Recommendations Regarding the Appropriateness of Virtual Care: A Systematic Review

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Abstract

Objective: *To identify and analyze factors influencing the appropriateness of virtual and in-person care and to synthesize current evidence-based recommendations to assist health care providers in determining when virtual or in-person care is most suitable.*

Methods: *Four databases (MEDLINE, CINAHL, Embase, and APA PsychInfo) and Google Scholar were searched to identify qualitative, quantitative, and mixed methods studies and clinical practice guidelines published between January 2014 and January 2024 focused on appropriateness of virtual care. Articles were extracted and uploaded to Covidence for screening. Two researchers screened the articles independently, and a third researcher resolved any conflicts. Data were extracted from articles, and factors influencing the appropriateness of virtual care were categorized using thematic analysis.*

Results: *The search retrieved 5,136 articles, of which 75 met inclusion criteria and were included in the review. An additional eight articles were identified following a supplemental search of reference lists, resulting in a total of 83 articles included in the study. Six primary concepts influencing the appropriateness of virtual care were identified from the literature (patient characteristics, clinical presentation and disease, timepoint in the care process, burden of care, provider factors, and technology platform) and 22 subconcepts. A flowchart incorporating these concepts was developed to assist in clinical decision-making regarding the suitability of virtual and in-person care.*

Discussion: *Findings from this systematic review provide clinicians with a structured approach to evaluating the suitability of virtual versus in-person care, supporting evidence-based decisions and effective integration of virtual care into the health care system.*

Keywords: *virtual care, systematic review, health care delivery, telemedicine, appropriateness*

Introduction

Virtual care consists of any interaction between patients and/or members of their circle of care, occurring remotely, using any forms of communication or information technologies, with the aim of facilitating or maximizing the quality and effectiveness of patient care.[1] While virtual technologies have existed for many years, it was not until the early stages of the COVID-19 pandemic that it became a prominent option of care, in response to the public health goal of minimizing in-person interactions.[2] Restrictions on in-person interactions and changes in billing codes, policies, and regulations have led to an exponential increase in virtual care use.[3] While the rapid implementation of virtual care has been challenging for patients and providers, both have positive views of virtual care, and as a result, it is likely to be an increasing component of health care postpandemic.[4,5]

Technological advancements now make virtual care a possibility for a significant portion of mainstream care that did not seem possible just 20 years ago. With a broader array of options for care interactions, care providers must now assess which method of interaction is most appropriate for a given patient and episode of care. Appropriateness of care can be defined as health care that is suitable or proper for a specific circumstance; in other words, the right care for the right patient at the right time, served by the right provider in the

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right location.[6] An integrative review found appropriateness of care was conceptualized in five domains: evidence-based care, resource use, patient-centeredness, clinical expertise, and equity.[7] Inappropriate care, including the misuse, underuse, and overuse of resources,[8] can delay care,[9] lead to adverse patient outcomes,[10] and drain health care resources.[11]

However, most of the relevant literature explores the definition of appropriateness in the context of in-person care. Furthermore, while significant research has accumulated on how to best conduct virtual care, less is known about when virtual care is (in)appropriate and what considerations are needed to make that determination. For many providers, virtual care appropriateness remains novel and ill-defined.

To support health care providers, health systems, and policy makers in navigating care appropriateness in the era of virtual care, we conducted a systematic review to identify and analyze factors influencing the appropriateness of virtual and in-person care and to synthesize current evidence-based recommendations to assist health care providers in determining when virtual care is most suitable.

Methods

Reporting of this study adheres to the Preferred Reporting Items for Systematic reviews and Meta-Analyses 2020 statement.[12] A search strategy was developed in collaboration with a medical librarian experienced in searches for systematic reviews to identify articles focused on the appropriateness of care in the era of virtual care. Keywords and controlled vocabulary were identified for the concepts of virtual care and appropriateness. The search strategy was initially developed for MEDLINE (OVID) and subsequently translated for Embase (OVID), CINAHL (EBSCOHost), and American Psychological Association PsycInfo (OVID) (Supplementary Table S1). The search was limited to articles published from 2014 to the date of the search (January 22, 2024). In addition to the above databases, we searched Google Scholar and reviewed the reference lists of relevant studies to identify additional studies that met inclusion criteria.

References were exported from the databases and imported into Covidence, a web-based software platform to streamline systematic, scoping, and other detailed reviews, and duplicates were removed. Article titles and abstracts were screened independently for relevance by two reviewers, with a third reviewer for conflicts. The full text of articles deemed potentially relevant following title and abstract screening was subsequently reviewed. The following inclusion and exclusion criteria were applied:

INCLUSION CRITERIA

1. Qualitative, quantitative, or mixed methods studies or clinical practice guidelines focused on appropriateness of virtual care (determining when virtual care is (in) appropriate)
2. Published January 1, 2014—date of search January 22, 2024
3. English or French language articles

EXCLUSION CRITERIA

1. Book chapters, commentaries, editorials, conference abstracts, master's theses, or PhD theses
2. Grey literature
3. Nonhuman (e.g., veterinary) and nonacademic studies

Discrepancies between the two reviewers were resolved with a third reviewer. Papers selected for inclusion in the study were then reviewed for factors influencing the suitability of virtual and in-person care and for recommendations to assist health care providers in determining when virtual care is most suitable. Key information from articles, including study design, concepts and factors related to the appropriateness of virtual care, and recommendations regarding virtual care, was abstracted using Elicit, an artificial intelligence-powered tool to assist researchers in conducting literature reviews, with subsequent full verification independently by two members of the research team. We assessed the quality of evidence using the modified Oxford Center for Evidence-Based Medicine rating scheme.[13,14] Two independent reviewers rated the articles, and disagreements were resolved by a third reviewer. Factors associated with the suitability of the type of care were identified in an iterative manner by two researchers using thematic analysis.[15]

Results

The search yielded 83 articles addressing the appropriateness of virtual care. Analysis of these sources revealed six primary concepts and 22 subconcepts that emerged as overarching themes in determining when virtual care is appropriate or inappropriate.

STUDY CHARACTERISTICS

The search strategy retrieved an initial 5,136 articles published between January 2014 and January 2024 (*Fig. 1*). After automated and manual filtering for duplicates and screening title and abstracts, 1,511 full-text articles were assessed for eligibility. Seventy-five articles met inclusion criteria following full-text review. An additional 8 articles were identified following a supplemental search of reference lists, resulting in a total of 83 articles included in the study. These studies

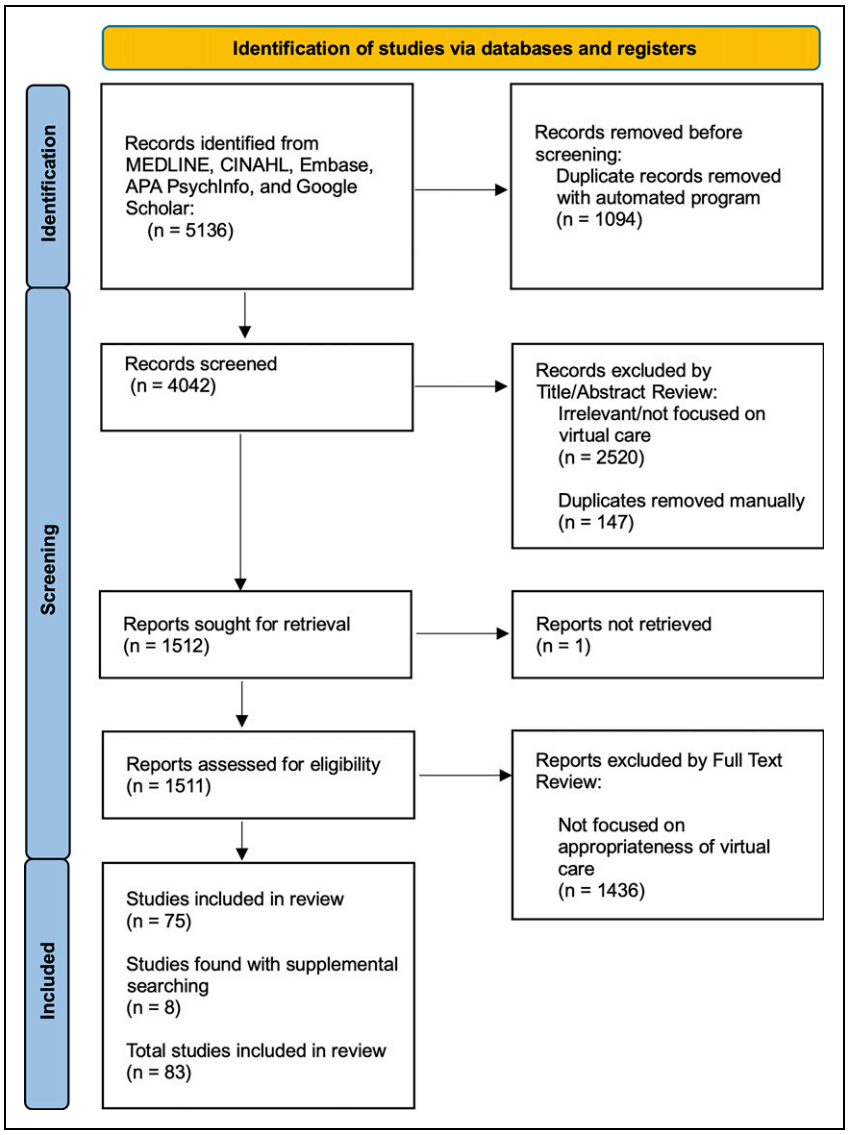

Fig. 1. Identification of studies via databases and academic search engine.

included practice guidelines, quantitative studies, qualitative studies based on interviews with clinicians and patients, and mixed methods studies (Supplementary Table S2).

Factors Influencing the Appropriateness of the Type of Care

The following considerations relating to the decision to use virtual or in-person care were identified: patient characteristics, clinical presentation and disease, timepoint in the care process, burden of care, provider factors, and technology platform. These concepts are thematically presented in *Fig. 2*, highlighting the concepts and several subconcepts that define the appropriateness of virtual care. Recommendations related to these concepts to determine when virtual care is appropriate or when in-person care is more appropriate, along with general recommendations for conducting appropriate virtual care, are presented in *Table 1*.

PATIENT CHARACTERISTICS

Eight studies highlighted patient preference as a key factor in determining the suitability of virtual care.[5,21,23,30,40,54,66,83] A preference for virtual care generally makes it more appropriate. While the reasons for a patient's preference can vary—such as lack of necessary technology, privacy concerns, or digital literacy—these studies emphasized that patient preference for virtual or in-person care is crucial in deciding the appropriateness of virtual care, regardless of the reason.[5,21,23,30,40,54,66,83]

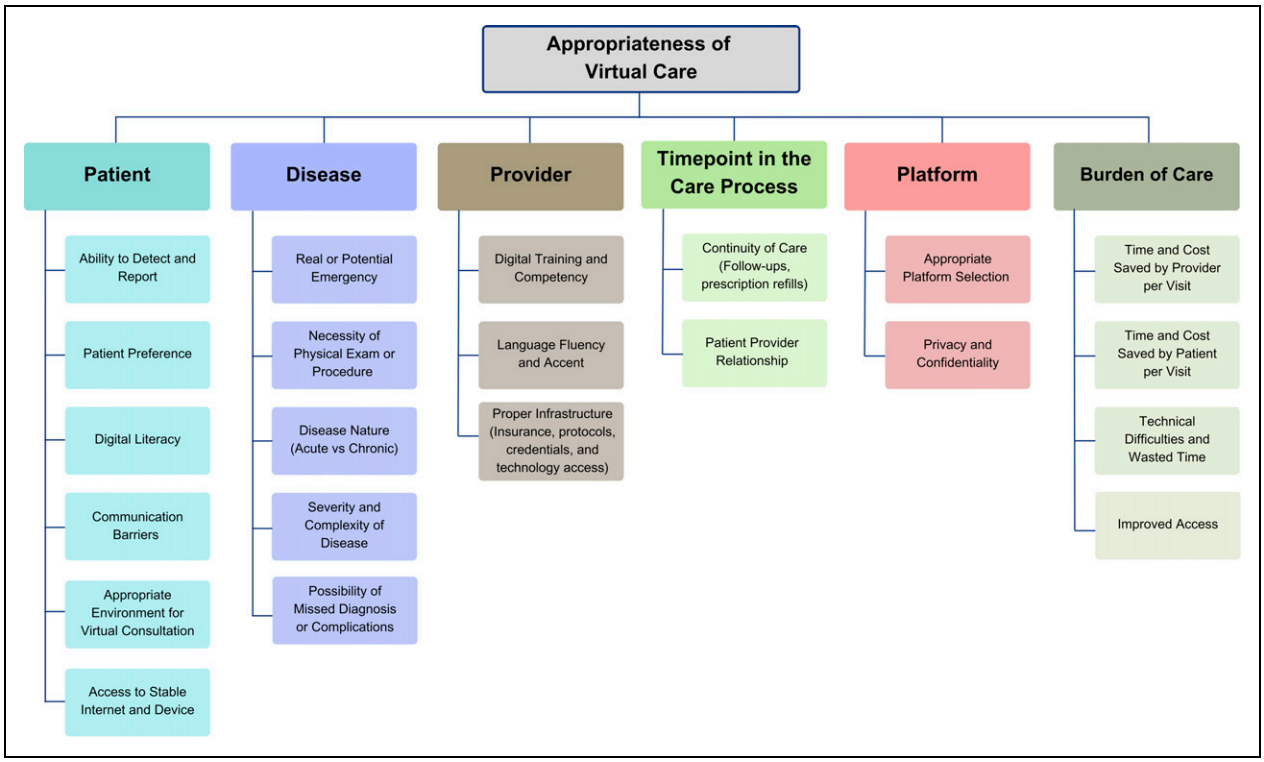

Fig. 2. Thematic representation of concepts and subconcepts that define the appropriateness of virtual care.

Six studies highlighted the patient's digital literacy as a factor in deciding whether virtual care is appropriate or not. When a patient is literate about the use of technologies necessary for virtual care, virtual care would be more appropriate for them compared with patients who lack the needed digital literacy.[16,21,24,50]

For virtual care to be effective, certain communication barriers must be addressed.[5,30,36,41,84,85] Patients need to be fluent in the language of the consultation and not have a strong accent that could impede understanding during virtual consultations. If language barriers are present, virtual care platforms should be capable of involving a third person who speaks the patient's language to act as a translator, or it may be preferable to consider in-person care.[61] Patients must also be capable of detecting and reporting symptoms accurately; this means that some pediatric or elderly patients, very ill patients, or patients who have severe cognitive or intellectual disabilities or a very limited educational background may struggle to communicate their symptoms accurately.[5,21] This can lead to missed diagnoses, overlooked complications, or inaccurate assessment of disease severity.

Access to stable internet and a compatible device is also crucial.[16,17,41,82,83] Some rural and northern areas lack stable internet connections, and individuals with lower socioeconomic status may not be able to afford devices to facilitate virtual care, rendering virtual care that utilizes the internet less appropriate for these patients unless other community resources are available. Lastly, an appropriate environment for virtual care must be considered. While most patients may have a quiet and private room to connect with their health care providers, others, such as university students with multiple roommates or parents with several children, may not have such a conducive setting.[5,30] However, what constitutes an appropriate environment is variable and depends on patient preference and clinical context.

CLINICAL PRESENTATION AND DISEASE

When considering whether virtual care is appropriate for a patient, the clinical presentation and nature of the disease are also crucial factors. For chronic and stable conditions requiring frequent follow-up visits, virtual care would be more appealing, as it reduces the burden of transportation and travel for the patient. This convenience can improve adherence to follow-up schedules and overall management of chronic diseases.[21,40,50,54,83] However, for severe diseases or conditions in which emergent treatment may be required, in-person care is generally more appropriate to ensure immediate and comprehensive medical intervention.[21,30,40,42] Exceptions exist in scenarios where in-person care is not possible, and virtual care then becomes the only viable option. Ultimately, the decision to opt for virtual or in-person care should be based on the nature of the disease, the risk of complications, the potential for missed diagnoses, and the likelihood of

Table 1. Compiled Recommendations Regarding When Virtual Care or in-Person Care is Appropriate along with General Recommendations to Carry out Appropriate Virtual Care

APPROPRIATENESS PILLARS	MORE APPROPRIATE FOR VIRTUAL CARE	LESS APPROPRIATE FOR VIRTUAL CARE	GENERAL RECOMMENDATIONS
Patient characteristics	Patients with regular access to video-enabled devices and good internet connection.[16–19] Older or vulnerable populations unable to attend in-person visits.[19,20] Patients with substantial mobility challenges, at risk when leaving home (e.g., immunocompromised), or when something within the home is vital for decision-making (e.g., reviewing medications or access to caregivers).[4,17,21,22] Patients comfortable with the level of privacy possible with virtual care.[23]	Patient or family prefers in-person care.[23–26] Patients with sensory or cognitive impairments, significant developmental delays, behavioral limitations, or those lacking family/caregiver support for virtual care.[20,27,28] Patients with language barriers, low technical capabilities, or no access to internet enabled devices.[21,29,20]	Implement a shared decision-making process considering patient needs, preferences, access to technology, and other contextual factors (language barriers, cognitive abilities, age, ability to engage, etc.).[5,16,18,24,27,30–35] Offer multiple care modalities (virtual, in-person, hybrid) and ensure patient and caregiver awareness of benefits/limitations of virtual care and their right to choose or terminate virtual care.[5,18,26,31,32,36–38] Incorporate cultural and spiritual elements, local beliefs, and traditions, and include family/community in virtual care delivery.[32,37] Have resources for patients with language interpretation or disability needs.[39] Integrate personal interaction within telehealth through in-person encounters and patient choice, ensuring psychological and emotional safety and trust.[24]
Clinical presentation and disease	Virtual care is effective for chronic care management when no physical examination, procedure, or specimen collection is needed and for stable, nonemergent, less complex, and less severe conditions.[17,20,21,23,40–49] Information gathering, such as after hospital discharge.[50] Facilitating patient self-management, patient education, and discussing patient data trends.[51] For complex comanagement of disease, to enhance communication between providers.[41] Mild conditions with low risk of harm where symptoms can be described completely.[21,25,50] For less complex, less severe, or treatment-compliant mental health problems.[19,52] For routine obstetric services, addressing immediate postpartum and pregnancy concerns, and for providing reassurance without needing physical evaluation.[31,51,53]	Clinical situations requiring physical examination, procedures, specimen collection, or interventions (e.g., newborn assessments, developmental screenings, joint injections, vaccinations).[4,20,21,23,29,40,45,47,49,50,54–60] New, significant urgent/emergent symptoms, severe conditions, acute conditions, declined health, life-threatening diagnosis, urgent follow-ups, or high risk of missed diagnosis.[4,20,21,40,46,51,56,61–64] Complex or nuanced psychiatric issues and mental health or psychosocial concerns.[40,58,65] Sensitive issues to discuss, bad news to deliver, no established patient–physician relationship, significant diagnosis or test results, or privacy concerns with virtual care.[4,40,66,44,27,67]	
Timepoint in the care process	Use virtual care for initial patient-provider consultations to increase accessibility and for triage purposes. This includes assessing the need for in-person visits and handling nonurgent clinical concerns.[22,29,56,58,68] For follow-up visits, care coordination/continuation, prescription refills, medication options/management, discussing unremarkable/simple test results, and engaging families in care planning.[22,40,44,45,47,48,53,54,56,58,60,65,69,70]	In-person care should be considered for new patients, consults, and referrals, especially for immigrant, refugee, and Indigenous populations.[20,21,36,37,49,58,67,70,74] In-person consultation should be considered when primary care provider and specialists have differing perspectives on the appropriateness of eConsult for a given case.[73]	Establish a valid patient–physician relationship before providing virtual care.[24,40,48,49,66,71,72] Use virtual care as a supplement to in-person care, ensuring some in-person contact.[24,33,48,72,75]

continued →

Table 1. Compiled Recommendations Regarding When Virtual Care or in-Person Care is Appropriate along with General Recommendations to Carry out Appropriate Virtual Care *continued*

APPROPRIATENESS PILLARS	MORE APPROPRIATE FOR VIRTUAL CARE	LESS APPROPRIATE FOR VIRTUAL CARE	GENERAL RECOMMENDATIONS
	Use eConsult for questions that cannot be answered by referring to guidelines, when the primary care provider needs specialist input to determine if an in-person specialty visit is needed, or if the patient can be managed in primary care with specialist guidance.[64,65,68,71–73] Use virtual care between patients and their established primary care physician to maintain continuity of care.[66,69]		
Burden of care	Use virtual care when there are significant barriers to accessing in-person care (e.g., long travel distances, high costs, illness, stigmatized issues, difficulty taking time off work).[4,16,24,25,66,72,75] To provide faster diagnosis, and earlier treatments, and increase access to specialists for those with geographic constraints (rural and remote communities).[24,25,29,41,66,76,72,65,69,75,77,78]		Policies to include family caregivers should be developed to allow the patient to age-in-place. If there is an absence of a colocated caregiver, identify trusted individual who can provide technical support and advocacy.[26]
Provider factors	If the provider is competent in providing virtual care.[19,79] When the provider has adequate access to telehealth technologies.[68,71,80] Use virtual care for administrative tasks, multidisciplinary meetings, and if the provider deems it appropriate.[46,58,67,70]	Situations where virtual care increases workload, clinicians' unfamiliarity with technology, or clinician deems it appropriate.[57,68,71] Administrative workflow not optimized for optimized for virtual care.[60]	Ensure initial and ongoing training for virtual care staff and providers including ethical responsibilities and professional standards. Establish special competence and training/certification programs specific to virtual care delivery.[18,38,39,64,76,79–81] Assess multiple parameters including patient satisfaction with virtual care for effectiveness and quality.[80]
Technology platform	Audio is preferred over video call when the patient has vision limitations.[82] Audio is preferred over video call when the patient has poor internet connection.[82] Optimization of platform accessibility through mobile devices is recommended.[82] It is recommended for the platform to have time zone configuration to reflect local time and date.[82] Having a "need help now" feature and a list of trigger words/actions that flags potential risk.[82]		Ensure secure and private communication platforms. Electronic health record connectivity and flexible platform options are encouraged (e.g., participation without video).[18,37,60]

emergencies.[5,10,21,30,31,40–43,50,54,66,83,86–88] Evaluating these factors ensures that patients receive the most appropriate and effective care for their specific health conditions.

TIMEPOINT IN THE CARE PROCESS

The timepoint in the care process is another factor to consider when determining the suitability of virtual care, as the appropriateness of virtual care can differ between initial visits and subsequent follow-ups.[21,40,44,50,54,66,83,88] Virtual care is generally more appropriate for discussions of lab results, follow-up appointments, medication changes, and prescription refills.[40,50] These types of interactions typically require minimal physical examination and can be effectively managed through remote consultations. Conversely, initial diagnoses and treatments, which often necessitate thorough physical examinations and possibly diagnostic testing, are better suited for in-person visits,[40,88] although virtual-guided assessments, home diagnostic tools, and remote labs continue

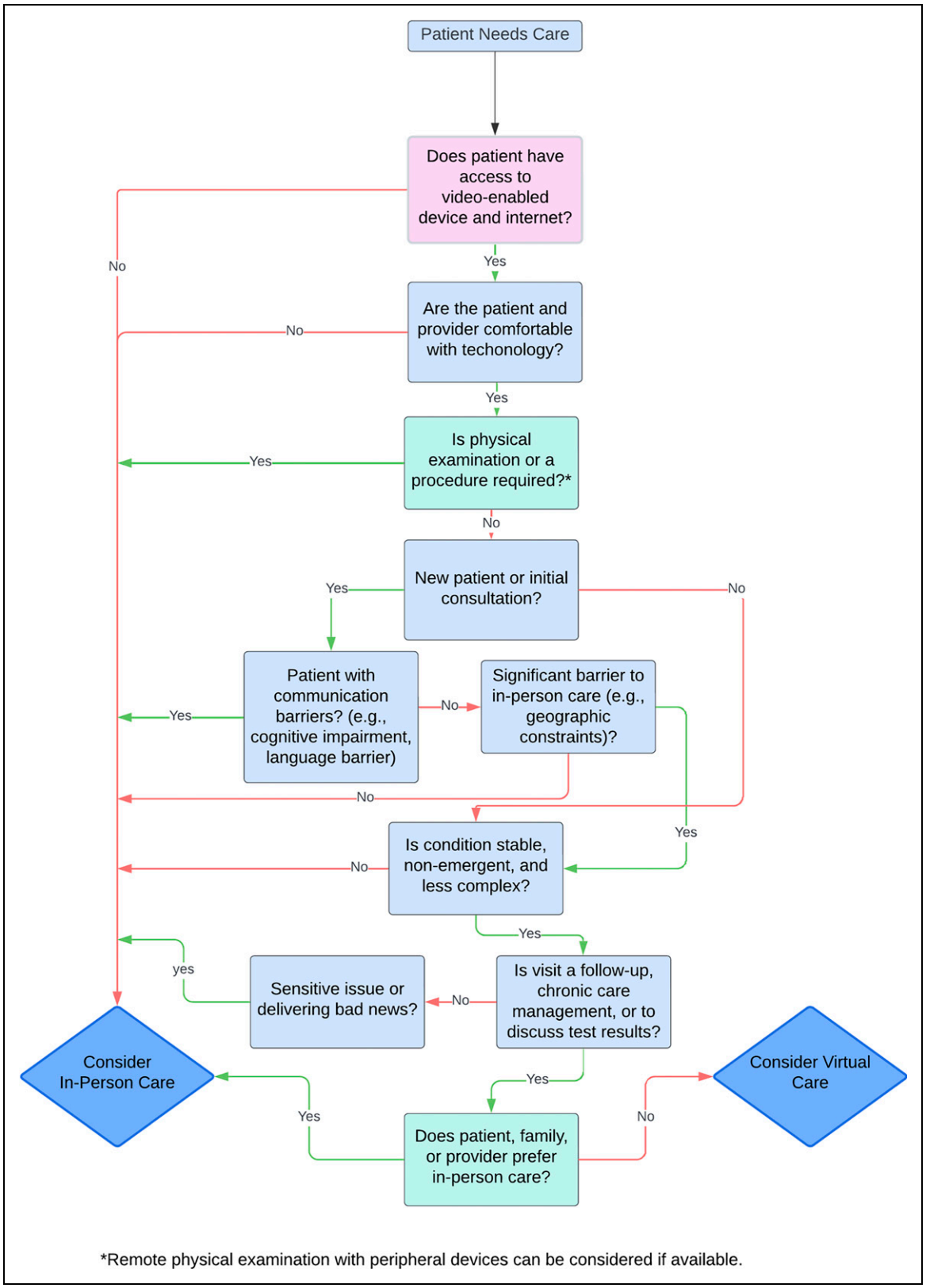

Fig. 3. Decision tree for virtual or in-person care.

to expand the utility of virtual care. The stage in the care process is therefore a key consideration, with virtual care being advantageous for ongoing management and routine follow-ups, while in-person care is more appropriate for initial assessments and treatment. Furthermore, if an existing patient–provider relationship is established, the interaction tends to be more effective in a virtual setting compared with a first visit before any relationship has yet been developed.[5,40,89] This preexisting familiarity can enhance communication and trust, making virtual care interactions more efficient and effective.

BURDEN OF CARE

The burden of care, encompassing financial savings and time efficiency for both providers and patients, is a critical consideration in the suitability of virtual care.[50,83,84,88,90] Virtual care is more appropriate if it significantly reduces the financial and logistical burdens associated with in-person visits, especially for individuals living in remote or rural areas. It is more appropriate if it increases access to specialists who may not be locally available, thus improving patient health outcomes.[29,66,84,87,91] Increased access could also be through virtual consultations, whether between provider and patient, provider to provider, or provider to other health professionals, to enhance access to otherwise unavailable services.

If virtual care led to an increased burden of care, then it would be less appropriate.[83] Increased burden with virtual care could be due to technical difficulties and troubleshooting that the provider or patient might face, additional costs to the health system to develop the infrastructure for virtual care, and the need for providers to train and develop competency in providing virtual care.[90,92,93] If the provider spends significant time with technical issues and troubleshooting, then the burden of care of the provider would increase drastically and virtual care would become inappropriate. Having a system in place that assists the provider in providing virtual care could minimize these challenges. For some patients, this increased burden could outweigh the reduced burden from travel costs, particularly if they lack digital literacy and need to spend significant time troubleshooting and learning how to use the technology required for virtual care. It is important to keep these factors in mind to ensure that the benefits of virtual care are not negated by these additional challenges.

PROVIDER FACTORS

When determining the suitability of virtual care, several provider factors are critical to consider. First, the competency and training of the provider play a significant role; providers who have received specific training and possess experience in virtual care are more adept at delivering high-quality remote health care services.[90–92] Second, the provider's fluency in the language of the consultation and the absence of a strong accent were identified as important aspects, as clear audio communication is essential for effective patient–provider interactions.[4,85] In addition, infrastructure to support virtual care is crucial, including proper billing codes, procedures, equipment, guidelines, and insurance coverage, which are all necessary to maintain high-quality care and optimize the provider's time.[16,20,45,54,55,94] Finally, providers must have access to adequate technological support and equipment, such as high-speed internet and information technology support, to conduct virtual care effectively.[16,20,45,54,55,94] These factors collectively ensure that virtual care is delivered efficiently and effectively, benefiting both providers and patients.

TECHNOLOGY PLATFORM

The choice of virtual care technology platform significantly influences the appropriateness of virtual care, with key elements being platform modality (such as messaging, audio calls, video calls, and asynchronous videos) and privacy features.[83,85,89,90] Video consultations should be avoided in situations where the patient has visual limitations or a slow internet connection, as these can impede effective communication and care. Optimization of platform accessibility through mobile devices is crucial, as many patients rely on their smartphones for virtual care.[82] Platforms should ideally have a time zone configuration to reflect local time and date, ensuring that appointments are scheduled accurately and conveniently for both patients and providers.[82] In addition, having a "Need Help Now" button or feature is essential for immediate assistance, along with a list of trigger words to flag potential risks and ensure patient safety.[82]

The importance of privacy in providing appropriate virtual care was predominant in literature.[5,16,23,29,30,50,82,83,90,95,96] Privacy concerns may arise from other individuals in the home, people who can access the smart device, or potential hackers and scammers who might steal health information.[5,16,23,29,30,50,82,90,95,96] Therefore, an appropriate platform selection is one that maximizes the privacy and security of both the patient and the health system. This includes robust encryption, secure login procedures, and clear protocols for protecting patient data from unauthorized access.[83] By prioritizing privacy and security, virtual care platforms can ensure that sensitive health information remains confidential and that patients feel safe and protected during their virtual consultations. It is also important to acknowledge that the level of privacy required varies significantly depending on the context and preferences of the patient.[5,16,23,29,30,50,82,90,95,96]

Recommendations for Appropriateness of Virtual Care

Table 1 provides an overview of recommendations regarding the appropriateness of virtual care versus in-person care based on the six concepts of appropriateness highlighted above. Recommendations emphasize that virtual care is generally more suitable for patients with reliable equipment and stable internet access, follow-up visits, chronic care management, and situations where in-person visits pose significant challenges.[4,16–23,40–44,46–49] However, it is less appropriate for new patients, complex cases requiring physical examinations, or when dealing with severe, acute conditions.[4,20,21,40,46,51,56,61–64] Many articles stress the importance of shared decision-making, offering multiple care modalities, and ensuring proper training for health care providers.[5,16,18,24,27,30–35,39,76,79–81] Key recommendations include establishing a valid patient–provider relationship before providing virtual care, integrating human connection, and using virtual care as a complement to, rather than a replacement for, in-person care.[24,40,48,49,66,71,72] Recommendations also emphasize the need for secure platforms, cultural sensitivity, and ongoing assessment of virtual care effectiveness and quality.[18,32,37,80] From these common themes, a flowchart was developed (*Fig. 3*) to help guide decision-making about when to use virtual care.

Discussion

Ensuring more seamless integration of virtual care requires health care providers, health systems, and policy makers to refine principles of appropriateness of care and consider that the default of in-person care may now not be universally the most appropriate type of care for all patients and all clinical presentations. In this systematic review, we examined how the determination of whether an appointment was virtual, in-person, or hybrid has been approached across different specialties and health professions. Although the guidance varied between specialties, patient characteristics, clinical presentation and disease, time point in the care process, burden of care, provider factors, and technology platform were found to be important concepts that help define the appropriateness of virtual care. These concepts, as outlined in *Fig. 2*, along with recommendations presented in *Table 1*, can guide the decision-making process for choosing between in-person, virtual, and hybrid care.

It is important to acknowledge that the suitability of virtual care is inherently variable and dependent on the specific specialty, clinical context, and patient-specific factors. While this review identifies general, cross-specialty themes, the proposed framework is not intended to be prescriptive.[4,20,21,23,29,40,45,47,49,50,54–60] Rather, it is meant to serve as a foundational guide that can be adapted by health care systems and providers based on their unique contexts and patient populations. By recognizing this variability, the framework aims to support informed, context-sensitive decisions around the implementation of virtual, in-person, or hybrid care models.

Virtual care offers substantial potential in improving patient care. For patients that live in rural and remote regions or have mobility limitations, travel for in-person care carries an especially large burden that virtual care may alleviate.[4,16,24,25,66,72,75] Virtual care may assist in earlier diagnoses and better management of disease for patients who encounter barriers to in-person care, such as the need for travel or childcare.[24,25,29,41,65,66,69,72,75–78] Virtual triage could be used to help determine whether patients, in both rural and urban settings, can be seen in an outpatient community setting rather than the emergency room. This could improve patient flow and keep emergency rooms reserved for patients who require more urgent care and reduce extended wait times.[22,29,56,58,68] Virtual care also allows care providers to reduce their overhead and increases their flexibility. At the same time, virtual care presents certain limitations, such as barriers to effective patient-provider communication and constraints on the physical examination. Nonetheless, ongoing innovations are underway to bridge this gap in physical examination and enhance the clinical capabilities of virtual care.[97] Virtual care can place added costs and challenges for patients and providers if they do not have the appropriate technology or ability to use it.

One of the potential strengths of virtual care is its complementarity to in-person care. Hybrid models of care, which involve both virtual and often in-person care in a patient's management over a longer time period, were not discussed directly but were implied within many of the articles and strongly encouraged. Results suggest that hybrid care should be the dominant model across a variety of specialties, primary care, and consultations.[20,21,23,36,40,45,51,53,54,61,73,76,80] For example, Jones & Cross-Barnet (2023) suggest that a hybrid model in the context of pediatrics allows patients to balance access, engagement, and specific patient care needs.[45] Poulin et al. (2018) highlight that a hybrid approach with eConsults (taking the form of an email, an electronic referral, or a phone call between a patient and a provider, two providers, or a provider and another health care worker) can reduce the need for some in-person consultations, reducing the burden on specialists.[73] Hybrid care may also be crucial to providing appropriate care to vulnerable populations. For example, Dingwall et al. (2015) suggest that a hybrid approach with translation services available in Indigenous languages may provide the most appropriate mental health services.[61]

With the introduction of digital peripherals such as stethoscopes and otoscopes for home use,[97] virtual care can partially overcome one of its main challenges: the lack of complete physical examination capabilities. Increased availability of solutions for remote diagnostics, including laboratory and imaging, may allow patients in rural and remote communities to access specialist care virtually with locally available diagnostic testing. Telerobotic sonography, for example, provides an opportunity to provide real-time ultrasound examinations to rural and remote communities.[98]

Furthermore, telerobotic systems can enable endovascular intervention from a remote location, providing coronary and peripheral vascular intervention and stroke treatment.[99] In addition, the physical examination gap that virtual care faces can be minimized through a collaborative care model. In this model, other health care workers, such as nurses, perform the physical exam under the guidance of a provider who is present virtually.[100] One of the challenges of virtual care is the impersonal nature and the lack of human connection. Virtual reality has the potential to address this challenge and make virtual care more immersive and enhance the feeling of physical presence.[101] As technology advances, clinical scenarios that may be inappropriate for virtual care today due to these limitations may be appropriate for virtual care in the future.

A systems approach is required to consider how integration of virtual and hybrid care as routine care options may impact existing care models from patient, provider, health system, and payer perspectives. Further development of guidelines and clinical standards across specialties is suggested to provide guidance on the most appropriate type of care for specific clinical indications and visit types, considering patient and system factors that may modify the most appropriate type of care. Further research on the appropriate use and effectiveness of hybrid care in patient management is suggested, as this is currently an underexplored area in the literature. In addition, development of dedicated educational/certification programs specifically for providing virtual care is needed.

Virtual care has the potential to significantly enhance health equity by reducing costs and eliminating the need for travel, which can be prohibitive for many individuals and families. By enabling patients to consult with specialists remotely, virtual care provides access to expert medical advice that might otherwise be unavailable in underserved or rural communities. This is especially relevant to Indigenous communities living in remote locations. However, while virtual care can bridge gaps in access, it also poses the risk of increasing inequity. This is particularly true for individuals who lack access to smart devices, live in areas with insufficient internet speeds, or are patients with limited digital literacy. These barriers must be addressed to ensure that the benefits of virtual care are distributed equitably across all populations.[92]

There are some limitations to this study. Much of the literature was published during the COVID-19 pandemic, with many models of virtual care developed out of necessity to ensure patient and clinician safety during the pandemic and reduce transmission of COVID-19. As virtual care matures, clinicians may feel comfortable using virtual care for a broader range of clinical conditions, and some of the conclusions of articles included in this review are likely to evolve as clinicians gain additional expertise in virtual care. Alternatively, clinicians may be more inclined to recommend in-person care in some cases rather than virtual care in the absence of a clear need to minimize in-person contact during a public health emergency. In addition, in this review, the vast majority of the literature originated from western countries, and results may not be generalizable to other developed or developing countries. Finally, many of the articles identified through this review are based on cross-sectional studies, opinions of respected authorities, and case reports. This has the potential to introduce bias in our synthesis of the results. Sources such as book chapters, theses, commentaries, and guidance from professional bodies were excluded, as these types of literature undergo variable peer review processes. Future research could incorporate these materials and explore areas only briefly addressed here, such as the appropriateness of specific virtual care modalities such as asynchronous or audio-only formats. In addition, further studies could focus on validating the proposed flowchart and exploring its integration into clinical decision-making processes.

Conclusions

Virtual care use has grown exponentially since the beginning of the COVID-19 pandemic, and continued growth is likely longer-term. While virtual care offers significant potential in improving patient outcomes and reducing the burden on the health care system, it also challenges health care providers, patients, and health systems in determining the most appropriate type of care, with either virtual, hybrid, or in-person options. The six concepts of appropriateness highlighted in this article provide guidance to clinicians when making this decision. Future research should consider the standardization of virtual care guidelines and their effective integration into existing health care systems. Further research should assess the validity of the proposed flowchart and explore its integration into electronic health record decision support tools, as well as explore the potential of hybrid care in the long-term management of patients, especially those with chronic conditions.

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Supplementary Material

Supplementary Tables

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