

# Health Care Utilization and Costs Associated with Chronic Hepatitis C in a Managed Care Population

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## 1. Background

Hepatitis C virus (HCV) is one of the most common blood-borne infections in the United States (US), affecting approximately 1.8% of the population (4 million people)<sup>1</sup>. Among all patients infected with HCV, approximately 20% develop cirrhosis of the liver<sup>2</sup>, which leads to a substantial consumption of health care resources and associated costs. Combined with aging of the HCV population and increasing costs for treatment, chronic liver disease from HCV is expected to present a substantial economic burden over the next 10 to 20 years<sup>3</sup>. Despite the potential cost implications to managed care systems in the US, HCV-related medical costs have not been widely investigated using administrative claims data.

## 2. Objective

To analyze retrospective insurance claims to document disease-specific resource utilization and costs associated with chronic HCV among managed care enrollees.

## 3. Methods

### Study Design

The study involved a retrospective analysis of longitudinal insurance claims from a large US health plan.

### Data Source

The data source was the Integrated Health Care Information Services (IHCIS) database containing medical (inpatient, outpatient, physician, ancillary) and pharmacy claims from a national sample of 30 managed care health plans covering approximately 38 million lives from 1997 to 2006. We used the five most recent years (2002–2006) of data for our analysis.

### Inclusion Criteria

Criteria for inclusion in the study were as follows:

- Primary or nonprimary diagnosis of chronic HCV (International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM] codes 070.44, 070.54, 070.70, or 070.71)
- No evidence of hepatitis B virus (HBV)
- Continuous plan enrollment for at least 6 months prior to and at least 12 months following the first observed diagnosis (index date)

### Outcome Measures

Outcomes measured in the study included the following:

- Demographic characteristics of patients diagnosed with HCV
- Number and frequency of HCV-related surgeries, diagnostic procedures, and laboratory tests
- Per-patient utilization and charges for HCV-related encounters during a period of 12 months following patients' index diagnosis, stratified by cost category:
  - Inpatient stays
  - Skilled nursing facility (SNF) stays
  - Emergency department (ED) visits
  - Physician office visits
  - Durable medical equipment and home health visits
  - Other outpatient/ancillary care
  - Laboratory tests
  - Pharmaceutical prescriptions
  - Total HCV-related utilization

## 4. Results

### Patient Characteristics

- A total of 20,662 patients with a diagnosis of chronic HCV met all study inclusion criteria
- Patients were predominantly male (61%), and the average age was 49 years
- Approximately half of the sample size was between the ages of 45 and 54
- More than 55% of the study sample was from the Northeast region
- The most common types of insurance plans among the study population were health maintenance organizations (HMOs) and preferred provider organizations (PPOs)
- The average Charlson Comorbidity Index (CCI) score was 0.95

Table 1. Characteristics of the Study Sample<sup>a</sup>

	Chronic HCV Patients (N = 20,662)	
	N	%
Gender		
Female	8,121	39.30
Male	12,541	60.70
Age		
Mean (standard deviation [SD])	48.94 (10.03)	
Median	50	
Range (min, max)	(1, 79)	
Age category		
<18	191	0.92
18-24	339	1.64
25-34	878	4.25
35-44	3,934	19.04
45-54	10,350	50.09
55-64	4,021	19.46
65+	949	4.59
Geographic region		
Northeast	11,424	55.29
South	5,234	25.33
Midwest	1,970	9.53
West	2,020	9.78
Unknown	14	0.07
Health plan type <sup>b</sup>		
HMO	7,823	37.86
POS	3,768	18.24
PPO	8,448	40.89
IND	468	2.27
Other	155	0.75
Charlson Comorbidity Score		
Mean (SD)	0.95 (1.66)	
Median	0	
Range (min, max)	(0, 16)	

<sup>a</sup> Study sample includes patients meeting the following criteria: (1) ≥ 6 months health plan enrollment prior to first observed chronic HCV diagnosis; (2) ≥ 12 months health plan enrollment following first observed chronic HCV diagnosis; (3) no evidence of hepatitis B at any time during entire claims history

<sup>b</sup> HMO = health maintenance organization; POS = point of service; PPO = preferred provider organization; IND = independent/self

### HCV-Related Diagnostic and Surgical Procedures

- Liver ultrasounds and liver biopsies were the most common procedures, prevalent in 30% and 25% of the patient population, respectively
- Liver transplantations occurred in 48 patients (0.23%)
- Sclerotherapy, which occurred only in 6 patients, was the least common procedure

### HCV-Related Laboratory Tests

- Complete blood count (CBC) tests were the most common, with more than 50% of patients undergoing at least one CBC test during the 12-month analysis period. Patients who had undergone a CBC test had four tests per year on average
- Metabolic panel tests and HCV panel tests were also common and were prevalent in 34% of patients

Table 2. Descriptive Summary of HCV-Related Diagnostic and Surgical Procedures During the 12-Month Period Following HCV Diagnosis

	Chronic HCV Patients (N = 20,662)			
	N	%	Number of Events <sup>a</sup>	
			Mean	SD
Major HCV-Related Surgeries and Diagnostics				
Had ≥ 1 colonoscopy	2,984	14.44	1.04	0.24
Had ≥ 1 endoscopy	2,227	10.78	1.24	0.73
Had ≥ 1 Liver Ultrasound	6,171	29.87	1.21	0.61
Had ≥ 1 Liver CT Scan	42	0.20	1.00	0.00
Had ≥ 1 Sclerotherapy	6	0.03	1.03	0.25
Had ≥ 1 Liver Biopsy	5,202	25.18	1.50	1.22
Had ≥ 1 Liver Transplantation	48	0.23	1.06	0.24
Had ≥ 1 Paracentesis	184	0.89	3.46	4.92
Had ≥ 1 Transjugular Intrahepatic Portosystemic Shunt (TIPS)	29	0.14	1.10	0.41

<sup>a</sup> Among those that have the event (conditional mean).

Table 3. Descriptive Summary of HCV-Related Laboratory Procedures During the 12-Month Period Following HCV Diagnosis

	Chronic HCV Patients (N = 20,662)			
	N	%	Number of Events <sup>a</sup>	
			Mean	SD
Major HCV-Related Laboratory Procedures				
Had ≥ 1 hepatic panel test	5,840	28.26	2.39	2.50
Had ≥ 1 HCV RNA test	7,024	33.99	1.69	1.18
Had ≥ 1 HCV genotype test	2,978	14.41	1.07	0.27
Had ≥ 1 HCV antibody test	1,408	6.81	1.10	0.46
Had ≥ 1 comprehensive metabolic panel test	7,096	34.34	2.42	3.02
Had ≥ 1 basic metabolic panel test	2,724	13.18	1.96	2.69
Had ≥ 1 coagulation test (prothrombin time)	5,660	27.39	2.26	3.51
Had ≥ 1 alfa fetoprotein test	3,609	17.47	1.39	0.97
Had ≥ 1 complete blood count test	10,337	50.03	4.08	5.38
Had ≥ 1 hepatitis A antibody test	1,904	9.21	1.07	0.28
Had ≥ 1 hepatitis B antibody test	2,209	10.69	1.10	0.39
Had ≥ 1 HIV antibody test	342	1.66	1.05	0.24
Had ≥ 1 HIV confirmatory test	34	0.16	1.09	0.38
Had ≥ 1 cryoglobulin test	345	1.67	1.09	0.32
Had ≥ 1 thyroid function test (TSH, T3, T4)	5,393	26.10	1.82	1.55
Had ≥ 1 lipid panel test	6,053	29.30	1.55	1.06
Had ≥ 1 autoimmune marker test <sup>b</sup>	3,014	14.59	1.20	0.56

<sup>a</sup> Among those that have the event (conditional mean)

<sup>b</sup> Includes rheumatoid factor, antimitochondrial antibody, antinuclear antibody

### HCV-Related Health Care Utilization

- Patients had approximately 10 HCV-related encounters during the 12-month analysis period, with \$6,864 in total HCV-related health care costs
- Pharmacy costs (\$3,433) accounted for 50% of the total costs
- More than 14% of patients had an inpatient hospitalization, with an average total inpatient cost of \$2,078. The average length of stay among those hospitalized was 5 days
- Nearly 65% of patients had at least one office visit, and 51% had other outpatient or ancillary visits

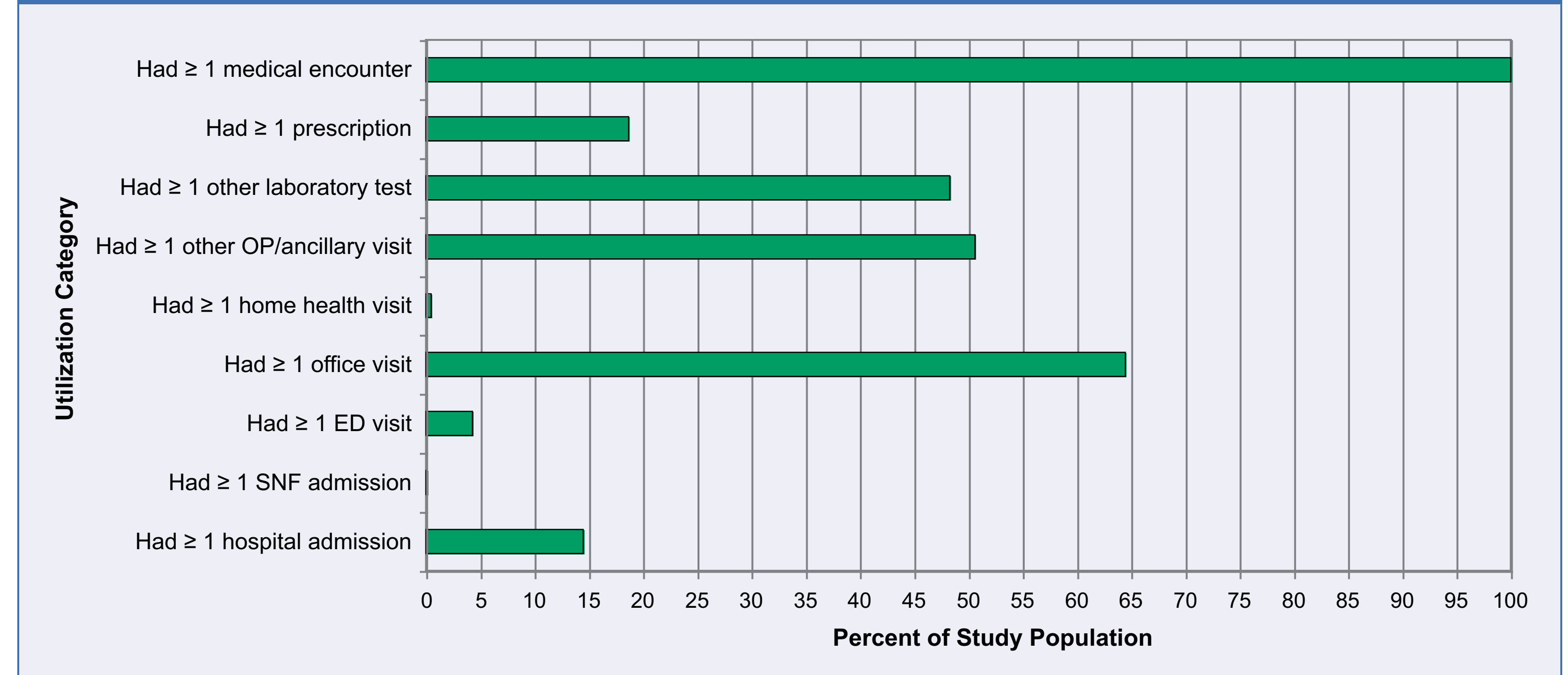
Table 4. Descriptive Summary of HCV-Related Health Care Utilization and Costs During the 12-Month Period Following HCV Diagnosis

	All HCV Patients (N = 20,662)
HCV-related Inpatient Stays	
Mean no. unique hospital admissions (SD)	0.19 (0.57)
Mean no. of inpatient days (SD) <sup>a</sup>	5.04 (7.37)
Mean total cost (SD)	\$2,077.94 (\$11,434.60)
HCV-related skilled nursing facility (SNF) stays	
Mean no. unique SNF admissions (SD)	0.001 (0.04)
Mean no. of SNF days (SD) <sup>a</sup>	6.65 (10.38)
Mean total cost (SD)	\$7.73 (\$412.60)
HCV-related emergency department (ED) visit	
Mean no. ED days (SD)	0.05 (0.28)
Mean total cost (SD)	\$33.63 (\$327.64)
HCV-related office visits	
Mean no. of office visit days (SD)	1.99 (3.22)
Mean total cost (SD)	\$238.97 (\$742.97)
HCV-related home health/DME services	
Mean no. home health visit days (SD)	0.03 (0.60)
Mean total cost (SD)	\$32.45 (\$1173.90)
HCV-related other outpatient (OP)/ancillary services	
Mean no. other OP/ancillary visit days (SD)	1.22 (2.97)
Mean total cost (SD)	\$759.92 (\$2,261.55)
HCV-related laboratory services	
Mean no. laboratory tests (SD)	4.80 (10.70)
Mean total cost (SD)	\$280.73 (\$762.77)
HCV-related pharmacy <sup>b</sup>	
Mean no. prescriptions obtained (SD)	2.12 (5.34)
Mean total cost (SD)	\$3,432.79 (\$8,549.56)
HCV-related total health care utilization (including pharmacy)	
Mean no. encounters (SD)	10.40 (16.62)
Mean total cost (SD)	\$6,864.17 (\$14,813.82)

<sup>a</sup> Mean number of days estimated only among patients with at least 1 unique admission

<sup>b</sup> Includes combination peginterferon regimens with ribavirin, peginterferon monotherapy regimens, combination interferon regimens with ribavirin, interferon monotherapy regimens and interferon (consensus interferon)

Figure 1. Rates of HCV-Specific Encounters



## 5. Limitations

- Patients were identified based on ICD-9-CM diagnosis codes that, if recorded inaccurately, may have caused some patients to be incorrectly identified as having HCV. The validity of the results therefore depends on the accuracy of record keeping among providers submitting claims in the IHCIS database
- The analysis period covers only 12 months. Chronic HCV is likely to have a cost implication to third-party payers across several years. Therefore an analysis that spans multiple years will be ideal for estimating the long-term cost impact of chronic HCV

## 6. Conclusions

- Chronic HCV is a costly condition that presents significant economic burden to managed care payers
- Pharmacy and inpatient hospitalization costs are the primary drivers of HCV-related costs

### References

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