Reframing Equity: A Multi-Perspective Analysis of Telehealth Screening Tools Through The Lens of Patients and Clinicians

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Abstract

Background: Telehealth usage increased dramatically during the COVID-19 pandemic, but equitable access remains a concern. Patients lacking technology access, skills, and digital literacy might not benefit fully. Validated telehealth literacy screening instruments are lacking. This study evaluated existing tools from patient and clinician perspectives.

Methods: Five telehealth literacy screening tools were identified through a literature review: 1) Digital Literacy Self-Assessment Tool (DLSAT), 2) Electronic Health Literacy Scale (eHEALS), 3) Digital Health Care Literacy Scale (DHLS), 4) Telehealth Literacy Screening Tool (TLST), and 5) University of Alabama-Birmingham Technology Comfort Survey (TCS). Patients ($n = 44$) and clinicians ($n = 24$) completed an online survey rating each tool across domains of 1) User experience, 2) Engagement, 3) Relevance, and 4) Health literacy.

Results: Patients ranked the TCS highest overall, while clinicians ranked the DHLS highest. The DLSAT ranked high for both groups and received above-average ratings across all categories. Interestingly, while the TLST is the only telehealth-specific tool, it was only ranked 3rd and 4th for patients and clinicians, respectively. The eHEALS was consistently the lowest-ranked tool by both patients and clinicians. Patients valued simplicity and clarity, while clinicians favored brevity and clinical focus.

Conclusion: Perspectives differed between patients and clinicians regarding optimal telehealth literacy screening tools. Screening instruments should align with key engagement drivers: access, competency, digital literacy, relevancy, trust, and preferences. Tailored tools co-designed with patients and clinicians can promote equitable telehealth adoption and engagement.

Technology has brought about a profound transformation in connectivity, access, and convenience for millions of people globally. Digital health innovations have demonstrated the potential to improve health outcomes, quality of care, and patient experience.[1] The utilization of telehealth has dramatically increased over the years, providing people with the opportunity to use technology to access healthcare services and information, communicate with their healthcare team, and manage their health over time. This includes increased telemedicine video visits and virtual care modalities, including remote monitoring, patient portal utilization, and digital clinical trials.[2] Digitally enabled care models and telehealth offer the potential to address the quadruple aim in a new era of high access, high quality, lower cost, and high experience care.[3] While telehealth can potentially increase patient access to care, there is growing concern about its effect on the "digital divide," where patients who lack internet access at home, device access, or the skills needed to efficiently utilize telehealth technology will not reap the benefits.[4] The digital divide refers to the uneven access to technology across marginalized groups, demographics, and geographical regions. Achieving digital health equity – ensuring access to quality digital health resources, technology, and skills – requires a multifactorial approach and is vital as telehealth expands.

Traditionally, access has been a focal point, but understanding the needs around digital health literacy is critical to avoid exacerbating health inequities. Digital health literacy has been described as a super social determinant of health and relies on functional, communicative, critical evaluation, and translational competencies.[5] There

are many lessons to be learned from decades of experience in health literacy promotion as we delve into understanding the impact of digital health literacy on telehealth adoption and engagement. Approximately 9 out of 10 adults encounter difficulties with health literacy despite decades of interventions, including research, policies, and initiatives.[6]

With a growing emphasis on health equity, the definition of health literacy has evolved over the past decade. The previous definition focused on an individual's capacity to understand health information, whereas the updated definition now emphasizes using health information to make *well-informed decisions*.[7] It also now recognizes organizations' roles in providing accessible, understandable, and equitable health information and services. Healthy People 2030 defines health literacy as:

- Personal health literacy: individuals' ability to find, understand, and use health information and services to inform decisions.
- Organizational health literacy: organizations equitably enable individuals to find, understand, and use health information and services.

We build on these well-recognized definitions in defining digital health literacy as an individual's ability *to leverage technology* to find, understand, and use health information and services to inform decisions, including the role of organizations in equitably enabling individuals *to leverage technology* to find, understand, and use health information and services. Various tools have been used informally to assess digital health literacy; however, little is known about their potential impact on improving telehealth experiences from a patient and clinician standpoint. Currently, there is no validated or consensus instrument for screening patients who would benefit from additional support with telehealth engagement.

This study aims to assess existing digital literacy screening tools from both the perspective of patients and clinicians and analyze digital literacy screening tools for potential impact in improving telehealth experiences.

Methods

The authors searched published literature and lay press using a combination of the terms: telehealth, literacy, digital literacy, and screening tool. After an initial expert review (by authors MS and SK), the top five candidate screening tools were identified based on criteria of length, usability, patient-centricity, anticipated level of engagement, level of validation, and applicability to telehealth visits. The final list of five screening tools included those listed here.

1. Digital Literacy Self-Assessment Tool (DLSAT)[8]
2. Electronic Health Literacy Scale (eHEALS)[9]
3. Digital Health Care Literacy Scale (DHLS)[10]
4. Telehealth Literacy Screening Tool (TLST)[11]
5. University of Alabama-Birmingham Technology Comfort Survey (TCS)[12]

A survey was developed by our research team to evaluate each screening tool across four domains: 1) Patient/Clinician-centricity/User Experience, 2) Motivation to use/Engagement, 3) Context, Impact, Relevance, and 4) Health Literacy. These domains have a basis in patient-centric co-creation design frameworks.[13] The author's previous work in this area was leveraged, where the Health Collaboratory's Patient Shark Tank® uses a 12-domain structure in its proprietary scorecard, which was co-designed with patients, care partners, and clinicians and used to assess >2000 healthcare innovations. Four domains from the standard scorecard were selected for this assessment.[14] Aside from coaching on the use of the survey to assess the tools, the prompts provided across each domain are listed in Table 1.

The survey also included questions to understand baseline demographics and overall comfort level with technology. To validate the survey before distribution, we

Table 1. Patient and clinician prompts across each domain

Domains	Patient Prompts	Clinician Prompts
Patient/Clinician-Centricity and User Experience	• What was your overall experience with the tool? • How helpful would it be in preparing you for a telehealth visit with your healthcare team?	• How helpful is this tool in preparing you for a telehealth visit with a patient?
Engagement and Motivation to Use	• How likely are you to respond to this type of tool prior to a telehealth visit?	• How likely are you to send this tool to a patient prior to a telehealth visit and do you foresee any barriers to use?
Context, Impact and Relevance	• How relevant is this tool to you?	• How relevant is this survey instrument to you/your practice?
Health Literacy	• How easy was this tool to read and understand?	• Would a patient find this content easy to read and understand?

conducted a pilot survey with three patients and three clinicians, where respondents completed the survey and then provided feedback on survey length, clarity of instructions, appropriateness of response options, and any other issues. Based on this input, we refined ambiguous wording and removed redundant or unclear questions. Pilot participant data were not included in the overall study.

Patient evaluators (*n* = 44) with a range of telehealth experiences and comfort with technology were recruited from the Collaboratory Health Network, an innovation hub that advances health equity and care through participatory co-design between patients, care partners, clinicians, and subject matter experts. Clinicians (*n* = 24) with a range of telehealth experience were recruited via email outreach and were requested to evaluate these survey instruments across the same domains.

Patients and clinicians rated each screening tool across the domains on a 5-point Likert scale and also provided open-ended feedback. The quantitative ratings and qualitative feedback enabled comparative evaluation of the screening tools to determine the most effective and implementation-ready. The patient and clinician surveys were hosted and distributed on SurveyMonkey.com.[15] The screening tools are available in the Appendix. Both groups completed the online survey between November 2022 and March 2023.

Results

Gender balance was similar between clinicians and patients. Clinicians tended to be younger and had a higher percentage of Asian participants than patients. Patients spanned more generations and had higher proportions of Black/African American and Hispanic/Latino participants (Table 2).

Clinicians (100%) reported higher comfort levels with technology than patients (93%). Similarly, more clinicians (96%) than patients (82%) rated themselves as "comfortable" or "very comfortable" using technology to communicate with healthcare teams. For channels used for healthcare interactions, telephone calls were the most common for both groups (93% patients, 88% clinicians). A much higher percentage of clinicians reported using email (58% vs. 5% of patients), texting (37% vs 5% of patients), and video visits (96% vs. 52% of patients) for healthcare interactions. Patient portals were used by 45% of patients versus 83% of clinicians (Table 3). Overall, clinicians reported greater comfort with technology for healthcare communication and more frequent usage of a wider variety of digital communication channels than patients.

The open-ended feedback highlighted the strengths and weaknesses of the screening instruments (Table 4).

Table 2. Comparative demographics between patients and clinicians

	Patient (*n* = 44)	Clinicians (*n* = 24)
Gender (%)		
Male	43%	46%
Female	41%	50%
Other	9%	0%
Generation (year born)		
Greatest Generation (Before in or before 1924)	0%	4%
Silent Generation (1925–1945)	14%	0%
Baby Boomer (1946–1964)	34%	4%
GenX (1965–1980)	25%	29%
GenY (1981–1996)	18%	63%
GenZ (1997–2009)	9%	0%
Race		
American Indian or Alaska Native	5%	8%
Asian	18%	46%
Black or African American	27%	0%
Caucasian	34%	25%
Native Hawaiian or Pacific Islander	7%	0%
Other	9%	13%
Ethnicity		
Hispanic or Latino	34%	8%
Not Hispanic or Latino	66%	79%

Note: Percentages may not add up to 100% as users may have skipped certain questions.

Table 3. Technology baseline among patients and clinicians

	Patients (*n* = 44)	Clinicians (*n* = 24)
Technology relationship		
Rated average or higher	93%	100%
Comfort level in using technology in healthcare		
Rated average or higher	83%	96%
Channels used for healthcare interactions		
Telephone call	93%	88%
Email	5%	58%
Text	5%	37%
Patient Portal	45%	83%
Virtual Video Visit	52%	96%
Other	2%	4%

Table 4. The patient and clinician surveys reported strengths and weaknesses of the screening instruments

Patients (*n* = 44)						
Screening Instruments	Patient Centricity	Motivation to Use	Relevance	Health Literacy	Overall Top Choice	Overall Ranking
DLSAT	2.55	2.52	2.41	3.80	23%	2
eHEALS	2.20	2.05	2.3	2.77	0%	5
DHLS	2.66	2.45	2.41	3.91	5%	4
TLST	3.07	2.73	2.73	3.89	7%	3
TCS	3.61	3.23	3.09	4.11	66%	1
Clinicians (*n* = 24)						
Screening Instruments	Clinician Centricity	Motivation to Use	Relevance	Health Literacy	Overall Top Choice	Overall Ranking
DLSAT	3.38	2.79	3.5	3.67	27%	2
eHEALS	2.88	2.54	2.88	3.21	6%	5
DHLS	3.46	3.25	3.54	3.83	44%	1
TLST	3.04	2.79	3.04	3.33	7%	4
TCS	2.78	2.57	2.87	3.3	13%	3

DHLS: Digital Health Care Literacy Scale; DLSAT: Digital Literacy Self-Assessment Tool; eHEALS: Electronic Health Literacy Scale; TCS: University of Alabama-Birmingham Technology Comfort Survey; TLST: Telehealth Literacy Screening Tool.

Patients expressed concern about terminology such as "literacy" and questioned the relevance of the frequency of technology use to skills. "Brevity doesn't equate to relevance" for patients, while clinicians preferred short and sweet screeners. Overall, patient and clinician open-ended responses provided insights into why certain telehealth literacy screening tools were rated higher or lower (Table 5).

Patients ranked the TCS highest overall, while clinicians ranked the DHLS highest. Patients gave the TCS the highest ratings for all subdomains (user-centricity, engagement, relevance, and ease of health literacy). Similarly, clinicians rated the DHLS subdomains the highest across the board.

The DLSAT ranked high for both groups and received above-average ratings across all categories. Interestingly, while the TLST is the only telehealth-specific tool, it was only ranked 3rd and 4th for patients and clinicians, respectively. The eHEALS was consistently the lowest-ranked tool by both patients and clinicians. It did not receive the top overall ranking from any participants.

Discussion

Telehealth engagement encompasses a complex set of interacting factors, which serve as the building blocks to achieving digital health equity. Typically, there has been a focus on patient engagement in adoption efforts. Yet, telehealth engagement requires a dual-pronged approach, including strategies to engage clinicians equitably. Based on the study findings and supplemental co-design work in developing the Techquity tool described below, we developed a telehealth engagement architecture that reflects multitiered drivers (Figure 1). Access and competency form the foundation. Digital literacy and relevancy build upward to motivate adoption, whereas trust and preferences drive engagement over time. As we saw in the survey results, there can be a disconnect between patient and clinician perspectives. Incorporating these differing perspectives will enable better alignment in screening and approaches to engagement.

Access is the basic foundation of digital inclusion and connectivity. The telehealth engagement domain typically receives the most focus through various screenings and strategies to bridge the digital divide. Access to basic broadband services and smartphones has increased since 2019, and 91% of Americans have at least one of these technologies.[16] Patient access and alerting care teams about these access gaps are essential to addressing this disparity. A recent study showed that a majority of physicians were not knowledgeable of their patients' internet connectivity, ability to pay for cellular plans, or video-capable device access.[17] Targeted interventions (such as providing tablets to veterans experiencing homelessness) have been instrumental in closing the gap.[18] However,

Table 5. Selected comments from patients and clinicians

DLSAT	Comments
Patient	• "I don't like the word literacy. Makes me feel like you're testing my intelligence."
	• "Even though I use some of this technology, I don't use it for healthcare except for phone calls so I'm not sure if applicable."
	• "How does frequency of use really apply to my literacy?"
Clinician	• "It's readily easy to identify who isn't [tech oriented] and bridge the gap when that's the case."
	• "It's a fairly long survey."
eHEALS	
Patient	• "Questions seem very repetitive and they just reword questions. I don't understand what it's trying to measure or assess?"
Clinician	• "Too granular for screening purposes"
	• "I think this survey has limited utility because it only assesses confidence, not competence."
DHLS	
Patient	• "It doesn't seem like there's a lot of information that would be valuable for doctor or nurse?"
	• "Sure I can click on a zoom link and try and troubleshoot an issue, but how is that assessing my digital literacy?"
	• "Too short."
Clinician	• "Short and specifically asks patient if they can set up the video visit."
	• "Shorter and more likely for a patient to do it."
TLST	
Patient	• "Are all phones these days a smartphone? Cox? What's MyChart?"
	• "Why is it so focused on smartphone or tablet? I use my computer for video visits and patient portal. Doesn't that count?"
Clinician	• "Uses some technical terms, but I guess if these simple technical terms are not well understood, then the literacy is probably low."
	• "The brevity of this survey is key."
	• "The focus on clinically relevant applications is also something highly applicable."
TCS	
Patient	• "Easy to understand and easy flow."
	• "I may have one cell phone or internet today and change next month. How often will this be updated and how will the information be used?"
Clinician	• "Overall I am indifferent between the tools. just want to be as simple as "facetime" just one click and connect to patients. If not, I will prefer seeing patient in clinic."

DHLS: Digital Health Care Literacy Scale; DLSAT: Digital Literacy Self-Assessment Tool; eHEALS: Electronic Health Literacy Scale; TCS: University of Alabama-Birmingham Technology Comfort Survey; TLST: Telehealth Literacy Screening Tool.

telehealth engagement requires a focus on many other areas, as described in the additional drivers.

Competency is another key domain in telehealth engagement that focuses on the cognitive ability and demonstration of technical skills in efficiently utilizing technology to evaluate and actively participate in a telehealth interaction. Utilization of technology doesn't always translate into proficiency, and many of the telehealth screeners that were assessed also focused on the individual's competency. Tools, such as the John Hopkins Electronic Health Record (EHR) interface,[19] have also been deployed at the point of care to identify patients who may need technical assistance based on risk factors, such as whether they have a patient portal account, completed an e-check in or engaged in a video visit within the past 3 months. Targeted telehealth education has also improved telehealth engagement in older adults.[20] Although there has been more focus on patient competencies, there is also a gap in understanding clinician competencies and providing clinicians with the necessary skills to engage in telehealth.[21,22]

Digital literacy
Digital literacy is the degree to which people can find, understand, and use information and services to inform
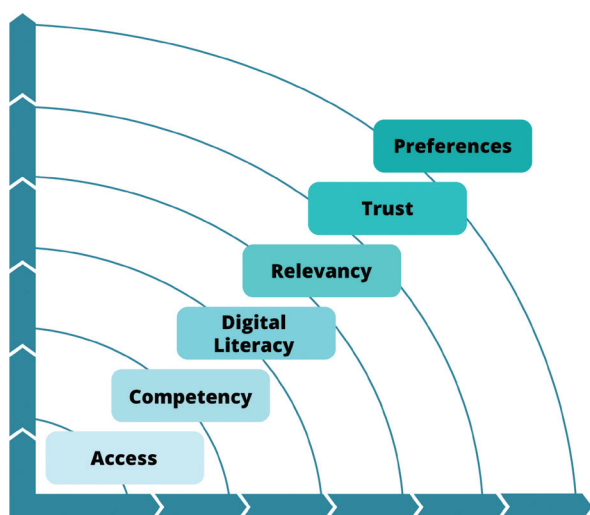
Fig. 1. Telehealth engagement drivers.

health-related decisions and actions "through technology," and an organization's responsibility in enabling this. Many telehealth screeners only address digital literacy at a very high level through self-reported surveys; however, like health literacy screeners, literacy assessment has limitations and can be difficult to measure.[23] Clinician digital literacy is equally important to assess, as care team digital literacy can improve their attitudes toward and engagement with health information systems, resulting in safer and more high-quality care.[24] In the author's experience, clinicians' comfort with technology greatly improves their ability to problem-solve and coach a patient through connecting on a video visit. The rise of the digital-native physician includes a workforce that is interested in augmenting virtual care with additional digital health technologies, including remote patient monitoring, digital devices, and artificial intelligence.[25]

Relevancy

Relevancy and context matter and can be defined as the interrelated circumstances and factors that can help someone better conceptualize a situation and ultimately influence the choices and decisions made. Context and relevance are intertwined aspects of telehealth engagement, and when something is considered relevant, it's perceived as important in a particular situation. Relevancy was a domain that emerged throughout the assessment of telehealth screeners, where patients emphasized a lack of connection to what matters to them and how relevant the questions in the screeners were to improving their care. Often, these screeners are provided without context on how the information will be used and/or acted upon. This concern has also surfaced with basic demographic questions patients are often asked at the point of care. Patients

need to understand the actions that will be taken based on information collected to understand the relevance to their illness and/or healthcare services provided. Clinicians and care teams need to understand the actions they may need to take based on patient information collected, accounting for workflow constraints and barriers to adoption.

The determinants of trust in digital health require additional exploration. Trust is fundamental to the patient–doctor relationship and can impact telehealth adoption and engagement. Black patients were more than four times more likely than Caucasians to seek healthcare in the emergency department instead of telehealth services due to mistrust of digital platforms and a lack of pre-established relationships with physicians.[26] Undocumented immigrants have expressed concern about using telehealth services for fear of information being shared with law enforcement agencies, which could lead to negative consequences.[27] Despite telehealth's value, data privacy and security concerns have hindered perceived benefits and adoption.[28] Developing clinicians' trust toward a patient is equally important for sustained telehealth engagement. Physicians mistrust patient-reported vitals and home diagnostic tests.[29] Assessing and allaying causes of mistrust is an important aspect of a telehealth engagement.

Preferences

Preferences are the choices that people express based on beliefs, attitudes, and personal values. With a heightened focus on improving patient satisfaction and the overall healthcare experience, respect for a patient's preferences has emerged as a key tenet of patient-centered care. Regulatory bodies have also emphasized prioritizing patient preferences through guidance documents and requirements and incorporated them into research studies over the years.[30] Despite the spotlight on patient preferences in research, methods to act upon these preferences at the point of care are lacking. In addition, clinicians' preferences around preferred methods of interacting with patients must also be considered.

In summary, a telehealth engagement architecture spanning the full range of access, competency, digital literacy, relevancy, trust, and preferences provides valuable context on telehealth adoption and engagement. This highlights opportunities to build upon existing digital literacy screening tools to comprehensively profile the interrelated needs and goals of patients and clinicians using these key drivers to influence the overall efficacy of the telehealth interaction. Achieving equitable telehealth engagement requires understanding the multilayered drivers that can evolve. Our findings highlight key differences between patients and clinicians that impact these drivers. Co-designing equitable

digital health tools that serve patients' and clinicians' needs and preferences requires human-centered design strategies that integrate repeat cycles of ideation, prototyping, testing, and refinement by actively involving all end users in the development process from inception to implementation.

An example of this includes the author's use of a participatory co-design process with patients, care partners, and clinicians in developing the Techquity Tool (https://techquity.health/), which elicits technology preferences around various healthcare interactions to support telehealth engagement.[31] Strategies that promote inclusiveness and equity-centered perspectives are critical in ensuring diverse insights are harnessed in developing telehealth engagement tools. Co-designed tools can be further evaluated and validated once released into live environments to further understand the unique elements of people's experiences with the digital health ecosystem so that any potential impacts on health inequity can be evaluated and addressed. In addition, any workflow disruptions and barriers to implementation can also be evaluated across care teams. Implementation science models should be used to understand how evidence-based interventions can be adapted and optimized in real-world contexts and settings. A comprehensive telehealth engagement architecture, which must include screening, education, and training support for both patients and clinicians, is imperative to close equity gaps and realize the promise of telehealth.

This study includes several limitations. The survey was sent to patients and clinicians in English and completed online. We did not specifically assess patient baseline health literacy, and we recognize that clinicians may also not have proper training to detect reading levels in text or identify plain language.

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References

1. Abernethy A, Adams L, Barrett M, Bechtel C, Brennan P, Butte A, et al. The promise of digital health: then, now, and the future. NAM Perspect. 2022:10.31478/202206e. https://doi.org/10.31478/202206e

2. Bouabida K, Lebouché B, Pomey MP. Telehealth and COVID-19 pandemic: an overview of the telehealth use, advantages, challenges, and opportunities during COVID-19 pandemic. Healthcare. 2022 Nov;10(11):2293. https://doi.org/10.3390/healthcare10112293

3. Barron M, Mishra V, Lloyd S, Augenstein J. How to measure the value of virtual health care. harvard business review [Internet]. 2021 Jun 24 [cited 2023 Sep 12]; Available from: https://hbr.org/2021/06/how-to-measure-the-value-of-virtual-health-care

4. Ramsetty A, Adams C. Impact of the digital divide in the age of COVID-19. J Am Med Inform Assoc. 2020 Jul 1;27(7):1147–8. https://doi.org/10.1093/jamia/ocaa078

5. van Kessel R, Wong BLH, Clemens T, Brand H. Digital health literacy as a super determinant of health: more than simply the sum of its parts. Internet Interv. 2022 Feb 7;27:100500. https://doi.org/10.1016/j.invent.2022.100500

6. Berkman N, DeWalt D. Health literacy interventions and outcomes: an updated systematic review. AHRQ Publ; 2004.

7. Health Literacy in healthy people 2030—healthy people 2030. health.gov [Internet]. [cited 2023 Sep 16]. Available from: https://health.gov/healthypeople/priority-areas/health-literacy-healthy-people-2030

8. EdTech Center. EdTech Center @ World Education. [cited 2023 Aug 22]. Digital Literacy Self-Assessment Tool. Available from: https://edtech.worlded.org/resource/digital-literacy-self-assessment-tool/

9. Norman CD, Skinner HA. eHEALS: the eHealth Literacy Scale. J Med Internet Res. 2006 Nov 14;8(4):e27. https://doi.org/10.2196/jmir.8.4.e27

10. Nelson LA, Pennings JS, Sommer EC, Popescu F, Barkin SL. A 3-item measure of digital health care literacy: development and validation study. JMIR Form Res. 2022 Apr 29;6(4):e36043. https://doi.org/10.2196/36043

11. Gillie M, Ali D, Vadlamuri D, Carstarphen KJ. Telehealth literacy as a social determinant of health: a novel screening tool to support vulnerable patient equity. J Alzheimers Dis Rep. 6(1):67–72. https://doi.org/10.3233/ADR-210024

12. Irfan A, Lever JM, Fouad MN, Sleckman BP, Smith H, Chu DI, et al. Does health literacy impact technological comfort in cancer patients? Am J Surg. 2022 Apr;223(4):722–8. https://doi.org/10.1016/j.amjsurg.2021.08.006

13. Bird M, McGillion M, Chambers EM, Dix J, Fajardo CJ, Gilmour M, et al. A generative co-design framework for healthcare innovation: development and application of an end-user engagement framework. Res Involv Engagem. 2021 Mar 1;7(1):12. https://doi.org/10.1186/s40900-021-00252-7

14. Health Collaboratory. The Health Collaboratory. [cited 2023 Sep 16]. Patient Shark Tank. Available from: https://www.healthcollaboratory.com/patientsharktank.html

15. SurveyMonkey [Internet]. San Mateo, CA: SurveyMonkey. Available from: www.surveymonkey.com

16. Greenwood S. Mobile technology and home broadband 2021. Pew Res Cent Internet Sci Tech [Internet]. 2021 Jun 3 [cited 2023 Sep 16]. Available from: https://www.pewresearch.org/internet/2021/06/03/mobile-technology-and-home-broadband-2021/

17. Kalicki AV, Moody KA, Franzosa E, Gliatto PM, Ornstein KA. Barriers to telehealth access among homebound older adults. J

Am Geriatr Soc. 2021;69(9):2404–11. https://doi.org/10.1111/jgs.17163

18. Garvin LA, Hu J, Slightam C, McInnes DK, Zulman DM. Use of video telehealth tablets to increase access for veterans experiencing homelessness. J Gen Intern Med. 2021 Aug 1;36(8):2274–82. https://doi.org/10.1007/s11606-021-06900-8

19. Hughes HK, Canino R, Sisson SD, Hasselfeld B. A simple way to identify patients who need tech support for telemedicine. Harv Bus Rev [Internet]. 2021 Aug 10 [cited 2022 Oct 8]. Available from: https://hbr.org/2021/08/a-simple-way-to-identify-patients-who-need-tech-support-for-telemedicine

20. Jezewski E, Miller A, Eusebio M, Potter J. Targeted telehealth education increases interest in using telehealth among a diverse group of low-income older adults. Int J Environ Res Public Health. 2022 Jan;19(20):13349. https://doi.org/10.3390/ijerph192013349

21. Piggott L, Piggott, Simon, Kelly, Maureen. Impact of telehealth implementation on non-consultant hospital doctors training experience [Internet]. 2023 [cited 2023 Sep 12]. Available from: https://www.researchsquare.com

22. Sakumoto M, Jelinek R, Joshi AU. Identification of gaps in graduate medical education telehealth training. Telehealth Med Today [Internet]. 2021 Jul 30 [cited 2023 Sep 10];6(3). Available from: https://telehealthandmedicinetoday.com/index.php/journal/article/view/276

23. Liang L, Brach C. Health literacy universal precautions are still a distant dream: analysis of U.S. data on health literate practices. Health Lit Res Pract. 2017 Nov;1(4):e216–30. https://doi.org/10.3928/24748307-20170929-01

24. Kuek A, Hakkennes S. Healthcare staff digital literacy levels and their attitudes towards information systems. Health Informatics J. 2019 Apr 15;26:592–612. https://doi.org/10.1177/1460458219839613

25. Hodgkins M, Barron M, Jevaji S, Lloyd S. Physician requirements for adoption of telehealth following the SARS-CoV-2 pandemic. Npj Digit Med. 2021 Feb 9;4(1):1–3. https://doi.org/10.1038/s41746-021-00390-y

26. Yee V, Bajaj SS, Stanford FC. Paradox of telemedicine: building or neglecting trust and equity. Lancet Digit Health. 2022 Jul 1;4(7):e480–1. https://doi.org/10.1016/S2589-7500(22)00100-5

27. Saadi A, Rodriguez JA. Addressing privacy concerns central to success of telehealth use among undocumented immigrants. Health Aff Forefr [Internet]. [cited 2023 Sep 16]. Available from: https://www.healthaffairs.org/do/10.1377/forefront.20201118.621497/full/

28. Houser SH, Flite CA, Foster SL. Privacy and security risk factors related to telehealth services—a systematic review. Perspect Health Inf Manag. 2023 Jan 10;20(1):1f.

29. SteelFisher GK, McMurtry CL, Caporello H, Lubell KM, Koonin LM, Neri AJ, et al. Video telemedicine experiences in COVID-19 were positive, but physicians and patients prefer in-person care for the future. Health Aff (Millwood). 2023 Apr;42(4):575–84. https://doi.org/10.1377/hlthaff.2022.01027

30. Center for Devices and Radiological Health. Patient Preference Information (PPI) in medical device decision making. FDA [Internet]. 2023 Jul 3 [cited 2023 Sep 16]; Available from: https://www.fda.gov/about-fda/cdrh-patient-science-and-engagement-program/patient-preference-information-ppi-medical-device-decision-making

31. Health Collaboratory. TechQuity tool for patient preferences [Internet]. [cited 2023 Sep 19]. Available from: http://techquity.health/

Appendix

Telehealth Literacy Screening Tools

1. Digital Literacy Self-Assessment Tool (DLSAT)
2. Electronic Health Literacy Scale (eHEALS)
3. Digital Health Care Literacy Scale (DHLS)
4. Telehealth Literacy Screening Tool (TLST)
5. Technology Comfort Survey (TCS)

1. Digital Literacy Self-Assessment Tool (DLSAT)
Citation: https://edtech.worlded.org/resource/digital-literacy-self-assessment-tool/
https://docs.google.com/document/d/1Oz2jPEKx-KjT3YBlDwMf1s_clxMYmZFJIMyZERyz_ya0/edit

Instructions for learners—Please answer all of these questions. Ask for help if you need it! Your answers are confidential. We will use them to help us learn what you need to learn most.

1. Tell us what you have and how often you use it/them:

   I have this type of device.

   Smartphone

   • Yes
   • No

   Tablet

   • Yes
   • No

   Computer

   • Yes
   • No

   How often do you use each type of device?

   Smartphone

   • Daily
   • Weekly
   • Monthly
   • Never

   Tablet

   • Daily
   • Weekly
   • Monthly
   • Never

   Computer

   • Daily
   • Weekly
   • Monthly
   • Never

2. In the past week, how have you used each type of device? Please check all that apply that show what you have used the device for.

   Smartphone

   • Texting
   • Voice calls
   • Emails
   • Messaging apps (WhatsApp, Viber, etc…)
   • Web browsing (Chrome, Firefox, Internet Explorer)
   • Apps (games, translation, English learning, etc.)

   Tablet

   • Texting
   • Voice calls
   • Emails
   • Messaging apps (WhatsApp, Viber, etc…)
   • Web browsing (Chrome, Firefox, Internet Explorer)
   • Apps (games, translation, English learning, etc.)

   Computer

   • Texting
   • Voice calls
   • Emails
   • Messaging apps (WhatsApp, Viber, etc…)
   • Web browsing (Chrome, Firefox, Internet Explorer)
   • Apps (games, translation, English learning, etc.)

3. What app do you like to use to communicate with friends and family?

   • WhatsApp
   • Viber
   • Facebook
   • Texting
   • Other:_____

4. Internet Access: Where do you go to use the internet? (Circle all that you actually use.)

   • Computer at home
   • Computer at school or learning center
   • Computer at work
   • Computer at library
   • Computer somewhere else (Where?) _____ _____
   • Cell phone/tablet with Wi-Fi at work/library etc.
   • Cell phone/tablet with Wi-Fi using your cell plan.
   • Other? _____ _____

5. How comfortable are you with doing these things on a computer or laptop?

   Turning a computer on and logging on

   • I feel very confident.

- I feel a bit nervous about it.
- I'm not comfortable at all.

Using a mouse and keyboard

- I feel very confident.
- I feel a bit nervous about it.
- I'm not comfortable at all.

Navigating around a website

- I feel very confident.
- I feel a bit nervous about it.
- I'm not comfortable at all.

Setting Favorites or Bookmarks on your web browser

- I feel very confident.
- I feel a bit nervous about it.
- I'm not comfortable at all.

Using Google Search or other search engines

- I feel very confident.
- I feel a bit nervous about it.
- I'm not comfortable at all.

2. Electronic Health Literacy Scale (eHEALS)
Citation: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1794004/
Instrument: https://www.jmir.org/article/viewFile/507/1/2977

I would like to ask you for your opinion and about your experience using the internet for health information. For each statement, tell me which response best reflects your opinion and experience right now.

1. How useful do you feel the internet is in helping you in making decisions about your health?

    - Not useful at all
    - Not useful
    - Unsure
    - Useful
    - Very useful

2. How important is it for you to be able to access health resources on the internet?

    - Not important at all
    - Not important
    - Unsure
    - Important
    - Very important

3. I know what health resources are available on the internet

    - Strongly disagree
    - Disagree
    - Neutral

- Agree
- Strongly agree

4. I know where to find helpful health resources on the internet

    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

5. I know how to find helpful health resources on the internet

    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

6. I know how to use the internet to answer my questions about health

    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

7. I know how to use the health information I find on the internet to help me

    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

8. I have the skills I need to evaluate the health resources I find on the internet

    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

9. I can tell high quality health resources from low quality health resources on the internet

    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

10. I feel confident in using information from the internet to make health decisions

    - Strongly disagree

- Disagree
- Neutral
- Agree
- Strongly agree

Thank you!

3. Digital Health Care Literacy Scale (DHLS)

Citation: https://formative.jmir.org/2022/4/e36043/

Please indicate your agreement with the following statements.

I can use applications/programs (such as Zoom) on my cell phone, computer, or another electronic device on my own (without asking for help from someone else)

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

I can set up a video chat using my cell phone, computer, or another electronic device on my own (without asking for help from someone else)

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

I can solve or figure out how to solve basic technical issues on my own (without asking for help from someone else)

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

4. Telehealth Literacy Screening Tool (TLST)

Citation: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8925120/
Tool: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8925120/bin/adr-6-adr210024-s001.pdf

Patient Questionnaire

Access to technology (1–4)

1. Do you have internet at your home?

   - Yes
   - Sometimes
     ◦ Please explain:
   - No
   - I don't know

If answered yes or sometimes to having internet (1):

2. What devices do you use to go on the internet? Select all that apply.

   - Computer
   - Smartphone
   - Tablet

3. Who provides your internet access if you use a smartphone or tab?

   - A cellular data plan (through a phone company such as Verizon or T-Mobile)
   - Wi-Fi (through a cable company such as Cox)

4. Does someone else help you use your smartphone or tablet?

   - Yes
     ◦ Please explain:
   - No

Please answer the following questions to the best of your ability. The questions relate to your baseline use and exclude the help of another individual.

Technological literacy (5–8).

5. If you use a smartphone or tablet, are you comfortable with typing words into this device, such as text messaging?

   - (2) Yes
   - (1) Sometimes
   - (0) No or unsure

6. If you use a smartphone or tablet, are you comfortable with opening and exiting different windows, for example, entering your email or messages and then going back to your home page?

   - (2) Yes
   - (1) Sometimes
   - (0) No or unsure

7. If you use a smartphone or tablet, are you comfortable with scrolling down a page?

   - (2) Yes
   - (1) Sometimes
   - (0) No or unsure

8. If you use a smartphone or tablet, are you comfortable with selecting buttons or clicking boxes, such as "yes" or "no"?

   - (2) Yes
   - (1) Sometimes
   - (0) No or unsure

eHealth literacy (9–12)

9. If you use a smartphone or tablet, are you comfortable using MyChart (this is an application or icon on your device)?

- (2) Yes
- (1) Sometimes
- (0) No or unsure

10. If you use a smartphone or tablet, are you comfortable with opening your email that is connected to your My-Chart account? • (2) Yes • (1) Sometimes • (0) No or unsure • (2) Yes

- (1) Sometimes
- (0) No or unsure

11. If you use a smartphone or tablet, how often do you go to your MyChart account?

- (2) Frequently
- (1) Sometimes
- (0) Never or unsure

12. If you use a smartphone or tablet, how often do you open your email associated with your MyChart account?

- (2) Frequently
- (1) Sometimes
- (0) Never or unsure

5. Technology Comfort Survey (TCS)
Citation: https://pubmed.ncbi.nlm.nih.gov/34384588/

What cell phone do you have (circle one)?

- iPhone
- Android (e.g. Blackberry, Pixel, HTC, LG, Sony, Samsung)
- Windows (e.g. Nokia Lumia)
- Amazon Fire Phone
- Non smart phone (e.g. flip phone)
- Do not know
- Prefer not to answer

What kind of internet access do you have at home (circle all that apply)?

- Dial up modem
- Cable modem (e.g. Spectrum)
- DSL (e.g. U-Verse)
- Satellite (e.g. Dish)
- Fiber optic (e.g. Google Fiber
- Cell phone

- I do not have internet at home
- Prefer not to answer

Please circle the answer that best represents your response
How often do you have someone help you read hospital materials?

- Always
- Often
- Sometimes
- Occasionally
- Never

How often do you have problems learning about your medical condition because of difficulty in understanding written information?

- Always
- Often
- Sometimes
- Occasionally
- Never

How often do you have a problem understanding what is told to you about your medical condition?

- Always
- Often
- Sometimes
- Occasionally
- Never

How confident are you filling out medical forms by yourself?

- Not at all
- A little bit
- Somewhat
- Quite a bit
- Extremely

For each of the following questions, circle a number from 1 to 10 where 1 indicates that you are very uncomfortable (terrible) performing the task and 10 is highly comfortable (excellent).

1. Using a cell phone to send a text message ____
2. Checking email ____
3. Downloading an app ____
4. Commenting on a friend's post on social media ____
5. Connecting to a free Wi-Fi network ____
6. Making a video-based call with your phone ____
7. Changing the password to your phone ____