Gap: Screening for hepatitis C virus is suboptimal, leading to untreated patients and consequently, more advanced disease progression. This leads to higher patient morbidity and mortality and higher healthcare costs.

Learning Objective: Recognize the demographic characteristics of those at risk for hepatitis C infection and learn how to initiate screening programs in high risk areas.

Supporting Rationale

- The incidence of acute hepatitis C is growing. Reported hepatitis C infections increased from 1232 per 100,000 people in 2011 to 2436 in 2015.[1] The incidence of hepatitis C infection has also been growing in traditionally low-risk groups, including women and children. Maternal infection rates have been climbing; hepatitis C is now diagnosed in 10.1 out of every 1,000 births in Tenessee and every 22.6 of every 1,000 births in West Virginia.[2,3] Identifiying these women is particiarly important since their infants needs to be monitored for seroconversion and antibody testing.

- Despite the diverse group of patients with hepatitis C, physicians and other health care providers tend to screen the highest risk groups only. Common risk factors that previously guided screening included injection drug use, previous blood transfusion prior to 1992, hemodialysis, and birthdate between 1945-1965. However, an 8-week study of 4713 patients conducted in an urban emergency department showed by adhering to this traditional risk-based testing, hepatitis C infection would have been missed in 25% of patients.[4] The findings of this particular study imply that universal screening might be of benefit.

- Numerous studies have found that current screening for hepatitis C infection is suboptimal. One survey of baby boomers revaled that only 13.8% were screened for hepatitis C, despite the fact that this is recommended for every individual in that age group.[5] A 2014 review article estimated that only 50% of the 3.5 million individuals with chronic hepatitis C virus infection are aware of their infection.[6] A 2016 restrospective study looking at community health center showed that only 8.3% of eligible patients were screened for hepatitis C infection.[7]

- In addition to being optimal for patients, screening has been found to be cost effective.[7] By diagnosing the disesae in earlier stages prior to fibroisis, cirrhosis, hepatocellular carcinoma or other sequalae, healthcare costs are much lower.

- Barriers to screening have been shown to exist. Physician barriers to screening have been identified as lack of time, reluctance to be responsible for follow-up, forgetting to screen, and a lack of knowledge regarding screening and treatment recommendations.[8,9] Patient barriers to screening include the fear of positive results, reluctance to disclose information, lack of time, poor access to care, and lack of knowledge about hepatitis C.[8]

Gap: Among individuals who have been screened and found to be positive for hepatitis C virus, access to care and achieving recommended treatment remains suboptimal.

Learning Objective: Create a strategy for patients positive for hepatitis C virus to ensure that they have access to care, the ability to perform shared decision making, and appropriate treatment choices, assigned correctly based on genotype, and patient preference.

Supporting Rationale

- Patients diagnosed with hepatitis C virus often do not receive proper treatment for their disease. A 2014 systematic review and meta-analysis showed that of patients with hepatitis C infections, only 43% had access to outpatient care.[6] Furthermore, only 16% of these patients received treatment. In 2016, a different study looking at 4371 hepatitis C positive patients at the University of Birmingham revealed that only a third were linked to hepatitis C care.[10] By 2017, it appears that more work is still needed. A retrospective cohort from an academic center showed only 28.7% of patients with hepatitis C received antiviral treatment, while a large meta-analysis concluded that the overall treatment rate for hepatitis C is only 25.5%.[11,12]

- Many providers are not aware of the treatment protocols for chronic hepatitis C infection. While traditionally, hepatitis C was treated with interferon, the standard of care today is antiviral treatment. Drugs used include combinations of glecaprevir, pibrentasvir, sofosbuvir, velpatasvir, voxilaprevir, elbasvir, and grazoprevir. Guidelines for treatment are rapidly evolving as new research comes forth; making it paramount that physicians and other health care providers stay up to date. The first interferon sparing treatment was just approved in December of 2013. Many drug combinations exist for treatment as well, often depending on the particular hepatitis C genotype.[13]

- It is important not only to treat hepatitis C, but to treat it early. All patients with hepatitis C should be treated as the cure rate with treatment is 94-98%.[4]. The goal is sustained virologic response, defined as the absence of detectable viral RNA 12 weeks after completion of treatment. Treating hepatitis C leads to a 70% reduction in liver cancer and a 90% reduction in liver-related mortality and transplantation.[14,15] Furthermore, a delay in treatment might decrease the benefit of sustained virologic response. Waiting to treat hepatitis C until advanced liver fibrosis begins (Metavir fibrosis states F3 and F4) results in two to five times higher rates of morality compared to Metavir state F2 fibrosis.[16]

Summary of Needs Assessment

- The World Health Organization has set a goal to eliminate HCV by 2030[17]

- Hepatitis C is a growing public health issue and screening is suboptimal.

- The demographics of patients with hepatitis Care changing

- Treatment recommendations for hepatitis C infection has changed over the last five years secondary to new antiviral drug availability and physician education is needed.
- Early treatment is paramount to prevent long-term complications of chronic hepatitis C

References

1. Surveillance for viral hepatitis: United States 2015. Centers for Disease Control website. https://www.cdc.gov/hepatitis/statistics/2015surveillance/index.htm. Accessed February 5, 2018.
2. Patrick SW, Bauer AM, Warren MD, Jones TF, Wester C. Hepatitis C virus infection among women giving birth- Tennessee and United States, 2009-2014. *MMWR Morb Mortal Wkly Rep.* 2017;66(18):470-473.
3. Kuncio, DE, Newbern, EC, Johnson, CC. Failure to test and identify perinatally infected children born to hepatitis C virus-infected women. *Clin Infect Dis*. 2016;62:980–985.
4. Hsieh YH, Rothman RE, Laeyendecker OB, et al. Evaluation of the Centers for Disease Control and Prevention recommendations for hepatitis C virus testing in an urban emergency department. *Clin Infect Dis*. 2016;62(9):1059-65.
5. Jemal A, Fedewa SA. Recent hepatitis C virus testing patterns among baby boomers. *Am J Prev Med.* 2017;53(1):e31-e33.
6. Yehia BR, Schranz AJ, Umscheid CA, Lo Re V. The treatment case for chronic hepatitis virus infection in the United States: a systematic review and meta-analysis. P*LoS One.* 2014;9(7): e101554.
7. Cook N, Turse EP, Garcia AS, Hardigan P, Amofah SA. Hepatitis C virus infection screening within community health centers. *J Am Osteopath Assoc*. 2016;116(1):6-11.
8. Dietrich D. Current issues involving screening for hepatitis C virus infection. *Gastroenterology and Hepatology*. 2015; 11(11):778-780.
9. Shahnazarian V, Karu E, Mehta P. Hepatitis C: improving the quality of screening in a community hospital by implementing an electronic medical record intervention. *BMJ Qual Improv Rep.* 2015. 20;4(1): pii.
10. Franco R, Overton ET, Tamhane AR, et al. Characterizing failure to establish hepatitis C care of baby boomers diagnosed in the emergency department. *Open Forum Infect Dis*. 2016; 3(4): ofw211.
11. Lin M, Kramer J, White D, et al. Barriers to hepatitis C treatment in the era of direct-acting anti-viral agents. *Aliment Pharmacol Ther*. 2017 Nov;46(10):992-1000.

12. Vutien P, Jin M, Le MH, Nguyen P, Trinh S, Huang J-F, et al. Regional differences in treatment rates for patients with chronic hepatitis C infection: systematic review and meta-analysis. *PLoS ONE*. 2017;12(9): e0183851.
13. Halota W, Flisiak R, Juszczyk J, et al. Recommendations for the treatment of hepatitis C in 2017. *Clin Exp Hepatol*. 2017; 3(2): 47–55.
14. Morgan TR, Ghany MG, Kim HY, et al. Outcome of sustained virological responders with histologically advanced chronic hepatitis C. *Hepatology.* 2010; 52(3): 833–844.
15. Van der Meer AJ, Veldt BJ, Feld JJ, Wedemeyer H, Dufour JF, Lammert F, et al. Association between sustained virological response and all-cause mortality among patients with chronic hepatitis C and advanced hepatic fibrosis. *JAMA.* 2012;308(24):2584-2593.
16. Zahnd C, Salazar-Vizcaya LP, Dufour JF, Mullhaupt B, Wandeler G, Kouyos R, et al. Impact of deferring HCV treatment on liver-related events in HIV+ patients. In Conference on Retroviruses and Opportunistic Infections (CROI) February 23-26. Seattle, WA; 2015.
17. Eliminate hepatitis: World Health Organization [news release]. Geneva: World Health Organization Media Centre; July 27, 2017. http://www.who.int/mediacentre/news/releases/2017/eliminate-hepatitis/en/. Accessed February 5, 2018.