

BMJ Open Electronic consultation in correctional facilities worldwide: a scoping review

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ABSTRACT

Objective To provide an overview of the use of and evidence for eConsult in correctional facilities worldwide.

Design Scoping review.

Data sources Three academic databases (MEDLINE, Embase and CINAHL) were searched to identify papers published between 1990 and 2020 that presented data on eConsult use in correctional facilities. The grey literature was also searched for any resources that discussed eConsult use in correctional facilities. Articles and resources were excluded if they discussed synchronous, patient-to-provider or unsecure communication. The reference lists of included articles were also hand searched.

Results Of the 226 records retrieved from the academic literature search and 595 from the grey literature search, 22 were included in the review. Most study populations included adult male offenders in a variety of correctional environments. These resources identified 13 unique eConsult services in six countries. Six of these services involved multiple medical specialties, while the remaining services were single specialty. The available evidence was organised into five identified themes: feasibility, cost-effectiveness, access to care, provider satisfaction and clinical impact.

Conclusions This study identified evidence that the use of eConsult in correctional facilities is beneficial and avoids unnecessary transportation of offenders outside of the facilities. It is feasible, cost-effective, increases access to care, has an impact on clinical care and has high provider satisfaction. Some gaps in the literature remain, and we suggest further research on patient satisfaction, enablers and barriers to implementation, and women, youth and transgender populations in this setting to inform service providers and stakeholders. Despite some gaps, eConsult is evidently an important tool to provide timely, high-quality care to offenders.

INTRODUCTION

Offenders in correctional facilities experience poorer health outcomes than the general population and face significant challenges in accessing specialist care.^{1–6} In Canada, offenders were found to have higher rates of latent tuberculosis, sexually transmitted infections, hepatitis C, HIV and other blood-borne infections,⁶ which may require specialist care. Similar findings have been reported in other countries.^{7–9} Many factors

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ To our knowledge, our scoping review is the first to focus on asynchronous, provider-to-provider communication in correctional facilities, as others have primarily examined synchronous models or those providing patient-to-provider communication.
- ⇒ The methodology used for this scoping review was transparent and rigorous, providing an extensive summary of the academic and grey literature regarding electronic consultation use in correctional facilities.
- ⇒ This review did not limit studies by country of publication, allowing for contributions from a broad scope (worldwide) to highlight eConsult's generalisability and scalability.
- ⇒ The publicly available grey literature search results often did not evaluate the use of eConsult in correctional facilities, and we did not follow-up with institutions for data supporting their use.

affect offenders' ability to access prompt specialty care, including the logistical, financial and safety considerations around their travel outside of the institution,¹⁰ and the remote location of many correctional facilities with limited access to healthcare workers.⁴ However, offenders' time in correctional facilities provides an opportunity to improve their health, which could lead to secondary benefits to society, such as decreasing healthcare costs and improving health in the general population.⁶

Several approaches to improve access to care in correctional facilities have been implemented, including real-time/synchronous (eg, video conferencing) telehealth and telemedicine tools to facilitate communication between patients and providers, or between primary care providers (PCPs) and specialists. However, real-time synchronous video visits require high-bandwidth telecommunication and adequate image quality/resolution for accurate diagnoses.^{10 11} This can pose a challenge for correctional facilities, particularly in Canada, where these institutions tend to be located in rural and remote

areas¹² where access to high-speed internet could pose a challenge.¹³ Thus, asynchronous/store-and-forward telemedicine tools may be better suited for these settings.

In Canada, Ontario eConsult has been developed to improve timely access to specialist advice. Electronic consultation (eConsult) is a secure web-based tool that allows PCPs, including physicians and nurse practitioners, to communicate asynchronously with specialists about a patient's care, often eliminating the need for an in-person specialist visit.¹⁴ Ontario eConsult and other such services have been shown to reduce wait times, improve access to specialist advice and reduce costs in community settings.^{15–18} These benefits have also been demonstrated in long-term care, whose population faces similar challenges in accessing external care.^{19 20} Moreover, a study describing utilisation of the infectious disease specialty service through Ontario eConsult identified tuberculosis, hepatitis and sexually transmitted infections, which are prevalent in the corrections population, within the top 10 reasons for use.²¹ As eConsult use expands across Canada, the potential benefits of using eConsult in Canadian correctional facilities should be explored.

Thus, the objective of this review is to provide an overview of the use of and evidence for eConsult in correctional facilities worldwide. The results will facilitate discussions between Correctional Services Canada (CSC) and the Ontario eConsult Centre of Excellence about implementing a nationwide eConsult service in correctional facilities, and inform the use of eConsult as a tool in correctional facilities worldwide.

METHODS

Study design

This study follows the scoping review methodological framework proposed by Arksey and O'Malley.²² At each stage of the study, we held meetings with key stakeholders, including healthcare professionals and policymakers from CSC (figure 1). Stakeholders provided input on study design and interpretation of findings.

While a variety of terms are used in the literature to describe electronic consultation (eg, e-consultation, teleconsultation, tele-expertise), for the purposes of this study we will use the term 'eConsult' to refer to the web-based communication and 'eConsult service' to refer to the platform that offers this web-based communication. Our review consisted of three parts: academic literature search, grey literature search and forward snowballing.

Academic literature search

Search strategy

On 9 July 2020, we conducted a literature search of three academic databases: MEDLINE, Embase and CINAHL. The searches in MEDLINE and Embase were built and run through Ovid, and the search in CINAHL was built and run through EBSCOhost. Titles published from January 1990 to July 2020 in English and French were included. We did not limit our search by country of study.

The major search concepts that defined the Subject Heading terms and Keywords are Corrections and Electronic Consultation. The lists of Subject Headings and Keywords were developed through an initial review of articles and in consultation with a health sciences librarian at the University of Ottawa (online supplemental appendix A, B).

Inclusion criteria

Articles were included if they presented data on eConsult use in correctional settings. eConsult was defined as a secure, asynchronous communication that allows PCPs (defined as family physicians, nurse practitioners, physician assistants or any medical doctor who considered themselves to deliver primary care) to request advice from specialists or allied health services, such as dentistry or pharmacy. Articles were included if they discussed any type of corrections environment (eg, minimum security facilities, mental health facilities and Indigenous facilities).

Exclusion criteria

We excluded literature on synchronous communication modalities (eg, real-time video visits or telephone consults); patient-to-provider communication; and email, social media-based or web-based communication that was not explicitly stated as secure or described using synonymous terms. We also excluded studies if the communication was strictly one-way and did not allow for iterative communication between providers. Abstracts, commentaries and reviews that did not present data on an eConsult service were also excluded.

Study selection

Two reviewers (English: CS and MH-S; French: SK and CS) independently screened each abstract. The full texts of all abstracts deemed potentially relevant were screened for inclusion. To ensure reliability of the full-text screening, reviewers CS and MH-S independently reviewed the same 10 randomly selected English full-text articles and checked for agreement. A third reviewer (SK) was consulted to resolve disagreements. Once a high level of agreement was attained, the remaining full-text articles were each screened by one of the reviewers (English: CS and MH-S; French: SK and CS).

Data extraction

The following information was extracted from each article to a data charting form by one of the reviewers: publication title, author, year, study type/design, country, study objective/purpose, description of the electronic consultation intervention, single versus multispecialty service, setting, study population, sample size, outcome measures, main findings and additional notes.

Grey literature search

The grey literature was searched on 6 August 2020. First, the keywords developed for the academic literature search (online supplemental appendix A) were combined

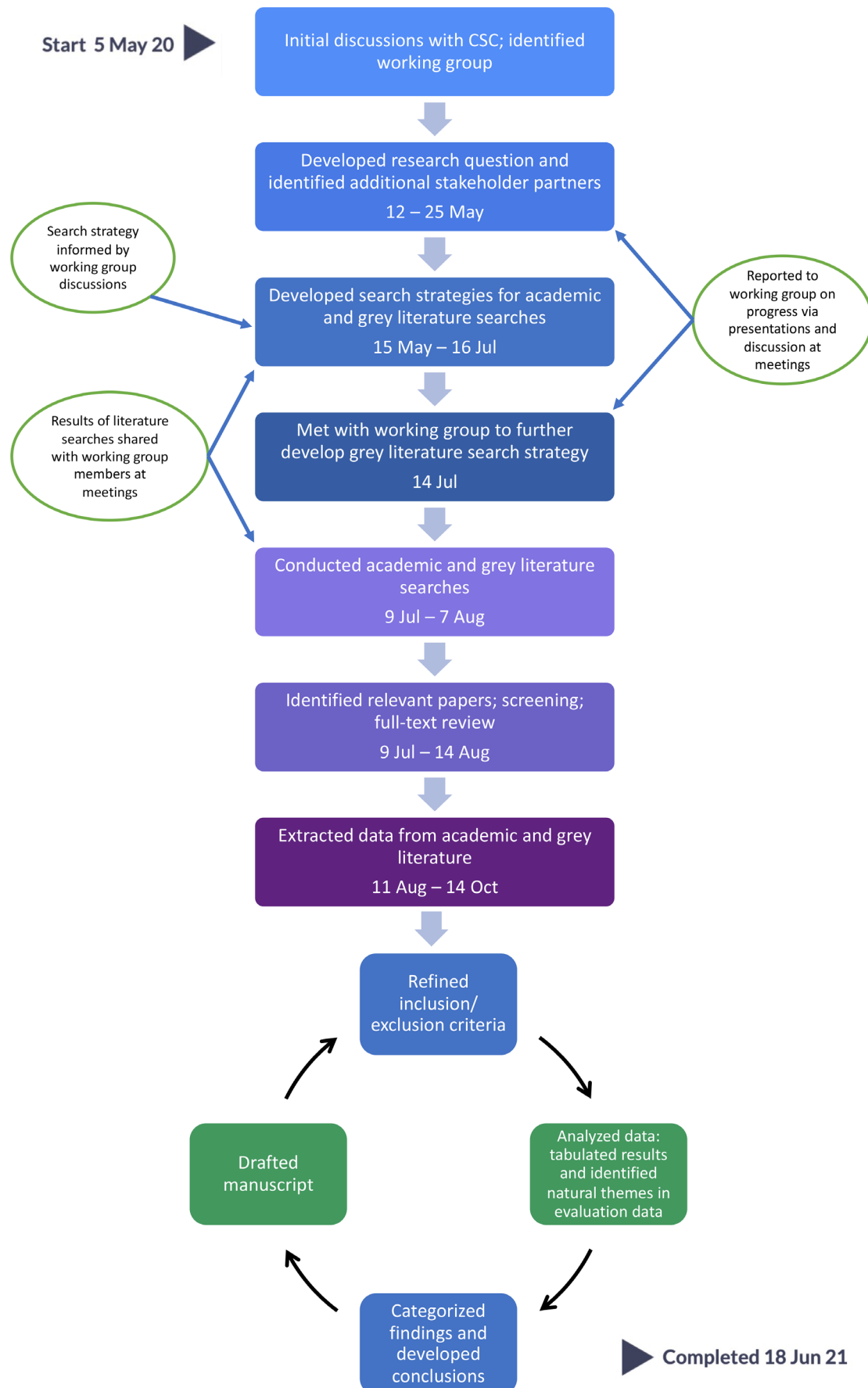


Figure 1 Timeline of scoping review to provide an overview of the use of and evidence for eConsult in correctional facilities worldwide. CSC, Correctional Services Canada.

using Boolean terms in the Google search engine (online supplemental appendix C). Screening was limited to the first 10 pages of results. Next, advanced site searches of government websites, organisations and academic conferences identified by stakeholders were performed through the Google search engine using the same keywords. The government websites of the USA, UK, Ireland and Australia were searched for information about eConsult use in correctional facilities, as these countries were suggested by our CSC stakeholders. Relevant resources were sought from the WHO, Federal Bureau of Prisons, CSC, RubiconMD, HubMD and Capplaw organisations. Finally, the websites of two annual academic conferences, 'Custody and Caring' held by the University of Saskatchewan and the 'American Correctional Association Conference', were searched to identify any relevant abstracts. The advanced Google searches were also limited to the first 10 pages of results.

All results were screened by webpage title and description preview in the Google search engine. Any articles or resources that discussed eConsult use in correctional facilities were recorded, and data were extracted to the data charting form. Articles were included if they discussed any type of corrections environment, a secure, asynchronous eConsult and involved provider-to-provider communication. Exclusion criteria were the same as those for the academic literature search.

Forward snowballing

The reference lists of included articles were reviewed for any relevant resources that were not captured by our search. Articles about relevant research studies described in published conference abstracts or grey literature were sought through targeted searches of the Google search engine. This involved searching for the authors of the study or the name of the eConsult service, if available. If no results were found, authors were contacted by email. Any available information was extracted to the data charting form.

Analysis

After data extraction, characteristics of included academic articles, intervention descriptions and main findings were summarised and tabulated. The available evidence from evaluation of eConsult in correctional settings was categorised under five naturally emerging themes. The included articles were not subject to quality appraisal, as this is not typically done during scoping review studies²² and given the diversity of literature obtained from the above sources, much of which was not academic.

Patient and public involvement

No patient involved.

RESULTS

The results have been organised into the following categories: overview of included literature, landscape of

eConsult in correctional facilities and evaluation of eConsult and available evidence.

Overview of included literature

Academic literature search

The electronic search of the three databases yielded 226 non-duplicate records for title and abstract screening. Eighty-five articles were included for full-text review, nine of which were included in the review (figure 2).^{10 23–30} No additional articles were identified by screening the reference lists of the included articles. The included studies were published between 2001 and 2018. The study designs of included articles displayed large variation, with the plurality being cost analysis studies (n=3). Other study types were descriptive (n=2), pilot (n=1), retrospective cohort (n=1), cross-sectional retrospective chart review (n=1) and cross-sectional (n=1). Study populations included adult offenders (n=7),^{10 23–27 30} youth offenders (n=1)²⁸ and female offenders (n=3).^{25 27 30} The correctional environments described in the included studies were mixed, with variation from maximum security prisons to juvenile detention facilities. Details of included studies are available in table 1.

Grey literature search

The grey literature search yielded 595 total results: 100 generated by the initial keyword search; 127 from the advanced site search of the relevant government websites; 347 from the advanced site search of relevant organisations identified; and 21 from the advanced site search of the two academic conferences. After screening the webpage title and description previews, 22 resources were included for full-webpage review. A total of 13 resources were retained for data extraction.^{31–43}

Landscape of eConsult in correctional facilities

The 22 included resources from the academic and grey literature searches indicated widespread use of eConsult in correctional facilities worldwide. From these resources, we identified 13 unique eConsult services implemented in the USA (n=7), Australia (n=2), France (n=1), Canada (n=1), Brazil (n=1) and Colombia (n=1). The literature from Canada discussed a teledermatology service, the Champlain BASE eConsult service, and the Ontario eConsult Program. These services are now combined under Ontario eConsult, and thus reported as one unique service. A map of these services can be found in figure 3. The types of eConsult services were quite mixed, with around half being multispecialty (n=6). The most common single specialty services were dermatology (n=2) and ophthalmology (n=2). The other single specialty services provided communication with psychiatry, specifically regarding depression (n=1), hepatology, specifically regarding hepatitis C virus (n=1) and dentistry (n=1). Details of the eConsult services identified through the academic and grey literature searches and their impact are available in table 2.

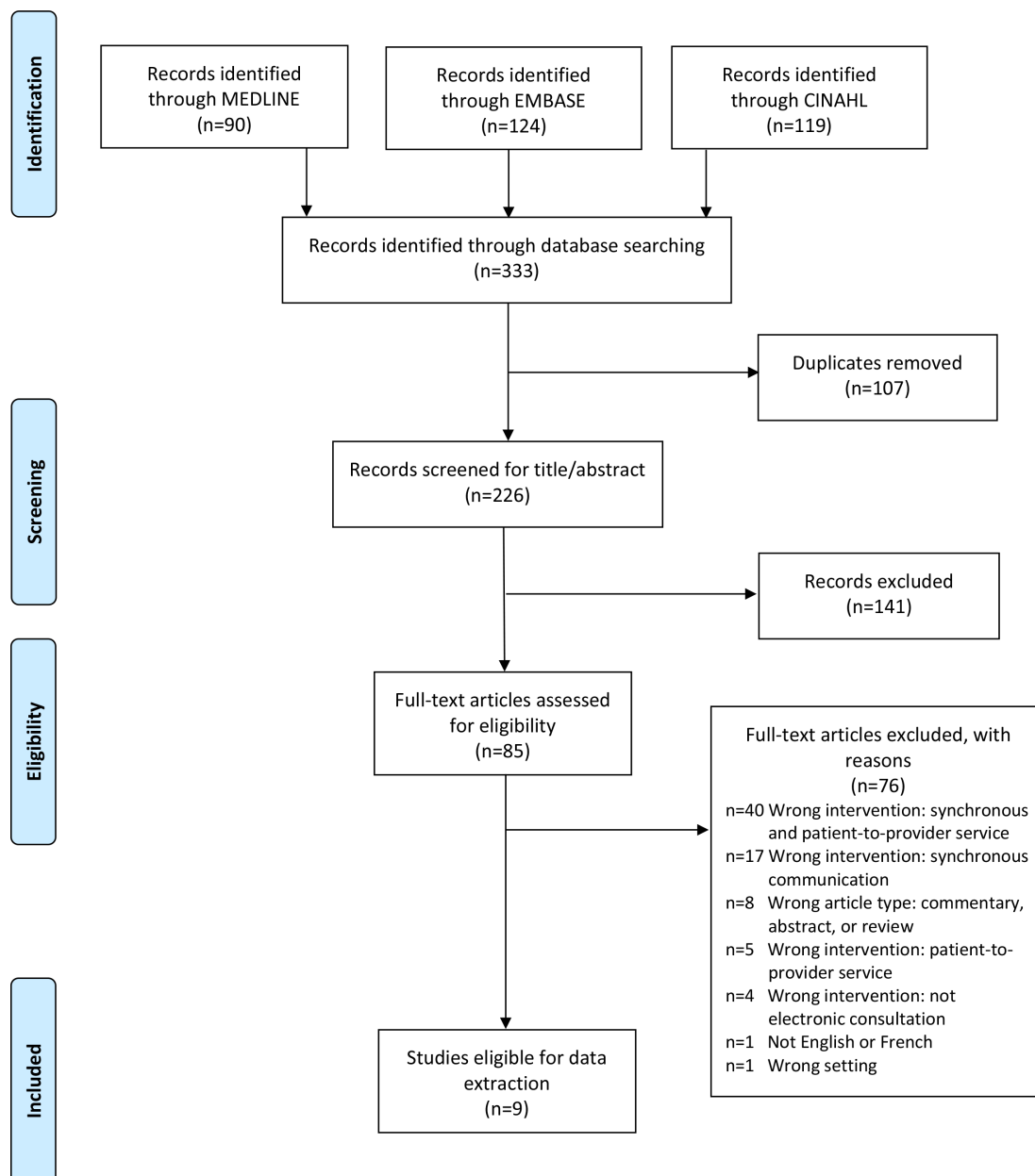


Figure 2 Flow diagram demonstrating inclusion and exclusion of papers during academic literature search.

Case example: teledermatology using WebDCR

The French teledermatology service using WebDCR by the SESAN group is one example of a successful eConsult service that has been well-described in the academic literature.^{25 27 30} The earliest form of this particular service was established in 2008, with the initial pilot study published in 2016.²⁷ The service is still active at the time of this publication. In 2018, Zarca *et al* demonstrated that this single specialty dermatology service enabled timely access to specialist advice, with a median response time of 5 days.³⁰ For the physicians at the correctional facility, most eConsult requests (85%) were initiated in less than 30 min. For the dermatologists responding to the request, most eConsult cases (90%) were completed in less than 30 min. eConsult was shown to be feasible in this setting, with 88% of requests having a satisfactory or very satisfactory picture

quality and 82% of patients having a completed treatment plan. In contrast, less than half (35%) of patients had a completed treatment plan in the control group (face-to-face appointment). Only 3% of the cases with satisfactory eConsult requests required a face-to-face consultation or hospitalisation for further investigation. The service was also found to be well accepted among physicians, with all responders in agreement that they would like to continue using the teledermatology service.

Evaluation of eConsult and available evidence

The academic literature describes a variety of outcome measures assessed to evaluate eConsult services in correctional settings. Most of the grey literature resources simply identified the use of eConsult in a correctional facility and did not include evaluation data. Though reported in

Table 1 Characteristics of included academic studies

Citation	Loc*	Study type/ design	Setting	Study population	Sample size
Aoki <i>et al.</i> ²³ Cost-effectiveness analysis of telemedicine to evaluate diabetic retinopathy in a prison population.	USA	Cost-effectiveness analysis.	Prison units throughout East Texas that provide primary healthcare to 125 000 inmates; the Eastern Regional Medical Facility is located 120 miles north of Galveston.	Adult, patients with type 2 diabetes with diabetic retinopathy.	Reference case: one 40-year-old African-American man Sensitivity analysis: assumed to be 750 patients with diabetes in a prison, with 75% examined using teleophthalmology. n=106.
Barrera-Valencia <i>et al.</i> ²⁴ Cost-effectiveness of Synchronous vs Asynchronous Telepsychiatry in Prison Inmates With Depression.	CO	Cost-effectiveness analysis.	Medium-Security Penitentiary and Prison Establishment of Manizales; Establecimiento Penitenciario y Carcelario de Mediana Seguridad de Manizales, Colombia.	Male inmates, age greater than 18 years, within the 'mild depression' and 'very severe depression' bracket of Zung's Self-Rating Depression Scale (1965). Inmates were referred by the general practitioner and had a positive HDRS score; inmates were excluded if they had visual or hearing impairment, they were currently undergoing psychiatric treatment, or if they failed to consent.	n=106.
Bertin <i>et al.</i> ²⁵ (Tele)dermatology between two French hospitals: Two years of experience.)	FR	Descriptive study.	Two corrections facilities: Maison d'Arrêt de Bois-d'Arçay and Maison d'Arrêt pour femmes de Versailles.	89% men, adults aged 18–79 years. Compared with inpatient teledermatology cases, the incarcerated population had a higher proportion of male patients and they presented with conditions that had a more chronic evolution. Incarcerated women had more significant histories of disease compared with men.	n=231.
Gavigan <i>et al.</i> ²⁶ Patterns of skin disease in a sample of the federal prison population: A retrospective chart review.	CA	Observational, cross-sectional, retrospective chart review.	Federal correctional facilities in Kingston, Ontario, Canada.	Male, aged 20–39 years, sentenced to 2 years or longer in prison.	n=320 patients (258 seen in-person, 60 evaluated using eConsult, 2 who received both).
Khatibi <i>et al.</i> ²⁷ (Tele)dermatology in a prison setting: A retrospective study of 500 expert opinions.)	FR	Descriptive study.	The Fresnes prison (maison d'arrêt de Fresnes) in France.	94.1% men with a mean age of 34 years.	n=500 consultations.
Morosini <i>et al.</i> ²⁸ Performance of distant diagnosis of dental caries by teledentistry in juvenile offenders.	BR	Cross-sectional study.	Juvenile detention facility, CENSE São Francisco Piraquara, Paraná, southern Brazil.	Male, juvenile offenders aged 15–19 years who were undergoing social and educational measures of deprivation of liberty.	n=102.

Continued

Table 1 Continued

Citation	Loc*	Study type/ design	Setting	Study population	Sample size
Pan <i>et al.</i> ²⁹ The value of provider-to-provider telehealth.	USA	Cost analysis through computer simulation.	Models considered four settings: emergency departments, prisons (correctional facilities), nursing home facilities and physician offices. Two possible encounter pairings relevant to corrections were considered: ¹ correctional facilities to emergency departments; ² correctional facilities to physician offices.	Patients, prisoners and nursing home residents (not otherwise specified).	The 1668 prisons in the USA, each with one telehealth equipment set.
Yogesan <i>et al.</i> ¹⁰ Online eye care in prisons in Western Australia.	AU	Pilot study.	Maximum-security prison, located 25 km from Perth.	Patients aged 30–82 years that either had prior appointments at public hospitals for ophthalmic assessment or were known to be diabetic, with probable ophthalmic pathology.	n=11.
Zarca <i>et al.</i> ³⁰ Tele-expertise for diagnosis of skin lesions is cost-effective in a prison setting: A retrospective cohort study of 450 patients.	FR	Retrospective cohort study.	All prisons in a network of eight prison primary care units and two hospital dermatology units, in France.	Male and female patients, aged greater than 18 years, presenting to medical units in participating prisons with a dermatological condition needing a dermatologist's advice. Mean age was 34.2 years. 90% were men. Control group: Patients who had a dermatologist consultation appointment made in 2013 and 2014 in one prison of the network, for which tele-expertise was not implemented. Providers of tele-expertise were 10 physicians: one from each local care unit () and one from each expert site ().	450 patients (511 requests) in the intervention group; 54 requests in the control group 10 physicians (8 PCPs and 2 dermatologists).

*Location: AU=Australia; BR=Brazil; CA=Canada; CO=Colombia; FR=France; USA=United States of America. HDRS, Hamilton Depression Rating Scale; PCP, primary care provider.

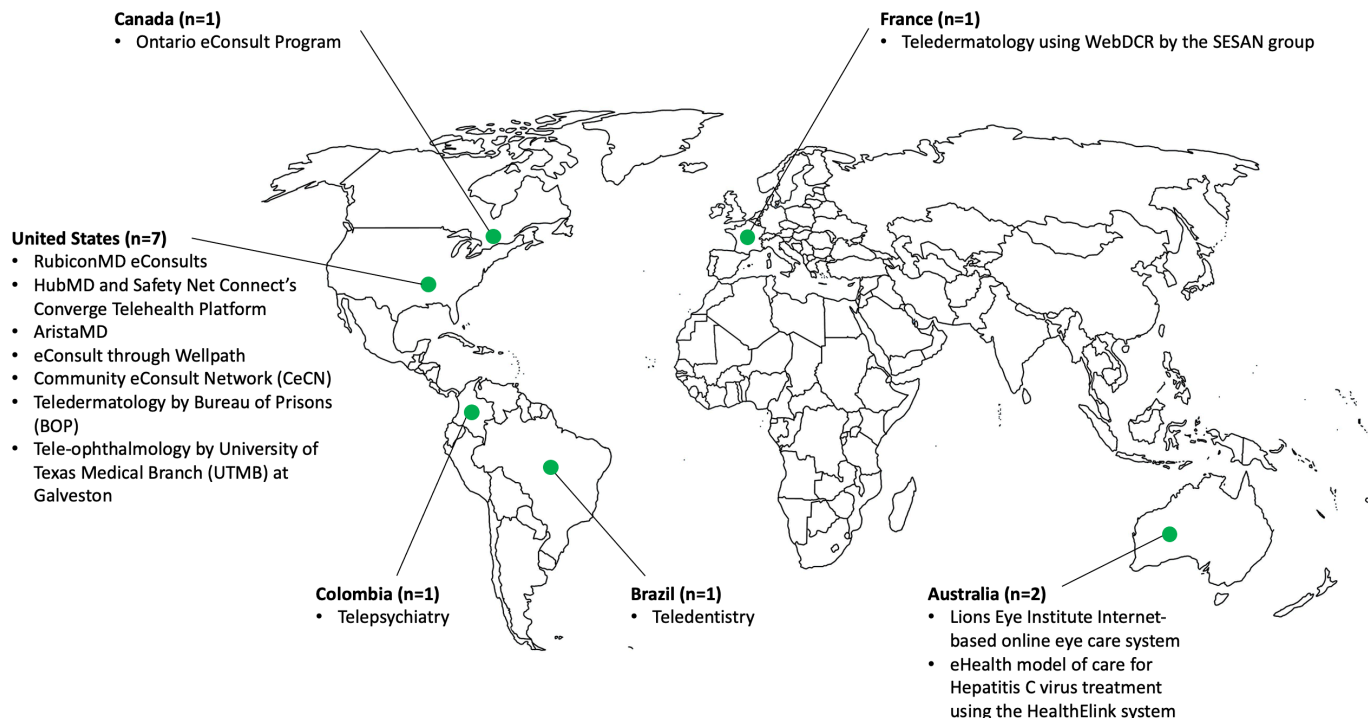


Figure 3 Map of eConsult services used in correctional facilities worldwide.

several resources,^{31–34 37 38 40} much of the data were not from evaluations specific to corrections environments. In the grey literature, preliminary results from evaluation of a unique eConsult service in correctional settings are only available for Ontario eConsult, Federal Bureau of Prisons and the eHealth system for hepatitis C virus treatment.^{33 40 43} Available evidence is summarised under five identified themes: feasibility, cost-effectiveness, access-to-care, provider satisfaction and clinical impact. The main findings of individual studies are summarised in [table 2](#).

Feasibility

Feasibility of eConsult use in correctional settings was evaluated by assessing providers' ability to operate the technology platform and any additional equipment needed, amount of human resources required, number of encounters initiated, time spent by each provider on the platform, quality of images captured (where appropriate), accuracy of diagnoses and quality of the assessment/information provided via eConsult. These outcome measures were assessed in nine studies.^{10 24–28 30 33 43} eConsult was shown to be feasible in correctional facilities, with minimal time required by providers in the facilities to initiate an encounter and high-quality advice and accurate diagnoses provided by specialists. Gavigan *et al* showed there is high agreement between dermatological diagnoses provided following in-person assessment versus eConsult assessment.²⁶ Similarly, there is high agreement between traditional in-person dental examinations and asynchronous teledentistry examinations.²⁸ In another study, the authors reported that dermatologists spent an average of 8 min per case and responded to 10 consultations per week.²⁷ However, the teledentistry study reported some

challenges related to obtaining images, including poor lighting of certain areas and time-consuming training to produce good quality dentistry photographs.²⁸

Cost-effectiveness

A commonly studied outcome measure was cost-effectiveness (n=6).^{10 23 24 29 30 42} It was specifically examined in some articles via annual transports avoided, annual appointment costs avoided and investment and operating costs of the eConsult equipment (some eConsult services required additional equipment in the correctional facility, such as imaging instruments). Many of these studies were conducted using hypothetical or simulation models. eConsult was found to be cost-effective in all six studies, as it decreases the cost of care and reduces transport of offenders outside of correctional facilities. Cusack *et al* found that the cost savings from 'store-and-forward' (ie, asynchronous) consultation outweigh implementation costs.⁴² A simulation study modelled the hypothetical use of eConsult for ophthalmology, which highlighted the effectiveness of diabetic retinopathy diagnoses, cost savings and timeliness of the response (<24 hours) as some of the main benefits. The authors of the study demonstrated that teleophthalmology costs less for each quality-adjusted life year (QALY) gained compared with non-teleophthalmology (US\$882/QALY vs US\$947/QALY, respectively).²³ Another simulation study discussed lower associated costs with store-and-forward models.²⁹ Using a store-and-forward telehealth model, 411 000 transports between correctional facilities and physician offices in the USA could be avoided annually, resulting in an annual cost avoided of US\$162 million. However, it should be noted that a hybrid store-and-forward/real-time

Table 2 Service descriptions and their impact

Citation	Loc*	Service description	Service type	Main findings
Harity. ⁴³ An eHealth model of care in the management of chronic disease: Chronic hepatitis C infection.	AU	The HEALTHeLINK system provides asynchronous communication and records sharing between primary care providers (PCPs), allied health, patients and hepatitis specialists.	Single specialty: hepatitis C virus (HCV).	Five nurses and six medical officers within three prison systems initiated 77 patient with HCV assessments. Those treated through the eHealth model vs current standard showed non-significant differences in proportion who achieved sustained virological response 12 weeks post-treatment. Adherence to guideline-based care was significantly higher in the eHealth model. The model was acceptable and displayed good usability for most users (specialists, general practitioners and patients).
Yogesan <i>et al.</i> ¹⁰ (2001) Online eye care in prisons in Western Australia.	AU	Internet-based eye care system used to store and transmit prisoners' medical and ophthalmic history, visual acuity, intraocular pressure and digital images of the retina and eye to ophthalmologists. Responses arrive in 24 hours.	Single specialty: ophthalmology.	Data from 11 patients were successfully transmitted and the ophthalmologist replied within 24 hours. Only one of six scheduled in-person appointments was still needed after the consultation, the specialist made one surgical referral, and the remaining patients were given appropriate medications if necessary. There was a cost saving of \$4440 per consultation.
Morosini <i>et al.</i> ²⁸ (2014) Performance of distant diagnosis of dental caries by teledentistry in juvenile offenders.	BR	Allows users to either (1) upload clinical intraoral images to a file-sharing service for download by a distant consultant, or (2) record them on a compact disc and send them to the consultant.	Single specialty: dentistry.	This study found 'strong' to 'almost perfect' agreement between traditional (in-person) and remote examination assessments. This was true of both modes of image transmission. Sensitivity ranged from 48% to 73%, and specificity was either 97% or 98%.
Gavigan <i>et al.</i> ²⁶ (2016) Patterns of skin disease in a sample of the federal prison population: A retrospective chart review.	CA	Secure online platform allowing referring physicians to send patient history and clinical photographs to dermatologists for consultation.†	Single specialty: dermatology.	The three most common dermatological diagnoses made via eConsult (acne, psoriasis and rosacea) are similar to those made through in-person assessment (acne, psoriasis and other superficial mycoses). eConsult is an effective tool for dermatological diagnosis.
Laucius. ³² Ottawa-made platform cuts wait time for consults. (30 July 2018)	CA	Web-based platform offering doctors and nurse practitioners asynchronous communication with specialists via managed specialty groups. Available across Ontario and extended to federal corrections facilities in the province in August 2018.†	Multispecialty.	No data from evaluation in correctional settings are reported. Evaluation in community settings shows high patient satisfaction and acceptability. About two-thirds of queries can be answered without the need for a face-to-face appointment.
SEAMO. ³³ eConsult available at all eight Ontario CSC facilities. (4 July 2019)	CA	Ontario eConsult offers a secure online application facilitating communication between PCPs and specialists. Available province-wide and extended to Correctional Services in 2018.†	Multispecialty.	At least one physician and delegate team was registered at each CSC facility in Ontario. eConsult usage by CSC physicians grew by 333% from the last 100 days of 2018 to first 100 days of 2019. Sixty eConsult requests were sent between 1 January and 30 June 2019. The top three most requested specialties were Dermatology (34%), Cardiology—Electrophysiology (20%) and Haematology (10%).

Continued

Table 2 Continued

Citation	Loc*	Service description	Service type	Main findings
Barrera-Valencia <i>et al.</i> ²⁴ (2017) Cost-effectiveness of Synchronous vs Asynchronous Telepsychiatry in Prison Inmates With Depression.	CO	Asynchronous platform through which patients' clinical information can be sent to a psychiatrist for diagnosis and advice on management/treatment.	Single specialty: psychiatry, specifically depression.	The asynchronous platform and a synchronous patient-to-psychiatrist video conferencing telepsychiatry model used for comparison were both effective in treating depression in prisons. The asynchronous model was significantly more clinically effective ($p < 0.001$). The mean response time of the psychiatrist was 8 hours. On average, the asynchronous modality is most cost-effective.
Bertin <i>et al.</i> ²⁵ (2017) (Tele)dermatology between two French hospitals: Two years of experience).	FR	Secure teledermatology platform (WebDCR) through which medical files and photos are submitted, automatically generating an email sent to the expert centre. Response is provided by PDF file and required within one business day.‡	Single specialty: dermatology.	Teledermatology was used to assess a breadth of pathologies. Photos and information provided by the requester were rated as good quality in 82.8% and 96.1% of cases, respectively. The median response time was 2.9 hours. A definite diagnosis was made for 36.5% of requests, and treatment was proposed in 83.6% of cases. Responses led to requests for examinations in 44.2% of cases. Only 25/231 (10.8%) of cases required an additional consultation with a dermatologist, and 5/231 (2%) required hospitalisation.
Khatibi <i>et al.</i> ²⁷ (2016) (Tele)dermatology in a prison setting: A retrospective study of 500 expert opinions).	FR	Requests for remote advice sent by two internists via e-mail on the secure intranet. Responses were required within a maximum of 5 working days.‡	Single specialty: dermatology.	A breadth of issues were addressed. Of the 500 consultations, 47 led to a treatment based on additional tests requested through the consultation, 11 were to see patients for a follow-up related to their treatment, and 13 consultations by the internist physicians were related to treatment failure or relapse of the disease. The dermatologist spent an average of 8 min per case and responded to 10 consultations per week.
Zarca <i>et al.</i> ³⁰ (2018) Tele-expertise for diagnosis of skin lesions is cost-effective in a prison setting: A retrospective cohort study of 450 patients.	FR	Dermatology tele-expertise network and platform on secure server (SESAN Group, http://www.sesan.fr/), used in eight prison primary care units and two hospital dermatological departments.‡	Single specialty: dermatology.	Median response time was 5.0 days. Requesting providers spent under 7 min making the request in 50% of cases, and dermatologists spent less than 6 min analysing and responding in 50% of cases. 82% of patients had a completed treatment plan (vs 35% when tele-expertise was not used). Only 2.9% of all patients required a later face-to-face appointment or hospitalisation. Service costs became less than the traditional model after 186 cases/year (over eight implementation sites). Tele-expertise was well accepted among physicians with most responders ($n=9/10$) willing to continue using it.
Aoki <i>et al.</i> ²³ (2004) Cost-effectiveness analysis of telemedicine to evaluate diabetic retinopathy in a prison population.	USA	A hypothetical store-and-forward teleophthalmology system in which retinal images are sent to a University of Texas Medical Branch (UTMB) ophthalmologist for diabetic retinopathy screening.	Single specialty: ophthalmology.	This study demonstrates that teleophthalmology is more cost-effective than non-teleophthalmology, increases the number of quality adjusted life years, and reduces the occurrence of retinopathy followed by blindness in patients with type 2 diabetes.
Russell <i>et al.</i> (Tele)medicine Risk Management Considerations. ³¹	USA	Defines telemedicine services as the remote delivery of healthcare services and clinical information using telecommunications technology. The above UTMB service is discussed as an example of use in correctional facilities.	Single specialty: ophthalmology.	Telemedicine is used in prison systems. No primary data are reported. The report cited the above study ²³ and their findings.

Continued

Table 2 Continued

Citation	Loc*	Service description	Service type	Main findings
Cusack <i>et al.</i> The Value of Provider-to-Provider Telehealth Technologies. ⁴²	USA	Describes non-emergent store-and-forward consultation as the collection and storage of clinical data/images by a provider for forwarding to a second provider who interprets and responds at a different time and place.	Multispecialty.	This report identifies associated costs/savings of telehealth use in correctional settings. The cost savings from store-and-forward consultation outweigh implementation costs; however, a hybrid store-and-forward/real-time system was found to be most cost-effective.
Delaware Department of Corrections Introduces Telehealth e-Consults via Connections Community Support Programmes and CeCN. (5 October 2017) ³⁷	USA	A national network (Community eConsult Network) delivering rapid response eConsults to primary care providers in every state and territory.	Multispecialty.	No primary data from correctional settings are reported. Data from community health settings shows that only 31% of eConsults necessitated a face-to-face visit with a specialist. Anecdotally, implementation of eConsult is expected to result in cost savings by reducing offender transportation and associated costs (eg, escort by correctional officers); more timely care; better health outcomes; fewer in-person specialist appointments; and reduced burden on community health systems on re-entry.
Kansas Department of Corrections Proposal #EVT000-6973—Comprehensive Healthcare Services. Kansas Health and Recovery Solutions, PC and Wellpath. (10 January 2020) ³⁹	USA	eConsult; details not specified.	Multispecialty.	No primary data reported. Innovations from Wellpath include use of eConsult to facilitate provision of medical and behavioural healthcare in jails, prisons and other facilities.
Kendig. ⁴⁰ Telehealth Expansion, Correctional Health Connection Newsletter of the Coalition of Correctional Health Authorities. (January 2014)	USA	National telermatology service providing national consultations (eg, evaluation, diagnosis and treatment recommendations) to 118 institutions.	Single specialty: dermatology.	No primary data reported. The brief update states that most telermatology cases can be evaluated with a written clinical history and emailed digital pictures of the rashes alone.
Nash-Wong. ³⁶ Safety Net Connect and HubMD Partner to Expand Timely Access to Virtual Specialty Care for Underserved and Correctional Healthcare Patient Populations. (7 May 2020)	USA	Telehealth platform (converge) integrating eConsult, eReferral and Televisit technology. Built on partnership between two existing organisations (HubMD and Safety Net Connect).	Multispecialty.	No primary data reported. The article states that the platform enables care delivery in the primary care office or medical home, reducing the patient's need to travel. Other cited benefits are increased access to care, improved care coordination, promotion of evidence-based practices and improved quality.

Continued

Table 2 Continued

Citation	Loc*	Service description	Service type	Main findings
Pan <i>et al.</i> ²⁹ (2008) The value of provider-to-provider telehealth.	USA	Computer simulation comparing store-and-forward, real-time video and hybrid telehealth models for (1) correctional facilities to emergency departments and (2) correctional facilities to physician offices.	Not specified.	Using a store-and-forward model, an estimated 411 000 transports between correctional facilities to physician offices can be avoided annually, resulting in an annual cost avoided of US\$162 000 000. With initial investment and annual costs, the national net benefit to correctional facilities would be US\$3.33 billion annually once in steady state. Of the three models, the hybrid model was found to be the most cost-effective.
Introcaso <i>et al.</i> ³⁸ Perspective on teledermatology's present and future. (December 2018)	USA	A store-and-forward telehealth platform (AristaMD) allowing consultation through secure messaging. Responses requested within 24 hours.	Multispecialty; single specialty discussed: dermatology.	No evaluation data are reported. The interviewed physician stated that teledermatology addresses barriers of access, including patient's financial resources, geographical location, lack of health insurance, transportation, time off from work and childcare. They also identify the educational value of teledermatology.
Centre for Healthcare Strategies. RubiconMD. (updated July 2018) ³⁴	USA	Web-based eConsult service. Includes several EMR integrations and HIPAA-compliant mobile applications.	Multispecialty.	No primary data reported. Article cites the following results: over 75% of cases (across various care settings) have resulted in improved care plans and 84% of eConsults receive responses in under 4 hours.
RubiconMD Who We Serve. (2020) ³⁵	USA	As described above.	Multispecialty.	No primary data reported. Impact of eConsult in corrections is described: it enables timely access to quality specialists, allowing for on-site treatment, resulting in improved patient care and reduced costs.
The Florida Senate Committee on Criminal Justice. Use of Telemedicine in Inmate Healthcare. (September 2011) ⁴¹	USA	Defines store-and-forward telemedicine as clinical information being obtained at one site and uploaded and stored on a remote server until downloaded for review by a specialist at another location.	Multispecialty.	No primary data are reported. The Brief outlines current use of telemedicine in inmate healthcare across the USA, benefits of its use, and drawbacks. It identifies Florida as the only one of the 10 largest US state correctional systems that does not use telemedicine. Benefits cited include increased access to specialists, reduced transportation, reduced security risk, cost savings and more timely provision of care. Primary concerns of use are data transfer speeds (not applicable for asynchronous models), equipment and infrastructure needs, and quality of the clinical experience.

*Location: AU=Australia; BR=Brazil; CA=Canada; CO=Colombia; FR=France; USA=United States of America.

†The literature from Canada discussed a teledermatology service, the Champlain BASE eConsult service, and the Ontario eConsult Program. These services are now combined under Ontario eConsult.

‡The literature from France discussed a dermatology tele-expertise network offered through a teledermatology platform, secure intranet and tele-expertise platform. These studies were describing the same teledermatology service using WebDCR by the SESAN group.

CSC, Correctional Services Canada.

video model was found to be the most cost-effective, as additional transports could be avoided.^{29 42}

Reimbursement and funding are also important considerations when discussing cost-effectiveness. Reimbursement was discussed in two studies,^{10 23} with variations in different countries. Only one study discussed funding for eConsult.³⁰ Zarca *et al.* indicated that their teledermatology service was funded by the Paris Regional Health Agency.³⁰

Access-to-care

Access-to-care was assessed in five studies based on the specialists' response time and breadth of specialities available.^{10 24 25 30 33} eConsult was found to improve access to care through timely diagnosis and treatment. From the five studies, the median specialist response time to answer the eConsult question ranged from 2.9 hours to 5 days. The multispecialty eConsult service specified that the top three most accessed specialty groups were dermatology, cardiology and haematology.³³

Provider satisfaction

Two studies examined providers' satisfaction with eConsult and it was found to be high.^{30 43} Satisfaction was measured 6 months post-intervention with 90% of physicians willing to continue using eConsult.³⁰ In the other study, specialists and general practitioners reported high usability and acceptability of an eHealth model of care that included eConsult. It was noted that nurses reported suboptimal usability and lower acceptability scores of the entire eHealth model, but the majority of nurses rated the specialist consultation (ie, eConsult) component as useful or very useful.⁴³

Clinical impact

Several articles (n=6) reported on the clinical results of the eConsult, such as the number or proportion of eConsult cases with a diagnosis provided, request for additional assessments/tests made, advice provided, treatment plans recommended and face-to-face visit still needed or recommended.^{10 23–25 30 43} In one study, the proportion of patients with a completed treatment plan was 82% compared with only 35% when eConsult was not used.³⁰ Another study reported that adherence to guideline-based care was significantly higher in those using eConsult compared with the standard-of-care.⁴³ Finally, eConsult resulted in reduced need for appointments, as only one of six scheduled in-person appointments was still needed after the consultation.¹⁰

DISCUSSION

This scoping review identified 13 unique eConsult services used in correctional facilities across six countries, including Canada.^{26 32 33} Findings from the academic and grey literature searches were consistent, in that they are overwhelmingly positive and support use of eConsult in the correctional setting. Comparisons between

synchronous and asynchronous models supported the use of asynchronous eConsult-type communication for correctional facilities.^{24 29} While eConsult is currently operating in many correctional facilities, most offer access to a single specialty group only, suggesting that expansion of multispecialty eConsult services could improve offenders' access-to-care.

eConsult was shown to be feasible and effective in corrections facilities. Several consistent benefits were reported in the literature. Primarily, eConsult improves access to specialist advice for offenders, allowing for timely diagnosis, management and treatment. Furthermore, eConsult significantly reduces costs of care through avoided transportation of offenders outside of the facility for in-person appointments that are often no longer needed. This also improves safety for offenders, guards accompanying offenders to appointments, providers and the public.³¹ eConsult has high provider satisfaction and allows for provision of high-quality specialist advice. Likewise, the timeliness of advice received through eConsult was highlighted as a key benefit, with consistent evidence of a median response time of less than 5 days. This is particularly important for offenders, who are in most cases incarcerated for only a short time.³⁰ Notably, the median length of incarceration in Canada is less than 1 month,⁴⁴ while the average wait time for patients to see a specialist in-person is 5.2 months.⁴⁵ As a result, many offenders may not receive an appointment until after they have re-entered the community, increasing the likelihood of missed visits and poor continuity of care, and further exacerbating the poor health outcomes associated with this group.⁶ eConsult allows many of these patients to receive specialist-informed care on a shorter timeline, thereby improving the quality and equity of healthcare for offenders and reducing the risks of care disruption. Similar results have been reported in related literature reviews⁴⁶ and ongoing studies.⁴³

Though evidence in the academic literature is highly favourable of eConsult in correctional settings, some potential challenges for implementation have been identified in commentaries, including regulatory issues, start-up costs, administrative support, training and technical difficulties.^{47–49} For example, Fletcher discussed the difficulties of receiving adequate funding in correctional facilities for start-up costs, such as purchasing basic equipment and improving telecommunication networks.⁴⁷ The academic literature reported limitations of eConsult involving time-consuming training, costs of high data-transfer speeds, and any necessary equipment or required infrastructure. However, the tone in the literature suggests these challenges are surmountable and outweighed by the benefits that have been previously mentioned. For example, despite the concerns noted in the teledentistry study, there was high agreement between in-person and remote examination assessments, suggesting that eConsult is feasible and does not compromise clinical examination.²⁸ Although there are some concerns regarding the quality of clinical experience,⁴¹ studies on eConsult have shown



that in-screen interpretation is as reliable as hard copy interpretation, given proper equipment and training.⁵⁰ Furthermore, start-up costs will vary in different regions based on the presence of pre-existing technical infrastructure that meets security and privacy requirements.⁵¹ In our region, registration and ability to use the Champlain BASE eConsult Service requires minimal training.⁵² Start-up costs are low due to the presence of pre-existing technical infrastructure for the service and the lack of additional equipment required, such as specialised video equipment, beyond an internet-enabled device.⁵¹

The methodology employed for this scoping review was rigorous and transparent. To our knowledge, our review is the first to focus on asynchronous, provider-to-provider communication in correctional facilities, as others have primarily examined synchronous models⁵³ or those providing patient-to-provider communication.⁴⁶ Another aspect of its novelty is the examination of the academic and grey literature across a broad scope (worldwide). However, we recognise some limitations. The grey literature search results were compiled from publicly available online resources, which included limited evaluation of the identified eConsult services in correctional settings at the time the search was conducted. We did not follow-up with institutions to find more data supporting their use. Furthermore, we only searched the government websites of four countries, which was a convenience sample suggested by our CSC stakeholders. Given the increasing attention to telemedicine and digital health services during the COVID-19 pandemic, we also recognise there will be value in conducting an updated search in coming years to include literature published after July 2020. Regardless, this scoping review presents an overview of existing literature and evidence on the topic, which will be useful to healthcare administrators, policy-makers, eConsult providers, clinicians providing care in correctional facilities, offenders living in these facilities and their advocates.

Although this review identified promising evidence supporting eConsult use in correctional facilities, there remain several aspects requiring further evaluation. While some studies discussed patient satisfaction,^{24 43} data supporting these findings are limited due to low-response rates and should be examined in more detail. Cost-effectiveness should also be studied in more detail, as most of these findings from the academic literature were based on simulation and modelling studies rather than from the implementation of eConsult. As the majority of offenders with access to eConsult are adult men, an assessment of the unique challenges facing women, youth or transgender offenders is warranted. In addition to these topics, future research should more closely examine individual eConsult services established in correctional settings to identify key enablers, considerations and barriers for implementation, in addition to those previously identified in the literature.^{47 48} These should be considered in individual jurisdictions by service providers and addressed prior to full-service implementation.

Reviews of the health of offenders in Canada, USA, Australia and several other countries have demonstrated a gap in the research on this population.^{54 55} This may be due to the ethical challenges associated with the collection of health data for corrections populations, including power differentials between offenders and staff in correctional facilities as well as researchers; maintaining the safety and security of both researchers and offenders; obtaining voluntary participation in research; protecting the privacy of offenders; and confidentiality of their personal information.⁵⁶ Additionally, many offenders have mental illnesses;^{46 54} researchers must be aware of the consequences, such as the stigma, for those participating in mental health research.⁵⁷ These considerations should be accounted for when planning future research involving this population.

Results of this scoping review will inform discussions between CSC and the Ontario eConsult Centre of Excellence about potential expansion of Ontario eConsult to correctional facilities across Canada. Our team is planning to conduct interviews with an interdisciplinary team of healthcare administrators, senior leadership, physicians, nurses and pharmacists from CSC involved in an ongoing pilot of Ontario eConsult in 13 facilities in Ontario to identify enablers and barriers specific to their sites. Learnings from those interviews will inform future implementation.

CONCLUSION

The existing evidence suggests that the use of eConsult in correctional facilities is feasible and beneficial, as it improves timely access to specialist advice for offenders, reduces the cost-of-care and avoids unnecessary transportation and security issues. To fill gaps in the current literature, future research should continue to assess patient satisfaction and cost-effectiveness; study the unique challenges faced by women, youth and transgender offenders and the unique benefits eConsult may offer these populations; and identify enablers and barriers to implementation of individual services. This information would better support organisations that may be interested in implementing eConsult in these specific contexts. Despite these gaps in our current knowledge, it is clear that eConsult will be an important tool for providing high quality, timely healthcare to offenders; thus, it should be a priority for decision makers and advocates to implement a nationwide service in correctional facilities across Canada, and in other jurisdictions worldwide.

ORIGINAL PROTOCOL FOR THE STUDY

The original unpublished protocol for this study is included as a supplementary file (online supplemental appendix D).

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