SUSQI PROJECT REPORT

Making Virtual Healthcare a Reality

Start date of Project: April 22, 2024
Date of Report: July 5, 2024

Team Members:

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Background:

The South Health Campus (SHC) General Neurology Clinic (GNC) provides multidisciplinary care to patients with various neurologic conditions across Southern Alberta. In-person visits to outpatient clinics have significant environmental, social, and financial costs to both patients and providers. Environmentally, emissions from transportation to and from the clinic can be quite significant. This is especially important in a city with relatively poor public transport, and at a site that serves a large catchment area with potentially long travel distances to attend. Bedding and medical supply use, while not exorbitant, is also an important contributing factor to environmental impact. In terms of social costs, time spent traveling to and from appointments and in the waiting room can often be longer than the appointment itself. Nursing and clerical staff also have less time to allocate to other tasks, as both their services are required for in-person visits. An often-overlooked social cost of in-person appointments is access to care. Appointment times are generally longer meaning fewer patients can be seen, and at our centre, 7.4% of in person follow-ups were not attended, whereas only 5.0% of virtual visits were “no shows”. Financially, fuel costs and parking costs can add up, especially with our local hospital system recently increasing parking prices for patients. These impacts are only compounded if patients require family members to attend appointments with them.

To try and reduce these impacts, we proposed a campaign to increase the number of virtual visits offered at the SHC GNC. Importantly, there is strong evidence to suggest that virtual medicine is not inferior to in-person medicine for many neurologic conditions.[1-3]

Given the relative discomfort of doing an initial consultation virtually, we decided to focus on follow-up appointments within the SHC GNC. In the 6 months prior to the start of the project, 1,293 follow-up visits were completed. Of these, 45% were in person. We decided to further narrow our focus to visits

that were for an ICD-10 diagnosis of “migraine”, “headache”, “other migraine”, and “epilepsy” - conditions where the neurologic examination is often normal and/or often remains static over time to reduce the potential risk of missing an exam finding due to the virtual nature of the appointment. 42% of follow-up virtual visits, and 34% of in-person follow-up visits were for these diagnoses. Using this data, we extrapolate that 200 visits over the past 6 months were held in person, but could have been virtual.

This project was led by Drs. Megan Yaraskavitch and Vikram Karnik. Dr. Yaraskavitch is the Program Lead for General Neurology and the Quality Improvement Lead for the Division of Neurology. Dr. Karnik is the Site Lead for Clinical Neurosciences at the South Health Campus. Other important contributors to the project were the Clinical Quality Improvement Consultant at South Health Campus, Program Manager of Outpatient Neurosciences Clinics, Unit Manager of Ambulatory Neurosciences, Nurse Clinician of Ambulatory Neurosciences, Clinical Facilitator of Virtual Health at Alberta Health Services, and General Neurology nurses and booking clerks.

Specific Aims:

To reduce the number of in-person follow up appointments at the South Health Campus General Neurology Clinic by 30% over 6 months**,** leading to long term ecological, social, and financial benefit to patients and the health care system.

To do this, we needed to extrapolate the potential benefits of such an endeavor prior to implementation. This extrapolated data is included in this report, along with a strategy to implement our plan to increase virtual visits.

Methods:

Step 1: Value Stream Mapping (Appendix 1) was undertaken to identify Environmental, Social, and Financial Costs both supporting and opposing virtual care.

- Environmental:
    - patient/caregiver travel
    - medical supplies (bedding, wipes to clean room)
    - hospital electrical vs. using landline telephone grid
- Social Cost:
    - Patient/caregiver time to attend in-person appointment
    - Nursing/clerical time only required for in-person appointment
    - Visit time - fewer patients are seen as in-person appointments take longer
    - No show rate is higher with in-person appointments
    - Risk of infection or fall when traveling to/from in-person appointment
    - Potential negative impacts include physician and patient satisfaction with the visit and/or impact on the physician-patient relationship
- Financial Cost:
    - Cost to patient include fuel costs and parking costs.
    - Potentially reduced cost to the system as fee codes are less with virtual appointments
    - Potential negative impact - physicians could have reduced income resulting in lower satisfaction

Step 2: Root Cause Analysis (Appendix 2) to determine why virtual appointments are not used more.

- Machine/Equipment:
    - Lack of video equipment for providers who prefer this to telephone appointments so an examination can be performed.
        - As a result, providers need to use a separate device which often adds time to clinic.
    - Patient difficulties in accessing or setting up technology.
    - Phone and/or internet connections can be unstable.
- Physical Environment and Culture:
    - Face to face appointments are how things have "always been done".
    - Financial incentive for physicians as in-person appointments have higher fee codes (fee-for-service physicians only).
- Process and Implementation:
    - EMR is set up for virtual appointments but not all patients are signed up for "AHS connect" - giving patients virtual access to their chart, and easy access to virtual appointment set-up.
        - As a result, if "Zoom" appointments are set up, both physician and patient must log in to a separate application.
    - EMR is not set up with an easy "click box" for a virtual follow-up - users need to specify this, whereas in-person follow up can be booked with one click.
    - No clear process for clerks on how to book virtual follow ups.
- People/Personal:
    - Physician:
        - Discomfort in providing virtual appointments
            - Concerns care is inferior
            - Concerns technology won't work
            - Concerns around rapport building
            - Concerns around medico-legal risk
        - Concern about privacy/consent for virtual appointments
            - Personal/work email address being shared?
        - Lack of awareness of sustainability impact
        - Unsure how to involve other team members
            - More time doing medication reconciliation etc. as nursing is not typically involved with virtual care.
    - Patient:
        - Concern around less time with physician
        - Concern that the assessment will be inferior
        - Family attendance harder on the phone
        - Loss of outing/social experience with caregiver
        - Lack of awareness of sustainability impact

Step 3: Interventions and Implementation of Plan:

- Engaging key informants and partners to ensure adequate infrastructure for project
    - Neurosciences Program Manager/Unit Manager
    - Neurosciences Nurse Clinician
    - Booking Clerk within General Neurology Clinic
    - Nurse within General Neurology Clinic
    - Clinical Facilitator, Virtual Health, Alberta Health Services
- Determining scope - narrowed scope to include only General Neurology Clinic to allow for ease of implementation and sustainability in the short term. We then narrowed our scope further to diagnoses which were common for maximum impact of the intervention, but would also allow physicians to feel confident in performing virtual assessments (epilepsy, migraine, other headache)
- Resources required: We were able to obtain virtual care technology kits for 3 clinic rooms, provided to us by the Clinical Facilitator for Virtual Health. The kits include webcams and headsets as well as software integration to ensure virtual appointments can be accessed from the local electronic medical record.
- Next steps involve physician engagement and implementation of these virtual health visits with a target start date of September 10th, 2024.

Step 4: Extrapolation of Outcomes and Patient Survey:

- Given implementation will be in September of 2024, results are currently modelled pending this full implementation and will be described in the measurement section.

Once we had projected the potential impact of the project (below), we needed to acquire equipment to make virtual appointments feasible for healthcare practitioners. We had to engage various administrators to ensure the equipment could be obtained, and follow up appointments could be easily booked within our electronic medical record. Ease of access to appointments (i.e. logging into the computer in the clinic room) will be vital for early and ongoing use of virtual appointments. Once the equipment is acquired, we plan to measure the same data prospectively over six months, and will determine the ecological, economical, and social impacts of our intervention.

Measurement:

Patient outcomes:

- Although patient health outcomes are difficult to determine over only a 6-month period, we do not anticipate any significant changes in health outcomes for patients as it pertains to their disease state. It is well established in the neurology literature that virtual health is non inferior to in-person follow up appointments. We do not have any balancing measures within our project given this is well established in the literature, and we are using a lower risk patient group as described above.
- We also anticipate that no-show rates will go down, as our data shows that no-show rates are lower with virtual appointments in comparison to in-person visits. This data is captured within our EMR and will be monitored as an outcome measure.

Population outcomes:

- As mentioned, we anticipate that access to care may improve with this plan. Virtual visits are generally shorter, allowing for more follow-up visits to be completed in one clinic day. Additionally, it may provide more time for new initial visits to be completed. This may shorten waitlists, leading to improved access to care for a broader subset of patients.

Environmental sustainability:
We pulled visit data from the general neurology clinic over the past 6 months. The data was obtained from our electronic medical record, and included:

- Number of visits that were in person vs. virtual, and then subclassified to the diagnoses of "epilepsy", "migraine", or "headache".
- Number of no shows associated with in person vs. virtual appointments.
- Travel distance to the clinic based on each patient's home address. The median (to eliminate large outliers which were skewing data) two-way travel distance for each patient was used. We used 60km as the maximum distance from SHC, as 85% of patients lived between 60km of SHC. We then used the median travel distance for all patients - both these steps were taken to eliminate outliers and make our data more generalizable.

To estimate the CO2e of an acute outpatient appointment (face to face) an emission factor from Personal Social Services Research Unit (PSSRU)[4] was adapted. Travel was removed from the initial factor of 22 kgCO2e, for a factor of 17.75 kgCO2e per outpatient appointment. Return travel was added on using an emission factor of 0.259 kgCO2e/km for an average passenger vehicle from the Canadian vehicles database, Natural Resource Canada[5]. This factor accounts for fuel but does not include well-to-tank emissions. We did not include well-to-tank emissions on the advice of members from the AHS Office of Sustainability, who suggested that the location, fuel producer, and supplier would all be difficult variables to control.

Factors for an appointment and travel were multiplied by the number of in-person appointments in our specified data pool to estimate CO2e associated with an in-person follow up appointment.

To estimate the CO2e of a virtual telephone appointment, an emission factor of 0.1 kgCO2e/31 minutes outpatient consultation was used, taken from Greener NHS (England, UK – reference not publicly available). The factor includes scope 2 and scope 3 emissions (life cycle assessment).

Economic sustainability:

- As described, we have obtained virtual care kits to facilitate ease of virtual appointments. The estimated, one-time cost for this equipment is $700. The price does not represent AHS contract price and is derived from publicly available cost information. No other costs are anticipated.

Social sustainability:
Patients

- To determine social and patients financial costs, we created a patient survey which collected the following data:
    - Time spent preparing for / attending the appointment.

    - Attendance of family members, and their time spent in helping the patient attend the appointment.
    - Fuel/parking/food costs associated with the appointment.
- We then calculated the average time spent on an in-person appointment, and the average cost per visit based on the responses.
- We anticipate that costs and time spent preparing for appointments will go down for patients over our 6-month assessment period.

Staff

- A potential variable to consider here is physician billings. Fee codes for virtual visits are significantly less in comparison to in person visits. While increasing virtual visits may reduce health care costs overall, physician uptake may be poor due to concerns around reduced income. Due to the scope of the study, we did not measure physician uptake/engagement.

Results:

Patient outcomes:

- We anticipate no measurable differences between those who kept in person appointments and those who were seen virtually, as patient health outcomes have been shown not to differ between these two forms of assessments, particularly when it comes to follow ups. No balancing measures were taken given this is well established already in the literature.
- We also anticipate a reduction in no-show rate, which may in turn improve patient outcomes and access to care.

Population outcomes:

- Anticipated population-based outcomes include more patient assessments per clinic, therefore increasing access to specialty care for patients. This can be measured through our electronic medical record.

Environmental sustainability:

The median two-way distance to reach the SHC general neurology clinic was 64km. By multiplying this by 0.259 kgCO2e (emissions factor per km driven), and subsequently by 586 (total number of in-person follow-up appointments), patient travel to and from the clinic accounted for 9,713.5 kgCO2e emissions.

The CO2e of appointments was calculated by multiplying the number of in-person appointments by the 17.75 kgCO2e (factor for acute outpatient appointments), for a total of 10,401.5 kgCO2e emissions. Combined, the total ecological cost for the in-person appointments plus travel is estimated to be 20,115 kgCO2e emissions over 6 months (for 586 appointments), or 40,230 kgCO2e per year (for 1,172 appointments).

A phone call in place of the in-person follow up appointment equates to 58.6 kgCO2e for the same number of patients (586) in 6 months.

It is estimated that if we reduce the number of visits by only 30%, we could save 6,017 kgCO2e in 6 months (176 appointments), or **12,034 kgCO2e per year** (352 appointments)**.** This CO2e saving is equivalent to driving 46,463 km in an average car.

Economic sustainability:

- Aside from the direct patient savings, there are clear service productivity improvements, as appointment times are shorter, nurses are not required to check in virtual patients thus making their days more efficient, and room cleaning is not required.
- There is also an inherent cost avoidance as fee codes for virtual care are less than that of an in-person assessment.

Social sustainability:

Patients

- Our patient survey received 10 responses in 1 week. The average cost per patient per follow up visit was $36. This included fuel costs, meal costs, and parking costs. If we assume all in-person appointments are converted to virtual appointments, we extrapolate that total savings to patients would be $21,096 over a 6 month period (for 586 appointments), or over $42,000 per year (for 1,172 appointments). If in-person appointments are reduced by 30%, we would be saving patients approximately $12,600 a year.
- Our survey also looked at time spent preparing for, attending, and leaving the appointment. The average amount of time people took away from their lives for appointments was 94 minutes. If we assume that the average virtual appointment is 30 minutes (they are generally shorter, but time spent setting up equipment can be taken into account here), we will save each patient on average 64 minutes of their day. If we assume all in-person appointments are converted to virtual appointments, 625 hours will be saved for 586 patient appointments in a 6-month period, or 1,250 hours would be saved for 1,172 appointments in a year.
- We also asked whether family members attended, and how much time they would spend with patients before/during/after the appointment. Family members attended half of the appointments but spent the same amount of time on visits as patients. Using the same calculation strategy as above, but with half the visits, family members would save 313 hours over a 6-month period or 626 hours over a year.

Staff

- While we have not formally surveyed staff, there has been a lot of positive energy towards this project in preliminary physicians meetings. Concerns around physician payment could potentially be mitigated by higher volumes of patients being seen. There were several physicians keen on expanding this initiative beyond just the general neurology clinic.

Discussion:

The ultimate goal of this project is to increase the use of virtual visits for follow up appointments within the South Health Campus General Neurology Clinic, specifically for patients with diagnoses of migraine, epilepsy, and other forms of headache. Due to time constraints, the first stage of our project was to map out the potential benefit of converting in-person follow ups to virtual visits.

Indeed, by conducting these follow ups virtually, we expect to see significant ecological benefit, along with social and financial benefit to patients. Even by assuming that only 30% of in-person follow ups will be converted to virtual appointments, which is our ultimate goal, we would save patients and their families 281 cumulative hours of travel time, and nearly $6300 over a 6 month period, extrapolated to 562 hours and $12,600 saved annually. This is on top of the **12,034 kgCO2e per year** savings annually.

When discussing the project at our physicians' meeting, there were a lot of positive comments and hopes to expand the project to other clinics. We are therefore hopeful that uptake of virtual appointments will be strong. However, ongoing marketing of this project will be essential as the use of virtual appointments will need to become habit for the project to have sustained long-term benefit. It will also be essential to share the potential benefit with patients, as there is sometimes reluctance on the patient end to consider a virtual appointment as the equivalent of an in-person follow up.

There were several barriers to getting the project started. First and foremost, significant staff education and training was required. From the physician end, we needed to ensure all physicians were aware of the project and potential benefits and had privacy projected virtual healthcare accounts. Within the EMR, we needed both a tab for physicians to select "virtual follow up" when completing a patient visit, and an option to enter a virtual appointment when a patient is about to be seen. On the clerical end, we needed to provide training on how to set up virtual follow up appointments. All these efforts are ongoing, and are requiring a significant amount of time to complete due to administrative delays. Procuring equipment also took some time as cost approval was required from administration. Total start-up time was approximately 12 weeks.

If we are successful in demonstrating benefit in the general neurology clinic, there appears to be significant motivation from our group to expand this project to other clinics. The hope is that over the next few years, we have successfully transitioned the majority of our South Health Campus neurology clinics to a consistent use of virtual health care.

Conclusions:

Over the next 6 months, we hope to see significant uptake in virtual health care in the General Neurology Clinic at South Health Campus, with demonstrable ecological, economical, and social benefits.

A key driver to the success of the project was the motivation of the physician group to do "something" to make our healthcare system more sustainable. The structure of the Green Team Competition provided us with an opportunity to critically assess areas for improvement within our department, and the support from the Centre for Sustainable Healthcare helped shape our ideas into what we feel will be a small, but impactful project. The hope is that by starting small, we can measure the impact more easily, creating a case to expand to other areas within our department.

We quickly realized that even a small project like ours would require commitment from a large group of people - physicians, nurses, clerical staff, hospital administration, IT support, and departmental

leadership. Engaging all key informants will be essential to ensuring the initiative has a lasting effect, and can spread to involve other outpatient areas. Despite barriers that have delayed the start of our project, we are seeing ongoing excitement and motivation to complete the project. Departmental leadership have also been very engaged, and based on the foundation that we have built, are planning on submitting a large scale CIHR grant with four pillars for sustainable health care - telehealth (which we have helped initiate and will lead), de-prescribing, reducing testing, and OR sustainability.

The hope is that this project harnesses long standing departmental passion for "green" healthcare and continues to drive our department forward in developing new ideas for sustainability.

References and Resources

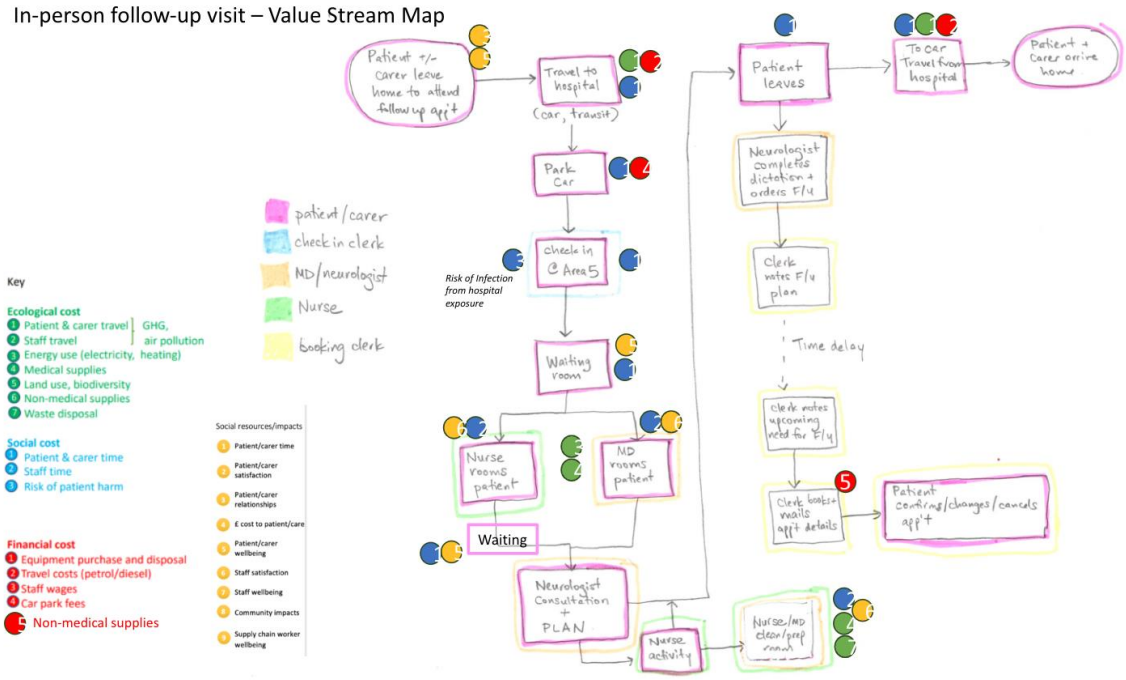
1. Patel UK, Malik P, DeMasi M,Lungariya A, Jani VB. Multidisciplinary Approach and Outcomes of Tele-neurology: A Review. *Cureus*. 2019. 11(4): e4410.
2. Houston E, Kennedy AG, O'Malley D, Rabinowitz T, Rose GL and Boyd J. Telemedicine in Neurology: A Scoping Review of Key Outcomes in Movement Disorders. *Telemedicine and e-Health*. 2022. 28(3): 295-308.
3. Schneider RB and Biglan KM. The promise of telemedicine for chronic neurological disorders: The example of Parkinson's disease. *Lancet Neurology*. 2017. 16: 541-551.
4. *PSSRU(2019). Available from: https://www.pssru.ac.uk/project-pages/unit-costs/unit-costs-2019/*
5. **Fuel consumption ratings search tool (nrcan-rncan.gc.ca)**

Note:

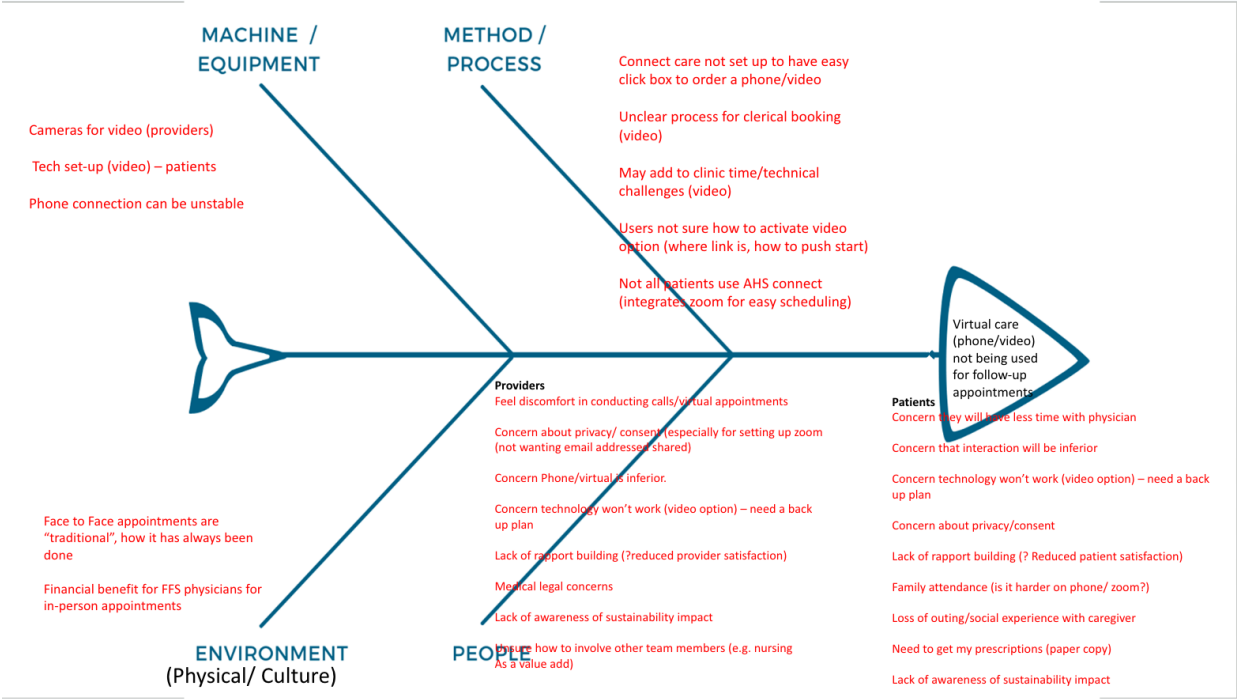
- Emission factor to calculate vehicle emissions obtained from Canada Natural Resources
- Units of healthcare activity provided by the Centre for Sustainable Healthcare

Appendices

Appendix 1: In Person Follow-Up Value Stream Map



Appendix 2: Root Cause Analysis as to why Virtual Health Care is underutilized.



Critical success factors

Please select one or two of the below factors that you believe were most essential to ensure the success of your project changes.

People	Process	Resources	Context
☐ Patient involvement and/or appropriate information for patients - to raise awareness and understanding of intervention **X** Staff engagement ☐ MDT / Cross-department communication ☐ Skills and capability of staff ☐ Team/service agreement that there is a problem and changes are suitable to trial (Knowledge and understanding of the issue) ☐ Support from senior organisational or system leaders	☐ clear guidance / evidence / policy to support the intervention. ☐ Incentivisation of the strategy – e.g., QOF in general practice ☐ systematic and coordinated approach ☐ clear, measurable targets ☐ long-term strategy for sustaining and embedding change developed in planning phase x integrating the intervention into the natural workflow, team functions, technology systems, and incentive structures of the team/service/organisation	☐ Dedicated time ☐ QI training / information resources and organisation process / support **X** Infrastructure capable of providing teams with information, data and equipment needed **X** Research / evidence of change successfully implemented elsewhere ☐ Financial investment	**X** aims aligned with wider service, organisational or system goals. ☐ Links to patient benefits / clinical outcomes ☐ Links to staff benefits ☐ 'Permission' given through the organisational context, capacity and positive change culture.