HEPATITIS C WHAT'S NEW?

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Disclosure

- We have nothing to disclose

Objectives

- Discuss prevalence of Hepatitis C in Alaska
- Review when treatment for Hepatitis C is appropriate
- Describe first line treatment options for Hepatitis C

Treatment Guidelines

- HCV Guidance
  - *American Association for the Study of Liver Diseases and the Infectious Diseases Society of America*

AASLD-IDSA. HCV Guidance: Recommendations for, Managing, and Treating Hepatitis C. 2017Testing

HCV Statistics

Global Prevalence	United States Prevalence	Global Death Rate	United States Deaths	Alaska Prevalence
~177.5 million	~2.7-3.9 million	~399,000 / year	19,629 in 2015	~1,600

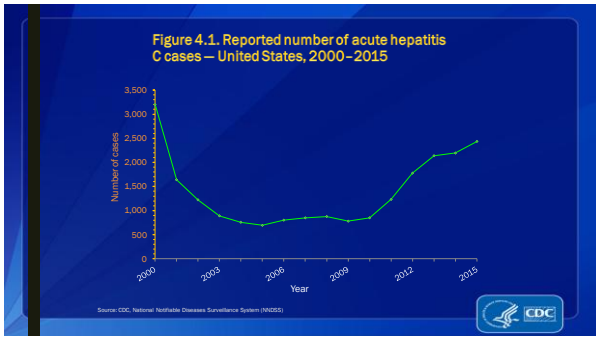
- Higher burden than HIV
  - *2016 Worldwide Prevalence HIV: 36.7 million*
  - *2015 United States Prevalence HIV: 1.1 million*

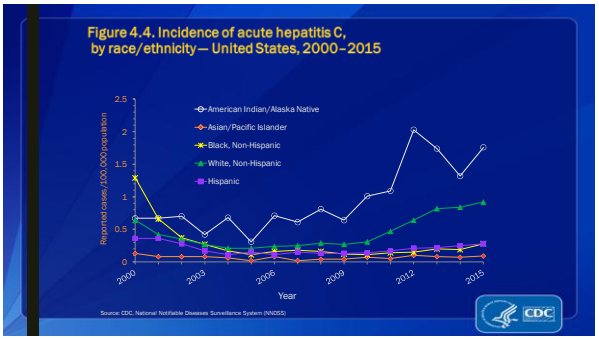
1. HIV Surveillance Report. CDC. https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html November 30, 2017.
2. Viral Hepatitis Surveillance United States, 2015. CDC https://www.cdc.gov/hepatitis/statistics/2015surveillance/ index.htm
3. http://www.who.int/mediacentre/factsheets/fs164/en/.
4. Petruzziello. Global epidemiology of hepatitis C virus infection: An up-date of the distribution and circulation of hepatitis C virus genotypes.

HCV Statistics

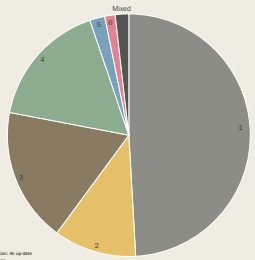
	Past/present HCV cases reported	2015 Number of HCV Related Deaths	2015 Death Rate per 100,000
White	19,874 (35.5%)	12,355	4.38
Black	3,617 (6.5%)	3,606	8.14
Hispanic	2,458 (4.4%)	2,699	6.40
American Indian/Alaska Native	151 (0.3%)	367	12.95
Asian/Pacific Islander	404 (0.7%)	445	2.49
Unknown/missing	28,772 (51.0%)		

1. Viral Hepatitis Surveillance United States, 2015. CDC https://www.cdc.gov/hepatitis/statistics/2015surveillance/index.htm
2. http://www.who.int/mediacentre/factsheets/fs164/en/
3. Petruzziello. Global epidemiology of hepatitis C virus infection: An up-date of the distribution and circulation of hepatitis C virus genotypes.





Genotype Prevalence



- Genotype 1
  - 1a: 31%
  - 1b: 68%

1. http://www.who.int/mediacentre/factsheets/fs164/en/
2. Petruzziello. Global epidemiology of hepatitis C virus infection: An up-date of the distribution and circulation of hepatitis C virus genotypes.

Hepatitis Infection

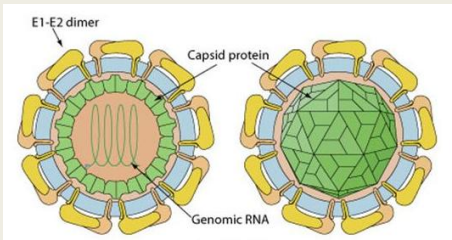
	Hepatitis A	Hepatitis B	Hepatitis C
Acute vs Chronic	Acute	Both	Both
Transmission	Fecal-oral	Blood, body fluid	Blood, body fluid
Vaccine	Yes	Yes	No
1st Line Tx	Supportive	PEG-INF or NRTI	DAA Combo
2nd Line Tx	-	-	Add Ribavirin

Shapiro, Karen, et al. McPeep Counter Book. McPeep, Inc., 2018.

Hepatitis C Virus

- Single-strand, positive sense RNA virus
- Outer - Enveloped glycoproteins in a lipid bilayer
- Inner – Protein layer encapsulating core known as capsid protein
- Single strand of viral genomic RNA

HCV Structure

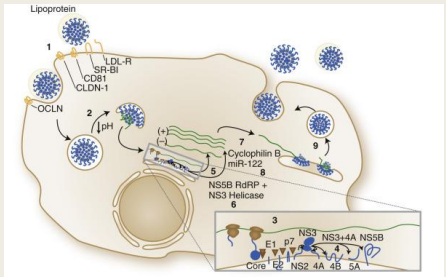


http://viralzone.expasy.org/all_by_species/37.html

Pathophysiology

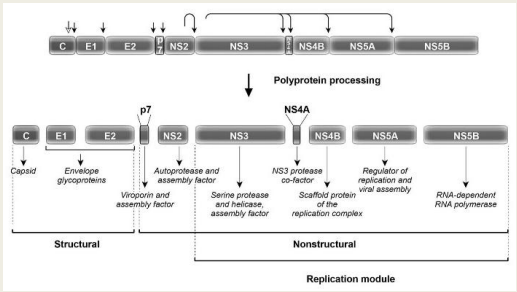
- Binds hepatocyte and undergoes endocytosis
- Uses host ribosomes and endoplasmic reticulum to make single polyprotein molecule
- Cleaved into 10 mature viral proteins
  - *Structural: E1, E2, P7 and NS2*
  - *Non-structural: NS3, NS4A, NS4B, NS5A and NS5B*
- Non-structural: post-translational processing (drug targets)
- Structural: pieces incorporated into new viral structure

1. Kish, Troy, et al. "Hepatitis C in a New Era: A Review of Current Therapies." *Pharmacy and Therapeutics* , vol. 42, no. 5, May 2017, pp. 316–330
2. Scheel TK, Rice CM. Understanding the hepatitis C virus life cycle paves the way for highly effective therapies. Nat Med 2013; 19:837.



Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition. Published January 1, 2015. Pages 1904-1927.e11. © 2015.

Structural/Non-Structural Proteins



Dubuisson, Jean. "Virology and Cell Biology of the Hepatitis C Virus Life Cycle – An Update." Journal of Hepatology, Elsevier, 3 Nov. 2014

Drug Targets – NS3/4A Protease Complex

- Heterodimeric serine protease complex
  - *Made up of NS3 and NS4A proteins*
- NS3: possesses the **proteolytic** activity
- NS4A: membrane bound; acts as a **cofactor**
- Enzyme involved in post-translational processing and HCV replication

Dubuisson, Jean. "Virology and Cell Biology of the Hepatitis C Virus Life Cycle – An Update." Journal of Hepatology, Elsevier, 3 Nov. 2014

Drug Targets – NS5A Protein

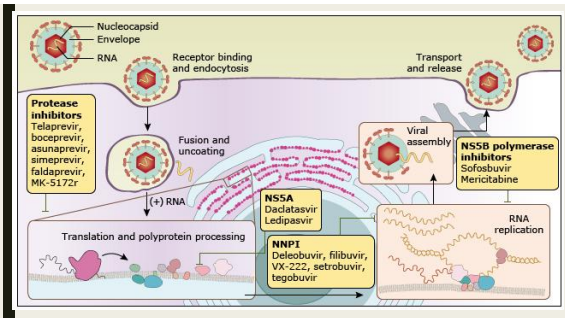
- Known as "replication complex" protein
- Critical role in both:
  - *Viral replication*
  - *Assembly of viral complex*
- Exact mechanism by which this is accomplished is uncertain

Dubuisson, Jean. "Virology and Cell Biology of the Hepatitis C Virus Life Cycle – An Update." Journal of Hepatology, Elsevier, 3 Nov. 2014

Drug Targets – NS5B Polymerase

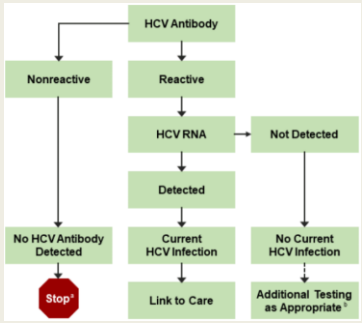
- RNA-dependent RNA polymerase
- Enzyme involved in post-translational processing and HCV replication
- Has multiple catalytic binding sites for drug therapy
  - *1 nucleoside site*
  - *4 known non-nucleoside sites*
- Structure itself is conserved across all HCV genotypes
  - *Polymerase inhibitors (PIs) – have activity against all genotypes*

Dubuisson, Jean. "Virology and Cell Biology of the Hepatitis C Virus Life Cycle – An Update." Journal of Hepatology, Elsevier, 3 Nov. 2014



Who Gets Tested?

- Anyone born from 1945 – 1965
- Illicit drug use – IV or intranasal
- Long term hemodialysis
- Needle sticks
- Children born to HCV infected women
- Incarcerated – ever
- HIV
- Yearly testing for persons who have continued risk factors
  - *Drug use*



Who to Treat?

- Chronic HCV infection
- Earlier treatment = better SVR
  - *F0 or F1 15 year survival rate = 92% with SVR*
- F3 – 2x increase in liver related mortality after treatment
- F4 – 5x increase in liver related mortality after treatment
- Recommended to treat earlier

AASLD-IDSA. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. 2017

Selecting Treatment

- Genotype
- Previous treatment
- Cirrhosis
- Co-morbid conditions

AASLD-IDSA. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. 2017

Co-Morbidities

- Prior Liver Transplantation
  - *Treat prior to treatment and after*
- HIV Co-infection
  - *Accelerates fibrosis*
- HBV Co-infection
  - *Treat both as if mono-infection*

AASLD-IDSA. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. 2017

Risk factors for accelerated fibrosis progression

Non-Modifiable	Modifiable	Viral
Fibrosis stage	Alcohol consumption	Genotype 3
Inflammation grade	Nonalcoholic fatty liver disease	Co-infection
Older age	Obesity	- Hepatitis B
Male	Diabetes	- HIV
Organ transplant		

AASLD-IDSA. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. 2017

Hepatitis C Regimen Roadmap

Direct Acting Antiviral (DAA) Classes

TARGET	SUFFIX	EXAMPLE
NS3/4A **Pr**otease	"- **Pr**evir"	Sime**Pr**evir
NS5**A** Protein	"- **A**svir"	Daclat**A**svir
NS5**B** Polymerase	"- **B**uvir"	Sofos**B**uvir

Hepatitis Treatment

NS3/4A Inhibitors	NS5A Inhibitors	NS5B Inhibitors
Simeprevir*	Daclatasvir*	**Sofosbuvir****
Telaprevir*	Ombitasvir	Dasabuvir
Boceprevir*	**Elbasavir**	
Paritaprevir	**Ledipasvir**	
Glecaprevir	**Velpatasvir**	
Grazoprevir	**Pibrentasvir**	
Voxilaprevir		

DAA Adverse Effects

- **Overall well tolerated**
- Fatigue
- Weakness
- Headache
- Rash (photosensitivity)

Shapiro, Karen, et al. RxPrep Course Book. RxPrep, Inc., 2018.

Warnings and Monitoring

- October 2016:
  - *FDA Boxed Warning added to all DAAs*
- "**Hepatitis B virsus (HBV) reactivation** has been reported in hepatitis C virus (HBC)/HBV co-infected patients who were **receiving or had completed treatment with HCV DAA and were not receiving HBV antiviral therapy**; some cases have resulted in **fulminant hepatitis, hepatic failure and death**. **Test all patients for evidence of current or prior HBV infection** prior to initiation of DAA. Monitor co-infected patients for hepatitis flare or HBV reactivation during and following treatment."

Lexi-Comp, Inc. Lexi-Drugs® | Lexi-Comp, Inc.; January 10, 2018.

Drug-Drug Interactions

- Contraindicated with strong 3A4 inducers
  - *Carbamazepine, oxcarbazepine, phenobarbital, phenytoin, rifampin, St. John's wort*
  - *May decrease drug levels and result in treatment failure*
- Amiodarone
  - *Serious symptomatic bradycardia with certain DAAs*
- Acid suppressive therapy
  - *May decrease drug levels and result in treatment failure with certain DAAs*

Shapiro, Karen, et al. *RxPrep Course Book*. RxPrep, Inc., 2018.

Drug Interactions

- Check all new medications
- Keep a list of medications
- Always ask about supplements and over the counter medications
- Helpful resources
  - www.hep-druginteractions.org

Ledipasvir/Sofosbuvir (Harvoni®)

- NS5A + NS5B Combination
- FDA approved October 2014
- **Dose**: Once daily with or without food
- **Genotypes:** 1, 4, 5 or 6
- **Adverse Effects:** Insomnia (3-6%), Irritability (9%), Myalgia (9%)

Lexi-Comp, Inc. (Lexi-Drugs®). Lexi-Comp, Inc.; January 10, 2018.

Ledipasvir/Sofosbuvir (Harvoni®)

- Sofosbuvir Component
  - *Serious **symptomatic bradycardia** when used in combination with Amiodarone and another DAA*
  - *Generally occurs within **hours to a few days** following administration*
  - *Risk may increase when taking other negative inotropic/chronotropic medications or patients with cardiac comorbidities*
  - *May also increase risk of myopathy with statins*

Lexi-Comp, Inc. (Lexi-Drugs®). Lexi-Comp, Inc.; January 10, 2018.

Ledipasvir/Sofosbuvir (Harvoni®)

- Ledipasvir Component
  - *Avoid or minimize acid suppressive therapy*
  - ***Antacids** – Separate by 4 hours*
  - ***H_2RAs** – Take at same time or 12 hours apart*
    Use ≤ famotidine 40 mg BID or equivalent
  - ***PPIs** – Take at same time*
    Avoid ≥ omeprazole 20 mg/day or equivalent

Shapiro, Karen, et al. *RxPrep Course Book*. RxPrep, Inc., 2018.

Ledipasvir/Sofosbuvir (Harvoni®)

- **ION-1**
- 865 treatment-naïve patients
  - *Cirrhotic patients included*
- 12 weeks vs 24 weeks treatment
- SVR was 97-99% across all study arms
  - *No difference based on length of treatment*
- No difference in cirrhosis vs no cirrhosis
  - *97% vs 98% respectively*

- **ION-3**
- 647 treatment-naïve patients
  - *Excluded cirrhotic patients*
- 12 weeks vs 8 weeks treatment
- SVR was 93-95% across all study arms
  - *No difference based on length of treatment*
- Relapse rate were higher in 8-week arm (20/431) vs 12-week arm (3/216)

AASLD-IDSA. HCV Guidance: Recommendations for Managing and Treating Hepatitis C. 2017Testing

Grazoprevir/Elbasvir (Zepatier®)

- NS3/4A + NS5A Combination
- FDA approved January 2016
- **Dose**: Once daily with or without food
- **Genotypes**: 1 and 4
- **Adverse Effects**: Elevated ALT (1%), Night sweats (2%), Insomnia (2-3%)

1. LexiComp, Inc. (Lexi-Drugs®). LexiComp, Inc.; January 10, 2018.
2. Kieh, Troy, et al. "Hepatitis C in a New Era: A Review of Current Therapies." *Pharmacy and Therapeutics* , vol. 42, no. 5, May 2017, pp. 314–330

Grazoprevir/Elbasvir (Zepatier®)

- Screening for NS5A polymorphism is recommended
- **Contraindicated** with efavirenz, HIZ protease inhibitors and cyclosporine
- Increase risk of **myopathy** with **statins**
  - *Grazoprevir/Elbasvir may increase serum concentrations of statins that are major 3A4 substrates*

Shapiro, Karen, et al. *RxPrep Course Book*. RxPrep, Inc., 2018.

Grazoprevir/Elbasvir (Zepatier®)

- **C-Edge**
- 382 treatment-naïve patients
- Genotypes 1, 4 and 6
- 12-weeks total treatment
- 92% SVR in genotype 1a
- 99% SVR in genotype 1b

AASLD-IDSA. HCV Guidance: Recommendations for, Managing, and Treating Hepatitis C. 2017Testing

Velpatasvir/Sofosbuvir (Epclusa®)

- NS5A + NS5B Combination
- FDA approved June 2016
- **Dose**: Once daily with or without food
- **Genotypes**: First DAA approved for all genotypes
- **Adverse Effects**: Headache (22%), Fatigue (15%), Nausea (9%)

LexiComp, Inc. (Lexi-Drugs®). LexiComp, Inc.; January 10, 2018.

Velpatasvir/Sofosbuvir (Epclusa®)

- **Contraindicated** in Child-Pugh Class B or C
- Velpatasvir Component
  - *Avoid or minimize acid suppressive therapy*
  - ***Antacids*** – *Separate by 4 hours*
  - ***H_2RAs*** – *Take at same time or 12 hours apart*
    Use ≤ famotidine 40 mg BID or equivalent
  - ***PPIs*** – *Use is not recommended*

Shapiro, Karen, et al. *RxPrep Course Book*. RxPrep, Inc., 2018.

Velpatasvir/Sofosbuvir (Epclusa®)

- **Astral-1**
- 624 patients with genotypes 1, 2, 4, 5 or 6
- Placebo-controlled trial
  - *12-weeks total treatment*
- 328/323 genotype 1 achieved SVR
- 120/121 cirrhotic patients achieved SVR

AASLD-IDSA. HCV Guidance: Recommendations for, Managing, and Treating Hepatitis C. 2017Testing

Glevaprevir/Pibrentasvir (Mavyret®)

- NS3/4A + NS5A Combination
- FDA approved August 2017
- **Dose**: 3 tablets once daily **With** food
- **Genotypes**: Second DAA approved for all genotypes
- **Adverse Effects**: Headache (9-17%), Fatigue (11-14%), Diarrhea (3-7%)

Lexi-Comp, Inc. (Lexi-Drugs®). Lexi-Comp, Inc.; January 10, 2018.

Glevaprevir/Pibrentasvir (Mavyret®)

- **Contraindicated** in Child-Pugh Class C
- **Avoid** co-administration with atazanavir or rifampin
- Other interactions still unknown or theorized
  - *Minor substrate CYP3A4*
  - *Inhibits BRCP/ABCG2, CYP1A2 (weak), CYP3A4 (weak)*

Lexi-Comp, Inc. (Lexi-Drugs®). Lexi-Comp, Inc.; January 10, 2018.

Glevaprevir/Pibrentasvir (Mavyret®)

- **Surveyor-1**
- Phase 2 trial; 8-week treatment
- 33/34 with SVR
  - *No virologic failures*
- **Endurance-1**
- 703 noncirrhotic, genotype 1 patients
- 8-weeks vs 12-weeks
  - *SVR 99% vs 99.7% respectively*
- Expedition-1
- 146 compensated cirrhotic patients
- Genotype 1, 2, 4, 5 or 6
- SVR of 99%
- Expedition-2
- 153 HIV/HCV co-infected patients
- Any genotype
- 8-weeks (noncirrhotic patients) and 12-weeks cirrhotic patients
- SVR of 98%

AASLD-IDSA. HCV Guidance: Recommendations for, Managing, and Treating Hepatitis C. 2017Testing

Monitoring During Therapy

- Labs
  - *CBC, SCr, hepatic function panel*
- 10x increase in ALT – discontinue therapy
- HCV viral load
  - *4 and 12 weeks after completion of therapy*

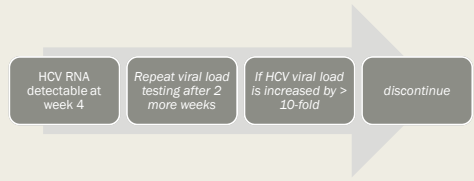
AASLD-IDSA. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. 2017

Monitoring After Response

- Sustained Virologic Response (SVR) = continued absence of detectable HCV RNA for 12 weeks for more after completion of therapy
- No advanced fibrosis – monitor as if never infected
- Assess for recurrence if ongoing risk for HCV
- Advanced fibrosis – assess for hepatocellular carcinoma twice yearly

AASLD-IDSA. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. 2017

Discontinuation from Lack of Efficacy



AASLD-IDSA. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. 2017

Monitoring After Treatment Failures

- Disease progression every 6 – 12 months
  - *CBC, INR and LFTs*
- Screening for hepatocellular carcinoma every 6 months
  - *If F3 or F4*
- Esophageal varices screening if cirrhosis present
- Evaluate retreatment options as new therapies are developed

Treatment failures

- 2nd line therapy dependent on previous exposure
- Peg-interferon or ribavirin exposure
- NS3 Protease Inhibitor exposure
- Sofosbuvir exposure
- NS5A inhibitor exposure

Genotype 1a/1b

Recommended	Duration	Rating
Treatment-Naïve Genotype 1a/1b		
Elbasvir/grazoprevir 50-100 mg*	12 weeks	I,A
Glecaprevir/pibrentasvir 300-120 mg	8 weeks	I,A
Ledipasvir/sofosbuvir 90-400 mg	12 weeks	I,A
Ledipasvir/sofosbuvir 90-400 mg**	8 weeks	I,B
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	I,A
Treatment-Naïve Genotype 1a/1b with cirrhosis		
Elbasvir/grazoprevir 50-100 mg*	12 weeks	I,A
Glecaprevir/pibrentasvir 300-120 mg	12 weeks	I,A
Ledipasvir/sofosbuvir 90-400 mg	12 weeks	I,A
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	I,A

* For Genotype 1a: Without baseline NS5A RAS for elbasvir
** For patients who are non-black, HIV-uninfected and HCV RNA level < 6 million IU/mL

Genotype 1 recap

- Similar recommendations for type 1a and 1b
- Glecaprevir/Pibrentasvir, ledipasvir/sofosbuvir, sofosbuvir/velpatasvir
  - *If NS5A RAS or unknown resistance*
- May shorten duration of ledipasvir/sofosbuvir
  - *Non-black, HIV-uninfected, HCV RNA level < 6 million IU/mL*

Genotype 2

Recommended	Duration	Rating
Treatment-Naïve Genotype 2		
Glecaprevir/pibrentasvir 300-120 mg	8 weeks	1,A
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	1,A
Treatment-Naïve Genotype 2 with Cirrhosis		
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	1,A
Glecaprevir/pibrentasvir 300-120 mg	12 weeks	1,B

Genotype 3

Recommended	Duration	Rating
Treatment-Naïve Genotype 3		
Glecaprevir/pibrentasvir 300-120 mg	8 weeks	1,A
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	1,A
Treatment-Naïve Genotype 3 with Cirrhosis		
Glecaprevir/pibrentasvir 300-120 mg	12 weeks	1,A
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	1,A

Genotype 4

Recommended	Duration	Rating
Treatment-Naïve Genotype 4		
Glecaprevir/pibrentasvir 300-120 mg	8 weeks	I,A
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	I,A
Elbasvir/grazoprevir 50-100 mg	12 weeks	IIa,B
Ledipasvir/sofosbuvir 90-400 mg	12 weeks	IIa,B
Treatment-Naïve Genotype 4 with cirrhosis		
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	I,A
Glecaprevir/pibrentasvir 300-120 mg	12 weeks	I,B
Elbasvir/grazoprevir 50-100 mg	12 weeks	IIa,B
Ledipasvir/sofosbuvir 90-400 mg	12 weeks	IIa,B

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Genotype 5 or 6

Recommended	Duration	Rating
Glecaprevir/pibrentasvir 300-120 mg	8 weeks (no cirrhosis)	I,A
Glecaprevir/pibrentasvir 300-120 mg	12 weeks (cirrhosis)	I,A
Sofosbuvir/velpatasvir 400-100 mg	12 weeks	I,B
Ledipasvir/sofosbuvir 90-400 mg	12 weeks	IIa,B

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Resistance-Associated Substitution Testing

NS5A Testing Recommended	NS5A Testing NOT Recommended
Elbasvir/grazoprevir – genotype 1a	Elbasvir/grazoprevir – genotype 1b
Ledipasvir/sofosbuvir – genotype 1a consider if treatment experienced	Glevaprevir/pibrentasvir – any genotype
Sofosbuvir/velpatasvir – genotype 3 treatment-experienced	Ledipasvir/sofosbuvir – genotype 1b
Daclatasvir plus sofosbuvir – genotype 3	Paritaprevir/ritonavir/ombitasvir ± dasabuvir ± weight based ribavirin
	Sofosbuvir/velpatasvir – genotype 1, 2, 4, 5, 6
	Sofosbuvir/velpatasvir/voxilaprevir – any genotype

Other Available Treatment Options

Single Agent Products	Combination Products
Simeprevir (Olysio®)	Paritaprevir/Ombitasvir/Ritonavir (Technivie®)
Daclatasvir (Daklinza®)	Paritaprevir/Ombitasvir/Ritonavir/Dasabuvir (Viekira Pak®)
Sofosbuvir (Sovaldi®)	Voxilaprevir/Velpatasvir/Sofosbuvir (Vosevi®)

Regimens in Special Populations

Drugs	Kidney Disease	Safety in CTP B, C
Ledipasvir/Sofosbuvir	**≥30 mL/min**	**Yes**
Dasabuvir/ombitasvir/paritaprevir/ritonavir	Used in Dialysis	No
Elbasvir/grazoprevir	**Safe in Dialysis**	**No**
Sofosbuvir/Velpatasvir	**≥30 mL/min**	**Yes**
Sofosbuvir/Velpatasvir/Voxilaprevir	≥30 mL/min	No
Glevaprevir/pibrentasvir	**Safe in Dialysis**	**No**

1. LexiComp, Inc. (Lexi-Drugs®). Lexi-Comp, Inc.; January 10, 2018.
2. Kish, Troy, et al. "Hepatitis C in a New Era: A Review of Current Therapies." *Pharmacy and Therapeutics* , vol. 42, no. 5, May 2017, pp. 316–330

Treatment Costs Based on Average Wholesale Price (AWP)

Drug	Daily Cost	12-week Treatment
Daclatasvir	$900	$75,600
Dasabuvir/ombitasvir/paritaprevir/ritonavir	$1190	$99,980
Elbasvir/grazoprevir	**$780**	**$65,520**
Ledipasvir/sofosbuvir	**$1350**	**$113,400**
Ombitasvir/paritaprevir/ritonavir	$1095	$91,983
Simeprevir	$948	$79,632
Sofosbuvir	$1200	$100,800
Sofosbuvir/velpatasvir	**$1068**	**$89,712**
Glevaprevir/pibrentasvir*	**$565**	**$47,520**

1. LexiComp, Inc. (Lexi-Drugs®). Lexi-Comp, Inc.; January 10, 2018.
2. Kish, Troy, et al. "Hepatitis C in a New Era: A Review of Current Therapies." *Pharmacy and Therapeutics* , vol. 42, no. 5, May 2017, pp. 316–330

Assisting in Cost

- Gilead Sciences offers "SUPPORT PATH" program
  - *Sofosbuvir*
  - *Sofosbuvir/Ledipasvir*
  - *Sofosbuvir/Velpatasvir*
- AbbVie offers assistance through ProCeed program
  - *Dasabuvir/ombitasvir/paritaprevir/ritonavir*
  - *Ombitasvir/paritaprevir/ritonavir*
- Other companies have similar programs
- The American Liver Foundation
  - *hepc.liverfoundation.org/resources/what-if-i-need-financial-assistance-to-pay-for-treament*

1. Kieh, Troy, et al. "Hepatitis C in a New Era: A Review of Current Therapies." *Pharmacy and Therapeutics* , vol. 42, no. 5, May 2017, pp. 316–330

Conclusion

- Importance of compliance
- Co-morbidities
- Many drug-drug interactions
- Continued education
- Refill reminders
- Be a positive resource