

7.3b Telemedicine and Telehealth

10x10 – Introduction to Biomedical Informatics & Artificial Intelligence
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Telemedicine and telehealth

Definitions of telemedicine, telehealth, and related terms

Usage

Research results

Policy issues

Future directions

Usage during COVID-19 (Hatef, 2023)

Patients using telehealth during COVID-19 were, like before COVID-19, more likely to be young to middle-aged, female, White, of higher socioeconomic status, and living in urban settings

Across variety of conditions, telehealth produced similar clinical outcomes as compared with in-person care; differences in clinical outcomes from in-person care, when seen, generally small and not clinically meaningful

Telehealth may be less suitable and less desirable for patients with complex clinical conditions, those needing physical exams, and for therapies requiring the development of rapport between patients and providers

Providers noted that cost of telehealth could be barrier to care owing to limits of insurance reimbursement

Some patients perceived telehealth as barrier to improved health outcomes owing to absence of physical exam and challenges in developing rapport and communicating with care team, potentially resulting in delayed or missed diagnoses

Research results since pandemic

Use with low-income Californians increased access and engagement with healthcare system, especially with language concordance and well-functioning equipment (Joynt, 2023)

In adults with diabetes receiving endocrinology care, patients who used telemedicine alone had inferior glycemic outcomes compared with patients who used in-person or mixed care (Zupa, 2023)

Use of community tele-paramedicine consisting of in-home paramedic visits with video visits by emergency physicians improved care in health disparity communities (Daniels, 2024)

Patients with chronic conditions reported usefulness and ease of navigating telehealth, but lower socioeconomic status, limited English proficiency, inadequate health literacy, lower educational attainment, and low patient activation led to poorer quality telehealth (Yoon, 2024)

Research results (cont.)

Among veterans initially advised to seek care within 24 hours, use of tele-emergency care compared to standard nurse phone triage led to decreased ED visits, hospitalizations, and out-of-work spending within 7 days (Li, 2023)

Large majority of patients at comprehensive cancer center expressed satisfaction with telemedicine visits in proportions that remained consistent beyond the end of pandemic (Doshi, 2024)

Consumers demanding virtual care options and health systems may need to respond for business reasons (Dutta, 2024)

Research results – quality and value of care

Quality of care

- Quality performance measures for patients receiving in-person vs. telemedicine primary care in large integrated health system (Baughman, 2022)
- Virtual care program in Ontario led to improved healthcare quality metrics (Mangalamoorthy, 2023)

Low-value care – studies of Medicare patients found comparable or reduced levels (Liu, 2024; Ganguli, 2025)

Climate change – telemedicine and de-centralization of cancer care reduce carbon footprint (Hantel, 2024)

Hospital at home

Reduced cost, healthcare use (lab tests and consultations), and readmissions while increasing physical activity compared with usual hospital care (Levine, 2020)

Patients had better experiences with care team, more experiences promoting healing such as better sleep and physical activity, and better experiences with systems factors such as the admission processes (Levine, 2021)

Reduced length of stay without increasing readmission risk and reduction of 30-day and one-year mortality rates (Zychlinski, 2024)

Communications challenges during teleconsultation (Sota, 2025)

No. ^a	Theme	Example evidence
T1	Technical issues	Low quality of camera or audio, or poor internet connection prevents examination ^{2,6,7,9-12,15-20}
T2	Difficulties in developing rapport	Establishing rapport requires various things (quality communication, physical contact, or atmosphere) that occur during in-person consultations ^{10,12,15,20-24}
T3	Lack of non-verbal communication	Clinicians lack clues (facial expressions or gestures) to determine whether patients fully understand their explanation or not ^{1,7,11,15,22,25,26}
T4	Lack of physical examination	Insufficient information about a patient's health status could lead to discordance between clinicians and patients in their perception of disease ^{1,2,6,10,20,21,25,27,28}
T5	Language barrier	As with in-person communication, language barriers present obstacles during communication ^{8,23,27,29,30}
T6	Spatial issues	Involvement of household members may interrupt consultations ^{6,12,31}
T7	Clinician preparation	Clinicians need training for new technologies and online communication ^{6,16}
T8	Difficulties in assessing patients' health literacy	Clinicians reported experiencing difficulty assessing patients' non-verbal communication and whether they understand the explanation or not ¹¹

Policy issues

Major policy issues

- Reimbursement
- Licensure and credentialing

Resources

- US government
 - [Policy](#)
 - [Changes after end of COVID-19 public health emergency](#)
- [Center for Connected Health Policy \(CCHP\)](#)

Non-radiology telemedicine reimbursement in US before COVID-19 (Yang, 2016)

Medicare – covered for real-time visits in designated rural areas, demonstration projects, Alaska, and Hawaii

Medicaid – decision left to state governments

Private insurers – required in some states, may be provided in others

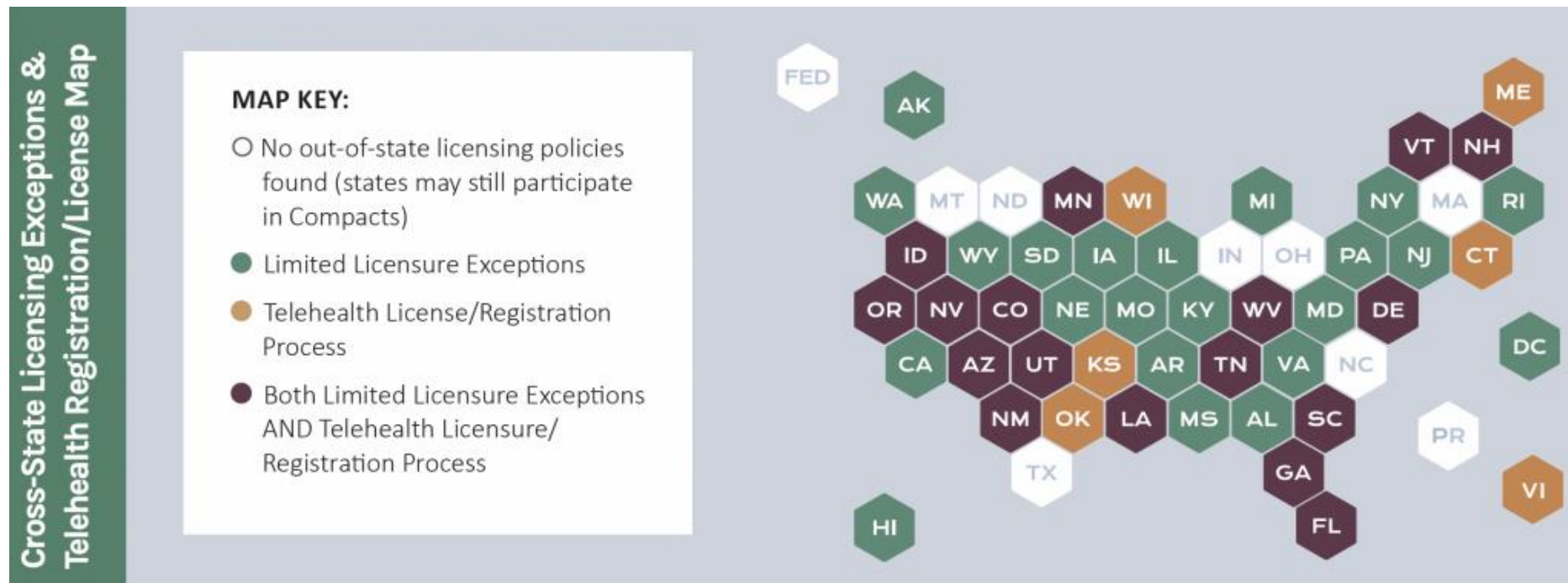
VA – expanding programs; considered to be part of larger EHR effort (Darkins, 2008; Hill, 2010; Broderick, 2013)

Advocacy for “parity” laws (Thomas, 2016)

Reimbursement

Expansion of reimbursement reduced as pandemic receded (Rubin, 2022; Mehrotra, 2022)

CCHP maintains policy trends and annual reports (e.g., CCHP, 2024)



Licensure and credentialing

In US, medical licensure done at state level

Growing advocacy for improved interstate licensure via compacts (Chaudhry, 2015)

- [Federal](#)
- [CCHP](#)
- [Rural Health Information Hub \(RHIMHub\)](#)

CCHP tracks six compacts

- Interstate Medical Licensure Compact
- Nurses Licensure Compact
- Physical Therapy Compact
- Psychology Interjurisdictional Compact
- Audiology and Speech-Language Pathology Interstate Compact
- Emergency Medical Services Personnel Licensure Interstate Compact

Best practices going forward

Safety issues must be explored and addressed (Graber, 2020)

Telehealth competencies across the learning continuum (AAMC, 2021)

- Training of medical students (Alkureshi, 2021)
- Appropriate integration of clinical students into televisit process (Wamsley, 2021; Balaji, 2021)

Opportunity to adopt patient-generated health data (Rosner, 2021)

Need to go from “digitization to digital transformation” (Adler-Milstein, 2021)

Must be cognizant of harms from all of digital health (Perakslis, 2023), including privacy and security (Tazi, 2024)

Domains of telehealth competencies for practitioners (AAMC, 2021)

Patient Safety and Appropriate Use – when and why to use, safety and readiness of patient and clinician

Access and Equity – mitigate cultural and other biases to promote equitable access to care

Communication – effectively communicate with patients, families, caregivers, and healthcare team members

Data Collection and Assessment – obtain and manage clinical information to ensure appropriate and high-quality care

Technology for Telehealth – have basic knowledge of technology needed for the delivery of high-quality services

Ethical Practices and Legal Requirements – meet federal, state, and local facility practice requirements for minimal standards to deliver care; maintain privacy and patient-physician relationship

Teaching telemedicine (Alkureshi, 2021)

TELEMEDS Tips to Optimize Virtual Visits

TELEMEDS	<u>T</u> est it out first	Prior to the visit, practice using your virtual visit platform. Check audio & video. Test mute & screen share. Practice splitting the screen to allow you to see your patient & the EHR at the same time.
	<u>E</u> valuate your schedule	Identify patients that should not have virtual visits. Proactively anticipate needs for the visit (outside records, translation services, etc).
	<u>L</u> ayout an agenda	Contextualize your visit agenda by reviewing your patient's interval history (last note, labs, etc). Note any outstanding orders or preventative health needs that should be addressed.
	<u>E</u> stablish visit rules	Introduce yourself, team members & verify your patient. Determine a technical back-up plan. Identify your patient's goals for the visit & balance those with your agenda items.
	<u>M</u> odify your speech	Vary tone & inflection. Speak slowly to allow for buffering & lag. Pause for questions often. Check for understanding.
	<u>E</u> ncourage patient engagement	Look for opportunities to educate patients using screen share - demonstrate websites, review EHR information. Engage patients in note writing when appropriate and jointly create an after visit summary to reinforce the plan.
	<u>D</u> emonstrate positive nonverbal communication	Maintain good eye contact. Smile or express concern when appropriate. Signal active listening by nodding or shaking your head.
	<u>S</u> ummarize next steps	Be specific about when & how to follow up. Encourage patient portal use to review after visit summary & chart updates for reference. Elicit direct patient feedback .

Toward the future

AMA advocates move from telehealth to “digitally enabled-care” with [Digital Health Playbook series](#)

Recommendations from

- Society for General Internal Medicine (Chen, 2023) – issues in
 - Policy
 - Clinical practice
 - Education
- OECD (Keelara, 2025)

Role for generative AI (Pool, 2024)?