Cost Effectiveness Analysis of Hepatitis C Virus Treatment at the San Francisco Veterans Affairs Healthcare System

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Background

In the United States, veterans using the Veterans Affairs (VA) healthcare system are approximately two times more likely to be chronically infected with the Hepatitis C Virus (HCV). While Hepatitis C can be cured by achieving Sustained Viral Response (SVR), the medications used have caused much controversy due to their high prices and side effects. Little is known about the cost-effectiveness of older treatment regimens compared to newer, IFN-free regimens at the VA healthcare system. Obtaining this knowledge will allow the VA to make more informed decisions on treatment standards of Hepatitis C.

Objective

This study aimed to examine the cost effectiveness of available Hepatitis C treatment options from 1991-2018 in patients receiving care at the San Francisco VA healthcare facility.

Methods

- De-identified data was collected from electronic medical records from 440 patients diagnosed with Hepatitis C at the San Francisco Veterans Affairs Healthcare Facility from 1991-2018.
- Two computer based decision models were created: one adopting the provider perspective and one adopting the societal perspective.
- Model inputs: treatment (older, IFN containing regimens or newer, IFN-Free regimens), SVR rates, mortality rates, genotype status, cirrhosis rates, cost of medication, cost of adverse effects of treatment, cost of treatment failure, and cost of patients with untreated Hepatitis C.
- Output from the provider perspective model consisted of the incremental cost effectiveness ratio (ICER) for cost per patient cured. Model output from the societal perspective model is ICER of cost per life year gained. Sensitivity analysis was performed to determine the robustness of the model.

Sample Characteristics

Table 1: Patient Characteristics

Characteristics	N (%)
Overall	440
Sex	
Male	415 (94)
Female	25 (6)
Ethnicity	
Caucasian	248 (56.4)
African American	117 (26.6)
Latino	50 (11.3)
Asian or Pacific Islander	7 (1.58)
Native American	18 (4)
Genotype	
Genotype 1	304 (69.1)
Genotype 2	54 (12.7)
Genotype 3	50 (11.3)
Genotype 4	4 (0.91)
Mixed	3 (0.68)
Liver Cirrhosis Rates	
Diagnosis of Cirrhosis	140 (31.8)
Hepatocellular Carcinoma	
Diagnosis of HCC	49 (11.1)
Recorded History of Illicit Drug Use (IDU)	
Recorded IDU	322 (73.2)
Recorded History of Alcohol Use	
Recorded Alcohol Use	283 (64.3)
Psychiatric Illness Diagnosis	
Any Psychiatric Illness Diagnosis	262 (59.5)

Cost Effectiveness Outcomes

Table 2: Summary of cost effectiveness from the societal perspective

Treatments	Costs ($)	Effectiveness, Life Years	Incremental Effectiveness, Life Years	ICER ($/Life Year Gained)
No Treatment	54,240	6.22	NA	NA
Older Generation (IFN/RBV or IFN/RBV with Telaprevir or Boceprevir)	59,592	8.9	2.83	1,997
Newer Generation, IFN-Free (2nd generation DAA)	**57,916**	**14.82**	**8.60**	**427**

Table 3: Summary of cost effectiveness from the provider perspective

Treatments	Costs ($)	Effectiveness, SVR Rate	ICER ($/SVR Percentage Point)
No Treatment	20,977	0.0	NA
Older Generation (IFN/RBV or IFN/RBV with Telaprevir or Boceprevir)	31,795	0.39	28,319
Newer Generation, IFN-Free (2nd generation DAA)	42,191	0.91	23,638

Cost Effectiveness Curves

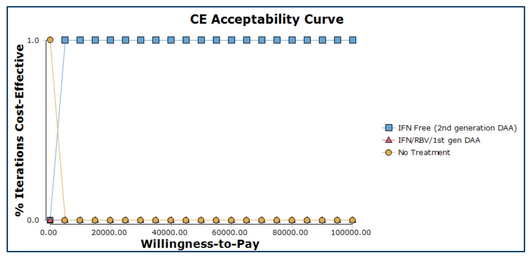

Figure 1:
Acceptability curve from the societal perspective, demonstrating the change in incremental cost effectiveness as the willingness to pay changes. An IFN-Free regimen had acceptable cost effectiveness at willingness to pay thresholds above $5,000 per life year.

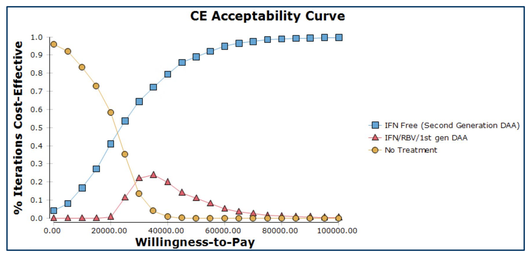

Figure 2:
Acceptability curve from the provider perspective, demonstrating the change in incremental cost effectiveness as the willingness to pay changes.an IFN-Free regimen had acceptable cost effectiveness at willingness to pay thresholds above $25,000 per cure.

Results

- The cohort had a high prevalence of mental disorders (59.5%) and history of illicit drug use (73%) (Table 1).
- Our data demonstrated that, from both perspectives, treatment with IFN-free second generation direct acting antiviral treatment was the most cost-effective option (Table 2, 3).
- CEA Acceptability Curves demonstrate treatment with an IFN-Free regimen had acceptable cost effectiveness at willingness to pay thresholds above $25,000 per cure and $5,000 per life year (Figure 1,2).

Discussion

- These findings supported the use of IFN-free, second generation DAA regimens as first line treatment options.
- Because these regimens are highly effective, further significant health complications resulting from HCV infection are effectively prevented, resulting in long-term cost savings for the VA.
- Though specific to current recommendations and prices, our model is applicable to current treatment recommendations.

Conclusions

- This analysis demonstrated the greater cost effectiveness of newer, interferon-free second generation DAA regimens in comparison to older generation treatments at the San Francisco VA.
- Studies comparing the cost effectiveness of different interferon-free treatments will continue to generate helpful results that would better inform current HCV treatment decisions.

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