

CADTH Health Technology Review

# eConsult for Provider-to- Provider Consultation

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## Abbreviations

<b>eConsult</b>	electronic consultation
<b>PCP</b>	primary care provide
<b>PHI</b>	protected health information
<b>EMR</b>	electronic medical records

## Key Messages

- The main cost considerations related to electric consultation (eConsult) can be grouped as start-up or infrastructure costs (e.g., equipment, developing electronic forms, creating workflows, and web page design), remunerations, (e.g., for primary care providers, specialist, and auxiliary staff), and societal cost (e.g., productivity loss, time spent travelling, cost of fuel to travel).
- Considerations for a successful integration of eConsult models into clinical workflows may be broadly categorized into pre-implementation factors (e.g., appropriate training for staff, anticipating and addressing potential barriers or concerns, and having contingency plans for technological failures), implementation factors (e.g., ensuring availability of appropriate data collection and processing devices and software, defining appropriateness of eConsult, building efficiency into the design by using standardized data capture forms, maximizing auto-populating data fields to reduce documentation time, ensuring appropriate confidential documentation, and emphasizing critical information).
- There were limitations in that no papers were identified to address the questions regarding ethical and professional considerations for the collection, use, and disclosure of protected health information, or the strengths and limitations of a standalone eConsult versus an eConsult platform integrated within an electronic medical records system. Furthermore, although the included studies contained some useful answers, they were not designed to address any of the research questions. Thus, well-designed studies focusing on the individual questions may be necessary for more comprehensive answers.

## Research Questions

1. What ethical and professional considerations should be accounted for in the collection, use, and disclosure of protected health information (PHI) in an electric consultation (eConsult) framework?
2. What are the necessary cost considerations to ensure the sustainability of an eConsult program?
3. What are the strengths and limitations of eConsult as a standalone platform relative to one that is integrated within an electronic medical records (EMR) system?
4. What considerations are required for the successful integration of eConsult models into clinical workflows?

## Background

The mismatch between supply and demand for specialty services presents a barrier to access to specialty care, especially for rural or urban populations considered to be at a disadvantage.<sup>1</sup> Challenges include making and attending appointments, prolonged wait times, transportation difficulties, and burden to patients from additional visits.<sup>1</sup> According to a 2018 publication, Canada placed last among 11 participating countries in a Commonwealth Fund survey that assessed patient access to care.<sup>2</sup> Since 2010, 56% of patients in Canada wait at least 4 weeks to see a specialist, compared with an average 36% for the Commonwealth

Fund.<sup>3</sup> Poor access to care — which includes prolonged waiting — can cause anxiety for patients and their families, can increase pain, and can affect a patient's ability to carry out daily activities, leading to a deterioration in overall quality of health.<sup>2,4</sup> Delayed access to care by specialists can result in delayed diagnosis and duplication of services, causing frustration for patients and dissatisfaction among primary care clinicians.<sup>2</sup> The use of specialist consultation by primary care providers (PCPs) to seek expert opinions in real time on specific care questions may help improve access; however, it is often hindered by patient and physician scheduling conflicts.<sup>1</sup> Therefore, eConsult has emerged as an innovation designed to improve access to specialist care.

eConsult (also called store-and-forward electronic consultation), is an asynchronous approach to telehealth where a PCP can request that a specialist review and offer a recommendation for a clinical inquiry. eConsult, real-time or synchronous telemedicine, and remote patient monitoring form the 3 main types of telemedicine.<sup>5</sup> The primary goals of an eConsult system are threefold: to provide short-term diagnostic and therapeutic advice to PCPs and patients when circumstances do not require a face-to-face consultation with the specialist, to prepare patients for in-person visits by arranging for completion of tests in advance, and to provide PCPs and specialists interaction to support chronic disease management.<sup>6</sup>

Reported benefits of eConsult include increased access to specialty clinics and reduced turnaround time for a consult, enhanced overall quality of care, increased satisfaction to patients and providers, reduced patient travel costs, improved provider productivity, opportunity for PCP education through eConsult exchange, and improved physician-to-physician communication.<sup>1-6</sup> However, some barriers to the uptake and scaling up of eConsults have been described; these included absence of a defined appropriate use of eConsults, increased health care expenditures if eConsult does not result in a significant decrease or avoidance of in-person visits, care fragmentation, inadequate communication between clinicians, privacy and security concerns, lack of established business models, and difficulty in billing.<sup>1,7,8</sup>

The aim of this report is to summarize the evidence about eConsults regarding considerations for (1) the collection, use, and disclosure of PHI, (2) necessary cost to ensure sustainability, (3) strengths and limitations of standalone versus integrated platforms, and (4) factors for successfully integrating eConsult models into clinical workflows.

## Methods

### Literature Search Methods

An iterative set of targeted literature searches was conducted in April 2020 and May 2020 by an information specialist in Medline, as well as a focused internet search. The search strategies were comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were virtual consults, primary care providers, and specialists. These concepts were then combined with either: costs, ethics/privacy, workflows, or electronic health records. The initial searches were limited to English-language documents published between January 1, 2010, and the

original search dates. For the current report, database and internet searches were rerun on September 8, 2021, to capture any articles published since the initial search dates.

## Selection Criteria and Methods

The study selection was done in 2 phases. In the first level of screening, titles and abstracts were reviewed and potentially relevant full-text articles were retrieved and assessed for inclusion. Two reviewers screened citations and selected studies. The final selection of full-text articles was based on the availability of relevant pieces of information to answer any of the research questions. One reviewer extracted data and summarized relevant information into tables. No critical appraisal was performed. Papers that did not provide a specific answer to any of the research questions were excluded.

## Summary of Evidence

### Quantity of Research Available

A total of 235 citations were identified in the literature search. Following screening of titles and abstracts, 145 citations were excluded and 90 potentially relevant reports from the electronic search were retrieved for full-text review. Two potentially relevant publications were retrieved from the grey literature search for full-text review. Of these 92 potentially relevant articles, 81 publications were excluded for various reasons, and 11 publications with relevant information to answer any of the research questions were included in this report. These comprised 6 cost evaluation studies and 5 nonrandomized studies with information on considerations for the successful integration of eConsult models into clinical workflows.

### Summary of Findings

#### Q1. What ethical and professional considerations should be accounted for in the collection, use, and disclosure of PHI in an eConsult framework?

No study was identified that provided relevant information regarding the ethical and professional considerations for the collection, use, and disclosure of PHI in an eConsult framework; therefore, no summary can be provided.

#### Q2. What are the necessary cost considerations to ensure the sustainability of an eConsult program?

A summary of the characteristics and conclusions of the 6 studies contributing relevant information about cost considerations to ensure the sustainability of an eConsult program is presented in [Table 1](#).

#### Q3. What are the strengths and limitations of eConsult as a standalone platform relative to one that is integrated within an EMR system?

No study was identified that provided relevant information regarding the strengths and limitations of eConsult as a standalone platform relative to one that is integrated within an EMR system; therefore, no summary can be provided.

**Table 1: Characteristics of Included Studies With Information on Cost Considerations to Ensure the Sustainability of an eConsult Program**

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Cost factors considered	Results, authors' conclusion, summary
Vidal-Alaball et al. (2018) <sup>5</sup> Spain	A cost saving analysis comparing teledermatology with face-to-face dermatology visits in the county of Bages in 2016	PCPs (n = NR) from 14 primary care facilities	Dermatologists (n = NR)	The economic impact of asynchronous telemedicine services compared with the cost of traditional outpatient consultations	<ul style="list-style-type: none"> <li>• Equipment</li> <li>• Staff cost (e.g., PCP and dermatologists' rates)</li> <li>• Number of dermatology visits</li> <li>• Societal (e.g., productivity loss, time spent travelling, cost of fuel to travel)</li> </ul>	"The results of this study show that using teledermatology instead of face-to-face dermatology consultations can save 51,164 € per year (11.4 € per patient visited) in the county of Bages. Most savings were societal (40,814 € per year). When removing societal costs, the savings amounted to 10,350 € per year." <sup>5</sup> p.6
Liddy et al. (2017) <sup>9</sup> Canada	A cross-sectional study and cost analysis of all eConsult cases submitted from Nunavut through the Champlain BASE eConsult Service between August 2014 and April 2016	15 PCPs (all family physicians) from Nunavut	55 specialists available through the Champlain BASE eConsult Service	Total societal costs and savings associated with the Champlain BASE eConsult Service	Direct costs included: <ul style="list-style-type: none"> <li>• delivery costs (e.g., for supporting and operating the eConsult service)</li> <li>• consultation-specific costs (e.g., specialist remuneration for answering eConsults as well as staff time for assigning cases to specific specialists),</li> <li>• added referral costs (e.g., costs for eConsults where the PCP was not originally contemplating a referral, but initiated one because of eConsult)</li> <li>• patient travel costs (estimated based on the cost of a flight from the</li> </ul>	eConsultation services were provided for at least 11 conditions. The most referred to specialties were dermatology (16%), cardiology (8%), endocrinology (7%), otolaryngology (7%), and obstetrics/gynecology (7%).  "We provide evidence that widescale implementation of e-consult in Canada's north would greatly improve access to specialists, improve the provider experience of care, reduce health system costs and potentially have a tremendous positive impact on quality of patient care beyond access. There is an urgency to move forward with enabling policies, provider engagement, partnerships with government and commitment to implementation." <sup>9</sup> p. 6

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Cost factors considered	Results, authors' conclusion, summary
					PCP's town in Nunavut to Ottawa and back)	
Liddy et al. (2016) <sup>4</sup> Canada	A costing evaluation of all eConsults in the Champlain health region of Eastern Ontario, Canada, submitted between April 1, 2014, and March 31, 2015, from the societal perspective	Referrals originated from PCPs (n = NR) practicing in rural areas	Specialists from 44 different specialty groups	Net potential societal cost savings associated with the Champlain BASE eConsult Service	<ul style="list-style-type: none"> <li>• Delivery costs</li> <li>• Specialist remuneration</li> <li>• Costs associated with face-to-face (traditional) referrals initiated due to of eConsult</li> </ul> Potential savings included: <ul style="list-style-type: none"> <li>• costs of traditional referrals avoided</li> <li>• indirect patient savings through avoided travel and lost wages and productivity</li> </ul>	A total of 3,487 eConsults were completed, 40% of which led to avoiding originally contemplated face-to-face specialist visit. eConsult led to a net societal saving of \$38,729, or \$11 per eConsult.  "Our findings suggest that eConsult services have the potential to lower the costs for the healthcare system and make care more affordable for patients by reducing indirect costs of care. Patient-centred health services should consider incorporating eConsult services into their practices in order to reduce the economic burden of care." <sup>4</sup> p.6
Liddy et al. (2016) <sup>10</sup> Canada	Simulated cost implication studies of different remuneration models for specialists' pay for eConsults in Canada, based on Champlain BASE eConsult data	Not specified	68 specialists from 43 different specialty groups	Specialists' remuneration in eConsults in Canada, using different models	<ul style="list-style-type: none"> <li>• Prorated hourly rate model (e.g., the Champlain BASE eConsult Service uses \$200.00 per hour prorated to length of time)</li> <li>• Incentive model (i.e., prorated plus bonus for time to complete eConsult: \$10.00 and \$5.00 for within 24 and 48 hours, respectively)</li> <li>• Fee-for-service (Billing code) model (uses flat fee per eConsult, regardless</li> </ul>	3,670 eConsults (i.e., 97.2% of the total submitted between April 1, 2014, and March 31, 2015) were included in the analyses. The specialist response time – median (IQR) = 0.78 (IQR: 0.153.2) days  Mean (SD) = 2.2 (3.1) days. Most (67.5%) eConsults in the incentive remuneration model were completed within 1 day (56.2%) or 2 days (11.4%).  The average specialist cost per eConsult under the different models were: <ul style="list-style-type: none"> <li>• prorated hourly rate = \$45.72</li> </ul>

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Cost factors considered	Results, authors' conclusion, summary
					<p>of duration to complete eConsult; e.g., \$44.50 for specialist and \$16.00 for PCP in Ontario)</p> <ul style="list-style-type: none"> <li>• Flat weekly fee (based on a set total time, or a minimum duration with the option to increase based on volume, blocked for eConsult)</li> </ul>	<ul style="list-style-type: none"> <li>• incentive model = \$51.90</li> <li>• fee-for-service = \$40.50 (\$60.50 overall, adding the accompanying PCP remuneration)</li> <li>• flat weekly fee = \$337.00 for a set block of 3 hours per week or \$133.41 using the 1-hour increments method, assuming at least \$200 per week.</li> </ul> <p>The findings suggest that the prorated hourly rate model is associated with the lowest average cost per eConsult, whereas the flat weekly fees model has the highest cost per eConsult. Based on specialist remuneration alone, the fee-for-service model led to a lower cost than the prorated hourly rate model; however, the accompanying PCP remuneration makes the overall cost higher. The incentive model had the fastest time to complete eConsults. Thus, where promptness of response is a priority, that model may be a reasonable choice though it raises the expenditure.</p> <p>“While these results are based on a Canadian healthcare system and the current workflow of the Champlain BASE eConsult, our findings can inform policymakers considering the implementation of an eConsult service, or those wishing to further develop</p>

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Cost factors considered	Results, authors' conclusion, summary
						an existing platform. In a different healthcare context where universal healthcare coverage is not offered, other remuneration models beyond the scope of the Champlain BASE eConsult data may be of interest. Future research should explore payment models for eConsult in other healthcare contexts and their impact on quality and outcome." <sup>10</sup> p.8
Liddy et al. (2015) <sup>11</sup> Canada	Costing evaluation, with a break-even analysis, of all eConsults in the Champlain health region of Eastern Ontario, Canada, submitted between April 1, 2011, and March 31, 2014, from the payer's perspective	235 PCPs	27 different specialty groups	Direct and variable costs associated with the Champlain BASE eConsult Service, and the number of eConsults needed for it to break even	<p>Direct costs:</p> <ul style="list-style-type: none"> <li>• Start-up costs (e.g., cost to develop the electronic forms, workflows, and web page design)</li> </ul> <p>Variable costs:</p> <ul style="list-style-type: none"> <li>• Delivery costs (e.g., setup and registration, support, and administration costs)</li> <li>• Consultation-specific costs (e.g., payments made to specialists and costs for staff to direct each eConsult to the appropriate specialist)</li> </ul>	<p>eConsults were completed for a total of 2,606 cases over the study period. Most frequent eConsults were in dermatology (17.7%), endocrinology (9.9%), neurology (9.1%), hematology (8.6%), obstetrics/gynecology (7.4%), and cardiology (7.3%). eConsults resulted in avoiding originally planned face-to-face specialist visits in 40.3% (n = 1,051) of cases processed.</p> <p>"We showed a marked decrease in the cost per eConsult over each annual period with a projected break-even point at 7,818 cases. Future research is needed to identify and examine similar outcomes that may lead to cost savings, as well as patient and provider perspectives on eConsult and evaluate the program's effect on quality-of-care outcomes."<sup>11</sup> p.73</p>

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Cost factors considered	Results, authors' conclusion, summary
Butler and Yellowlees (2012) <sup>12</sup> US	A retrospective cost analysis comparing ATP with STP and traditional in-person psychiatric consultations in the primary care setting	PCPs at a rural community clinic in California	Psychiatrist at a university hospital in California	Fixed and variable costs of providing the psychiatric services using ATP, STP, or traditional psychiatric consultations	Fixed costs: <ul style="list-style-type: none"> <li>• Infrastructure costs (e.g., laptops, video equipment, software, and hardware)</li> <li>• Development costs for the web-based consultation software</li> <li>• Provider training costs</li> </ul> Variable costs: <ul style="list-style-type: none"> <li>• Labour costs (e.g., for consultation by psychiatrist, PCP, and auxiliary staff)</li> </ul>	“The marginal costs of the ATP, STP, and in-person models were \$68.18, \$107.50, and \$96.36, respectively... STP was the most expensive model in terms of both fixed costs and marginal cost. ATP had intermediate fixed costs and the lowest marginal cost. In-person consultations had the lowest fixed costs and intermediate marginal cost. The break-even point between the ATP and in-person models was 249 patient encounters.” p.75  “The results of this study provide early evidence that the ATP consultation model delivers care at lower marginal cost than either STP or traditional in-person consultations from the perspective of the healthcare system. If these data are reproducible, it follows that wider adoption of ATP-like models could lead to less costly delivery of healthcare.” <sup>12</sup> p.76

ATP = asynchronous telepsychiatry; BASE eConsult = Building Access to Specialists through eConsultation; IQR = interquartile range; NR = not reported; PCP = primary care provider; SD = standard deviation; STP = synchronous telepsychiatry.

#### **Q4. What considerations are required for the successful integration of eConsult models into clinical workflows?**

A summary of the characteristics and conclusions of the 6 studies that contribute relevant information about considerations for the successful integration of eConsult models into clinical workflows is presented in [Table 2](#).

**Table 2: Characteristics of Included Studies With Information on Considerations for the Successful Integration of eConsult Models into Clinical Workflows**

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Factors considered or identified	Results, authors' conclusion, summary
Anderson et al. (2021) <sup>13</sup> US	A qualitative study in the VA New England Healthcare System using qualitative content analysis of semi-structured interviews to identify and describe salient categories. The study was conducted from October 2018 to September 2019.	35 PCP from 6 medical centres in a VISN in the US. They included 3 large urban sites and 3 rural sites	38 specialty care providers from all 6 participating VISN sites to represent 3 high-volume medical subspecialties (cardiology, neurology, and pulmonology)	The feasibility and acceptability of implementing the upscaling of decentralized eConsult delivery into a centralized (hub-and-spoke) model on a VISN level	<p>Potential benefits:</p> <ul style="list-style-type: none"> <li>Expanded access to specialist expertise</li> <li>Increased timeliness of eConsult responses</li> </ul> <p>Potential barriers or concerns:</p> <ul style="list-style-type: none"> <li>Differences in resource availability and management styles between sites</li> <li>Anticipated disruption to working relationships</li> <li>Lack of incentives for central eConsultants</li> <li>Dedicated staff's burnout and fatigue</li> <li>Technological challenges</li> <li>Lack of motivation for change</li> </ul>	<p>Interviewees acknowledged the following prospect, using the centralized eConsult model:</p> <ul style="list-style-type: none"> <li>Site with unavailable or understaffed specialists could access need specialties care</li> <li>Benefit specialists in need of advice of other specialists with expertise in niche areas (e.g., neurosurgery, pulmonary hypertension)</li> <li>Potential to capitalize on specialty services across different sites by leveraging access to highly specialized clinical expertise of certain specialists to other facilities beyond their local base</li> <li>Provision of more detailed and efficient responses by reserving time to answer eConsults</li> </ul> <p>Perceived barriers included:</p> <ul style="list-style-type: none"> <li>Actively drawing on specialists at well-resourced sites to staff the "hub," whereas the low-resource sites would be the primary beneficiaries</li> <li>Uncertainty about consultants' knowledge of care processes</li> </ul>

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Factors considered or identified	Results, authors' conclusion, summary
						<p>and resources to implement recommendations at less complex facilities</p> <ul style="list-style-type: none"> <li>• Potential for the model to have an effect on established local relationships between clinicians, and between clinicians and patients, which could impact tone and content of advice or care</li> <li>• Potential to undermine the motivation to provide high-quality, detailed eConsult responses to prevent a face-to-face referral to specialist's service</li> <li>• Specialists feared that a centralized eConsult might have a lower threshold to recommend a face-to-face visit, potentially leading to an increase in local clinic volume</li> <li>• Concern about risk for burnout or fatigue if the central eConsultants were not provided with sufficient work credit or protected time. Also, a duty to answer eConsults as one's main or sole clinical responsibility would be monotonous and taxing</li> </ul> <p>"Based on a case study from one of the largest integrated healthcare</p>

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Factors considered or identified	Results, authors' conclusion, summary
						<p>systems in the United States, our work identifies novel concerns and offers insights for healthcare organizations contemplating a scale-up of their e-consult systems." "Scaling up e-consults in line with the hub-and-spoke model may help pave the way for a centralized and efficient approach to care delivery, but the success of this transformation will depend on healthcare systems' ability to evaluate and address barriers to leveraging economies of scale for e-consults."<sup>13</sup> p.2165</p>
<p>Rankine et al. (2021)<sup>14</sup> US</p>	<p>An iterative user-centred design and evaluation process for the development of an eConsultation system, with target users from a research network of primary care practices and the Division of Adolescent and Young Adult Medicine of a university medical centre in Pittsburgh</p>	<p>12 general pediatricians</p>	<p>12 adolescent medicine specialists</p>	<p>User feedback on the usefulness and usability of eConsultations for adolescents and young adult patients</p>	<p>The following 4 considerations were proposed for efficiency in usability:</p> <ul style="list-style-type: none"> <li>• Reducing documentation time by avoiding redundancy, minimizing free-text entry, and using drop-down menus</li> <li>• Organizational changes to emphasize critical information, including prompting for the specific consult question at the beginning of the templated note</li> <li>• Maximizing the use of auto-populated data fields</li> </ul>	<p>"Through an iterative user-centered design process, we identified user perspectives to guide the refinement of an e-consultation system based on general pediatrician and adolescent medicine specialist feedback on usefulness and usability related to the care of AYAs. Qualitative analysis of this feedback revealed both opportunities and risks related to confidentiality, communication, and the use of tailored documentation prompts that should be considered in the development and use of e-consultations with AYAs."<sup>14</sup> p. 1</p>

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Factors considered or identified	Results, authors' conclusion, summary
					<ul style="list-style-type: none"> <li>• Balancing the recommendations for efficient documentation with the need for adequately detailed information.</li> </ul> <p>The following measures were proposed to reduce potential errors in implementing the proposals:</p> <ul style="list-style-type: none"> <li>• Minimize potential errors in auto-populated data in EHR, by acknowledging the potential for inaccuracies or outdated information in the fields</li> <li>• Ensure accurate information for interprofessional communication</li> <li>• Maximize clarity of prompts for specific patient and clinical information</li> <li>• Maximize clarity of prompts about confidentiality and communication to ensure appropriate confidential documentation within the EHR</li> </ul>	

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Factors considered or identified	Results, authors' conclusion, summary
Ahmed et al. (2020) <sup>1</sup> US	A retrospective cohort study using data from primary and specialty care practices at 2 large academic and 2 community hospitals of an integrated health system in Massachusetts	1,096 referring providers in internal medicine, family medicine, medicine pediatrics, primary care, or women's health	121 specialist consulting in 5 specialties – hematology, infectious disease, dermatology, rheumatology, and psychiatry – between October 2017 and November 2018	Appropriateness of eConsult inquiries, characterized as diagnostic, therapeutic, for provider education, or at the request of the patient	<p>The appropriateness of eConsult as assessed by the following 4 criteria (a detailed definition of each is provided in the article):</p> <ul style="list-style-type: none"> <li>• Not answerable by reviewing evidence-based summary sources (i.e., an eConsult asking a question that could be easily answered by referencing a point-of-care resource or clinical guidelines is not considered appropriate)</li> <li>• Not merely requesting logistic information (i.e., an eConsult asking only about institutional knowledge or information that does not necessitate input from a physician is not considered appropriate)</li> <li>• Having appropriate clinical urgency (i.e., an eConsult asking for evaluation of a condition that needs to be urgently assessed is not considered appropriate)</li> <li>• Having appropriate patient complexity (i.e., an eConsult asking for evaluation of a condition</li> </ul>	<p>A total of 6,512 eligible eConsults were made. Overall, 70.2% of eConsults met all 4 criteria for appropriateness, with the frequency of unmet criteria varying among specialties. Most consultations (73.1% to 87.8%) were answered within 1 day.</p> <p>“Novel metrics to assess the appropriateness and utility of e-consults provide meaningful insight into practice, provide a rubric for comparison in future studies in additional settings, and suggest areas to improve resource use and patient care.”<sup>1</sup> p.640</p>

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Factors considered or identified	Results, authors' conclusion, summary
					that would necessitate in-person assessment by a specialist is not considered appropriate)	
<b>Costello et al. (2020)<sup>15</sup></b> <b>US</b>	A prospective study performed between November 2016 and September 2017	PCPs (n = NR) from a local clinic providing serves to the underinsured patient population in Phoenix, Arizona, US	Consultant specialist (n = NR) from a tertiary institution providing teledermatology eConsults in Scottsdale, Arizona, US	Satisfaction, confidence, accuracy, and efficiency and efficacy of referrals	Pre-implementation considerations included: <ul style="list-style-type: none"> <li>• Identification of PCPs, establishing technological obstacles</li> <li>• Expected volumes, workflows for providers</li> <li>• Contingency plans for technological failures</li> <li>• Training PCP on their workflow and practice with mock consultations</li> <li>• Training allied supportive staff on their workflow, their PCPs' workflow, and performing mock consultations</li> </ul> Implementation considerations included: <ul style="list-style-type: none"> <li>• Ensuring availability of appropriate data collection and processing devices and software (e.g., Mobile devices with dermoscopic attachments, VPN and PhotoExam application, and HIPAA-compliant</li> </ul>	"In conclusion, we established a teledermatology network and were able to provide high-quality care to patients with limited access to specialty care by integrating a mobile phone-based application into an existing EHR. We provided care within our community to clinics outside our care network. Teledermatology significantly increased PCP absolute diagnostic and management concordance, as well as significantly increased PCP confidence in diagnosis and management. There was high-provider satisfaction with the service and low in-person referral rates. A similar process can be utilized by other large health care organizations throughout the United States to provide high-quality consultation to clinics with un- and underinsured populations." <sup>15</sup> p.940

Author (publication year), country	Study design	Referring PCP	Specialty consulted	Outcomes measured	Factors considered or identified	Results, authors' conclusion, summary
					<p>and -encrypted Qualtrics standardized templates to transmit all information)</p> <ul style="list-style-type: none"> <li>• Standardized data capture forms for PCP to summarize lesional or rash history</li> <li>• Teledermatology consultation,</li> <li>• Post-teledermatology consultation primary care plan</li> <li>• Face-to-face dermatology consultation, and post-face-to-face provider discussions</li> </ul>	
<p>Lee et al. (2018)<sup>16</sup> US</p>	<p>Qualitative interviews with thematic content analysis to identify main themes and subthemes</p>	<p>40 PCPs from the Los Angeles County Department of Health Services, including 12 internists, 17 family practitioners, and 11 advanced practice clinicians</p>	<p>Not applicable (the study was designed to assess PCP perceptions on eConsults)</p>	<ul style="list-style-type: none"> <li>• PCP perceptions of the results of eConsult implementation on clinical workflow and workload</li> <li>• Care coordination and access to specialists</li> <li>• Clinician and staff relationships with specialists</li> <li>• Referral decision--</li> </ul>	<p>Refer to box in <a href="#">Primary Care Practitioners' Perceptions of Electronic Consult Systems (nih.gov)</a><sup>16</sup> for proposed questions to guide the implementation of eConsult, including PCP interface design, process design, pre-eConsult processes, post-eConsult processes, implementation planning and messaging, and maintenance feedback</p>	<p>The results showed opposing views on 3 qualitative themes about how PCPs perceived eConsult, as indicated by the following:</p> <ul style="list-style-type: none"> <li>• Quicker access to specialist care for those who need it, and more timely care for patients who did not require a specialist visit (as they no longer need to wait for an appointment to see the specialist). However, some PCPs thought that eConsult was an obstruction that slowed access to care.</li> <li>• A shift of specialty care-related</li> </ul>

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				<p>making and comfort with managing a broader array of diagnoses</p> <ul style="list-style-type: none"> <li>• Satisfaction with specialty access</li> </ul>		<p>duties to the PCP, which some considered as an opportunity for education while others perceived as a burdensome shift of work.</p> <ul style="list-style-type: none"> <li>• Some believed that eConsult dialogue strengthened communication and relationships with the specialist. However, others viewed interactions with specialist as more antagonistic</li> <li>• In addition, most PCPs had some frustration with the administrative burden of eConsult and interface issues, including lack of integration between eConsult and electronic health records.</li> </ul> <p>“The implementation of eConsult as a transformative delivery innovation had a range of positive and negative consequences for PCPs’ day-to-day practice. Informed by our analysis, our list of guiding questions (Box) highlights decisions that health systems implementing eConsult must make, either intentionally or by default.”<sup>16</sup> p. 10 and 18</p>

AYA = adolescents and young adults; EHR = electronic health records; HIPAA = Health Insurance Portability and Accountability Act; PCP = primary care provider; VISN = Veterans Integrated Service Networks; VPN = virtual private network.

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