Table 3: Privacy and Security Challenges and Risk Factors

CHALLENGES RISK FACTORS	DESCRIPTION OF THE PROBLEMS	STUDIES
PATIENT RELATED		
Privacy and confidentiality concern	• Privacy and cost were expressed as telehealth concerns. • Privacy and confidentiality concerns with telehealth visits. No technology-based confidentiality concerns. • Privacy concerns with use of remote video consultations. • Clinical staff reported challenges with ensuring privacy and confidentiality related to telehealth visits. • As noted in the survey of 65 patients, about one fourth had concerns about privacy and confidentiality when using telemedicine services, whereas nearly one half did not have these concerns. • Concern for the protection of patient privacy is expressed. • Privacy concerns were minimal and factors that influenced this included age, BMI, marital status, and readmissions. • Respondents reported privacy concerns before telehealth services. These concerns included being at home with other household members, other group members having household members at home, and technology-related issues such as hacking. • After attending their first telehealth sessions, participants indicated that the telehealth format did not affect their experience of privacy, suggesting that the experience in the telehealth session may have alleviated concerns for several participants and did not prompt new concerns for others. • Potential challenges include lack of familiarity with and access to technology and connectivity as well as issues protecting confidentiality and data security.	Alexander et al. (2021), Allison et al. (2022), Dekker et al. (2020), Esmaeilzadeh et al. (2021), Harsono et al. (2022), Majmundar et al. (2022), Manze et al. (2022), Payán et al. (2022), Puzzitiello et al. (2021), Thomas et al. (2021), Wood et al. (2021) Zayde et al. (2021)

Age related, such as Elderly, young adults	• Presence of parents and the location of the visit. • Neurosurgery patients expressed privacy concerns. • Individual-level patient barriers were older age, LEP, and limited digital literacy. • Privacy concerns with pediatric and adolescent population.	Allison, et al. (2022), Majmundar et al. (2022), Payán et al. (2022), Woods et al. (2021)
Space, location, environment (homeless)	• Difficult to have privacy without being overheard in the patient's home as well as provider's home office. • Clinical staff reported challenges with ensuring privacy and confidentiality related to telemedicine describing their experience of conducting telemedicine visits from home and navigating disruptions in their living spaces. • Among those with housing, lack of privacy in larger households and not having adequate space for confidential and private conversations was problematic. • Concern for the protection of patient privacy, requires patients have access to a private area for discussion and perform a virtual examination poses difficulties for patients who do not have access to private housing and lack access to proper equipment such as personal headphones. • Videoconferencing may inadvertently provide an unwarranted visualization of the patient's living conditions to the provider. • Unstable housing for the homeless presented challenges for providers. Coordination with shelter medical team to obtain privacy space for visits and care.	Allison et al. (2022), Harsono et al. (2022), Payán et al. (2022), Puzzitiello et al. (2021), Woods, 2021
Special patient population, such as HIV, pregnancy, mental health	• Some (HIV) patients reflected on the difficulty of speaking about personal information during telemedicine visits. • Perceived patient safety and privacy concerns obtaining contraception via telehealth.	Harsono et al. (2022) Manze et al. (2022)
Trust of provider and others	• Participants noted that to be successful, telehealth visits must be described and shown to them by their own provider or other trusted individual(s), such as a pharmacist. • The need for a suitable space may be another reflection of trust and privacy concerns rather than an issue of access to the technology needed to participate in a remote video visit. • We interpret our findings to indicate that the acceptability of remote video consultation might	Alexander et al. (2021) Dekker et al. (2020) Esmaeilzadeh et al. (2021)

	be improved by measures to gain trust and ensure privacy. • The need for a suitable space may be another reflection of trust and privacy concerns rather than an issue of access to the technology needed to participate in a remote video visit. • Perceived trust in medical care platforms' competency.	
Technology use Health/digital literacy (language, medical terminology) Patient awareness, Communication	• Most participants expressed a lack of interest and comfort in using Internet-capable devices (e.g., mobile devices, tablets, computers). • Need to assist patients with the technological requirements and reassure them that the remote video visit is secure and private. • Perceived technical errors • Perceived information completeness • Perceived communication barriers • Perceived technical challenges • Patients experienced technology barriers. Individual-level patient barriers were older age, LEP, and limited digital literacy. • Difficulty using telehealth, uncomfortable using the necessary technology to participate in virtual appointments. Widespread use of telehealth may not be readily accessible to everyone. Instead of assuming that patients know how to interact with technology, we may need to take "universal digital health literacy precautions" by assuming that they do not know how unless proven otherwise. • Problems with Bluetooth syncing and cellular data connectivity. These problems resulted in an inability for the Bluetooth enabled data collection devices to reliably sync the patient's clinical data to the tablet for transmission to clinicians.	Alexander et al. (2021) Dekker et al. (2020) Esmaeilzadeh et al. (2021) Harsono et al. (2022) Payán et al. (2022) Puzzitiello et al. (2021) Thomas et al. (2021)
HEALTH CARE PROVIDER RELATED		
Privacy and confidentiality concern	• The athletic trainers were concerned with privacy and patient preferences and noted their level of experience and access to technology influenced these thoughts. • Patient focused including privacy, experience, and preferences. • Lack of privacy • Difficulty using with young children and youth in need of substance use treatment • Finding a Health Insurance Portability and Accountability Act (HIPAA)-compliant platform	Monk et al. (2021), Payán et al. (2022), Palinkas et al. (2021), Pooni et al. (2021), Rogers et al. (2021), Schinasi et al. (2021), Schoebel et al. (2021)

	• Patients may have limited ability to be able to engage confidentially with their provider. • Privacy and confidentiality concerns for providing adolescent and young adult telehealth visits. • Difficulty in protecting patient privacy. • The list of concerns includes patient privacy.	
Space, location, environment	• Lack of private workspace for personnel. • Difficulty in maintaining awareness of the surroundings to protect patient privacy.	Payán et al. (2022), Rogers et al. (2021)
Technology use Digital literacy Accessibility	• Barriers to telehealth services included limited access to internet and technology • A key implementation barrier was the negative impact of COVID-19 on operations, which included the financial impact of losing patient volume/revenue and personnel shortages. • Personnel identified as central to facilitating implementation and use, included: 1) champions at various levels (leadership, peers) to provide leadership, motivation, and expertise; 2) clinic staff (e.g., CHWs, medical assistants) responsible for preparing patients and intake processes prior to each visit; 3) information technology (IT) personnel to issue equipment and provide technical support; and 4) bilingual personnel who provided high quality language concordant care. • Patients may have limited ability to be able to engage confidentially with their provider. • Providers continued to have concerns about the reliability of internet connections to support telemedicine. Families won't be able to access video services due to lack of digital devices, cellular data, or Wi-Fi, limitations in the physical assessment of a patient by video and quality of audio or video will be poor. • Providers identified several populations for which telebehavioral health was less accessible: clients with serious mental illness and substance use disorder, those with no broadband Internet access, children, and older adults.	Palinkas et al. (2021), Payán et al. (2022), Pooni et al. (2021), Schinasi et al. (2021), Schoebel et al. (2021)
Limitation of quality assessments and diagnosis	• Clinician focused concerns • Feasibility of provide quality of care through telehealth services. Accuracy of the diagnosis due to lack of physical touch of the patients. • Limitations in the physical assessment of a patient by video, and quality of audio or video will be poor.	Monk et al. (2021), Schinasi et al. (2021), Wood et al. (2021)

	• Limited ability to perform physical examination on HIV adolescent patient.	
Professional development, training	• Challenge in training providers and clients. • Personnel capacity: A key implementation barrier was the negative impact of COVID-19 on operations, which included the financial impact of losing patient volume/revenue and personnel shortages. • Professional development capacity refers to personnel knowledge and familiarity with telemedicine as well as the availability of trainings or learning resources. Personnel with limited telemedicine knowledge and prior experience struggled, saying a lack of knowledge and uncertainty about appropriate use was challenging in the face of rapid implementation and workflow changes. • Issues with the Telemedicine system, lack of training and experience. Lack of team training.	Palinkas et al. (2021), Payán et al. (2022), Rogers et al. (2021)
Burn out of using telemedicine	• Providers reported an increase in their level of burnout with the use of telemedicine.	Pooni et al. (2021)
Liability, legal and regulatory issues	• Limitations in policy and reimbursement, technology and understanding the appropriateness and potential impact on patient health outcomes.	Pooni et al. (2021), Schinasi et al. (2021)
Reimbursement issues	• Training providers and clients, and reimbursement challenges. Policy changes to enable reimbursement, internet access, training, and provider licensing resulted in substantially fewer appointment cancellations or no-shows, greater family engagement, reduction in travel time, increased access for people living in remote locations, and increased provider communication and collaboration.	Palinkas et al. (2021)