COVID-19: 8 weeks later

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Who am I?
Who am I?

• Associate Professor, Departments of Anesthesiology and Medicine, Section of Critical Care.

• Work in the OR and ICU at Health Sciences Centre

• M.Sc, (Candidate) Clinical Trials/Epidemiology London School Hygiene and Tropical Medicine.

• Consultant Scientist, National Microbiology Laboratory, Public Health Agency of Canada

• Medical Lead, Department of Anesthesiology COVID-19 response team
Where are we now?

What is the plan going forward?
• Basic Virology of Coronaviruses
• Previous Coronavirus Outbreaks
• Current Status of Disease
• Anesthesia Implications
Goals of the talk

• Current situation in Manitoba
• How do we compare?
• Why are other countries getting hit so hard?
• Answer some common questions
• Why we have to increase OR volume
• Provincial Plan
Things I’ve learned about myself

1. Eating at restaurants
2. Non-essential shopping
3. Touching my face
Manitoba Cases

Manitoba COVID-19: caseload status

[Updated: May 05, 2020]

Data source: Government of Manitoba
My personal curve

Cumulative snacks (kg)
Manitoba COVID-19: hospitalizations

Data source: Government of Manitoba
Worldwide
Common questions

• Why are other countries getting smoked?
• How bad is COVID-19?
• Will there be a second wave?
• Can I get COVID-19 again if I already had it? i.e. am I immune?
• We’re getting a vaccine soon, right?
• Am I at higher risk as a health care worker?
Why are some countries getting smoked?

1. Demographics/Population Density
2. Cultural Factors
3. Lockdowns
4. Luck (bad or good)
Deaths vs. Population density

[Bar chart showing deaths per million residents and population density for Spain, Italy, France, UK, New York, Sweden, and Canada.]
What went wrong in Italy and NYC?

- Population density
- Demography
- Aggressive use of PPE.
- Hospital practice: ‘Intubate early’
- Admit everyone
- No discharge until 2 negative tests
Intubate early
Excel field hospital, London
How bad is this really?

- What do you mean by bad?
- Cases? ICU admission? Deaths?
- Best to look at deaths.
  - Most ‘accurate’
  - Asymptomatic cases
  - Lack of ability to test everyone/people not getting tested
How bad is this really?

Number of deaths registered by week, England and Wales, 28 December 2019 to 1 May 2020

Source: Office for National Statistics
How bad is this really?

Canadian Data

- Age group: <19, 20-39, 40-59, 60-79, >80
- Percentage: 0, 15, 30, 45, 60

- Hospital vs. ICU
How bad is this really?

Canadian Data

Mortality

Age group

<19  20-39  40-59  60-79  >80

0  17.5  35  52.5  70

%
How bad is this really?

- Canada: 82% deaths in long term and personal care homes.
- Europe: >50%
- USA ~40%
How bad is this really?

- Asymptomatic cases definitely happen
- This is actually good news
- Best modeling estimates: we are missing 10-15 cases for every case we detect.
- So: divide the hospitalization and death rates by 10-15
- In Canada: mortality rate could be 0.4-0.6% overall
How bad is this really?

- CFR
- Estimated CFR

<table>
<thead>
<tr>
<th>Age Group</th>
<th>CFR</th>
<th>Estimated CFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;19</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>20-39</td>
<td>1.0</td>
<td>0.06</td>
</tr>
<tr>
<td>40-59</td>
<td>4.0</td>
<td>0.3</td>
</tr>
<tr>
<td>60-79</td>
<td>26.0</td>
<td>1.7</td>
</tr>
<tr>
<td>&gt;80</td>
<td>59.0</td>
<td>4.6</td>
</tr>
</tbody>
</table>

The graph shows the distribution of CFR and Estimated CFR across different age groups.
Are you sure it's not that bad?

Charles de Gaulle
2000 crew (mostly 18-40yo)
1000 positive
500 asymptomatic
Hospitalization rate ~2%
No deaths
Can I get COVID-19 again?
Can I get COVID-19 again?

- Unlikely
- Current testing is PCR
- PCR detects viral RNA
- Doesn’t tell you if virus is alive
- Viral culture: gold standard
Can I get COVID-19 again?

- Viral culture vs. PCR
- PCR positive >20 days
- No viral culture positive after day 9 of symptoms
- Likely not infectious after day 9
But I heard I’m not immune if I get it
Can I get COVID-19 again?

- No reason to believe you are not immune
- This is why we vaccinate people in the first place
- Unknown how long immunity lasts for
- Antibody tests unreliable and not validated yet
- T cell response could be lifelong
How long am I immune for?

- Experience with MERS Coronaviruses shows antibody responses lasts for almost 3 years.
But there’s a vaccine coming soon, right?
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But there’s a vaccine coming soon, right?

• Will initial candidates work?
• What if the vaccine makes the disease worse? (Vaccine induced enhancement)
• FDA/Health Canada Approval
• Production supply chain problems
  • Syringes, vials, stoppers
  • Very few companies currently make vaccines
• Who gets it first?
Will there be a Second Wave?

Manitoba COVID-19: caseload status
(Updated: May 05, 2020)

Data source: Government of Manitoba
Am at high risk because I am a HCW?

- Risk of contracting virus?
- Risk of Hospitalization, ICU, death?
- Stats on this are tricky.
- Unclear how many HCWs infected.
- Most of us don’t fall into high risk categories.
- Death stats most accurate
The secondary attack rate is the proportion of susceptible individuals who have contact with the primary case and go on to develop the disease as a consequence of this contact.
Secondary Attack rate

• SAR for household contacts ranges from 5-17%
• For spouses: 27%
• Comparison:
  • Chicken Pox: 85-90%
  • Measles: >90%
  • Ebola: 18% (47% for nurses)
Am at high risk because I am a HCW?

How do we calculate risk?

- Let’s look at 3 different countries.
- England
- Italy
- USA

\[ \text{Risk} = \frac{\text{# people who died}}{\text{# people at risk}} \]

\[ \text{Risk Ratio} = \frac{\text{Risk in General population}}{\text{Risk in HCWs}} \]
Risk for Italians

\[
\text{Death Risk Italians} = \frac{30,000}{60,000,000}
\]

\[
\text{Death Risk Italian HCW} = \frac{159}{950,000}
\]

\[
\text{Risk Ratio} = \frac{30,000/60,000,000}{159/950,000}
\]

Risk death General population compared to HCW:

2.98 (95% Confidence interval 2.6-3.5)
Am I at high risk because I am a HCW?

Relative risk: Population vs. Health Care Worker

- Italy (Doctors/Nurses) 2.98 (95% Confidence interval 2.6-3.5)
- England (All) 4.1 (95% Confidence interval 3.1-4.8)
- USA (All) 30 (95% Confidence interval 26-36)
- New York City Metro Transit Authority Employee risk compared to population

6.1 (95% Confidence interval 5-7.4)
But I intubate!!!!

Or stand close to someone who does
But I intubate!!!!
But I intubate!!!!

- Intubation is often called an AGMP
- Many studies ‘simulate’ intubation
- Put a fan (or pop a ballon) in a mannequins mouth
- Add some colorful goo
- Presto!
Risk factors for SARS CoV-1 and intubation
Risk factors for SARS CoV-1 and intubation

• This was all from ICU
• No higher risk for MD intubating
• Higher risk for nurses in the room, BUT: their patients were on BiPAP and Optiflow.
• Also:
  • Higher incidence of ‘crash’ intubations
  • Lower use of Gown, Gloves, Mask, Face Shields
  • Less knowledge of IP&C practices and PPE donning/doffing.
Risk factors for SARS CoV-1 and intubation

- One study from Toronto
- Studies from other centers did not show an increased risk with intubation.
Why is the OR different?
Bottom line

- Crash Intubating people with SARS-CoV-2 with No sedation or paralysis, minimal PPE, poor knowledge of donning/doffing is DANGEROUS

- Intubating people with SARS-CoV-2 with sedation and paralysis AND proper PPE AND proper knowledge of donning/doffing is NOT DANGEROUS
Will there be a Second Wave?
NYC Deaths

Deaths in New York City above or below normal

Month ending Apr. 4
5,330 more deaths than expected
Counted so far

3,350 coronavirus deaths
Counted so far

Sept. 2001
2,730 more deaths
than expected

USING C.D.C. DATA THROUGH APRIL 10
The more important wave
The plan forward

• The backlog of OR cases will lead to more death/disability in the coming months/years

• We need to increase number of cases we do

• Largest determinant of societal health is median income

• Economic consequences of Covid 19 potentially catastrophic
The plan forward

• Concerns regarding opening up society/ORs at the same time: ‘Taking off our seatbelt while stepping on the gas’.

• Robust system in place at the Provincial level.

• **Red Yellow Green** system
  
  • Community cases (and age distribution)
  
  • Hospitalized/ICU cases and bed capacity
  
  • PPE supplies
  
  • Ability to track/trace/isolate cases.
Conclusions

• We’re not going to get hit as hard as London/NYC
• COVID-19 is BAD if you are over 70. Not so much if you are <50.
• It is unlikely that you will get COVID-19 again.
• There is no vaccine coming any time soon.
• Because of our PPE, health care workers are at lower risk.
• We need to start doing more surgery to prevent future death/disability.