HCV Simplified Treatment

This is a PDF version of the following document:
Module 8: HCV Test and Cure
Lesson 4: HCV Simplified Treatment

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Eligibility for Simplified HCV Treatment

Who is Eligible for HCV Treatment?

The American Association for the Study of Liver Diseases and Infectious Diseases Society of America (AASLD-IDSA) Hepatitis C Guidance recommends treatment for ALL persons with chronic hepatitis C virus (HCV) infection, except for individuals who have a short (e.g., less than 12 months) life expectancy.[1] The landscape of hepatitis C care has been revolutionized by the discovery and widespread use of direct-acting antivirals (DAAs) to treat HCV infection. The DAAs are safe, highly effective, well-tolerated, and provide a cure to more than 95% of persons who receive an 8- or 12-week course with one of the currently recommended pangenotypic regimens. Treatment of HCV with DAAs has been shown to reduce the risk of hepatic complications such as hepatocellular carcinoma and liver-related mortality.[1] Further, HCV treatment with cure has the public health benefit of preventing transmission of HCV. Decisions regarding initiation of therapy will naturally be influenced by the individual's willingness and readiness to start. It is important that HCV therapy not be withheld based on active substance use, older age, or mental health illness, as none of these are a contraindication to treatment.[Q] Eligibility for HCV Treatment

Who is Eligible for Simplified HCV Treatment?

The AASLD-IDSA HCV Guidance has devised a simplified HCV treatment approach, which can be used most HCV treatment-naïve adult patients.[2,3] This simplified approach has been made possible with the availability of the safe, highly effective, pangenotypic DAA regimens glecaprevir-pibrentasvir and sofosbuvir-velpatasvir. The following summarizes the AASLD-IDSA HCV Guidance regarding eligibility for the simplified HCV treatment approach.[2,4,5]

This simplified HCV approach is appropriate for adults with chronic HCV, including persons with HIV, who meet the following criteria:

- **Any HCV Genotype**: Persons with any HCV genotype are eligible for the simplified treatment approach. This approach is made possible because the recommended regimens in the simplified treatment (glecaprevir-pibrentasvir and sofosbuvir-velpatasvir) have pangenotypic activity.
- **Treatment-Naïve**: Only persons who are HCV treatment-naïve adults are considered appropriate for the simplified approach. Patients are not eligible for this simplified approach if they have previously received HCV treatment since prior treatment may be associated with development of drug resistance and may necessitate adjustments to therapy.
- **Without Cirrhosis or with Compensated Cirrhosis**: The simplified treatment approach is considered appropriate for persons without cirrhosis and for those with compensated cirrhosis (Child-

Turcotte-Pugh A). For this context, cirrhosis should have been evaluated as outlined in the prior lesson.

Who is NOT Eligible for Simplified HCV Treatment?

Although most adult patients are eligible for the simplified treatment approach, the AASLD-IDSA HCV Guidance recommends against using the simplified treatment in certain situations. The following summarizes specific conditions that, if present, should preclude use of the simplified treatment approach.[2,5]

- **Prior HCV Treatment**: Prior DAA exposure may result in the development of resistance-associated substitutions (RAS). Because of this, alternative regimens for HCV treatment may be needed in these populations.[6,7]
- **Hepatitis B Surface Antigen-Positive**: Reactivation of HBV has been increasingly recognized as a potential adverse event associated with treatment of HCV.[8,9,10] The risk of reactivation is highest among hepatitis B surface antigen (HBsAg)-positive patients, but rare cases have been described in HBsAg-negative and hepatitis B core antibody (anti-HBc) positive patients.[11,12] Patients who are HBsAg positive may need initiation of HBV antiviral therapy concurrently with initiation of HCV treatment versus close monitoring while on DAAs.[13] Patients who are HBsAg-negative but anti-HBc-positive can be monitored with alanine aminotransferase (ALT) levels at baseline, at the end of HCV treatment, and at post-treatment follow-up.[13]
- **Compensated Cirrhosis with End-Stage Renal Disease**: Individuals with cirrhosis that is compensated (Child-Turcotte-Pugh score

Recommended Regimens for Simplified Treatment

There are two equally recommended DAA options to use for the simplified treatment of persons with chronic HCV: (1) an 8-week treatment course with oral glecaprevir-pibrentasvir and (2) a 12-week treatment course with oral sofosbuvir-velpatasvir.[2,3,5] Both of these regimens have pangenotypic activity, have once-daily dosing, are well-tolerated, and have cure rates greater than 95% with all HCV genotypes. The following table and text provide additional details about these two medications and the recommendations for use in the simplified treatment for adults without cirrhosis or adults with compensated cirrhosis.

Table 2. Medications Used in HCV Simplified Treatment

Table 2.

Medications Used in Simpified HCV Treatment

Med	Glecaprevir-Pibrentasvir	Sofosbuvir-Velpatasvir
Trade Name	*Mavyret*	*Epclusa*
Adult dose (oral)	Glecaprevir 300 mg and pibrentasvir 120 mg once daily, taken as 3 tablets once daily	Sofosbuvir 400 mg and vel single tablet once daily
Duration*	8 weeks	12 weeks[#]
Food requirement	Take with food.	Take with or without food.
Hepatic impairment	Contraindicated in patients with decompensated liver disease (Child-Turcotte-Pugh B or C).	No dose adjustment neces (Child-Turcotte-Pugh A, B,
Renal impairment	No dosage adjustment is recommended in patients with any degree of renal impairment, including patients with end-stage renal disease on dialysis.	No dosage adjustment is r renal impairment, includin dialysis.
Notable drug interactions *See Prescribing Information for full list and details of drug interactions*	Coadministration with **ethinyl estradiol** or any ethinyl estradiol-containing medications is contraindicated. Glecaprevir-pibrentasvir can increase levels of hormone and cause ALT elevation. Coadministration is contraindicated with **rifampin** due to potential loss of therapeutic effect with glecaprevir-pibrentasvir. Coadministration is not recommended with certain HMG-CoA Reductase Inhibitors (**atorvastatin, lovastatin, or simvastatin)**; use with other HMG-CoA Reductase Inhibitors may require dose adjustment of the HMG-CoA Reductase Inhibitor. Coadministration is not recommended with **carbamazepine** due to the potential loss of therapeutic effect with glecaprevir-pibrentasvir. Coadministration is not recommended with some **HIV antiretroviral medications**, including HIV protease inhibitors and some non-nucleoside reverse transcriptase inhibitors (e.g., efavirenz and etravirine).^ Coadministration is not recommended with **St. John's Wort** (hypericum perforatum) due to the potential loss of therapeutic effect with glecaprevir-pibrentasvir.	Coadministration with **pro** recommended. If medically should be taken with food daily. Use of other PPIs an been studied. Coadministration is not rec **rifapentine** due to potent sofosbuvir-velpatasvir. Coadministration is not rec medication **amiodarone** c Coadministration is not rec **carbamazepine, phenyt** potential loss of therapeut Coadministration is not rec medication **efavirenz**. Coadministration is not rec **Wort** (hypericum perforat therapeutic effect with sof Coadministration is not rec medication **topotecan**.

Med	Glecaprevir-Pibrentasvir	Sofosbuvir-Velpatasvir
	Coadministration is not recommended with **cyclosporin** when the dose of cyclosporin is >100 mg/day.	

*In treatment-naïve individuals without cirrhosis or with compensated cirrhosis. Treatment for patients with decomp this discussion.
#Note: patients with compensated cirrhosis and HCV genotype 3 should have treatment guided by HCV genotypic d resistance testing does not show the NS5A resistance associated substitutions (RAS) Y93H, then the 12-week sofosb resistance testing shows NS5A RAS Y93H, then weight-based ribavirin should be added to the 12-week sofosbuvir-v recommended regimen should be chosen (e.g., glecaprevir-pibrentasvir one daily for 8 weeks or sofosbuvir-velpatas
**See Liverpool HCV drug interaction site
^See AASLD/IDSA guidance section on HIV and HCV coinfection.

[Q] GP Drug Interactions

Glecaprevir-Pibrentasvir

Glecaprevir-pibrentasvir is the first pangenotypic NS3/4A protease inhibitor-NS5A inhibitor combination to be approved that offers a potent treatment option for most patients with chronic HCV, including an 8-week option for HCV treatment-naïve patients.

- Efficacy: In the main registration trials, sustained virologic response (SVR) rates for 8 or 12 weeks of glecaprevir-pibrentasvir for HCV genotypes 1-6 were greater than 95% with very few on-treatment virologic breakthroughs or posttreatment relapses.[21,22]
- Adult Dosing and Duration: The recommended dosing is three tablets taken once daily with food for 8 weeks.
- Contraindications: This drug is not an option for patients with decompensated cirrhosis (Child-Turcotte-Pugh B or C), given the presence of the protease inhibitor.
- Notable Drug Interactions: Statin therapy may need to be held or dose adjusted during treatment with glecaprevir-pibrentasvir. Coadministration with ethinyl estradiol is contraindicated since glecaprevir-pibrentasvir can increase estrogen hormone levels and cause ALT elevation. Potential drug interactions can occur with some HIV antiretroviral medications, including HIV protease inhibitors and the non-nucleoside reverse transcriptase inhibitors efavirenz and etravirine.
- Dosing with Renal Impairment: No dosage adjustment is recommended in patients with any degree of renal impairment, including patients with end-stage renal disease who are receiving dialysis.
- Dosing with Hepatic Impairment: Use of glecaprevir-pibrentasvir is contraindicated in patients with decompensated liver disease (Child-Turcotte-Pugh B or C).

Sofosbuvir-Velpatasvir

Sofosbuvir-velpatasvir is a pangenotypic NS5A-NS5B inhibitor single-pill combination regimen that has potent activity against HCV genotypes 1-6.

- Efficacy: In the main registration trials, SVR rates for 12 weeks for HCV genotypes 1-6 were in the range of 95-100% with very few virologic breakthroughs or posttreatment relapses.[20,23,24]
- Adult Dosing and Duration for Persons without Cirrhosis: The recommended dosing is one tablet taken once daily with or without food for 12 weeks.
- Adult Dosing and Duration for Persons with Compensated Cirrhosis: Patients with compensated cirrhosis who will be treated with sofosbuvir-velpatasvir should have an HCV genotype performed. Individuals with HCV genotype 1, 2, 4, 5, or 6 should be treated with the same regimen as used for persons without cirrhosis (one tablet taken once daily with or without food for 12 weeks). Persons with HCV genotype 3 should have further evaluation with HCV genotypic drug-resistance testing, with treatment guided by these results. If drug-resistance testing does not show the NS5A resistance-associated substitution (RAS) Y93H, then the same sofosbuvir-velpatasvir regimen listed above can be

used (one tablet taken once daily with or without food for 12 weeks). If resistance testing shows NS5A RAS Y93H, then weight-based ribavirin should be added to the 12-week sofosbuvir-velpatasvir regimen, or another recommended regimen should be chosen (e.g., glecaprevir-pibrentasvir once daily for 8 weeks).

- Contraindications: Sofosbuvir-velpatasvir can, in contrast to HCV protease-inhibitor-containing regimens, be used safely in persons with decompensated cirrhosis.
- Notable Drug Interactions: Levels of velpatasvir can be significantly reduced with concurrent use of acid-reducing agents, particularly proton-pump inhibitors. If a proton-pump inhibitor is medically indicated, then the manufacturer advises that sofosbuvir-velpatasvir be taken with food 4 hours before dosing omeprazole 20 mg daily. Other proton-pump inhibitors and other doses have not been adequately studied to recommend coadministration.
- Renal Impairment: No dosage adjustment is recommended in patients with any degree of renal impairment, including patients with end-stage renal disease on dialysis.
- Dosing with Hepatic Impairment: No dose adjustment is necessary with sofosbuvir-velpatasvir for any degree of hepatic impairment (Child-Turcotte-Pugh A, B, or C).

[Activity] C. Recommended Regimens for Simplified Treatment Approach

Monitoring and Management Related to HCV Treatment

Laboratory Monitoring During HCV Treatment

The following summarizes recommendations for laboratory monitoring in the AASLD-IDSA HCV Guidance [2,3]during HCV treatment of individuals using the simplified treatment approach.

Laboratory Monitoring Recommendations

- For all persons receiving the simplified treatment approach, routine HCV RNA monitoring during treatment is not recommended.[2,3]
- In patients without cirrhosis, routine laboratory monitoring is not required during HCV treatment with DAA therapy, unless they have one of the special indications listed below (diabetes or receiving anticoagulation).[3]
- In patients with compensated cirrhosis, a hepatic function panel can be sent at 4 and 8 weeks after starting treatment, with the rationale that liver decompensation can rarely occur among persons with cirrhosis who are receiving HCV treatment. Since the risk of major hepatotoxicity with these agents is very low, this is not a strong recommendation.[2] If an individual has worsening of liver blood tests, such as a significant increase in bilirubin, ALT, or aspartate aminotransferase (AST), they should be referred to a specialist.[2]
- Hepatic function panel assessment during and at the end of treatment is reasonable to consider among those individuals whom you suspect have metabolic dysfunction-associated steatotic liver disease (MASLD) as a contributing factor to liver enzyme elevation. Patients who do not have complete normalization of their ALT/AST on therapy may require further follow-up or evaluation.

Special Considerations in Persons with Diabetes

- Observational data have shown that chronic HCV infection can impair glycemic control.[25] Direct-acting antiviral (DAA) therapy and HCV clearance have been shown to improve glycemic control in patients with diabetes, as evidenced by a decrease in mean hemoglobin A1c and decreased insulin use.[25,26]
- Patients taking medications to treat diabetes, particularly insulin and sulfonylureas, should be counseled about the potential increased risk of developing hypoglycemia while receiving DAA treatment and after successful DAA treatment.[27] Symptoms and warning signs for hypoglycemia should be reviewed. Providers should note that insulin and other diabetes medication dose adjustments may be indicated during and following HCV treatment.[Q] Impact of HCV Treatment on Diabetes

Special Considerations in Persons Receiving Anticoagulation

- Fluctuations in INR values may occur in patients receiving warfarin concurrent with HCV treatment. This has been described as reduced warfarin sensitivity in most cases.[28] The mechanism is unclear but may reflect cytochrome P450 interactions as well as improvement in hepatic function and vitamin K metabolism.
- Clinicians should be aware of this potential drug interaction and plan to monitor INR closely during HCV treatment and minimize subtherapeutic levels of anticoagulation.[2,3]
- Drug interactions have not been observed with coadministration of HCV treatment with direct oral anticoagulants (DOACs).[29]

Laboratory Testing after Completing HCV Treatment

The following summarizes recommendations for laboratory monitoring at the end of the simplified HCV treatment (or soon thereafter).[2,3]

Test-of-Cure: Sustained Virologic Response

It is recommended to check a quantitative HCV RNA level as a test-of-cure following HCV treatment. This is preferentially done 12 weeks (or more) following completion of treatment. Given high rates of patients lost to follow-up at 12 weeks post treatment, an alternative option is to obtain an HCV RNA 4 weeks post treatment in patients without cirrhosis or prior DAA exposure.[2,3] At either 12 weeks or 4 weeks post treatment, the goal is to achieve an undetectable HCV RNA, known as a sustained virologic response (SVR). Although achieving an SVR at 12 weeks (SVR12) is the gold standard for HCV cure, randomized controlled trials have shown greater than 99% concordance between SVR12 and SVR4 in patients without cirrhosis and without prior DAA exposure.[30,31] Although the SVR12 and SVR4 rates typically exceed 95%, achieving an SVR cannot be assumed after treatment completion and must be confirmed.[2,3] An SVR is considered a durable virologic cure, with multiple studies demonstrating that more than 99% of patients who achieve SVR continue to have undetectable HCV RNA in the blood years after therapy, unless they acquire HCV again.[32,33] In addition, achieving an SVR has also been shown to result in long-term clinical benefits with improved event-free survival.[34,35][Activity] E. Follow up After the HCV Test and Treat Approach

Checking Hepatic Function Panel

Checking a hepatic function panel at least 12 weeks after completing treatment is also recommended, especially for individuals who have significant baseline elevations in ALT and/or AST levels.[2,3] Liver fibrosis, as well as liver aminotransferase levels, can improve after SVR. Therefore, individuals who achieve an SVR and do not have cirrhosis or other factors that would contribute to chronic liver disease (e.g., excessive alcohol use or metabolic dysfunction-associated steatotic liver disease) do not require further HCV or liver-related clinical monitoring.

Management of Incomplete DAA Adherence

Incomplete adherence to DAAs is relatively common among persons receiving treatment for HCV and has the potential to impact SVR12 rates.[36,37] Although short periods of nonadherence are unlikely to affect response to treatment, longer periods of nonadherence can lead to virologic failure.[38,39] Based on published literature and expert consensus, the AASLD-IDSA HCV Guidance has issued recommendations for the management of nonadherence events that factor in the duration of nonadherence and whether the nonadherence event(s) occurred within or after the first 28 days of therapy (Table 3).[5] It is important to note that these recommendations are intended to address nonadherence events in treatment-naïve individuals who qualify for the simplified treatment algorithm and are receiving glecaprevir-pibrentasvir or sofosbuvir-velpatasvir. Management of incomplete adherence in patients who fall outside this guidance should be done in consultation with an HCV specialist. It is also important to note that in these recommendations, the phrase “restart DAA therapy immediately” means restarting the current treatment course and does not mean restarting from day 1 of treatment. Because treatment interruptions longer than 7 days require further investigation and increase the likelihood of virologic failure, patients should be instructed to notify their provider if they miss more than 7 days of therapy at any point in their DAA treatment course.

Supplemental Case Study Exercises

The following interactive case studies are intended to provide a quick assessment and review of HCV simplified treatment, with questions related to criteria, regimen choices, indications for genotypic, monitoring response to treatment, and management of treatment interruptions.
[Activity] D. Initiation of HCV Treatment in Person with Alcohol Use Disorder
[Activity] E. Glecaprevir-Pibrentasvir Treatment with Compensated Cirrhosis
[Activity] F. What is the next step that should be taken for this patient?
[Activity] G. Drug Interactions with Glecaprevir-Pibrentasvir
[Activity] H. Drug Interactions with Sofosbuvir-Velpatasvir
[Activity] I. Management of Treatment Interruption with less than 7 Missed Days
[Activity] J. Management of Treatment Interruption After Missing 8-20 Days

Summary Points

All persons with chronic HCV infection should be treated except individuals who have a less than 12-month life expectancy; treating HCV in persons who inject drugs is a high priority to eliminate the impact of the HCV epidemic in the United States and globally.

The discovery and widespread use of pangenotypic DAAs to treat HCV has led to the AASLD-IDSA recommendation for a simplified HCV treatment approach, expanding the health care workforce able to provide HCV treatment. The AASLD-IDSA simplified HCV treatment algorithm provides specific criteria for the inclusion and exclusion of treatment-naïve persons.

There are two recommended simplified treatment courses for persons with chronic HCV: oral glecaprevir-pibrentasvir and oral sofosbuvir-velpatasvir; both have pangenotypic activity, once-daily dosing, cure rates greater than 95%, and are well-tolerated.

The glecaprevir-pibrentasvir 8-week treatment regimen consists of 3 tablets taken once daily with food; it is not an option for persons with decompensated cirrhosis.

The sofosbuvir-velpatasvir 12-week regimen consists of 1 tablet taken once daily with or without food with no dose adjustment necessary for hepatic impairment; persons with compensated cirrhosis should have a genotype performed as persons with HCV genotype 3 may require an alternative regimen or the addition of weight-based ribavirin.

Routine laboratory monitoring during simplified treatment with DAAs is not needed for most patients, but posttreatment monitoring should include a test-of-cure to determine whether they achieved an SVR.

Individuals with incomplete medication adherence during treatment should be managed based on how far into treatment they are and how many days of medication doses are missed.

Citations

1. AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. When and in Whom to Initiate HCV Therapy.
[AASLD-IDSA Hepatitis C Guidance] -

2. AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. Simplified HCV Treatment for Treatment-Naive Adults With Compensated Cirrhosis.
[AASLD-IDSA Hepatitis C Guidance] -

3. AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. Simplified HCV Treatment for Treatment-Naive Adults Without Cirrhosis.
[[AASLD-IDSA Hepatitis C Guidance] -

4. AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. Initial treatment of HCV infection.
[AASLD-IDSA Hepatitis C Guidance] -

5. Bhattacharya D, Aronsohn A, Price J, Lo Re V. Hepatitis C Guidance 2023 Update: AASLD-IDSA Recommendations for Testing, Managing, and Treating Hepatitis C Virus Infection. Clin Infect Dis. 2023;ciad319.
[PubMed Abstract] -

6. AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. HCV resistance primer.
[AASLD-IDSA Hepatitis C Guidance] -

7. AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. Retreatment of persons in whom prior therapy failed.
[AASLD-IDSA Hepatitis C Guidance] -

8. Bersoff-Matcha SJ, Cao K, Jason M, et al. Hepatitis B Virus Reactivation Associated With Direct-Acting Antiviral Therapy for Chronic Hepatitis C Virus: A Review of Cases Reported to the U.S. Food and Drug Administration Adverse Event Reporting System. Ann Intern Med. 2017;166:792-8.
[PubMed Abstract] -

9. Ou P, Fang Z, Chen J. Hepatitis B reactivation in a chronic hepatitis C patient treated with ledipasvir and sofosbuvir: A case report. Clin Res Hepatol Gastroenterol. 2017;41:e17-e18.
[PubMed Abstract] -

10. Wang C, Ji D, Chen J, et al. Hepatitis due to Reactivation of Hepatitis B Virus in Endemic Areas Among Patients With Hepatitis C Treated With Direct-acting Antiviral Agents. Clin Gastroenterol Hepatol. 2017;15:132-6.
[PubMed Abstract] -

11. Belperio PS, Shahoumian TA, Mole LA, Backus LI. Evaluation of hepatitis B reactivation among 62,920 veterans treated with oral hepatitis C antivirals. Hepatology. 2017;66:27-36.
[PubMed Abstract] -

12. Suda T, Shimakami T, Shirasaki T, et al. Reactivation of hepatitis B virus from an isolated anti-HBc positive patient after eradication of hepatitis C virus with direct-acting antiviral agents. J Hepatol. 2017;67:1108-11.
[PubMed Abstract] -

13. Terrault NA, Lok ASF, McMahon BJ, et al. Update on prevention, diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. Hepatology. 2018;67:1560-99.
[PubMed Abstract] -

14. AASLD-IDSA. HCV Guidance: Recommendations for testing, managing, and treating hepatitis C.
[AASLD-IDSA Hepatitis C Guidance] -

15. Dore GJ, Trooskin S. People with Hepatitis C Who Inject Drugs - Underserved, Not Undeserving. N Engl J Med. 2020;383:608-11.
[PubMed Abstract] -

16. Neale J, Tompkins C, Sheard L. Barriers to accessing generic health and social care services: a qualitative study of injecting drug users. Health Soc Care Community. 2008;16:147-54.
[PubMed Abstract] -

17. Motavalli D, Taylor JL, Childs E, et al. "Health Is on the Back Burner:" Multilevel Barriers and Facilitators to Primary Care Among People Who Inject Drugs. J Gen Intern Med. 2021;36:129-37.
[PubMed Abstract] -

18. Cepeda JA, Thomas DL, Astemborski J, et al. Impact of Hepatitis C Treatment Uptake on Cirrhosis and Mortality in Persons Who Inject Drugs: A Longitudinal, Community-Based Cohort Study. Ann Intern Med. 2022;175:1083-91.
[PubMed Abstract] -

19. Oru E, Trickey A, Shirali R, Kanters S, Easterbrook P. Decentralisation, integration, and task-shifting in hepatitis C virus infection testing and treatment: a global systematic review and meta-analysis. Lancet Glob Health. 2021;9:e431-e445.
[PubMed Abstract] -

20. Solomon SS, Wagner-Cardoso S, Smeaton L, et al. A minimal monitoring approach for the treatment of hepatitis C virus infection (ACTG A5360 [MINMON]): a phase 4, open-label, single-arm trial. Lancet Gastroenterol Hepatol. 2022;7:307-17.
[PubMed Abstract] -

21. Zeuzem S, Foster GR, Wang S, et al. Glecaprevir-Pibrentasvir for 8 or 12 Weeks in HCV Genotype 1 or 3 Infection. N Engl J Med. 2018;378:354-69.
[PubMed Abstract] -

22. Asselah T, Kowdley KV, Zadeikis N, et al. Efficacy of Glecaprevir/Pibrentasvir for 8 or 12 Weeks in Patients With Hepatitis C Virus Genotype 2, 4, 5, or 6 Infection Without Cirrhosis. Clin Gastroenterol Hepatol. 2018;16:417-26.
[PubMed Abstract] -

23. Feld JJ, Jacobson IM, Hézode C, et al. Sofosbuvir and Velpatasvir for HCV Genotype 1, 2, 4, 5, and 6 Infection. N Engl J Med. 2015;373:2599-607.
[PubMed Abstract] -

24. Foster GR, Afdhal N, Roberts SK, et al. Sofosbuvir and velpatasvir for HCV genotype 2 and 3 infection. N Engl J Med. 2015;373:2608-17.
[PubMed Abstract] -

25. Yuan M, Zhou J, Du L, Yan L, Tang H. Hepatitis C Virus Clearance with Glucose Improvement and Factors Affecting the Glucose Control in Chronic Hepatitis C Patients. Sci Rep. 2020;10:1976.

[PubMed Abstract] -

26. Andres J, Barros M, Arutunian M, Zhao H. Treatment of Hepatitis C Virus and Long-Term Effect on Glycemic Control. J Manag Care Spec Pharm. 2020;26:775-81.
[PubMed Abstract] -

27. Soriano V, Barreiro P, de Mendoza C. Hypoglycemia in a diabetic patient during hepatitis C therapy. Hepatology. 2016;63:2065-6.
[PubMed Abstract] -

28. DeCarolis DD, Westanmo AD, Chen YC, Boese AL, Walquist MA, Rector TS. Evaluation of a Potential Interaction Between New Regimens to Treat Hepatitis C and Warfarin. Ann Pharmacother. 2016;50:909-17.
[PubMed Abstract] -

29. McDaniel K, Utz AE, Akbashev M, et al. Safe co-administration of direct-acting antivirals and direct oral anticoagulants among patients with hepatitis C virus infection: An international multicenter retrospective cohort study. J Viral Hepat. 2022;29:1073-8.
[PubMed Abstract] -

30. Ferrante ND, Newcomb CW, Forde KA, et al. The Hepatitis C Care Cascade During the Direct-Acting Antiviral Era in a United States Commercially Insured Population. Open Forum Infect Dis. 2022;9:ofac445.
[PubMed Abstract] -

31. Gane E, de Ledinghen V, Dylla DE, et al. Positive predictive value of sustained virologic response 4 weeks posttreatment for achieving sustained virologic response 12 weeks posttreatment in patients receiving glecaprevir/pibrentasvir in Phase 2 and 3 clinical trials. J Viral Hepat. 2021;28:1635-42.
[PubMed Abstract] -

32. Manns MP, Pockros PJ, Norkrans G, et al. Long-term clearance of hepatitis C virus following interferon α-2b or peginterferon α-2b, alone or in combination with ribavirin. J Viral Hepat. 2013;20:524-9.
[PubMed Abstract] -

33. Yoshida EM, Sulkowski MS, Gane EJ, et al. Concordance of sustained virological response 4, 12, and 24 weeks post-treatment with sofosbuvir-containing regimens for hepatitis C virus. Hepatology. 2015;61:41-5.
[PubMed Abstract] -

34. Krassenburg LAP, Zanjir WR, Georgie F, et al. Evaluation of Sustained Virologic Response as a Relevant Surrogate Endpoint for Long-term Outcomes of Hepatitis C Virus Infection. Clin Infect Dis. 2021;72:780-6.
[PubMed Abstract] -

35. Simmons B, Saleem J, Heath K, Cooke GS, Hill A. Long-Term Treatment Outcomes of Patients Infected With Hepatitis C Virus: A Systematic Review and Meta-analysis of the Survival Benefit of Achieving a Sustained Virological Response. Clin Infect Dis. 2015;61:730-40.
[PubMed Abstract] -

36. Cunningham EB, Hajarizadeh B, Amin J, et al. Adherence to Once-daily and Twice-daily Direct-acting Antiviral Therapy for Hepatitis C Infection Among People With Recent Injection Drug Use or Current Opioid Agonist Therapy. Clin Infect Dis. 2020;71:e115-e124.
[PubMed Abstract] -

37. Serper M, Evon DM, Stewart PW, et al. Medication Non-adherence in a Prospective, Multi-center Cohort Treated with Hepatitis C Direct-Acting Antivirals. J Gen Intern Med. 2020;35:1011-20.
[PubMed Abstract] -

38. Cunningham EB, Amin J, Feld JJ, et al. Adherence to sofosbuvir and velpatasvir among people with chronic HCV infection and recent injection drug use: The SIMPLIFY study. Int J Drug Policy. 2018;62:14-23.
[PubMed Abstract] -

39. Fabbiani M, Lombardi A, Colaneri M, et al. High rates of sustained virological response despite premature discontinuation of directly acting antivirals in HCV-infected patients treated in a real-life setting. J Viral Hepat. 2021;28:558-68.
[PubMed Abstract] -

References

- Adinolfi LE, Gambardella M, Andreana A, Tripodi MF, Utili R, Ruggiero G. Steatosis accelerates the liver damage of chronic hepatitis C patients and correlates with specific genotypes and visceral adiposity. Hepatology. 2001;33:1358-64.
[PubMed Abstract] -

- Advisory Committee on Immunization Practices (ACIP). Recommended Adult Immunization Schedule by Medical Condition and Other Indications, United States, 2024.
[ACIP] -

- Beste LA, Green PK, Berry K, Kogut MJ, Allison SK, Ioannou GN. Effectiveness of hepatitis C antiviral treatment in a USA cohort of veteran patients with hepatocellular carcinoma. J Hepatol. 2017;67:32-9.
[PubMed Abstract] -

- Bhattacharya D, Belperio PS, Shahoumian TA, et al. Effectiveness of All-Oral Antiviral Regimens in 996 Human Immunodeficiency Virus/Hepatitis C Virus Genotype 1-Coinfected Patients Treated in Routine Practice. Clin Infect Dis. 2017;64:1711-1720.
[PubMed Abstract] -

- Chalasani N, Younossi Z, Lavine JE, et al. The diagnosis and management of nonalcoholic fatty liver disease: Practice guidance from the American Association for the Study of Liver Diseases. Hepatology. 2018;67:328-57.
[PubMed Abstract] -

- Chung RT, Andersen J, Volberding P, et al. Peginterferon Alfa-2a plus ribavirin versus interferon alfa-2a plus ribavirin for chronic hepatitis C in HIV-coinfected persons. N Engl J Med. 2004;351:451-9.
[PubMed Abstract] -

- Diehl AM, Day C. Cause, Pathogenesis, and Treatment of Nonalcoholic Steatohepatitis. N Engl J Med. 2017;377:2063-2072.
[PubMed Abstract] -

- Hézode C, Lonjon I, Roudot-Thoraval F, Pawlotsky JM, Zafrani ES, Dhumeaux D. Impact of moderate alcohol consumption on histological activity and fibrosis in patients with chronic hepatitis C, and specific influence of steatosis: a prospective study.Aliment Pharmacol Ther. 2003;17:1031-7.
[PubMed Abstract] -

- Ikeda K, Saitoh S, Koida I, et al. A multivariate analysis of risk factors for hepatocellular

carcinogenesis: a prospective observation of 795 patients with viral and alcoholic cirrhosis. Hepatology. 1993;18:47-53.
[PubMed Abstract] -

- McMahon BJ, Bruden D, Bruce MG, et al. Adverse outcomes in Alaska Natives who recovered from or have chronic hepatitis C infection. Gastroenterology. 2010;138:922-31.
[PubMed Abstract] -

- Murphy AA, Herrmann E, Osinusi AO, et al. Twice-weekly pegylated interferon-α-2a and ribavirin results in superior viral kinetics in HIV/hepatitis C virus co-infected patients compared to standard therapy. AIDS. 2011;25:1179-87.
[PubMed Abstract] -

- Nelson NP, Weng MK, Hofmeister MG, et al. Prevention of Hepatitis A Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices, 2020. MMWR Recomm Rep. 2020;69:1-38.
[PubMed Abstract] -

- Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in adults and adolescents with HIV. Department of Health and Human Services. Considerations for antiretroviral use in patients with coinfections: hepatitis C (HCV)/HIV coinfection. September 21, 2022.
[HIV.gov] -

- Poynard T, Bedossa P, Opolon P. Lancet. Natural history of liver fibrosis progression in patients with chronic hepatitis C. The OBSVIRC, METAVIR, CLINIVIR, and DOSVIRC groups. Lancet. 1997;349:825-32.
[PubMed Abstract] -

- Rigamonti C, Mottaran E, Reale E, et al. Moderate alcohol consumption increases oxidative stress in patients with chronic hepatitis C. Hepatology. 2003;38:42-9.
[PubMed Abstract] -

- Rinella ME. Nonalcoholic fatty liver disease: a systematic review. JAMA. 2015;313:2263-73.
[PubMed Abstract] -

- Schillie S, Harris A, Link-Gelles R, Romero J, Ward J, Nelson N. Recommendations of the Advisory Committee on Immunization Practices for Use of a Hepatitis B Vaccine with a Novel Adjuvant. MMWR Morb Mortal Wkly Rep. 2018;67:455-8.
[PubMed Abstract] -

- Schillie S, Vellozzi C, Reingold A, et al. Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep. 2018;67:1-31.
[PubMed Abstract] -

- Shih YF, Liu CJ. Hepatitis C Virus and Hepatitis B Virus Co-Infection. Viruses. 2020;12:741.
[PubMed Abstract] -

- Tsui JI, Williams EC, Green PK, Berry K, Su F, Ioannou GN. Alcohol use and hepatitis C virus treatment outcomes among patients receiving direct antiviral agents. Drug Alcohol Depend. 2016;169:101-9.
[PubMed Abstract] -

- Vento S, Garofano T, Renzini C, et al. Fulminant hepatitis associated with hepatitis A virus superinfection in patients with chronic hepatitis C. N Engl J Med. 1998;338:286-90.

[PubMed Abstract] -

Figures

Figure 1 Simplified Treatment Criteria

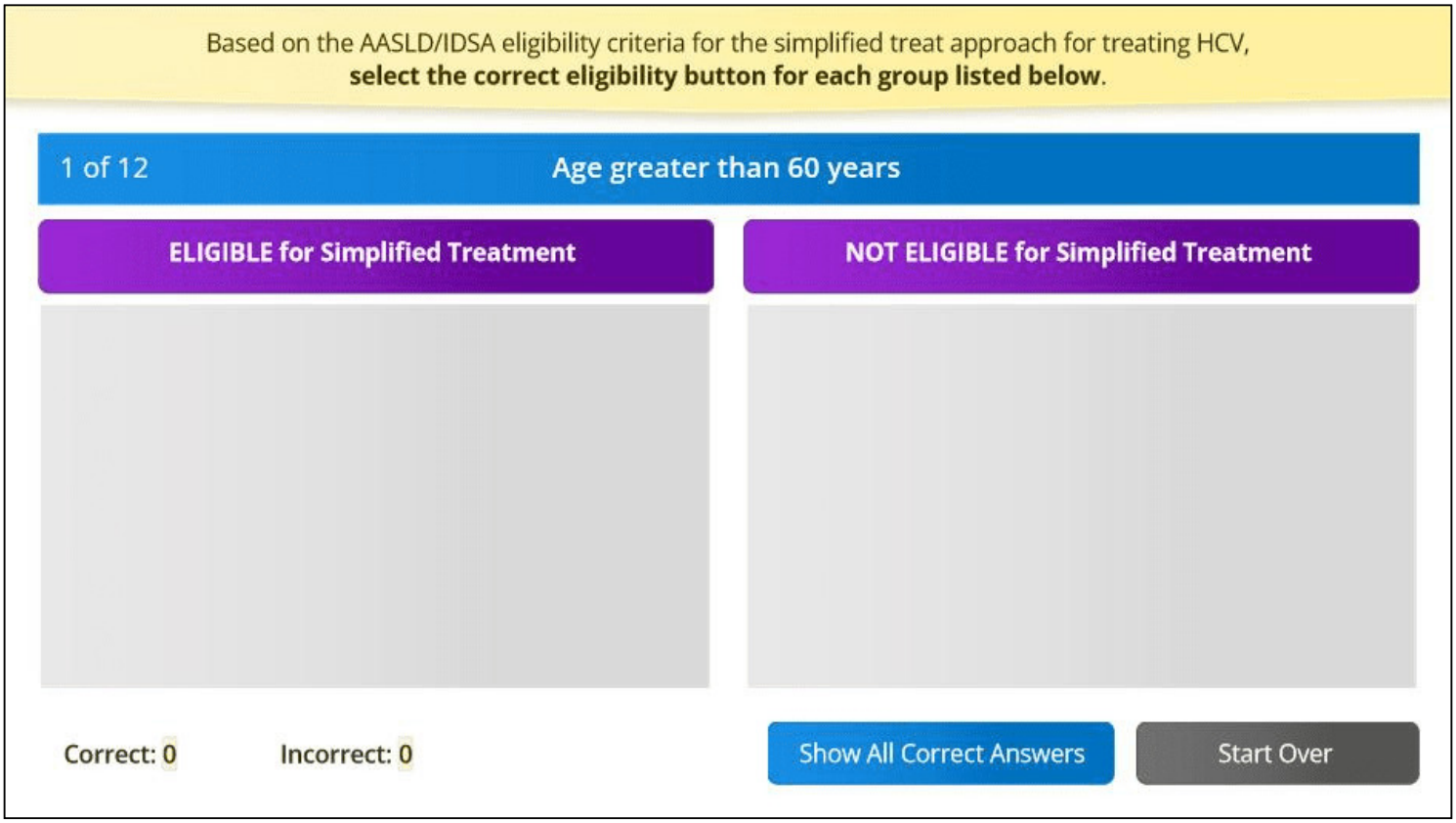

Figure 2 Simplified Treatment Medication Options

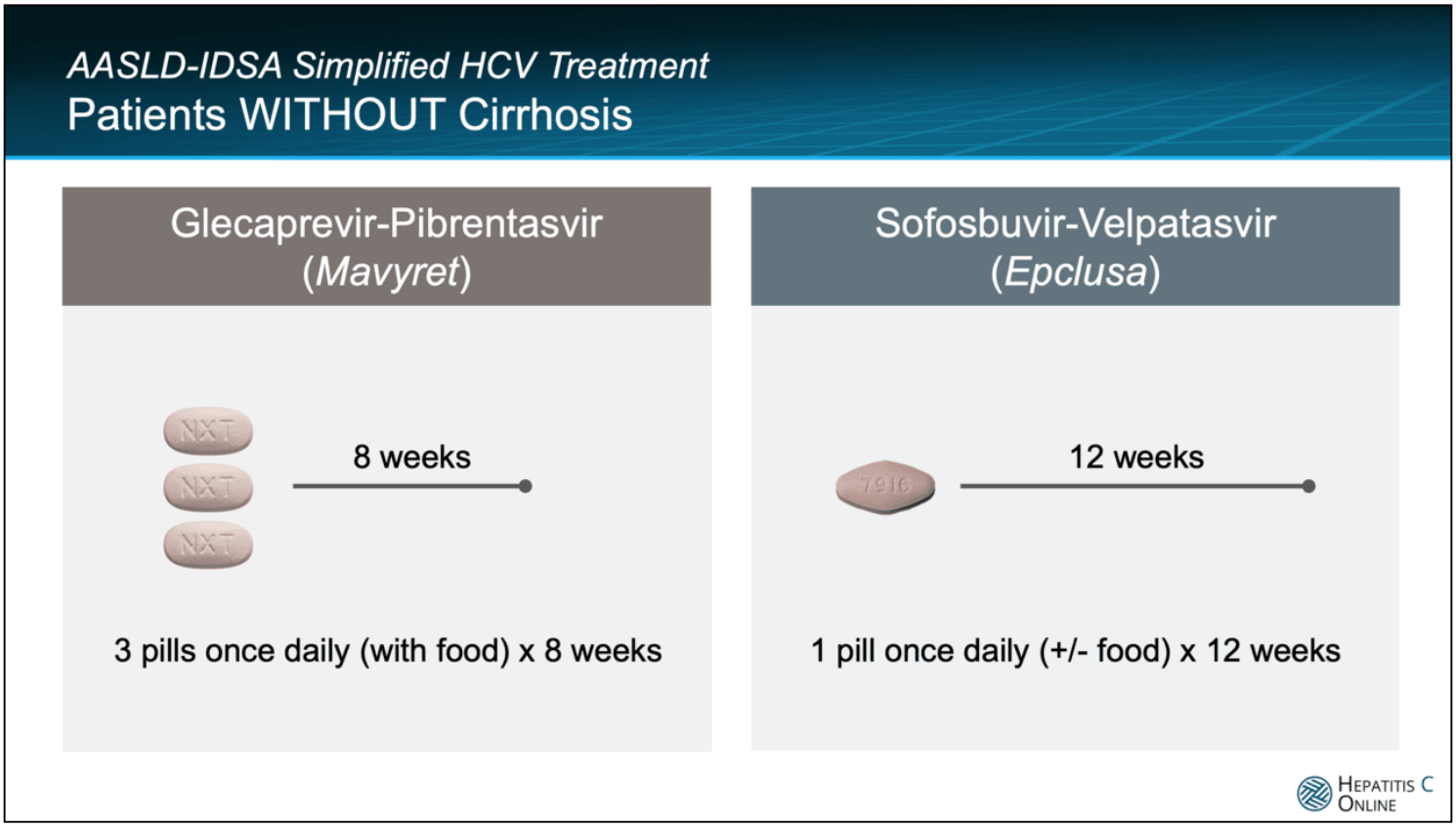

Figure 3 HCV Treatment Exercises

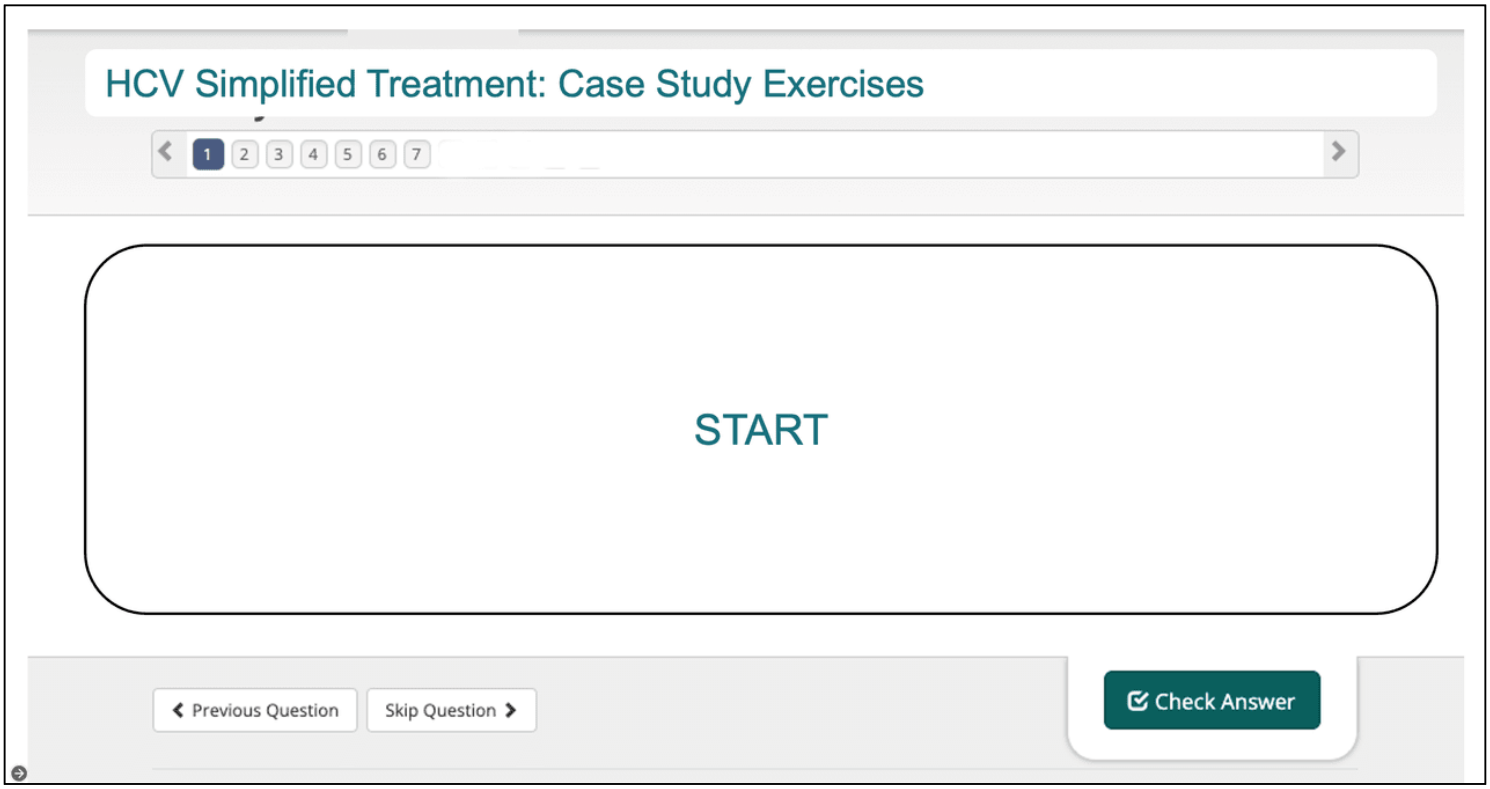

Table 1. HCV Simplified Treatment Eligibility: Test and Cure

AASLD/IDSA HCV Guidance: Simplified HCV Treatment Eligibility Criteria	
Who is Eligible for Simplified HCV Treatment Algorithm	**Wh Simplifie**
Adults with chronic HCV infection who are treatment-naïve, including: • Any HCV genotype • HIV coinfection • Persons without cirrhosis or with compensated cirrhosis (Child-Turcotte-Pugh A*)	**Adults with chronic HCV infect** • Previously received HCV tr • Hepatitis B surface antiger • Compensated cirrhosis (Ch (eGFR <30 mL/min/m^2) • Current or prior decompen ≥7 • Current pregnancy • Known or suspected hepat • Prior liver transplantation

Source:

- AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. Simplified HCV Treatment for Treatment-Naive Adults With Compensated Cirrhosis. [AASLD-IDSA Hepatitis C Guidance]
- AASLD-IDSA. HCV Guidance: Recommendations for testing, management, and treating hepatitis C. Simplified HCV Treatment for Treatment-Naive Adults Without Cirrhosis. [[AASLD-IDSA Hepatitis C Guidance]

Table 2. Medications Used in HCV Simplified Treatment

Table 2.

Medications Used in Simpified HCV Treatment

Med	Glecaprevir-Pibrentasvir	Sofosbuvir-Velpatasvir
Trade Name	*Mavyret*	*Epclusa*
Adult dose (oral)	Glecaprevir 300 mg and pibrentasvir 120 mg once daily, taken as 3 tablets once daily	Sofosbuvir 400 mg and vel single tablet once daily
Duration*	8 weeks	12 weeks[#]
Food requirement	Take with food.	Take with or without food.
Hepatic impairment	Contraindicated in patients with decompensated liver disease (Child-Turcotte-Pugh B or C).	No dose adjustment neces (Child-Turcotte-Pugh A, B,
Renal impairment	No dosage adjustment is recommended in patients with any degree of renal impairment, including patients with end-stage renal disease on dialysis.	No dosage adjustment is r renal impairment, includin dialysis.
Notable drug interactions *See Prescribing Information for full list and details of drug interactions*	Coadministration with **ethinyl estradiol** or any ethinyl estradiol-containing medications is contraindicated. Glecaprevir-pibrentasvir can increase levels of hormone and cause ALT elevation. Coadministration is contraindicated with **rifampin** due to potential loss of therapeutic effect with glecaprevir-pibrentasvir. Coadministration is not recommended with certain HMG-CoA Reductase Inhibitors (**atorvastatin, lovastatin, or simvastatin)**; use with other HMG-CoA Reductase Inhibitors may require dose adjustment of the HMG-CoA Reductase Inhibitor. Coadministration is not recommended with **carbamazepine** due to the potential loss of therapeutic effect with glecaprevir-pibrentasvir. Coadministration is not recommended with some **HIV antiretroviral medications**, including HIV protease inhibitors and some non-nucleoside reverse transcriptase inhibitors (e.g., efavirenz and etravirine).^ Coadministration is not recommended with **St. John's Wort** (hypericum perforatum) due to the potential loss of therapeutic effect with glecaprevir-pibrentasvir. Coadministration is not recommended with **cyclosporin** when the dose of cyclosporin is >100 mg/day.	Coadministration with **pro** recommended. If medically should be taken with food daily. Use of other PPIs an been studied. Coadministration is not rec **rifapentine** due to potent sofosbuvir-velpatasvir. Coadministration is not rec medication **amiodarone** c Coadministration is not rec **carbamazepine, phenyt** potential loss of therapeut Coadministration is not rec medication **efavirenz**. Coadministration is not rec **Wort** (hypericum perforat therapeutic effect with sof Coadministration is not rec medication **topotecan**.

*In treatment-naïve individuals without cirrhosis or with compensated cirrhosis. Treatment for patients with decomp this discussion.

[#]Note: patients with compensated cirrhosis and HCV genotype 3 should have treatment guided by HCV genotypic d resistance testing does not show the NS5A resistance associated substitutions (RAS) Y93H, then the 12-week sofosb resistance testing shows NS5A RAS Y93H, then weight-based ribavirin should be added to the 12-week sofosbuvir-v recommended regimen should be chosen (e.g., glecaprevir-pibrentasvir one daily for 8 weeks or sofosbuvir-velpata

Med	Glecaprevir-Pibrentasvir	Sofosbuvir-Velpatasvir
**See Liverpool HCV drug interaction site ^See AASLD/IDSA guidance section on HIV and HCV coinfection.		

Table 3. AASLD/IDSA: Management of Treatment Interruptions

AASLD/IDSA HCV Guidance: Simplified HCV Treatment for Treatment-Naive Adults Without Cirrhosis

Recommended Management of DAA Treatment Interruptions for Treatment-Naive Patients without Cirrhosis or with Compensated Cirrhosis Receiving Glecaprevir-Pibrentasvir or Sofosbuvir-Velpatasvir

Interruptions Before Receiving 28 Days of DAA Therapy
Missed ≤7 Days • **Restart** DAA therapy immediately. Complete therapy for originally planned duration (8 or 12 weeks).
Missed ≥8 Days • **Restart** DAA therapy immediately. Restarting DAA takes precedence over obtaining HCV RNA level. • **Obtain** HCV RNA test as soon as possible, preferably the same day as restarting the DAA therapy. ◦ If HCV RNA is negative (undetectable), complete originally planned DAA treatment course (8 or 12 weeks; total planned dosage[a]). Recommend extending DAA treatment for an additional 4 weeks for patients with genotype 3 infection and/or compensated cirrhosis. ◦ If HCV RNA is positive (>25 IU/L) or not obtained, extend DAA treatment for an additional 4 weeks.
Interruptions After Receiving ≥28 Days of DAA Therapy
Missed ≤7 Days • **Restart** DAA therapy immediately. Complete therapy for originally planned duration (8 or 12 weeks).
Missed 8-20 Consecutive Days • **Restart** DAA therapy immediately. Restarting DAA takes precedence over obtaining HCV RNA level. • **Obtain** HCV RNA test as soon as possible, preferably the same day as restarting the DAA therapy. ◦ If HCV RNA is negative (undetectable), complete originally planned DAA treatment course (8 or 12 weeks; total planned dosage[a]). Recommend extending DAA treatment for an additional 4 weeks for patients with genotype 3 infection and/or compensated cirrhosis. ◦ If HCV RNA is positive (>25 IU/L) or not obtained, **stop** DAA treatment and retreat according to recommendations in the Retreatment Section in the AASLD-IDSA Guidance.
Missed ≥21 Consecutive Days • **Stop** DAA treatment and assess for SVR12. If SVR12 not achieved, retreat according to recommendations in the Retreatment Section.
Abbreviations: DAA = direct-acting antiviral; HCV = hepatitis C virus; SVR = sustained virologic response [a]Extend duration of therapy such that the patient receives the total planned dosage (ie, the total number of daily pills). For example, if a patient missed 10 days of a planned 8-week course of therapy, treatment would be extended to 8 weeks plus 10 days.

Source:

- Bhattacharya D, Aronsohn A, Price J, Lo Re V. Hepatitis C Guidance 2023 Update: AASLD-IDSA Recommendations for Testing, Managing, and Treating Hepatitis C Virus Infection. Clin Infect Dis. 2023;ciad319. [PubMed Abstract]