

Washington Apple Health: Hepatitis C Treatment Policy
(June 13, 2016)

Policy

Washington Apple Health determines medical necessity for the treatment of chronic hepatitis C infection, based on criteria 1-5, except as noted in the “TREATMENT SPECIFIC EXCEPTIONS” section below. Washington Apple Health will approve coverage for all patients with chronic HCV infection regardless of fibrosis scoring.

1. Patient has chronic hepatitis C infection defined by:
 - a. a positive (i.e. reactive) HCV antibody test that is at least six months old; **and** has a detectable and quantifiable HCV RNA (> 15 international units/ML) six months after date of positive HCV antibody test; **OR**
 - b. two detectable and quantifiable HCV RNA (> 15 international units/ML) tests at least six months apart; **AND**

2. Prescriber is:
 - a. a specialist in one of the following areas:
 - i. Gastroenterologist
 - ii. Hepatologist
 - iii. HIV
 - iv. Infectious disease; **OR**
 - b. Prescriber is participating and consulting with Project ECHO or one of the specialists listed above (requires consultation note or documentation of phone call).
NOTE: Exceptions may be made for other non-specialist providers who work in coordination with an organized system of care, have received training in hepatitis C diagnosis, staging and treatment protocols, and have ready access to specialists that treat HCV; **AND**

3. Required documentation and lab tests
 - a. HCV Antibody test administered at least 6 months before request for treatment
 - b. HCV Genotype
 - c. HCV RNA Viral Load
 - i. At least 6 months after the positive HCV antibody test; or
 - ii. Within 6 months prior to the date of request for treatment if liver fibrosis score is F1;
 - iii. Within 12 months prior to the date of request for treatment if liver fibrosis score is F2 or greater.
 - iv. Diagnostic tests to determine liver fibrosis staging are required to ensure the appropriate treatment regimen is used (e.g. patients with cirrhosis require longer treatment). Liver staging test results must be less than 2 years old;

- v. If patient has cirrhosis must document if patient is compensated, currently decompensated, or has had previous episodes of decompensation.
- 4. Patients with the following conditions are not eligible for HCV treatment until the condition is resolved. Patients who:
 - a. Are taking medications that are contraindicated with or have a severe drug interaction with the prescribed HCV treatment
 - b. Are pregnant or planning on becoming pregnant
 - c. Have severe end organ disease and are not eligible for transplant (e.g. heart, lung, kidney)
 - d. Have decompensated liver disease with CPT > 12 or MELD > 20
 - e. Have a clinically-significant illness or any other major medical disorder that may interfere with patients' ability to complete a course of treatment
 - f. In the professional judgment of the primary treating clinician would not achieve a long term clinical benefit from HCV treatment (e.g. patients: with multisystem organ failure; receiving palliative care; significant pulmonary or cardiac disease; and malignancy outside of the liver not meeting oncologic criteria for cure)
 - g. Have a MELD < 20¹⁶ and one of the following:
 - i. Cardiopulmonary disease that cannot be corrected and is a prohibitive risk for surgery
 - ii. Malignancy outside the liver not meeting oncologic criteria for cure
 - iii. Hepatocellular carcinoma with metastatic spread
 - iv. Intrahepatic cholangiocarcinoma
 - v. Hemangiosarcoma
 - vi. Uncontrolled sepsis
- 5. Retreatment Criteria
 - a. Re-treatment with PEG interferon based treatment will be approved based on AASLD guidelines unless listed in the exceptions section above.
 - b. Re-treatment after all- DAA regimen:
 - i. All cases will be considered individually.
 - c. Must provide prior treatment regimen including response and timelines
 - d. Lab reports documenting presence or absence of resistant mutations
 - e. Medical necessity will be based on expert recommendations that members not be re-treated with a regimen containing a drug they have failed or relapsed on:
 - f. Patients having failed a regimen containing an NS3/4A protease inhibitor (boceprevir, telaprevir, simeprevir or paritaprevir) should not be re-treated with a regimen containing one of these agents. Harvoni® (Ledipasvir/sofosbuvir) is suitable for retreatment in such cases unless contraindicated.

QUANTITY AND DISPENSING LIMITS

Patients meeting the criteria above may receive HCV treatment. Approval may be limited to a 14 day supply on the original dispensing and no less than 28 days on each subsequent dispensing. Plans may limit dispensing to a single specialty pharmacy with exceptions for members without stable mailing addresses.

PREFERRED TREATMENT REGIMEN

Harvoni® is the preferred agent and should be used first-line wherever recommended by the current AASLD guidelines, unless there are contraindications to its use.

TREATMENT SPECIFIC EXCEPTIONS

The following drugs require Harvoni® failure (when appropriate)

1. The use of Viekira Pak® (paritaprevir/ritonavir/ombitasvir/dasabuvir) may be considered **medically necessary** to treat patients with the appropriate HCV genotype who do not have moderate to severe liver disease after failure or intolerance to Harvoni® (ledipasvir/sofosbuvir), or if patients creatinine clearance is < 30ml/min.
2. The use of combination Olysio® (simeprevir) and Sovaldi® (sofosbuvir) to treat HCV is considered **not medically necessary**, since there is an equally or more effective less costly alternative, Harvoni® (ledipasvir/sofosbuvir).
3. The use of Daklinza® (daclatasvir) plus Sovaldi® (sofosbuvir) +/- ribavirin may be considered **medically necessary** to treat patients with appropriate HCV genotype after failure of or intolerance to Harvoni® (ledipasvir/sofosbuvir).
4. The use of Technivie® (paritaprevir/ritonavir/ombitasvir) may be considered **medically necessary** to treat patients with the appropriate HCV genotype who do not have moderate to severe liver disease after failure of or intolerance to Harvoni® (ledipasvir/sofosbuvir), or if the CrCl is < 30 ml/min.
5. The use of Zepatier® (elbasvir/grazoprevir) may be considered **medically necessary** to treat patients with the appropriate HCV genotype who do not have without moderate to severe liver disease when ALL of the following criteria have been met:
 - a. Documentation of genotype 1a resistance testing showing no NS5A resistance-associated polymorphisms (at amino acid positions 28,30,31, or 93) in treatment naïve and treatment experienced patients; **AND**
 - b. The patient tried and failed Harvoni® (ledipasvir/sofosbuvir) therapy is required; **OR**
 - c. the patient is NOT a suitable candidate for treatment with Harvoni® (ledipasvir/sofosbuvir) for the following reasons:
 - i. CrCl < 30 mL/min; **OR**
 - ii. Intolerance to Harvoni® (ledipasvir/sofosbuvir);**AND**
 - d. Hepatic testing prior to therapy initiation showed no clinically significant Liver Function Test (ALT) elevations. Hepatic testing should be repeated at 8weeks for a 12 week course of therapy and at 12 weeks for a 16 week course of therapy.

6. Length of Therapy Exceptions

- a. Although Harvoni® (ledipasvir/sofosbuvir) was approved by the FDA for a 12-week course of therapy, based on the clinical trials and as noted in the FDA approved label for Harvoni® (ledipasvir/sofosbuvir), an 8-week course may be considered in patients with baseline viral load less than 6 million units/mL.
 - i. ION-3 excluded patients with cirrhosis and investigated shortening therapy from 12 weeks to 8 weeks (with or without RBV). (Kowdley, 2014) SVR12 rate was 93% to 95% across all arms, with no difference in SVR in the intention-to-treat analysis. However, relapse rates were higher in the 8-week arms (20 of 431) regardless of RBV use compared with the 12-week arm (3 of 216). Post hoc analyses of the 2 RBV-free arms assessed baseline predictors of relapse and identified lower relapse rates in patients receiving 8 weeks of ledipasvir/sofosbuvir who had baseline HCV RNA levels below 6 million IU/mL (2%; 2 of 123), and was the same for patients with similar baseline HCV RNA levels who received 12 weeks (2%; 2 of 131). This analysis was not controlled and thus substantially limits the generalizability of this approach to clinical practice. Shortening treatment to less than 12 weeks for patients without cirrhosis should be done with caution and performed at the discretion of the practitioner.
- b. All other deviations from the length of therapy recommended by the AASLD guidelines are considered **investigational**.

References:

1. American Association for the Study of Liver Disease (AASLD). Recommendations for testing, managing, and treating Hepatitis C. 2014; Available at: <http://www.hcvguidelines.org/full-report-view>. Accessed January 14, 2014.
2. Friedrich-Rust M, Ong MF, Martens SJ, et al. Performance of transient elastography for staging of liver fibrosis: A meta-analysis. *Gastroenterology*. 2008; 134: 960-974.
3. Boursier J, de Ledinghen V, Zarski JP, et al: Comparison of eight diagnostic algorithms for liver fibrosis in Hepatitis C: new algorithms are more precise and entirely noninvasive. *Hepatology*. 2012; 55(1): 58-67.
4. Ferraioli G, Tinelli C, Lissandrin R, et al. Point shear wave elastography method for assessing liver stiffness. *World J Gastroenterol*. 2014; 20: 4787-4796.
5. Ferraioli G, Tinelli C, Dal Bello B, et al. Performance of liver stiffness measurements by transient elastography in chronic Hepatitis. *WJ Gastroenterol*. 2013; 19(1):49-56.
6. Crespo G, Fernandez-Varo G, Marino Z, et al. ARFI, FibroScan®, ELF, and their combinations in the assessment of liver fibrosis: A prospective study. *J Hepatol*. 2012; 57: 281-287.
7. Cassinoto C, Lapuyade B, Alt-Ali A, et al. Liver fibrosis: Noninvasive assessment with acoustic radiation force impulse elastography – comparison with FibroScan M and XL probes and FibroTest in patients with chronic liver disease. *Radiology*. 2013; 269: 283-292.
8. Fabrizi F, Martin P, Dixit V, Messa P. Meta-analysis of observational studies: Hepatitis C and survival after renal transplant. *J of Viral Hepas*. 2014; 21: 314-324.
9. Berenguer M, Schuppan D. Progression of liver fibrosis in post-transplant Hepatitis C: mechanisms, assessment, and treatment. *J Hepatol*. 2013; 58: 1028-1041.
10. Curry MP, Fornis X, Chung RT, et al. Sofosbuvir and ribavirin prevent recurrence of HCV infection after liver transplantation: An open-label study. *Gastroenterology*. 2015; 148: 108-17.
11. Flamm SL, Everson GT, Charlton MR, Denning JM, Arterburn S, Brandt-Sarif T. Ledipasvir/Sofosbuvir with ribavirin for the treatment of HCV in patients with decompensated cirrhosis: Preliminary results of a prospective, multicenter study. 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014. Boston, MA. Available at: http://www.natap.org/2014/AASLD/AASLD_36.htm.
12. Aspinall EJ, Corson S, Doyle JS, et al. Treatment of Hepatitis C virus infection among people who are actively injecting drugs: A systematic review and meta-analysis. *Clin Infect Dis*. 2013; 57(S2): S80-S89.
13. Robaey G, Grebely J, Mauss S, et al. Recommendations for the management of Hepatitis C virus infection among people who inject drugs. *Clin Infect Dis*. 2013; 57(S2):S129-S137.
14. Waizmann M and Ackermann G. High rates of sustained virological response in Hepatitis C virus-infected injection drug users receiving directly observed therapy with peginterferon alpha-2a (PEGASYS) and once daily ribavirin. *J Subst Abuse Treat*. 2010; 38: 338-345.

15. Belfiori B, Ciliegi P, Chiodera A, et al. Peginterferon plus ribavirin for chronic Hepatitis C in opiate addicts on methadone/buprenorphine maintenance therapy. *Dig Liver Dis.* 2009; 41: 303-307
16. Dove LM, Brown RS. Liver transplantation in adults: Patient selection and pretransplantation valuation. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed on December 4, 2014.)
17. Gilead Science. Sofosbuvir (Sovaldi™). Product Label. 2014. Accessed January 20, 2015.
18. Gilead Science. Ledipasvir/Sofosbuvir (Harvoni™). Product Label. 2014. Accessed January 20, 2015.
19. AbbVie. Ombitasvir/Paritaprevir/Ritonavir/Dasabuvir (Viekira Pak™). Product Label. 2014. Accessed January 20, 2015.
20. Genentech. Peginterferon alpha-2a (Pegays™). Product Label 2014. Accessed February 19, 2015.
21. Genentech. Ribavirin (Copegus™). Product Label 2013. Accessed February 19, 2015
22. Kowdley K, Gordon S, Reddy R, et al. Ledipasvir and sofosbuvir for 8 or 12 weeks for chronic HCV without cirrhosis (ION3). *N Engl J Med.* 2014; 370: 1879-88.
23. Feld JJ, Kowdley KV, Coakley E, et al. Treatment of HCV with ABT-450/r/ombitasvir and dasabuvir and ribavirin (SAPPHERE-I). *N Engl J Med.* 2014; 370: 1594-1603.
24. Zeuzem S, Jacobson IM, Baykal T, et al. Retreatment of HCV with ABT-450/r-ombitasvir and dasabuvir with ribavirin (SAPPHERE-II). *N Engl J Med.* 2014; 370: 1604-1614.
25. Ferenci P, Berstein D, Lalezari J, et al. ABT-450/r-ombitasvir and dasabuvir with or without ribavirin for HCV (PEARL-III/IV). *N Engl J Med.* 2014; 370: 1983-1992.
26. Afdhal N, Zeuzem S, Kwo P, et al. Ledipasvir and sofosbuvir for untreated HCV genotype 1 infection (ION1). *N Engl J Med.* 2014;370: 1889-98.
27. Poordad F, Hezode C, Trinh R, et al. ABT-450/r-ombitasvir and dasabuvir with ribavirin for Hepatitis C with cirrhosis (TURQUOISE-II). *N Engl J Med.* 2014; 370: 1973-1982.
28. Afdhal N, Reddy R, Nelson D, et al. Ledipasvir and sofosbuvir for previously treated HCV Genotype 1 Infection (ION2). *N Engl J Med.* 2014; 370: 1483-93.
29. Bourlier M, Sulkowski M, Omata M, et al: An integrated safety and efficacy analysis of > 500 patients with compensated cirrhosis treated with ledipasvir/sofosbuvir with or without ribavirin. 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014. Boston, MA. Available at: http://www.natap.org/2014/AASLD/AASLD_15.htm.
30. Andreone P, Colombo MG, Enejosa JV, et al. ABT-450, ritonavir, ombitasvir, and dasabuvir achieves 97% and 100% sustained virologic response with or without ribavirin in treatment-experienced patients with HCV genotype 1b infection (PEARL-II). *Gastroenterology.* 2014; 147:359-365.
31. Jacobson I, Gordon S, Kowdley K, et al. Sofosbuvir for Hepatitis C genotype 2 or 3 in patients without treatment options (POSITRON/FUSION). *N Engl J Med.* 2013; 368: 1867-1877.
32. Zeuzem S, Dusheiko G, Salupere R, et al. Sofosbuvir and ribavirin in HCV genotypes 2 and 3 (VALENCE). *N Engl J Med.* 2014; 370: 1993-2001.

33. Lawitz E, Poordad F, Brainard D, et al. Sofosbuvir with Peginterferon-ribavirin for 12 weeks in previously treated patients with Hepatitis C genotype 2 and 3 and cirrhosis. *Hepatology*. 2014 doi: 10.1002/hep.27567.
34. Gane EJ, Stedman CA, Hyland RH, et al. Nucleotide polymerase inhibitor sofosbuvir plus ribavirin for Hepatitis C (ELECTRON). *N Engl J Med*. 2013; 368:34-44.
35. Gane E, Hyland R, An D, et al. Ledipasvir/Sofosbuvir fixed-dose combination is safe and effective in difficult-to-treat populations including GT3 patients, decompensated GT1 patients, and GT1 patients with prior sofosbuvir experience. International Liver Congress. 2014. London UK.
36. Gane EF, Hyland RH, An D, et al. High efficacy of LDV/SOF regimens for 12 weeks for patients with HCV genotype 3 or 6 infection. . [Abstract LB11.] 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014. Boston, MA. Available at: http://www.natap.org/2014/AASLD/AASLD_27.htm.
37. Lawitz E, Mangia A, Wyles D, et al. Sofosbuvir for previously untreated chronic Hepatitis C infection (FISSION/NEUTRINO). *N Engl J Med*. 2013; 368: 1878-1887.
38. Ruane PJ, Ain D, Riad J, et al. Sofosbuvir plus ribavirin in the treatment of chronic HCV genotype 4 infection in patients of Egyptian ancestry. 64th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 1-4, 2013. Washington DC.
39. Kapoor R, Kohli A, Sidharthan S, et al. All oral treatment for genotype 4 chronic Hepatitis C infection with sofosbuvir and Ledipasvir: Interim results from the NIAID SYNERGY trial. [Abstract 240.] 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014. Boston, MA. Available at http://www.natap.org/2014/AASLD/AASLD_76.htm.
40. Pol S, Reddy KR, Baykal T et al. Interferon-free regimens of ombitasvir and ABT-450/r with or without ribavirin in patients with HCV genotype 4 infection: PEARL-I study results. [Abstract 1928.] 65th Annual Meeting of the American Association for the Study of Liver Diseases (AASLD). November 7-11, 2014; Boston, MA.
41. Sulkowski MS, Naggie S, Lalezari J, et al. Sofosbuvir and rivabirin for Hepatitis C in patients with HIV coinfection (PHOTON-I). *JAMA*. 2014; 312(4): 353-361.
42. Molina JM, Orkin C, Iser DM, et al. Sofosbuvir plus ribavirin for the treatment of Hepatitis C infection in patients coinfectd with HIV (PHOTON-2): A multicenter, open label, nonrandomized, phase 3 study. *Lancet*. Published online February 4, 2015. Accessed February 16, 2015.
43. Townsend K, Osinusi A, Nelson A, et al. Use of Ledipasvir/sofosbuvir fixed dose combination for treatment of HCV genotype-1 infection in patients coinfectd with HIV (ERADICATE). [Abstract 84.] 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014. Boston, MA. Available at: http://www.natap.org/2014/AASLD/AASLD_01.htm.
44. Wyles D, Sulkowski MS, Eron JJ, et al. TURQUOISE-I: 94% SVR12 in HCV/HIV-1 coinfectd patients treated with ABT-450/r/ombitasvir and dasabuvir and ribavirin. [Abstract 1939.] 65th Annual Meeting of the American Association for the Study of Liver

Disease (AASLD). November 7-11, 2014. Boston, MA. Available at:
http://www.natap.org/2014/AASLD/AASLD_28.htm.

45. Charlton M, Gane E, Manns MP, et al. Sofosbuvir and ribavirin for treatment of compensated recurrent Hepatitis C virus infection after liver transplantation. *Gastroenterology*. 2014; doi:10.1053/j.gastro.2014.10.001.
46. Reddy KR, Everson GT, Flamm SL, Denning JM, Arterburn S, Brandt-Sarif T. Ledipasvir/Sofosbuvir with ribavirin for the treatment of HCV in patients with post-transplant recurrence: Preliminary results of a prospective, multicenter study. [Abstract 8.] 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014. Boston, MA. Available at http://www.natap.org/2014/AASLD/AASLD_16.htm.
47. Kwo PY, Mantry PS, Coakley E, et al. An interferon-free antiviral regimen for HCV after liver transplantation (CORAL-I). *N Engl J Med*. 2014; 371: 2375-2382.
48. Flamm SL, Everson GT, Charlton MR, et al. Ledipasvir/sofosbuvir with ribavirin for the treatment of HCV in patients with decompensated cirrhosis: Preliminary results of a prospective multicenter study. 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014. Boston, MA. Available at http://www.natap.org/2014/AASLD/AASLD_36.htm.
49. Bristol-Myers-Squibb. Daclatasvir (Daklinza™). Product Label 2015. Accessed August 12, 2015.
50. AbbVie. Ombitasvir/Paritaprevir/Ritonavir/ (Technivie™). Product Label 2015. Accessed August 12, 2015.
51. Nelson DR, Cooper JN, Lalezard JP, et al. All-Oral 12-Week 12-week treatment with daclatasvir plus sofosbuvir in patients with hepatitis C virus genotype 3 infection: ALLY-3 phase III study. *Hepatology*. 2015; 61: 1127-1135.
52. Hézode C, Asselah T, Reddy KR, et al. Ombitasvir plus paritaprevir plus ritonavir with or without ribavirin in treatment-naïve and treatment-experienced patients with genotype 4 chronic hepatitis C virus infection (PEARL-I): a randomized, open-label trial. *Lancet*. 2015; 385: 2502-2509.
53. Sulkowski MS, Gardiner DF, Rodriguez-Torres M, et al. Daclatasvir plus sofosbuvir for previously treated or untreated chronic HCV infection. *NEJM*. 2014; 370(3): 211-221.
54. Jacobson IM, Dore GH, Fried MW, et al. Simeprevir with pegylated interferon alfa 2a plus ribavirin in treatment-naïve patients with chronic hepatitis C virus genotype 1 infection (QUEST-1): a phase 3, randomized, double-blind, placebo-controlled trial. *Lancet*. 2014; 384: 403-413.
55. Manns M, Marcellin P, Poordad F, et al. Simeprevir with pegylated interferon alfa 2a or 2b plus ribavirin in treatment-naïve patients with chronic hepatitis C virus genotype 1 infection (QUEST-2): a randomized, double-blind, placebo-controlled, a phase 3 trial. *Lancet*. 2014; 384: 414-426.
56. Lawitz E, Poordad F, Brainard DM, et al. Sofosbuvir with peginterferon-ribavirin for 12 weeks in previously treated patients with Hepatitis C and genotype 2 or 3 and cirrhosis. *Hepatology*. 2015; 61: 769-775.

57. Foster GR, Pianko S, Brown A, et al. Efficacy of sofosbuvir plus ribavirin with or without peginterferon-alfa in patients with hepatitis C virus genotype 3 infection and treatment-experienced patients with cirrhosis and hepatitis C virus genotype 2 infection. *Gastroenterology*. 2015; 1-9. doi: 10.1053/j.gastro.2015.07.043.
58. Doss W, Shiha G, Hassany M, et al. Sofosbuvir plus ribavirin for treating Egyptian patients with hepatitis c genotype 4. *J Hepatology*. 2015; 63: 581-585.
59. Ruane PJ, Ain D, Stryker R, et al. Sofosbuvir plus ribavirin for the treatment of chronic genotype 4 hepatitis C virus infection in patients with Egyptian ancestry. *J Hepatology*. 2015; 62: 1040-1046.
60. Kohli A, Kapoor R, Sims Z, et al. Ledipasvir and sofosbuvir for hepatitis C genotype 3: a proof-of-concept, single centre, open-label phase 2a cohort study. *Lancet*. 2015; 15: 1049-1054.
61. Lawitz E, Matusow G, DeJesus E, et al. A phase 3, open-label, single-arm study to evaluate the efficacy and safety of 12 weeks of Simeprevir (SMV) plus sofosbuvir (SOF) in treatment-naïve or experienced patients with chronic HCV genotype 1 infection and cirrhosis: OPTIMIST-2. 50th Annual Meeting of the European Association for the Study of the Liver (EASL). April 22-26, 2015; S264; Vienna, Austria.
62. Kwo P, Gitlin N, Nahass R, et al. A phase 3, randomized, open-label study to evaluate the efficacy and safety of 8 and 12 weeks fo Simeprevir (SMV) plus sofosbuvir (SOF) in treatment-naïve and experienced patients with chronic HCV genotype 1 infection without cirrhosis: OPTIMIST-1. 50th Annual Meeting of the European Association for the Study of the Liver (EASL). April 22-26, 2015; S270; Vienna, Austria.
63. Abergel A, Loustaud-Ratti V, Mitivier S, et al. Ledipasvir/sofosbuvir for the treatment of patients with chronic genotype 4 or 5 HCV infection. 50th Annual Meeting of the European Association for the Study of the Liver (EASL). April 22-26, 2015; Vienna, Austria.
64. Foster GR, McLauchlan J, Irving W, et al. Treatment of decompensated HCV cirrhosis in patients with diverse genotypes: 12 weeks sofosbuvir and NS5A inhibitors with/without ribavirin is effective in HCB genotypes 1 and 3. [Abstract O002] 50th Annual Meeting of the European Association for the Study of the Liver (EASL). April 22-26, 2015; Vienna, Austria. Available at http://natap.org/2015/EASL/EASL_34.htm
65. Wyles DL, Ruane PJ, Sulkowski MS, et al. Daclatasvir plus sofosbuvir for HCV in patients coinfectd with HIV-1. *NEJM*. 2015; 373(8): 714-725.
66. Poordad F, Schiff ER, Vierling JM, et al. Daclatasvir, sofosbuvir, and ribavirin combination for HCV patients with advanced cirrhosis or post-transplant recurrence: ALLY-1 phase 3 study. [Abstract L08] 50th Annual Meeting of the European Association for the Study of the Liver (EASL). April 22-26, 2015; Vienna, Austria.
67. Bourliere M, Bronowicki J, de Ledinghen V, et al. Ledipasvir/sofosbuvir fixed dose combination is safe and efficacious in cirrhotic patients who have previously failed protease-inhibitor based triple therapy. [Abstract LB-6.] 65th annual Meeting of the American Association for the Study of Liver Diseases (AASLD). November 7-11, 2014; Boston, MA.

68. Charlton M, Everson GT, Flamm SL, et al. Ledipasvir and sofosbuvir plus ribavirin for treatment of HCV infection in patients with advanced liver disease. *Gastroenterology*. 2015; 149: 649-659.
69. Pungpapong S, Werner KT, Aqel B, et al. Multicenter experience using sofosbuvir and Simeprevir with/without ribavirin to treat HCV genotype 1 after liver transplantation. [Abstract 9] 65th Annual Meeting of the American Association for the Study of Liver Disease (AASLD). November 7-11, 2014; Boston, MA.
70. Pungpapong S, Aqel B, Leise M, et al. Multicenter experience using Simeprevir and sofosbuvir with without ribavirin to treat hepatitis C genotype 1 after liver transplant. *Hepatology*. 2015; 61(6): 1880-1886.
71. Pockros PJ, Reddy KR, Mantry PS, et al. Safety of ombitasvir/paritaprevir/ritonavir plus dasabuvir for treating HCV GT1 infection in patients with severe renal impairment or end-stage renal disease: the RUBY-1 study. [Abstract L01] 50th Annual Meeting of the European Association for the Study of the Liver (EASL). April 22-26, 2015; Vienna, Austria.
72. Merck. Elbasvir/grazoprevir (Zepatier™) Product Label. 1/2016. Accessed June 6, 2016.