PRACTICES OF NURSE PRACTITIONERS IN SCREENING FOR HEPATITIS C

By

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PRACTICES OF NURSE PRACTITIONERS IN SCREENING FOR HEPATITIS C

A

PROJECT

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By

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Abstract

The purpose of this project was to determine both hepatitis C virus (HCV) screening rates and the percentage of cases diagnosed among adults born between 1945 and 1965 in a general practice clinic staffed by nurse practitioners (NPs). A descriptive study was conducted using a chart review of all patients born between 1945 and 1965 seen by NPs in a primary care clinic during a three month period of time. Data was collected on the total number of patients in the target group, those born between 1945 and 1965, as well as each patient's gender, birth date, if screened for HCV, result of screening, and the reason for screening. Findings revealed that screening rates were suboptimal, with only six out of 178 patients in the target group having been screened for HCV. Age and gender did not appear to be a factor in whether or not a patient was screened.

Practices of Nurse Practitioners in Screening for Hepatitis C

Statement of the Problem

Prevalence. Hepatitis C virus (HCV) causes significant morbidity and mortality in the United States (Campos-Outcalt, 2012) and has been declared a global health problem by the World Health Organization (WHO) (2012). Approximately 1-1.5% of the U.S. population (Campos-Outcalt, 2012) and 3% of the global population (Tran, 2012) are living with a chronic HCV infection. It is estimated there are 2.7 million to 3.9 million people in the United States chronically infected with HCV (Holmberg, Spradling, Moorman, & Denniston, 2013; Ward, Valdiserri, & Koh, 2012). During 2003–2012, the overall average annual rate of newly reported HCV infections in Alaska was 133.8 cases per 100,000 population. Rates were highest in the Gulf Coast, Anchorage/Mat-Su, and Southeast regions. By rough comparison, in 2011, the rate of newly reported HCV in six U.S. states and two large U.S. cities ranged from 36.0 to 239.2 per 100,000 population (State of Alaska Epidemiology, 2013). Only about one-third of those with HCV have been referred for care and 5% to 6% successfully treated (Holmberg et al., 2013). From 1999-2007 the number of HCV related deaths increased by 50%.

While deaths from HCV have been increasing, the numbers of new infections have decreased over the last several decades (it is thought that this is due to new blood safety and infection control measures.) The rising morbidity from HCV reflects the changing epidemiology, changing incidence, and distribution of the disease. Approximately 81% of those infected were born between 1945 and 1965, in a group commonly known as the baby boomer generation. Many have been infected for several decades and are now developing cirrhosis and hepatocellular carcinoma (Ward, Valdiserri, & Koh, 2012). Overall prevalence may be declining,

but the looming increase in mortality among the baby boomer generation is of significant concern.

Consequences. Unfortunately, from 2000 to 2007, only 4.31% of the population was screened for HCV, and among those screened 5.15% were found to be infected (Roblin et al, 2011). Additionally, in findings from a study presented at the AASLD 2013 annual Liver Meeting, it was found that 9.9% of persons born 1945-1965 tested positive for HCV (Highleyman, 2013.) Despite recent advances in HCV treatment and care, it is estimated that between 50% (Tran, 2012) and 75% (Ward, Valdiserri, & Koh, 2012) of chronically infected individuals are unaware of their status because they have never undergone testing. As a consequence of these low levels of detection, in combination with the high prevalence of HCV in the baby boomer generation, the Centers for Disease Control (CDC) (2012) put forth new recommendations regarding screening for HCV (Smith et al., 2012). In addition to screening all high risk and symptomatic patients, the CDC now recommends that all adults born between 1945 and 1965 receive a one-time screening test regardless of risk factors (see Figure 1). This is known as birth cohort screening. Additionally, the CDC recommends all persons identified as positive for HCV infection undergo a brief alcohol screening with appropriate intervention, followed by referral for care and potential treatment of HCV and its associated conditions. These recommendations add to, but do not replace, those put forth in 1998 recommending screening for high-risk patients (Smith et al., 2012).

Persons who should be tested once for HCV include:

- Adults born 1945 through 1965

Persons who should be routinely tested for HCV include those who:

- Are currently injecting drugs
- Have ever injected drugs
- Received clotting factor concentrates produced before 1987
- Were ever on long-term hemodialysis
- Have persistently abnormal alanine aminotransferance levels (ALT)
- Were notified they received a blood transfusion from a person who later tested positive for HCV infection
- Received blood, blood components, or organ transplant before July 1992
- Are infected with HIV

Figure 1. CDC Recommendations for HCV screening. (CDC, 2012)

The U.S. Preventive Services Task Force (USPSTF) released a recommendation in June 2013 that mirrors that of the CDC: screening for those at high risk of infection and a one-time screening for those born between 1945 and 1965 (USPFTF, 2013). Previously, the USPSTF recommended against testing asymptomatic adults without risk-factors for HCV. Prior to this change, Edlin (2012) reported that without a change to recommendations for routine screening, HCV-related deaths would quadruple in the next 20 years, and the benefits of birth-cohort screening would far outweigh the costs.

Complications of chronic HCV infection include liver failure, liver cancer (hepatocellular carcinoma), and death (Holmes, Thompson, & Bell, 2013). HCV is the primary cause of cirrhosis and hepatocellular carcinoma globally and the most common cause of liver disease in the United States (Lok et al., 2012). It is estimated that 50% of cirrhosis, end-stage liver disease, and hepatocellular carcinoma is the result of an HCV infection (Olson & Jacobson, 2011). It is also the leading indication for liver transplantation (Lok et al, 2012). About half of those who develop cirrhosis will die from liver-related disease. Between 8,000 and 10,000 deaths per year in the United States alone are attributed to HCV infection (Missiah, Ostrowski, & Heathcote, 2008).

Primary care includes health promotion, disease prevention, health maintenance, counseling, patient education, as well as diagnosis and treatment of acute and chronic illnesses in a variety of health care settings (American Academy of Family Physicians, 2013). Primary care providers are often the first line of defense in screening for disease, making the primary care clinic an ideal setting for HCV screening. Due to their significant role in primary care, nurse practitioners (NPs) play a vital role in screening and referral for HCV (Olson & Jacobson, 2011). Additionally, the NP is able to evaluate the newly-diagnosed patient by performing liver function tests that may reflect advanced liver fibrosis, evaluating immunity to hepatitis A and B, and evaluating for fatty liver disease or focal lesions. The NP can also counsel the newly diagnosed patient on lifestyle changes (Olson & Jacobson, 2011).

Purpose

The evidence shows that HCV has continued to be a significant health care problem in the United States and that new recommendations for birth cohort screening have been implemented to reduce morbidity and mortality (Campos-Outcalt, 2012). However, Lugtenberg,

Burgers, Besters, Han, and Westert (2011) reported that there is often a gap between guidelines and practice. They state that adherence to guidelines is often suboptimal, ranging from 52 to 95%, depending on which guideline is referenced. Voogdt-Pruis, Van Ree, Gorgels, and Beusmans (2011) found that NPs demonstrated higher adherence to guidelines than do other general practitioners. They found that 77% of NPs and 57% of general practitioners adhered to cardiovascular prevention guidelines. Although the majority of NPs followed the cardiovascular guidelines, there is limited evidence of NP adherence specific to HCV screening guidelines. However, what is known is that only 4.31% of the total population has been screened for HCV (Roblin, Smith, Weinbaum, & Sabin, 2011). In order to reduce the financial and humanitarian impact of HCV, it has been shown that interventions are needed to increase screening. However, to date, no studies have been conducted regarding whether new birth cohort screening recommendations are being implemented and improving screening rates as intended (Hoover et al., 2012; Jonckheere, Vincent, Belkhir, Wilmes, Vandercam, & Yombi, 2013). The purpose of this project was be to determine both HCV screening rates and the percentage of cases diagnosed among adults born between 1945 and 1965 in a general practice clinic staffed by NPs.

Literature Review

Disease Progression. Hepatitis C is an infection with the HCV virus, which results in liver inflammation. It is a blood borne illness most often transmitted by sharing needles or other equipment to inject drugs (CDC, 2013). Other, less common modes of transmission include administration of contaminated blood transfusions, blood products, transplant organs (seen before 1992 when HCV blood tests became available), needle stick injuries in health care settings, and being born to a mother infected with HCV. HCV cannot be spread through breast milk, food or water, saliva, or casual contact such as hugging (WHO, 2013). Tran (2012) stated

that when a person initially contracts HCV, there is roughly a 75% chance he/she will become chronically infected and a 25% chance his/her immune system will be able to eradicate the virus without medical intervention.

After exposure, most patients are asymptomatic for several weeks. When initial symptoms occur they are mild, nonspecific, intermittent, and may include jaundice, fatigue, anorexia, weakness, abdominal pain, and dark urine (Lok et al., 2012). These symptoms may appear intermittently for years, but never be severe enough to cause the patient to seek medical attention. Missiah, Ostrowski, and Heathcote (2008) stated that eventually fibrosis will develop, possibly followed by cirrhosis, hepatocellular carcinoma, and possibly liver-related death. Later symptoms are those associated with liver disease, cirrhosis, and hepatocellular carcinoma (Lok et al., 2012).

Missiha et al. (2008) stated that many patients never develop cirrhosis because of the slow progression of HCV. Most sequelae of HCV do not appear until after fibrosis of the liver develops into cirrhosis. According to Tran (2012), this often takes 20-30 years. In some individuals, the evolution to cirrhosis and eventually end stage liver disease can take up to 50 years (Missiha et al., 2008). The rate of development is, however, related to several modifiable and nonmodifiable factors. Potentially modifiable factors include alcohol consumption, co-infection with hepatitis B virus or HIV, cigarette smoking, daily cannabis use, and iron overload. Nonmodifiable factors include age at infection, duration of infection, male sex, race, genetic factors, and viral genotype (Missiha et al, 2008).

Testing. According to Campos-Outcalt, (2012) practitioners take a two-step approach to screening patients for HCV. First, patients should be tested for HCV antibodies (anti-HCV). If that result is positive, then a HCV ribonucleic acid (RNA) and genotype, also called HCV

nucleic acid, should be ordered. Depending on how it is ordered, this will provide either a quantitative viral load or a qualitative evaluation for presence or absence of the HCV virus. If the HCV RNA is negative, then the patient is among the 25% of those who were exposed, but able to eradicate the virus without medical intervention. These patients do not need any further testing or treatment. If the nucleic acid test is positive, the patient is chronically infected with HCV. This test will also determine with what genotype the patient is infected (see Figure 2).

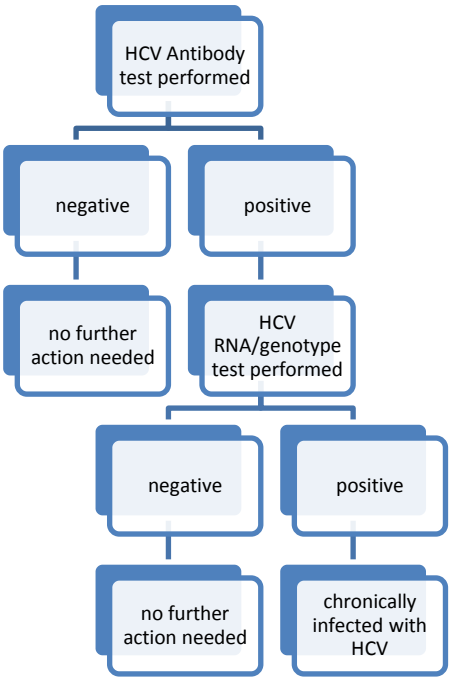

Figure 2. Recommended testing sequence for identifying current HCV infection. (CDC, 2013)

According to Heck, Dingrando, Proctor, and Cavanagh (2013), HCV antibody tests do not distinguish between current and past (resolved) HCV infections. In order to determine whether a person is currently infected, an HCV RNA test is needed. Heck et al. (2013) analyzed surveillance data reported to the CDC from eight sites in the United States from 2005 to 2011. They found that of 217,755 newly reported cases, 49.2% were antibody positive only. These

antibody positive only results were the consequence of past HCV infections that resolved (either from treatment or spontaneously), false positive results, or false negative results upon more extensive testing. Nucleic acid testing is an improved and more sensitive test for detecting HCV RNA. It allows for very small amounts of RNA to be detected by massive copying of the gene fragment.

Treatment. Campos-Outcalt (2012) state that those who are found to be chronically infected with HCV should receive appropriate referral, most often to a gastroenterologist or hepatologist, for assessment of possible chronic liver disease and potential treatment. However, before they are seen by a specialist, they should be counseled to make lifestyle changes to avoid further liver damage, such as stopping or reducing alcohol consumption, avoiding medications or herbal substances that can damage the liver, and maintaining a healthy weight. If not already immune, vaccines for hepatitis A and hepatitis B virus should be administered as soon as possible. They should also be counseled on steps to prevent transmitting HCV to others, such as not sharing items that may come into contact with blood (needles, toothbrushes, razors, nail clippers) and not donating blood, tissue, or semen. According to Tran (2012), treatment varies depending on the HCV viral genotype. HCV is a single-stranded RNA virus that infects liver cells. As a consequence of frequent viral mutations, there are more than 50 subtypes, grouped into six genotypes.

According to Mayhew (2011), HCV is usually treated by a hepatologist or gastroenterologist. The goal of treatment is sustained virologic response (SVR) and stopping the progression of fibrosis and cirrhosis. A patient has reached SVR when no HCV can be detected in his/her blood six months after completing treatment. The risk of hepatocellular carcinoma is not eliminated by eradication of HCV; however, it is greatly decreased. Treatment is typically

indicated for those who have abnormal alanine aminotransferase values, significant liver fibrosis or cirrhosis, normal renal function, are not anemic or neutropenic, and have a willingness to comply with therapy. Factors that make treatment less likely to be successful include high viral load, obesity, black or Latino race, advanced age, and high degree of liver fibrosis. Grade and stage of liver fibrosis is determined by liver biopsy.

The treatment for patients with HCV has rapidly changed in recent years. From 1998 to 2013, therapy evolved from interferon monotherapy, to peginterferon monotherapy, to peginterferon plus ribavirin, to triple therapy with peginterferon plus ribavirin plus a NS3A/4A protease inhibitor (boceprevir or telaprevir) (University of Washington, 2105). However in 2014, three new all-oral regimens were approved by the FDA: (1) ledipasvir-sofosbuvir, (2) simeprevir plus sofosbuvir, and (3) ombitasvir, paritaprevir, ritonavir and dasabuvir (AASLD/IDSA/IAS-USA, 2015). Current guidelines for treatment with these medications are jointly set by the American Association for the Study of Liver diseases (AASLD), Infectious Diseases Society of America (IDSA), and the International Antiviral Society-USA (IAS-USA.) These new all-oral regimens that are safe, highly effective, and require relatively short duration in therapy. In the United States, genotype 1 HCV accounts for approximately 70-75% of all HCV infections, followed by genotype 2 and 3. Genotype 1 infection has historically been the most difficult to treat. However, using the new direct antiviral agents released in 2014, patients with genotype 1 are now the most likely to have success with treatment, with more than 90% achieving SVR. Using current treatment guidelines SVR rates for genotype 2 are approximately 95%, and 65-80% for genotype 3 (University of Washington, 2015). However, these new treatments have a downfall. Complicating the use of these direct acting antiviral agents is the high price of therapy.

For example, the cost of the preferred regimens for treatment of genotype 1 infection range from approximately $63,000 to $300,000 (University of Washington, 2015).

Barriers to screening. Barriers to screening for HCV include lack of provider knowledge, cost, and patient resistance. Lugtenberg et al. (2011) report that the greatest barrier to screening is patient resistance. Other barriers to screening include limited time of primary care visits, awkwardness of discussing behavioral risks, and perceived poor tolerability of HCV treatments (Vuppalanchi & Kwo, 2013). Due to frequent, multiple changes in the screening recommendations for those born between 1945 and 1965, it is difficult for providers and patients to determine whether or not these tests will be covered by private insurance, Medicare, or Medicaid. A phone call to Medicaid concerning HCV screening did not result in a clear determination of coverage. It was stated that, at this time, services are not authorized and coverage is based upon medical necessity and determined at the time of billing. HCV screening is not listed under preventive and screening services on the medicare.gov website. However, at this time, birth cohort screening is a grade B recommendation by the USPFTF, and therefore coverage is mandated, without any cost sharing by the patient, by the Affordable Care Act (The AIDS Institute, 2014.) A phone call to Quest Diagnostics Laboratory reveals that the cost of an HCV antibody test with reflex, for a patient without insurance, is $139.53.

Cost. McGarry et al. (2012) conducted a five year study of the cost effectiveness of screening 100% of U.S. residents born between 1946 and 1970, excluding those previously diagnosed with HCV. It is interesting to note that the CDC (2012) screening recommendations include only screening those born between 1945 and 1965 (Smith et al., 2012). McGarry et al. (2012) assumed that all infected patients who meet treatment criteria would be treated. They estimated that of the 102 million that would be screened, 1.6 million would have positive results.

Screening costs were projected to be higher for birth-cohort screening, costing $80.4 billion versus $53.7 billion for risk-based screening. Further, McGarry et al. estimated there would less cost associated with the treatment of advanced liver disease because patients would have access to early intervention ($31.2 billion vs. $39.8 billion).

McGarry et al. (2012) compared birth-cohort screening to risk-based screening and found birth cohort screening would lead to 84,000 fewer cases of decompensated liver cirrhosis, 46,000 fewer cases of hepatocellular carcinoma, 10,000 fewer liver transplants, and 78,000 fewer HCV related deaths. The researchers concluded that when looking solely at dollar amounts, birth-cohort screening was more expensive than risk-based screening. It would cost an estimated $37,700 for every year added to a person's life; however, it was estimated that the average consumer would be willing to pay that amount. Screening could therefore be considered cost effective.

Rein et al. (2012) estimated that nearly 67 million Americans born between 1945 and 1965 visited a primary care clinic during 2006. Of these, 1.2 million were chronically infected but unaware. Almost 15 million of these people underwent antibody testing due to risk factors, and of those 135,000 were treated and 53,000 achieved SVR. A much larger number, 60.4 million people, underwent antibody testing due to birth-cohort screening, and of those 552,000 people underwent treatment, of those 229,000 achieved SVR. Approximately, 1,070,840 new cases were identified due to birth cohort screening. Although birth cohort screening saved an estimated 82,000 lives, the monetary cost is high. It is estimated that birth cohort screening, and treatment of those found to be infected increased medical costs by $5.5 billion. Additionally, productivity loss due to treatment was estimated at $6.9 billion. When looking at the cost per year added to a person's life due to detection and successful treatment of HCV, it is less

expensive when birth cohort screening is used. When compared to risk-based screening, it costs an estimated $15,700 less per year of life added.

Risks and benefits. The CDC (2012) analyzed both the risks and benefits of birth cohort screening prior to releasing recommendations. Benefits include increased focus on preventive services, regular medical monitoring, and behavioral changes for those with HCV. Early identification increases the likelihood that treatment can be initiated advanced liver disease has developed. Risks include potential adverse reactions to treatment medications, screening costs, complications associated with liver biopsy (pain, bleeding, intestinal perforation, and death), and anxiety associated with a false positive result. However, the benefits appear to outweigh the risks and birth cohort screening is expected to reduce HCV related morbidity and mortality (Smith et al., 2012).

Similar studies. Jonckheere et al. (2013) conducted a retrospective study to determine staff knowledge, screening rates, and seroconversion rates for HCV of individuals enrolled in an AIDS Reference Centre in order to determine physicians' adherence to HCV screening recommendations. They found that 87.5% of physicians reported adherence to HCV screening guidelines (to screen all human immunodeficiency virus (HIV) positive patients); however, in 2011 it was reported that only 44% of HIV infected individuals had undergone HCV screening. This may be explained by a possible response bias in using a self-report measure. When reviewing the literature, Jonckheere et al. (2013) found that there was a trend toward low adherence to hepatitis screening guidelines. Jonckheere et al. (2013) concluded that there was a need for clinics to evaluate their data and implement interventions to increase hepatitis screening, including education of clinicians.

Hoover et al. (2012) conducted a retrospective chart review analyzing hepatitis prevention in a random sample of HIV-infected men who have had sex with men (MSM) in eight HIV clinics in six U.S. cities. Charts were reviewed for evidence of screening for hepatitis A, B, and C and vaccination status for hepatitis A and B. They found that screening rates for HCV were suboptimal, with only 54% of HIV-infected MSM screening for HCV. Hoover et al. (2012) concluded that interventions are needed to increase adherence to guidelines for screening.

Methods

This is a descriptive project designed to determine HCV screening and diagnosis rates among those born 1945-1965 seen by NPs in a primary care clinic. Data was collected using a chart review of all patients born between 1945 and 1965 seen during a 3-month period of time in a primary care clinic of NPs in Anchorage, Alaska. Charts of patients seen by providers not currently employed at the clinic were excluded. Data was collected on the total number of patients in the target group, those born between1945 and 1965, as well as each patient's gender, birth date, if screened for HCV (yes, no), result of screening (positive, negative, not applicable), and the reason for screening (birth-cohort, risk-factor, symptoms, not applicable). A patient was considered screened for HCV if there is any record of history of HCV screening. A sample data collection sheet is shown in Appendix A.

Following the chart review, the educational presentation was offered to the NPs employed at the clinic. It included a PowerPoint presentation, which the NPs could review at their convenience. It outlined the prevalence of HCV among the target population, the success of available treatment options, and the results of the chart review. Additionally, the educational PowerPoint recommended that each patient be screened at check in by the front desk staff for eligibility for HCV screening. An outline of the PowerPoint presentation is shown in Appendix

B. Additionally, a handout was given to the NPs outlining the recommendations released by the CDC in 2012 (Smith et al., 2012). A sample handout is shown in Appendix C. Each participant's demographics were compiled in the data collection sheet shown in Appendix A. Participants names were not included in this spreadsheet. The original data collection sheets will be held confidential in a secure location for 3 years, after which time they will be shredded.

Data Analysis

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 21.0. Demographic variables were evaluated using descriptive statistics. Nominal-level variables (gender) were analyzed using frequencies. Interval/ratio level data (screening and diagnosis rates) are reported as percentages.

All of the available charts in the clinic were reviewed (n = 178), of which 44.9% (n = 80) were male and 55.1% (n = 98) were female. The mean age of the participants was 57.95 years (SD = 5.34), with a range of 45 to 70 years. Of the participants in the target group, 3.4% (n = 6) had been screened for HCV and 96.6% (n = 172) had not been screened for HCV, represented in Figure 3 below.

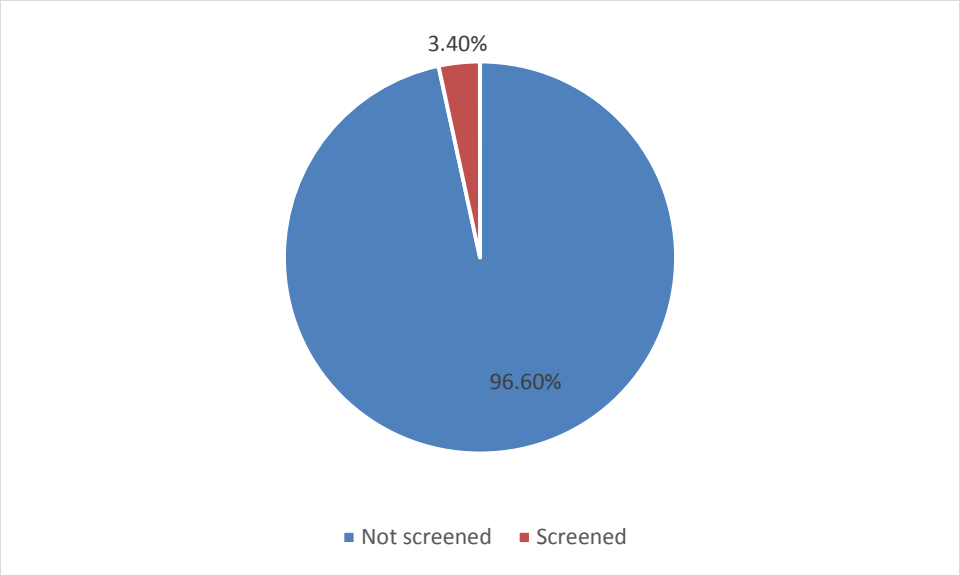

Figure 3. Percentage of patients 1945-1965 born screened for HCV (n = x).

Of the six patients screened for HCV, one patient was positive and five were negative for HCV. Gender breakdown revealed that three were male and three were female. The average age was 56.31 years old (*M* = 56, *SD* = 5.53). We were unable to determine the reason why three of the patients were screened for HCV. However, we were able to determine that two were screened due to a risk factor, and one were screened due to symptoms. No patients were screened due to birth cohort. The patient who was screened due to a risk factor was the only patient screened for HCV who tested positive.

Discussion

Screening rates for HCV in the target population, those born between 1945 and 1965, were suboptimal, with only 3.4% of patients screened. Of the six patients screened, one tested positive for HCV. Age and gender do not appear to be a factor in whether or not a patient was screened. With no patients screened due to birth cohort, it appears that the CDC (2012) guidelines for targeted birth cohort screening were not being followed. While half of the patients

were screened for unknown reasons, as the reason for screening was not documented in their chart, the overall rate of targeted birth cohort screening was subpar. The very low screening rate in this pilot study highlights the need for further research. In addition to describing screening and diagnosis rate, it would be beneficial to investigate if NPs are aware of the guidelines and the reason for non-adherence to CDC (2012) recommendations for HCV screening. Conducting a pre-test, post-test exploring whether an educational intervention affects screening rates would also be useful. Additionally, in future studies it would be helpful to evaluate screening rates among patients seen for preventive care visits.

When made aware of the results of HCV screening rates, one NP expressed that she was not surprised. She stated she knew that the percentage of patients screened would be low. When asked about birth cohort screening in her practice, one NP at the clinic stated that she was aware of the recommendations released by the CDC (2012), but that she did not routinely offer her patients born from 1945 to 1965 testing. Reasons for not screening were patients without risk factors or symptoms were unwilling to accept any risk of being financially responsible for the tests when they "knew" they didn't have HCV, and that the clinic performs many Department of Transportation physicals, and HCV screening is not required. Additionally, the NP stated that it is difficult to include all recommended screening tests given the limited time for routine physicals. She usually discusses screening tests for conditions for which a patient is at highest risk. There were several limitations of this project. Only one clinic participated in the study and it did not accept insurance, which likely reduced the screening rate. This clinic did, however, bill Medicaid. Additionally, data was not discriminated based upon the type of visit (preventive care, injury, illness, etc.) for which the patient was seen.

Outcomes & Implications

HCV causes significant morbidity and mortality in the United States. It is estimated that up to 1.5% of the US population is living with HCV (Campos-Outcalt, 2012) and that 81% of those people were born between 1945 and 1965. Additionally, an estimated 50% to 75% of infected individuals have never been screened, and are therefore unaware of their status (Ward, Valdiserri, & Koh, 2012.) Recommendations for birth cohort screening were implemented to reduce morbidity and mortality (Campos-Outcalt, 2012.) Treatment is available for HCV, but can only be offered to those patients who have been tested. Over 90% of patients with HCV genotype 1 can achieve SVR, or be "cured" with a twelve week medications, risking minimal side effects (University of Washington, 2015). Given recent advancements in treatment, screening is especially important now. This project demonstrates that screening for HCV by NPs in this study falls far below the national recommendations. By promoting awareness of and adherence to HCV screening guidelines, NPs can positively influence outcomes. By routinely screening and referring patients with HCV for treatment, NPs can reduce the prevalence of liver fibrosis, cirrhosis, hepatocellular carcinoma, and liver transplants (Lok et al., 2012.) Treatment is the hands of experts, but the path to cure starts with primary care providers.

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Appendix A

Sample Data Collection Sheet

Table A-1

Collection Sheet for Chart Review

Patient #:	Gender: Male (M)/ Female (F)	Birth date:	Screened: Yes (Y)/ No (N)	Result: Positive (P)/ Negative (N)/ Not applicable (NA)	Reason screened: Birth-cohort (BC)/ Risk-factor (RF)/ Symptoms (SX)/ Other (O)
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Appendix B

Educational PowerPoint Outline

- Guidelines for Hepatitis C screening in primary care
- the problem
- Hepatitis C virus (HCV) causes significant morbidity and mortality in the United States (Campos-Outcalt, 2012) and has been declared a global health problem by the World Health Organization (World Health Organization, 2012).
- prevalence
- From 1999-2007 the number of HCV related deaths increased by 50%.
- Although deaths from HCV are increasing, the numbers of new HCV infections have decreased over the last several decades.
- Approximately 81% of those infected were born between 1945 and 1965 (Ward, Valdiserri, & Koh, 2012).
- consequences
- Despite recent advances in HCV treatment and care, it is estimated that only between 50% (Tran, 2012) and 75% (Ward, Valdiserri, & Koh, 2012) of chronically infected individuals are aware of their status because they have never undergone testing.
- consequences
- In 2012 the CDC put forth new recommendations stating that in addition to screening all high risk and symptomatic patients for HCV, all adults born 1945-1965 receive a one-time blood test, regardless of risk factors(Smith et al, 2012).
- consequences
- Complications of chronic HCV infection include liver failure, liver cancer (hepatocellular carcinoma), and death (Holmes, Thompson, & Bell, 2013).
- Between 8,000 to 10,000 deaths per year in the United States alone are attributed to HCV infection (Missiah, Ostrowski and Heathcote, 2008).
- Significance to nurse practitioners
- Due to their significant role in primary care nurse practitioners play a vital role in screening and referral for HCV (Olson & Jacobson, 2011).
- purpose

- Due to their significant role in primary care nurse practitioners play a vital role in screening and referral for HCV (Olson & Jacobson, 2011).
- Disease progression

- Hepatitis C is an infection with the HCV virus, which results in liver inflammation.
- Initial symptoms develop several weeks after exposure and are nonspecific.
- After several years fibrosis will develop, possibly followed by cirrhosis, hepatocelluar carcinoma, and eventually liver-related death.
- testing
- First, patients should be tested for HCV antibodies (anti-HCV). If that result is positive, then a HCV nucleic acid test should be ordered.
- If the nucleic acid test is negative, then the patient was exposed, but is not chronically infected.
- If the nucleic acid test is positive, the patient is chronically infected with HCV.

- treatment
- Treatment varies depending on the genotype.
- Genotype 1 is the most common in the U.S.
- The treatment outlook for patients HCV has rapidly changed in recent years.
- In 2014 three new all-oral regimens were approved by the Food and Drug Administration (FDA) for the treatment of HCV.
  - These new all-oral regimens are more effective and much better tolerated than historical treatments.

- Treatment efficacy
- The goal of treatment is sustained virologic response (SVR) and stopping the progression of fibrosis and cirrhosis. A patient has reached SVR when no HCV can be detected in their blood six months after completing treatment.
- Multiple recent studies have shown SVR rates greater than 90% for genotype 1, 95% for genotype 2, and 65-80% for genotype 3 using current treatment guidelines

- Barriers to screening
- Barriers to screening for HCV include lack of provider knowledge, cost, and patient resistance.
- Due to frequent, multiple changes in the screening recommendations for those born between 1945 and 1965 it is difficult to determine whether or not these tests will be covered by private insurance, Medicare, or Medicaid.

- cost
- Screening costs are projected higher with birth-cohort screening.
- It is estimated there would less cost associated with the treatment of advanced liver disease.
- When looking solely at dollar amounts, birth-cohort screening is more expensive than risk based screening.
- However, birth cohort screening is estimated to save 78,000 lives.
- Risks and benefits
- Benefits include increased focus on preventive services, regular medical monitoring, and behavioral changes for those with HCV.
- Risks include potential adverse reactions to treatment medications, screening costs, complications associated with liver biopsy (pain, bleeding, intestinal perforation, and death), and anxiety associated with a false positive result.
- Results
- All of the available charts in the clinic were reviewed (n=178), of which 44.9% were male (n=80) and 55.1% were female (n=98). The mean age of the participants was 57.95 years (M=57.95, SD=5.34), with a range of 45 to 70 years. Of the participants in the target group, 3.4% (n=6) had been screened for HCV and 96.6% (n=172) had not been screened for HCV.
- Who will get this information?
- The results will be shared with the nurse practitioners who participated in the study.
- Additionally, the results will be submitted for publication in The Journal for Nurse Practitioners. The names of the patients, nurse practitioners, and clinic will be confidential.

Appendix C

HCV Education Handout

CDC Recommendations for HCV Screening

Persons who should be tested once for HCV include:

- Adults born 1945 through 1965

Persons who should be routinely tested for HCV include those who:

- Are currently injecting drugs
- Have ever injected drugs
- Received clotting factor concentrates produced before 1987
- Were ever on long-term hemodialysis
- Have persistently abnormal alanine aminotransference levels (ALT)
- Were notified they received a blood transfusion from a person who later tested positive for HCV infection
- Received blood, blood components, or organ transplant before July 1992
- Are infected with HIV

(CDC, 2013)