



BRIEFING NOTES

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IDEAS TO FLATTEN THE CURVE OF COVID-19 TRANSMISSION

Authors: Parisa Yazdjerdi¹ and Kash Khorasani²

1 Graduate student, Department of Electrical and Computer Engineering, Concordia University, Montreal, Canada

2 Professor, Department of Electrical and Computer Engineering, Concordia University, Montreal, Canada.

SUMMARY

- ✚ This BN provides four general ideas and suggestions on how to “flatten the curve of transmission” for COVID-19 pandemic that is designated as quarantine strategy, smart application, and diagnostics.
- ✚ The provided ideas/suggestions are based on our understandings and results collected from other countries in response to this pandemic.
- ✚ Our goal is to enhance these recommendations to be in line with current requirements and situations in Canada.
- ✚ All the above ideas can provide support and guidelines to the DND/CAF and the entire country to be more resilient to new waves of COVID-19 or any other pandemic in future to avoid, minimize, and reduce the pandemic’s negative effects on social, political, and economical fronts.

CONTEXT

- ✚ Spread of the COVID-19 pandemic is affecting the entire world and has caused significant economical, political, social and healthcare crises.
- ✚ Each organization and individual in any country are responsible to support the society to reduce the effects of this pandemic and stop its spread through “flatten the curve of transmission”.
- ✚ It is important to learn lessons from other countries and enhance the best policies and ideas (if possible) to adapt and use them in Canada.
- ✚ This BN provides certain suggestions and ideas that could support the DND/CAF in collaborating and supporting governmental or private organizations, and individuals to flatten the transmission curve in Canada.

RECOMMENDATIONS

- ✚ Quarantine strategy
 - Setting strict laws in red zones, neighborhoods, and cities with extremely high number of infected cases could ultimately decrease the overall transmission to public at large significantly.
 - Strict rules should restrict residents of different areas from leaving the boundary of their designated areas and DND/CAF can provide support to the police departments in applying these laws.
- ✚ Smart applications [1]
 - DND/CAF can support the development and usage of smartphone Apps to identify and detect the health status of individuals.

- Individuals with different health situation should be identified, isolate, and made distinguishable through the use of the above device application. An example of typical statuses is shown by colors in Table 1 below.

Table 1

Healthy	
New comer to the municipality, city, state, or country	
Infected cases with or without symptoms	
Those who have recovered from COVID-19 but can still transmit the virus	
Those who were in contact with an infected individual	

- Restrictive rules and guidelines for entering public places based on health status of individuals.
 - Example: having green status should be compulsory for each individual who is willing to enter public areas such as banks, supermarkets, pharmacies, retail shops, restaurants, etc.
- Police can track individuals through their GPS information
 - This will increase restrictions and avoid unnecessary movement of individuals with gray, red, orange, or yellow status in the public.
- Police can receive alarms in case an infected person does not respect the rules.
- Each user can assess and observe the density of people along with their health status on his/her application in or before entering a public area such as a supermarket.
- The Apps can be used as a communication protocol within society. It effectively can
 - Notify users with daily statistical information such as the number of infected, cured, or dead cases through broadcasts.
 - Notify users about new cases in a recently visited public places such as supermarkets or restaurants. Also, their status would change automatically to yellow by the Apps AI-based technology.
 - Locate the nearest testing point instead of waiting in long lines of call centers.
 - Suggest the nearest location to buy face masks, 70% alcohol, hand sanitizers and other disinfecting products.

Police departments, hospitals and testing clinics, border officers, pharmacies, and retail shops are required to have access to this Apps in order to update their corresponding status. The importance of such technology is that it can be used for future diseases to avoid pandemic and epidemic and their resulting consecutive catastrophic effects and damages.

Diagnosis of COVID-19

One of the main challenges in age of COVID-19 is development of vaccine or an effective treatment medicine to cure and control the disease.

- Using Artificial intelligence (AI) and machine learning approaches it is possible to increase the speed of analyzing the effects of drugs and vaccines on different groups of people based on their corresponding specific mathematical models.
 - Development of mathematical models: the model developed in [2] must be enhanced and modified by considering the effects of drugs (input) on the number of death rate (output) within a specific number of days.
 - Utilization of deep learning methods such as reinforcement learning, to optimize the amount of drug in order to decrease the number of deaths per day [3].
 - DND/CAF can facilitate this objective by collaborating in development of detailed models as well as optimizing the drug dosage through AI-based solutions.
- Patient testing, isolation, identification, and examination using AI techniques
 - Chest X-ray images are one of the most effective and accurate approaches to recognize the existence of COVID-19 virus in the lung. These images can be autonomously and intelligently analyzed by using AI methods rather than waiting for specialists and doctors to analyze them, which would clearly enhance the efficiency and response time of treatments much faster than currently done by humans.
- DND/ CAF may be able to support healthcare organizations and researchers by providing them with advanced infrastructure and computational resources to be able to implement, verify, and validate AI techniques.

REFERENCES

- [1] <https://www.aljazeera.com/news/2020/05/qatar-covid-19-app-mandatory-experts-question-efficiency-200524201502130.html>
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