Hep C State Policy Simulator

Example Scenario Details

The Hep C State Policy Simulator (or, HepCSim) can directly inform many decisions regarding policy, strategy, and investments related to the prevention, screening, and treatment of hepatitis C. Moreover, HepCSim provides a means to ask and answer comparative questions *regardless* of whether the user has access to advanced statistical packages like SAS or STATA. To illustrate this point, the example scenarios below provide step-by-step guidance for using Microsoft Excel (or a similar spreadsheet program) to generate comparative estimates for user-specified screening and treatment scenarios.

Example One

In this example scenario, HepCSim is used to explore how state-wide changes in testing and treatment policies in 2019 would affect cumulative HCV-related spending and health outcomes in Tennessee by 2030. Because the use case focuses on the state as a whole, we do not present subpopulation specific results, though these results are available. The second example scenario demonstrates how sub-population results may be used.

This scenario evaluates the following changes in screening and treatment policy and capacity:

1. Adoption of a universal screening policy for all subpopulations (i.e., Medicaid, Medicare, Privately Insured, Incarcerated, and Uninsured).
2. Attainment and maintenance of a 10% annual screening rate across all subpopulations.
3. Removal of all treatment restrictions based on disease severity for all subpopulations.
4. Attainment and maintenance of a 50% annual treatment rate across all subpopulations.

Step 1. Generate baseline results

To generate the baseline used for comparison in this scenario, first select the state of interest (Tennessee) and then select "Download Results." No input options need to be changed because the starting values for the state are assumed to represent the baseline scenario.

Step 2. Pull relevant baseline data for comparison calculations

Once the zip file is downloaded and opened, select and open the CSV file labeled TN_HepC_cost_trends.

Select and copy the first four columns, which correspond to "Year," "Disease management cost ($) for all selected subpopulations," "Screening cost ($) for all selected subpopulations," and "Treatment cost ($) for all selected subpopulations." The latter three columns correspond to state level totals that will be the focus of this example scenario.

Paste the selected values into the first sheet of a new Excel workbook (or similar spreadsheet program), which will hereafter be referred to as the "Analysis Workbook."

Next, select and open the CSV file named TN_HepC_disease.

Select and copy the first two columns, which correspond to "Year" and "Liver-related deaths." All columns in this spreadsheet capture state-level estimates; they cannot be disaggregated by sup-population.

Paste the selected values a second worksheet in the "Analysis Workbook."

Step 3. Generate alternative screening and treatment scenario results

To generate the alternative scenario data for this example, change the intervention input parameters as follows:

1. Under the Screening tab, select "Universal" as the screening policy for all subpopulations (i.e., Medicaid, Medicare, Privately Insured, Incarcerated, and Uninsured).
2. While still under the Screening tab, click the "Show/Hide Screening Rates" button and set the values to 10% for all subpopulations.
3. Next, click the Treatment tab and change the "Treatment Rates for Hepatitis C" to 50% for all subpopulations.
4. While still under the Treatment tab, set the "Treatment Restrictions" for each subpopulation to "No restrictions."

Once these changes are made, press "Update Plots" and wait for HepCSim to generate the new results.

Once those new results are available, select the "Download Results" option.

Step 4. Pull relevant data for comparison calculations

Repeat all of step 2 using the new CSV files generated and downloaded under Step 3.

To differentiate the baseline and comparator scenario data, it may help to revise the column names for the alternative scenario data.

Step 5. Generate cumulative estimates of spending (overall and by sub-component) and liver-related deaths for each scenario

Total spending on hepatitis C-related care in a given year is calculated by summing spending for the individual cost drivers (i.e., disease management, screening, and treatment).

Cumulative spending (total and by cost driver) for the desired time horizon is then calculated by summing the relevant columns across the period of interest (in this case, 2019-2030).

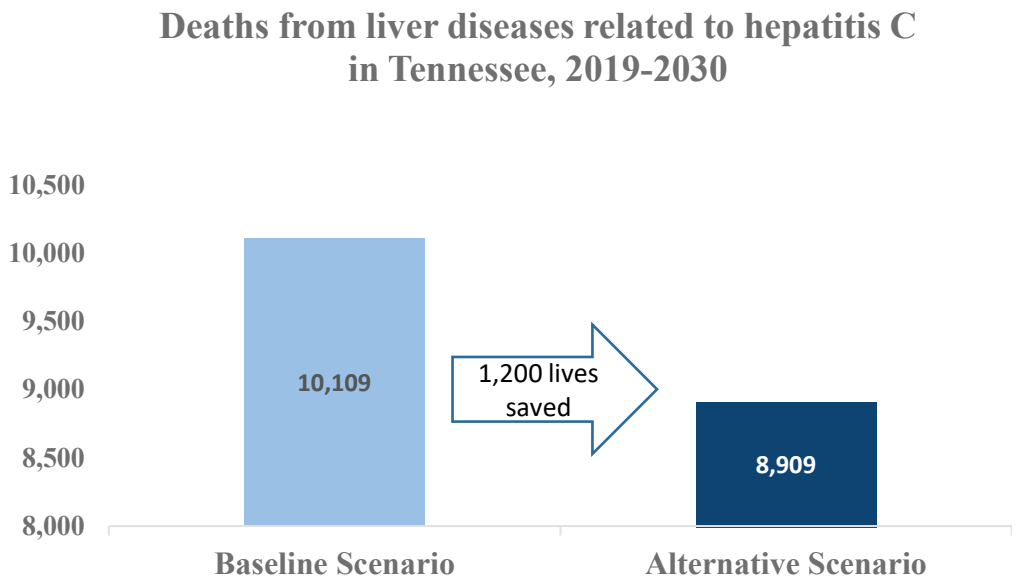
Similarly, cumulative liver-related deaths can be calculated by summing deaths across the desired timeframe.

Step 6. Perform comparative calculations

Finally, subtract the summed baseline data from the summed alternative scenario data to calculate the change from baseline to the alternative scenario for the desired time horizon.

For example, the difference in cumulative spending between the two scenarios is found by subtracting cumulative spending (across all years and cost drivers) for the baseline scenario ($2.086B) from the cumulative spending calculated under the alternative scenario ($2.074B). The result, -$12.45M, indicates that cumulative spending is greater under the baseline scenario. In other words, by 2030, in the state of Tennessee the amount spent on hepatitis-C related screening, treatment, and disease management costs would be $12.45M *less* if the state adopted universal screening and treatment policies in 2019, and expanded screening capacity to 10% and treatment capacity to 50% for all subpopulations. In addition, the number of liver-related death would decrease by 1,200 cases, which would translate into 1,200 lives saved under the alternative scenario.

As demonstrated by the figure below, the Analysis Workbook can also be used to prepare graphics that illustrate these results.


Deaths from liver diseases related to hepatitis C
in Tennessee, 2019-2030
10,500
10,000
9,500
9,000
8,500
8,000
10,109
1,200 lives saved
8,909
Baseline Scenario
Alternative Scenario

Example Two

In this example, HepCSim is used to explore how a set of changes in hepatitis C treatment options, if implemented by Texas Medicaid in 2019, would affect HCV-related spending and health outcomes among HCV-infected beneficiaries over the next 5 years (i.e., in 2019-2023). Specifically, this scenario evaluates the following changes to treatment policy, prices, and capacity:

1. A reduction in the average cost per curative therapy from $20,000 to $7,000[1].
2. Removal of all treatment restrictions based on disease severity (as measured by fibrosis score).
3. An increase in annual treatment rates from 50% to 65%.

Please note that HepCSim does not make assumptions about how these changes were achieved. Rather this example evaluates a plausible scenario wherein reduced treatment costs lead to removal of treatment restrictions and moderate increases in treatment capacity.

Step 1. Generate baseline results

To generate the baseline for this scenario, first select the state of interest (Texas) and then select "Download Results". No input options need to be changed because the starting values for the state are assumed to represent the status quo to which policy changes will be compared.

Step 2. Pull relevant baseline data for comparison calculations

Once the zip file is downloaded and opened, select and open the CSV file labeled TX_HepC_cost_trends.

Select and copy the following columns:

- Column A "Year"
- Column E "Medicaid Treatment cost ($)," which represents total hepatitis C-related costs (i.e., sum of the screening, treatment, and disease management costs)
- Columns J-L, which correspond to "Medicaid Disease management cost ($)," "Medicaid Screening cost ($)," and "Medicaid Treatment cost ($)"

Paste the selected values into the first sheet of a new "Analysis Workbook".

Next, select and open the CSV file named TX_HepC_disease.

Select and copy all columns, including "Year," "Liver-related deaths," "New cases of hepatocellular carcinoma," "New cases of decompensated cirrhosis," and "New cases of compensated cirrhosis (F4)." Please note that these columns capture state-level estimates—they cannot be disaggregated by sub-population.

Paste the selected values into a second worksheet in the "Analysis Workbook."

Step 3. Generate the alternative treatment and cost scenario results

To generate the alternative scenario data for this example, change the intervention input parameters as follows:

1. Under the Treatment tab, change the "Treatment Rates for Hepatitis C" from 50% to 65% for the Medicaid subgroup.
   - Do not change treatment rates for other subgroups (i.e., Medicare, Privately Insured, Incarcerated, and Uninsured).
2. While still under the Treatment tab, set "Treatment Restrictions" for the Medicaid subgroup to "No restrictions."

[1] The model does not adjust for applicable rebates or Federal Medical Assistance Percentage (FMAP) rates.

- Do not change treatment restrictions for other subgroups (i.e., Medicare, Privately Insured, Incarcerated, and Uninsured).

3. Next, click the Costs tab and change the "Cost of Antiviral Treatment" from $20,000 to $7,000 for the Medicaid subgroup.
   - Do not change costs for other subgroups (i.e., Medicare, Privately Insured, Incarcerated, and Uninsured).

Once these changes are made, press "Update Plots" and wait for HepCSim to generate the new results.

Once those new results are available, select the "Download Results" option.

Step 4. Pull relevant alternative scenario data

Repeat all of step 2 using the new CSV files generated and downloaded under Step 3.

To differentiate the baseline and alternative scenario data, it may help to revise the column names for the alternative scenario data.

Step 5. Generate cumulative estimates of spending and hepatitis C related health outcomes for each scenario

Cumulative spending between 2019 and 2023 for the Medicaid population is calculated by summing total or cost-driver specific (i.e., disease management, screening, or treatment) spending across those years.

Similarly, the cumulative number of hepatitis C related health outcomes (i.e., liver-related deaths; new cases of hepatocellular carcinoma, decompensated cirrhosis, or compensated cirrhosis) can be found by summing the relevant outcome columns across 2019-2023.

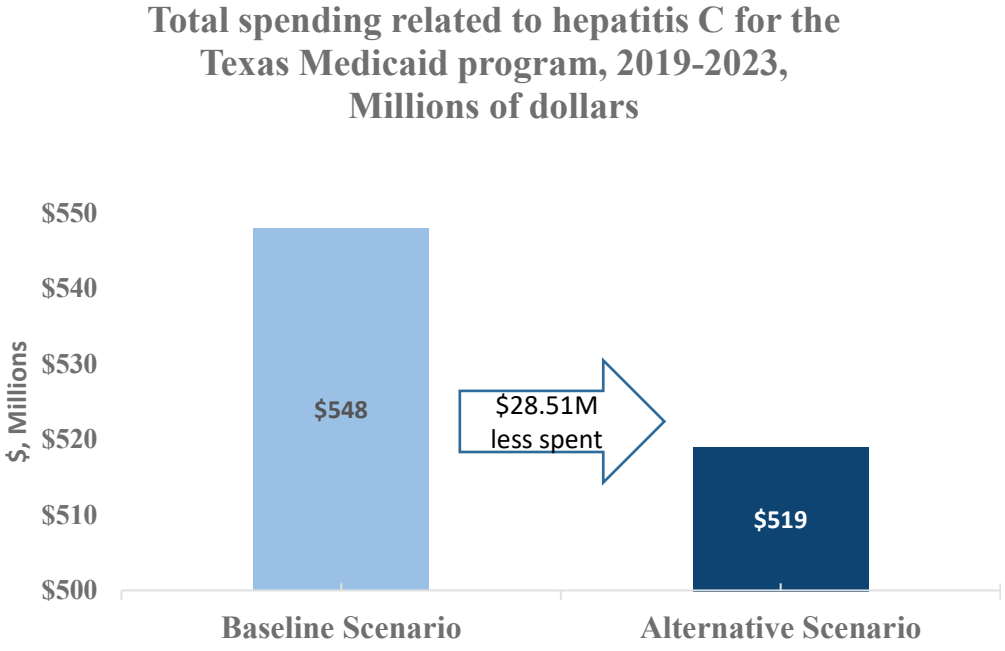
Step 6. Perform comparative calculations

Last, to compare the cumulative costs and hepatitis C-related health outcomes for these scenarios, subtract the summed baseline data from the alternative data to calculate the change from baseline to the alternate scenario.

For example, the difference in cumulative spending between the two scenarios is found by subtracting cumulative spending for the baseline scenario ($547.8M) from the cumulative spending calculated under the alternative scenario ($519.3M). The result, -$28.51M, indicates that cumulative spending is greater under the baseline scenario. In other words, by 2023, the Texas Medicaid program would spend $28.51M *less* on hepatitis C-related screening, treatment, and disease management costs if the program negotiated lower prices for antiviral treatment, removed all treatment restrictions, and increased treatment rates from rates in 2019. Moreover, 2/3 of those savings—or, around $19M—would come from decreases in disease management costs for persons cured of their infections; only 1/3 of the savings would come from reduced prices for direct acting antivirals.

The comparative results also indicate that the Medicaid policy changes modeled under this scenario would save the lives of 217 Texans and prevent another 395 from developing hepatocellular carcinoma.

As demonstrated by the figure below, the Analysis Workbook can also be used to prepare graphics that illustrate these results.


Total spending related to hepatitis C for the Texas Medicaid program, 2019-2023, Millions of dollars
$550
$540
$530
$520
$510
$500
$, Millions
$548
$28.51M less spent
$519
Baseline Scenario
Alternative Scenario