ORIGINAL ARTICLE

Assessing new patient attachment to an integrated, virtual care programme in rural primary care

Cayden Peixoto, M.Sc[1], Jonathan Fitzsimon, MB ChB[2], Lisa Hawkins, H.BA[3], Judy Hill, RD CDE[3]

[1]Institut du Savoir Montfort, Ottawa, ON, Canada, [2]Department of Family Medicine, University of Ottawa, Ottawa, ON, Canada, [3]Petawawa Centennial Family Health Centre, Petawawa, ON, Canada

Correspondence to: Jonathan Fitzsimon, jfitzsi2@uottawa.ca

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Abstract

Introduction: An estimated 20% of residents of Renfrew County, a rural and underserved community in Ontario, do not have a family physician or alternative primary care provider. Integrated virtual care (IVC) aims to address this crisis by enrolling individuals who are not currently attached to a primary care provider, to a named family physician who works predominantly remotely. The physician is embedded within an existing, local family health team. The aim of this study was to assess and describe the IVC model's capacity to enrol previously unattached patients in Renfrew County and provide adequate primary care.

Methods: We conducted a cross-sectional, descriptive study of data collected from patients enrolled for at least 3 months to an IVC family physician from 15 November 2021 (earliest appointment date for first IVC patients) to 30 June 2022 inclusive.

Results: *N* = 790 patients were successfully attached to a family physician and received at least 3 months of care through IVC within the study period. Of the study population, 65% were female and over 75% were under the age of 55. Among patients who were current smokers at the time of IVC enrolment (*n* = 115), approximately 1 in 5 (18.3%) started a smoking cessation programme following referral by their IVC physician. In addition, IVC physicians and allied health professionals performed 66 colorectal cancer screenings, 164 cervical cancer screenings and 39 breast cancer screenings during the study period, bringing many overdue patients up to date for routine testing.

Conclusion: IVC has been successful in attaching previously unattached patients to a family physician and providing, comprehensive, team-based primary care during its initial 7 months of operation. Similar integrated primary care delivery concepts can also use these results to guide their own development and quality improvement.

Keywords: Family medicine, integrated virtual care, rural medicine, rural patients

Résumé

Introduction: On estime que 20% des habitants du comté de Renfrew, une communauté rurale et mal desservie de l'Ontario, n'ont pas de médecin de famille ou d'autre prestataire de soins primaires. Le programme de Soins virtuels intégrés (SVI) vise à résoudre cette crise en proposant aux personnes qui n'ont pas de prestataire de soins primaires de consulter un médecin de famille désigné qui travaille principalement à distance. Le médecin est intégré à une équipe de santé

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familiale locale existante. L'objectif de cette étude était d'évaluer et de décrire la capacité du modèle de SVI à inscrire des patients qui n'étaient pas rattachés à un prestataire de soins primaires dans le comté de Renfrew et à leur fournir des soins primaires adéquats.
Méthodes: Nous avons mené une étude transversale et descriptive des données recueillies auprès des patients inscrits depuis au moins trois mois auprès d'un médecin de famille IVC entre le 15 novembre 2021 (date de rendez-vous la plus proche pour les premiers patients SVI) et le 30 juin 2022 inclus.
Résultats: *N* = 790 patients ont été rattachés avec succès à un médecin de famille et ont reçu au moins 3 mois de soins par l'intermédiaire des SVI au cours de la période d'étude. Parmi la population étudiée, 65% étaient des femmes et plus de 75% avaient moins de 55 ans. Parmi les patients qui fumaient au moment de leur inscription aux SVI (*n* = 115), environ 1 sur 5 (18,3%) a entamé un programme de sevrage tabagique après avoir été orienté par son médecin en SVI. En outre, les médecins du centre et les professionnels paramédicaux ont effectué 66 dépistages du cancer colorectal, 164 dépistages du cancer du col de l'utérus et 39 dépistages du cancer du sein au cours de la période d'étude, ce qui a permis à de nombreux patients en retard de SE soumettre à des tests de routine.
Conclusion: Le programme de SVI a réussi à mettre en relation des patients qui ne l'étaient pas auparavant avec un médecin de famille et à fournir des soins primaires complets en équipe au cours de ses sept premiers mois d'activité. Des concepts similaires de prestation de soins primaires intégrés peuvent également utiliser ces résultats pour guider leur propre développement et l'amélioration de la qualité.

Mots-clés: Médecins de soins virtuels intégrés, médecine rurale, médecins de famille, patients ruraux isolés

INTRODUCTION

Renfrew County and integrated virtual care

Rural and remote communities face challenges in providing equitable and adequate accessibility to comprehensive primary care.[1] Rural areas are often large with dispersed facilities, increasing the travel burden to accessing primary care for most rural residents.[2] This is also exacerbated by the smaller and dispersed populations of rural areas, as they may not support an adequate supply of family physicians.[1,3]

Like many rural communities, Renfrew County in Ontario (approximate population: 106,365)[4] does not have enough family physicians to fully meet the needs of the community. Approximately 20% of residents do not have attachment to a family physician or alternative primary care provider.[5] With no urgent care or walk-in clinics, residents of Renfrew County must often choose between accessing care at the emergency department (ED) or to forego care entirely.[6] This includes those residing in Petawawa (approximate population: 18,160[4]), the largest community in Renfrew County. Petawawa comprises a mix of semi-urban and rural residents and includes families of military personnel from the nearby Petawawa Garrison. However, while the military personnel receive their primary care at the garrison, their families must find primary care in the community.

Integrated virtual care (IVC) aims to address the problem of low primary care attachment and insufficient local physician workforce in Renfrew County by enrolling individuals, who are not currently attached to a family physician or alternative primary care provider, to a named family physician who works predominantly remotely. The physician is embedded within the Petawawa Centennial Family Health Centre (PCFHC), as part of an existing, local Family Health Team. PCFHC has a blended salary, patient enrolment model for physicians.

IVC patients receive comprehensive, team-based primary care with family physician leadership, through a blend of in-person and virtual care options. When care is provided by allied health professionals in the local family health team, these interactions are communicated efficiently with the patient's doctor.[7] Virtual care options with IVC include secure messaging, telephone and video encounters and enhanced telemedicine options at the PCFHC. Partnership with the existing community paramedicine programme allows a range of at-home care options for vulnerable, housebound patients. Other physicians, nurse practitioners and allied health professionals within the group, provide in-clinic care options for enrolled IVC patients. At all times, the named IVC family physician retains overall responsibility for their patients' primary care.

The implementation of a virtual triage and assessment centre (VTAC) in Renfrew County during the COVID-19 pandemic[5] was found to be effective at providing acute, episodic care and reducing both ED visits and hospitalisations in Renfrew County.[6] While IVC may have a downstream effect of helping reduce ED volumes in Renfrew County, the overall aim of IVC is to attach patients and provide comprehensive primary care. Notably, a preliminary patient satisfaction study of an early iteration of the IVC model (n = 121) reported that 90% of patients were either very satisfied or satisfied with the care from their IVC family physician and 75% felt that their IVC experience was as good or better than any previous in-person care.[8] While these results suggest that IVC can provide acceptable care to patients, IVC's ability to attach patients to a family physician and provide primary care services has yet to be assessed and quantified.

The primary objective of this study was to describe the IVC model's capacity to enrol previously unattached patients in Renfrew County and provide adequate primary care. As metrics of clinical care, we evaluated cancer screenings and smoking cessation referrals among a convenience sample of previously unattached patients, who were attached to an IVC family physician for at least 3 months.

METHODS

Study design and population

The present descriptive study evaluated data collected from a cohort of patients attached for at least 3 months to an IVC family physician from 15 November 2021 (earliest appointment dates for first IVC patients) to 30 June 2022 inclusive. Therefore, patients in this study must have been enrolled into the IVC programme by 31 March 2022 and were thus receiving care for at least 3 months and up to seven and a half months.

There was no recruitment of patients performed directly for this study. Unattached residents of Petawawa in Renfrew County, who had accessed acute care through VTAC[5] more than once, were routinely approached to see if they and any unattached members of their household would like to join IVC.

To be included in the study population, IVC patients must have met all the following inclusion criteria.

- Eighteen years of age or older at the time of enrolment
- Attached to a named IVC family physician for at least 3 months as of 30 June 2022 inclusive
- Able to read and converse in English.

Study measures and data collection

All data used in this study were collected routinely as part of clinical practice from IVC patients. All patients interested in enrolling in IVC are routinely sent an electronic consent form[9] and an administration form[10] to complete through Ocean (CognisantMD, Toronto, ON), a secure and encrypted E-mailing system. This form collects sociodemographic data, as well as information on patient and family medical history.

The onboarding process leading to enrolment to an IVC family physician includes collation of the patient's medical history and a review of their existing medications by a pharmacist. A medical chart and cumulative patient profile are completed prior to the first encounter with their new family physician. A first virtual appointment with the named family physician is then booked over the phone or by video. Patients typically have their first appointment virtually with their new family physician within 2 weeks of finishing the enrolment process.

Study data were obtained retrospectively from a report generated from the IVC electronic medical records (EMR). An exhaustive chart review of the EMR (OSCAR, McMaster University, ON) for all patients included in this study was conducted by the data custodian (LH) to ensure the accuracy of the demographic and clinical data used and reported in this study. Complete data were available for all patients included in the study population.

Outcomes

We reviewed cancer screening tests performed for colorectal cancer, cervical cancer and breast cancer, among the study population from the time of IVC enrolment to the inquiry date on 1 July 2022. Ontario guidelines and recommendations for cancer screening were used to determine the number of patients in the study who were eligible and overdue for colorectal, cervical and breast cancer screening at the time of IVC enrolment.[11] We also evaluated the number of new

referrals and subsequent enrolments to smoking cessation programmes among current smokers during the study period.

Ethical considerations

This study was approved by the Montfort Hospital Research Ethics Board.

RESULTS

Descriptive statistics of the study sample are provided in Table 1. During the study period, IVC attached 790 adult patients to a family physician, who all met inclusion criteria and were included in the study population. All patients were enrolled into IVC for 3–7 months, with a median follow up time of 183 days (standard deviation [SD] =39.6).

Most of the study population was female (65.7%) and aged 64 or younger (82.3%). 115 patients in the study sample were current smokers at time of IVC enrolment, and as of June 2022, approximately 20% had been referred to a smoking cessation programme. The prevalence of chronic diseases was relatively low, for example, hypertension was present among only 22.8% patients. Mental health issues had a higher prevalence with 38.5% of patients suffering from either depression or anxiety and 15.2% experiencing both depression and anxiety.

Over the course of the 7-month study period, there were 2823 unique IVC patient appointments. Seventy per cent (1988) of these appointments were conducted virtually with one of the three IVC physicians and the other 30% (835) of appointments were conducted in-person with one of the six IVC allied health professionals. The median number of appointments for patients during the study period was 3 (SD = 2.57).

During the study period, IVC physicians and allied health professionals performed 66 colorectal cancer screenings, 164 cervical cancer screenings and 39 breast cancer screenings, helping to bring many overdue patients up to date for routine testing [Table 2]. For example, the 66 colorectal cancer screening tests performed since the index date increased the proportion of eligible patients who were up to date for screening from 6.9% (17 of 245) to 33.9% (83 of 245). These results demonstrate that IVC was effective at identifying unscreened patients, and, often within a few weeks of enrolment, performing catchup screenings.

Table 1: Study population descriptive statistics (*N*=790)

Study characteristic	*n* (%)
Age (years), mean (SD)	47.64 (16.49)
18–34	209 (26.5)
35–49	223 (28.2)
50–64	218 (27.6)
65–79	116 (14.7)
80+	24 (3.0)
Sex	
Male	271 (34.3)
Female	519 (65.7)
Current tobacco use	115 (14.6)
Referral to smoking cessation programme	21 (18.3)*
Chronic diseases	
Hypertension	180 (22.8)
COPD	30 (3.8)
CHF	9 (1.1)
Diabetes	83 (10.5)
Mental heath	
Anxiety	236 (29.9)
Depression	188 (23.8)
Anxiety or depression	304 (38.5)
Anxiety and depression	120 (15.2)

*Sample for calculation included only those who were current smokers (*n*=115). COPD: Chronic obstructive pulmonary disease, CHF: Congestive heart failure, SD: Standard deviation

DISCUSSION

Overall, IVC has been an efficient vehicle for improved equity in access to primary care in Renfrew County by increasing the availability of attachment to comprehensive team-based primary care with family physician leadership. During its first 7 months of operation, IVC successfully attached 790 (previously unattached) patients to a named family physician and conducted over 2800 patient appointments during the study period. IVC was also effective in both identifying patients requiring preventative care and improving access to relevant interventions and performing over 200 cancer screening tests for eligible and overdue patients.

IVC was found to be highly effective and efficient at providing preventative care among its patient population. Upon enrolment in IVC, only 6.9%, 22.4% and 17.0% of eligible patients were known to be up to date for routine colorectal, cervical and breast cancer screening, respectively. As of 30 June 2022 (end of study outcome window), 33.9%, 58.9 and 39.2% of eligible IVC patients were up to date for these three cancer screening tests, respectively. IVC was responsible for a large

Table 2: Cancer screening among the study patient population				
Routine cancer screening performed	Number of eligible patients entering IVC[a]	Number of eligible patients known to be up to date for screening at IVC enrolment (%)[b]	Number of screening tests performed since index date[c]	Number of eligible patients known to be up to date for screening at end of outcome window (%)[d]
Colorectal cancer screening	245	17 (6.9)	66	83 (33.9)
Cervical cancer screening (Pap)	450	101 (22.4)	164	265 (58.9)
Breast cancer screening (mammogram)	176	30 (17.0)	39	69 (39.2)

[a]Patients aged 50–75 at the time of IVC enrolment were considered eligible for colorectal cancer screening. Female patients aged 21–69 and aged 50–75 were considered eligible for cervical cancer and breast cancer screening, respectively, [b]Patients were considered up to date if their last cancer screening test occurred within 2 years before IVC enrolment for colorectal cancer, 3 years before IVC enrolment for cervical cancer screening, and 2 years before IVC enrolment for breast cancer screening, [c]Index date was 15 November 2021 (earliest appointment date for first IVC patients), [d]End of outcome window was 30 June 2022 inclusive. IVC: Integrated virtual care

absolute increase in the proportion of patients who received recommended routine cancer screenings. Moreover, approximately 1 of 5 current smokers in the study sample were referred to, and enrolled in, a smoking cessation programme since IVC enrolment [Table 1]. These results highlight IVC's ability to improve access to, and increase rates of, preventative care interventions.

The shift from predominantly in-person clinical appointments to virtual care and mixed model options during the COVID-19 pandemic was recently found to have no increase on ED use among individuals attached to a family physician in Ontario.[12] This suggests that in the absence of in-person physician availability, virtually delivered primary care alternatives do not drive-up Ontario ED volumes. In the case of IVC, increased primary care attachment rates resulting from IVC may lead to decreased ED use in Renfrew County. As previously mentioned, the implementation of a VTAC in Renfrew County during the COVID-19 pandemic was found to be effective at reducing both ED visits and hospitalisations,[6] suggesting that other virtual care models in Renfrew County, particularly IVC which provides primary care attachment, may have a similar effect. However, a population-based comparative study would be required to fully evaluate IVC's clinical (and economic) impact.

Primary care attachment is associated with better preventative care and chronic disease management and a lower risk of unmet healthcare needs.[13,14] Therefore, it is likely that there would be some undiagnosed chronic disease among IVC patients, especially for individuals who were unattached for longer durations. This may explain why the prevalence of chronic diseases found in our sample of IVC patients [Table 1] appears low for a rural patient population in Renfrew County.[6]

The main goal of the IVC model is to increase attachment to comprehensive, team-based primary care with family physician leadership. To effectively work towards this goal, as well as to continually improve healthcare delivery, IVC must be evaluated over time using the internationally recognised Quadruple Aim Framework (improve population health, enhance patient experience, reduce costs and improve working life for healthcare workers).[15,16] As a next step, an in-depth analysis of the patient experience using validated tools to measure patient satisfaction among a larger sample of IVC patients is warranted to identify areas of improvement in healthcare access, delivery and quality for patients. In addition, future study of the IVC provider experience is required to determine how healthcare quality can continue to be improved, while also preventing potential fatigue and burnout among IVC physicians.

Limitations

Our study population skewed young, with over 80% being under the age of 65 and was predominantly female (65%). This variance from the population of Renfrew County as a whole[4] is likely due to the inclusion of families of military personnel based at the nearby Petawawa Garrison. It may not be representative of the rest of Renfrew County or other rural, clinical patient rosters. Therefore, study results may not be generalisable outside of our sample of Renfrew County IVC patients. In addition, this skewed distribution within the study population may have also influenced the lower prevalence of chronic disease found in our sample of IVC patients, as chronic diseases such as hypertension, COPD and heart failure, are more prevalent among male and older populations.[17,18]

Due to the descriptive nature of this study, and because this study evaluated IVC within its initial months of operation, there is no direct clinical or temporal comparator for our results. Therefore, it is currently unclear if IVC provided better or comparable care to traditional in-person primary care among the study population. Future study of IVC's clinical impact in Renfrew County, as well as IVC patient and provident satisfaction is warranted to address knowledge gaps.

Consistent evaluation of IVC over time is key to ensuring that patients are satisfied and are receiving the best clinical care possible. With future studies planned to continue the evaluation and improvement of IVC across the Quadruple Aim Framework, IVC can be a genuine option to ameliorate the crisis of access to comprehensive, team-based primary care in Renfrew County and beyond.

CONCLUSION

During its initial *7* months of operation, Renfrew County IVC attached *790* patients, who did not previously have a family doctor, to a named physician and provided timely access to preventative care services. The results of this study will be critical for quality improvement and future development of IVC as it continues to expand, and more patients receive care in this way. Our results can be used to guide future clinical, economic and patient/provider experience evaluations of IVC and to support the adoption of the IVC model in other regions, particularly in rural, remote and underserved communities like Renfrew County.

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Conflicts of interest: Jonathan Fitzsimon is the Medical Lead for the Renfrew County Integrated Virtual Care. Judy Hill is the Executive Director of PCFHC. The authors declare that there are no other conflicts of interest.

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