Improving Adherence to Hepatitis C Screening: A Pilot Project

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# Table of Contents

Abstract ................................................................................................................................. 3  
Introduction ......................................................................................................................... 4  
Literature Review ................................................................................................................ 5  
Framework ............................................................................................................................ 8  
Project Purpose .................................................................................................................. 9  
Institutional Review Board Approval .................................................................................. 10
Methodology ......................................................................................................................... 9
  - Project Design .................................................................................................................. 9
  - Population & Specific Sampling Plan ............................................................................. 9
  - Procedures ....................................................................................................................... 10
  - Measurements ................................................................................................................ 10
  - Statistical Analysis ........................................................................................................ 11
Results .................................................................................................................................. 11
Discussion ............................................................................................................................ 12
Limitations ............................................................................................................................ 13
Implications .......................................................................................................................... 14
Conclusion ............................................................................................................................. 14
References ............................................................................................................................. 16
Appendices ........................................................................................................................... 22
Abstract

Purpose: The purpose of this project was to determine whether implementing a clinical prompt reminder in the electronic medical record (EMR) would improve provider’s adherence to Hepatitis C Viral (HCV) screening per the United States Preventive Services Task Force (USPSTF) guideline.

Background: Nearly four million Americans are infected with HCV, but the majority are unaware of their status (CDC, 2012). HCV is a chronic progressive disease and is strongly associated with liver cancer and other HCV complications in untreated individuals (El-Serag, 2012). Although HCV can be cured, the lack of HCV screening makes the disease underdiagnosed and undertreated.

Methodology: A pilot project was conducted using a one group pre and post- test design without a comparison group. Pre-intervention and post-intervention data was collected by retrospective chart review. The project was conducted in three phases. In phase one, a baseline assessment of the provider’s compliance to the HCV screening guideline was conducted. In phase two, the HCV birth cohort alert was implemented into the EMR. Finally, phase three assessed whether the prompt made any difference in the provider’s screening rate.

Results: The findings showed statistically significant differences in the pre-intervention and post-intervention with a p= 0.008 (1 tailed).

Conclusions: Implementing the HCV clinical prompt reminder to the EMR had a statistically and clinically significant effect on increasing health care providers (HCPs) adherence to the recommended screening guidelines.
Improving Adherence to HCV Screening Among Primary Health Care Providers

Hepatitis C Viral (HCV) infection is the most common chronic blood borne infection in the United States (US) (CDC, 2012). Nearly four million Americans have HCV and are often not aware of their infection status (CDC, 2012). Most chronic HCV patients do not present with any symptoms until serious liver complications occur (Heidelbaug & Bruderly, 2006). In fact, chronic HCV is ranked among the top causes for end-stage liver disease and liver transplantation in the US (Shehab, Orrego, Chunduri, & Lok, 2003). The economic burden from HCV in the US is expected to exceed $1 billion per year between the years 2010 and 2019 (Shehab, Orrego, Chunduri, & Lok, 2003). Unlike hepatitis A and B, there is no vaccine available for HCV.

The prevalence of HCV in the US is highest among baby boomers born between 1945 to 1965 when compared to other age cohorts (CDC, 2012). Therefore, a one-time screening for HCV antibody regardless of symptoms or other risk factors is recommended in this birth cohort. This is a grade B recommendation and is supported by the Center for Disease Control (CDC), the United States Preventive Services Task Force (USPSTF), and the American Association for the Study of Liver Diseases (AASLD).

Unlike other chronic illnesses such as Human Immunodeficiency Virus (HIV) and diabetes, HCV is a chronic infection that can be cured. Even though HCV is curable, many studies showed that inadequate screenings by health care providers (HCPs) despite recommendations from large governing bodies make HCV underdiagnosed and undertreated. The purpose of this project was to close the gap by increasing HCV screening awareness and improving providers’ adherence to HCV screening guidelines in the baby boomer population.
Literature Review

Hepatitis C Viral (HCV) infection is highest among those who are born between 1945 to 1965 (CDC, 2012). People born during this period are five times more likely to be HCV positive compared to people born during other periods and account for 75% of HCV positive people in the U.S (CDC, 2012). As a result, the CDC and the USPSTF recommend a one-time HCV screening in this birth cohort (CDC, 2012). The USPSTF gives this screening guideline a grade B recommendation (CDC, 2012). Screening for HCV in high risk populations is also endorsed by other large governing health agencies such as the Institute of Medicine (IOM), National Institutes of Health (NIH) and the AASLD.

Although screening for HCV is recommended by many large bodies, not all clinicians adhere to screening guidelines. Many studies share similar findings concluding that primary care physicians' practices are suboptimal when it comes to HCV screening. Despite the fact HCV is curable, the low screening rates have resulted in many infected HCV individuals not being diagnosed and getting the proper treatment. Yehia et al. (2014) found although there are approximately 3.5 million people with HCV, 50% were not diagnosed and only 9% were successfully treated. In addition, it is projected that 45% of untreated HCV individuals will develop cirrhosis by 2030 (Davis et al., 2010) and in 2012, HCV was the leading cause for liver transplantation (Kim et al., 2014). Over half of HCV liver-related deaths could have been prevented if 75% of people with HCV were identified and received HCV treatment (Litwin et al., 2012). Identifying those who are infected with HCV is the first step in reducing HCV related complications and economic burden.
Birth Cohort Screening

Birth cohort screening for HCV is preferred over universal screening because of the low prevalence of HCV in the general population (Rein et al., 2012). Birth cohort screening is simple to implement and less time consuming compared to risk-based screening which has a high failure rate and has missed many infected people due to various limitations of this screening method (Asrani & Davis, 2014). Screening people born between 1945 to 1965 for HCV and referring infected individuals for treatment has many positive patient outcomes including fewer cases of cirrhosis, liver transplants, liver cancer, lower mortality and reduction in HCV transmission rates (CDC, 2012). One study showed that targeting this birth cohort has resulted in identifying 808,580 new cases of chronic HCV infection, a 75% risk reduction of liver cancer and a 30% reduction in all-cause mortality in those who received HCV treatment and later were cured (Rein et al., 2012). A one-time HCV screening in this birth cohort and getting those infected on therapy is as cost effective as cervical cancer screening or cholesterol screening and treatment (Rein et al., 2012).

Guideline Adherence & Screening Methods

Although guidelines recommend screening for HCV in high risk populations, only 59% of primary care physicians report adhering to guidelines (Shehab, Orrego, Chunduri, & Lok, 2003). Despite 59% of primary care physicians reporting adherence to HCV screening guidelines during a survey, the findings at the end of the study showed otherwise. Of 229 individuals who had HCV, only 16% of them were tested by their clinicians based on risk-based factors (Shehab, Orrego, Chunduri, & Lok, 2003). Barriers such as clinicians lack of time, knowledge, awareness, and stigmatizing has made screening for HCV using the risk-based factors difficult to use resulting in many infected
individuals not being identified (Asrani & Davis, 2014).

To increase clinicians’ screening guideline practices, a systematic review was conducted to determine whether a clinical reminder in the progress note was effective in increasing screenings. A systematic review of 51 randomized controlled trials (RCT) showed that having physician reminders whether it is a combined paper-based with computer, paper-based reminders, or fully computerized would increase preventative screening adherence on an average of 12% to 14% (Dexheimer, Talbot, Sanders, Rosenbloom & Aronsky, 2008). A meta-analysis of randomized clinical trials showed that using a physician reminder does increase the number of cervical cancer screenings and tetanus immunizations, resulting in improved provider’s preventative compliance rates (Austin, Balas, Mitchell & Ewigman, 1994). A systematic review of 98 randomized clinical trials showed that using a computerized system to integrate components of physician reminders along with a treatment plan and patient education in primary care can improve patient’s outcome and improve quality of care (Balas et al., 1996).

Having a HCV specific reminder in the progress note, increases HCV screening from 6% to 10% (Litwin et al., 2012). Drainoni et al. (2012) concluded that “A brief risk screener with a paper-based clinical reminder was effective in increasing HCV testing in a primary care setting” (p e115). A randomized study using a similar intervention showed that having an electronic reminder improved adherence to guidelines and increases Lynch Syndrome identification by 18% (Overbeek et al., 2010). Similarly, using electronic reminders to increase adherence to prenatal group B streptococcal screening guidelines showed that screening increased from 69% to 84% (MacLaughlin et al., 2014). Lastly, when electronic clinical reminders were implemented at a primary care setting
in Kodiak, Alaska, there was a significant increase in preventative screening above the national average for tobacco use, alcohol use, depression, intimate partner violence, and a comprehensive cardiovascular exam (Onders, Spillane, Reilley, & Leston, 2014).

Framework

The Iowa Model of Evidence Base Practice to Promote Quality Care was used to implement this quality improvement project. The Iowa model acts as a map for healthcare providers to successfully implement changes and affect patient outcomes (Melnyk & Fineout-Overholt, 2011). This model includes a small-scale pilot study to test the outcome of the change and is widely recognized by healthcare providers for its ease of use and applicability (Melnyk & Fineout-Overholt, 2011). The Iowa model starts by identifying a problem or “trigger”. Upon completion of the pilot study, the team will determine if changes are appropriate for adoption into practice. Once the problem is identified, the organization determines if it is a priority. If deemed a priority, a team is formed and conducts rigorous research for a pilot study. The benefit of having a pilot study is that it allows the study to be tested on a smaller scale, making it possible to modify the study as needed before implementing it on a larger scale. Specifically, this project was a pilot to determine whether the clinical prompt reminder was effective in improving providers’ adherence to HCV screening. At the end of the project, the practice owner decided to implement the clinical prompt throughout his clinic, but with some modifications specifically to avoid unnecessary screening and improve efficiency. This Quality improvement (QI) project was done using this conceptual model framework to help minimize barriers and increase chances of success.
Project Purpose

In adult patients born between 1945 to 1965, how does implementing an electronic clinical reminder to the current EMR system improve provider’s adherence to Hepatitis C Viral (HCV) screening guidelines and increase HCV diagnosis?

The purpose of this project was to improve provider’s adherence to HCV screening guidelines as recommended by the CDC and the USPSTF using a clinical prompt reminder.

Methodology

Project Design

The pilot project used a one group pre and post-test design without a comparison group.

Population and Sampling Plan

The target population in this project was four HCPs at a local family care practice clinic within a large metropolitan area in Texas. The group consisted of two medical doctors (MD), one nurse practitioner (NP) and one physician assistant (PA). All the providers work full time. The sampling was a non-probability convenience sample.

Setting

The QI project was implemented at a family practice clinic in an urban city within Texas that sees pediatric, adult and geriatric patients. The clinic accepts most commercial health insurances plans in addition to Medicaid, Medicare and the uninsured. The clinic is open Monday to Saturday. The clinic currently has a staff of one practice manager, four providers and eleven medical assistants (MAs).
Procedure

The QI project and protocols were reviewed and approved by the University of Texas at Arlington Institutional Review Board as research exempt. The project was also approved by the clinic owner to initiate the alert. Prior to implementing the intervention, the principal investigator held an educational session which included all HCPs and clinic staff. The purpose of the meeting was to introduce the QI project and inform the staff of the upcoming alert. The principal investigator provided information regarding HCV and evidence-based recommendations for screening to ensure that all the providers and staff were up to date with the recommended guidelines. A sample script of how to approach patients about HCV testing was given to HCPs and staff (see appendix D) handout of HCV facts was given and the session was interactive (see appendix E). A weekly visit to the clinic was done to ensure that the staff’s questions and concerns were all addressed during the one month implementation process.

Measurement

A pilot project was conducted to evaluate the effectiveness of the intervention. A randomized retrospective chart review was performed on 50 charts to collect pre-intervention data. Documentation of HCV screening was assessed and scored as “yes” if found and “no” if not found. In addition, patients were considered “screened” if the providers documented the screening was offered or they ordered the HCV antibody test during that visit. Patients were excluded if they were not born within the birth cohort group (01/01/1945 to 12/31/1965). The intervention time frame was one month starting from November 1st, 2016 to November 30th, 2016. Post-intervention data was collected by performing a randomized chart review on 50 charts assessing the same parameter and...
assigning the same scores.

**Implementing the Birth Cohort Alert in the EMR**

The clinic uses Eclinicalworks. After the practice owner reviewed and approved the implementation, the information technology (IT) team was contacted to initiate the alert. The IT team created an alert based on the date of birth (01/01/1945 to 12/31/1965). The alert automatically appeared for all individuals born in this birth cohort as “Hepatitis C screening due now”. To avoid repeated or unnecessary screening, the provider could suppress the alert if there was a documented HCV antibody test ordered or an established ICD 9 or 10 diagnosis code for HCV. The provider could also defer the alert and document if the patient declined the screening.

**Statistical Analysis**

The IBM Statistical Package for the Social Sciences (SPSS) version 20 was used for all data analysis in this QI project. The computation used age, date of birth and gender. Nominal data of “yes” or “no” for HCV screening was used as the measurement in this QI project. For ease of computation, a number value of 1 was assigned as yes to HCV screening and 0 as no to HCV screening. Due to the small sample size, a two tailed Fisher’s Exact Test was used for the analysis of contingency tables.

**Results**

Data was collected on 50 pre-intervention encounters and 50 post-intervention encounters. Of the 50 randomized pre-intervention encounters, 20 had received HCV screening compared to 30 who did not. Of these 50 randomized post-intervention encounters, 33 had received HCV screening compared to 17 who did not (see figure 1 in Appendix A). The proportional frequencies of pre-versus
post compliance for HCV screening were observed and tested using Chi Square with Fisher’s Exact tests. HCV testing went from 40% pre-prompt to 66% one month after the prompt was implemented. The difference between 40% screening rate and the 66% screening rate is statistically significant above 95% confidence for a $P = 0.008$. The findings showed that the Fisher’s exact chi-square test results for two-sided test, is significant at or above 98.4% confidence ($p=0.016$ two tailed). This project showed that the intervention had a significant effect on the proportion of HCV screening that was being done. Given that the two samples were intentionally randomized, it is concluded that the prompt reminder was capable of effectively changing the proportion of HCV screening from lower to higher. The higher screening rate post intervention is both clinically significant as well as statistically significant (see figure 2 & 3 in Appendix B & C).

**Discussion**

The QI project showed that a clinical prompt reminder does increase provider’s adherence to HCV screening guidelines. Prior to this QI project, the HCPs were only ordering routine health maintenance screening during an annual wellness exam. However, with the EMR prompt alert, providers were prompted to order the test when it was due instead of waiting until the annual wellness exam. This could possibly increase early diagnosis and prevent delays in care.

The results of the QI project were shared with the clinic staff. The HCPs over all felt that although the clinical prompt alert was a simple intervention, it did have a great impact on increasing awareness of the number of patients that needed to be screened. However, one provider mentioned certain patients had already had the HCV screening and he still received the alert. He suggested that the prompt could have been improved by automatically suppressing unnecessary alerts. Prior to
implementing the prompt, the idea of suppressing unnecessary alerts using ICD 9 or 10 codes and previously ordered labs had been considered. Due to database complications and time limitations, it was not implemented. Another health care provider suggested that the prompt could benefit other health care services such as vaccinations or ordering future labs. The alert could be expanded to other recommended screenings such as mammograms, colonoscopies, bone density testing, and pap smears. The four providers overall felt that the prompt was helpful in increasing HCV screening rates and the prompt could be expanded to other necessary preventative and health maintenance reminders in the general patient population.

**Limitations**

Although this project found a strong correlation between the prompt and screening rates, the interpretation of this project cannot be generalized to other health care settings due to the small sample size. The four providers were analyzed as a whole instead of each provider being analyzed individually. Theoretically, one provider could have skewed the results of the other providers. It would be necessary to analyze each provider individually in a future study. Of note, this project cannot control confounding factors such as any effects of the providers, clinic, or patient attributes such as age, education, or gender.

Another barrier to this project was the one group pre and post-test design without a comparison group. Without a control group, the result may be biased and cannot be generalized to the whole population. Finally, the project had a limited time frame. Suggestion for future research would be a larger sample, and having a control group with random assignment of subjects of longer duration to strengthen the study.
The QI project strongly supports the use of a clinical prompt to improve HCP's screening rates related to HCV. This is especially important because the mortality of HCV is now higher than HIV (Ly KN et al., 2012). This is a problem because HCV is mostly a silent disease where the majority of people do not present with any symptoms. Although HCV is curable, many studies show that people with HCV are not being diagnosed in order to receive treatment (Yehia et al., 2014). Infected individuals can end up with severe liver damage and death if left untreated (Litwin et al., 2012). The benefit of having a clinical prompt has been shown to encourage HCPs to improve screening. Increased HCV screening could possibly lead to more patients being diagnosed and an increased cure rate. The prompt could also reduce the number of potential negligent lawsuits from patients who develop cancer related to HCV as a result of providers failing to follow the recommended screening guidelines. The clinical prompt benefits in many ways and could be expanded to other routine health maintenance care.

Findings of a statistically significant difference that is higher in the post interventional group is an important clinically significant finding of this project. The QI project showed that implementing a clinical prompt to the EMR encourages screening for HCV in a private primary care clinic. The project showed that the prompt was feasible and effective in increasing the number of patients who received HCV testing. Although the prompt was helpful, providers felt that the prompt could be more tailored to avoid redundant prompts for already screened patients. The use of a clinical prompt has great potential in improving patient care and outcomes and could be expanded to other health care
services. The finding in this project demonstrated both statistical and clinical significance of having a clinical prompt alert in increasing provider’s adherence to the HCV screening guideline.
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IMPROVING ADHERENCE TO HCV SCREENING


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doi:10.1197/jamia.M2555


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IMPROVING ADHERENCE TO HCV SCREENING


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http://uta.summon.serialssolutions.com/2.0.0/link/0/eLVHCXMw3V3Nb9MwFLe6XUBCaIvxh

Appendix A

Table 1

Pre-test and Post-test Contingency Table

Pre vs Post Intervention Group & Hepatitis C Screening Crosstabulation

<table>
<thead>
<tr>
<th>Count</th>
<th>Hepatitis C Screening</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no</td>
<td>yes</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Pre vs Post Intervention Group</td>
<td>Pre Intervention</td>
<td>30</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Post Intervention</td>
<td>17</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>53</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix B

### Table 2

**Fisher's Exact Test Table**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>6.784</td>
<td>1</td>
<td>.009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>5.781</td>
<td>1</td>
<td>.016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>6.865</td>
<td>1</td>
<td>.009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.016</td>
<td>.008</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- a. 0 cells (0.0%) have expected counts less than 5. The minimum expected count is 23.50.
- b. Computed only for a 2x2 table
Appendix C

Table 3

Bar Graph

![Bar Chart]

Hepatitis C Screening

- Pre vs Post Intervention Group

- Pre Intervention:
  - Count: 30
  - Percentage: 30.00%
  - Count: 20
  - Percentage: 20.00%

- Post Intervention:
  - Count: 33
  - Percentage: 33.00%
  - Count: 17
  - Percentage: 17.00%
Talking to Patients about Hepatitis C Testing

You may wish to present the hepatitis C test as simply one in a set of routine tests conducted to assess general health. The following script was designed to help facilitate a discussion about hepatitis C testing.

<table>
<thead>
<tr>
<th>indicate the rationale for the test</th>
<th>The Centers for Disease Control and Prevention (CDC) now recommends that people your age be tested for hepatitis C.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>Hepatitis C is a virus that can cause gradual, progressive liver damage. People can have the infection for many years – even decades – without knowing it. Many people have no symptoms, so getting a blood test is the only way to know if you have hepatitis C.</td>
</tr>
<tr>
<td>Reassure patient about the value of the HCV test</td>
<td>The antibody test will help you find out if you have been exposed to the virus at any time in your life.</td>
</tr>
<tr>
<td>Obtain consent</td>
<td>If it is all right with you, I would like to test you for hepatitis C today.</td>
</tr>
</tbody>
</table>
**HEPATITIS C**

**General Information**

**What is hepatitis?**

"Hepatitis" means inflammation of the liver. The liver is a vital organ that processes nutrients, filters the blood, and fights infections. When the liver is inflamed or damaged, its function can be affected.

Heavy alcohol use, toxins, some medications, and certain medical conditions can cause hepatitis. However, hepatitis is most often caused by a virus. In the United States, the most common types of viral hepatitis are Hepatitis A, Hepatitis B, and Hepatitis C.

Most people who get infected with the Hepatitis C virus develop a chronic, or lifelong, infection.

**What is Hepatitis C?**

Hepatitis C is an infection of the liver that results from the Hepatitis C virus. **Acute** Hepatitis C refers to the first several months after someone is infected. **Acute** infection can range in severity from a very mild illness with few or no symptoms to a serious condition requiring hospitalization. For reasons that are not known, about 20% of people are able to clear, or get rid of, the virus without treatment in the first 6 months.

Unfortunately, most people who get infected are not able to clear the Hepatitis C virus and develop a chronic, or lifelong, infection. Over time, **chronic** Hepatitis C can cause serious health problems including liver disease, liver failure, and even liver cancer.

**How is Hepatitis C spread?**

Hepatitis C is usually spread when blood from a person infected with the Hepatitis C virus enters the body of someone who is not infected. Today, most people become infected with Hepatitis C by sharing needles, syringes, or any other equipment to inject drugs. Before widespread screening of the blood supply in 1992, Hepatitis C was also spread through blood transfusions and organ transplants. While uncommon, poor infection control has resulted in outbreaks in healthcare settings.

While rare, **sexual** transmission of Hepatitis C is possible. Having a sexually transmitted disease or HIV, sex with multiple partners, or rough sex appears to increase a person's risk for Hepatitis C. Hepatitis C can also be spread when getting tattoos and body piercings in unlicensed facilities, informal settings, or with non-sterile instruments. Also, approximately 6% of infants born to infected mothers will get Hepatitis C. Still, some people don't know how or when they got infected.

**What are the symptoms of Hepatitis C?**

Many people with Hepatitis C do not have symptoms and do not know they are infected. If symptoms occur, they can include fever, feeling tired, not wanting to eat, upset stomach, throwing up, dark urine, grey-colored stool, joint pain, and yellow skin and eyes.

**When do symptoms occur?**

If symptoms occur with acute infection, they can appear anytime from 2 weeks to 6 months after infection. If symptoms occur with chronic Hepatitis C, they can take decades to develop. When symptoms appear with chronic Hepatitis C, they often are a sign of advanced liver disease.

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Continued on next page
How would you know if you have Hepatitis C?

The only way to know if you have Hepatitis C is to get tested. Doctors use a blood test, called a Hepatitis C Antibody Test, which looks for antibodies to the Hepatitis C virus. Antibodies are chemicals released into the bloodstream when someone gets infected. Antibodies remain in the bloodstream, even if the person clears the virus.

A positive or reactive Hepatitis C Antibody Test means that a person has been infected with the Hepatitis C virus at some point in time. However, a positive antibody test does not necessarily mean a person still has Hepatitis C. An additional test called a RNA test is needed to determine if a person is currently infected with Hepatitis C.

Can Hepatitis C be treated?

Yes. However, treatment depends on many different factors, so it is important to see a doctor experienced in treating Hepatitis C. New and improved treatments are available that can cure Hepatitis C for many people.

How can Hepatitis C be prevented?

Although there is currently no vaccine to prevent Hepatitis C, there are ways to reduce the risk of becoming infected with the Hepatitis C virus.

- Avoid sharing or reusing needles, syringes or any other equipment to prepare and inject drugs, steroids, hormones, or other substances.
- Do not use personal items that may have come into contact with an infected person’s blood, even in amounts too small to see, such as razors, nail clippers, toothbrushes, or glucose monitors.
- Do not get tattoos or body piercings from an unlicensed facility or in an informal setting.

For more information

Talk to your health professional, call your health department, or visit www.cdc.gov/hepatitis.