PGI7

Low Prevalence of Hepatitis C Virus (HCV) Diagnosis in US Health Care Data

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ABSTRACT

Objectives: The National Health and Nutrition Examination Survey (NHANES) estimates chronic HCV infection prevalence at 1.0% of the US population or ~3 million individuals as of 2008, with a peak HCV antibody prevalence of 4.3% for those born in the 1950s. From NHANES III we can assume that 78% of HCV antibody-positive patients will not clear the virus; therefore, we expect to observe 3.4% chronic HCV infection in this peak population.

Methods: Patients diagnosed with HCV (ICD-9 codes 070.41, 070.44, 070.51, 070.54, 070.70, 070.71, V02.62) between 2002 and 2006 were identified in MedStat commercial health insurance claims. We calculated age-sex prevalence of diagnosis by birth year. A log-regression model was constructed to examine the relationship between prevalence of HCV diagnosis and number of observation years.

Results: The prevalence of patients with a HCV diagnosis in 2006 was 0.12%. The prevalence of patients with HCV diagnosis was consistent in each year's claims, peaking in those born between 1950 and 1955. Longitudinal data across 5 years demonstrated increasing diagnosis rates with additional years of observation, according to a log function. Modeled for 10 years of observation, total diagnosed prevalence was estimated at 0.29%; peak prevalence was 1.6% for males and 0.9% for females for those born in the early 1950s.

Conclusions: In each year examined, the claims-based prevalence of an HCV diagnosis was about 10% of the NHANES III estimated prevalence (0.12% vs 1.3%). Although diagnosed HCV prevalence increased with years of observation, the 10-year modeled diagnosis prevalence was only 22% of NHANES III estimated prevalence. Like in NHANES III, peak prevalence of HCV in claims was observed in patients born in the 1950s. This suggests that many patients have long-standing HCV infection. Further research is warranted to examine whether HCV-related advanced liver disease is more commonly coded in claims data.

INTRODUCTION

- Hepatitis C virus (HCV) is the most common blood-borne pathogen.¹ Chronic HCV can progress to cirrhosis and is the leading cause of hepatocellular carcinoma, liver failure, and liver transplants in the US.^{2,3,4}
- The National Health and Nutrition Examination Survey (NHANES III)⁵ estimated the prevalence of HCV infection as 1.0% of the US population or ~3 million individuals as of 2008, with a peak prevalence of 4.3% for those born in the 1950s.
 - Assuming that 78% of HCV antibody-positive patients will not clear the virus, a 3.4% peak chronic HCV infection is expected in the general population.

OBJECTIVES

• The goal of this study was to investigate the prevalence of diagnosed and undiagnosed chronic HCV in the US commercially insured population, and compare these data with NHANES III estimates.

METHODS

- Patients diagnosed with HCV (International Classification of Diseases, Ninth Revision [ICD-9] codes 070.41, 070.44, 070.51, 070.54, 070.70, 070.71, V02.62) between 2002 and 2006 were identified in MedStat commercial health insurance claims data.⁶
- Age-sex prevalence of HCV diagnosis was calculated by birth year.
- A log-regression model was constructed to examine the relationship between prevalence of HCV diagnosis and number of observation years.

RESULTS

Prevalence of HCV Infection Estimated by NHANES III

- with HCV was 1.5%.

Table 1: Prevalence of HCV Antibodies in the General US Population						
1999-2000	2001-02	2003-04	2005-06	Average	Projection to 2008	
1.2%	1.9%	1.5%	1.3%	1.5%	1.2%	

Numerator: People who tested positive for Hepatitis C antibody. Weighted by WTMEC Year 2 Full Sample 2 Year MEC Examination Weight.





Calculation of Prevalence of Chronic HCV Infection in the General Population



• Calculation of Prevalence of Antibodies for HCV

- The average of NHANES 1999 to 2006 estimates the percentage of patients ever infected

• The peak prevalence of HCV antibody positivity was in individuals born in the 1950s, 4.3%; this corresponds to 6.1% for males and 2.6% for females (Figure 1).

• We determined the prevalence of chronic HCV infection by analyzing NHANES III for HCV RNA positivity among people with a positive result for HCV antibody (Figure 2).

and gender-adjusted prevalence was 78%, indicating that spontaneous clearance of the virus took place in 22% of individuals.

Calculation of the Expected Prevalence of HCV Infection Among **Commercially Insured Members in the US**

- necessary:
- Prevalence of antibodies for HCV among commercially insured members:
- o Since 88% of the general population is under 65 years of age, and the prevalence of anti-HCV antibodies in the general population is 1.5%, about 1.7% of the population below 65 years can be expected to have antibodies to HCV (1.5% / 88% = 1.7%).
- Prevalence of chronic HCV infection among commercially insured members
- o Since 78% of the population with antibodies to HCV can be expected to have chronic infection, 1.3% of the under 65 year commercially insured US population can be expected to have chronic HCV infection $(1.7\% \times 78\% = 1.3\%)$.

Estimation of Chronic HCV Infection Rate Using MedStat Commercial Claims Data

- Patients with chronic HCV infection were identified using MedStat commercial claims data with demographic adjustments to the standard demographics of 1 million members.
- The prevalence of diagnosed chronic HCV in the general population was 0.12% based on the claims incurred in 2006.
- Longitudinal data across 5 years demonstrated that the diagnosis rate for HCV infection increased with additional years of observation (Figure 3).





• To compare NHANES III to the Medstat commercial population, 2 additional calculations were

- To better determine the rate of diagnosed HCV infection in the US Commercially insured population, a model based on the 5 observation-year prevalence was constructed, with the assumption that:
 - Male prevalence = 0.000905 ln (Num Years)+0.001454
 - Female prevalence = 0.000539 ln (Num Years)+0.000947
- Assuming that 10 years is an appropriate observation period for HCV patients, a factor of 2.4 was developed which was used to estimate the prevalence of HCV infection by multiplying this number with the prevalence obtained from a single year of claims data.
- The modeled prevalence of HCV infection was 0.29% with 10 years of observation (Figure 4); the modeled peak prevalence of HCV infection by year of birth was during the 1950s for both sexes; 1.6% in males and 0.9% in females.



- When the combined male and female HCV infection diagnosis rate modeled from claims data was compared with that of NHANES it was found to be only 22% of that from the NHANES estimate (0.29% vs 1.3%, respectively) indicating that about 78% of patients with chronic HCV infection in the commercially insured population have not been diagnosed (Table 2).
- $The modeled \, prevalence \, of \, diagnosed \, chronic \, HCV \, infection \, for \, the \, commercially \, insured \, population$ born in the 1950s was 21% of that from the NHANES estimate for the same population (0.7% vs 3.4%, respectively)

Table 2: Proportion of Undiagnosed Chronic HCV Infection by Number of Observation Years

Number of Observation Years	Observed Preva- lence of Diagnosed Chronic HCV Infection (%)	Model Prevalence of Diagnosed Chronic HCV Infection (%)	Estimated Prevalence of Chronic HCV Infection (%)*
1	0.12	0.12	1.3
2	0.17	0.17	1.3
3	0.20	0.20	1.3
4	0.22	0.22	1.3
5	0.24	0.24	1.3
6		0.25	1.3
7		0.26	1.3
8		0.27	1.3
9		0.28	1.3
10		0.29	1.3
11		0.29	1.3
12		0.30	1.3
13		0.30	1.3
14		0.31	1.3
15		0.31	1.3
16		0.32	1.3
17		0.32	1.3
18		0.33	1.3
19		0.33	1.3

Estimated Prevalence of Chronic HCV infection (1.3%) = Prevalence of HCV Positive in Entire Population (1.5%)(1 - % Age 6 + [12%])*% Chronic HCV Infection given HCV Positive (78%). ⁺% Undiagnosed Chronic HCV Infection = 1 – Model Prevalence of Diagnosed Chronic HCV Infection/Estimated Prevalence of Chronic HCV Infection.

% Undiagnosed Chronic HCV Infection [†]
91
87
85
83
82
81
80
80
79
78
78
77
77
77
76
76
76
75
75

CONCLUSIONS

- This study showed that the diagnosis rate for HCV infection in the US commercially insured population is low (22% of NHANES estimated prevalence).
- The majority of individuals with HCV infection in this population have not been diagnosed.
- As in the NHANES data, peak prevalence of HCV in claims data was observed in patients born in the 1950s and the diagnosis rate among persons born in this decade was also low (21% of NHANES estimate for people born in the 1950s). This suggests that many patients have long-standing HCV infection and may be at risk for decompensated liver disease.
- Given that HCV infection is usually asymptomatic until the onset of advanced liver disease, and that diagnosis is a crucial step in the prevention of advanced liver disease, it would be of interest in future studies to examine the prevalence of advanced liver disease related to HCV infection in the commercially insured population relative to the general population.

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Author Disclosures

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