Poster #546

Development of an Electronic Medical Record (EMR) Based Algorithm to Place Patients in the HCV Care Cascade

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Background

- Hepatitis C virus (HCV) is the most common blood-borne infection in the United States, Centers for Diseases Control (CDC) estimates 2.7 – 3.9 million chronic cases, it is the leading cause of cirrhosis, hepatocellular carcinoma, and liver transplant
- With the release of multiple highly effective, well tolerated direct- acting antiviral agents (DAA) against hepatitis C virus there is an opportunity for a cure if effective and efficient care engagement could be realized
- Disease specific care cascades have become important public health and organizational tools to characterize gaps in care, drive process improvement, and target resources; however their construction can be laborious and to be useful for ongoing process improvement they need to be continuously maintained
- We sought to create an algorithm to electronically derive an individual's location in the HCV care cascade from data available in the electronic medical record (EMR) from a single hospital
- We describe the development of an EMR-based algorithm to identify patients with known HCV infection and classify them by their stage in the HCV care cascade
- We report the algorithm's performance, future applications, and its potential applicability in other institutions

Methods

- We included all new institutional diagnoses, defined as patients with a first HCV antibody positive (Ab) test from 2013 to 2015 with positive or no confirmatory testing.
- Patients with HCV Ab+ tests prior to 2013 and those with negative confirmatory testing were excluded
- We included 5 milestones in the cascade including: positive HCV Ab, HCV RNA testing, linkage to care defined as an outpatient visit with a HCV provider, prescribed treatment, and sustained virologic response (SVR) (Table 1)
- An initial algorithm was developed to categorize patients into each stage of care.
- A manual review of the initial model identified signals for patients who may have been receiving care from outside physicians
- The final algorithm (Figure 1) was then applied to all included patients
- To evaluate accuracy we created a reference standard to replicate a clinician's review of the chart
- A single researcher without access to the algorithm performed the reference standard review on a random sample of 129 patients

Results

- The algorithm identified 1225 patients with a new institutional diagnosis of HCV infection
- 711 (58%) patients with a detectable HCV RNA, 330 (27%) patients linked to care, 100 (8%) patients prescribed treatment, and 39 (3.2%) reached SVR (Figure 2)
- The algorithm correctly categorized 117 of 129 (90%) patients compared to 126 of 129 (98%) for the reference standard
  - 6 of 12 (50%) errors related to documented care by outside HCV providers
  - 4 of 12 (33%) errors related to care provided at an affiliated institution

Results (cont.)

Stage of Care	Description	Definition
1	Diagnosed	Positive Hepatitis C Antibody
2	RNA Viral Load	Positive Hepatitis C Quantitative or Qualitative Viral Load
3	Linked to Care	1) Outpatient appointment with an Infectious Disease or Gastroenterology provider after the diagnosis of Hepatitis C 2) Any patient prescribed HCV therapy
4	Prescribed Treatment	1) Prescription for any medication used to treated Hepatitis C 2) Any patient linked to care who reached Sustained Virologic Response (SVR)
5	Sustained Virologic Response	Negative HCV Viral Load >12 weeks after expected completion of therapy

Table 1: 5 Stages of the Electronic HCV Care Cascade with associated definitions

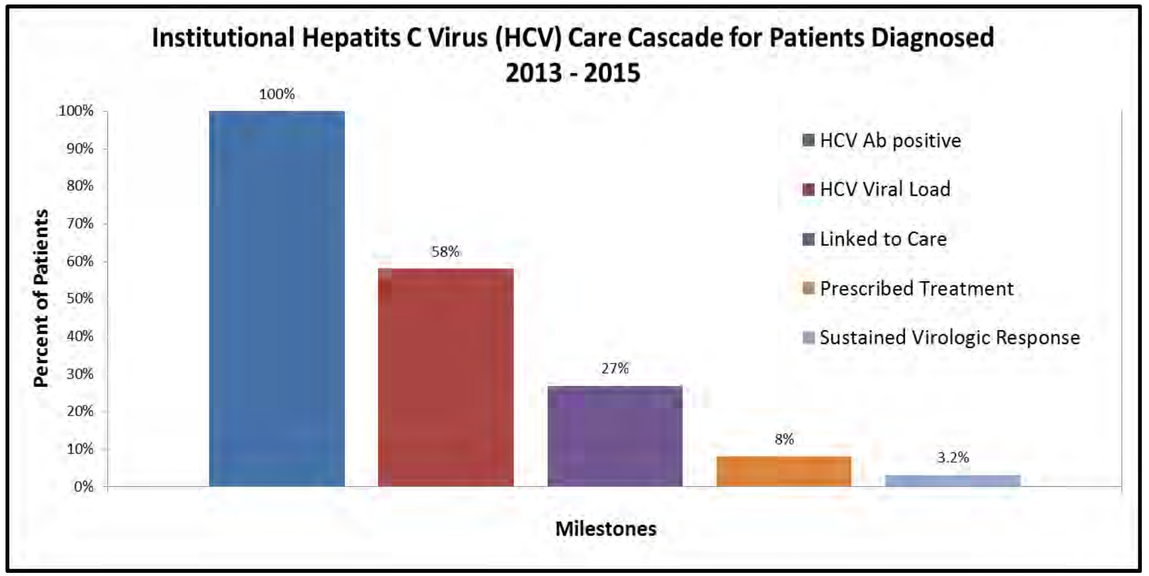


Figure 2: Hepatitis C Virus Care Cascade for New Institutional Diagnosis 2013 - 2015

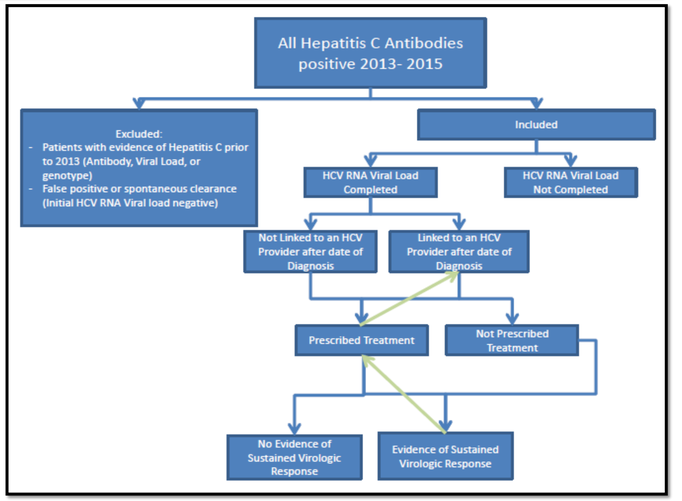


Figure 1: Algorithm for the HCV Care Cascade
Blue arrows are based directly off information obtained in the EMR while green lines are assumptions based on information obtained in the EMR

Conclusion

- Using commonly available data from an EMR, our algorithm has a high accuracy for placing individuals in the HCV care cascade, and identified significant gaps at each step of the care cascade at our institution. An electronic care cascade provides a method to readily measure and monitor performance in HCV treatment and care over time

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