Public Health Challenges of COVID-19: COVID-19 is currently conceptualized to have a droplet mode of spread with transmission by modalities including respiratory droplets, contact, and fomites. A high proportion of COVID-19 patients remain asymptomatic or have mild symptoms which leads to high transmission in the population. With no currently available treatments or vaccines, COVID-19 has a high lethality, and epidemiological measures such as social isolation remain the mainstay of mitigation for the foreseeable future until a vaccine or treatment is discovered. It has been challenging to model the COVID-19 “illness curve” both in the short-term and long-term as noted in China where COVID-19 was first described followed by its spread across the world and in Canada.

Mental Health Challenges of COVID-19: The epidemiological and public health measures to “flatten the curve” of COVID-19 has brought out unprecedented changes in the lives of Canadians with profound effects on mental health with substantially projected increases in rates of depression and self-harm. Hospitals and mental health systems have had to reprioritize care with a focus on immediate challenges and redeployment of professionals in preparation for anticipated areas of surge in need (e.g. Intensive Care Units).

Neurostimulation Treatments for Mental Illness: Neurostimulation has significant evidence in the management of mental illness, particularly in more treatment-resistant and severe conditions, and two forms have established evidence: Electroconvulsive therapy (ECT) and repetitive Transcranial Magnetic Stimulation (rTMS). Unlike pharmacotherapy, neurostimulation treatments are procedure-based and treatments such as ECT represent a collaborative effort between disciplines including, psychiatry and anesthesia. ECT has significant evidence in the management of treatment-resistant conditions such as depression, schizophrenia, mania, catatonia. rTMS has significant evidence in the management of depression which has failed one or more antidepressant treatments.

Impact of COVID-19 Pandemic on Neurostimulation Treatments in Canada: People suffering from treatment-resistant mental illness have suffered from significant lack of access to neurostimulation treatments pre-COVID, this has been further exacerbated during the COVID period. Several hospitals across Canada have terminated neurostimulation treatments, some have decided to selectively offer brief treatments for the most severe conditions with great variance in terms of patient selection, treatment offering and procedure settings.

Impact on Priority populations: ECT has significant evidence in the management of treatment-resistant mental illness (e.g. mood disorders) in the older population. Thus, older adults in assisted living and long-term care facilities and their caregivers who represent a population at greater risk for COVID-19 and associated stress are further negatively impacted by lack of access to ECT treatments. Individuals with COVID-19, individuals who use substances, those with ongoing chronic health conditions (e.g. cancer, HIV, hepatitis, chronic pain) and/or ongoing chronic mental health conditions (e.g. psychosis), individuals without a fixed home address, within the prison system, with disabilities, and those who have less developed social support structures and lower economic stability such as refugees are all vulnerable populations at much greater risk for Depressive Disorders where neurostimulation treatments such as ECT and rTMS have their strongest impact. Thus, COVID-19 is increasing the risk of mental illness among these vulnerable populations and their families and simultaneously decreasing access to much needed neurostimulation treatments such as ECT: A situation which is likely to worsen as the COVID-19 pandemic evolves and in proportion to the length of time it takes for the development of definitive treatments/vaccines for COVID-19. Similarly,
varying interpretations based on risk perceptions put healthcare delivery personnel from various disciplines and frontline healthcare workers at greater risk of COVID-19 and psychological distress associated with lack of harmonized procedures\textsuperscript{5,9}.

ECT is performed under general anesthesia which often mandates bag mask ventilation. This carries a **risk of aerosolization which can potentially lead to an increased risk of exposure** from patients who might be asymptomatic carriers\textsuperscript{9}. While the aerosolization risk can be minimized with use of Personal Protective Equipment (PPE) and other measures, hospitals have developed varying protocols based on discussions between departments of Infection Prevention & Control (IPAC), anesthesia, psychiatry and nursing with often arbitrary choices based on evolving knowledge and interpretations of “risk concern”. Further, ECT treatments have been completely cancelled or offered in various settings: **within the operating room, in the post-anesthesia care unit or in negative pressure rooms**. This situation has been further exacerbated by “surge planning” and redeployment with scarcity of personnel and equipment including PPE\textsuperscript{4,7}. Finally, some hospitals have decided to offer only **acute phase treatments and forego maintenance phase**, a situation which puts vulnerable patients at high risk of relapse and adverse outcomes such as death by suicide in the long-term.

**Preliminary Knowledge Synthesis Process**\textsuperscript{11-21}: This was done using a review of existing literature with a systematic search process, evaluation of position statements published by relevant organizations, critical review of applicability of rTMS details from Non-Invasive Brain Stimulation Guidelines\textsuperscript{22}, and on the ground experience of 3 large hospitals offering neurostimulation treatments in Toronto.

**Preliminary Knowledge Synthesis Overview**\textsuperscript{11-21}.

**ECT**: When considering ECT for patients during the COVID-19 pandemic circumstances, classifying whether ECT is elective, urgent/essential, or an emergency is the important first step of the decision making process by the ECT team to reduce ECT caseload. A systematic screening process for COVID-19 symptoms prior to administering ECT is important to reduce exposure risk, but there is possibility of asymptomatic carriers, and everyone in the ECT treatment room must consistently use Personal Protective Equipment (PPE) and adhere to protocols for PPE use. Ventilation with the bag and mask procedure has potential to aerosolize. ECT could be avoided for COVID-19 positive patient or patient under investigation for COVID-19 unless there is imminent risk. In consultation with anesthesia/IPAC, weighing the risks/benefits, a negative pressure room and/or intubation may be suggested or required for COVID-19 patients. Depending on the phase of the pandemic, PPE availability could vary and N95 masks are considered mandatory at some locations, reducing the team members to the required minimum can help limit exposure and conserve PPEs. Further, organizing ECT schedule based on relative infection risk is optimal. Pre-procedure testing might be an option to reduce risk of infection and conserve PPE if the testing becomes rapidly available, interpretable and quick in the future. Finally, having a systematic staffing plan which includes a master list of the team, having longer intervals between team changes and creating back-up plans are ideal.

**RTMS**\textsuperscript{22} is offered as daily treatments\textsuperscript{8}, does not involve anesthesia or nursing, it does involve close contact between the provider and the patient\textsuperscript{8}. In the setting of redeployment and redirection of scarce resources towards what is considered as “essential/emergency care”\textsuperscript{7}, several rTMS programs have stopped offering these treatments\textsuperscript{23}. rTMS has the best evidence for depressive disorders\textsuperscript{8} which are estimated to have increased and will continue to increase as the COVID-19 pandemic evolves. For
**Knowledge Mobilization Plans.** The next steps are to examine key issues in Anesthesia & Infection Prevention & Control, evolving knowledge around COVID-19 (knowns and unknowns), key ethical issues of acute vs maintenance ECT treatments, choices based on severity/acuteity of mental illness, disproportionate long-term impact on vulnerable populations with mental illness. We will also examine organizational/administrative aspects of decision making impacting choice of treatment, consider organizing a Delphi survey of ECT practitioners across the country, obtain input from pertinent patient advocacy group, and examine approaches adopted by other procedural specialties in the COVID-19 context.
References

