Tropical Diseases, Travel Medicine and Vaccines

REVIEW

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Traveling with chronic viral hepatitis

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Abstract

Viral hepatitis is one of the infectious diseases with an overall increasing mortality rate. The global burden of acute viral hepatitis remains substantial, with hepatitis A, B, C, D, and E responsible for millions of new cases annually and significant morbidity, especially in resource-limited settings and among travelers to endemic regions. People living with chronic viral hepatitis, especially with advanced liver disease, may face specific health risks and management challenges during travel, which makes preparing for travel especially important. Travel-related gastroenteritis or febrile syndromes can lead to more severe clinical outcomes due to limited hepatic reserve. Newly acquired hepatitis A and E significantly increase the risk of liver failure and mortality in patients with chronic liver disease. This review emphasizes the critical importance of checking the immunization status of patients with chronic viral hepatitis before travel, managing antiviral medications, assessing risk of complications, evaluating the health infrastructure of the destination country, and applying food and water safety precautions. Safe travel for patients with chronic viral hepatitis can be facilitated through an appropriate risk assessment and a personalized travel plan.

Keywords Chronic liver disease, Viral hepatitis, International travel, HAV, HEV, HBV, HCV, HDV, Travel medicine, Immunization, Liver cirrhosis, Superinfection, Global health

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Introduction

International travel is an increasingly relevant context for patients living with chronic viral hepatitis, a population that remains substantial worldwide: in 2024, the World Health Organization (WHO) estimated that 240 million people were living with chronic hepatitis B virus (HBV) infection and 47 million with hepatitis C virus (HCV) infection [1]. For these patients, travel for work, family, migration, or leisure intersects with disease-specific needs, including continuity of antiviral therapy, access to medical documentation and care abroad, and assessment of liver disease stability before departure [2]. Travel may also introduce preventable hepatic risks, particularly exposure to food- and waterborne infections. Among these, hepatitis A virus (HAV) and hepatitis E virus (HEV) are some of the most common vaccine-preventable infections acquired during travel, and for which people with chronic liver disease, including HBV and HCV, are considered at increased risk of serious disease. Contemporary travel-medicine guidance emphasizes that chronic illness does not usually preclude travel, but that individualized pre-travel consultation, ideally several weeks before departure, allows clinicians to review immunization status, medications, destination-specific risks, and contingency planning. These considerations make travel preparedness an important but often overlooked component of comprehensive care for people living with chronic viral hepatitis.

Methods

Study design and scope

This review was prepared by experts from the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) Study Group for Viral Hepatitis (ESGVH) based on the existing evidence base and expert opinion, with the aim to provide a current and comprehensive clinical perspective to guide clinicians in providing the best recommendations for safe travel in patients with chronic viral hepatitis [3]. The review covers pre-travel risk assessment and preventive measures, as well as potential complications during travel and the management of superinfections.

Search strategy, inclusion and exclusion criteria

A comprehensive, non-systematic literature review on the subject was conducted in databases such as PubMed, Embase, Google Scholar, and Cochrane Library. The study included articles, systematic reviews, and meta-analyses published between 2000 and 2025. Combinations of MeSH terms and keywords were used during the searches: "Viral hepatitis", "International Travel", "HAV", "HBV", "HCV", "HDV", "HEV", "Travel Medicine", "Immunization", "Liver Cirrhosis", "Superinfection". Case reports with a limited number of patients and publications in languages other than English were excluded. The authors also reviewed current recommendations and guidelines from major international organizations such as the WHO, European Centers for Disease Control and Prevention (ECDC), the European Association for the Study of the Liver (EASL), and the American Association for the Study of Liver Diseases (AASLD).

Key challenges for travelers with chronic viral hepatitis

Chronic HBV and HCV are common among travelers visiting friends and relatives, long-term expatriates and those traveling from intermediate or high prevalence countries [4, 5]. A US screening study conducted among travelers found that 16% originated from HBV-endemic regions and 25% had serological evidence of previous HBV infection [6]. This underscores that chronic hepatitis among travelers is not a marginal issue; rather, a substantial proportion of international travelers therefore require tailored risk assessment.

Most cases of chronic viral hepatitis remain clinically stable during international travel; however, depending on the degree of the underlying liver disease, different exposures during travel may present a unique set of challenges. Advanced liver disease can reduce physiological reserve and diminish the ability to tolerate common travel-related stressors such as heat exposure, dehydration, prolonged flights and altitude changes. Evidence from travelers with chronic liver disease (CLD) indicates a heightened vulnerability to systemic infections, fluid-electrolyte imbalance, and metabolic stress during travel [7]. Furthermore, an underlying hepatic dysfunction may exacerbate the severity or duration of otherwise mild travel-related illness [8].

Acute travel-related illness such as gastroenteritis, febrile syndromes, or respiratory infections can have more pronounced clinical effects in individuals with chronic HBV or HCV. Travel-specific illnesses such as dengue or malaria have also been associated with more severe manifestations in individuals with CLD [7, 9].

Travelers with CLD may encounter the same behavioral and environmental exposures known to elevate the risk of acquiring viral hepatitis among the general traveling population, i.e., sexual contact with new partners, tattooing, piercing, and receiving medical or dental care abroad, particularly during medical tourism. Several studies have quantified the risk of HBV acquisition in travelers. Older epidemiological data estimate that approximately 1 in 2,500 travelers may acquire symptomatic HBV infection after travel to high-endemicity regions [10]. A more detailed synthesis shows that long-term travelers to intermediate or high-prevalence countries face monthly HBV incidence rates of 25–420 per 100,000

with the highest risks associated with sexual exposure, medical procedures, and tattooing [11].

A targeted review emphasized that travelers frequently engage in at-risk behaviors, particularly casual sexual encounters and accessing medical or dental care abroad, yet often underestimate the risk of HBV acquisition associated with these activities [12, 13].

Risk perception remains low. Large surveys have shown that although awareness of HAV/HBV vaccination exists, actual uptake is inadequate, with many travelers failing to recognize their vulnerability [14]. This gap extends to individuals already living with HBV or HCV, who may perceive themselves as "healthy HBV carriers" and may not seek specialized pre-travel consultation, limiting opportunities for risk mitigation tailored to their chronic condition.

Variability in infection-control standards across countries further represents a major challenge. Unsafe injections, poorly sterilized dental instruments, and unregulated tattooing or piercing remain recognized routes of bloodborne pathogen transmission globally. While these exposures are widely discussed in the context of HBV/HCV acquisition, they also pose important risks for those with chronic infection, particularly in resource-limited settings where emergency care may be unavoidable [11, 13].

Psycho-social challenges are frequently under-recognized but can significantly affect travel experiences. Qualitative research has documented widespread stigma, fear of disclosure, and concerns about discrimination among individuals living with HBV [15].

Viral hepatitis: pre-travel preparation

Pre-travel risk assessment

At least four weeks before a scheduled trip, all travelers should consult a healthcare practitioner specialized in travel medicine. A comprehensive pre-travel consultation should include a detailed review of the traveler's medical history, as well as a destination-specific risk assessment [16]. A recommended pre-travel clinical checklist for liver diseases is given in Table 1. In addition, for travelers with chronic HBV or HCV infection (or residual post-HCV liver fibrosis), the consultation should also focus on determining the stability and degree of control of the underlying liver disease. This assessment can be done by the travel medicine physician or, more frequently, by the patient's routine treating physician. Specifically, for chronic HBV and (untreated) HCV, priority should be given to viral load and biochemical assessment [17, 18], liver disease staging, including fibrosis, hepatic synthetic function, and determining the presence or absence of cirrhosis or prior decompensation. Further evaluations focus on assessing the degree of hepatic impairment (if any), screening for complications (e.g., cirrhosis, portal hypertension, or varices in those with advanced liver fibrosis), and ensuring that the chronic condition is well-compensated before travel. In most cases, traveling is safe and no different for the general population. In patients with liver cirrhosis, hepatic reserve and prognosis may be further stratified using standardized scores such as the Child-Pugh classification and, particularly in end-stage or transplant-relevant liver disease, the Model of End-Stage Liver Disease (MELD) score. Patients in Child-Pugh class A, who are considered to have well-compensated disease, generally tolerate travel well. However, caution is warranted for those in Child-Pugh class B, who are considered to exhibit significant functional liver compromise. For Child-Pugh class C, or patients with a MELD score > 15, travel, in particular long-term travel, is generally not indicated, due to a high short-term risk of life-threatening complications such as liver decompensation, variceal bleeding, encephalopathy, or spontaneous bacterial peritonitis [16, 19].

Pre-travel assessments should check for hepatitis A and B immunity (anti-HAV IgG, HBsAg, anti-HBs, and anti-HBc) [20, 21]. Hepatitis A is the most common vaccine-preventable disease among travelers to developing countries, and hepatitis B risk is increased in regions with high endemicity or where travelers may require medical care, undergo procedures, or engage in high-risk activities [11, 22]. Travelers should be counseled on the avoidance of bloodborne pathogen exposures, including medical procedures, tattoos, and unprotected sex, especially in regions with high HBV or HCV prevalence [11, 16, 23, 24].

Patients with chronic HBV infection traveling to HDV-endemic areas should be counseled to avoid high-risk behaviors such as unprotected sexual intercourse, injection drug use, and exposure to non-sterile medical procedures [25].

For HCV, pre-travel assessments should differentiate between active and past infection (following spontaneous clearance or post-treatment sustained virological response (SVR)). Active cases should be prioritized for treatment with direct-acting antivirals (DAAs). The focus of the pre-travel consultation should be on determining the stage of liver disease and the risk of acute decompensation, if any, during travel. Advanced liver disease (defined as fibrosis F3 or F4) at DAA treatment baseline, as well as family history of hepatocellular carcinoma warrant ongoing surveillance for portal hypertension and hepatocellular carcinoma post-SVR [26], and the risk of reinfection in high-prevalence areas should not be overlooked, as SVR does not provide a protective immune response [27].

Patients should also be counseled on environmental stressors, alcohol consumption, dehydration, and exposure to hepatotoxic substances (e.g., herbal remedies)

Table 1 Pre-travel clinical checklist for liver disease

Category	Action item	Clinical detail / Goal	Check
Risk stratification	Calculate MELD/Child-Pugh for advanced/end-stage liver disease	High-risk travelers with decompensated or end-stage liver disease should be identified, in particular individuals with Child-Pugh C or MELD score > 15, and should be advised to avoid travel unless absolutely necessary.	
Immune status	Serological screening	Check HAV IgG and HBV triple panel (HBsAg, anti-HBc, anti-HBs), alongside anti-HCV and HIV serologies.	
Vaccination	Accelerated vaccine schedule	For HAV, seroprotection generally occurs 14 days after the first vaccine dose, with a second dose 6 months later to ensure long-term immunity. For HBV vaccination (or for combined HAV/HBV vaccination), if the trip is < 4 weeks away, use the accelerated 0-7-21 day vaccination schedule, and remember to complete primary vaccination with a fourth vaccine dose 12 months later. Double doses of HBV aluminum-adjuvanted vaccines (40 µg per dose) should be considered for patients with immune compromise.	
Chronic medication	Antiviral supply	Bring an extra supply of medication, in case the trip is prolonged. Keep medication in hand luggage to avoid treatment interruptions. Ensure medication stability in extreme weather conditions.	
Malaria prophylaxis	Check destination resistance patterns and underlying liver diseases	Malaria chemoprophylaxis should be selected according to destination-specific recommendations and individualized according to liver disease severity, renal function, comorbidities, pregnancy status, and potential drug interactions. Chronic viral hepatitis without significant hepatic impairment does not in itself impact standard malaria prophylaxis, but specialist advice is advisable in advanced liver disease.	
Emergency kit	Rescue medications	Oral rehydration salts may be useful for diarrhea- or vomiting-associated dehydration, but should be used according to individualized advice in patients with ascites, hyponatremia, renal impairment, or fluid/sodium restriction. NSAIDs should generally be avoided, and paracetamol/acetaminophen should not exceed recommended reduced doses. Patients with a history of hepatic encephalopathy should carry their prescribed lactulose and/or rifaximin, as appropriate.	
Food & water safety	"Boil it, cook it, peel it"	To avoid HAV or HEV exposure, as well as other waterborne or foodborne illnesses, it is recommended to avoid raw shellfish, undercooked pork or camel meat, and non-bottled water and ice. All food should be cooked, and fruits and vegetables washed thoroughly and peeled.	
Documentation	Physician letter	A brief medical letter should describe, in English, the patient's medical history, liver disease stage and chronic medication.	
Insurance	Pre-existing coverage	Confirm that the patient's health insurance explicitly covers complications of chronic liver disease and emergency medical evacuation.	

MELD – model of end-stage liver disease score; HAV – hepatitis A virus; HBV – hepatitis B virus; HEV – hepatitis E virus; HBsAg – HBV surface antigen; anti-HBs – HBV surface antibodies; anti-HBc – HBV core antibodies; anti-HCV – HCV antibodies; HIV – human immunodeficiency virus; NSAIDs – nonsteroidal anti-inflammatory drugs

during travel, which can exacerbate liver dysfunction. Many travel insurance plans do not cover preexisting conditions; travelers with chronic hepatitis should confirm coverage for liver complications or medical evacuation [28].

Pre-travel vaccination

For all travelers, catch-up for any missed routine vaccines should be performed as soon as possible. Furthermore, certain supplementary destination-specific vaccinations should be considered [2], and travelers with advanced CLD may be at risk of worsening their condition in case of superinfections with viral or bacterial pathogens [29], and should be prioritized for vaccination. Liver cirrhosis weakens both innate and adaptive immune responses, making this population particularly susceptible, and immunization plays a key role in protecting this patient population In travelers with chronic viral hepatitis, all approved vaccines are considered safe, with priority given to choosing conjugated over polysaccharidic vaccines, where available.

Regarding immunization against hepatitis A, a single dose of vaccine provides substantial short-term protection, but long-term immunity requires completion of the two-dose series. The second dose should be administered at least 6 months after the first. If the second dose is delayed, it should be given as soon as feasible, without the need to restart the series. Following vaccination, anti-HAV antibodies have been shown to persist for at least 20 years [30], with mathematical modeling predicting that more than 97% of individuals will sustain protective anti-HAV antibody titers for at least 25 to 40 years after vaccination [31, 32]. A satisfactory immune response can be obtained with the two-dose regimen in patients with compensated liver disease (94–98%), whereas seroconversion may be reduced (51–71%) in patients with

decompensated cirrhosis [33], with data from patients living with HIV suggesting that a third dose can further increase seroconversion rates [34, 35]. All inactivated hepatitis A vaccines are safe, with mild local reactions such as redness at the injection site being the most common adverse events reported [31, 35]. For travelers aged > 40 years, individuals with immune compromise, or those with end-stage liver disease, immunoglobulins may be considered in addition to active immunization against HAV if travel is imminent (< 14 days), to a high endemicity area, with anticipated high exposure depending of the activities at the destination. The vaccine series should still be completed post-travel for durable immunity [36].

The HBV vaccine should be administered to all patients with CLD who have neither chronic HBV infection nor protective anti-HBs titers (> 10 mIU/mL), with a standard 0-1-6 months regimen and possibility for an accelerated four-dose regimen, at 0-7-21 days and a final dose 12 months later. In patients without advanced liver disease, seroprotection rates following HBV vaccination are generally high, > 90% of healthy adults achieving protective anti-HBs titers after series completion, even with prolonged intervals between doses. Immune memory persists for decades, and booster doses are not routinely required for immunocompetent individuals who complete the primary series [37]. Patients with cirrhosis may require supplementary vaccine doses or administering double doses (40 µg per dose) for aluminum-adjuvanted vaccines, to achieve optimal protection [38–40]. A CpG-adjuvanted vaccine results in higher seroconversion rates in patients living with HIV [40], and data for patients with cirrhosis are awaited. All approved hepatitis B vaccines are considered very safe for individuals with CLD [41].

A combined HAV/HBV vaccine is also available and can be administered according to the HBV vaccination schedule described above, either with the three-dose series, or with the accelerated four-dose series. The combined HAV/HBV vaccine is also safe, and has been reported to elicit long-term protection and strong anamnestic responses, even after delayed completion [32, 36].

One HEV vaccine (HEV239) is currently licensed in China, Pakistan and India [42]. It has demonstrated high efficacy and durable protection for at least 10 years in adults, with a favorable safety profile in clinical trials [43]. However, global access is limited by a lack of WHO prequalification, and missing regulatory approvals in the EU and beyond [42, 44]. Future research should prioritize currently unresolved issues such as vaccine efficacy, cross-genotype protection, optimal vaccine dosing, vaccine logistics, and the cost-effectiveness of pre-travel HEV vaccination, particularly for at-risk travelers with liver cirrhosis, to improve clinical management and prevent HEV-induced liver decompensation.

Travelers going to areas where seasonal flu is circulating should receive the influenza vaccine at least two weeks before departure. Seroconversion in travelers with CLD may be slightly lower compared to the healthy population for the A/H1N1 vaccine component (80–87%), but the clinical impact has not been quantified, and influenza vaccines are generally considered protective against severe and complicated influenza [45]; antibodies remain detectable for a period of 6 to 12 months [46]. Chemoprophylaxis for influenza is generally not recommended, or could only be used in very high risk settings and in patients with immune compromise, to bridge the 14 days post-vaccination window until antibodies are developed following administration of an inactivated influenza vaccine. For elderly patients, priority should be given to high dose or adjuvanted influenza vaccines, where available [47].

Patients with CLD are considered a risk group for severe COVID-19, and should be prioritized for vaccination, with COVID-19 severity increasing based on the degree of underlying liver disease, and the number of cumulated comorbidities [48, 49]. Vaccination significantly reduces mortality in this patient population [50]. In patients with CLD who are not immunocompromised, the primary vaccination schedule follows age- and product-specific recommendations for the general population, with subsequent updated/seasonal doses administered according to national guidance. Patients who are liver transplant recipients or otherwise moderately to severely immunocompromised should follow expanded immunocompromised schedules, which include a multidose primary series and additional updated doses at shorter intervals.

Travelers with CLD are also prioritized for pneumococcal vaccination. In pneumococcal vaccine–naïve adults, current schedules generally use either a single higher-valency pneumococcal conjugate vaccine (PCV), such as PCV20 or PCV21, or PCV15 followed by the polysaccharidic vaccine PPSV23 at least 8 weeks later, depending on local availability. In patients previously vaccinated with a lower-valency vaccine, for example PCV7 or PCV13, high-valency conjugate vaccines such as PCV20 or PCV21 may also be considered for expanding pneumococcal protection; country-specific recommendations based on age, risk, and vaccine-history should be followed [51].

Apart for the specific vaccines mentioned above, the pre-travel consultation should also ensure catch-up for routine vaccinations, such as tetanus, diphtheria, pertussis, polio (Tdap-IPV) and, where applicable, measles-mumps-rubella (MMR) and varicella [52].

Depending on the specific epidemiological risk profile of the destination country, vaccination should also be considered for yellow fever, typhoid, meningococcal

ACWY and/or B, Japanese encephalitis, tick-borne encephalitis, or cholera. Special caution is warranted with the live attenuated yellow fever vaccine. It may be considered in non-immunocompromised patients with stable CLD when travel-related exposure risk mandates vaccination, but requires individualized specialist assessment in advanced or decompensated cirrhosis. This vaccine is generally contraindicated in liver transplant recipients receiving immunosuppression and in other patients with significant immunosuppression; when vaccination is contraindicated but travel is unavoidable, travelers should receive specialist advice, a medical waiver if appropriate, and strict mosquito-avoidance counseling Table 2.

Viral hepatitis: during travel

Prevention and treatment

Key areas of focus for travelers with CLD include maintaining consistent medication supplies during travel, avoiding disease exacerbations, preventing new infections, ensuring food and water safety, access to emergency healthcare abroad, and acceptable travel insurance. Patients with recently diagnosed viral hepatitis should be prioritized for rapid staging of liver disease and management plan, ideally before travel [60]. Routine evaluation of the underlying liver disease should be performed prior to travel, and the trip should be postponed or avoided during acute hepatitis flare or decompensated liver disease [61].

An evaluation of the destination's healthcare infrastructure is also important as access to medications for chronic hepatitis, including nucleos(t)ide analogues, and the availability of specialized hepatology services equipped with advanced diagnostic tools cannot be presumed to be available in all regions or settings [60].

Most oral antiviral medications used by patients with chronic HBV infection (tenofovir, entecavir, and in certain settings lamivudine) and chronic HCV infection (DAAs) are stable at room temperature, making travel arrangements relatively easy.

However, there are some important things that travelers should keep in mind:

1) Medications should be kept in original labeled containers to facilitate customs clearance.
2) A prescription or physician letter (in English) describing the indication for the medication should be kept together with the pills (Table 3).
3) Medications should ideally be carried in hand luggage to avoid gaps in treatment coverage in case of misplaced or delayed luggage.
4) Medications should be protected from extreme temperatures (direct sunlight or car storage should be avoided).
5) Insulated medication cases should be considered for travel to extreme climate regions.

Travelers should carry a letter from their treating physician summarizing their diagnosis, treatment, and disease stage and stability; a list of current medications with international nonproprietary medication names; recent relevant laboratory test results, vaccination records; allergy information; and emergency contact details of their home medical team (Table 3). Carrying both physical and digital copies, in English, and including translations into the destination regional language, can also be useful.

For travelers on interferon-based regimens (though increasingly uncommon), or on bulevirtide (for HDV treatment) refrigeration requirements necessitate careful planning, including portable cooling devices or arrangements for refrigerated storage at accommodations [16].

When travel involves different time zones, it may be difficult to maintain regular antiviral drug timing. If needed, travelers can gradually adjust the timing by 1 h each day to align with the destination's local schedule. The key therapeutic goal is to avoid missed doses, unintended treatment interruption, or excessive prolongation of the dosing interval, thereby minimizing the risk of compromised viral suppression. When dose timing must be adjusted across time zones, a modest shortening of the interval before the next dose is generally preferable to a prolonged delay. Specific instructions should be individualized according to the antiviral agent, its pharmacokinetics, and product-specific missed-dose recommendations.

Table 2 Comparative immunogenicity and dosing of vaccines against viral hepatitis in patients with liver cirrhosis [21, 53–59]

Vaccine	Compensated cirrhosis (seroconversion)	Decompensated cirrhosis (seroconversion)	Recommended adjustments
Hepatitis A	~ 90% – 98% [21, 58]	~ 57% – 71% [21, 58]	In case of negative anti-HAV IgG following a standard two-dose vaccination, a third dose should be administered.
Hepatitis B	~ 16% – 79% [21, 59]	~ 30% – 33.3% [59]	Repeat vaccination with double-dose (40 µg) of aluminum-adjuvanted vaccines at 0, 1, and 6 months; consider CpG-adjuvanted vaccine.
Hepatitis E	High (extrapolated) [43, 54]	Unknown	There is no established dosage regimen yet for patients with liver cirrhosis. Detailed information regarding food and water hygiene is extremely important.

Table 3 Standardized medical travel letter template

Standardized medical travel letter	
Date of issue:	
Patient's full name, ID	**Patient's age**
Primary diagnosis	**Current clinical status** [e.g., clinically stable, compensated cirrhosis, etc.]
Child Pugh score	**MELD score**
Other relevant comorbidities	
Vaccination history	
Current Medications	
(The patient requires the following medications for daily management. Please allow the patient to carry these medications and associated delivery devices (e.g., needles/syringes) through customs and security.)	
Medication name 1 (INN):[Route of administration (e.g., orally), dosage (e.g., 245 mg), frequency (e.g., once daily), duration (e.g., 6 months)]	
Medication name 2 (INN):[Route of administration (e.g., orally), dosage (e.g., 245 mg), frequency (e.g., once daily), duration (e.g., 6 months)]	
Important Clinical Notes	
Allergies:[List allergies or state "No known drug allergies"]	
Specific risks:[e.g., Risk of variceal bleeding, immunosuppression, or "No acute risks at this time"]	
Laboratory (most recent workup):[Last known ALT/AST, viral load, fibrosis level, etc.]	
Contact Information	
(In the event of a medical emergency or if clarification is required, please contact)	
Treating physician	
Department/Institution	
Emergency telephone	
E-mail address	
Physician's printed name [Medical registration number] [Official stamp]	

INN – international nonproprietary medication names (active substance)

Risk of superinfection

The global burden of acute viral hepatitis remains substantial, with millions of new cases annually and significant morbidity, especially in resource-limited settings and among travelers to endemic regions [62]. With increasing globalization, travel has become routine, with millions traveling each year for various purposes like tourism, business, education, healthcare, or to visit friends and relatives [63].

In patients with chronic viral hepatitis, episodes of superinfection may increase the risk of decompensation of the underlying liver disease [64], and important considerations should be given to avoiding HAV and HEV infection, newly acquired HBV or HCV infection, as well as HDV superinfection in patients with HBV infection [64, 65].

HAV infection, transmitted by fecal-oral route or by contaminated water, is particularly prevalent in endemic regions such as South Asia, Africa, the Middle East, and Latin America [20]. Acute HAV infection in patients with chronic hepatitis can result in fulminant liver failure, and numerous studies have documented HAV outbreaks among travelers, even in high-income countries [20, 66, 67]. WHO statistics indicate that HAV is thought to have caused over 7,000 deaths globally in 2016 [68]. Recent large HAV outbreaks affecting tourists in Central Europe demonstrate that the threat of travel-associated HAV infection exists even in developed regions [69]. HAV infection is disproportionately severe in patients with chronic hepatitis, and particularly in the presence of cirrhosis [69, 70]. Studies have shown that superinfection with HAV in pre-existing CLD is 23–29 times more likely to result in death compared to HAV infection alone [71].

HEV remains a significant pathogen, particularly in highly endemic regions such as South Asia and Sub-Saharan Africa [72]. While historically considered a disease confined to travelers visiting remote tropical regions, evidence accumulated over the past 5–10 years has shown that HEV is also prevalent in industrialized countries [73]. Genotypes 3 and 4, in particular, cause zoonotic and foodborne infections in many regions, including Europe [74]. Travel to endemic areas also remains a significant risk, and fecal-oral transmission is common, particularly in rural areas with inadequate sanitation. Seasonal factors also contribute to the risk of infection; for example, parts of South Asia and the Middle East experience significant increases in HEV cases during monsoon or flood periods [72, 75]. These outbreaks are associated with high rates of hospitalization, and severe illness in individuals with underlying liver disease.

HEV has emerged as an important trigger of acute-on-chronic liver failure (ACLF) in patients with CLD [76];

specifically, HEV may increase the risk of liver failure and mortality in CLD by 20–70% [76, 77]. HEV serology and HEV RNA testing should be performed in any patient with chronic hepatitis who has a recent exposure or travel history and presents with subacute clinical worsening, unexplained elevations in aminotransferases, or new-onset jaundice [74, 77]. In individual with immunosuppression, HEV infection can become chronic [78].

HBV prevalence varies: low (< 2% HBsAg+) in North America and Western Europe, intermediate (2–7%) in Central Asia, South America, and Eastern Europe, and high (≥ 8%) in China, Africa, the Middle East, and Southeast Asia [79]. HCV burden is very high in Sub-Saharan Africa and Central Asia. Asia has the highest global burden, with Mongolia in particular reporting the highest HCV incidence rate [80, 81]. Medical tourism, unsafe injections, and unprotected sexual contact significantly increase the risk of infection with HBV, HCV, and hepatitis delta virus (HDV). The Middle East, Central Asia, Africa, certain countries in Eastern Europe, and the Mediterranean region are regions with a higher prevalence of HDV [82–84], and regional HDV prevalence among individuals positive for HBsAg can be as high as 10%. HDV coinfection significantly accelerates progression to liver cirrhosis with increased risk of hepatocellular carcinoma [82–84].

Hand hygiene is an essential part of pre-travel recommendations. Frequent washing using soap and safe water, and the use of 60% alcohol-based sanitizer when washing facilities are unavailable are advised [85]. Visiting areas with poor sanitation infrastructure can pose a high risk of acquisition of HAV or HEV for unvaccinated travelers [2], while also increasing the risk of diseases such as typhoid, which can also be acquired through contaminated food and water [86]. Food and water safety precautions are especially critical for travelers with chronic viral hepatitis, to mitigate their potential risk of severe disease from enteric infections [87]. Bottled water from sealed containers or water that has been boiled is recommended, and ice should be avoided, as it is often made from untreated water. Furthermore, bottled or treated water should be used for tooth brushing and washing fruits and vegetables in high risk areas [88]. Fruits and vegetables should be washed and peeled personally, food should be thoroughly cooked and served hot, raw salads or pre-cut produce should be avoided. Raw or undercooked meat, seafood, eggs, shellfish, and food items from street vendors should be avoided [88]. Foodborne infections are more likely to occur in places where food is kept for longer intervals at room temperature, such as buffets, and in establishments with poor sanitation [89].

Emerging hepatotropic viruses

Emerging hepatotropic viruses include agents whose epidemiologic behavior is changing in ways that require updated diagnostic and surveillance strategies. These features form a framework for determining which pathogens need special attention in travel medicine risk assessments [90]. HEV stands out as a prominent example, not only due to its classical genotypes but also because of several zoonotic and atypical variants that have gained importance in the 2020s [72, 91]. Camel-derived HEV-7 represents the first confirmed instance of a zoonotic strain capable of causing chronic infection in humans through dietary exposure [92]. Travelers should be advised to avoid raw camel products. Likewise, rabbit-associated HEV-3ra strains have been documented in sporadic human cases in Europe, while rat-derived HEV (*Rocahepevirus ratti*) has emerged as a novel spillover threat linked to urban rodent populations [93, 94]. These variants share the ability to access human populations through newly recognized animal hosts, and their detection can be challenging since conventional HEV serology or PCR may be insufficient [72]. Advanced molecular methods such as HEV RNA testing and species/genotype discrimination are particularly important in travelers with relevant exposure [72]. Different HEV assays are available worldwide but access to HEV diagnostic testing is suboptimal globally [95]. Additionally, the evolving novel strains (e.g., Orthohepevirus C, HEV genotypes C1 and C2 variants, etc.) and other hepatotropic viruses, such as HAV, CMV, EBV, and other viruses (exotic viruses) pose a hurdle that affects both diagnostic sensitivity and specificity [96, 97].

Several arboviruses also qualify as emerging or re-emerging hepatotropic pathogens. Yellow fever virus is not a newly discovered agent, but its geographic expansion and recurrent high-intensity outbreak cycles place it in the category of re-emerging threats relevant to travel medicine. Recent increases in incidence across the Americas and Africa show that changes in mosquito populations can bring yellow fever back as an important threat for hepatitis [98, 99]. Severe dengue infections can also affect the liver, causing problems that range from mild enzyme elevation to acute liver failure. Because dengue is spreading globally and mosquito habitats are changing with the climate, it now represents both an emerging and re-emerging hepatotropic virus for travelers [100, 101].

Reports of severe acute non-A-E hepatitis in children since 2022 have raised concerns about a new mechanism of liver injury [102]. Further studies have shown a strong link between co-infection with adeno-associated virus 2 (AAV2) and adenovirus-41, suggesting that these cases may result from the combined effects of multiple viruses rather than a single pathogen [103]. Additionally, the recent identification of human circovirus-1 (HCirV-1)

causing hepatitis in immunocompromised patients provides another rare but important example of an emerging hepatotropic virus [104].

Several novel genomic variants of HBV and HCV, such as HBV S-gene immune-escape mutations and the growing recognition of unusual and emerging HCV subtypes, including genotype 7, genotype 8, and other divergent lineages now described in global molecular surveys, represent another dimension of emergence [90, 105]. Although these variants are not currently associated with new outbreaks, they hold significance for diagnostics, and vaccine or treatment effectiveness [90]. Thus, the concept of emergence in hepatotropic viruses extends beyond clinical epidemiology to include evolutionary virology and the dynamic adaptation of these pathogens.

Several major drivers will determine how hepatotropic viral risks change over time. Changes in ecological conditions and dietary habits can contribute to zoonotic transmissions [91]. Increasing urban rodent density, expansion of wildlife habitats, and intensification of livestock production may facilitate broader exposure to *Rocahepevirus ratti*, HEV3-ra, and other hepeviruses that haven't been characterized yet, circulating in mammalian reservoirs [93, 94]. The global trade of animal-derived food products also raises the possibility of transboundary spread of zoonotic strains, particularly in regions without systematic HEV screening in animals [72].

Climate change also alters the epidemiology of hepatotropic arboviruses [98–101]. Rising temperatures, changing rainfall patterns, and the geographic distribution of vectors may shift yellow fever and dengue transmission into new areas [98, 99]. This includes previously low-risk subtropical regions where people have little natural immunity. These ecological changes may lead to more outbreaks involving significant liver injury or even fulminant hepatic failure, creating new challenges for surveillance systems and travel vaccination policies [100, 101].

Another future concern is the possibility of viral interactions and co-infections, as shown by the link between AAV2 and adenovirus-41 in severe pediatric acute hepatitis [103]. Similar interactions may also involve TTV, HCirV-1, or other parts of the human virome, especially in individuals with weakened immunity or genetic vulnerability [104].

Hepatitis flare

Risk factors for the exacerbation or decompensation of viral hepatitis in travelers include exposure to endemic hepatitis viruses at their destination, severe systemic infections, environmental factors, inadequate hygiene, restricted medical access [106], or discontinuation of antiviral therapy [64, 107, 108]. Clinical signs of exacerbation may include jaundice, fatigue, nausea, vomiting, fever, abdominal pain, and elevation of bilirubin and transaminases [55]. When signs of liver failure appear (encephalopathy, ascites, hemorrhage), rapid intervention and transfer to a specialized center is necessary [109].

Hepatotoxicity / drug interactions

Potential drug–drug interactions, hepatic or renal dose-adjustment requirements, and avoidance of contraindicated or potentially hepatotoxic agents. Medications commonly used during travel, including antimalarials, antibiotics, antifungals, analgesics, and antiemetics, should be selected with attention to liver disease stage and hepatic safety. For example, expert recommendations for patients with chronic HCV generally advise limiting acetaminophen/paracetamol to low doses, commonly no more than 2 g/day in patients without cirrhosis and 1–2 g/day in those with cirrhosis, with avoidance in the setting of heavy alcohol use.

Travelers with chronic viral hepatitis, particularly those with advanced CLD, cirrhosis, hepatic decompensation, renal dysfunction, or polypharmacy, may be more vulnerable to drug-related adverse events during travel. Pre-travel assessment should therefore include careful review of the patient's regular treatment regimen, with particular attention to the hepatic safety of commonly used travel medications such as antimalarials, antibiotics, antifungals drugs, pain relievers, antiemetics. For example, acetaminophen/paracetamol remains the first line analgesic or antipyretic, and can be used at standard dosages for mild CLD, not exceeding the total daily dose of 4 g, and at reduced doses in patients with advanced CLD, especially cirrhosis, commonly not exceeding 2 g per day [110]. Non-steroidal anti-inflammatory drugs should generally be avoided in patients with liver cirrhosis [111]. Drug interactions with any chronic medication should also be considered for newly added drugs, and for those in the travel emergency medical kit.

Alcohol use during travel should be discouraged in patients with chronic liver disease, as it may worsen liver injury, increase dehydration risk, impair adherence, and interact with commonly used medications, including sedatives, analgesics, and hepatotoxic agents.

Alcohol use during travel should be discouraged in patients with CLD, as it may worsen liver disease, increase dehydration risk, impair adherence, and interact with other used medications, including analgesics or sedatives. Over-the-counter medications and herbal or traditional remedies also pose risks, as many are associated with liver toxicity or drug interactions [112, 113].

When traveling to malaria-endemic regions, patients with CLD should receive destination-specific malaria prevention advice, with chemoprophylaxis selected according to malaria resistance patterns, liver disease severity, renal function, comorbidities, pregnancy status,

and potential drug–drug interactions [60]. Atovaquone-proguanil is generally well tolerated and does not usually require dose adjustment in mild-to-moderate hepatic impairment, although data are limited in severe hepatic impairment. Doxycycline is also a commonly used option, but patients should be counselled about photosensitivity, gastrointestinal intolerance, and esophagitis prevention. Mefloquine requires caution, and an alternative drug should be prescribed particularly in patients with neuropsychiatric contraindications or severe liver disease, while chloroquine is only appropriate for chloroquine-sensitive destinations and requires caution or dose adjustment in significant hepatic impairment [114].

Treatment interruption

Patients with chronic HBV, HCV or HDV infection who are on specific treatment with, respectively, nucleos(t)ide analogues (NUCs), DAAs, bulevirtide or pegylated interferon may sometimes encounter difficulties in continuing the treatment while traveling. These difficulties may be the result of various factors, such as traveling to a destination in a different time zone, the laws of the destination country regarding medicines, the availability of drugs at the destination, or changing one's behavior or habits during vacations. The duration of the trip may also influence adherence to the treatment.

Interrupting NUC treatment in patients with HBV infection should be avoided, as it often leads to flares, which may potentially be severe, especially in those with a more advanced underlying liver disease. Optimal adherence thresholds for nucleos(t)ide analogue therapy in chronic HBV infection have not been uniformly defined; however, adherence of at least 95% is commonly used as a practical target in clinical studies and is generally considered desirable for sustained viral suppression. Most studies on adherence in HBV treatment use a cut-off of 80%. The mean adherence found in a systematic review ranges from 81 to 99%, while adherence of 100% varies from 66 to 92% in the same article [115]. According to EASL guidelines for the management of chronic hepatitis B, most cases of virological failure are attributed to poor adherence rather than viral resistance [116]. ALT flares may appear as soon as two weeks after interrupting NUC therapy, and most often appear within the first 6–12 months off-NUC [117]. ALT flares have been reported to occur sooner after stopping tenofovir and later after stopping entecavir, with rates of hepatic decompensation ranging from 2.1% to 4.0% [118, 119]. Pegylated interferon is administered subcutaneously weekly, and therefore it might not be a problem for short trips, under one week, but for longer trips, cold-chain transportation of the medication should be arranged.

Current DAAs for HCV treatment are prescribed for 8–12 weeks, and achieve a rate of 95–99% sustained virological response (SVR). Although HCV treatment is relatively short, adherence may not be perfect, with values ranging from 74 to 100% in one systematic review [120]. Adherence is lower in patients with psychiatric disorders and in people who inject drugs (PWID) [121]. Studies in PWID showed that patients who achieved over 50% adherence had a sustained virological response (SVR) in 99% of cases [122]. However, there is granularity that should be taken into account when considering adherence, specifically not only the number of missed doses, but also the spacing between the missed doses. The Australian recommendations for the management of hepatitis C virus infection (2022) state that if the interruption lasted for less than 7 days, the treatment should be resumed and the original prescribed course completed (i.e., all pills taken) [123]. If the duration is longer than 7 days and occurring in the first 4 weeks, a new course of treatment should be started, and if occurring after the first 4 weeks, an HCV RNA should inform the decision to continue (for negative HCV RNA) or restart with a more potent regimen (for positive HCV RNA) [123].

Patients with HDV infection on bulevirtide should make arrangements to carry a sufficient supply of drug and ancillary supplies for preparation, injection, and discarding sharps, and to transport the medication respecting the cold chain. Stopping bulevirtide may lead to flares and virologic and biochemical relapse, within approximately 24 weeks, but data is still preliminary [124].

In summary, to prevent hepatic flares due to inadvertent interruption of treatment for chronic viral hepatitis, medication stocks should be checked prior to travel, time zone differences should be planned, and appropriate transport conditions should be ensured.

Medical access, supplies, and emergency care

Differences in health-system organization, capacity, and diagnostic and therapeutic capabilities across regions of the world can significantly influence health outcomes, especially for patients with advanced CLD, who may be at elevated risk of complications if travel-related illness or treatment interruptions occur [125]. Therefore, thorough travel planning, including a pre-travel assessment, preparation of medical supplies, and a well-designed emergency plan in case of deterioration, remains essential for safe travel.

Insurance planning and access to care

Travel insurance is particularly important for patients with chronic viral hepatitis, especially those with advanced liver disease, as they are at increased risk of liver decompensation, severe infections and the need for hospitalization, all of which may require expensive and urgent medical interventions during travel [126–128]. It is recommended that people with advanced CLD acquire

Table 4 Red-flag symptoms for travelers with viral hepatitis

Red-Flag Symptom	Clinical Concern	Recommended Action
Hematemesis or melena	Possible variceal or upper gastrointestinal tract bleeding	Emergency evaluation in facility with endoscopy capability
New or worsening jaundice	Acute hepatic injury, cholestasis, or decompensation	Prompt clinical and laboratory assessment
Altered mental status	Hepatic encephalopathy	Immediate evaluation; consider early evacuation if progressive
Fever with abdominal pain in patients with ascites	Suspected spontaneous bacterial peritonitis	Urgent diagnostic paracentesis before empiric antibiotic therapy
Rapid abdominal distension	New or worsening ascites	Medical evaluation within hours
Syncope, dizziness, hypotension	Hemodynamic instability	Medical evaluation within hours

a full medical insurance, covering their existing comorbidities, medical repatriation and emergency treatments [11, 62, 129]. Failure to declare baseline conditions to the insurer may result in invalidation of the insurance policy in case of a medical event [16]. Specialized travel insurers commonly utilize medical screening questionnaires to evaluate pre-existing liver disease, including diagnosis, disease stability, prior decompensation, recent hospitalizations, transplant status, current treatment, and the likelihood of requiring emergency care or repatriation abroad [16]. Although underwriting criteria vary between insurers, risk assessment generally follows the clinical severity of liver disease: stable chronic infections without advanced fibrosis may be considered lower risk; fibrosis without cirrhosis may be considered intermediate risk and may require additional evaluation, documentation, or surcharge depending on insurer; compensated cirrhosis is usually considered higher risk and may be associated with surcharges, exclusions, or additional documentation; and decompensated cirrhosis, transplant candidacy, or post-transplant status generally requires specialist insurance assessment and may be excluded from standard policies [130–132].

Identifying medical facilities, e.g., hospitals or tertiary care centers capable of providing appropriate diagnostic and therapeutic services at planned destinations should be undertaken in advance, and contacting these facilities beforehand to confirm available services may be useful. Embassy official websites, international hospital networks, and the International Society of Travel Medicine (ISTM) clinic locator are valuable tools for selecting appropriate facilities [133].

Personal medical kit and essential supplies

A well-organized personal medical kit may support uninterrupted therapy and reduce dependence on unfamiliar healthcare systems. Travelers should carry routine supplies for antiviral and any chronic treatment during travel, including an extra supply of medication, in case the trip is prolonged. Medications should be transported at recommended storage conditions, in their original packaging, together with a medical letter, and kept in the hand luggage to avoid treatment interruptions in case of luggage delay. Travelers may further benefit from carrying supportive therapies commonly needed for symptom management, including analgesics, antiemetics, oral rehydration solutions and antidiarrheal agents, selected with attention to liver disease stage, renal function, contraindications, and potential drug interactions, if any [134].

Hygiene and sterility supplies are particularly important in low-resource environments, in particular for travelers who need to ensure continuity of injectable medications such as pegylated interferon or bulevirtide [135].

Emergency preparedness and recognition of red-flag symptoms

Emergency preparedness is essential for travelers with CLD, especially those with advanced fibrosis or cirrhosis who have limited physiological reserve. Mild disruptions of general health during travel, such as traveler's diarrhea with dehydration or an acute viral infection with fever, can potentially lead to decompensation in very advanced liver disease [136]. Early recognition of warning signs such as new onset or worsening of jaundice, malaise, loss of appetite, nausea, and dark urine may indicate acute liver damage and cholestasis [137]. Neurological changes such as altered sleep-wake rhythm, loss of concentration, agitation, or confusion may suggest hepatic encephalopathy and require prompt evaluation (Table 4) [138]. Gastrointestinal bleeding is an emergency; hematemesis or black stool suggests possible variceal bleeding and may require endoscopic intervention. Acute abdominal pain with fever in patients with ascites should raise suspicion for spontaneous bacterial peritonitis (Table 4) [139].

Logistical planning is essential. Travelers with advanced CLD should carry a written plan for emergencies, including contact information for local health facilities identified in advance and clear instructions for contacting insurance and initiating evacuation if needed. These documents should be with the patient at all times and not stored in luggage. In low-income regions, prearranged transport to tertiary care centers may prevent significant

delays. Essential items, such as a charged mobile phone, backup battery, medical summary, medication list, laboratory results, blood type, and insurance details, should remain readily accessible at all times. Individuals with a higher risk, including those with end-stage liver disease, or a high MELD score, should ensure all of the above and have a predefined threshold for urgent medical assessment, transport, or evacuation, agreed with their hepatologist before travel, such as new or worsening encephalopathy, active gastrointestinal bleeding, recurrent fever, suspected infection, acute kidney injury, severe dehydration, or hemodynamic instability [140]. Blood transfusions should be avoided in certain regions where blood safety measures are not in place, unless necessary for life-saving treatment.

Telemedicine and remote support for travelers

Telemedicine and digital applications can remotely assist travelers and help keep them in contact with the treating physician in their home country, to ensure continuity of care and to address minor issues that do not require an in-person medical consultation [141]. This could include digital health apps and or health cards or secure teleconferencing systems. Importantly, telemedicine should not replace urgent medical care at the destination, when it is needed.

Stigma, entry restrictions

Logistical and social barriers such as stigma, entry restrictions, visa requirements may impact where and how patients living with chronic viral hepatitis can travel. Chronic HBV or HCV infection generally does not preclude short-term international travel, but some countries require medical screening for long-term residence, employment, study, or immigration visas, which may include HBV and/or HCV testing. Positive results can affect visa eligibility, employment clearance, or insurance/health-coverage requirements depending on the destination, visa category, occupation, and local regulations; therefore, travelers planning extended stays or work abroad should verify current requirements with official immigration authorities before departure.

Intersection between stigma and privacy

Medical information is generally treated as confidential, and disclosure to third parties, including insurers, usually requires explicit consent or another lawful basis. However, data-protection standards, insurer practices, and enforcement vary between jurisdictions; travelers should therefore review consent forms and policy terms carefully before sharing sensitive health information [142–144].

Stigma associated with HBV and HCV unfortunately remains widespread globally, potentially impacting quality of life, access to healthcare, social and professional integration, and treatment adherence [145–148]. Anticipated stigma is the expectation or fear of future discrimination, which may lead individuals to conceal their diagnosis or avoid disclosure to employers, insurers, or even healthcare providers. This fear is a major barrier to accessing care, insurance, and support, and is associated with reduced health-seeking behavior and delayed treatment [149]. Anticipated stigma is especially prevalent among travelers, who may worry about being denied care, coverage or facing higher premiums if their status is revealed [149, 150].

Entry restrictions and visa health requirements

Most countries do not impose entry restrictions or special visa health requirements for travelers with chronic HBV or HCV infection, except in specific circumstances such as long-term immigration, work in healthcare, or study in certain regions [11, 17]. Still, travelers should consult local regulations for long-term stays. Some countries, including countries in the Middle East and parts of Asia and the Pacific, may require medical screening for HBV and/or HCV as part of long-term visa, residence, work-permit, or student-visa applications. In such cases, chronic HBV or HCV infection may affect visa eligibility or occupational clearance, particularly for healthcare workers and for applicants in sectors such as childcare, domestic work, beauty services, or other roles involving close contact with vulnerable populations [11, 132, 151]. Requirements vary substantially by country, visa category, occupation, and time; therefore, travelers planning long-term stays, employment, or study abroad should verify current requirements with the relevant embassy, immigration authority, or employer before departure. The AASLD hepatitis B guidance notes that, in the United States, HBV should not preclude school participation, professional training, employment, or healthcare practice; medical and dental schools should not exclude applicants solely on the basis of HBsAg positivity [17].

Chronic viral hepatitis: post-travel follow-up

The risk of acquiring viral hepatitis during travel is determined by destination-specific endemicity, duration of stay, vaccination status, and specific exposures. Among non-immune travelers, HAV risk has historically been estimated at approximately 3–6 cases per 1,000 travelers per month in highly endemic regions. HEV genotypes 1 and 2 are primarily transmitted by fecal-oral route and associated with waterborne outbreaks in regions with inadequate sanitation, while HEV 3 and 4 are mainly zoonotic and foodborne. HCV acquisition during travel is uncommon but may occur through injection drug use, unsafe medical or cosmetic procedures, transfusion or injection exposures in settings with poor infection control, and sexual practices associated with blood exposure;

background HCV prevalence remains heterogeneous but is higher in parts of Eastern Europe, Central Asia, Africa, the Middle East, Asia, and Latin America [11, 62].

Post-travel follow-up should monitor for jaundice, fatigue, anorexia, nausea, vomiting, dark urine, acolic stools, and right upper quadrant pain. Subclinical infection is common, and any evidence of hepatic dysfunction warrants further evaluation [62]. A detailed travel history is essential for risk stratification. In fact, assessment of hepatic disease in returning travelers requires detailed characterization of travel-related exposures, including destinations visited, duration of travel, dates of departure and return, and time from exposure to symptom onset, since these details help narrow the differential diagnosis based on incubation periods [152, 153].

Evaluation should also entail behavioral and environmental exposures, including accommodation type, sources of food and water, and activities associated with increased risk of enteric or vector-borne diseases. A comprehensive review of alcohol intake, recreational drugs, prescription medications, and herbal or traditional remedies is essential, given the potential for hepatotoxicity from both conventional and nonconventional drug agents. Pre-travel vaccination history, including dates and doses received, and information on chemoprophylaxis and treatments received during travel must also be checked.

Most viral hepatitis acquired while traveling becomes apparent soon after arriving home, as incubation periods for HAV and HEV are usually around 2–6 weeks, and for HBV and HCV, 6 weeks to 6 months [152–154]. Other cosmopolitan viruses (e.g., CMV, EBV) [155], bacterial infections (e.g., leptospirosis, brucellosis), and parasitic diseases (e.g., liver flukes, amoebic abscess, hydatid disease) may also present with hepatic involvement, and their prevalence varies by region and types of exposure [153, 156]. Incubation period categories are a key tool for narrowing the differential diagnosis in returned travelers with fever and hepatitis/jaundice.

Initial laboratory workup should include liver function tests (AST, ALT, ALP, GGT, bilirubin), which are sensitive markers and help differentiate hepatocellular from cholestatic injury. Elevated transaminases are common in acute viral hepatitis, but also occur in other infections (e.g., dengue, malaria, CMV, EBV) and non-infectious causes (e.g., autoimmune or drug-induced liver injury) [153, 157].

For hepatitis A, diagnosis is confirmed by HAV IgM antibodies, which may persist for up to 6 months, whereas HAV IgG indicates past infection or immunity. Hepatitis E should be considered in travelers with acute hepatitis and/or neurologic manifestations, especially those returning from endemic regions or with exposure to undercooked pork or contaminated water. Diagnosis relies on HEV IgM serology and HEV RNA [95]. HBV serologic status is characterized by the triple panel test: HBsAg, anti-HBc, and anti-HBs. Acute infection is indicated by HBsAg and anti-HBc IgM; chronic infection is confirmed by HBsAg persisting beyond 6 months. HDV should be considered in HBsAg-positive individuals with risk factors; diagnosis uses HDV total antibody and PCR for HDV RNA. Hepatitis C screening begins with anti-HCV antibody, typically positive 6–8 weeks after exposure, but confirmation of active infection requires HCV RNA or HCV core antigen [157, 158].

Additional laboratory evaluation may include serologies for CMV, EBV, and other tropical causes of hepatitis of viral origin (e.g., dengue, yellow fever, and other causes of hemorrhagic viral fever, such as Ebola, Crimean-Congo hemorrhagic fever, Lassa), as well as stool ova and parasite examination for long-term travelers [159–161]. Screening for other bloodborne pathogens (HIV, syphilis) is recommended for travelers with relevant exposures. Integration of combined HBV, HCV, and HIV screening into routine travel-related screening should be considered [154, 156, 162].

Conclusion

Travel planning for patients with chronic viral hepatitis should include a baseline evaluation of the underlying disease, as well as ensuring continuity of current treatment while also creating a protective shield against acute infections that may threaten liver reserve. Key strategies that clinicians and travel health specialists should focus on include pre-travel counseling, provision of preventive services, medical counselling for risk reduction of acquisition of new infections, and continued follow-up after travel. Early planning, evidence-based vaccination and prevention protocols, and patient education can increase the overall safety of travel for patients with chronic liver disease.

Abbreviations

ACLF	Acute-on-chronic liver failure
CCHF	Crimean-Congo Haemorrhagic Fever
CDC	Centers for Disease Control and Prevention
CLD	Chronic liver disease
CMV	Cytomegalovirus
DDAs	Direct antiviral drugs
EBV	Epstein-Barr virus
HAV	Hepatitis A virus
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HDV	Hepatitis D virus
HEV	Hepatitis E virus
LFTs	Liver function tests
MELD	Model for end-stage liver disease
NAAT	Nucleic acid amplification test
NSAIDs	Nonsteroidal anti-inflammatory drugs
NUC	Nucleoside/nucleotide analogues
PCV15	Pneumococcal 15-Valent Conjugate Vaccine
PCV20	Pneumococcal 20-Valent Conjugate Vaccine
PPSV23	23-Valent Pneumococcal Polysaccharide Vaccine

PLWH	People living with HIV
PWID	People who inject drugs
SVR	Sustained virological response
TDF/TAF	Tenofovir
WHO	World Health Organization

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