



Samuel Bailey  
Benjamin Scalley  
Marisa Gilles

# Hepatitis C polymerase chain reaction testing by GPs

## Background

Approximately 75% of patients exposed to the hepatitis C virus will become chronically infected. Polymerase chain reaction (PCR) testing more than 6 months after exposure is necessary to identify this group. This pilot study assessed the practical application of PCR testing in the general practice context.

## Methods

General practitioners of patients newly notified as positive for hepatitis C antibody between 1 August 2007 and 1 August 2012 were invited to participate. They completed a self-administered survey, recording details on the use of hepatitis C PCR testing in their patients.

## Results

The survey found that 16 patients (46%) did not undergo any PCR testing for hepatitis C. Of those who underwent PCR testing, 11 (58%) were positive on PCR testing but only six (55%) of those with a positive PCR test were retested 6 months later.

## Discussion

Appropriate use of PCR is necessary to identify patients with chronic hepatitis C and offer appropriate referral and treatment.

## Keywords

clinical audit; diagnosis; disease management; hepatitis C

Individuals exposed to the hepatitis C virus will undergo seroconversion, developing life-long hepatitis C antibodies. It is estimated that within 6 months, 25% of patients will clear the virus naturally and therefore no longer be infected.<sup>1</sup> Conversely, an estimated 75% of patients will develop chronic hepatitis C, becoming vulnerable to complications and remaining infective to contacts.<sup>1</sup>

Hepatitis C polymerase chain reaction (PCR) testing is routinely used to distinguish between patients who have cleared the virus and those who remain chronically infected. Ideally, PCR testing should be requested when the patient is initially notified as positive for hepatitis C antibody, and again 6 months later. It is crucial to test 6 months after the initial serology result to ensure chronic infection is distinguished from those who have spontaneously cleared the virus.

Previous studies have identified gaps in general practitioners' (GPs') knowledge of hepatitis C testing: 22% of GPs thought the presence of hepatitis C antibodies differentiated between cleared and chronic infection<sup>2</sup> and only 32% recognised that PCR testing could identify patients who had naturally cleared the virus.<sup>3</sup> Patients who have cleared the virus can become re-infected if exposed to the virus again; however, 20–29% of GPs thought that detection of hepatitis C antibodies signified immunity.<sup>2–4</sup> It could be assumed that this confusion translates into suboptimal patient care. The aim of this pilot study was to formally assess the practical application of hepatitis C PCR testing by regional Australian GPs in patients notified as positive for hepatitis C antibody.

## Methods

### Study population

Patients who were newly notified as being positive for hepatitis C antibody between 1 August 2007 and 1 August 2012, after testing by regional GPs located in the midwest region of Western Australia, were identified from the Western Australian Notifiable Infectious Diseases Database.

### Study design

The GPs who requested the hepatitis C antibody testing for these patients were invited to participate in the study. The GPs audited their own patient notes, recording the date and result of each hepatitis C serology and PCR test that was performed. The completed forms were collected and data collated. The researchers and the GPs retained the completed forms as part of their audit process.

Ethics approval was granted by the Western Australian Country Health Service Human Research Ethics Committee (reference number 2014:01). GPs who audited their patient notes and participated in an optional education session at the completion of the pilot study were awarded professional development points from the Royal Australian College of General Practitioners or the Australian College of Rural and Remote Medicine.

## Results

One hundred and ten patients who had been tested by 35 different GPs were identified. Thirty-one of these patients (28%) were no longer known to the GP who requested the hepatitis C antibody test and, therefore, were excluded. Fifteen GPs who cared for 35 of the remaining 79 patients agreed to be involved. This represented a response rate of 44%.

The survey found that 19 patients (54%) underwent hepatitis C PCR testing and 16 patients

(46%) did not. The use of hepatitis C PCR testing in this sample group is summarised in *Table 1*.

Hepatitis C RNA was not detected in eight patients, signifying that they had naturally cleared the virus. Hepatitis C RNA was detected in 11 patients; five of these patients were not tested after 6 months of their initial hepatitis C antibody notification.

## Discussion

Distinguishing patients with chronic hepatitis C from those who have cleared the virus is crucial. Further management should be directed at those who are chronically infected, including referral for treatment, monitoring for cirrhosis and monitoring for hepatocellular carcinoma.

Just under 50% of patients included in the study did not have any hepatitis C PCR testing and so decisions regarding further management in these patients was not possible. Of those who underwent PCR testing 42% had cleared the hepatitis C virus; this clearance rate is higher than traditionally expected.<sup>1</sup> The remaining patients who underwent testing were positive for hepatitis C RNA; however, five patients were not tested 6 months after their initial hepatitis C antibody notification and therefore it was not possible to differentiate chronic infection from viral clearance.

This pilot study is limited by the small numbers of GPs and patients who fulfilled the inclusion criteria in this regional area, and by the low response rate. GPs who agreed to participate may also have had a greater awareness and interest in hepatitis C, leading to a degree of recruitment bias. This would have resulted in a bias towards GPs with potentially greater knowledge and interest in the area.

The population residing in the regional setting of this study, while broadly similar to the population of Western Australia, differs with respect to two main characteristics: the region has

a higher proportion of Aboriginal people, compared with the statewide population (11.6% and 3.2%, respectively) and a lower proportion of working-age people – a greater proportion of the people are aged <20 years and >64 years.<sup>5</sup> It is not clear if there are differences between the practice of GPs in urban areas and in regional areas, but the findings of this study are consistent with previous research in this area suggesting that the results are generalisable to the populations of other geographic areas.<sup>2,3</sup>

The aim of this pilot study was to assess the practical application of hepatitis C PCR testing in primary care. There are, however, several factors that may influence hepatitis C PCR testing. The availability of the test, poor patient compliance with testing and difficulty contacting patients may be barriers to further testing. Previous research suggests that confusion among GPs about hepatitis C serology and PCR testing may also be influential.<sup>2,3</sup> Knowledge of the appropriate testing for hepatitis C is also a readily modifiable factor.

The development of new directly acting antiviral agents increases the likelihood of hepatitis C viral clearance in a greater proportion of infected individuals, without the side effects associated with interferon-based therapies.<sup>6</sup> These developments reinforce the importance of hepatitis C PCR testing to identify those who are chronically infected and in whom treatment should therefore be considered. This pilot study highlights that hepatitis C PCR testing is currently underused by GPs. Neglecting PCR testing prevents diagnosis and appropriate management, and ultimately impedes the initiation of potentially curative treatment.

Similar studies are recommended to evaluate the practical use of hepatitis C PCR testing and educate GPs on the recommended management of this infection. Further studies investigating the barriers to hepatitis C PCR testing are also recommended.

## Implications for general practice

- Hepatitis C serology detects only previous exposure to the hepatitis C virus but is the sole test performed on many patients.
- Hepatitis C PCR testing is required at the time of initial hepatitis C serology and 6 months later to distinguish chronic infection from a patient who has cleared the virus. This study suggests that appropriate testing is being performed in the minority of patients.

## Authors

Samuel Bailey BMBS, Public Health Resident, Geraldton Population Health Unit; Combined Universities Centre for Rural Health (UWA); Geraldton, WA

Benjamin Scalley BEd, MBBS (Hon), CTH, MPH, Public Health Registrar, Geraldton Population Health Unit, Geraldton, WA. benjamin.scalley@health.wa.gov.au

Marisa Gilles BSc, MBChB, MPH, MAE, FAFPHM, Public Health Physician, Geraldton Population Health Unit, Geraldton, WA

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## References

1. Bradford D, Dore G, Grulich A, et al. HIV, viral hepatitis and STIs: a guide for primary care. Darlinghurst: Australian Society for HIV Medicine, 2008.
2. Dev A, Sievert W. A survey of Australian general practice management of hepatitis C-infected patients from non-English-speaking backgrounds. *J Gastroenterol Hepatol* 2002;17:295–300.
3. Wang YH, Guy R, Hellard M. The Victorian hepatitis C education program for GPs – an evaluation. *Aust Fam Physician* 2009;38:749–52.
4. D'Souza RF, Glynn MJ, Alstead E, Osonayo C, Foster GR. Knowledge of chronic hepatitis C among East London primary care physicians following the Department of Health's educational campaign. *QJM* 2004;97:331–36.
5. Epidemiology Branch, Western Australia Department of Health. General Health Profile, Demographic & Health Overview. Perth: Western Australian Department of Health, 2014.
6. Chung RT, Baumert TF. Curing chronic hepatitis C – The arc of a medical triumph. *N Engl J Med* 2014;370:1576–78.

**Table 1. PCR testing for hepatitis C in 35 patients positive for hepatitis C antibody**

PCR test		PCR result		PCR test at least 6 months after hepatitis C antibody notification	
Performed	19	Positive	11	Performed	6
		Negative	8		
Not performed	16	–		Not performed	5

correspondence [afp@racgp.org.au](mailto:afp@racgp.org.au)