Key Theme: New Hepatitis C (HCV) therapies are more effective at treating HCV, but come at higher financial costs.

Background

- HCV therapies have increased in effectiveness in recent years
- New direct antiviral agents (DAA) entering the market since 2011 have achieved sustained virologic responses (SVR) over 90% in clinical trials
- Increasing effectiveness = increasing costs
- Providers halt adoption of new therapies due to cost concerns, patients are being “postponed” treatment awaiting new therapies’ FDA approval
- Estimating the cost effectiveness of these new therapies is important for providers to determine which treatments to adopt in the context of growing cost concerns.

Methods, Inputs and Model Assumptions

Aims
- Estimate Incremental Cost Effectiveness Ratio (ICER), Incremental Net Monetary Benefit (INMB) for new drug regimens compared to standard of care

Markov Simulation Model

- Boceprevir (BOC) 24 week regimen (standard of care)
- Sofosbuvir (SOF) 12 and 24 week regimen
- Simprevir (SIM) 12 and 24 week regimen
- Semprevir and Sofosbuvir (SIM/SOF) 12 and 24 week regimen
- Ledipasvir and Sofosbuvir (LDV/SOF) 12 and 24 week regimen
- Insurance Provider Perspective; 30 year time horizon
- Stratifications based on treatment outcomes
  - Successful/Unsuccessful Treatment, SVR Achieved/no SVR

Inputs and Model Assumptions

- All transition probabilities from Phase III clinical trials
- Cost data from literature review, wholesale acquisition costs (WAC), discounted to 2014 $US
- Quality-adjusted life years (QALY) estimated from literature, clinical trials
- BOC considered “standard of care”
- Patients are genotype 1a/1b
- Patients can die (all-cause and HCV-related) at any stage
- Both SVR and Treatment Failure patients transition on to HCV natural disease progression
- Liver Fibrosis (Metavir score F0-F4), Decompensated Cirrhosis (DC), Hepatocellular Carcinoma (HC), Liver Transplant and Death
- Acceptance threshold estimated at $50,000

Probabilistic Sensitivity Analysis

- Annual costs of non-treatment-related HCV care
- Utilities for all transitions
- Proportion of patients in initial Metavir score groupings

Drug Regimen Cost and SVR Inputs

<table>
<thead>
<tr>
<th>Drug Regimen</th>
<th>Cost (WAC)</th>
<th>SVR</th>
<th>Est. WAC</th>
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<tbody>
<tr>
<td>Victrelis BOC/24wks</td>
<td>June 2011</td>
<td>0.65</td>
<td>$64,825</td>
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<tr>
<td>Olysio Sim/12,24 wks</td>
<td>November 2013</td>
<td>0.70</td>
<td>$66,000/12wk</td>
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<tr>
<td>Sovaldi SOF/12,24 wks</td>
<td>December 2013</td>
<td>0.84</td>
<td>$84,000/12wk</td>
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<tr>
<td>Harvoni SLDV SOF/12,24 wks</td>
<td>October 2014</td>
<td>0.96</td>
<td>$94,500/12wk</td>
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<tr>
<td>SIM SOF 12,24 wks</td>
<td>Combo therapy</td>
<td>0.98</td>
<td>$150,000/12wk</td>
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</tbody>
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Deterministic Results

<table>
<thead>
<tr>
<th>Incremental Cost Effectiveness Ratio</th>
<th>Incremental Net Monetary Benefit</th>
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<tbody>
<tr>
<td>BOC 24 Weeks</td>
<td>ICER – 12 wk Therapies</td>
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<tr>
<td>SIM</td>
<td>$5,967.71</td>
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<tr>
<td>SOF</td>
<td>$162,575.81</td>
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<tr>
<td>SIM/SOF</td>
<td>$99,082.87</td>
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<tr>
<td>LDV/SOF</td>
<td>$34,677.81</td>
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Probabilistic Sensitivity Analysis - 12 Week Therapies to Standard of Care

- SIM, LDV/SOF 12-week regimens are cost effective at $50,000/QALY compared to standard of care
- No 24 wk regimens are cost effective
- SIM 12-wks most cost effective alternative to standard of care (lower cost at higher effectiveness compared to alternative therapies)
- SIM 12-weeks has highest INMB compared to BOC 24-wks

Limitations, Conclusions and Discussion

- Patients cannot “regress” in health
- No increased risk factor applied to 24 week therapy patients
- Costs, utilities of cirrhosis estimated
- BOC not necessarily true “standard of care”
- No estimations/disutilities due to adverse events
- SIM therapies at 12 weeks dominant in both base-case and PSA
- - Least costly of alternative options compared to BOC
- LDV/SOF at 12 weeks similarly cost-effective with SIM compared to BOC
- - Higher SVR of LDV/SOF over SIM for treatment of sicker patients
- Additional analysis with regression in health states, updated real-world costs and real-world SVR rates
- Of the new HCV therapies, SIM is the best value for money when compared to BOC. SIM yields the highest QALYs of new therapy regimens.