

LETTER TO THE EDITOR

Necessity is the mother of invention: Rapid implementation of virtual health care in response to the COVID-19 pandemic in a lung transplant clinic

The COVID-19 pandemic has necessitated rapid changes in health-care delivery. Historically, uptake of virtual health care (VH) has been low, especially in specialized clinics; for example, 0.5% of all billable services were provided virtually in Canada in 2015.¹ Prior to March 2020, fewer than 5% of all patient visits in our clinic were by VH utilizing our health authority's approved platform; however, this platform required the patient to attend a remote healthcare facility, clearly undesirable during the pandemic. We trialed various platforms including FaceTime® and Zoom®. Barriers existed with both platforms such as specific device requirements, poor technology literacy, and/or privacy concerns. Ultimately, our clinic adopted a web-based platform (Doxy.me®) that allows for videoconferencing with end-to-end encryption between healthcare provider (HCP) and patient. Over the span of 2 weeks, our clinic transitioned to providing more than 90% of patient care utilizing VH, while maintaining usual clinic capacity of approximately 10 post-transplant patient visits per day. Patients transplanted within the previous 3 months and patients with unstable respiratory symptoms were prioritized for in-person visits.

Our clinic cares for >300 lung transplant recipients over an extended geography in western Canada; all patients are eligible for VH. Usual clinic workflow was modified to adapt to VH (Table 1). Human resource modifications were negligible after implementation of VH; our clinic has 3.5 transplant coordinators (RNs), 1 MD per clinic day, and 1 PharmD; no additional support staff was needed during or after implementation. Post-visit satisfaction surveys adapted from Sidhu et al² were completed immediately following VH visits, these surveys are Research Ethics Board exempt. After 6 weeks of data collection, 157 physician surveys were returned; 70% of visits have taken place by videoconference with the remaining 30% by telephone. Physicians reported being satisfied or very satisfied with VH over 90% of time. Physician dissatisfaction was often a result of missing or incomplete blood work or imaging. Technical problems interfered with care goals in only 2.5% of visits. In the same time period, 45 patient surveys were received, 71% from patients who live more than 150 kilometers from the clinic. Compared to usual care, 91% of patients reported

that the virtual visit was as good as or better than in-person visit. Fear of substandard care with VH compared to usual care, and lack of social interaction with other clinic patients and staff were identified by multiple patients as drawbacks of VH. The median estimated out-of-pocket expense saved per VH visit compared with in-person visits was CAN \$75 per patient (range \$0-\$1250), and the median estimated amount of time saved was 9 hours (range 0-92 hours).

Many barriers exist to successful implementation of VH for lung transplant patients given their frequent need for blood work, imaging, and pulmonary function testing or spirometry. In our case, these challenges were mostly mitigated by a provincial electronic medical record for laboratory and radiology reporting, allowing patients to have testing performed in their local areas. Clinic spirometry and pulmonary function testing were deferred when possible at the discretion of the transplant physician.

Virtual health care has been shown to be effective for management of a number of conditions including lung transplant follow-up.^{2,3} However, concerns with privacy continue to be a consideration, as does the inability for physicians to physically examine the patient, which may lead to suboptimal care. While this has not been demonstrated in the literature, few, if any, studies have been powered to capture this type of information. There is no literature evaluating the outcomes of rapid implementation of VH in lung transplant patients as necessitated by the COVID-19 pandemic.

Virtual health care will play a greater role in post-transplant care even after the COVID-19 pandemic. Patients, HCPs, and health systems are likely to demand increased access to VH to reduce cost and time spent accessing care, and to improve the overall patient experience. The greatest challenges associated with VH at this time appear to be technological barriers including inadequate technological infrastructure as well as poor technology literacy.⁴ Investment in improved VH infrastructure is needed to enable system-wide implementation. Our preliminary data demonstrate that VH can be rapidly implemented in lung transplant clinics with a high degree of patient and physician satisfaction. Research is ongoing to identify the optimal patients and circumstances for whom VH-based post-transplant

This project was exempt from The University of British Columbia and Vancouver Coastal Health Research Institute Research Ethics Board review.

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TABLE 1 Comparison of workflow between in-person and virtual patient care appointments

Clinic Type	In-person	Virtual
Routine pre-clinic Investigation	<ul style="list-style-type: none"> Performed locally Specialized investigations performed at transplant center 	<ul style="list-style-type: none"> Performed locally No specialized investigations
Clinic visit	<ul style="list-style-type: none"> Spirometry performed on site immediately prior to appointment Nursing assessment including vital signs, review of systems, and medication reconciliation Pharmacist and physician assessment, including physical examination and documentation to health record 	<ul style="list-style-type: none"> Nurse reviews patient-reported vital signs and home spirometry, review of systems, and medication reconciliation Pharmacist and physician assessment, including modified physical examination (inspection only) and documentation to health record
Follow-up	<ul style="list-style-type: none"> Performed locally when possible Telephone follow-up when possible 	<ul style="list-style-type: none"> Performed locally when possible Telephone or virtual follow-up when possible


care may be implemented in the long term using objective clinical end points.

ACKNOWLEDGEMENTS

The authors would like to thank the lung transplant nurse coordinators Emily Oates, Mandeep Dhindsa, Rebecca Sternagel, and Elsie Lok; as well as the clinic patient care coordinator Sharon Duncan for their tireless work implementing the transition to virtual care. We would also like to thank Drs. Céline Bergeron, Roland Nador, and John Swiston for participation in data collection. Lastly, we would like to thank the patients of the post-lung transplant clinic for their patience during this period of transition.

CONFLICT OF INTEREST

The authors have no competing interests to declare.

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How to cite this article: Wright RC, Partovi N, Levy RD.

Necessity is the mother of invention: Rapid implementation of virtual health care in response to the COVID-19 pandemic in a lung transplant clinic. *Clin Transplant*. 2020;34:e14062. <https://doi.org/10.1111/ctr.14062>