

# Management of hepatitis C patients by primary care physicians in the USA: results of a national survey

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**SUMMARY.** Hepatitis C is a major health problem worldwide, yet very little research has been performed to assess the knowledge base and practice patterns of primary care physicians (PCPs) regarding hepatitis C. The aim of this study is to determine the knowledge base and practice patterns of a nationwide cohort of PCPs. A survey was developed to assess the knowledge of PCPs regarding risk factors for hepatitis C, management of hepatitis C patients and attitude regarding testing for hepatitis C. The survey was mailed to 4000 PCPs in the USA. A total of 1412 (39%) PCPs completed the survey. The vast majority, > 90%, of PCPs correctly identified the most common risk factors for hepatitis C. However, only 59% indicated they ask all patients about hepatitis C risk factors, 70% reported they test all patients with hepatitis

C risk factors and 78% test all patients with elevated liver enzymes for hepatitis C. Most (72%) PCPs would refer an HCV-positive patient with elevated aminotransferase but only 28% would refer an HCV-positive patient with normal aminotransferase to a specialist. One-fourth of the PCPs did not know what treatment to recommend for hepatitis C patients. Our data suggest that hepatitis C patients may be underdiagnosed and under-referred. Specific educational initiatives and practice guidelines for PCPs are needed to optimize the recognition of patients at risk for hepatitis C and to ensure appropriate testing and referral.

**Keywords:** diagnosis, epidemiology, interferon, risk factors, survey, treatment.

## INTRODUCTION

Hepatitis C is a major health problem throughout the world. In the USA, it is estimated that 1.8% of the population is positive for hepatitis C antibody (anti-HCV) and chronic hepatitis C virus (HCV) infection accounts for 8000–10 000 deaths annually [1]. Despite the prevalence of this disease, there is very little information on the knowledge base and practice patterns of primary care physicians regarding hepatitis C.

Primary care physicians (PCPs) are the 'gate-keepers' to the US healthcare system. The Center for Disease Control (CDC) and the National Institutes of Health (NIH) consensus conference on hepatitis C recommended that all patients be asked about HCV risk factors [2,3]. Given the fact that HCV infection is often silent until the very late stages [4], it is imperative that PCPs are able to identify patients at risk for

hepatitis C and to institute appropriate diagnostic testing and referral while the disease is in its early stage.

In a previous study in 1997, we surveyed 404 PCPs in a large university-based health maintenance organization (HMO) regarding their knowledge of hepatitis C risk factors and management of patients with hepatitis C [5]. In that study, we found that most PCPs correctly identified the important risk factors for HCV infection but a substantial proportion over-estimated the risks of acquiring hepatitis C from a blood transfusion in 1994 or casual household contact. The most important deficit in patient care was the choice of supplementary or confirmatory tests for patients who were anti-HCV positive by enzyme immunoassay (EIA). We also identified considerable confusion over the indications for liver biopsy and therapy, and the efficacy of interferon treatment.

In the last 2 years, hepatitis C has been extensively covered at national meetings, in medical journals and by the popular press. A search of the Medline found 3932 publications on hepatitis C between January 1997 and December 1999.

The primary aim of this study was to determine the current knowledge base of PCPs throughout the USA regarding the diagnosis and management of HCV infection. The

Abbreviations: ALT, alanine aminotransferase; EIA, enzyme immunoassay; HCV, hepatitis C virus; HMO, health maintenance organization; PCP, primary care physicians.

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secondary aim was to determine if there has been any change in their knowledge and practice in the last 2 years. Because of the pivotal role of PCPs in the identification and screening of patients at risk, we also determined the rate at which PCPs inquire about risk factors for hepatitis C and the frequency and indications for hepatitis C testing.

## MATERIALS AND METHODS

A survey was developed to assess PCPs' knowledge of the risk factors for hepatitis C and the management of patients with hepatitis C. This survey was a modified version of the one used in our previous study [5]. A copy of this survey can be obtained from the authors (T.M.S.). The original survey included seven questions on risk factors and 10 questions on the management of patients with hepatitis C. The questions on risk factors listed various exposures and the respondents were asked to rate each of the exposures as a 'significant' or 'minimal' risk factor for HCV infection. Patient management questions were based on two clinical vignettes of patients who tested positive for anti-HCV by EIA. The first patient had elevated and the second had normal alanine aminotransferase (ALT) levels (Table 1). The survey also elicited demographic information on the respondents including specialty, years in practice, number of hepatitis C patients seen in the previous year and experience with interferon therapy. The current survey included additional questions on HCV risk factor assessment and anti-HCV testing in primary care clinics. In addition, the survey asked what treatment PCPs would recommend for patients with hepatitis C and the expected rate of sustained response for that treatment. Lastly, PCPs were asked if they had used educational tools to learn more about hepatitis C in the last 2 years.

The survey was mailed to 4000 PCPs in the USA. Three thousand PCPs were randomly selected from throughout the USA (Nationwide cohort). This group was weighted by the physician population in each state to provide a representative sample of the PCPs in the USA. The list of physician's names and addresses was purchased from the Medical Marketing Service (MMS) corporation (Woodale, IL). This list was derived from the American Medical Association mailing list and includes physicians who identified themselves as internists, family physicians or general practitioners. The

remaining 1000 PCPs (1999 HMO cohort) were members of the same university affiliated HMO in the state of Michigan that we surveyed in 1997.

The first copy of the survey was mailed in March 1999, along with a cover letter. The covering letter explained that the aim of this project was to determine the current knowledge base of PCPs regarding hepatitis C and reassured the physicians all answers would remain anonymous. The mailing also included a stamped return envelope. Two weeks after the survey was sent, a reminder postcard was mailed to all the physicians. A second mailing was performed four weeks later. A third and final mailing was sent 8 weeks after the first mailing, followed by a reminder postcard.

The results of all 1412 respondents are presented in the tables. The responses of the 1999 HMO cohort and the nationwide cohort were compared to determine if there is any difference in practice between PCPs in the state of Michigan and the rest of the USA. In addition, the responses of the 1999 HMO cohort and the 1997 HMO cohort were compared to determine if there is any change in knowledge and practice regarding hepatitis C in the past two years. *t*-tests were used for comparisons.

## RESULTS

Of the 4000 surveys mailed, 342 were returned because of 'incorrect address'. Of the 3658 delivered surveys, 2801 were mailed to the nationwide cohort and 857 to the HMO cohort. A total of 1412 (39%) PCPs completed the survey. The number of respondents in the HMO cohort was 407 (48%) and the nationwide cohort 1005 (36%).

### *Respondent demographics*

Most respondents were men (70%). The mean  $\pm$  SD age was  $47 \pm 11$  years. The majority (88%) of the respondents were family physicians (49%) or internists (39%). The remaining 12% classified themselves as 'other specialties' and were made up of the following: paediatricians (4%), internal medicine/paediatrics (3%) and nongastroenterology medicine subspecialists (5%) (Table 2). Most of the respondents (61%) had been in practice for more than 10 years.

When the 1999 HMO cohort and the nationwide cohort were compared, the HMO cohort had fewer internists and

Vignette 1	Vignette 2
55-year-old man	32-year-old woman
Elevated ALT (150 U/L) during check-up for life-insurance	Anti-HCV + (EIA) at blood donation
Subsequent work-up: anti-HCV + (EIA)	Subsequent work-up: normal ALT
Otherwise healthy/asymptomatic	Healthy/asymptomatic
History of IVDU in 1963	No risk factors

**Table 1** Summary of two clinical vignettes

more physicians belonging to 'other specialties' (20% vs. 9%,  $P = 0.001$ ).

When the demographics of the 1999 and 1997 HMO cohorts were compared, a slightly higher percent of the 1999 cohort had been in practice for more than 10 years (62% vs. 54%,  $P < 0.03$ ).

**Table 2** Demographics of respondents

Gender	
Male	70%
Female	30%
Age (mean year $\pm$ SD)	47 $\pm$ 11.0
Specialty	
Family medicine	49%
Internal medicine	39%
Other	12%
Paediatrics	4%
Medical subspecialist	5%
Miscellaneous	3%
Years in practice	
0–5	23%
6–10	16%
> 10	61%
Number of hepatitis C patients cared for in the last year	
0	19%
1–5	54%
6–10	16%
> 10	11%
Experience with HCV therapy	
None	44%
Followed patients treated by specialists	54%
I have treated patients on my own	1%

### Experience with hepatitis C patients

Most (73%) of the respondents had seen fewer than five hepatitis C patients in the past year and 44% had no experience with therapy for hepatitis C (Table 2). Only 1% of the PCPs had treated patients with antiviral therapy on their own.

When the two HMO cohorts were compared, the 1999 cohort had fewer physicians who had no experience with HCV therapy (49% vs. 70%,  $P < 0.001$ ).

### Educational tools

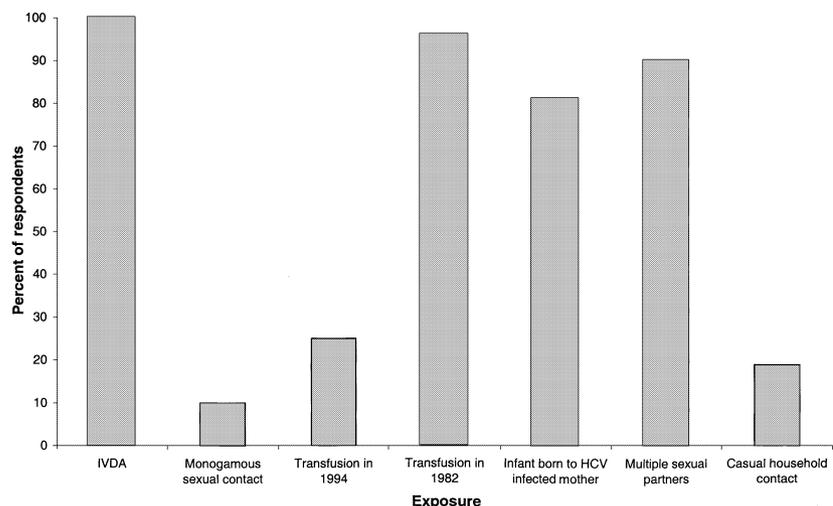
The vast majority (95%) of PCPs had used at least one educational tool and 62% of the PCPs had used two or more educational tools to learn more about hepatitis C in the last two years. When asked what types of educational tools they used to learn about hepatitis C, 74% reported using journal/review articles, 39% continuing education courses, 20% textbooks, and 8% on-line sites.

### Risk factors

The respondents were asked to rate various exposures as 'significant' or 'minimal' risks for acquiring HCV infection (Fig. 1). Almost all (97–100%) of the respondents correctly identified intravenous drug use, history of blood transfusion in the 1980s and multiple sexual partners as significant risk factors for HCV infection. However, 25% of the respondents also considered blood transfusion in the post-HCV screening era and 19% identified casual household contact as significant risk factors for HCV infection.

### HCV testing

Approximately half (59%) of the respondents indicated that they ask patients about HCV risk factors (Table 3). Among the respondents, only 78% reported that they test all patients



**Fig. 1** Percent of respondents identifying various exposures as 'significant' risk factors for acquiring HCV infection.

with elevated liver enzymes for hepatitis C while 70% reported that they test all patients with HCV risk factors regardless of their liver enzyme levels.

**Table 3** Hepatitis C-testing in primary care clinics

Entire cohort	
Do you ask all patients for HCV risk factors?	59%
Which of the following patients do you test?	
All patients with elevated liver enzymes?	78%
All patients with elevated liver enzymes and HCV risk factors?	97%
All patients with elevated liver enzymes and no identifiable cause?	96%
All patients with HCV risk factors regardless of liver enzyme levels?	70%

### Patient management

The majority (72%) of PCPs would refer the patient in vignette 1 to a gastroenterologist and would support management with liver biopsy (89%) and HCV therapy (91%) (Table 4). For the patient in vignette 2, 28% would refer the patient to a gastroenterologist while approximately half would support liver biopsy (55%) and HCV therapy (53%) if recommended by a specialist.

When asked what further tests they would perform, roughly half of the PCPs would repeat the EIA test for anti-HCV in both patients (37% in vignette 1 and 52% in vignette 2). Approximately half would also order a recombinant immunoblot assay (RIBA) for anti-HCV in both patients (51% in vignette 1 and 57% in vignette 2). A slightly higher percent of PCPs would order PCR testing for HCV RNA in the patient in vignette 1 (69%) and 50% would order PCR testing for the patient in vignette 2.

	Vignette 1	Vignette 2	<b>Table 4</b> Management of patients with hepatitis C
At this point your next step would be to:			
Reassure the patient that s/he is immune to hepatitis C	0%	0%	
Follow patient in clinic; no referral	9%	42%	
Follow in clinic; refer if symptoms develop	16%	29%	
Refer to a gastroenterologist	72%	28%	
Don't know	2%	1%	
What additional tests would you order (check all that apply):			
Anti-HCV EIA	37%	52%	
Anti-HCV by RIBA	51%	57%	
HCV RNA by PCR	69%	50%	
HCV genotyping	11%	7%	
Would you support a liver biopsy if recommended by a gastroenterologist:			
Yes	89%	55%	
Would you support therapy if recommended by a gastroenterologist:			
Yes	91%	53%	
If you support therapy, what regimen would you recommend:			
Interferon for 6 months	11%	NA	
Interferon for 12 months	9%		
Ribavirin alone	0.6%		
Interferon and ribavirin	52%		
Don't know	27%		
What rate of sustained response do you expect from the regimen you recommended:			
75%	12%	NA	
50%	43%		
25%	30%		
< 5%	0.6%		
Don't know	14%		

NA, not available.

### Treatment recommendations

When asked what treatment regimen they would recommend for the patient in vignette 1, 52% of PCPs recommended combination therapy with interferon and ribavirin, 20% recommended interferon monotherapy for 6–12 months and 27% responded they did not know what therapy to recommend (Table 4). Fourteen percent of the PCPs did not know the expected rate of sustained response for the treatment they chose. Of the PCPs that chose combination therapy, 15% expected a 75% sustained response rate, 55% expected a 50% sustained response rate and 34% expected a 25% sustained response rate.

### Comparison between subgroups

There were no significant differences between the 1999 nationwide and 1999 HMO cohorts in the responses to the questions on risk factors, HCV testing or patient management. When the risk factor responses in the two HMO cohorts were compared, PCPs in the 1999 cohort were more likely to rate transfusion in 1994 ( $P < 0.003$ ), and casual household contact ( $P < 0.0001$ ) as significant risk factors for HCV infection. With regard to patient management, the PCPs in the 1999 cohort were more likely to refer the patient in vignette 1 to a gastroenterologist (74% vs. 62%,  $P < 0.003$ ) and to recommend therapy (92% vs. 84%,  $P < 0.002$ ). The same differences were seen regarding the patient in vignette 2.

## DISCUSSION

Hepatitis C is a major health problem worldwide. Because of the high prevalence of this disease, PCPs must have an adequate basic knowledge of the diagnosis and management of hepatitis C. In a previous study conducted in 1997, we found substantial deficits in knowledge regarding hepatitis C among a cohort of PCPs in a university-based HMO in the state of Michigan [5]. Significant advances have been made in our understanding and management of hepatitis C in the last 2 years. In addition, there has been a great deal of coverage on hepatitis C in medical journals, at scientific conferences and by the lay press. The present study was conducted to determine the current level of hepatitis C knowledge among PCPs and to determine if there has been any change over the last 2 years. We also included a larger group of PCPs from across the country to determine if the data we collected from PCPs in one HMO are representative of PCPs in the rest of the USA.

The mailing list of nationwide PCPs was derived from the AMA mailing list and is considered to be the most comprehensive list of practising physicians in the USA [6,7]. Our overall response rate of 39% was comparable to that obtained in other surveys of PCPs [8,9]. In addition, the number of respondents, 1412, was comparable to the

number of respondents in other large surveys of primary care physicians and specialists [10–12]. Previous research has demonstrated that the most important reason for refusal to complete a survey is lack of interest in the subject [13,14]. It is possible that the physicians who completed the survey were more interested in hepatitis C than the physicians who did not participate in this study, and their responses may represent the 'best-case' scenario with regards to knowledge regarding hepatitis C. We feel that our respondents are representative of the PCPs in the nation as their demographics (gender, age and specialty) were similar to that of the 160 000 PCPs on the AMA mailing list.

Because of the anonymity of the surveys, we cannot determine if the same PCPs from the HMO participated in both studies. However, the similarity in demographics between the respondents in the 1999 and 1997 HMO cohorts allow us to make general comments regarding changes in knowledge of hepatitis C during the study period.

As gate-keepers of the USA healthcare system, PCPs have the important tasks of identifying patients who are at risk for hepatitis C and instituting appropriate evaluation and referral before the patients progress to cirrhosis and hepatic failure. We found that the vast majority of PCPs correctly identified the major risk factors for hepatitis C but a disconcertingly high percent (25%) considered blood transfusion in 1994, 2 years after institution of second generation EIA testing for anti-HCV among blood donors, as a significant risk factor for HCV infection. Over-estimation of the risk of blood transfusion may lead patients to refuse life-sustaining blood products. Of greater concern is that 19% of PCPs regarded casual household contact to be a significant risk factor for HCV infection. This may create unnecessary anxiety within families and stigma for the patients.

While most PCPs correctly identified the significant risk factors for HCV, only 59% of the respondents reported that they ask patients for HCV risk factors. Because our data was based on self-reporting, it is not clear if these figures reflect actual practice. Furthermore, previous research demonstrated that patients are often evasive when asked about high-risk behaviour [15]. It is therefore uncertain if reliable answers can be obtained through casual questioning. Of concern is that only 70% PCPs would test patients with risk factors for hepatitis C regardless of liver enzymes. This may result in underdiagnosis, given that one-third of patients with chronic hepatitis C may have normal liver enzyme levels [16,17]. Although hepatitis C is the commonest cause of chronic liver disease in the USA [18], only 78% of PCPs would test all patients with elevated liver enzyme levels for hepatitis C. This may result in misdiagnosis of some patients as a substantial proportion of patients with hepatitis C also have other aetiology(ies) for their liver disease such as alcoholism, hepatitis B and haemochromatosis [19–22]. Our data suggest that hepatitis C may be grossly underdiagnosed in primary care clinics. This may account for the finding that 19% of our respondents reported that they have not seen a

single patient with hepatitis C in the past year. Implementation of educational programs for PCPs or the use of self-administered instruments to assess HCV risk factors may assist in the identification of patients who warrant hepatitis C testing [23,24].

In this study, we found that the area with the greatest uncertainty continued to be the use of HCV tests. Appropriate and judicious use of HCV tests is important to identify patients with chronic HCV infection vs. recovered infection or false positive test result, and to minimize costs and delays in referrals. This may be facilitated by the development of simple algorithms for the evaluation of patients who test positive for anti-HCV [25,26].

In the current study, PCPs were more likely to refer hepatitis C patients with elevated liver enzymes to gastroenterologists. Nevertheless, 28% would not refer the patient in vignette 1 even though only 1% of the respondents had treated hepatitis C patients on their own. Despite recent publications on the results of two large randomized controlled trials of combination therapy of interferon and ribavirin vs. interferon monotherapy in the treatment of hepatitis C [27,28], only 52% of the respondents recommended combination therapy with interferon and ribavirin. While PCPs are not expected to treat hepatitis C patients without consultation with a specialist, it is important that they know the treatment options and the risks/benefits of therapy. The majority of respondents who would not support therapy for patient in vignette 1 reported that therapy was ineffective and/or associated with serious side-effects.

In summary, our current study revealed that significant deficits in knowledge regarding hepatitis C among PCPs continue to exist despite the widespread coverage of hepatitis C in medical journals, at scientific meetings and by the lay press; and the use of at least one educational tool to learn more about hepatitis C by 95% of the respondents in the last 2 years. Several factors may contribute to the knowledge deficits regarding hepatitis C among PCPs: the rapid evolution of new information, the lack of established guidelines catered for PCPs, the need for PCPs to keep up with advances in many diverse areas of medicine, and the possible ineffectiveness of current educational resources. Thus, educational initiatives and guidelines specifically designed for PCPs are needed to assist them in identifying patients at risk, conducting initial diagnostic evaluation, and initiating appropriate referrals, so patients with hepatitis C can be correctly diagnosed and treated while they are still in the early stage of disease. These guidelines should be simple, practical, easy to follow and validated through field studies.

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