

# 2018-19 Scenario Response

## Topic 3: Analyzing Hepatitis C using CMS Data



A program of The Actuarial Foundation

**Modeling The Future  
Challenge**



## Hep C Analysis Topic Overview

You are the actuarial representative on a team managing the pharmaceutical benefit insurance plan for the 15,000 retirees of a large company, Global Enterprises. Your task is to explain historical experience and to produce estimates of future pharmacy expense for Global Enterprises. You must also understand the offsets to total plan costs for all medical treatment in your analysis that would include inpatient care for any retirees.

One particular topic of considerable interest is the disease Hepatitis C. In recent years, new drug treatments for this disease have been in the news, and the Global Enterprises' Chief Financial Officer (CFO) wants you to help them understand how the company should incorporate these new treatments into their pharmacy benefit plan.

You are tasked with preparing a report on Hepatitis C for the CFO, who has considerable financial experience, but little clinical or pharmaceutical background. Before completing the report, Global Enterprise's CFO has first asked you to answer the questions on the following pages.



## Data

As preparation for answering the CFO's questions and completing your report, your team has decided to consider information and resources from these sites:

### About the disease:

- The Centers for Disease Control and Prevention (CDC) maintains a good site with information about the prevalence of the disease and disease characteristics. <https://www.cdc.gov/hepatitis/hcv/index.htm>.
- The American Liver Foundation is also a good source: <http://hepc.liverfoundation.org/>

**Care expense for the disease:** the Centers for Medicare and Medicaid Services (CMS) data files include lots of information, but of particular interest are data on the cost of medical care for the final stages of the disease and the cost of pharmacy benefits to treat the disease. Note that the data sources and querying tools will be very similar to those in one of the example scenario.

- Inpatient Care by year and Diagnosis Related Group (DRG): <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Inpatient.html>
- Pharmacy experience and trends in coverage by year and therapy: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Part-D-Prescriber.html>
- CMS Office of the Actuary Report: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html>

### General understanding changes in treatment for Hep C over the past decade:

- For a layman's understanding of recent changes in the treatment of Hep C, the major print news sources such as the New York Times, the Washington Post, and the LA Times are valuable and have covered this topic extensively.
- Additionally, the journal Health Affairs has a large amount of detailed and moderately technical coverage of this topic that may provide valuable background information.



## Questions

1. What is the prevalence of hepatitis C and what are its causes?
2. What populations are at risk? Does it differ by any demographic characteristics?
3. What percent of people with Hepatitis C develop advanced liver disease such as cirrhosis, liver failure or liver cancer?
4. What pharmaceuticals are used for treatment and for whom can they be used? Which of these pharmaceuticals are relatively new treatments (less than 10 years on the market) compared with other pharmaceuticals that have been on the market for a longer time-period?
5. What is the average medical cost per person with advanced hepatitis inpatient treatment in each year in the CMS files? Use the average medical cost for each beneficiary for the following DRG numbers (Diagnosis Related Group) that are related to hepatitis care: 432, 433, 434, 435, 436, 437, 441, 442 and 443. Assume that the total medical costs include both outpatient and inpatient care and that the additional costs of care for outpatient costs can be estimated as 0.7 times the cost of inpatient care. Is it possible to construct a statistically relevant trend line using linear regression to model this data? Why or why not?
6. What is the cost per day by drug (chemical) for each of the years of reported data? What is the total average cost of drugs per beneficiary for each year? Is it possible to construct a statistically relevant trend line using linear regression? Why or Why not?
7. Create a visual showing the change in cost per day, cost per beneficiary and rate of use in pharmaceutical therapy (drug). Annotate or use footnotes to explain the visual. Explain what changes over the years of the available data?

## Questions Cont.

8. Using both the CMS experience data and industry data including the CMS's office of the actuary file:
  1. Estimate the future cost per beneficiary of Hepatitis C pharmacy therapy (drugs) for each of the years 2022-2024. What drugs do you expect to be prevalent during these years and why?
  2. Estimate the future medical cost per beneficiary (person) of advanced liver disease for each of the years 2022-2024.
  
9. Assuming that none of the 15,000 retirees were tested and diagnosed with Hep C until 2022 when they were all tested and that all retirees that tested positive were able to use the new therapies on the market now, and that advanced liver disease appears within two years of the diagnosis, will Global enterprises save or lose money if they cover the pharmaceutical HEP C treatment in total over the years 2022 to 2024? Global Enterprise's CFO would like you to present the following information:
  1. How many Global Enterprise retirees do you expect to test positive for the disease during this timeframe?
  2. If Global Enterprise does not cover the pharmacy treatment, how expensive would it be for them to care for their retirees who contract the disease?
  3. If Global Enterprise does cover the new pharmacy treatments to treat retirees who contract the disease, how expensive would it be?
  4. Would you recommend to your CFO that Global Enterprise should cover the new treatments?
  
10. Summarize in a paragraph or two (or in a flow chart) what happened in HEP C treatment over the last 5 years. What new treatments were created and what was their impact on treating Hepatitis C? Are there other considerations besides financial to consider in calculating the value of the pharmacy treatment? What are they and how would they factor into your recommendations to the CFO on whether to cover the new treatments in your pharmacy plan for Global Enterprise's retirees?



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