



# Leveraging Telemedicine for Quality Assessment

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## OVERVIEW OF TELEMEDICINE IN HEPATOLOGY

The Federation of State Medical Boards defines telemedicine as “the practice of medicine using electronic communication, information technology, or other means between a physician in one location, and a patient in another location, with or without an intervening health care provider.”<sup>1</sup> Although telemedicine has been used in our field since 1995,<sup>2</sup> the coronavirus disease 2019 (COVID-19) pandemic has brought it to the front line. Setting up telemedicine platforms may be associated with significant

costs for hospitals and clinics; it is also limited by interstate licensing restrictions and reimbursement issues. From the patient side, it requires reliable Internet connections, compatible devices, and ease of logging in. However, most would agree that telemedicine is here to stay to facilitate access to care when face-to-face appointments are not possible or preferred by our patients. We foresee a blended care model that offers both face-to-face and telemedicine options to patients, based on patients’ preferences. Therefore, we need to understand how to leverage telemedicine to measure and continuously evaluate health

Abbreviations: AASLD, American Association for the Study of Liver Diseases; CI, confidence interval; CMS, Centers for Medicare & Medicaid Services; COVID-19, coronavirus disease 2019; CQC, Cirrhosis Quality Collaborative; ECHO, Extension for Community Healthcare Outcomes; EHR, electronic health record; EPIC, Evaluation of PegIntron in Control of Hepatitis C Cirrhosis; FIB-4, Fibrosis-4; HCC, hepatocellular carcinoma; MELD, Model for End-Stage Liver Disease; PRO, patient-reported outcome; SCAN-ECHO, Specialty Care Access Network-Extension of Community Healthcare Outcome; VA, Veterans Affairs. From the <sup>\*</sup>Section of Gastroenterology, Michael E. DeBakey Veterans Affairs Medical Center, Houston, TX; <sup>†</sup>Center for Innovations in Quality, Effectiveness and Safety, Michael E. DeBakey Veterans Affairs Medical Center, Houston, TX; and <sup>‡</sup>Section of Gastroenterology and Hepatology, Department of Medicine, Baylor College of Medicine, Houston, TX.

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care quality, drive quality improvement, and deliver high-value care in hepatology.

### TELEHEALTH AND HEALTH CARE QUALITY MEASUREMENT

Health care delivery is increasingly evaluated according to quality measures. The American Association for the Study of Liver Diseases (AASLD) recently developed an explicit set of evidence-based quality measures for adult patients with cirrhosis.<sup>3</sup> The quality measures are intended to be applicable in any clinical setting in which care for patients with cirrhosis is provided, and telemedicine is no exception.

Table 1 enlists key quality measures included in the AASLD cirrhosis set. These include screening for alcohol use, frailty assessment, and management of ascites, for example. These key metrics, which can be used in routing electronic medical records, can also be assessed and documented via telemedicine. Specifically, short, validated instruments can be administered before or after the telemedicine visit to screen for alcohol use, anxiety, or depression.<sup>4</sup> In kidney transplant candidates, the self-reported short form-36 physical functioning subscale score<sup>5</sup> has been used to assess frailty. Changes in weight can be monitored by Bluetooth-enabled scales connected to smartphones to track ascites, and these data can be fed back to electronic medical records.<sup>6</sup> Other metrics, such as hepatocellular carcinoma (HCC) screening, variceal screening, and hepatitis B vaccination, would require an

in-person visit for the care to be delivered. However, these data are readily available in electronic health records (EHRs) once performed, rendering it feasible to capture this information and track performance on these metrics as part of telehealth visits. These metrics can also be incorporated into population dashboards as part of quality improvement strategies. Within these population management systems, reports on quality metrics could identify patients for linkage to care, follow-up, and proactive care coordination.

Telehealth can also incorporate patient-reported outcomes (PROs) and quality-of-life measures via automated EHR prompts before or during the visit. As part of the AASLD Cirrhosis Quality Collaborative (CQC), patients at the participating sites are completing select PROs on the CQC information technology platform. One of the 10 sites also pilot-tested data collection on PROs where surveys were implemented within EPIC (Evaluation of PegIntron in Control of Hepatitis C Cirrhosis) using the MyChart feature (personal communication with Dr. Elliot Tapper). To date, more than 1000 patients have completed PROs via the CQC platform or within EPIC, providing foundational data to support the larger-scale implementation of PROs and quality-of-life measures that can guide health care decision making.

### APPROPRIATENESS CRITERIA FOR VIRTUAL VISITS IN HEPATOLOGY

We propose two sets of criteria that can be used to decide on the appropriateness of offering virtual visits

**TABLE 1. TELEMEDICINE AND QUALITY ASSESSMENT ACROSS A RANGE OF OUTCOME- AND PROCESS-BASED MEASURES**

	Assessment Method	Telemedicine Impact
<b>Outcomes-based measures</b>		
Ascites control	Patient survey <sup>12</sup>	Minimal
Hazardous drinking	Patient survey <sup>13</sup>	Minimal
Early-stage HCC	Imaging	Significant if all care delivered via telemedicine; limited in hybrid models
Liver-related hospitalization	EHRs/patient surveys	Minimal
Survival	EHRs/death registry	Minimal
<b>Process-based measures</b>		
Assess for memory and concentration	Patient survey	Minimal
HCC screening	Imaging and blood work	Significant if all care delivered via telemedicine; limited in hybrid models
Varices screening	Endoscopy	Significant if all care delivered via telemedicine; limited in hybrid models
Depression screening	Patient survey	Minimal
Referral to alcohol abuse program	Telemedicine/Teleconsultation, EHR	Variable, based on extent of hazardous drinking and need for in-person rehabilitation programs
Follow-up within 2 weeks after liver-related hospitalization	Telemedicine, EHR	Minimal
Liver transplant evaluation	Telemedicine/Teleconsultation	Minimal

instead of a traditional face-to-face visit to patients. Ease of telemedicine for patients: patients (and/or caregivers) need to have access to high-speed, stable Internet, a webcam with a microphone, or a smartphone that can conduct a videoconference. The second set of criteria is related to the type and severity of liver disease. Patients with stable liver diseases who do not require a complete physical examination, immediate invasive testing (e.g., diagnostic paracentesis), urgent cross-sectional imaging (e.g., rule out biliary obstruction), or laboratory testing (e.g., rule out acute liver failure) are appropriate for virtual care. Virtual care may be more appropriate for established patients than those seen initially for a consultation, given the need for a physical examination in most patients with liver disease (Table 2).

**TELEHEALTH AND EHR-BASED STRATEGIES TO IMPROVE HEALTH CARE DELIVERY**

The most well-known example of hepatology telemedicine is the Extension for Community Healthcare Outcomes (ECHO) project, developed by the University of New Mexico Health Sciences Center to provide complex specialty medical care to underserved populations through a model of team-based interdisciplinary development, where the focus was providers to providers.<sup>7</sup> The program was effective in enhancing access to patients with hepatitis C virus infection in underserved communities, with a similar response in the community and the academic settings.<sup>8</sup> Later, the Veterans Health Administration adopted this program and created the SCAN-ECHO (Specialty Care Access Network-Extension of Community Healthcare Outcome). SCAN-ECHO, combined with a form of electronic consultation, real-time consultation, and with didactic learning for front-line providers, was associated with a survival benefit in a recent evaluation (hazard ratio, 0.54; 95% confidence

interval [CI], 0.36-0.81; *P* = 0.003).<sup>9</sup> The authors found similar survival benefits, independent of baseline sociodemographic/clinical data (using a propensity score), for advanced liver disease (measured by Fibrosis-4 [FIB-4] score > 3.25). The reason for this survival benefit is unclear but perhaps could be attributed to higher rates of HCC and variceal surveillance in the group with higher FIB-4 score (42% versus 25% and 25% versus 15%, respectively).

More recently, a pilot study evaluated a novel telehealth intervention (Patient Buddy) in 40 patient-caregiver dyads. Patient Buddy is an app that allows real-time monitoring of medication and sodium adherence, weight, and cognition. This intervention demonstrated early efficacy by preventing hepatic encephalopathy-related readmissions and hence provided proof-of-concept data for future larger telehealth-based trials in cirrhosis.<sup>10</sup>

Telemedicine also has been successfully used to provide care to some of the sickest patients. Telehealth was associated with a significantly shorter time on the liver transplant wait list (138.8 versus 249 days), reduction in the time from referral to evaluation (hazard ratio, 0.15; 95% CI, 0.09-0.21; *P* < 0.01), and listing (hazard ratio, 0.26; 95% CI, 0.12-0.40; *P* < 0.01) in a study of 232 patients with advanced cirrhosis.<sup>11</sup> In this study, patients reported by John et al.<sup>11</sup> were considered for telemedicine evaluation if they did not require expedited inpatient evaluation (acute liver failure or Model for End-Stage Liver Disease [MELD] > 35) or were local patients (<100 miles). The patients were brought into the local Veterans Affairs (VA) clinic for the telehealth visit to complete this modality of telemedicine, where they were met by a telehealth-licensed vocational nurse or technician for documentation of vital signs and to help with the technology. The telemedicine visit with the transplant hepatologist included a detailed history of the patient, education about the liver

**TABLE 2. COMMON CONDITIONS FOR WHICH VIRTUAL CARE MAY BE APPROPRIATE**

Condition	Modifiers
Liver enzymes abnormalities	Chronic elevation (>6 months) Acute (<3x upper limit of normality)
Fatty liver on imaging	Incidental findings during routine examinations
Chronic viral hepatitis	Follow-up of chronic hepatitis B, treatment monitoring of hepatitis C, confirmation of sustained virological response
Risk stratification in the setting of chronic liver disease	Perioperative risk stratification in the setting of cirrhosis (compensated) Risk assessment of hepatitis B reactivation in the setting of future immunosuppressive therapy
Liver transplant evaluation and follow-up	Follow-up of patients with liver cancer or low MELD (e.g., ≥20) Follow-up of stable posttransplant patients

transplant process, listing, and posttransplant care. A randomized clinical trial with 106 liver transplant recipients using a telemedicine-based home management program showed that the telemedicine groups had a lower 90-day readmission rate compared with standard of care (28% versus 58%;  $P = 0.004$ ) and improved quality of life and general health.<sup>12</sup> In this program, Lee et al.<sup>12</sup> used a smart tablet and peripheral Bluetooth devices, free of charge, to obtain and record vital signs measurements, including temperature, blood pressure, blood sugar, and weight. The devices also supported daily text messages, education videos, and video FaceTime capability. Certainly, these interventions can clearly save costs associated with travel and facility usage, and likely increase patient satisfaction. Key components in both were medical stability, as discussed earlier (Table 2), and peripherals able to upload key vital signs pertinent for the virtual visit and/or remote monitoring.

In March 2020, the Centers for Medicare & Medicaid Services (CMS) released regulations and guidance for the duration of the COVID-19 Public Health Emergency, allowing Medicare to make payments for Medicare telehealth services and considered these visits the same as in-person visits and to be paid at the same rate.<sup>13</sup>

Although difficult to predict, telemedicine reimbursement flexibilities are likely to continue in some form. For example, this past July, the CMS proposed continuing to cover telehealth services allowed during the pandemic and expand telehealth coverage for mental health care. However, cost, quality, and logistical concerns will likely shape what these reimbursement flexibilities look like. Providers should request their representatives and Gastrointestinal political action committees propose continuation of this important initiative. Further, if state lines are considered as one of the barriers for ongoing use, one alternative could be the creation of a nationwide license so telemedicine/telehealth can be practiced nationwide.

So, given prior experiences, it is clear that in hepatology, we have an open avenue to improve hepatology care outreach and outcomes (Table 1).

## CHALLENGES IN THE APPLICATION OF TELEHEPATOLOGY

There are three major barriers in the expansion of telehealth for quality assessment and improvement. First,

technology capability that allows seamless communication between the dyad patient–caregiver and providers is key. Although some areas may not be robust enough to support video communication, the broad 5G coverage nationwide will likely be minimized. Furthermore, telehealth visits still require several steps of verification, a log-in process that may discourage less tech-savvy patients and providers on its use and still prefer face-to-face. Second, to enhance patients' experience, providers need to have appropriate credentialing and training of etiquette requirements. Finally, the broader question is liability and interstate access to the clinical encounter on documentation. The VA Videoconnet, the interface used at the VA to connect any patient to any provider anywhere, is the only tool that could be an example on how to deliver telemedicine care crossing borders without being subject to state-level restriction. Federation of State Medical Boards and CMS should prioritize expansion of telehealth such that it cuts state boundaries to reach patients wherever they may be.

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