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# Improving Hepatitis C Treatment Through a Structured Telehealth Process

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**Title:** Improving Hepatitis C Treatment Through a Structured Telehealth Process

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Abbreviations: HCV = Hepatitis C Virus; US = United States; EHR = Electronic Health Record;  
EOC = Episodes of Care; TeleHep C = Telehealth Hepatitis C Program



**Abstract**

The number of individuals infected with the hepatitis C virus (HCV) in the United States (US) continues to rise with nearly 2.4 million Americans infected in 2016. Recent hepatology guidelines have simplified screening, monitoring, and treatment guidelines for HCV, including recommending treatment of all infected individuals who are not nearing end of life. Despite changes to recommendations and simplified treatments, patients continue to face barriers accessing care, especially as the US faces the COVID-19 pandemic. A doctorate nursing student took this opportunity and evaluated practices within a comprehensive adult primary care clinic to develop and implement telehealth delivery of hepatitis C treatment. A new workflow was developed along with advanced tracking of patients within the electronic health record (EHR); therefore, improving tracking of patient treatment course and status. From consult to the HCV team to completion of treatment with confirmation of cure, episodes of care (EOC) allowed for adequate tracking of patient status. A 60-minute provider education session on the EHR process showed significant ( $p < 0.05$ ) improvement in understanding. Evaluation of process adherence for four months, and 25 patients, showed an average 79% adherence to process with accurate tracking of patient treatment status during HCV treatment. Tracking adherence reflected both new and returning patients.

**Conclusion:** Initiation and completion of HCV treatment is possible through telehealth visits with proper provider training and workflow process. This is important to note when considering expansion of HCV treatment within and outside organizations to increase overall access to treatment and achievement of cure.

In 2016, nearly 2.4 million Americans were living with a hepatitis C infection. With 51% of individuals unaware of infection, however, this number could be as high as 4.6 million <sup>(1)</sup>. The rates of hepatitis C infection continue to rise with a four-fold increase between 2010 and 2018 <sup>(1)</sup>. The groups at highest risk for infection include individuals in their 20s and 30s, and individuals with injection drug use <sup>(1)</sup>. The long-term effects of untreated hepatitis C are serious and include: cirrhosis, hepatocellular carcinoma, and hepatic decompensation which is the leading cause of liver transplants in the United States. In 15-20% of infected individuals, hepatitis C results in death <sup>(1)</sup>. While there is no vaccine for hepatitis C, over 90% of individuals infected can be cured with 8-12 weeks of oral therapy, further highlighting the importance of timely diagnosis and targeted intervention <sup>(1)</sup>.

Individuals with hepatitis C are often unaware of their seropositive status, resulting in delayed care. Since the infection is often asymptomatic, healthcare providers need to provide proactive, routine screening to at-risk groups to increase identification rates and offer intervention <sup>(1)</sup>. The screening and treatment gap continued to widen during the COVID-19 pandemic when access to care and resources were limited. Due to the COVID-19 pandemic and isolation precautions, clinics are increasingly utilizing telehealth for management of patient care <sup>(2)</sup>.

Evidence-based treatment guidelines in hepatitis C along with telehealth programs were evaluated to bridge the gaps in treatment, expand access to treatment, and improve rates of treatment completion. Based on telemedicine and hepatology recommendations, the team devised a process for delivering a telehealth hepatitis C program (TeleHep C) along with supporting documentation templates <sup>(3,4)</sup>. Additionally, we created education materials for

efficient and effective utilization of the EHR. We aimed to implement processes and trainings to improve provider use of telehealth to screen, treat, and track individuals with hepatitis C. Reducing barriers to care through telehealth, along with improved tracking of patients, was expected to increase the number of individuals treated while reducing the number of patients lost to care.

## **Methods**

### *Setting and Participants*

The process improvement project took place in a General Internal Medicine clinic located in Portland, Oregon. A microsystem assessment within the clinic showed a need to improve tracking of hepatitis C patients. Less than 40% of patients had a seropositive lab to match their diagnosis. The results identified a gap in tracking of patients' diagnoses or treatment, and a need for an improved process, especially as care was being transitioned to a telehealth format. Participants across a multidisciplinary team were identified for the TeleHep C project. Recruitment of these participants occurred through stakeholder meetings involving all members in the primary care clinic who treat or manage care of hepatitis C seropositive patients. The providers included: three doctors, a nurse practitioner, a licensed practical nurse, two medical assistants, and a pharmacist, totaling eight participants. Participation in the project was voluntary; any member who denied interest was excluded. All eight members of the care team chose to participate.

### *Intervention*

The project consisted of several stages of intervention: preparation, education, and activation. The team began by evaluating existing clinic processes for patients receiving hepatitis C treatment. The evaluation allowed for understanding of clinic culture, dynamics, and workflows which informed creation of a standardized telehealth process. Episodes of care (EOC), is a mechanism in which the EHR captures a single treatment course. Once activated, tracking forms populate within the EOC, and each subsequent encounter, whether telephone, virtual, or in-person is linked to the EOC. The EOC was identified as a reliable mechanism for patient tracking, and was currently utilized in other clinics within the organization, further aligning practices. The next step of the preparation stage included evaluating existing documentation templates and education materials available for patients with hepatitis C. New documentation templates and patient education materials were then created to provide consistency. The last step of the preparation stage was creation of a TeleHep C workflow for the interdisciplinary team utilizing identified processes and documentations (see Figure 1). The workflow was reviewed with participants for approval prior to distribution. Critical to this stage was integration of informatics staff who supported the team through modifications of the EHR.

During the education phase of the intervention, the project lead provided a 60-minute virtual education session to participants, demonstrating skills with opportunity for the providers to practice. There was a total of three education sessions offered to accommodate provider schedules. Each provider was provided a stepwise, illustrated manual demonstrating creation and management of EOCs and utilization of the data gathering tool within EHR. Additionally, providers were given a patient within a training EHR to practice skills and demonstrate proficiency. Training materials and resources were subsequently uploaded to a shared

communication platform where participants could continually access during and after project implementation.

The activation phase occurred after initiation of the new workflow, and the implementation of EOCs. The project lead gathered data every 4 weeks of intervention and reported back to providers at their monthly meeting. Discussions regarding ongoing barriers, triage of issues, and creative team problem solving occurred during these meetings between interdisciplinary teams. The discussion addressed what was going well to achieve improved patient tracking and identified gaps requiring change in practice. At the end of the project period, a provider champion was identified to continue activation and sustain adherence rates.

#### *Data Collection and Measures*

To assess processes, the team evaluated data entered by the providers into an episode of care at specific times in a patient's treatment. Specific information was expected to be included in the EOC at 0, 2, 4, 8, and 12 weeks of treatment. Information entered in the EOC was expected to align with the patient's current progress in treatment. The goal was to achieve 75% accuracy across all EOCs created during 16 weeks of intervention. Assessment of process was completed using an evaluation tool with expected milestones for patients at initiation of treatment, 2, 4, 8, and 12 weeks into treatment. Each EOC was compared to standard expectations for completeness to assure providers were updating patient information accurately and timely. Information not included at expected timeframes, was considered missing data, and reduced adherence rate. If a patient was in-between milestones, the previous one was used as the standard since they would not yet have achieved the subsequent milestone.



Two outcome measures were evaluated through the project: 1) participants' understanding of the EHR and ability to create episodes of care; and 2) participants' confidence in the treatment process to improve patient outcomes. To gather information from participants, questionnaires were administered prior to and after training sessions. The questionnaire included 5 questions, rated on a Likert-type scale from 1 to 5, with answers ranging from completely disagree to agree, indicating provider's competence and confidence. The goal was to achieve statistically significant improvement of participants' understanding, ability, and confidence in telehealth care for treatment of hepatitis C. After the training, the project lead manually verified whether each provider was able to successfully create an EOC on their provided practice patient.

### **Data Collection and Data Analysis**

To assess the project's process measure, aggregate data was gathered and overall percentage of completion was recorded at identified intervals. Percentage of completion, captured monthly, was compared at the end of 16 weeks to determine accuracy in completing episodes of care over time. Access to data regarding episodes of care was available in the EHR through generated reports triggered by initiation of EOC. Manual verification of EOC data compared to the expected standard represented adherence percentage. Outcome measures were evaluated utilizing a Wilcoxin Signed-Rank test to determine overall progression of understanding, ability, and confidence in participants after provided training. Provider's creation of episodes of care in the training environment and linking of the HCV form to track patient data indicated proficiency.

### *Ethical Approval*

Approval for the quality improvement project was granted by the hosting organization and the project lead's school of nursing. Both institutions' IRB exempted the project since it did not involve human subjects.

## **Results**

A Wilcoxin Signed-Rank test was completed to compare ordinal non-parametric data from pre- and post-test distributed to participants during the education phase. Results showed significant improvement in scores, with  $p < 0.05$  (see Table 1). Providers were asked to rate the likelihood of utilizing the new workflow on a Likert scale ranging from 1-10 where 1 indicated not likely at all and 10 indicated very likely. The mean score was 9.63 (SD = 0.77). Provider proficiency was verified manually by reviewing patient charts within practice EHR, which showed that seven out of 8 providers were able to create an EOC and link a HCV form. Adherence to TeleHep C workflow averaged 79% over four months, with each month's adherence improved from prior, except for month four (see Table 2). Evaluation of process adherence based on patient's time in treatment, demonstrated variable data; however, typically a longer duration in treatment indicated improved adherence compared to start of treatment (see Table 3).

## **Discussion**

Significant improvement in test scores after the education sessions demonstrated impact of education on providers understanding on EOC, and also the need for change in current practices. One provider was not able to demonstrate proficiency of the process in the practice environment, due to issues related to remote access to EHR, and inability to access the practice environment. They were able to verbalize the steps, and later on in the project, demonstrate the skills; however, since demonstration was not completed at the time of education, their results were

excluded. A mean utilization rating of 9.63 indicated high likelihood of providers implementing the workflow into practice.

Providers achieved the set goal of 75% adherence to process measured at each month. Month one through three showed increased percentage of adherence as the number of patients increased as well. Notable is the decrease in adherence rate in month four. The decrease in percentage was likely related to the addition of patients from rural Oregon, which is not a typical population for this clinic. Additionally, the process was designed for internal referrals from primary care providers within the clinic, and did not account for external referrals. As external referrals were received, they often were scheduled outside of the TeleHep C team, which bypassed steps of the workflow leading to gaps in information entered in EOCs. Gaps in adherence were most often related to missing dates within the EOC form, such as the assessment date, treatment start dates, and treatment end dates. Reminders during monthly meetings in the activation phase assisted in improving adherence in date entry within the EOC form.

Review of the process adherence based on weeks in treatment showed the highest percentage at weeks 2 and 8 of treatment. Contributing factors were multidisciplinary contact with patient at those times, including medical provider, medical assistance, nurses, and pharmacist. Each of these individuals had an opportunity to update the EOC during their contact with the patient, contributing to higher completion rates. Compared to initiation of treatment at 0 weeks, where the data entry is dependent on one person to initiate the EOC and attach the HCV tracking form. It is unclear as to why individuals 4 weeks in treatment would have a lower adherence rate than 2

and 8 weeks. A suspected cause is the increase in the amount of data required to be entered in the form, leading to missed opportunities. While data points were missed, overall adherence at 4 weeks was above the 75% goal. At 12 weeks, adherence was lower related to the need for follow through for completion of treatment. Patients could be lost to follow-up, discontinue treatment, or fail treatment leading to incomplete forms. Despite areas for growth, providers improved their ability to track patient progress at various points of treatment course to above 75% adherence.

### *Limitations*

There were a few limitations to this process improvement project. The first was limited data on patients prior to intervention. While the project lead had overall population data on Hepatitis C patients treated within the clinic, additional data points on treatment would strengthen the post-intervention analysis. Second, while post-education data showed improvement in provider knowledge, there was not enough time dedicated to the session. Virtual group sessions limited individual directed learning, and the project lead's ability to tailor to different level of learners. Multiple pauses within the session for questions and further demonstrations led to the session running over allotted time, and the project lead rushing through the end of the session. Several providers had limited ability to practice utilizing the data analytics tool as they did not have adequate access within the EHR. Lastly, since the project lead was not on-site during implementation, there was less contact with providers to continue to remind, reassure, and assess support needs in a timely manner. Most issues were resolved during monthly meetings, which left providers frustrated at times for weeks over an issue within the EHR.

### *Recommendations*

For future practice and potential duplication of this work, there are several recommendations. First would be more time dedicated to teaching sessions and potential individual sessions depending on group size. Increased time and individualized sessions would allow for the program lead to provide directed learning and tailor information to providers to assure optimal benefit from session. Prior to education sessions, the project lead should assure that providers have access to the technology and tools required. Access assures optimal use of time, decreased frustration related to barriers, and allows for proper demonstration of skills. Check-ins at regular, shorter intervals, potentially weekly would allow for timely feedback to providers, and if there are issues in workflow, timely adaptations. Delay in updates or corrections could lead to patterns of practice which may be difficult to modify. Next, when considering workflow, interdisciplinary members should be involved at initiation of care. Increased support for each other allows for accountability among members, which can in turn increase adherence. Lastly, in clinics within organizations, process should be designed for internal referrals, and also external referrals. The availability of different pathways to initiate EOCs, with interdisciplinary support will reduce missed opportunities.

At completion of the project, results showed that virtual education sessions are successful in teaching providers updates related to utilization of an EHR. After education sessions, the implementation of a standardized workflow utilizing information taught, was effective in increasing patient tracking to greater than 75%. For future organizations, early involvement of multidisciplinary teams, informatics supports, and longer education sessions would ensure a more efficient project implementation and success of workflow adherence. Overall, the project

lead with above implementation processes was able to achieve improved patient tracking; thus, would recommend intervention for future clinics with similar staffing and EHR access.

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Addendum:

Table 1: Assessment of Participants Pre/Post

<b>Question</b>	<b>Pre-Training (Avg.)</b>	<b>Post-Training (Avg.)</b>	<b>p value</b>
I Understand the purpose and function of episodes of care	2.3	4.62	.026*
I have the knowledge I need to utilize episodes of care in the electronic health record	3	4.37	.026*
I have the knowledge I need to utilize data analytic tools available to me in the electronic health record	2.5	4.25	.017*
Our current processes allow for proper tracking of patients through their hepatitis C treatment	2.75	3.87	.024*

Note: Answers were scored on Likert type scale where 1 indicated completely disagree, up to 5 completely agree. Providers were given test before and after 60-minute training session on episodes of care. \*p<0.05 = significant

Table 2: Process Adherence Overall

<b>Weeks of Intervention</b>	<b>Number of Patients</b>	<b>Avg %</b>
4	3	79.47%
8	8	82.36%
12	7	82.41%
16	7	71.56%
Total	25	79%

Note: Data shows the number of new and established patients seen in clinic at 4-week intervals of process intervention. Average percentage illustrates provider adherence to data entry and tracking of patients in episode of care



Table 3: Process Adherence by Weeks in Treatment

<b>Weeks in Treatment</b>	<b>Number of Patients</b>	<b>Avg % of Adherence</b>
0	6	58%
2	7	93%
4	8	78%
8	1	92%
12	3	86%

Note: Data shows percentage of adherence to data entry into episodes of care by providers based on patient's weeks in treatment at time data was gathered