polyester and inner of 100% cotton (thread count unknown)
  - 1 layer, 100% cotton bandanna
  - 1 layer, 100% polyester gaiter
- Do Not Use
  - Masks with exhalation valves

Who is wearing a mask?

- 36 different retail locations across five different counties in southeastern Wisconsin.
- 9935 shoppers entering retail stores during periods of June, July, and August 2020
- Shoppers were not aware they were being observed.
- Age categories: young (2 to 30 years old,) middle age (30 to 65 years old), older (over 65).[3]
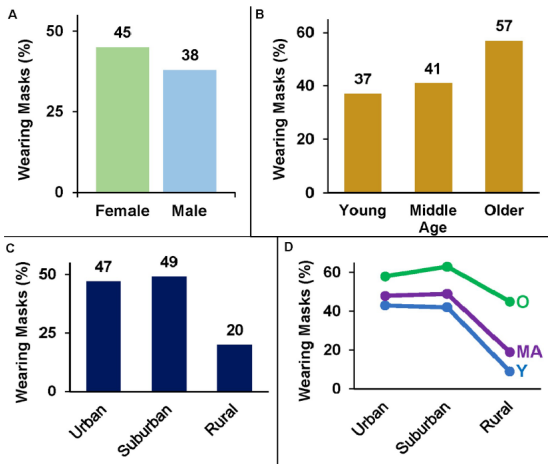
Figure: Mask-wearing percentages across gender, age, and location.
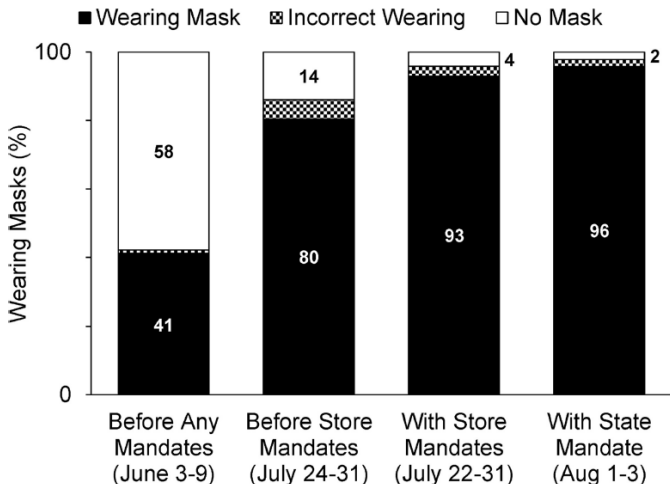
(Haischer et al., 2020)

Figure: Mask-wearing percentages between June and August 2020.

(Haischer et al., 2020)

The role of community-wide wearing of face mask

- 7.45 million people.
- The third most densely populated area in the world.
- 31 December 2019, the centre for Health Protection (CHP) of the Department of Health, alerted members of the public to maintain good hand hygiene, refraining from work or attending class at school, avoiding crowded places, seek medical advice promptly and wear a mask.
- Only area practicing universal masking despite the recommendation of WHO.
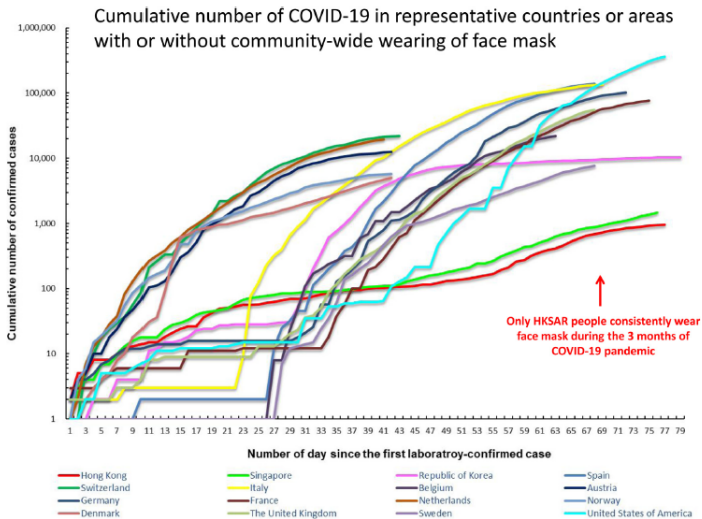- Total of 961 cases of COVID-19 were confirmed in HKSAR.[4]

Fig. 2a. Cumulative number of COVID-19 in representative countries or areas with or without community-wide wearing of face mask

(Cheng et al., 2020)

Table 1

Incidence of coronavirus disease 2019 (COVID-19) infection in Hong Kong Special Administrative Region (HKSAR) as compared with that of selected countries 2020 (at day 100 after official announcement of pneumonia outbreak in Wuhan, Hubei Province, China)[a].

Countries or city	Population (million)[b]	Cumulative number of confirmed case[c]	Number (percentage) of death	Incidence per million population[d]	Population density: population per km² (rank in the world)[e]
Hong Kong SAR[f]	7.45	961	4 (0.4%)	129.0	6782 (3rd)
Western Pacific Region					
Singapore	5.70	1,481	6 (0.4%)	259.8	7894 (2nd)
South Korea	51.78	10,384	200 (1.9%)	200.5	517 (13th)

(Cheng et al., 2020)

A Limitation in the Study

- Mask-off settings in the family.
- Type of mask used.
- The compliance of wearing face mask.