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Does virtual consultation between primary and specialised care improve healthcare quality? A scoping review of healthcare quality domains assessment

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ABSTRACT

Background Virtual consultation has been proposed as a promising tool to improve the coordination and quality of healthcare between primary and specialised care. However, despite its potential facilitators, the evidence on the usefulness of virtual consultation for improving healthcare quality domains is fragmented and unclear. This scoping review aims to assess the impact of virtual consultation on different healthcare quality domains.

Material and methods We conducted a scoping review with a rigorous search strategy on PubMed, EMBASE and Cochrane Library databases. The inclusion criteria were original articles, reviews, meta-analyses or letters to the editor, published between 1 January 2017 and 24 June 2022, and available in English, Spanish or French. For each of the articles selected, we identified the addressed healthcare quality domains, their facilitators and barriers, areas of improvement and data gaps. We have adhered to Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Review reporting standards.

Results 1284 manuscripts were retrieved. Finally, 235 papers were included in this review, most of which were original, descriptive studies. The most evaluated quality domain was effectiveness (223 articles). Safety and patient-centred care were the least evaluated. Simultaneous assessment of more than one domain was observed in 117 papers, being effectiveness and timeliness the most frequent combination. Our analysis revealed that virtual consultation is in development and underused. This tool has the potential to improve access to specialised care and enhance coordination between professionals.

Conclusions Virtual consultation has the potential to provide effective, efficient, equitable and timely attention. However, its contribution to safety and patient-centered care needs further evaluation. Our review emphasises the need for more rigorous research and standardised quality assessment criteria to obtain robust evidence on the usefulness of virtual consultation for improving healthcare quality domains.

WHAT IS ALREADY KNOWN ON THIS TOPIC

Virtual consultation is described as a tool capable of improving communication and care coordination, but it is necessary to analyse its impact on all healthcare quality domains in order to identify strengths and areas for improvement and to make the resources invested in its use profitable.

WHAT THIS STUDY ADDS

This is the first study that analyses the impact of virtual consultation on different healthcare quality domains. It shows that virtual consultation allows for more effective, efficient, equitable and timely medical care than direct face-to-face referral, but its contribution to patient safety and patient-centred care has not been properly evaluated.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

Virtual consultation can enhance primary care resolution capacity, although more studies are needed to adequately evaluate its contribution to improving patient safety and patient-centred care, using common performance indicators and standardised quality assessment criteria.

BACKGROUND

In recent decades, the development of communication technologies has helped the doctor-patient relationship and collaboration between doctors to transcend geographical limits, facilitating the provision of healthcare to dispersed and remote populations.[1 2] In this sense, virtual consultation has been implemented in various countries to improve coordination between primary and specialised care. This is an asynchronous, bidirectional, online, on-demand communication tool. It is usually based on the issuing of a telematic collaboration request from primary care, which is responded to by specialised care, although other modalities include videoconferences, telephone calls and two-way exchange of information between doctors and pharmacists or dentists.[3]

With any new health technology, it is essential to evaluate its capacity to improve patient care in order to ensure optimal use of the resources invested (in both implementation and operation). To identify strengths and areas to be improved, it is important to

analyse the repercussion of the technology on healthcare quality, that is, the degree to which care services increase the possibility of desired health outcomes for individuals and populations, in accordance with the available evidence.[4] The United States Institute of Medicine has established six domains, or dimensions, of healthcare quality: effectiveness, efficiency, timeliness, equity, safety and patient-centred care.[5]

Effectiveness is to provide healthcare based on the best available scientific evidence, avoiding overuse and underuse of technology and achieving the best health outcomes in patients. An example of effectiveness would be that all patients with diabetes referred to endocrinology had been asked for glycated haemoglobin.

Efficiency is defined as achieving maximum effectiveness at the lowest possible cost. For example, from health system managers' perspective, to reduce costs of unnecessary face-to-face consultations.

Healthcare is considered timely when it is provided at the right moment, without unnecessary or damaging delays and without geographical, cultural or organisational barriers. By primary care and patients' perspective, the communication of an allergy brought on by medication to the prescribing doctor to enable its change would be an example of timely attention. This concept is related to two organisational features of the health system that add value: longitudinality, or relationship that is established over time between professionals and patients, and continuity, referring to adequate coordination between care levels and professionals.

Equity is providing the same healthcare and the same attention for similar health problems, without social, economic, geographical, cultural or other distinctions. For example, enabling patients from remote rural areas to access the same resources as in urban areas.

Patient-centred care is to provide personalised care with transparency and respect for dignity, values, beliefs and choice in all matters related to the person and their illness, as well as organise healthcare thinking about patients rather than those who provide it. This involves integrating patients and their families into all aspects of care. Finally, safety refers to the elimination of unnecessary harm or potential harm associated with healthcare, that results from or is associated with the plans or actions of a healthcare professional during the provision of healthcare, and not that which is due to an underlying illness or injury. This is related to correcting diagnostic errors and avoiding unnecessary tests and treatments, among others.

Virtual consultation has been reported to improve effectiveness,[3 6] increasing the level of control and monitoring of patients and their access to available resources, both qualified humans and physical resources, such that they feel well informed and cared for without the need for additional face-to-face visits.[1 7] It has also been suggested that virtual consultation improves efficiency,[8] avoiding costs associated with unnecessary trips and complementary tests; equity, ensuring that patients with similar health problems receive comparable attention and care, with no social, economic, geographical,[9] cultural or other types of distinction; and timeliness,[10] favouring accessibility to specialists when necessary.

However, there seems to be little consensus regarding the implications for patient safety and patient-centred care.[11] In terms of patient safety, virtual consultation can prevent contagion in pandemic situations, allow the correction of erroneous initial diagnoses and the ordering of studies and treatments, although joint deliberation is difficult in complex cases that require rapid decision-making.[12] Its use also raises questions about threats to the confidentiality of clinical information, administrative errors and respect for patient preferences and autonomy.

Determining whether virtual consultation improves the quality of care in all domains is key to evaluating this tool and, ultimately, improving patient care. The objective of this scoping review was to analyse the existing evidence on virtual consultation between primary care and specialised care in order to determine its impact on the different domains of healthcare quality, identify facilitators and barriers, and evaluate the opinion of patients and professionals regarding this communication tool.

MATERIAL AND METHODS

Search strategy

To prepare this scoping review, we conducted a search for scientific articles published in the three main databases used in Health Sciences: PubMed, EMBASE and Cochrane Library. A search strategy was developed using four keywords (telemedicine, consultations, primary care and specialised care) combined with one other using the Boolean AND operator and using OR with related terms, both MESH and free, as described in online supplemental table 1. We also perform a backwards citation search.

Inclusion and exclusion criteria

The search was narrowed by applying the following inclusion criteria: articles published between 1 January 2017 and 24 June 2022; available in full-text versions in English, Spanish or French; and classified as an original article, review, systematic review, meta-analysis or letter to the editor. Due to technological advances in telemedicine in the last years, we decided to limit the search strategy to 5 years. In previous non-exhaustive reviews of references available, the number of items was much lower. Additionally, we consider that the last 2 years of the pandemic, with a large number of articles, had to be put in comparison with a similar technological and duration development period.

Articles that did not meet any of the inclusion criteria, duplicate articles and articles unrelated to the subject of the study were excluded.

Article selection and data extraction

Before the selection process, a concordance study was conducted to evaluate the authors' content classification. Subsequently, the articles underwent peer review,

initially for the title and abstract, and then for the entire text, to determine if they pertained to virtual consultations between primary care physicians and specialised care professionals. In case of disagreement, the third author made the final decision. Detailed information of the selected articles can be found in online supplemental table 2.

The following parameters were considered for each publication selected: first author, title, publication type and study design (original (descriptive or analytical), review (narrative, systematic or scoping review) and letters to the editor), publication year (2017–2022), country, health quality domains analysed and perspective of analysis (primary care, specialist care, patients or health system managers).

Information analysis and synthesis

For each of the articles selected in this review, we identified the reported healthcare quality domains, the facilitators and barriers of the use of virtual consultation for each of the six domains, as well as possible areas of improvement, data gaps and potential directions for future studies. The analysis of facilitators and barriers was a descriptive analysis because the reviewed articles did not use a common facilitators and barriers terminology. So, this analysis was a peer review consensus of the authors, to achieve agreement of criteria and judgments of evaluation. In case of disagreement, a third author decided.

Ethical aspects

This study did not require approval by the ethics committee, as it did not include any patients and was limited to the analysis of freely accessible published articles. No protocol for this scoping review was previously published.

RESULTS

The total number of articles retrieved was 1259, 1098 without duplicates, to which 25 articles identified by backwards citation search were added. Next, the 1123 articles were subjected to peer review. Following this approach, 235 articles were included (figure 1).[13]

Most were original (201, 85.5%), with a descriptive design (75.7%) and conducted in North America (65.6%), 34.9% were published between January 2021 and 24 June 2022 and 6.8% were multicentre studies. Analysis of the number of virtual consultations, professionals or patients involved in the different studies analysed revealed that most of them were local studies with small samples.

Table 1 outlines the classification, based on design and country of origin, of the set of selected articles.

In terms of content, 81 of the 235 articles discussed the characteristics of virtual consultation as a communication tool, its facilitators, possible areas of improvement and/or implementation in different specialties, while 154 articles focused on its use in a single specialty, the most frequent of which were dermatology (48) and psychiatry (23). The COVID-19 pandemic was cited as a reason for virtual consultation in 6.8% of articles.

The origin of the research was primary and secondary care professionals, but the perspective of analysis of the articles could be primary care, specialised care, the patients or health system managers. Regarding the articles selected in this review, the most addressed perspective of analysis was primary care, but the evaluation of virtual consultation often involves intertwined perspectives, and the most frequent combination was primary care and specialised care. The least addressed analysis perspective was the patients.

Of the health quality domains evaluated, the most frequent was effectiveness (223, 94.9%; in 99 articles effectiveness was the only domain evaluated), followed by timeliness (77, 32.8%) and efficiency (39, 16.6%),

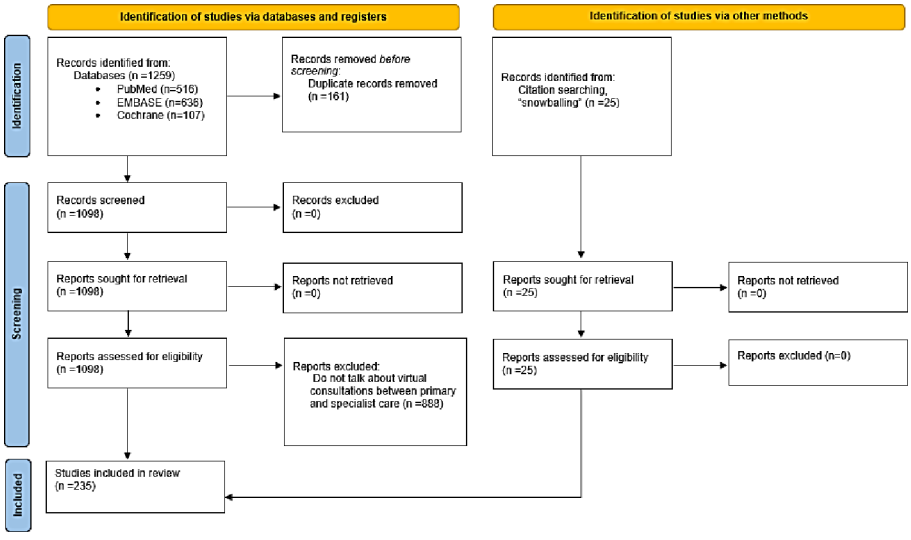

Figure 1 Stages of the review, formulated based on 'The PRISMA 2020 statement: an updated guideline for reporting systematic reviews'.[13] PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Table 1 Design and country of publication of the selected articles

Article design	North America	Europe	Other countries	Total
Descriptive	118 (50.2%)	29 (12.3%)	31 (13.2%)	178 (75.7%)
Analytical	15 (6.4%)	3 (1.3%)	5 (2.1%)	22 (9.8%)
Narrative review	10 (4.3%)	1 (0.43%)	1 (0.43%)	13 (5.2%)
Systematic review	6 (2.6%)	3 (1.3%)	1 (0.43%)	10 (4.3%)
Scoping review	2 (0.85%)	2 (0.85%)	0	4 (1.7%)
Letter to the editor	3 (1.3%)	5 (2.1%)	0	8 (3.4%)
Total	154 (65.6%)	43 (18.3%)	38 (16.1%)	235 (100%)

as indicated in online supplemental table 2, which also shows that 128 articles (54.5%) assessed the impact of virtual consultation in more than one domain. Of these, 99 articles assessed two domains, the most frequent combinations being effectiveness+timeliness (50), effectiveness+efficiency (24) and effectiveness+equity (11); 26 articles evaluated three domains and only 3 studied four domains.

Effectiveness was the most evaluated quality domain, present in 94.9% of the articles included. Facilitators of virtual consultation highlighted in the selected articles include improving coordination[14] between levels of care, access to specialised care and satisfaction of professionals and patients. Another noteworthy benefit was a reduction in waiting times and diagnostic delays,[6] prioritisation of consultations[3] and avoidance of unnecessary face-to-face consultations, as well as increased confidence in both the health system and primary care professionals.[11]

Other aspects highlighted among the included articles were the need for specific training and information on the necessary data,[15] available specialties and standards and protocols that should be used to avoid failures and errors.

In terms of efficiency, which was evaluated in 16.6% of articles, virtual consultation allows for reduced costs, avoiding face-to-face consultations and unnecessary trips by patients,[16] complementary studies that are not indicated[17] or devoid of value, and improved use of specialised resources, reducing referrals to emergency services. However, available evidence on health outcomes[18] and quality of life, and on the cost of implementing this health technology, remains scarce.

Of the articles included in our analysis, 32.8% reported improvements in timeliness, enabling faster access to specialised assistance18 through on-demand consultations. However, persisting barriers identified included a lack of specialised human and material healthcare resources, their centralisation in more populated areas, and a lack of virtual access to available resources due to poor internet connectivity in dispersed and remote populations.[9]

Regarding healthcare equity, 13.6% of articles reported a positive influence of virtual consultation on reducing geographical, economical and functional barriers[19] (bedridden patients or those with limited movement), particularly favouring accessibility to specialised care in rural[20] and remote[9] areas. Improving the telematic communication infrastructure and homogenising[21] the distribution of resources remains an unresolved challenge, complicating emergency assistance[22] in remote populations. Moreover, it is necessary to avoid the existence of multiple management styles and delays in face-to-face consultations after their electronic acceptance.

An improvement in patient safety[23] was reported in 7.2% of articles, which note a reduction in unnecessary harm related to healthcare, such as infections due to avoidable face-to-face visits in the context of the COVID-19[24] pandemic, correction of erroneous diagnoses,[25] avoidance of unnecessary tests and unindicated treatments, and prioritisation of treatment initiation, with consequent improvement in quality of life and life expectancy. Conversely, insufficient or doubtful data,[26] having little time[14] for patient assessment during virtual consultations, and the possibility of making decisions based on diagnostic errors, were identified as threats to safety.

Patient-centred care was the least valued healthcare quality domain, featuring in only 3% of the 235 articles included. Respect for the patient's autonomy, dignity, values and preferences,[27] improving the transparency of communication and safeguarding confidentiality[28] were all identified as challenges to achieving healthcare focused more on the patient than on the health system itself.

Online supplemental figure 1 shows the density of papers selected by quality domains, it allows to identify the lack of manuscripts on the assessment of patients' experiences and safety issues.

Table 2 shows the number of articles, out of the 235 selected, that analysed each healthcare quality domain, and summarises the facilitators and barriers identified, citing the number of articles that include each of them.

Regarding the opinion of patients, concerns regarding the use of virtual consultation (confidentiality, loss of direct contact with the specialist) were assessed in only 1 article, respect of their preferences in 3 articles and their satisfaction with this tool in 15 articles. Regarding healthcare professionals, their preferences were considered in 2 articles, their concerns in 6 and their satisfaction (trust and mutual knowledge between primary and specialised

Table 2 Number of articles included in the scoping review according to healthcare quality domains analysed and the corresponding facilitators and barriers identified

Healthcare quality domain	Facilitators	Barriers
Effectiveness (223, 94.9%)	Improves PC-SC coordination (82) Improves SC access (126) Increases patient and/or professional satisfaction (48) Reduces waiting times (54) Avoids face-to-face consultations (50)	Noncollaborative attitudes (14) Exclusion of relevant information (10) Necessary training (29) Complex VC (emergencies, shared deliberation) (14)
Efficiency (39, 16.6%)	Reduces travel costs (8) Reduces costs of face-to-face consultations (15) Reduces costs due to better management and fewer emergency room visits (16)	Analysis of the impact on the care process is required (15) Analysis of the cost of the technology is required (1)
Timeliness (77, 32.8%)	Facilitates on-demand consultations for: ► Clinical reasons (67) ► Bureaucratic reasons (visas, reports) (0)	Lack of SC resources (6) Lack of SC access (9)
Equity (32, 13.6%)	Barrier-free SC access: ► Geographic and/or economic barriers (24) ► Functional barriers (3)	Technological challenges (4) Non-homogeneous distribution of resources (14) Different management styles (4) Delayed in-person consultation after online assessment (2)
Safety (17, 7.2%)	Correction of diagnostic errors (8) Avoidance of infections (2) Avoids unnecessary treatments and tests and/or allows treatment initiation (8)	Insufficient time to assess VC (2) Insufficient or questionable data (2) Misdiagnoses and decisions based on misdiagnoses (3)
Patient-centred care (7, 3%)	Patient preferences can be expressed and considered (4) VC with trusted PCD (2) Improved transparency of communication to the patient (5)	Not involving or informing the patient (3) Legal responsibility (confidentiality) (4)

PC, primary care; PCD, primary care doctor; SC, specialised care; VC, virtual consultation.

care, shared care, facilitating feedback and reflective learning) in 47.

DISCUSSION

This scoping review on the quality of virtual consultation assessed each of the domains of healthcare quality, and included 235 articles on virtual consultation between primary and specialised care physicians, most of which were original descriptive studies. Effectiveness was the most commonly evaluated domain (94.9% of articles), followed by timeliness and efficiency. Only 42% of the studies evaluated more than one healthcare quality domain simultaneously. The most frequent combination was effectiveness and timeliness.

Almost all articles included in this review highlighted the effectiveness of virtual consultation as a tool for communication and for reducing waiting times and improving coordination between professionals and access to specialised care. However, in many primary care centres virtual consultation is not available in all specialties, and continuous updating of knowledge is necessary to improve its usefulness and ensure positive attitudes towards its adoption.

Of the articles included, 32.8% analysed the impact of virtual consultation on improving patient access to specialised care when needed most, although not all centres have the necessary technological infrastructures or human resources.

The efficiency[29 30] of virtual consultation was noted in 16.6% of articles, which reported savings in travel costs[16] and unnecessary tests and treatments, although these articles did not quantify the budget necessary for the development and operation of this tool, or analyse its impact on the use of resources or on patient morbidity.

A positive influence on equity was described in 13.6% of articles, which noted a reduction in barriers that limit timeliness of access to specialised care,[31] especially for patients living in areas with significant geographic dispersion or poor communication, or who have deteriorated functional health.[32 33] However, the distribution of resources is not homogeneous, different management styles complicate comparison and technological challenges, such as a single shared electronic medical record, persist.

The scarcity of studies assessing the key domains of safety (7.2%) and patient-centred care (3%) is noteworthy, although reported facilitators include correcting erroneous diagnoses and associated patient management, which may facilitate a shift towards care that is more oriented towards patient preferences and values. Potential negative aspects include possible threats to the confidentiality of clinical information and the risk of

making decisions without direct patient contact, sometimes based on insufficient information.[25] Collecting patients-reported experiences (PREMs) and patients-reported outcomes (PROMs) in medical health records, as internationally recognised instruments to measure the quality of health services from the patient's perspective, is a very relevant information for the evaluation of virtual consultation. Unfortunately, they have not adequately addressed in the reviewed literature. Collecting PREMs and PROMs,[34] and the development of a checklist to avoid forgetting relevant information, would be useful tools to improve virtual consultation safety. We did not identify any studies that comprehensively assessed quality, taking into account all components or domains.

Assessment of the quality of articles on virtual consultation revealed that only 6% of the 235 included articles corresponded to systematic reviews or scoping reviews, and only one was a meta-analysis. Most of the studies had a descriptive design with a small number of cases, and were limited to one or two health centres. These data highlight the need for further reviews and multicentre analyses to evaluate the impact of the peculiarities of each region, and the unequal distribution of health resources, on the implementation and evolution of virtual consultation.

Feedback and the promotion of positive attitudes were considered by healthcare professionals to be the most appropriate mechanisms to facilitate cooperation between different levels of care,[14] while concern about lack of time and increased workload are two key barriers that were identified.[35]

The use of virtual consultation entails adaptation and greater flexibility of medical agendas,[36] improvements in the identification of specialists to whom patients are referred, and greater standardisation of the referral process.[37–39] These issues have not been quantitatively evaluated in the literature. Furthermore, although many countries initially developed virtual consultation as a teledermatology tool,[23] its implementation in all medical[40–43] and surgical[44] specialties is warranted to improve the confidence[11] and resolutive capacity of primary care physicians,[45] as well as joint decision-making with other specialists.

An open question, which was not adequately addressed in the articles included in this review, concerns the training required by health professionals in order to effectively use new communication and information technologies.[7 46] In our opinion, it is essential to acquire knowledge about the functioning of virtual consultations as a computer-based tool. This includes knowledge about the specialties and medical centres that provide this service, the specific information necessary for effective communication (such as problem description, conducted examinations, performed tests and assessments), as well as the establishment of referral protocols to reduce the occurrence of errors.

Also, a notable observation, despite the inclusion of only three articles describing virtual consultation between primary care physicians and pharmacists, is the positive impact of this tool on the management of therapeutic adherence in patients with chronic diseases and of dose adjustment and drug interactions.[47] This is undoubtedly one of the areas in which work should continue in order to improve the safety and effectiveness of therapies.

Our study has certain limitations. The influence of the COVID-19 pandemic during the final phase of the period analysed (2021 and 2022 until June 24) could not be sufficiently analysed. Nonetheless, it is undeniable that the resulting restriction of movement and gathering, as well as the widespread use of telematic resources developed in different healthcare environments (specific software and communications technology aimed at improving the accessibility and communication between professionals) resulted in an increase in the number of papers published on virtual consultation.[48 49] Most of the articles included in this review correspond to studies conducted in Canada and the USA, both of which have health systems with organisational structures that differ from European counterparts. The various formats (to refer a complex patient to another specialty, to adjust patient's medication, to answer a question regarding the patient's evolution) and applications developed for virtual consultations and differences in insurer participation make comparison difficult. Other potential methodological limitation is the double-counting (overlap) of articles because a primary study could have been selected in our scoping review and also have been included in a systematic review also selected. Finally, because quality of care is a concept that involves multiple intertwined domains, it can sometimes be difficult to assign the theme of an article to a specific domain.

Several strengths of the current review should be noted. To the best of our knowledge, this is the first study to focus on the impact of virtual consultation on the different domains of healthcare quality, both individually and in combination, as opposed to focusing exclusively on organisational or situational aspects of the pandemic. Regarding the methodology used, the scoping review allows for broad exploration of the bibliography and provides a higher level of sensitivity in detecting knowledge gaps and research opportunities, synthesising available evidence to facilitate strategic decision-making. For this reason, although the selection of search filters may have resulted in the omission of some relevant articles, we believe that the methodology and the three databases used allow for a sufficiently exhaustive analysis of the topic. Finally, we sought to offset the risk of selection bias by having two authors review each article, and a third in cases of disagreement.

CONCLUSIONS

The studies included in this review indicate that virtual consultation enables more effective, efficient, equitable and timely healthcare attention than direct face-to-face referral from primary to specialised care. However, there is not enough evidence to adequately evaluate its

contribution to improving patient safety and patient-centred care based on the articles included in our review.

The aims of virtual consultation should be to promote adequate comprehensive care and healthcare continuity and coordination, and to establish primary care as the first point of contact with the health system, from where links to other resources can be formed. The resolutive capacity of this tool should be enhanced, with a view to providing patients with higher quality care.

The characteristics of the studies included in this review highlight the need for the use of common performance indicators and standardised quality assessment criteria, and for analytical, multicentre studies exploring the experience of both patients and professionals. Such studies are essential to obtain sufficient evidence to adequately and precisely evaluate the use of virtual consultation.

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Contributors All authors made substantial contributions to the conception or design of this study, participated in the collection, analysis or interpretation of results, and in the writing and critical review of the manuscript, and approved the final version submitted for publication.

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REFERENCES

1 Ricur G. *Telemedicine: general considerations and clinical areas of application. Electronic health handbook for managers of healthcare services and systems*. Santiago de Chile: ECLAC, 2012: 169–93.
2 Martínez A, Rodrígues R, Infante A, *et al*. *Methodological bases to evaluate the viability and the impact of projects of telemedicine*. Washington, D.C: Pan American Health Organization, 2001: 1–9.
3 Carrard VC, Roxo Gonçalves M, Rodriguez Strey J, *et al*. Telediagnosis of oral lesions in primary care: the estomatonet program. *Oral Dis* 2018;24:1012–9.
4 World Health Organization. Quality of care. Available: https://www.who.int/es/health-topics/quality-of-care#tab=tab_1 [Accessed 30 Mar 2023].
5 Institute of Medicine (IOM). *Crossing the quality chasm: a new health system for the 21st century*. Washington, D.C: National Academy Press, 2001.
6 Abu Libdeh A, Flanigan J, Heinan K. Experience with pediatric neurology E-Consults from a specialist perspective at an academic center. *J Child Neurol* 2022;37:373–9.
7 Working group of the Spanish society of internal medicine (SEMI), Spanish society of family and community medicine (semFYC). Consensus document care for patients with chronic diseases. Mergablum Publishing and Communication, Sevilla; 2011. Available: https://www.samfyc.es/pdf/boletin/2011%20semFYC%20SEMI%20DocConsenso%20AtencionPacienteEnfCronicas.pdf [Accessed 30 Mar 2023].
8 Ahmed S, Kelly YP, Behera TR, *et al*. Appropriateness, and content of electronic consultations across medical subspecialties. *Ann Intern Med* 2020;172:641–7.
9 Bello A, Zaidi D, Braam B, *et al*. Protocol: improving access to specialist Nephrology care among rural/remote dwellers of Alberta: the role of electronic consultation in improving care for patients with chronic kidney disease. *Can J Kidney Health Dis* 2019;6.
10 Adams TCE, Lim CT, Huang H. The practice of psychiatric e-consultation: current state and future directions. *Harv Rev Psychiatry* 2022;30:191–7.
11 Ackerman SL, Gleason N, Shipman SA. Comparing patients' experiences with electronic and traditional consultation: results from a multisite survey. *J Gen Intern Med* 2020;35:1135–42.
12 Anderson E, Vimalananda VG, Orlander JD, *et al*. Implications of electronic consultations for clinician communication and relationships: a qualitative study. *Med Care* 2021;59:808–15.
13 Page MJ, McKenzie JE, Bossuyt PM, *et al*. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71.
14 Aller MB, Vargas I, Coderch J, *et al*. Doctors' opinion on the contribution of coordination mechanisms to improving clinical coordination between primary and outpatient secondary care in the catalan national health system. *BMC Health Serv Res* 2017;17:842.
15 Eskeland SL, Brunborg C, Rueegg CS, *et al*. Assessment of the effect of an interactive dynamic referral interface (IDRI) on the quality of referral letters from general practitioners to Gastroenterologists: a randomised cross-over vignette trial. *BMJ Open* 2017;7:e014636.
16 Anderson D, Villagra VG, Coman E, *et al*. Reduced cost of specialty care using electronic consultations for Medicaid patients. *Health Affairs* 2018;37:2031–6.
17 Young NP, Elrashidi MY, Crane SJ, *et al*. Pilot of integrated, colocated neurology in a primary care medical home. *J Eval Clin Pract* 2017;23:548–53.
18 Archibald D, Stratton J, Liddy C, *et al*. Evaluation of an electronic consultation service in psychiatry for primary care providers. *BMC Psychiatry* 2018;18:119.
19 Helmer-Smith M, Fung C, Afkham A, *et al*. The feasibility of using electronic consultation in long-term care homes. *J Am Med Dir Assoc* 2020;21:1166–70.
20 Anderson D, Porto A, Angelocci T, *et al*. The impact of eConsults on access to specialty care for the uninsured in rural Texas. *J Health Care Poor Underserved* 2022;33:779–89.
21 Koraishy FM, Rohatgi R. Telenephrology: an emerging platform for delivering renal health care. *Am J Kidney Dis* 2020;76:417–26.
22 Keshvardoost S, Bahaadinbeigy K, Shadman H, *et al*. Design, development, and evaluation of a teleophthalmology system using a low-cost fundus camera. *Acta Inform Med* 2020;28:12–7.
23 Aragón-Caqueo D, Arceu M, Aragón-Caqueo G, *et al*. Teledermatology in Chile: experience of early implementation. *Skin Continuing Education in Dermatology* 2022;37:1–6.
24 Elliott LG, Sharma M. Teledermatology 2-week-wait skin cancer referrals during the COVID-19 pandemic: a service evaluation. *Clin Exp Dermatol* 2022;47:458–9.
25 Marwaha SS, Fevrier H, Alexeeff S, *et al*. Comparative effectiveness study of face-to-face and teledermatology workflows for diagnosing skin cancer. *J Am Acad Dermatol* 2019;81:1099–106.
26 Koenig CJ, Wenger M, Graham GD, *et al*. Managing professional knowledge boundaries during ECHO telementoring consultations in two veterans affairs specialty care liver clinics: a theme-oriented discourse analysis. *J Telemed Telecare* 2019;25:181–9.
27 Deeds SA, Dowdell KJ, Chew LD, *et al*. Implementing an opt-in eConsult program at seven academic medical centers: a qualitative

analysis of primary care provider experiences. *J Gen Intern Med* 2019;34:1427–33.
28 Verma R, Krishnamurti T, Ray KN. Parent perspectives on family-centered pediatric electronic consultations: qualitative study. *J Med Internet Res* 2020;22:e16954.
29 Starfield B. *Primary care. Balance between health needs, services and technology*. Barcelona: Masson, 2001: 153–81.
30 Starfield B. Primary care: an increasingly important contributor to effectiveness, equity, and efficiency of health services. SESPAS report 2012. *Gac Sanit* 2012;26 Suppl 1:20–6.
31 Nabelsi V, Lévesque-Chouinard A, Liddy C, *et al*. Improving the referral process, timeliness, effectiveness, and equity of access to specialist medical services through electronic consultation: pilot study. *JMIR Med Inform* 2019;7:e13354.
32 Liddy C, Joschko J, Guglani S, *et al*. Improving equity of access through electronic consultation: a case study of an eConsult service. *Front Public Health* 2019;7:279.
33 Department of Health. *Aragon Health Plan 2030*. Government of Aragon, 2018: 15–29.
34 Black N. Patient reported outcome measures could help transform healthcare. *BMJ* 2013;346:bmj.f167.
35 McGinn CA, Grenier S, Duplantie J, *et al*. Comparison of user groups' perspectives of barriers and facilitators to implementing electronic health records: a systematic review. *BMC Med* 2011;9:46.
36 Cobos M, Rifà A. Non-face-to-face consultation. *AMF* 2011;2:96–9.
37 Grimshaw J, Winkens R, Shirran L, *et al*. Interventions to improve outpatient referrals from primary care to secondary care. *Cochrane Database Syst Rev* 2008:CD005471.
38 Blank L, Baxter S, Woods HB, *et al*. Referral interventions from primary to specialist care: a systematic review of international evidence. *Br J Gen Pract* 2014;64:e765–74.
39 Kim-Hwang JE, Chen AH, Bell DS, *et al*. Evaluating electronic referrals for specialty care at a public hospital. *J Gen Intern Med* 2010;25:1123–8.
40 Bradi AC, Sitwell L, Liddy C, *et al*. Ask a neurologist: what primary care providers ask, and reducing referrals through eConsults. *Neurol Clin Pract* 2018;8:369–70.
41 Wasfy JH, Rao SK, Essien UR, *et al*. Initial experience with endocrinology e-Consults. *Endocrine* 2017;55:640–2.
42 Lai L, Liddy C, Keely E, *et al*. The impact of electronic consultation on a Canadian tertiary care pediatric specialty referral system: a prospective single-center observational study. *PLoS ONE* 2018;13:e0190247.
43 Kim EJ, Orlander JD, Afable M, *et al*. Cardiology electronic consultation (e-Consult) use by primary care providers at VA medical centres in New England. *J Telemed Telecare* 2019;25:370–7.
44 Busquet-Duran N, Vidal-Alaball J, Martínez-Somolinos S, *et al*. Descriptive study of a telemedicine program in palpebral pathology for primary care (TELE-eyelid). *Arch Soc Esp Oftalmol (Engl Ed)* 2022;97:303–9.
45 González Coloma F, Sandoval Garcés M, Gedda Quiroga V, *et al*. Teledermatology in remote parts of Chile: experience in 4 isolated rural areas. *Actas Dermo-Sifiliográficas (English Edition)* 2019;110:653–8.
46 Bilodeau H, Deri Armstrong C, Keely E, *et al*. Who uses eConsult? Investigating physician characteristics associated with usage (and nonusage). *Telemed J E Health* 2018;24:497–503.
47 Smith M, Vuernick E, Anderson D, *et al*. Pharmacist eConsult service for primary care medication optimization and safety. *Journal of the American Pharmacists Association* 2021;61:351–9.
48 Pavón I, Rosado JA, Salguero AL, *et al*. E-consultation as a tool for the relationship between primary care and endocrinology. Impact of COVID-19 epidemic in its use. *J Healthc Qual Res* 2022;37:155–61.
49 Casella G, Ingravalle F, Ingravalle A, *et al*. COVID emergency: an opportunity to increase the interaction between hepatologist and primary care physician. *Minerva Gastroenterol Dietol* 2020;66:328–30.

SUPPLEMENTARY MATERIAL:

Supplemental Table 1 Search strategy using PubMed, EMBASE, and Cochrane databases

BASE DE DATOS	ESTRATEGIA DE BÚSQUEDA Y TÉRMINOS
PubMed	#1 "telehealth s"[Tiab] OR "telemedicine"[MeSH Terms] OR "telemedicine"[Tiab] OR "telehealth"[Tiab] OR "remote consultation"[MeSH Terms] OR "remote consultation"[Tiab] OR "teleconsultation"[Tiab] OR "teleconsultations"[Tiab] OR "teleconsult"[Tiab] OR "teleconsultant"[Tiab] OR "teleconsultants"[Tiab] OR "teleconsulting"[Tiab] OR "teleconsults"[Tiab] OR "Virtual consultations"[tiab] OR "Virtual consultation"[tiab] OR "Electronic Consultations"[tiab] OR "Electronic Consultation"[tiab] OR "Electronic referrals"[tiab] #2 "interconsultation"[Tiab] OR "interconsultations"[Tiab] OR "referral and consultation"[MeSH Terms] OR "referral and consultation"[Tiab] OR ("Interspecialty"[Tiab] AND ("communication"[MeSH Terms] OR "communication"[Tiab] OR "communications"[Tiab])) OR "Interspecialty communication"[Tiab] OR "managed care programmes"[Tiab] OR "managed care programs"[MeSH Terms] OR "communication"[MeSH Terms] OR "communication"[Tiab] OR "continuity of patient care"[MeSH Terms] OR "continuity of patient care"[Tiab] OR "continuity of care"[Tiab] OR "feedback loops"[Tiab] OR (("coordination"[Tiab] OR "coordinations"[Tiab] OR "coordinative"[Tiab] OR "coordinators"[Tiab]) AND "care"[Tiab]) OR (("asynchronous"[Tiab] OR "asynchronously"[Tiab]) AND ("communication"[MeSH Terms] OR "communication"[Tiab] OR "communications"[Tiab] OR "communicative"[Tiab] OR "communicational"[Tiab] OR "communicator"[Tiab] OR "communicators"[Tiab])) OR (("asynchronous"[Tiab] OR "asynchronously"[Tiab]) AND ("consultants"[MeSH Terms] OR "consultants"[Tiab] OR "consultant"[Tiab] OR "consultative"[Tiab] OR "consulter"[Tiab] OR "consulters"[Tiab] OR "referral and consultation"[MeSH Terms] OR "referral and consultation"[Tiab] OR "consult"[Tiab] OR "consultation"[Tiab] OR "consultations"[Tiab] OR "consults"[Tiab])) OR "Asynchronous consultation"[Tiab] OR "interoperability"[Tiab] OR "interoperable"[Tiab] OR "interoperate"[Tiab] OR "interoperates"[Tiab] OR "interoperating"[Tiab] OR "interoperation"[Tiab] OR (("ambulatory care facilities"[MeSH Terms] OR "ambulatory care facilities"[Tiab]) AND ("coordinate"[Tiab] OR "coordinated"[Tiab] OR "coordinately"[Tiab] OR "coordinates"[Tiab] OR "coordinating"[Tiab] OR "coordination"[Tiab] OR "coordinations"[Tiab] OR "coordinative"[Tiab] OR "coordinatively"[Tiab] OR "coordinator"[Tiab] OR "coordinator s"[Tiab] OR "coordinators"[Tiab]) AND ("mechanism"[Tiab] OR "mechanisms"[Tiab])) OR "Clinical coordination mechanisms"[Tiab] OR "Integrated health care"[Tiab] #3 "physicians, primary care"[MeSH Terms] OR "primary care physicians"[Tiab] OR "physicians primary care"[Tiab] OR "primary health care"[MeSH Terms] OR "primary health care"[Tiab] OR "general practice"[MeSH Terms] OR "general practice"[Tiab] OR (("primary health care"[MeSH Terms] OR "primary health care"[Tiab] OR "primary care"[Tiab]) AND ("specialist"[Tiab] "specialization"[MeSH Terms] OR "specialists"[Tiab])) #4 "physicians"[MeSH Terms] OR "physicians"[All Fields] OR "physician"[All Fields] OR "tertiary healthcare"[MeSH Terms] OR "tertiary healthcare"[All Fields] OR "specialist"[All Fields] OR "specialists"[All Fields] OR "clinicians"[All Fields] OR "secondary care"[MeSH Terms] OR "secondary care"[All Fields] #1 AND #2 AND #3 AND #4 *Letter, Meta-Analysis, Review, Systematic Review, English, French, Spanish, from 2017 - 3000/12/12*

EMBASE	#1 'telehealth'/exp OR 'telemedicine'/exp OR teleconsultations OR 'remote consultations' OR 'virtual consultations' OR 'electronic consultations' OR 'electronic referrals' #2 interconsultation OR (('referral'/exp OR referral) AND ('consultation'/exp OR consultation)) OR 'interspecialty communication' OR (interspecialty AND ('communication'/exp OR communication)) OR 'managed care programs'/exp OR 'managed care programs' OR (managed AND ('care'/exp OR care) AND ('programs'/exp OR programs)) OR 'communication'/exp OR communication OR 'patient care'/exp OR 'patient care' OR 'feedback loops' OR 'coordination of care'/exp OR 'coordination of care' OR 'asynchronous electronic communication' OR 'asynchronous consultation' OR 'interoperability'/exp OR interoperability OR 'clinical coordination mechanisms' OR 'integrated health care' #3 #1 AND #2 #4 'general practitioner'/exp OR 'general practitioner' OR 'primary care provider'/exp OR 'primary care provider' OR 'primary health care'/exp OR 'primary health care' OR 'general practice'/exp OR 'general practice' OR 'primary care specialist' #5 #3 AND #4 #6 'physician'/exp OR physicians OR 'tertiary health care'/exp OR 'tertiary health care' OR 'specialist care' OR 'specialist consultations' OR 'specialty clinicians' OR 'secondary care specialists' #7 #5 AND #6 #8 #5 AND #6 AND [2011-2022]/py #9 #5 AND #6 AND [2011-2022]/py AND ([english]/lim OR [french]/lim OR [spanish]/lim) #10 #9 AND ('article'/it OR 'article in press'/it OR 'review'/it OR 'letter'/it) #11 #9 AND 'letter'/it #12 #9 AND ([cochrane review]/lim OR [systematic review]/lim OR [meta analysis]/lim)

Cochrane Library	#1 ("telehealth"):ti,ab,kw OR ("telemedicine"):ti,ab,kw OR (Teleconsultations):ti,ab,kw OR ("Remote consultations"):ti,ab,kw OR ("Virtual consultations"):ti,ab,kw (Word variations have been searched) #2 ("Electronic Consultations"):ti,ab,kw OR ("Electronic referrals"):ti,ab,kw (Word variations have been searched) #3 #1 OR #2 #4 (Communication OR "Continuity of care" OR "Feedback loops" OR "Coordination of care" OR "Asynchronous electronic communication"):ti,ab,kw OR ("Asynchronous consultation" OR Interoperability OR "Clinical coordination mechanisms" OR "Integrated health care"):ti,ab,kw OR (Interconsultation OR Referral OR Consultation OR "Interspecialty communication" OR "Managed Care Programs"):ti,ab,kw (Word variations have been searched) #5 #3 AND #4 #6 ("Primary care provider" OR "Primary Health Care" OR "General practice" OR "Primary care specialist"):ti,ab,kw (Word variations have been searched) #7 MeSH descriptor: [Physicians, Primary Care] explode all trees #8 #6 OR #7 #9 #5 AND #8

Supplemental Table 2 Classification of the 235 articles included based on first author, title, type of publication and study design, year of publication, country, and domains of healthcare quality assessed

FIRST AUTHOR	TITLE	PUBLICATION TYPE/STUDY DESIGN	YEAR	COUNTRY	HEALTHCARE QUALITY DOMAINS ASSESSED
Abu Libdeh et al	Experience with Pediatric Neurology e-Consults from a Specialist Perspective at an Academic Center	Original/ Descriptive	2022	United States	Effectiveness and timeliness
Ackerman et al	Patients Assess an eConsult Model's Acceptability at 5 US Academic Medical Centers	Original/ Descriptive	2020	United States	Effectiveness and patient-centred care
Ackerman et al	Comparing Patients' Experiences with Electronic and Traditional Consultation: Results from a Multisite Survey	Original/ Descriptive	2020	United States	Patient centred care
Adams et al	The Practice of Psychiatric E-Consultation: Current State and Future Directions	Narrative review	2022	United States	Timeliness and equity
Ahmed et al	Utility, Appropriateness, and Content of Electronic Consultations Across Medical Subspecialties	Original/ Analytical	2020	United States	Effectiveness and efficiency
Alfageme et al	Dermatologic Ultrasound in Primary Care: A New Modality of Teledermatology: A Prospective Multicenter Validation Study	Original/ Descriptive	2021	Spain	Effectiveness
Aller et al	Doctors' opinion on the contribution of coordination mechanisms to improving clinical coordination between primary and outpatient secondary care in the Catalan national health system	Original/ Descriptive	2017	Spain	Effectiveness and safety
Anderson et al	Electronic consultations and economies of scale: a qualitative study of clinician perspectives on scaling up e-consult delivery	Original/ Descriptive	2021	United States	Effectiveness and equity
Anderson et al	Implications of Electronic Consultations for Clinician Communication and Relationships: A Qualitative Study	Original/ Descriptive	2021	United States	Effectiveness and patient-centred care
Anderson et al	The Impact of eConsults on Access to Specialty Care for the Uninsured in Rural Texas	Original/ Descriptive	2022	United States	Effectiveness and equity
Anderson et al	Reduced Cost Of Specialty Care Using Electronic Consultations For Medicaid Patients	Original/ Descriptive	2018	United States	Effectiveness and efficiency
Anderson et al	A Cost-Effectiveness Analysis of Cardiology eConsults for Medicaid Patients	Original/ Descriptive	2018	United States	Efficiency
Aragón-Caqueo et al	Teledermatology in Chile: Experience of early implementation	Original/ Descriptive	2022	Chile	Effectiveness, timeliness, and safety
Aragón-Caqueo et al	A comparison between waiting times for teledermatology and face-to-face dermatology referral	Original/ Descriptive	2020	Chile	Effectiveness and timeliness
Archibald et al	Evaluation of an electronic consultation service in psychiatry for primary care providers	Original/ Descriptive	2018	Canada	Effectiveness and timeliness
Assis Acurcio et al	Cost-minimization analysis of teledermatology versus conventional care in the Brazilian National Health System	Original/ Analytical	2021	Brazil	Efficiency

Avery et al	Primary care psychiatry econsults at a rural academic medical center: Descriptive analysis	Original/ Descriptive	2021	United States	Effectiveness and timeliness
Azamar-Alonso et al	Electronic referral systems in health care: a scoping review	Review/ Scoping review	2019	Canada	Effectiveness and efficiency
Barnett et al	Los Angeles Safety-Net Program eConsult System Was Rapidly Adopted And Decreased Wait Times To See Specialists	Original/ Descriptive	2017	United States	Timeliness and equity
Bello et al	Protocol: Improving Access to Specialist Nephrology Care Among Rural/Remote Dwellers of Alberta: The Role of Electronic Consultation in Improving Care for Patients With Chronic Kidney Disease	Original/ Descriptive	2019	Canada	Timeliness and equity
Bergamo et al	Teledermatology with general practitioners and pediatricians during COVID-19 outbreak in Italy: Preliminary data from a second-level dermatology department in North-Eastern Italy	Letter to the editor	2020	Italy	Effectiveness, timeliness, efficiency and safety
Bhola et al	A pilot eConsultation service in Eastern Ontario: bridging clinical genetics and primary care	Original/ Descriptive	2019	Canada	Effectiveness and timeliness
Bianchi et al	The majority of skin lesions in pediatric primary care attention could be managed by Teledermatology	Original/ Descriptive	2019	Brazil	Effectiveness, timeliness, and safety
Bianchi et al	Benefits of teledermatology for geriatric patients: Population-based cross-sectional study	Original/ Descriptive	2020	Brazil	Effectiveness, timeliness, and efficiency
Bilodeau et al	Who Uses eConsult? Investigating Physician Characteristics Associated with Usage (and Nonusage)	Original/ Descriptive	2018	Canada	Effectiveness
Bock et al	Online Consultations Between General Practitioners and Psychiatrists in the Netherlands: A Qualitative Study	Original/ Descriptive	2021	Holland	Effectiveness and timeliness
Bradi et al	Ask a neurologist: What primary care providers ask, and reducing referrals through eConsults	Original/ Descriptive	2018	Canada	Effectiveness and timeliness
Breton et al	Scaling up eConsult for access to specialists in primary healthcare across four Canadian provinces: study protocol of a multiple case study	Original/ Descriptive	2019	Canada	Effectiveness and efficiency
Busquet-Duran et al	Descriptive study of a telemedicine program in palpebral pathology for primary care (tele-eyelid)	Original/ Descriptive	2022	Spain	Effectiveness and efficiency
Cajas Santana et al	Description of a tele-rheumatology service in a Colombian institution	Original/ Descriptive	2021	Colombia	Effectiveness and timeliness
Calderone et al	Telepsychiatry and integrated primary care: setting expectations and creating an effective process for success	Narrative review	2020	United States	Effectiveness and efficiency
Cardozo et al	Telehealth in Oral Medicine: report of an experience from public health care in a southern Brazilian state	Original/ Descriptive	2022	Brazil	Effectiveness and timeliness
Carrard et al	Telediagnosis of oral lesions in primary care: The EstomatoNet Program	Original/ Descriptive	2018	Brazil	Effectiveness and timeliness
Carter et al	Creation of an internal teledermatology store-and-forward system in an existing electronic health record: A pilot study in a safety-net public health and hospital system	Original/ Descriptive	2017	United States	Effectiveness and timeliness
Casella et al	COVID emergency: an opportunity to increase the interaction between hepatologist and primary care physician	Narrative review	2020	Italy	Effectiveness, timeliness, and safety

Cerimele et al	Bipolar disorder and PTSD screening and telepsychiatry diagnoses in primary care	Original/ Descriptive	2020	United States	Effectiveness and timeliness
Chan et al	Paging the eCardiologist: insights into referral behaviour of primary care physicians from qualitative analysis of a cardiology eConsult service	Original/ Descriptive	2018	Canada	Effectiveness
Chang et al	Electronic Consultation Systems: Impact on Pediatric Orthopaedic Care	Original/ Descriptive	2020	Canada	Effectiveness
Chow et al	Teledermatology in primary care in singapore: Experiences of family doctors and specialists	Original/ Descriptive	2021	Singapore	Effectiveness
Constanzo et al	Characterization of the Teleneurology Patients at the Hospital Las Higueras de Talcahuano—Chile	Original/ Descriptive	2020	Chile	Effectiveness and timeliness
Dahlén et al	Teledermoscopy images acquired in primary health care and hospital settings – a comparative study of image quality	Original/ Descriptive	2018	Sweden	Effectiveness and timeliness
Dahlén et al	Diagnostic agreement and interobserver concordance with teledermoscopy referrals	Original/ Descriptive	2017	Sweden	Safety
Daye et al	Point-of-Care Virtual Radiology Consultations in Primary Care: A Feasibility Study of a New Model for Patient-Centered Care in Radiology	Original/ Descriptive	2021	United States	Effectiveness
de Man et al	Primary Care Clinician Adherence to Specialist Advice in Electronic Consultation	Original/ Descriptive	2019	Canada	Effectiveness
Deeds et al	Implementing an Opt-in eConsult Program at Seven Academic Medical Centers: a Qualitative Analysis of Primary Care Provider Experiences	Original/ Descriptive	2019	United States	Effectiveness and patient-centred care
Donnelly et al	Interprofessional primary care during COVID-19: a survey of the provider perspective	Original/ Descriptive	2021	Canada	Effectiveness and timeliness
Doty et al	Primary Care Physicians' Role In Coordinating Medical And Health-Related Social Needs In Eleven Countries	Original/ Descriptive	2019	United States	Effectiveness
Dusendang et al	Association of teledermatology workflows with standardising co-management of rashes by primary care physicians and dermatologists	Original/ Descriptive	2022	United States	Effectiveness and timeliness
Elliot et al	Teledermatology 2-week-wait skin cancer referrals during the COVID-19 pandemic: a service evaluation	Letter to the editor	2022	England	Effectiveness, efficiency, and safety
Eskeland et al	Assessment of the effect of an Interactive Dynamic Referral Interface (IDRI) on the quality of referral letters from general practitioners to gastroenterologists: a randomised cross-over vignette trial	Original/ Analytical	2017	Norway	Effectiveness
Essop et al	The experiences of teleradiology end users regarding role extension in a rural district of the North West province: A qualitative analysis	Original/ Descriptive	2020	South Africa	Effectiveness and equity
Esteve-Matalí et al	Do primary and secondary care doctors have a different experience and perception of cross-level clinical coordination? Results of a cross-sectional study in the Catalan National Health System (Spain)	Original/ Descriptive	2020	Spain	Effectiveness
Fainardi et al	Management of Children with Acute Asthma Attack: A RAND/UCLA Appropriateness Approach	Original/ Descriptive	2021	Italy	Effectiveness and timeliness
Fang et al	Using telehealth to support pediatricians in newborn care	Narrative review	2021	United States	Effectiveness, timeliness, and efficiency

Fernández-Prada et al	Preliminary evaluation of an inter-professional e-consultation on vaccines	Original/ Descriptive	2020	Spain	Effectiveness and timeliness
Ferreira et al	Nosological profile of dermatological diseases in primary health care and dermatology secondary care in Florianópolis (2016–2017)	Original/ Descriptive	2020	Brazil	Effectiveness
Fiore et al	An electronic health record-based interoperable eReferral system to enhance smoking Quitline treatment in primary care	Original/ Analytical	2019	United States	Effectiveness
Fogel et al	Ask the eConsultant: Improving access to haematology expertise using an asynchronous eConsult system	Original/ Descriptive	2017	Canada	Effectiveness and efficiency
Forde et al	Telescopic otology referrals: Evaluation of feasibility and acceptability	Original/ Descriptive	2020	England	Effectiveness, timeliness, and efficiency
Fortney et al	Comparison of Teleintegrated Care and Telereferral Care for Treating Complex Psychiatric Disorders in Primary Care: A Pragmatic Randomized Comparative Effectiveness Trial	Original/ Analytical	2021	United States	Effectiveness
Fung et al	Clinical Questions Asked by Long-Term Care Providers Through eConsult: A Retrospective Study	Original/ Descriptive	2021	Canada	Effectiveness and timeliness
Giavina-Bianchi et al	Accuracy of Deep Neural Network in Triaging Common Skin Diseases of Primary Care Attention	Original/ Descriptive	2021	Brazil	Effectiveness and timeliness
Giavina-Bianchi et al	Teledermatology reduces dermatology referrals and improves access to specialists	Original/ Descriptive	2020	Brazil	Effectiveness
Gilani et al	Electronic Consults in Otolaryngology: A Pilot Study to Evaluate the Use, Content, and Outcomes in an Academic Health System	Original/ Descriptive	2020	United States	Effectiveness and efficiency
Golberstein et al	Effects of electronic psychiatric consultations on primary care provider perceptions of mental health care: Survey results from a randomized evaluation	Original/ Analytical	2018	United States	Effectiveness
Gonçalves-Bradley et al	Mobile technologies to support healthcare provider to healthcare provider communication and management of care	Meta-analysis	2020	England	Effectiveness
González et al	Teledermatology in Remote Parts of Chile: Experience in 4 Isolated Rural Areas	Original/ Descriptive	2019	Chile	Effectiveness, timeliness, and equity
González et al	Virtual consultations in Traumatology and Orthopaedic Surgery	Original/ Descriptive	2021	Spain	Effectiveness
González-López et al	Referral of Patients to Dermatology and Teledermatology Consultations in Spain. DIADERM Study	Original/ Descriptive	2019	Spain	Effectiveness
Gowda et al	A Collaborative Tele-Neurology Outpatient Consulation Service in Karnataka: Seven Years of Experience from a Tele-Medicine Center	Original/ Descriptive	2020	India	Effectiveness, timeliness, and equity
Greenwood-Lee et al	A categorisation of problems and solutions to improve patient referrals from primary to specialty care	Narrative review	2018	Canada	Effectiveness
Gregory et al	Store and forward Teledermatology - the Newport way	Original/ Descriptive	2018	England	Effectiveness and efficiency
Hall et al	Patient and Clinician Perspectives on Two Telemedicine Approaches for Treating Patients with Mental Health Disorders in Underserved Areas	Original/ Analytical	2022	United States	Effectiveness, timeliness, and equity
Haron et al	Mobile Phone Imaging in Low Resource Settings for Early Detection of Oral Cancer and Concordance with Clinical Oral Examination	Original/ Analytical	2017	Malaysia	Effectiveness

Haun et al	Health providers' experiences with mental health specialist video consultations in primary care: a qualitative study nested within a randomised feasibility trial	Original/ Descriptive	2021	Germany	Effectiveness
Helmer-Smith et al	The Feasibility of Using Electronic Consultation in Long-Term Care Homes	Original/ Descriptive	2020	Canada	Effectiveness, timeliness, and equity
Hensel et al	Optimizing Electronic Consultation Between Primary Care Providers and Psychiatrists: Mixed-Methods Study	Original/ Descriptive	2018	Canada	Effectiveness and timeliness
Herault et al	Experience of tele-expertise in cardiology in Pays de la Loire	Original/ Descriptive	2019	France	Effectiveness
Hoff et al	Physician Satisfaction With Telehealth: A Systematic Review and Agenda for Future Research	Systematic review	2022	United States	Effectiveness
Ibarra-Barrueta et al	Implementation of a pharmacy e-interconsultation integrated in patient medical record	Original/ Descriptive	2021	Spain	Effectiveness
Ionescu et al	A scoping review of the use of e-learning and e-consultation for healthcare workers in low- and middle-income countries and their potential complementarity	Scoping review	2022	Holland	Effectiveness
Ismail et al	Store-and-forward teledermatology service for primary care providers in Afghanistan	Original/ Descriptive	2018	United States	Effectiveness and equity
Johnston et al	Use of Electronic Consultation System to Improve Access to Care in Pediatric Hematology/Oncology	Original/ Descriptive	2017	Canada	Effectiveness and timeliness
Jones et al	Remote skin cancer diagnosis: Adding images to electronic referrals is more efficient than wait-listing for a nurse-led imaging clinic	Original/ Descriptive	2021	New Zealand	Effectiveness
Joschko et al	Electronic Consultation Services Worldwide: Environmental Scan	Systematic review	2018	Canada	Effectiveness and equity
Joschko et al	Just a click away: exploring patients' perspectives on receiving care through the Champlain BASETM eConsult service	Original/ Descriptive	2018	Canada	Effectiveness
Katz et al	iConnect CKD - virtual medical consulting: A web-based chronic kidney disease, hypertension and diabetes integrated care program	Original/ Analytical	2018	Australia	Effectiveness and timeliness
Keely et al	Specialist Perspectives on Ontario Provincial Electronic Consultation Services	Original/ Descriptive	2019	Canada	Effectiveness
Keely et al	Specialist Participation in e-Consult and e-Referral Services: Best Practices	Original/ Descriptive	2021	Canada	Effectiveness
Keely et al	Insights into Specialists' Participation and Self-Reported Billing Times in a Multispecialty eConsult Service: Correlating Response Length with Outcomes and Satisfaction	Original/ Descriptive	2020	Canada	Effectiveness
Keely et al	Improving access to gastroenterologist using econsultation: A way to potentially shorten wait times	Original/ Descriptive	2018	Canada	Effectiveness and timeliness
Keely et al	Unique Educational Opportunities for PCPs and Specialists Arising From Electronic Consultation Services	Letter to the editor	2017	Canada	Effectiveness
Keely et al	A comparison of faxed referrals and eConsult questions for rheumatology referrals: a descriptive study	Original/ Descriptive	2021	Canada	Effectiveness
Kendall et al	Evolving Toward Shared HIV Care Using the Champlain BASE eConsult Service	Original/ Descriptive	2019	Canada	Effectiveness

Keshvardoost et al	Design, development, and evaluation of a teleophthalmology system using a low-cost fundus camera	Original/ Descriptive	2020	Iran	Effectiveness, timeliness, and equity
Kim et al	Cardiology electronic consultation (e-consult) use by primary care providers at VA medical centres in New England	Original/ Descriptive	2019	United States	Effectiveness and timeliness
Kim et al	Implementation and evaluation of Stanford Health Care store-and-forward teledermatology consultation workflow built within an existing electronic health record system	Original/ Descriptive	2020	United States	Effectiveness
Kips et al	Teledermatology in Belgium: a pilot study	Original/ Descriptive	2020	Belgium	Effectiveness
Knox et al	e-Consult implementation success: lessons from 5 county-based delivery systems	Original/ Descriptive	2020	United States	Effectiveness
Koch et al	TELEDerm: Implementing store-and-forward teledermatology consultations in general practice: Results of a cluster randomized trial	Original/ Analytical	2022	Germany	Effectiveness
Koenig et al	Managing professional knowledge boundaries during ECHO telementoring consultations in two Veterans Affairs specialty care liver clinics: A theme-oriented discourse analysis	Original/ Descriptive	2019	United States	Effectiveness
Kohlert et al	Improving access to otolaryngology-head and neck surgery expert advice through eConsultations	Original/ Descriptive	2018	Canada	Effectiveness
Koraishy et al	Telenephrology: An Emerging Platform for Delivering Renal Health Care	Narrative review	2020	United States	Effectiveness, efficiency, and equity
Koriat et al	Tele-ophthalmology as an aid tool for primary care physicians in the IDF, during the Covid-19 lockdown	Original/ Descriptive	2022	Israel	Effectiveness and timeliness
Kwok et al	Electronic consultation system demonstrates educational benefit for primary care providers	Original/ Descriptive	2018	United States	Effectiveness
Lai et al	The impact of electronic consultation on a Canadian tertiary care pediatric specialty referral system: A prospective single-center observational study	Original/ Descriptive	2018	Canada	Effectiveness and timeliness
Leduc et al	Improving primary care access to respirologists using eConsult	Original/ Descriptive	2021	Canada	Effectiveness and timeliness
Lee et al	Teledermatology: A Review and Update	Narrative review	2018	United States	Effectiveness, timeliness, and efficiency
Lee et al	Perspectives of VA Primary Care Clinicians Toward Electronic Consultation-Related Workload Burden: A Qualitative Analysis	Original/ Descriptive	2020	United States	Effectiveness
Lee et al	Electronic consultations and clinician burnout: An antidote to our emotional pandemic?	Original/ Descriptive	2021	United States	Effectiveness
Lee et al	Primary Care Practitioners' Perceptions of Electronic Consult Systems: A Qualitative Analysis	Original/ Descriptive	2018	United States	Effectiveness
Leonard et al	Common Ground: Primary Care and Specialty Clinicians' Perceptions of E-Consults in the Veterans Health Administration	Original/ Descriptive	2022	United States	Effectiveness
Leyton et al	Evaluation of the Effects of the COVID-19 Pandemic on Electronic Consultation Use in Primary Care	Original/ Descriptive	2022	United States	Effectiveness and safety

Liddy et al	A Systematic Review of Asynchronous, Provider-to-Provider, Electronic Consultation Services to Improve Access to Specialty Care Available Worldwide	Systematic review	2019	Canada	Effectiveness and efficiency
Liddy et al	Improving Equity of Access Through Electronic Consultation: A Case Study of an eConsult Service	Original/ Descriptive	2019	Canada	Effectiveness and equity
Liddy et al	Impact of the Connected Medicine collaborative in improving access to specialist care: a cross-sectional analysis	Original/ Descriptive	2021	Canada	Effectiveness
Liddy et al	Supporting the spread and scale-up of electronic consultation across Canada: cross-sectional analysis	Original/ Descriptive	2019	Canada	Effectiveness
Liddy et al	Using the Quadruple Aim Framework to Measure Impact of Heath Technology Implementation: A Case Study of eConsult	Original/ Descriptive	2018	Canada	Effectiveness and efficiency
Liddy et al	Assessment of the Generalizability of an eConsult Service through Implementation in a New Health Region	Original/ Descriptive	2019	Canada	Effectiveness
Liddy et al	Improving access to specialists in remote communities: a cross-sectional study and cost analysis of the use of eConsult in Nunavut	Original/ Descriptive	2017	Canada	Effectiveness, efficiency, and equity
Liddy et al	Primary Care Providers' Perspectives on the Ontario eConsult Program	Original/ Descriptive	2021	Canada	Effectiveness
Liddy et al	Prevention of delayed referrals through the Champlain BASE eConsult service	Original/ Descriptive	2017	Canada	Effectiveness and safety
Liddy et al	eConsults and Learning Between Primary Care Providers and Specialists	Original/ Descriptive	2019	Canada	Effectiveness
Liddy et al	Understanding the impact of a multispecialty electronic consultation service on family physician referral rates to specialists: a randomized controlled trial using health administrative data	Original/ Analytical	2019	Canada	Effectiveness
Liddy et al	The use of electronic consultations is associated with lower specialist referral rates: a cross-sectional study using population-based health administrative data	Original/ Analytical	2018	Canada	Effectiveness and efficiency
Liddy et al	Effective Integration of an eConsult Service into an Existing Referral Workflow Within a Primary Care Clinic	Original/ Descriptive	2020	Canada	Effectiveness
Liddy et al	Sustainability of a Primary Care-Driven eConsult Service	Original/ Descriptive	2018	Canada	Effectiveness
Liddy et al	The Provincial Spread and Scale of the Ontario eConsult Service: Evaluation of the First 2 Years	Original/ Descriptive	2022	Canada	Effectiveness
Liddy et al	Supporting Better Access to Chronic Pain Specialists: The Champlain BASE(™) eConsult Service	Original/ Descriptive	2017	Canada	Effectiveness
Lieng et al	Primary Care Physician Adherence to Telepsychiatry Recommendations: Intermediate Outcomes from a Randomized Clinical Trial	Original/ Analytical	2022	United States	Effectiveness
Lin et al	Return on Investment Analysis of Health Experts onLine at Portsmouth: A 2-Year Review of the Navy's Newest Teleconsultation System	Original/ Descriptive	2017	United States	Effectiveness and efficiency

López-Liria et al	Teledermatology versus Face-to-Face Dermatology: An Analysis of Cost-Effectiveness from Eight Studies from Europe and the United States	Systematic review	2022	Spain	Effectiveness and efficiency
Lowenstein et al	Psychiatric Consultation at Your Fingertips: Descriptive Analysis of Electronic Consultation From Primary Care to Psychiatry	Original/ Descriptive	2017	United States	Effectiveness and timeliness
Lu et al	Implementation of psychiatric e-consultation in family medicine community health centers	Original/ Descriptive	2019	United States	Effectiveness and timeliness
Lutz de Araujo et al	The use of telemedicine to support Brazilian primary care physicians in managing eye conditions: The TeleOftalmo Project	Original/ Descriptive	2020	Brazil	Effectiveness and timeliness
Mahmoud et al	Using continuous quality improvement to design and implement a telepsychiatry program in rural Illinois	Original/ Descriptive	2020	United States	Effectiveness and timeliness
Malas et al	Exploring the Telepsychiatry Experience: Primary Care Provider Perception of the Michigan Child Collaborative Care (MC3) Program	Original/ Descriptive	2019	United States	Effectiveness and timeliness
Malcolm et al	E-Consults' Impact on Care Access and Wait Times in Rheumatology	Original/ Descriptive	2022	United States	Effectiveness
Mann et al	Adopting innovation in gynaecology: The introduction of e-consult	Original/ Descriptive	2018	New Zealand	Effectiveness and safety
Mantese et al	Telemedicine as support for primary care referrals to neurologists: Decision-making between different specialists when guiding the case over the phone	Original/ Descriptive	2021	Brazil	Effectiveness and timeliness
Maria et al	Teleconsultations and their implications for health care: A qualitative study on patients' and physicians' perceptions	Original/ Descriptive	2022	Portugal	Effectiveness
Marwaha et al	Comparative effectiveness study of face-to-face and teledermatology workflows for diagnosing skin cancer	Original/ Descriptive	2019	United States	Effectiveness and safety
McAfee et al	Store-and-forward teledermatology improves care and reduces dermatology referrals from walk-in clinics: A retrospective descriptive study	Letter to the editor	2020	United States	Effectiveness, timeliness, and efficiency
McGovern et al	Implementing a National Electronic Referral Program: Qualitative Study	Original/ Descriptive	2018	Ireland	Effectiveness
McKellips et al	Improving access to allied health professionals through the Champlain BASE™ eConsult service: a cross-sectional study in Canada	Original/ Descriptive	2017	Canada	Effectiveness and equity
Mechanic et al	TeleConnect: digitally connecting physicians across the health care system	Original/ Descriptive	2021	United States	Effectiveness
Meeker et al	Effect of Peer Benchmarking on Specialist Electronic Consult Performance in a Los Angeles Safety-Net: a Cluster Randomized Trial	Original/ Analytical	2021	United States	Effectiveness
Melius et al	Impact of Telehealth on Health Economics	Narrative review	2020	United States	Effectiveness, efficiency, and equity
Miller et al	Real-time teledermatology clinics in a tertiary public hospital: A clinical audit	Original/ Descriptive	2020	Australia	Effectiveness, timeliness, and equity

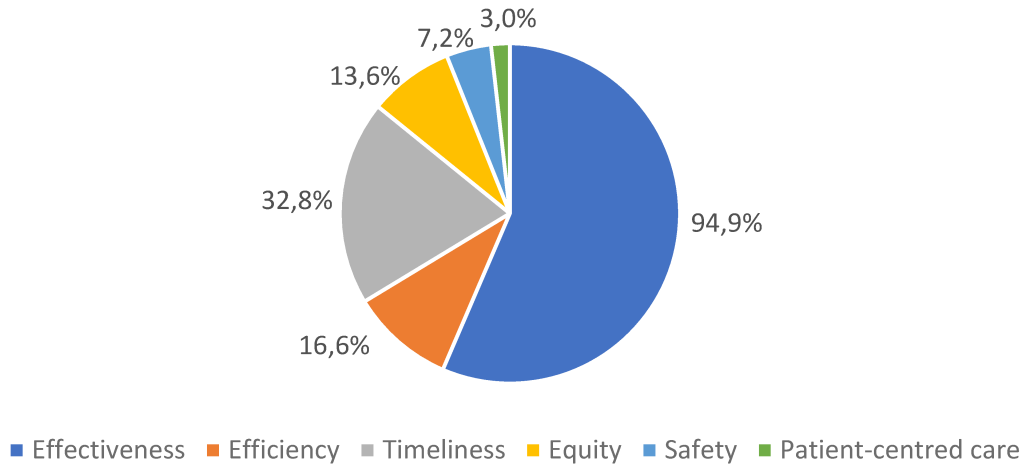
Mizes et al	Access to consultative dermatologic care via physician-to-physician asynchronous outpatient teledermatology	Original/ Descriptive	2021	United States	Effectiveness and timeliness
Mohammed et al	The impact of integrating electronic referral within a musculoskeletal model of care on wait time to receive orthopedic care in Ontario	Original/ Descriptive	2020	Canada	Effectiveness
Mohan et al	Store and forward teledermatology improves dermatology knowledge among referring primary care providers: A survey-based cohort study	Letter to the editor	2018	United States	Effectiveness and equity
Morrissette et al	Attitudes and perceived barriers toward store-and-forward teledermatology among primary care providers of the rural Mississippi	Original/ Descriptive	2022	United States	Effectiveness and equity
Muehlensiepen et al	Acceptance of telerheumatology by rheumatologists and general practitioners in Germany: Nationwide cross-sectional survey study	Original/ Descriptive	2021	Germany	Effectiveness and timeliness
Mundt et al	Telepsychiatry Consultation for Primary Care Treatment of Children and Adolescents Receiving Child Protective Services in Chile: Mixed Methods Feasibility Study	Original/ Descriptive	2021	Chile	Effectiveness, timeliness, and equity
Nabelsi et al	Improving the Referral Process, Timeliness, Effectiveness, and Equity of Access to Specialist Medical Services Through Electronic Consultation: Pilot Study	Original/ Descriptive	2019	Canada	Effectiveness, timeliness, and equity
Naka et al	Impact of dermatology eConsults on access to care and skin cancer screening in underserved populations: A model for teledermatology services in community health centers	Original/ Descriptive	2018	United States	Effectiveness and equity
Narva et al	Managing CKD by Telemedicine: The Zuni Telenephrology Clinic	Narrative review	2017	Mexico	Effectiveness, timeliness, and equity
Ness et al	Using an Innovative Telehealth Model to Support Community Providers Who Deliver Perinatal HIV Care	Original/ Descriptive	2017	United States	Effectiveness, timeliness, and safety
Olayiwola et al	Understanding the Potential for Patient Engagement in Electronic Consultation and Referral Systems: Lessons From One Safety Net System	Original/ Descriptive	2018	United States	Effectiveness and patient-centred care
Olayiwola et al	Electronic consultation impact from the primary care clinician perspective: Outcomes from a national sample	Original/ Descriptive	2019	United States	Effectiveness and safety
Olayiwola et al	Leveraging Electronic Consultations to Address Severe Subspecialty Care Access Gaps in Nigeria	Original/ Descriptive	2020	United States	Effectiveness, timeliness, and equity
Ong et al	An Integrated Kidney Care eConsult Practice Model: Results from the iKinect Project	Original/ Descriptive	2019	Canada	Effectiveness
Oseran et al	HbA1c-Triggered Endocrinology Electronic Consultation for Type 2 Diabetes Management	Original/ Analytical	2020	United States	Effectiveness
Osman et al	Barriers and facilitators for implementation of electronic consultations (eConsult) to enhance access to specialist care: a scoping review	Scoping review	2019	Canada	Effectiveness, timeliness, equity, and safety
O'Toole et al	The association between question type and the outcomes of a Dermatology eConsult service	Original/ Descriptive	2017	Canada	Effectiveness
Papadimitriou et al	Teledermoscopy of common pink, flat and scaly lesions as an adjuvant diagnostic method in everyday clinical practice: so far, so close	Letter to the editor	2021	Greece	Effectiveness and timeliness

Patil et al	Specialist to non-specialist teleconsultations in chronic respiratory disease management: A systematic review	Systematic review	2021	India, England	Effectiveness
Pavón et al	E-consultation as a tool for the relationship between Primary Care and Endocrinology	Original/ Descriptive	2021	Spain	Effectiveness
Pego-Reigosa et al	Analysis of the implementation of an innovative IT solution to improve waiting times, communication with primary care and efficiency in Rheumatology	Original/ Descriptive	2022	Spain	Effectiveness
Peña et al	Balance of the email consultation in the COVID-19 pandemic	Letter to the editor	2021	Spain	Effectiveness and efficiency
Perdoncini et al	Use of smartphone video calls in the diagnosis of oral lesions: Teleconsultations between a specialist and patients assisted by a general dentist	Original/ Descriptive	2021	Brazil	Effectiveness, timeliness, equity and safety
Pfeil et al	A telemedicine strategy to reduce waiting lists and time to specialist care: A retrospective cohort study	Original/ Analytical	2020	Brazil	Effectiveness
Piette et al	Impact of a store-and-forward teledermatology intervention versus usual care on delay before beginning treatment: A pragmatic cluster-randomized trial in ambulatory care	Original/ Analytical	2017	France	Effectiveness
Pignatiello et al	Lessons learned in a physician referral to pediatric telemental health services program	Original/ Descriptive	2019	Canada	Effectiveness, timeliness, and equity
Potapov et al	Electronic Consultations as an Educational Tool to Improve the Care of Transgender Patients in Primary Care	Original/ Descriptive	2021	United States	Effectiveness
Poulin et al	Offering eConsult to Family Physicians With Patients on a Pain Clinic Wait List: An Outreach Exercise	Original/ Descriptive	2018	Canada	Effectiveness
Powers et al	Creation of an Interprofessional Teledementia Clinic for Rural Veterans: Preliminary Data	Original/ Descriptive	2017	United States	Effectiveness and timeliness
Pun et al	Comparing the content of traditional faxed consultations to eConsults within an academic endocrinology clinic	Original/ Descriptive	2021	Canada	Effectiveness
Rankine et al	Optimizing e-Consultations to Adolescent Medicine Specialists: Qualitative Synthesis of Feedback From User-Centered Design	Original/ Descriptive	2021	United States	Effectiveness, safety, and patient-centred care
Rasheed et al	Impact of endocrine E-consultation on SGLT2i and GLP-1 RA prescription	Original/ Analytical	2021	United States	Effectiveness
Ray et al	Connected Subspecialty Care: Applying Telehealth Strategies to Specific Referral Barriers	Narrative review	2020	United States	Effectiveness and equity
Rea et al	Understanding Caregiver Perspectives on an Electronic Consultation and Referral System	Original/ Descriptive	2022	United States	Effectiveness
Rea et al	Shared Care: Using an Electronic Consult Form to Facilitate Primary Care Provider-Specialty Care Coordination	Original/ Descriptive	2018	United States	Effectiveness and timeliness
Rikin et al	Impact of an Opt-In eConsult Program on Primary Care Demand for Specialty Visits: Stepped-Wedge Cluster Randomized Implementation Study	Original/ Analytical	2020	United States	Effectiveness
Rizvi et al	Teledermatology in Norway using a mobile phone app	Original/ Descriptive	2020	Norway	Effectiveness and timeliness

Romero et al	Practice Models in Teledermatology in Spain: Longitudinal Study, 2009-2014	Original/ Descriptive	2018	Spain	Effectiveness
Rostom et al	Improving access to rheumatologists: Use and benefits of an electronic consultation service	Original/ Descriptive	2018	Canada	Effectiveness
Rusell et al	Electronic consultations (eConsults): a proof of concept trial in Australia	Original/ Descriptive	2021	Australia	Effectiveness
Rusell et al	Key Components of Traditional Consultation Letters and Their Relevance to Electronic Consultation Replies: A Systematic Review	Systematic review	2020	Canada	Effectiveness
Sanavro et al	Prisma Platform Study Group. Evaluation of the First Year(s) of Physicians Collaboration on an Interdisciplinary Electronic Consultation Platform in the Netherlands: Mixed Methods Observational Study	Original/ Descriptive	2022	Holland	Effectiveness
Schettini et al	Keeping care connected: e-Consultation program improves access to nephrology care	Original/ Descriptive	2019	United States	Effectiveness
Serhal et al	Characterizing Family Physicians Who Refer to Telepsychiatry in Ontario	Original/ Descriptive	2021	Canada	Effectiveness, timeliness, and equity
Severe et al	Clinical Predictors of Engagement in Teleintegrated Care and Telereferral Care for Complex Psychiatric Disorders in Primary Care: a Randomized Trial	Original/ Analytical	2022	United States	Effectiveness and timeliness
Silva et al	Orthopedic Asynchronous Teleconsultation for Primary Care Patients by a Large-Scale Telemedicine Service in Minas Gerais, Brazil	Original/ Descriptive	2021	Brazil	Effectiveness
Singh et al	Evaluation of an electronic consultation service for transgender care	Original/ Descriptive	2021	Canada	Effectiveness and timeliness
Singh et al	Evaluation of an Electronic Consultation Service for COVID-19 Care	Original/ Descriptive	2022	Canada	Effectiveness and timeliness
Skayem et al	Teledermatology: The perspective of French general practitioners	Letter to the editor	2021	France	Effectiveness
Skeith et al	The use of eConsults to improve access to specialty care in thrombosis medicine	Original/ Descriptive	2017	Canada	Effectiveness and timeliness
Smith et al	Pharmacist eConsult service for primary care medication optimization and safety	Original/ Descriptive	2021	United States	Effectiveness and timeliness
Snoswell et al	Current Economic Evidence for Teledermoscopy[204]	Original/ Descriptive	2020	Australia	Effectiveness and efficiency
Snoswell et al	What do Australian dermatologists expect to be paid for store-and-forward teledermoscopy? A preliminary investigation	Original/ Descriptive	2019	Australia	Efficiency
Stanistreet et al	Physician Remuneration for Remote Consults: An Overview of Approaches across Canada	Original/ Descriptive	2017	Canada	Efficiency
Thompson et al	Building eConsult (Electronic Consults) Capability at an Academic Medical Center to Improve Efficiencies in Delivering Specialty Care	Original/ Descriptive	2021	United States	Effectiveness and efficiency
Tian et al	Characteristics and Outcomes of Physician-to-Physician Telephone Consultation Programs: Environmental Scan	Systematic review	2021	Canada	Effectiveness and efficiency
Tobin-Schnittger et al	Improving quality of referral letters from primary to secondary care: a literature review and discussion paper	Systematic review	2018	Ireland	Effectiveness and efficiency
Tönnies et al	Health policy experts' perspectives on implementing mental health specialist video consultations in routine primary care - a qualitative interview study	Original/ Descriptive	2021	Germany	Effectiveness

Tran et al	eConsult Specialist Quality of Response (eSQUARE): A novel tool to measure specialist correspondence via electronic consultation	Original/ Descriptive	2021	Canada	Effectiveness
Tran et al	What makes a high-quality electronic consultation (eConsult)? A nominal group study	Original/ Descriptive	2020	Canada	Effectiveness
Tull et al	Teledermatology in the inpatient setting	Narrative review	2017	United States	Effectiveness and timeliness
Tuot et al	Evaluating diverse electronic consultation programs with a common framework	Original/ Descriptive	2018	United States, Canada	Effectiveness and timeliness
Tyler et al	A Community-Health System Intervention to Improve the Primary Healthcare of Adults With Down Syndrome Through Electronic Consultations	Original/ Descriptive	2021	United States	Effectiveness and equity
Ulloa et al	A cohort study of a general surgery electronic consultation system: safety implications and impact on surgical yield	Original/ Descriptive	2017	United States	Effectiveness
Urken et al	The role of electronic feedback loops in the continuous quality improvement of thyroid nodule and thyroid cancer care	Narrative review	2017	United States	Effectiveness
Van Cleave et al	Primary Care Providers' Use of a Child Psychiatry Telephone Support Program	Original/ Descriptive	2018	United States	Effectiveness and timeliness
van Sinderen et al	Is Teledermoscopy Improving General Practitioner Skin Cancer Care?	Original/ Descriptive	2019	Holland	Effectiveness and efficiency
Vázquez et al	Doctors' experience of coordination across care levels and associated factors. A cross-sectional study in public healthcare networks of six Latin American countries	Original/ Descriptive	2017	Argentina, Brazil, Chile, Colombia, Mexico, and Uruguay	Effectiveness
Verma et al	Parent perspectives on family-centered pediatric electronic consultations: Qualitative study	Original/ Descriptive	2020	United States	Patient-centred care
Veronese et al	Teledermoscopy in the Diagnosis of Melanocytic and Non-Melanocytic Skin Lesions: Nurugo™ Derma Smartphone Microscope as a Possible New Tool in Daily Clinical Practice	Original/ Descriptive	2022	Italy	Effectiveness and timeliness
Vidal-Alaball et al	A cost savings analysis of asynchronous teledermatology compared to face-to-face dermatology in Catalonia	Original/ Descriptive	2018	Spain	Efficiency
Vimalanda et al	Electronic consultations (E-consults) and their outcomes: a systematic review	Systematic review	2020	United States	Effectiveness
Vimalanda et al	Tools to improve referrals from primary care to specialty care	Original/ Descriptive	2019	United States	Effectiveness
Wade et al	Aiming for elimination: Outcomes of a consultation pathway supporting regional general practitioners to prescribe direct-acting antiviral therapy for hepatitis C	Original/ Descriptive	2018	Australia	Effectiveness
Walker et al	Electronic Consultation Between Primary Care Providers and Radiologists	Original/ Descriptive	2020	Canada	Effectiveness and safety
Wang et al	Pathology perspective on gynaecologic malignancy screening questions in electronic consultation	Original/ Descriptive	2021	Canada	Effectiveness
Wasfy et al	Initial experience with endocrinology e-consults	Original/ Descriptive	2017	United States	Effectiveness
Whittington et al	Cost savings associated with electronic specialty consultations	Original/ Descriptive	2021	United States	Effectiveness and efficiency

Winpenny et al	Improving the effectiveness and efficiency of outpatient services: a scoping review of interventions at the primary-secondary care interface	Scoping review	2017	England	Effectiveness and efficiency
Wrenn et al	Analysis of an electronic consultation program at an academic medical centre: Primary care provider questions, specialist responses, and primary care provider actions	Original/ Descriptive	2017	United States	Effectiveness
Xu et al	A coordinated PCP-Cardiologist Telemedicine Model (PCTM) in China's community hypertension care: Study protocol for a randomized controlled trial	Original/ Analytical	2017	China	Effectiveness
Yellowlees et al	Asynchronous Telepsychiatry: a Component of Stepped Integrated Care	Original/ Analytical	2018	United States	Effectiveness and efficiency
Yellowlees et al	Clinical outcomes of asynchronous versus synchronous telepsychiatry in primary care: Randomized controlled trial	Original/ Analytical	2021	United States	Effectiveness
Young et al	Pilot of integrated, colocated neurology in a primary care medical home	Original/ Descriptive	2017	United States	Effectiveness and efficiency
Zemanek et al	Clinical Trends Over the First Year of a Psychiatric Electronic Consult Service	Original/ Descriptive	2022	United States	Effectiveness
Zuniga et al	Using Telenephrology to Improve Access to Nephrologist and Global Kidney Management of CKD Primary Care Patients	Original/ Descriptive	2020	Chile	Effectiveness and timeliness



Supplemental Figure 1 Percentage of articles selected by quality domains evaluated