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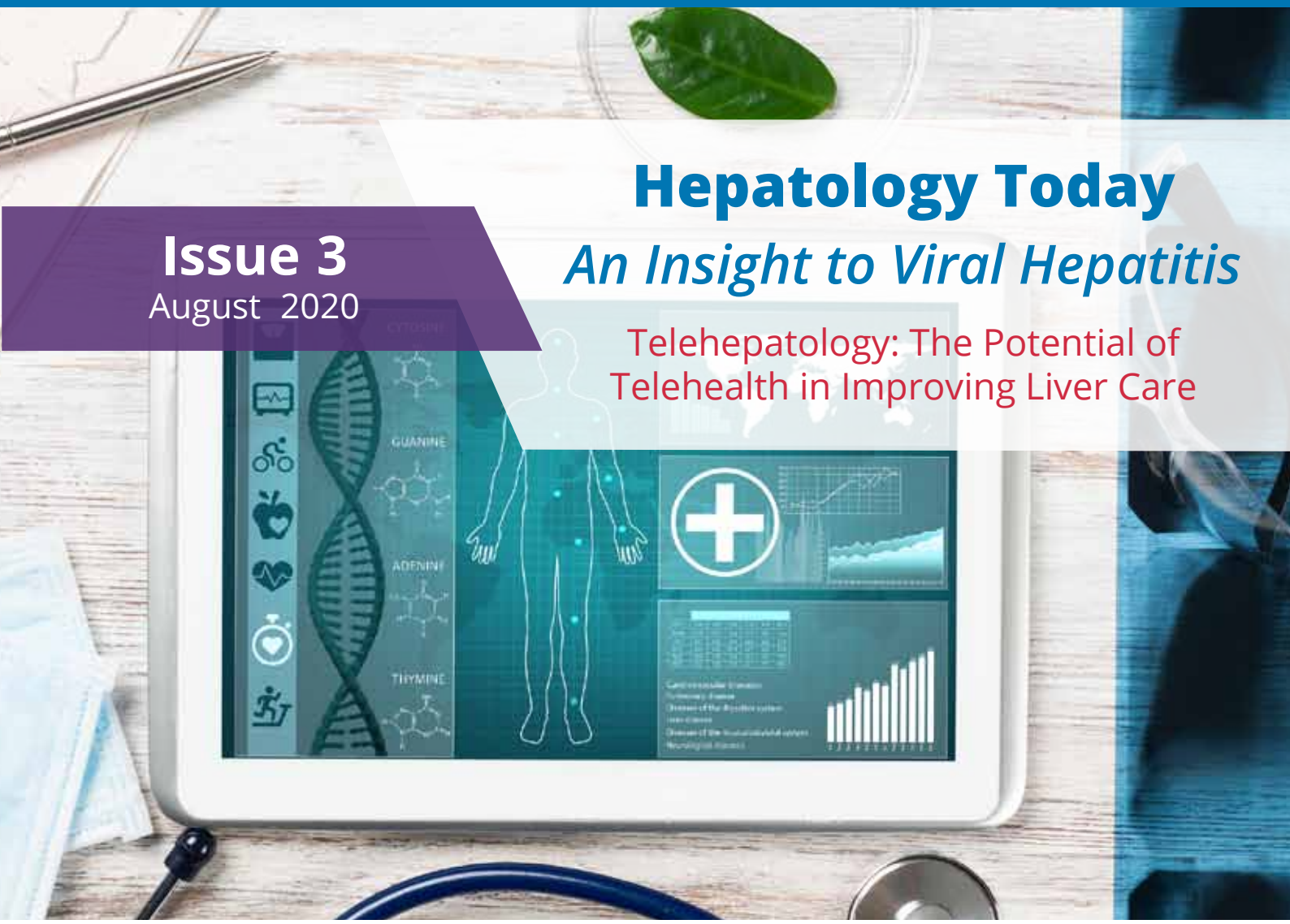
An Insight to Viral Hepatitis

Telehepatology: The Potential of Telehealth in Improving Liver Care



IN THIS ISSUE

Telehealth and its Role in Revolutionizing Global Health Care

Telehealth is a rapidly growing concept in the fields of health care communication and delivery and offers special opportunities to both provider and patients. With a rapid expansion of digital world, the health care delivery is changing significantly and is expected to have far-reaching effects. This initiative promises to reach the remotest communities across the globe and improve the health by defying physical, geographical, economic, and social distances. Advancing technological abilities can help address the disparities in the health care and its access while maintaining or reducing costs.[1,2]

The Concept of eHealth, Telehealth, Telemedicine and mHealth

eHealth: Delivery of health care and health resources by electronic means using internet and telecommunications. It is mostly used interchangeably with telehealth but has a broader coverage.[3,4]

Telehealth: A term coined by Bennet in 1978, includes the preventative, promotive, and curative aspects of health care.[5]

Telemedicine: A subset of telehealth that focuses on the curative aspect.[5]

mHealth: Electronic health applications that are implemented with the aid of mobile technology.[5]

Telehealth has enabled universal health coverage by improving access to quality, cost-effective health services using information and communication technologies (ICTs).[6] Telehealth and telemedicine are related in a similar way as health and medicine are related to each other.[5]

Figure 1 describes the relation between all these forms.[3,5]

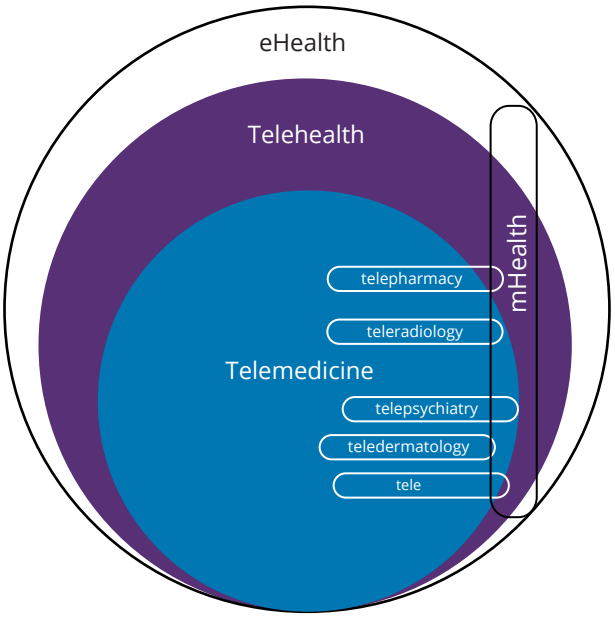


Figure 1: The association between ehealth, telehealth, telemedicine, and mhealth

Different Modalities of Telehealth

Synchronous or clinical video telehealth (CVT) or real-time video teleconferencing (VTEL): CVT enables health care providers (HCPs) to provide care to patients and/or consultation to other providers at a distance using smartphones or computer and in some cases, supportive peripheral medical equipment, such as digital stethoscopes, otoscopes, ultrasounds, etc. can be used to consult HCPs at remote sites.[7,8]

Asynchronous or store-and-forward telehealth: This involves collecting and storing clinical information and data such as lab reports, X-rays scans, echocardiograms, etc., at one time which can be used, interpreted, forwarded to remote sites for clinical evaluation.[7,8]

Remote monitoring: It involves assessing and monitoring of patients through remote monitoring devices (may or may not be in real-time).[8]

Teleconsultation: It covers provider-to-provider consultation on patient care.[8]

Benefits and Potential Uses of Telehealth[1,7,9]

- Improved quality and accessibility of medical care
- Efficient means for accessing tertiary care advice
- Improved quality of life of patients with chronic conditions
- Enabled physician's access to otherwise unavailable specialist opinions
- Reassurance to both doctors and patients

Acceptance of Telehealth Around the Globe

The World Health Organization (WHO) conducted its third global survey on eHealth (2015) with the aim to explore further developments in eHealth since their last survey in 2010 and its role in achieving universal health coverage. Figures 2, 3 and 4 represent the results of the survey.[6]

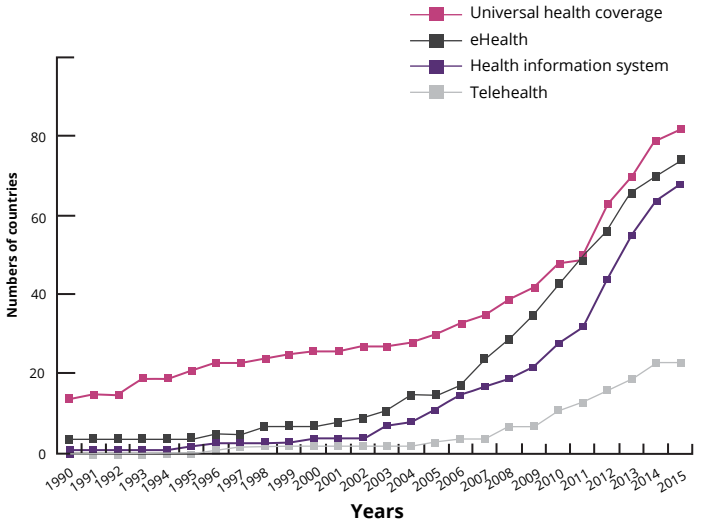
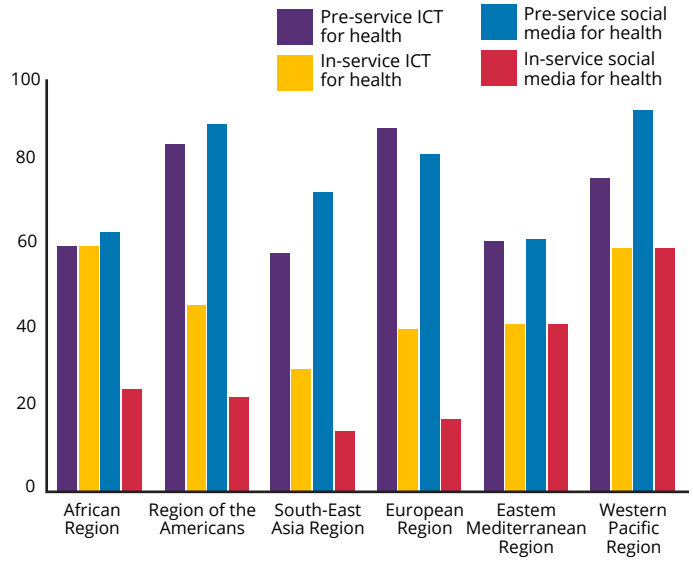
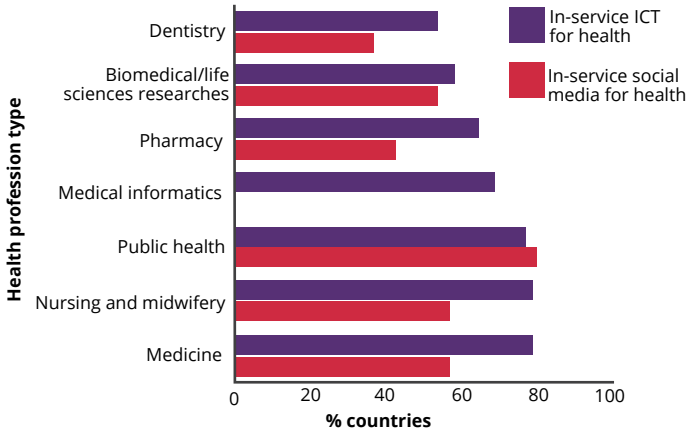


Figure 2: Number of countries with universal health coverage, eHealth, health information system, and telehealth policies or strategies (Year of adoption: 1990–2015)



Abbreviation: ICT, Information andcommunication technologies

Figure 3: WHO region-wise percentage of countries with eHealth training prospects for health sciences professionals and students



Abbreviation: ICT, Information and communication technologies

Figure 4: Percentage of different health areas receiving in-service training using telehealth

Key Findings of WHO's Global Observtoryfor eHealth (GOe) Survey Report[6]

- **125** — WHO member states showed highest response, thus reflecting a mounting interest of countries in eHealth
- **58%** — Responding member states have an eHealth strategy (approximately 90% of these strategies include objectives of universal health coverage or its key elements)
- **90%** — Countries with an eHealth strategy reported to have a special funding available for it
- **84%** — Countries use eLearning to impart education to medical students and doctors
- **47%** — Countries have national electronic health record systems
- **80%** — Countries reported that health care organizations use social media for the promotion of health messages

Telehealth and Telehepatology

Telehealth can effectively contribute to diagnostic, treatment, and management services of liver-related diseases and conditions to HCPs based in urban and rural settings who may have difficulty in accessing specialty care. Telehealth provides a basis for improvement and coordination of communication and care between specialty care and primary care providers (PCPs). Liver, gastroenterology, or any infectious disease specialist consultations are helpful for routine monitoring as well as for complicated clinical problems.[7] Patients with chronic hepatitis, alcoholic cirrhosis, and other liver-related problems have experienced reduced relapse, hospitalization, and increased quality of life with frequent teleconsultations.[1,9]

Telemedicine has shown to effectively manage the patients with chronic liver diseases (CLD) and has potential to improve management of viral hepatitis (hepatitis C virus [HCV] and hepatitis B virus [HBV]), especially HCV, patients with cirrhosis and hepatocellular carcinoma (HCC) and in pre- and post-liver transplant patients.[1, 9-11] The use of telemedicine can improve outcomes such as rehospitalization and quality of life after liver transplantation.[10] In patients with HCC, telemedicine offers the opportunity of multidisciplinary evaluation by virtual tumor boards.[1] Several recent studies in the Veterans administration in the US have demonstrated the effective use of telemedicine using video teleconferencing to increase access to care in cirrhosis patients that resulted in high satisfaction amongst patients, and improved self-care and timely surveillance to reduce readmissions in hospitals.[9]

Figure 5 illustrates an example of workflow of telehepatology.[12]

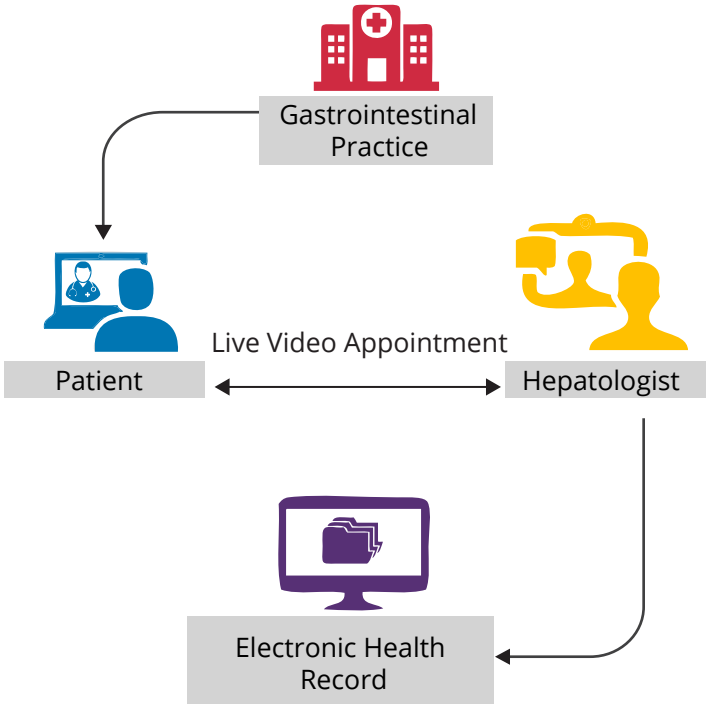


Figure 5: Telehepatology workflow illustration

The Use of Telemedicine for Viral Hepatitis in the Pre-COVID Era

According to European Association for the Study of the Liver (EASL), the main goal of HCV therapy is to achieve a sustained virologic response (SVR; undetectable HCV RNA) in 12 weeks after treatment completion (SVR12). Secondly, the goal is to improve the patient's quality of life and remove the stigma, and thirdly, prevent the progression of HCV-related hepatic and extra-hepatic diseases, including fibrosis, cirrhosis, decompensation of cirrhosis, HCC, etc. and prevent the onward transmission of HCV.[13]

Successful Telehealth Models for Chronic Hepatitis C Treatment

The ECHO Model

The Extension for Community Healthcare Outcomes (ECHO), or Project ECHO is one of the most well-known and cited examples for the use of telemedicine and innovative technology for HCV treatment. This model was designed to increase access to interferon-based treatment for HCV patients located in

rural areas of New Mexico. It specially targeted front-line primary care providers (PCPs) to enhance their expertise and facilitate discussion on problem-based learning via weekly live audio-video teleconferencing. Informative cases and presentations were developed for provider education.[1,14]

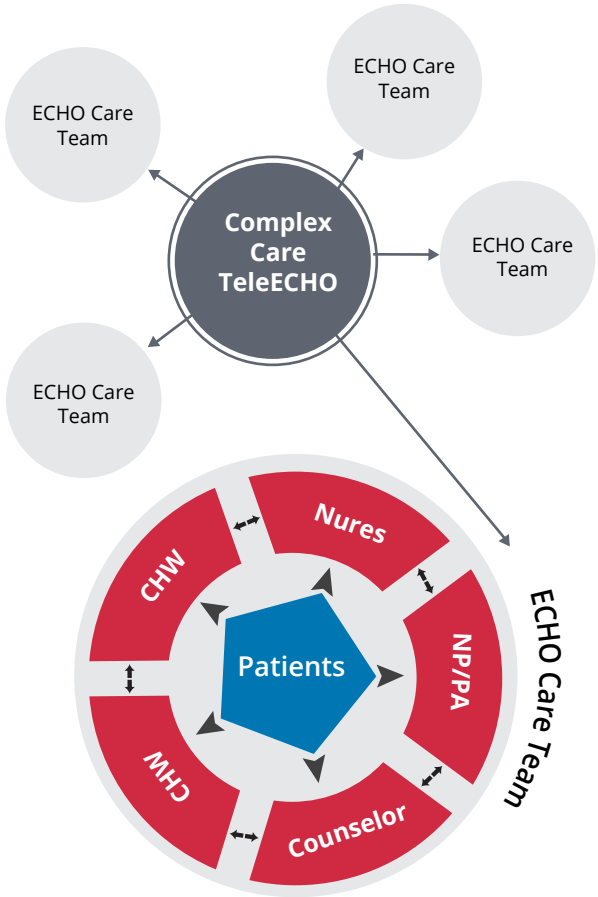
Subjects receiving chronic hepatitis C (CHC) interferon treatment administered by PCPs (treatment using videoconferencing), N=407

Control subjects receiving same CHC treatment at the University of New Mexico HCV clinic, n=146

Results

- No significant difference in SVR or viral eradication in the ECHO study arm (58.2%) and controlled arm (57.5%)

Figure 6 represents the ECHO model. ECHO model has transformed many practices of treatment nationally and internationally and has been well-adopted through different specialties. It can be incorporated into settings where continuous monitoring for HCV patients is required.



Abbreviations: ECHO, Extension for Community Healthcare Outcomes; CHW, community health workers; NP/PA, nurse practitioner or physician assistant

Figure 6: Schematic representation of the ECHO model

The SCAN/ECHO Model

Based on the ECHO model, department of Veterans Affairs (VA) implemented a similar model VA-ECHO for the rural population called as the SCAN/ECHO model.[7] VA-ECHO was adopted in 152 PCP sites. PCPs discussed patient treatment plans through videoconferencing with specialists every 1-2 weeks. The treatment mode was using DAA.[15]

Total PCPs: 4,173
376 PCPs: Treated 6,431 HCV patients exposed to VA-ECHO

3,797 PCPs: Associated with 32,322 HCV patients unexposed to VA-ECHO

Results

- No difference in rate of SVR was found in both the groups (58.2% in exposed 53.9% in unexposed; P=0.32).
- PCPs prescribed antiviral medications in 21.4% of unexposed and 2.5% of unexposed patients (P=0.01). Thus, the rate of PCP-initiated antiviral treatment was much higher in the exposed subjects as compared to the unexposed patients.
- HCV patients in VA-ECHO arm were more likely to receive antiviral treatment with equivalent cure rates than unexposed patients.

Conclusion

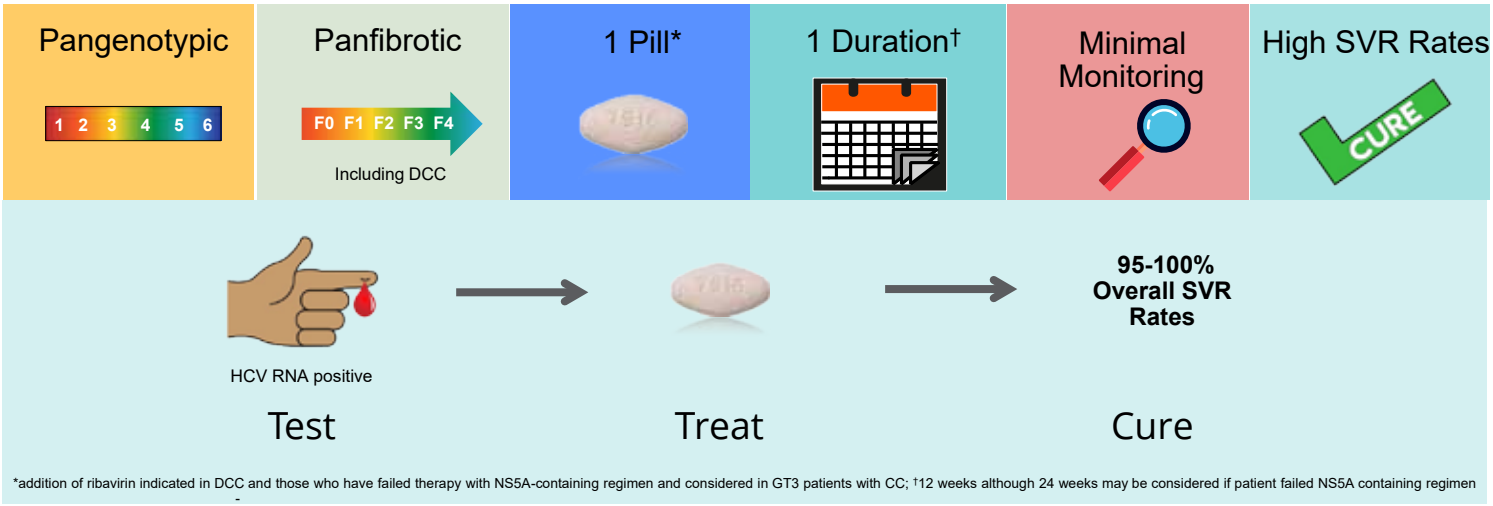
This study further supports that the implementation of VA-ECHO can improve rates of initiation of CHC treatment population.

Recent interventions in the treatment of HCV have successfully shown the implementation of telemedicine for high-risk populations which were managed by nurses, pharmacists, and PCPs with the help and support from remote hepatology specialists.[16] Similarly, in rural and remote settings, nurse-led HCV treatment was found to reduce the frequency of in-person visits to specialist by using e-portals and e-consultations for patient care.[17]

Other Successful Interventions for CHC Treatment

The WHO 2016 guidelines for the screening and management of HCV patients recommended DAA-based treatment instead of interferon-based regimens. DAA treatment that do not require ribavirin have shown improvement and many pan-genotypic regimens (successful resolution of chronic HCV infection [SVR12] in 85% or above treated individuals in all six major genotypes) was approved for use in patients aged 18 years and above.[18] Simple delivery of care for HCV control and successful elimination includes a once-daily single tablet treatment using sofosbuvir/velpatasvir (SOF/VEL), a pan-genotypic regimen. It is highly potent and promises significant addition to the current therapy using DAA regimens for chronic hepatitis C.[19] The regimen is illustrated in the Figure 7.

Table 1 includes the summary of interventions on telemedicine-based CHC treatment.[11]



Abbreviations: HCV, Hepatitis C virus; SVR, sustained virologic response; DAA: direct-acting antiviral agent; DCC: decompensated cirrhosis; F0-F4: fibrosis scores 0-4; GT: genotype

Source: Gilead Sciences Europe Ltd EPCLUSA (sofosbuvir/velpatasvir) SmPC, July 2019

Figure 7: Simple pan-genotypic single tablet regimen

Table 1: Telemedicine-based CHC programs

Study	Population	Modality	Findings
Talal *et al.,* 2018	Patients with hepatitis C undergoing an opioid substitution therapy program (*n*=62)	Biweekly telemedicine sessions between the patient and a specialty provider during the treatment course	Out of 45 patients treated , 42 (93.3%) achieved SVR
Marciano *et al.*, 2017	PCPs treating hepatitis C in the Patagonia Region in South America (*n*=14)	Videoconferences between community physicians (ECHO sites) and specialists (University Hospital, Argentina)	After 6 months of participation, significant improvement in PCPs' ability to stage fibrosis, determine right candidates for treatment, and select appropriate HCV treatment
Cooper *et al.,* 2017	Hepatitis C patients in Canada receiving care from the Ottawa Hospital Viral Hepatitis Outpatient Clinic; Telemedicine (n=157) and non-telemedicine (n=1130)	Videoconferences between patients and specialists	Significantly fewer telemedicine patients initiated AVT as compared to non-telemedicine patients (27.4% vs 53.8%; P<0.001). Those treated with DAA noted similar SVR rates (94.7% vs 94.8%; P=0.99)
Rossaro *et al.,* 2008	Patients with hepatitis C in rural California (*n*=103)	Videoconferences between patients and specialists	23% candidates underwent therapy; 15 patients were evaluated for liver transplant

Abbreviations: SVR, sustained virologic response; PCPs, Primary care providers; ECHO, extension for community healthcare outcomes; HCV, hepatitis C virus; AVT, antiviral therapy; DAA, direct-acting antivirals

Source: Stotts, M.J., J.A. Grischkan, and V. Khungar, Improving cirrhosis care: The potential for telemedicine and mobile health technologies. *World J Gastroenterol*. 2019. 25(29):3849-3856.

Barriers Faced in Implementation of Telehealth Services

Of note, despite the advantages and tremendous promises, the growth of telemedicine services was less impressive than expected until this year, due to several barriers including cultural barriers, the lack of proper regulations, insurance coverage, confidentiality and other issues.[2]

The substantial barriers include restricting the use of telemedicine opportunities to patients in rural areas who must travel to a local medical facility (e.g., doctor's clinic, hospital, dialysis center, or nursing facility) to receive telemedicine services from a specialist in a remote location. Also, some parity laws have reimbursement of the amount for telemedicine services like in-person services, but the reimbursement is a delayed process. In addition, traditional search methods and technology requirements limit the implementation of telehealth or telemedicine services.[12]

A systematic review studied 30 articles to evaluate the potential and significant barriers to implementation of telemedicine globally. The main organizational barriers included cost and reimbursement, legal liability, privacy and confidentiality matters, data security, efficiency, and workflow. The patient barriers were age and education level. The remaining barriers were categorized by staff and computer programmers.[18]

Figure 8 depicts the frequency of the barriers found in the above study.[18]

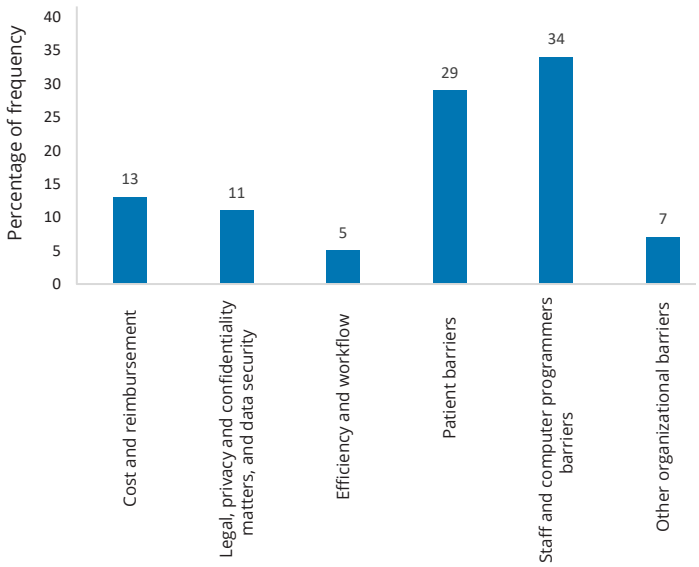


Figure 8: Percentage of different barriers as reported in the systematic review

Telehealth and COVID-19

The ongoing outbreak of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) causing Coronavirus Disease 2019 (COVID-19) has dramatically changed the need and accelerated the widespread use of remote health care approaches in order to prevent the spread of infection and avoid in-person visits.[21]

Telehealth during the pandemic limits the patients' and health care workers' exposure to the clinic environment, helps preserve the limited supply and unnecessary utilization of personal protective equipment (PPE), and lessens the backlog of delayed patient care due to the COVID-19 pandemic response.[12]

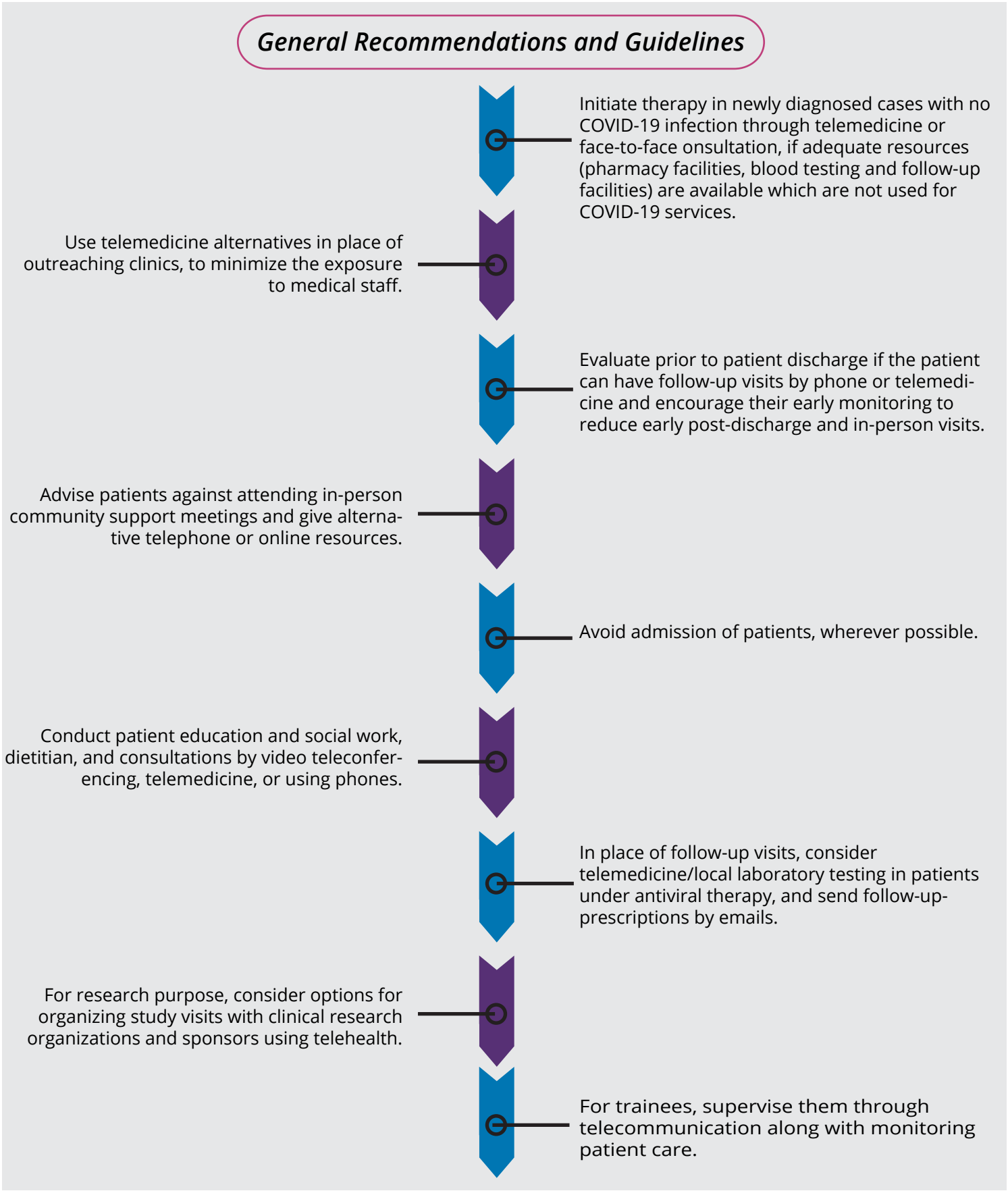
Expansion of Telehealth Services During the COVID-19

As a response to the COVID-19 pandemic, national agencies have started promoting telehealth while relaxing regulations and increasing funding. In addition to these, temporary waivers like relaxation in medical licensure laws related to the care of patients are expected to remain in action for the duration of the COVID-19 crisis.

COVID-19 and the Viral Hepatitis: Considerations for HCPs and Patient Care

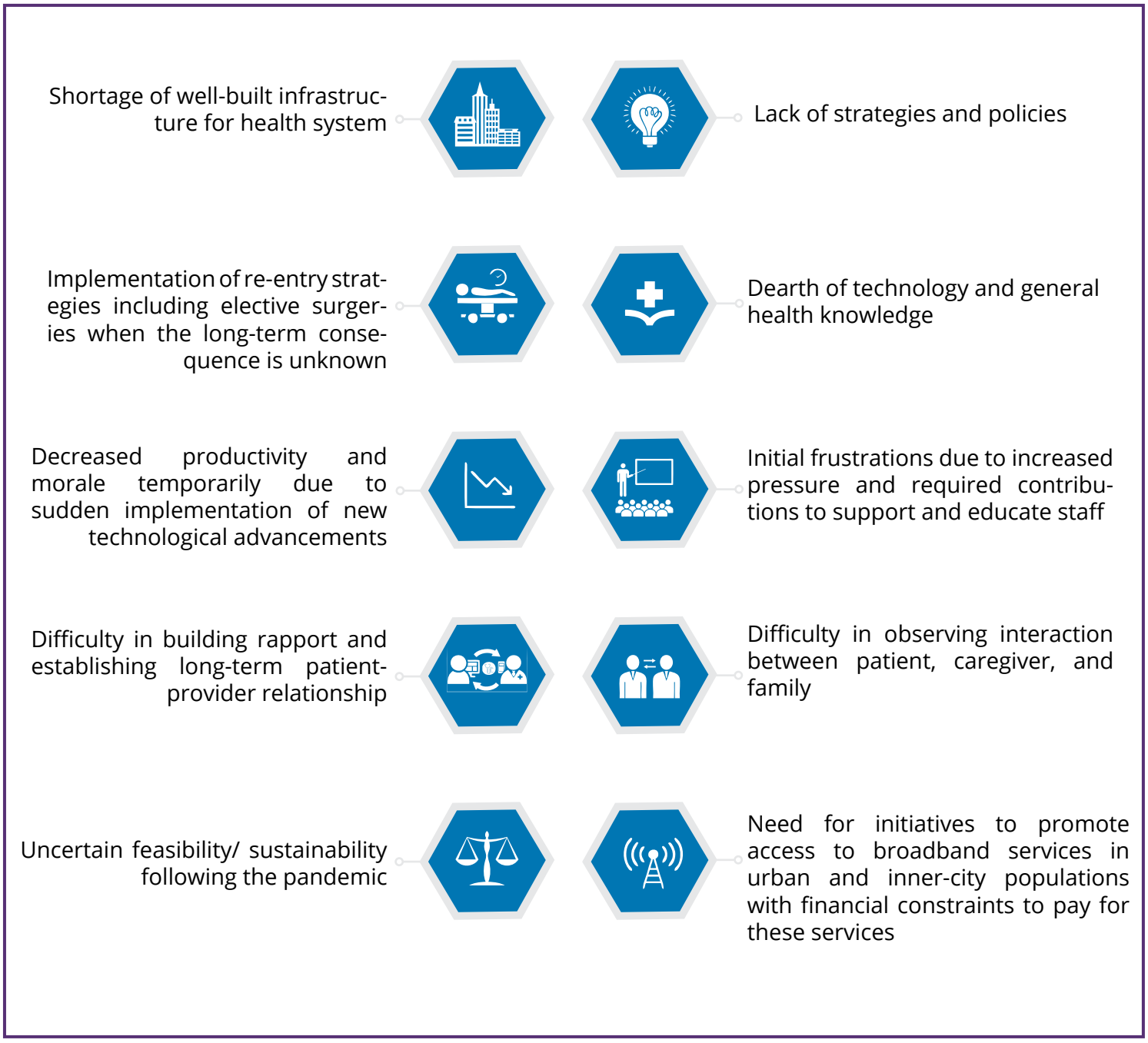
In patients with HBV and HCV infections, unique considerations involve all the possible precautions for therapies in those with or without COVID-19 infection and COVID-19 symptoms or abnormalities in hepatic biochemical tests.[22]

American Association for the Study of Liver Diseases (AASLD) and EASL recommendations address the issue of patients with liver disease and provide additional guidance for prevention, diagnosis and treatment of patients, as well as protection of health care workers by reducing their exposure.[23,24]



Challenges and Facilitators Influencing Telehealth-based Care

The transition due to COVID pandemic has led to various technological, logistical, and procedural challenges. Despite the promises and efforts being made, several challenges remain in integrating clinical care with telehealth.[12,21,25,26]



Based on a review that aimed to investigate the barriers and the facilitators influencing the use of home consultation systems in the health care settings, the frequently reported facilitators included cost savings, the ease to use the technology, reduced waiting and travel time, easy involvement of family members, privacy and security, among others. As per this study, patients belonging to different age groups and with different health conditions benefited from remote health services and well-accepted the telemedicine options as in-person and face-to-face consultation.[27]

Telemedicine Post-COVID-19 Pandemic – A Path Forward

Development of robust telehealth programs and refurbishing remote care approaches in hepatology will be vital. Expansion of telemedicine into areas of hepatology is required and holds potential for improving management. The next big challenge remains to integrate telemedicine into routine clinical care beyond this COVID-19 crisis.

Advancing Telehealth in Liver Disease

Telehealth can improve access to care and enhance care between visits. The technology to improve access is straightforward and limited research is required. To improve care in between visits, several exciting possibilities exist such as remote monitoring and patient disease management, but more research is needed. Patient disease management needs advancements in technology. This can enable the development of disease management platforms, which could expand both access and in-between visit monitoring, especially in remote areas.[9]

In order to promote telehealth, authorities should permanently expand the improvements to all beneficiaries, and private payers should adopt models for reimbursement of telemedicine services close to in-person visits.[21]

Other important aspects while advocating telehealth are identifying and establishing certain ethical standards and guidelines to enhance the quality of the services by therapists and specialists, to maintain the security and confidentiality of patient's information and uphold the high quality of doctor-patient relationship.[28]

Telehealth Curriculum: Training HCPs for Next Generation Medical Care

The need today is to introduce new skills and ways to change the roles and responsibilities and support professional development of HCPs to make the most out of telehealth.

Currently, few academic programs offer training and/or certification programs in telehealth. National Academic Center for Telehealth (NACT) at Thomas Jefferson University (US) have developed an instructional training program that was designed for acquiring the skills required to facilitate clinical telehealth at clinical settings. Given the trends, a growing market of such programs is estimated.[29]

Revamping Telehealth in the Middle East

The Middle East region is facing an increasing load on health care systems from COVID-19 with more than 1.2 million confirmed cases reported up to 10th July.[30] COVID-19 has uncovered gaps in medical infrastructure and resources and highlights the need for more proactive adoption of technology tools to support and ensure the accessibility and effectiveness of resources for any health care system. The integration of telehealth models into the health care will be the bedrock of a solid response to the crisis and beyond.

Recent Developments for Expanding Telehealth in the Middle East Region

The United Arab Emirates (UAE) Ministry of Health is working with technology sectors to setup its first virtual hospital in the Middle East

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Dubai-based telehealth startup InstaPract helps patients consult doctors from a distance during COVID-19

News Updates in Telehealth and Telehepatology

Click Here	**AASLD Clinical Insights**: COVID-19 and the Liver: Telemedicine During the COVID-19 Pandemic and Beyond
Click Here	**American Liver Foundation Webinar**: The Role of Telemedicine in the Management of Liver Disease
Click Here	**Clinical Liver Disease**: COVID-19 special series

Takeaways

Telehealth initiative promises to reach the remotest communities across the globe and improve the health by defying physical, geographical, economic, and social distances.

Different modalities of telehealth include:

- Synchronous or real-time video teleconferencing (VTEL)
- Asynchronous or store-and-forward telehealth
- Remote monitoring
- Teleconsultation

Benefits of telehealth are:

- Improved quality and accessibility of medical care
- Efficient means for accessing tertiary care advice
- Improved quality of life of patients with chronic conditions
- Enabled physician's access to otherwise unavailable specialist opinions
- Reassurance to both doctors and patients

Telemedicine has shown to effectively manage the patients with chronic liver diseases (CLD) and has potential to improve management of viral hepatitis, pre- and post-liver transplant patients, patients with hepatocellular carcinoma (HCC) and patients with cirrhosis.

Various chronic hepatitis C (CHC) interventions have showed successful use of telehealth models to enhance access to clinical care in remote locations prior to COVID-19 pandemic. The most important ones include the ECHO project and SCAN/ECHO model.

American Association for the Study of Liver Diseases (AASLD) and European Association for the Study of the Liver (EASL) recommendations address the issue of patients with liver disease and provide additional guidance for prevention, diagnosis and treatment of patients, as well as protection of health care workers by reducing their exposure.

Development of robust telehealth programs and refurbishing remote care approaches in hepatology will be vital.

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Reporting suspected adverse reactions after authorization of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals and patients are asked to report any suspected adverse reactions via the national reporting schemes as applicable. Adverse reactions may also be reported directly to the manufacturer of the suspected product. Adverse reactions related to Gilead products may be reported directly to Gilead via Drugsafety.dubai@gilead.com.

For any questions related to Gilead products or therapeutic areas, please contact: askgileadME@gilead.com.
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