

The Utilization of an Electronic Consultation Service During the Coronavirus Disease 2019 Pandemic

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Abstract

Objective: The coronavirus disease 2019 (COVID-19) pandemic forced many clinicians to rapidly adopt changes in their practice. In this study, we compared patterns of utilization of Ontario eConsult before and after the onset of the COVID-19 pandemic, to assess COVID 19's impact on how eConsult is used.

Materials and Methods: We conducted a longitudinal analysis of registration and utilization data for Ontario eConsult. All primary care providers (PCPs) and specialists who joined the service between March 2019 and November 2020, and all eConsult cases closed during the same period were included. The data were divided into two timeframes for comparison: prepandemic (March 2019–February 2020) and pandemic (March 2020–November 2020).

Results: In total, 5,925 PCPs joined during the study period, more than doubling total enrollment to 11,397. The average monthly number of eConsults increased from 2,405 (standard deviation [SD]=260) prepandemic to 3,906 (SD=420) pandemic. Case volume jumped to 24.3% in the first month of the pandemic, and increased by 71% during the COVID-19 pandemic timeframe. The median response time was similar in both timeframes (prepandemic: 1.0 days; pandemic: 0.9 days). The proportion of cases resulting in new/additional information (prepandemic: 55%, pandemic: 57%) or avoidance of a contemplated referral (prepandemic: 52%, pandemic: 51%) remained consistent between timeframes.

Conclusions: Registration to and usage of eConsult increased during the pandemic. Metrics of the service's impact, including response time, percentage of cases resulting in new or additional information, and avoidance of originally contemplated referrals were all consistent between the prepandemic and COVID-19 pandemic timeframes, suggesting scalability.

Keywords: Health Care Organizations and Systems, primary care, Referrals and Referral Networks, telemedicine

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has had a profound impact on health care worldwide. In addition to placing great strain on the systems themselves, restrictions brought on by the pandemic have altered the way—and the extent to which—many patients can access care.¹ In Canada, lockdowns that began in March 2020 caused many specialist offices to close down, pushing all but the most urgent cases to virtual appointments, and increasing the already significant wait times for many procedures, as capacity was freed up to accommodate a surge in COVID-19 cases.² With this abrupt transition to a different model of care delivery, innovative solutions that allow for virtual care are more important than ever to ensure that patients can get the care and guidance they need in a prompt, effective, and safe manner.^{3,4}

In June 2018, Ontario eConsult was created and made available to all primary care providers (PCPs) across the province with support from the Ontario Ministry of Health. The service built on the experience of the Champlain BASE™ eConsult service, which was launched and initially piloted in Eastern Ontario in 2010. Ontario eConsult is a secure online application that allows requesting providers (usually PCPs such as family doctors and nurse practitioners) to submit questions on patients' care to specialists from >100 specialty groups. Specialists respond in an average of 2 days, and two-thirds of cases are resolved without the patient needing a face-to-face specialist visit.^{5,6}

As the pandemic unfolded and patients across Ontario saw in-person specialist appointments canceled or indefinitely delayed, eConsult became a natural alternative means for

PCPs to seek specialist advice on their patients' behalf. In this study, we compared patterns of utilization of Ontario eConsult before and after the onset of the COVID-19 pandemic, to assess COVID 19's impact on how the service is used.

Methods

DESIGN

We conducted a longitudinal analysis of eConsults submitted through Ontario eConsult before and after the outset of the COVID-19 pandemic. This study received ethics approval from the Ottawa Health Science Network Research Ethics Board.

SETTING

The study was conducted in Ontario, Canada. Ontario is the most populous province in Canada, with >14 million residents, and is divided into five health regions: West, Central, Toronto Central, East, and North.

Ontario eConsult was established in 2018 and facilitates secure asynchronous communication between requesting providers and specialists. The service is funded through the Ministry of Health. To use the service, a requesting provider logs onto a secure web portal and fills out a structured electronic form that includes the patient's medical history, the clinical question being asked, and any pertinent attachments (e.g., laboratories and imaging). The specialist can then request additional information, provide advice, or advise for a face-to-face consultation. Once a case is closed, the requesting provider is prompted to complete a closeout survey that gathers information on the actions taken after the consultation.

PARTICIPANTS

Participants in the study included PCPs and specialists who were registered to the Ontario Telemedicine Network (OTN) Hub between March 1, 2019 and November 30, 2020. PCPs can access eConsult free of charge by signing up to the OTN Hub, which provides them with access to virtual care tools such as eConsult and a platform for secure virtual eVisits.

DATA COLLECTION

For this study, we drew registration and utilization data collected automatically by Ontario eConsult to examine the number of new PCP registrants to the OTN Hub, the total number of eConsults submitted per month by PCPs, and the number of new specialists who signed up to the eConsult service to provide consults. eConsults submitted by specialists were excluded from this study. The time period from March

2019 to February 2020 was defined as the prepandemic timeframe, whereas March 2020 to November 2020 was defined as the pandemic timeframe.

DATA ANALYSIS

We conducted a stratified analysis of the monthly number of eConsults submitted throughout the study timeframe for the five health regions in Ontario to assess whether any observed changes were consistent across the province. In addition, we assessed the number of PCPs who were active users, meaning they submitted at least three cases in a 6-month period.

Time stamps and the speciality group consulted were assessed to examine the median specialist response interval, the mean time specialists were spending on their responses, and to identify which specialities were most frequently consulted before and during the pandemic.

A descriptive analysis was completed on all eConsult closeout surveys done by PCPs. This was done to determine the PCP's course of action after the eConsult and to gain insight into whether a face-to-face referral was still needed or not.

Results

PROVIDER ENROLLMENT

At the start of the study period, 5,472 PCPs had signed up to the OTN Hub. By the end of the study period, 5,925 additional PCPs had joined, for a total of 11,397 enrolled PCPs. The number of active PCPs increased as well, growing from 1,496 in February 2020 to 2,086 in November 2020 (*Fig. 1*). Although numbers increased consistently month to month, the rate of growth accelerated substantially after the outset of the pandemic, with a 2.1-fold increase in new PCPs between the prepandemic and pandemic timeframes (*Fig. 2*). The most pronounced increase in new registrants came in March 2020, when the lockdown was initiated in Ontario, with a 9.5-fold increase in new monthly PCP registrants relative to the month prior (i.e., February 2020). Similarly, there was a sharp 8.5-fold increase in specialists who signed up to Ontario eConsult in March 2020 relative to the month prior (*Fig. 3*).

CASE VOLUME

The mean number of eConsults sent per month increased from 2,405 eConsults per month (standard deviation [SD] = 260) during the prepandemic timeframe to 3,906 (SD = 420) during the pandemic timeframe. Case volume increased by 71% during the pandemic timeframe, with 2,704 cases submitted on February 2020 versus 4,624 cases submitted November 2020 (*Fig. 4*). As with registration, the largest 1 month increase in eConsults sent (24.3%) occurred between February and March 2020.

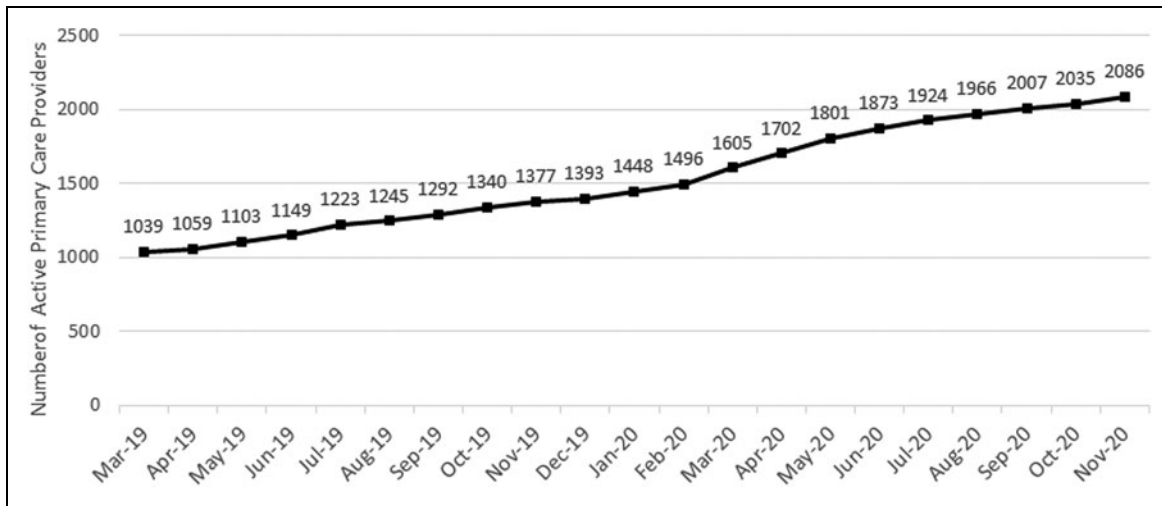


Fig. 1. Number of active PCPs on the Ontario eConsult Service per month. PCPs, primary care providers.

RESPONSE TIME

The median response time was similar in both timeframes (prepandemic: 1.0 days; COVID-19 pandemic: 0.9 days), as was the median time specialists spent responding (15 min in both timeframes).

MOST FREQUENTLY ACCESSED SPECIALTIES

Table 1 summarizes the top 10 specialties that PCPs were referring to during the prepandemic and pandemic timeframes. There was little change seen between timeframes, as

the majority of cases continued to be submitted to dermatology, hematology, endocrinology, and obstetrics and gynecology. One notable change was that pediatrics moved into the top 10 after the onset of the pandemic.

PCP CLOSEOUT SURVEY

eConsult’s impact on PCP decisions was consistent across timeframes. PCPs received advice for a new or additional course of action that they had not contemplated before in 55% of eConsults in the prepandemic timeframe versus 57%

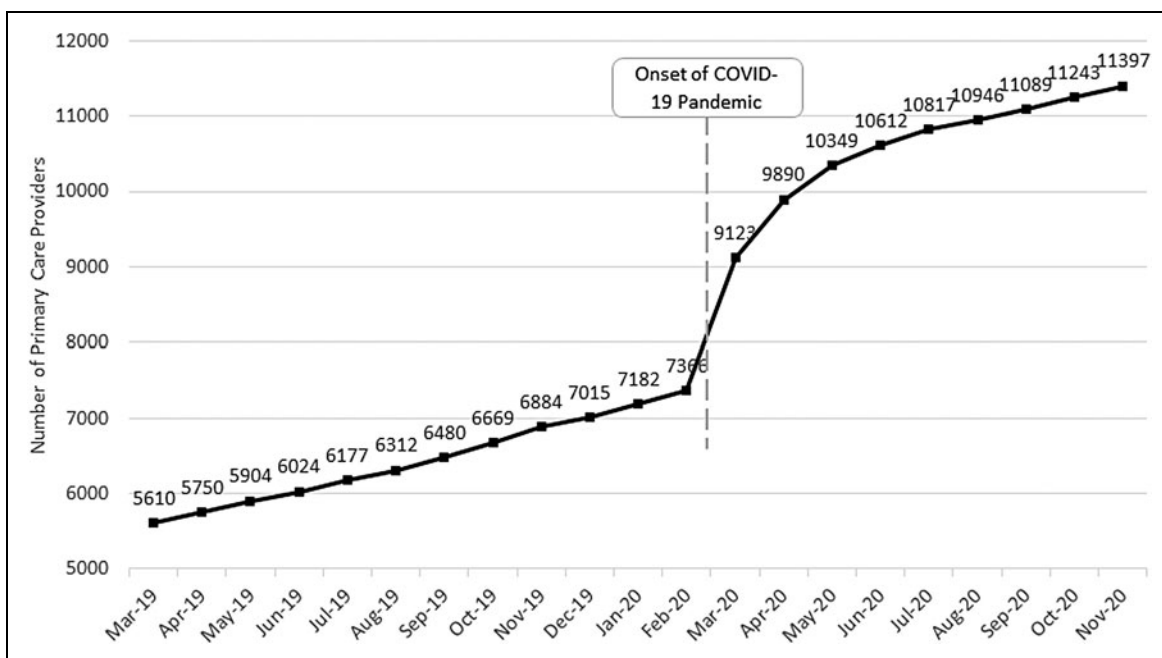


Fig. 2. Number of new PCPs (referrers have a specialty of Family/General Practice Medicine, or Nurse Practitioner) per month who signed up to the OTN Hub. OTN, Ontario Telemedicine Network.

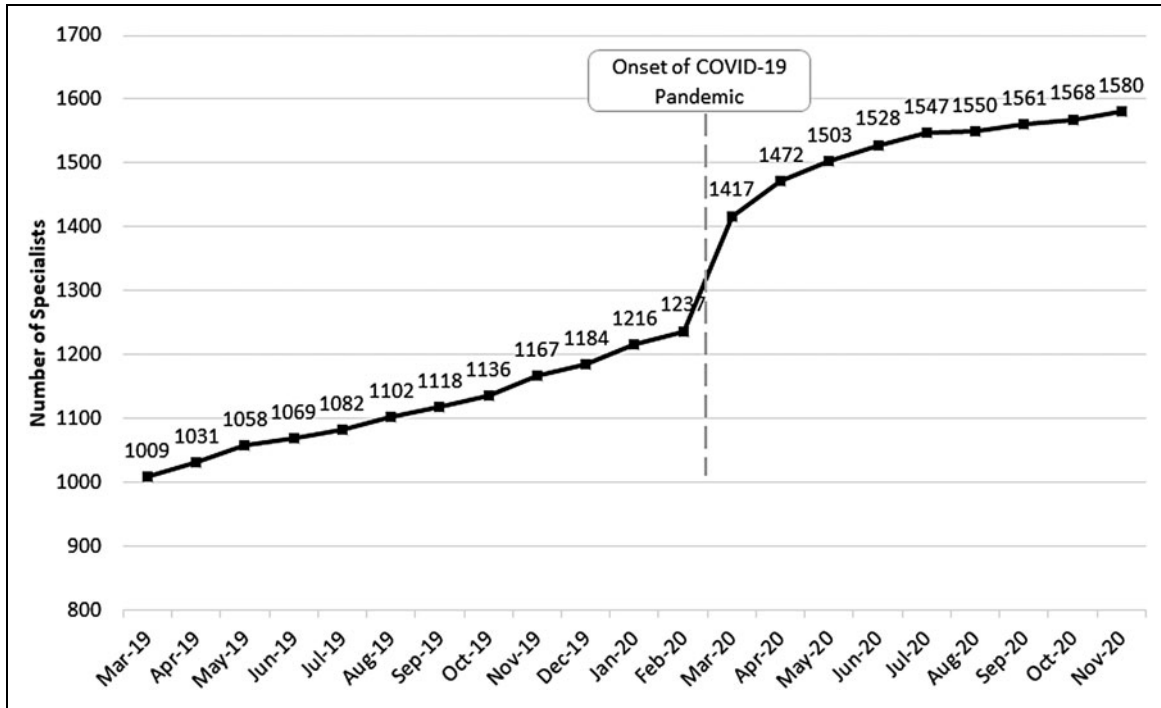


Fig. 3. Net new specialists per month who signed up to provide consultations on the Ontario eConsult Service.

in the pandemic timeframe (Fig. 5), and avoided a referral they had originally contemplated based on specialist advice in 52% of pre-pandemic cases and 51% of pandemic cases (Fig. 6).

Discussion

Our study revealed an appreciable increase in registration to the OTN Hub and usage of Ontario eConsult. Metrics of the service’s impact, including response time, billing time, percentage of cases resulting in new or additional infor-

mation, and avoidance of originally contemplated referrals were all consistent between the pre-pandemic and pandemic timeframes.

The COVID-19 pandemic resulted in a health system disruption that caused a surge in Ontario eConsult’s adoption and utilization. In accordance with Roger’s Diffusion of Innovation theory, the COVID-19 pandemic represented a “tipping point,” which resulted in a sharp increase in uptake of eConsult across the province.⁷ After the announcement of the state of emergency in March 2020, there was a significant increase in the

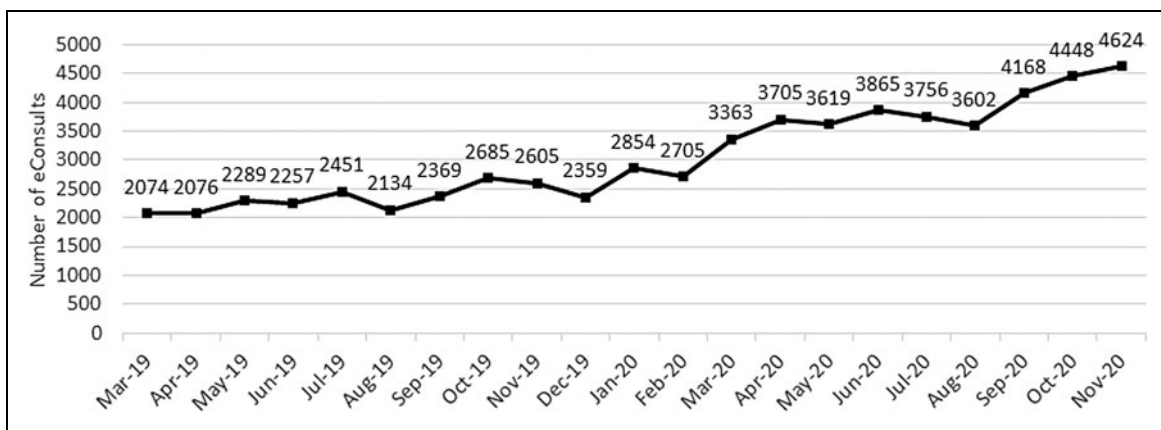


Fig. 4. Number of eConsults submitted by PCPs on the Ontario eConsult Service by month.

Table 1. Comparison of Specialty Distribution Before and After Outset of Pandemic

RANK	MARCH 2019– FEBRUARY 2020 (n=28,303)	%	MARCH 2020– NOVEMBER 2020 (n=34,787)	%
1	Dermatology	14	Dermatology	18
2	Hematology	10	Hematology	8
3	Endocrinology and Metabolism	7	Obstetrics and Gynecology	7
4	Obstetrics and Gynecology	7	Endocrinology and Metabolism	6
5	Neurology	6	Neurology	6
6	Cardiology	5	Psychiatry	5
7	Psychiatry	5	Internal Medicine	5
8	Gastroenterology	5	Pediatrics	5
9	Infectious Diseases	4	Cardiology	4
10	Internal Medicine	4	Gastroenterology	4

number of new registrants to the OTN Hub, as more PCPs were conducting video eVisits and submitting eConsults. A study conducted by Glazier et al. showed a 56-fold increase in PCP virtual visits (i.e., telephone and OTN video eVisits) between March and July 2020 compared with 2019.⁸

Similarly, this study showed a 71% increase in the volume of eConsults being submitted during the pandemic, highlighting the importance of innovative virtual tools during a pandemic. With many specialist offices closing during the lockdown or limiting outpatient services for essential visits, many PCPs turned to innovative virtual technologies such as eConsult for specialist advice. Similarly, there was a surge in new specialists who signed up to provide eConsults during the pandemic, recognizing the value of the service in continuing to support PCPs during the pandemic while maintaining physical distancing and helping conserve limited PPE supplies.

Although a number of studies have assessed video telehealth services during the pandemic, few studies have assessed the utilization of an eConsult system.⁸⁻¹³ A study by Phadke et al. assessed an eConsult service in a single academic center in Boston comparing the change in volume of traditional ambulatory consults versus eConsults before and after the announcement of the state of emergency in their region in March 2020.¹⁰ Results from this study showed that, although there was a decrease in the total volume of ambulatory referrals and eConsults, there was a significant increase in the relative volume of eConsults versus ambulatory referrals.

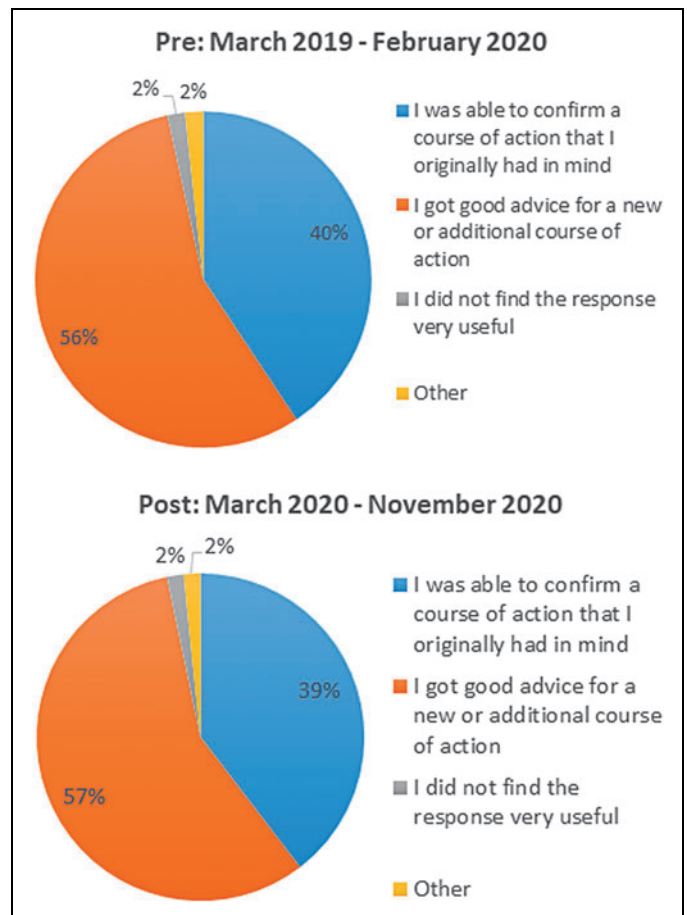


Fig. 5. Results of the referrer closeout survey question: “Which of the following best describes the outcome of this eConsult for your patient?” (A) Results from cases submitted and closed between March 2019 and February 2020 (n=25,035). (B) Cases submitted and closed between March and November 2020 (n=30,320). Survey results are only available for a subset of closed eConsults.

Similarly, a study conducted by Leyton et al. showed that, relative to the prepandemic time period, the odds of an eConsult being submitted by a PCP increased in an academic center in New York.¹⁴ The findings from the aforementioned studies are in line with ours, which demonstrated an increased utilization of eConsult services during the pandemic.

PCPs submitting eConsults were able to get rapid access to specialist advice while maintaining physical distancing during the pandemic. Response times did not change even with increasing use of the service during the COVID-19 pandemic. This could be due in part to the fact that more specialists also joined the service, which likely helped counteract the increased demand for the service. In addition, half of all eConsults resulted in an avoided face-to-face referral, which likely helped free up resources for more urgent cases during the

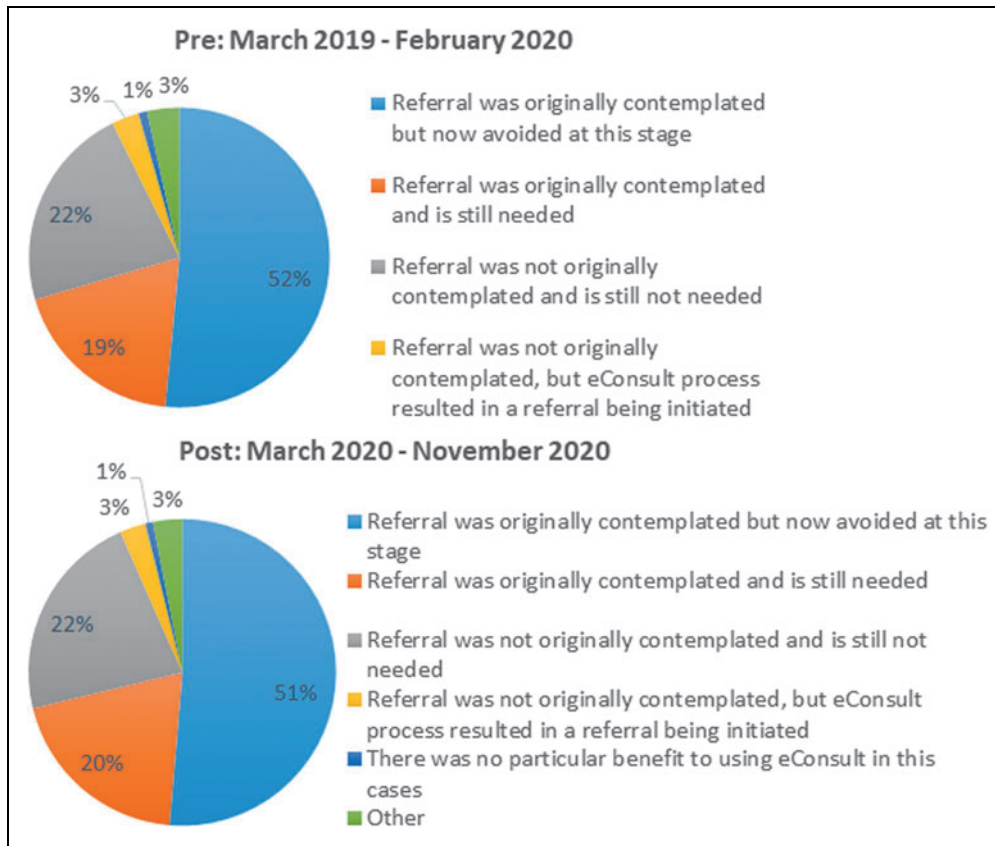


Fig. 6. Results of the referrer closeout survey question: “As a result of this eConsult would you say that”: (A) Results from cases submitted and closed between March 2019 and February 2020 ($n=25,035$). (B) Cases submitted and closed between March and November 2020 ($n=30,320$). Survey results are only available for a subset of closed eConsults.

pandemic when health care resources were strained. There was also no change in the percentage of eConsults that led to an avoided face-to-face referral, an outcome that differs from studies in other regions.

For example, a recent study by Frencher et al. looked at eConsults done before and during the COVID-19 pandemic and found a decrease in eConsults recommending face-to-face referrals.⁹ The authors suggested this difference was likely due to specialists being more reluctant to encourage in-person consultations during a pandemic, given the associated risk with spreading the disease. In Ontario, many specialists have also been using telemedicine or phone visits to assess patients, which may have mitigated the pandemic’s impact on referral recommendations for Ontario eConsult.

This study has several limitations. The data collected in this study were from a single province in Canada, which limits the generalizability of our findings. Furthermore, there is no PCP demographic data collected through the OTN Hub, which limits our ability to compare characteristics of new PCPs that joined the service relative to those that were already using the service be-

fore the pandemic. Also, this study did not assess cases submitted to the Champlain BASE service, which is a regional eConsult service used by those in Champlain and Mississauga/Halton. Although PCPs in these regions also have access to Ontario eConsult, any eConsults used on the Champlain BASE service were not captured in this study and, therefore, impact the regional numbers for the Central and East regions.

Finally, a small proportion of requesting providers could not be classified as PCPs or specialists as a result of ambiguous, incorrect, or blank specialty. Therefore, the number of PCPs and the resulting eConsults might be an underestimate.

Conclusion

This study demonstrates that PCPs increased their use of eConsult during the COVID-19 pandemic in Ontario. As specialist offices shut down or had limited availability, PCPs looked to in-

novative virtual tools such as eConsult to get specialist advice.

Recognizing the value of eConsult in supporting PCPs during the pandemic, COVID-19 specific subspecialty groups (i.e., COVID-19-infectious disease, COVID-19 vaccine allergy and immunology group, COVID-19 and pregnancy, COVID-19 and autoimmune diseases, and a COVID-19 public health group) have been established on the service to support providers navigate new information related to COVID-19. Future studies will examine the utilization and value of such groups during the COVID-19 pandemic.

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Disclosure Statement

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Health. They cofounded the Champlain BASE (Building Access to Specialists through eConsultation) eConsult service but do not retain any proprietary rights. E.K. answers eConsults through the service, less than one per month. J.S., G.G., and S.G. have no conflicts of interest to declare, real or perceived.

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