

# Knowledge and practices of chronic hepatitis B virus testing by general practitioners in Victoria, Australia, 2014–15

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## Background and objective

More than one-third of people living with chronic hepatitis B virus (HBV) in Australia have not been diagnosed. The aim of this study was to assess general practitioners' (GPs') knowledge and practices regarding chronic HBV diagnosis, and identify opportunities to improve testing rates.

## Methods

A cross-sectional survey was conducted with GPs working in Victoria, Australia. Statistically significant adjusted odds ratios for high knowledge, and ordering two or more HBV tests per week were calculated.

## Results

Of 1000 GPs who were invited to participate, 232 completed the survey. Chronic HBV knowledge, use of interpreters, and awareness of HBV testing guidelines were low. Chronic HBV knowledge and testing were associated with age and graduation from a medical school outside Australia. Testing was also associated with gender.

## Discussion

This study identified gaps in GPs' knowledge about chronic hepatitis. Several barriers to improving testing rates among at-risk populations were identified. We recommend revision of the guidelines for prevention in general practice, and educational activities to improve knowledge of at-risk populations for chronic HBV in Australia.

**H**epatitis B virus (HBV) infection causes significant morbidity and mortality globally, with nearly 700,000 estimated attributable deaths in 2013.<sup>1</sup> This occurs despite the availability of effective treatments for chronic HBV infection that prevent progressive liver disease and reduce the risk of hepatocellular carcinoma, and an effective and safe vaccine that prevents infection.<sup>2</sup>

It is estimated that 62% of the 240,000 people living with chronic HBV infection in Australia in 2015 had been diagnosed.<sup>3,4</sup> Most people living with chronic HBV infection in Australia are from culturally and linguistically diverse (CALD) communities, and were born overseas in areas endemic for HBV, mostly from the Asia–Pacific region and Africa.<sup>4</sup> In these populations, most infections occur at birth or in early childhood, when the risk of progression to chronic infection is high.<sup>5</sup>

General practitioners (GPs) are the first point of contact in the healthcare system for most Australians, and are the key workforce to target to increase HBV testing. Rates of HBV testing in general practice are unknown; however, available data suggest the rates are suboptimal. In a recent study, 85% of people identified as at-risk of chronic HBV had unknown HBV status in selected general practices in Melbourne, Victoria.<sup>6</sup> Another recent study in Sydney, New South Wales, identified gaps in GP knowledge, including HBV natural history, diagnosis, treatment availability and management.<sup>7</sup> Collectively, these factors may be associated with suboptimal HBV testing rates.

GPs should be supported to identify at-risk populations and initiate testing when indicated. The aim of this study was to assess GPs' knowledge and practices regarding chronic HBV diagnosis, and identify opportunities to improve HBV testing rates.

## Methods

A cross-sectional study was conducted with GPs practising in Victoria in 2014. There were 6456 Victorian GPs listed on the Australian Medical Publishing Company database, and 1000

were randomly selected and invited by mail to self-complete a paper-based or online survey ([www.surveymonkey.com](http://www.surveymonkey.com)) in October 2014. Reminders were sent after six, 12 and 18 weeks. The final mail-out was sent by registered mail in an effort to improve participation.<sup>8</sup> A stamped, self-addressed return envelope was included in each letter of invitation for survey return.

The survey collected demographic and patient profile data, and asked knowledge questions about chronic HBV, viral hepatitis resources and support awareness, and diagnosis and management. Frequency of requesting HBV tests was assessed by GPs reporting the number of HBV tests requested in the previous week (reported as 0, 1, 2–5, 6–9 and  $\geq 10$  tests). Responses were assigned to low (0 or 1 test) and higher ( $\geq 2$  tests) HBV testing.

Knowledge about HBV was assessed through three questions. These questions had only one correct answer:

1. Which of the following population groups have the highest risk of developing chronic hepatitis B in Australia? – Correct answer: Culturally and linguistically diverse communities
2. Is treatment available for chronic hepatitis B? – Correct answer: Yes
3. Which of the following serology results is indicative of chronic hepatitis B infection? – Correct answer: HBsAg positive, anti-HBc positive, anti-HBs negative

High-level HBV knowledge was measured by answering all three questions correctly. GPs were also assessed about their awareness and use of a range of testing guidelines, including The Royal Australian College of General Practitioners' (RACGP's) *Guidelines for preventive activities in general practice* (the Red Book),<sup>9</sup> Sexual Health Society of Victoria's *National management guidelines for sexually transmissible infections*,<sup>10</sup> and the Australasian Society for HIV Medicine's (ASHM's) *HIV, viral hepatitis and STIs: A guide for primary care providers*.<sup>11</sup> The survey was pre-tested on a small sample ( $n = 5$ ) of GPs.

Unadjusted and adjusted logistic regression identified statistically significant correlates ( $P < 0.05$ ) for inclusion in a final adjusted model for two outcomes: high HBV knowledge and ordering two or more HBV tests per week. Final adjusted models used reverse-stepwise selection where statistically significant unadjusted correlates were included in the initial model and removed sequentially until only significant correlates ( $P < 0.05$ ) remained. Data were entered into SurveyMonkey and analysed using Stata (Stata Statistical Software: Release 13. College Station, TX: StataCorp LP).

Participants were eligible for continuing professional development points through the RACGP's Quality Improvement and Continuing Professional Development (QI&CPD) program. Ethics approval was obtained from the Alfred Hospital's ethics committee (project number 198/14).

## Results

Of the 1000 GPs invited, 974 were eligible and 232 (24%) participated. Of the 26 GPs who were not eligible, current contact details were not available for 21 GPs and five GPs were not currently working. Among the GPs who were eligible to participate, there was a statistically significant difference between the proportion of females in the participant group, compared with the non-participant group ( $P < 0.05$ ); however, there was not a statistically significant difference between the mean age of participants, compared with non-participants.

Among the 232 participants, half (51%) were male, and the median age was 53 years (Table 1). The median time working as a GP was 25 years and most participants (77%) completed their primary medical degree in Australia. Half (48%) had never used an interpreter with non-English speaking patients.

One-quarter of participants completed HBV education activities within the previous five years (Table 2). In a usual week, one-quarter of participants usually requested one HBV test and more than

one-third requested between two and five HBV tests.

One-third of participants correctly identified that the main at-risk population for chronic HBV in Australia are patients from a CALD community. Most (>80%) correctly identified that treatment is available for chronic HBV, and three-quarters correctly identified the serological result indicating chronic HBV. One-quarter of participants correctly answered all three questions relating to HBV knowledge.

Two-thirds of participants were aware of the Red Book. Of these participants, one-fifth had used the Red Book to guide HBV testing within the previous 12 months (Table 3). Awareness of other testing guidelines that include HBV testing was lower, and around one-quarter of participants were aware of either the *National management guidelines for sexually transmissible infections or HIV, viral hepatitis and STIs: A guide for primary care providers*.

Of all the strategies suggested to support GPs identify those with chronic HBV, the strategy most commonly preferred was GP education on HBV and interpretation of test results ( $n = 161$ ; 69%), followed by assistance with identifying patients who should be tested for HBV ( $n = 156$ ; 67%).

In the adjusted analysis, a high level of HBV knowledge remained negatively associated with increasing age (adjusted odds ratio [AOR]: 0.94; 95% confidence interval [CI]: 0.91, 0.97) and positively associated with having graduated from a medical school in Australia (AOR: 4.6; 95% CI: 1.67, 12.7; Table 4). In the adjusted analysis, ordering more than two HBV tests per week remained negatively associated with being male (AOR: 0.47; 95% CI: 0.26, 0.85), increasing age (AOR: 0.96 for each additional year; 95% CI: 0.94, 0.99) and graduation from medical school in Australia (AOR: 0.43; 95% CI: 0.22, 0.85).

## Discussion

Chronic HBV and its complications are a major public health issue in Australia, and GPs have an essential role in the

timely treatment of chronic HBV and vaccination of contacts.

In this study, we identified several barriers that may prevent GPs from testing and diagnosing HBV in patients living with chronic HBV infection. These barriers include suboptimal knowledge about populations at increased risk of chronic HBV in Australia, poor knowledge of current HBV testing recommendations, and low use of interpreting services with CALD populations. Wallace notes that GP knowledge was one of many factors that impeded a GP's response to chronic HBV.<sup>12,13</sup> Only one-quarter of participants in this study correctly answered all three questions relating to HBV knowledge; however, we note that GPs may have interpreted questions differently (eg GPs may have interpreted population groups at highest risk of developing chronic HBV infection in Australia as population groups with HBV acquisition within Australia and excluded migrants from other countries).

Additional information was not collected about HBV educational activities (eg duration, date of training, content); we are therefore unable to juxtapose HBV knowledge between participants who had and had not previously undertaken HBV educational activities, or among those who had previously completed HBV education. Nonetheless, these results highlight the need for additional and enhanced HBV education for GPs. This is supported by participants and was the most commonly preferred strategy to support GPs to identify those with chronic HBV. A key area of low knowledge identified in this study was which groups were at risk of chronic HBV in Australia. Therefore, it is important that educational activities and resources include clear and consistent messaging about who to test for chronic HBV and the key populations most affected. In addition, HBV education targeted towards GPs who did not graduate from medical school in Australia and older GPs may be warranted, as these groups had significantly lower levels of HBV knowledge.

Most GPs were aware of the Red Book; however, only one-fifth used it to guide

**Table 1. Description of sample**

<b>Gender</b>	<b>n (median)</b>	<b>% (IQR)</b>
Female	113	48.7
Male	119	51.3
<b>Total</b>	<b>232</b>	
<b>Age (years)</b>	<b>(53)</b>	<b>(51–55)</b>
20–29	3	1.3
30–39	33	14.2
40–49	48	20.7
50–59	87	37.5
60–69	51	22.0
≥70	10	4.3
<b>Total</b>	<b>232</b>	
<b>Experience as a general practitioner</b>		
Median time as a GP (years)	(25)	(23–26)
<b>Country where primary medical degree was completed</b>		
Australia	179	77.2
Other	52	22.4
Not reported	1	0.4
<b>Total</b>	<b>232</b>	
<b>Among those who did not complete their primary medical degree in Australia</b>		
Low-prevalence country	37	71.2
Intermediate-to-high prevalence country	15	28.8
<b>Total</b>	<b>52</b>	
<b>Patient profile</b>		
<b>Estimated proportion of patients that are migrants from culturally and linguistically diverse community</b>		
0–25%	152	65.5
26–50%	52	22.4
51–75%	8	3.4
76–100%	13	5.6
Not reported	7	3.0
<b>Total</b>	<b>232</b>	
<b>Use an interpreting service (telephone or in-person) during standard consultations with patients who do not speak English as their first language</b>		
Always	8	3.4
Usually	25	10.1
Sometimes	80	34.5
Never	112	48.3
Not reported	7	3.0
<b>Total</b>	<b>232</b>	

HBV testing in the previous 12 months. The Red Book includes HBV testing within the context of a sexual health screen for individuals with high-risk sexual activity or during antenatal screening. However, it does not specifically assess chronic HBV disease status among at-risk populations within the context of chronic disease or cancer prevention.<sup>9</sup> The inclusion of HBV within the context of sexually transmissible infection (STI) screening is of critical concern as it implies that risk can be modified; however, the majority of people living with chronic HBV in Australia were born overseas and infected vertically rather than through sexual or other risk behaviours. Therefore, HBV testing is more appropriately prompted in the context of cancer prevention. It is prudent that subsequent editions of the Red Book ensure prevention of liver cancer is included alongside other areas of chronic disease management and cancer prevention.

Most people living with chronic HBV infection in Australia were born overseas and many speak little or no English.<sup>14</sup> The *Second National Hepatitis B Strategy 2014–2017* notes that CALD communities often experience barriers to accessing testing, including highly disrupted lives, limited access to healthcare services in their country of origin, cultural and language differences, and variable levels of education and health literacy.<sup>15,16</sup> Wallace also noted that issues related to language and cultural diversity created significant challenges for the clinical management of chronic HBV infection in general practice.<sup>12</sup> In this study, approximately half of the participants reported that they never used an accredited interpreting service with patients who do not speak English as their first language. Significant efforts are needed to ensure that communication needs of people from CALD backgrounds are met.

Several limitations to the study should be noted. First, the response rate was lower than anticipated and, therefore, the generalisability to all GPs is limited. However, the response rate was

**Table 2. HBV knowledge, education and testing behaviours**

<b>HBV training</b>	<b>n</b>	<b>%</b>
<b>Completed HBV education activities (within &lt;5 years)</b>		
Yes	59	25.4
No	168	72.4
Not reported	5	2.2
<b>Total</b>	<b>232</b>	
<b>HBV testing behaviour</b>		
<b>Average number of HBV tests per week</b>		
No tests	70	30.2
1 test	54	23.3
2–5 tests	87	37.5
≥6 tests	17	7.3
Not reported	4	1.7
<b>Total</b>	<b>232</b>	
<b>Chronic HBV management</b>		
<b>Currently monitoring any patients with chronic HBV</b>		
Yes	105	45.3
No	122	52.6
Not reported	5	2.2
<b>Total</b>	<b>232</b>	
<b>Number of patients being monitored (among general practitioners who monitor any patients with chronic HBV)</b>		
1–2 patients	55	52.4
3–4 patients	17	16.2
5–9 patients	13	12.4
≥10 patients	11	10.5
Not reported	9	8.6
<b>Total</b>	<b>105</b>	
<b>Trained Schedule 100 prescriber for hepatitis B maintenance prescribing</b>		
Yes	5	2.2
No	220	94.8
Not reported	7	3.0
<b>Total</b>	<b>232</b>	
<b>HBV knowledge</b>		
Correctly identified main at-risk population in Australia for chronic HBV	66	28.4
Correctly identified that treatment is available for chronic HBV	196	84.5
Correctly identified serological result indicating chronic HBV	177	76.3
Answered all knowledge-related questions correctly	55	23.7

*HBV, hepatitis B virus*

comparable to other GP survey response rates,<sup>17</sup> and several strategies were used in an attempt to increase this rate.<sup>8</sup> The low use of interpreters by GPs may have been overestimated by including GPs who spoke the same language as the patient; however, data to assess this was not collected. Appropriate HBV testing is dependent on patient profile, but this could not be assessed in our study, as we only considered the number of HBV tests conducted in the previous week. The negative association observed between HBV testing and males might be due to more female GPs conducting antenatal screening than male GPs, but we did not collect data to substantiate this. Study participants may have a greater interest in HBV and, therefore, these results may not be representative of all GPs in Victoria.

Further, this study was conducted among Victorian-based GPs only, and the results demonstrate the need for a broader national investigation to confirm the nature and extent of barriers to HBV testing and diagnosis by GPs. Finally, as noted above, GPs may have interpreted questions differently.

Chronic HBV infection is an increasingly important public health problem in Australia and globally. This study identified gaps in GPs knowledge of HBV infection. Potential barriers to improving testing rates for HBV infection among at-risk populations were identified, including the Red Book's emphasis on sexual but not vertical transmission of HBV, and low use of interpreting services. Revision of the Red Book is recommended, and enhanced educational activities to disseminate these guidelines and increase knowledge and testing of populations at risk of chronic HBV in general practice.

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**Table 3. Awareness and use of HBV testing and management guidelines and agreement with support strategies to identify those with chronic HBV**

	n	%
<b>Total number of general practitioners participating:</b>	<b>232</b>	<b>100.0</b>
<b>HBV testing guidelines</b>	<b>n</b>	<b>%</b>
<i>Guidelines for preventive activities in general practice</i>		
– Awareness of these guidelines	155	66.8
– Used these guidelines to guide HBV testing	33	21.3
<i>National management guidelines for sexually transmissible infections</i>		
– Awareness of these guidelines	68	29.3
– Used these guidelines to guide HBV testing	15	22.1
<i>HIV, viral hepatitis and STIs: A guide for primary care providers</i>		
– Awareness of these guidelines	60	25.9
– Used these guidelines to guide HBV testing	26	43.3
<i>Clinical guidelines for the management of sexually transmissible infections among risk populations</i>		
– Awareness of these guidelines	46	19.8
– Used these guidelines	18	39.1
<b>HBV management guidelines</b>	<b>n</b>	<b>%</b>
<i>B positive – All you wanted to know about hepatitis B: A guide for primary care providers</i>		
– Awareness of these guidelines	28	12.1
– Used these guidelines	15	53.6
<i>Hepatitis B and primary care providers</i>		
– Awareness of these guidelines	24	10.3
– Used these guidelines	9	37.5
<i>Decision making in hepatitis B virus</i>		
– Awareness of these guidelines	18	7.8
– Used these guidelines	8	44.4
<i>Australia and New Zealand chronic hepatitis B (chronic hepatitis B) recommendations: Summary and algorithm</i>		
– Awareness of these guidelines	29	12.5
– Used these guidelines	11	37.9
<i>hepbhelp.org.au</i>		
– Awareness of this website	33	14.2
– Used this website	15	45.5
<b>Agreement with support strategies to identify those with chronic HBV</b>	<b>n</b>	<b>%</b>
GP education on hepatitis B testing and interpretation	161	69.4
Assistance with identifying patients who should be tested for hepatitis B	156	67.2
Clearer guidelines for diagnosis of hepatitis B in general practice	130	56.0
Quick access – Print resources for reference within consultations	111	47.8
Web-based resources to support testing for hepatitis B testing	101	43.5
Implementation of recall and reminder systems to prompt hepatitis B testing	79	34.1
Visual aids to prompt hepatitis B testing in the consultation room	71	30.6
<i>HBV, hepatitis B virus</i>		

**Table 4. Correlates of a high level of HBV knowledge and ordering more than two HBV tests per week**

<b>Outcome 1: Correctly answered all knowledge scores</b>						
	<b>OR</b>	<b>P value</b>	<b>95% CI</b>	<b>AOR</b>	<b>P value</b>	<b>95% CI</b>
Male (reference: female)	0.61	0.11	0.33, 1.12			
Age (for each one year increase)	<b>0.94</b>	<b>&lt;0.0001</b>	<b>0.91, 0.97</b>	<b>0.94</b>	<b>&lt;0.0001</b>	<b>0.91, 0.97</b>
Years as a GP (for each one year increase)	<b>0.95</b>	<b>0.001</b>	<b>0.92, 0.98</b>			
Graduated from Australian medical school (reference: graduated internationally)	<b>3.64</b>	<b>0.01</b>	<b>1.37, 9.69</b>	<b>4.6</b>	<b>0.003</b>	<b>1.67, 12.67</b>
Estimated proportion of patients who are migrants from culturally and linguistically diverse community is >50%	1.33	0.57	0.49, 3.34			
Completed HBV education activities within <5 years (reference: no educational activities)	1.27	0.49	0.65, 2.51			
Conducts more than six HBV tests per week on average (reference: no tests)	<b>3.1</b>	<b>0.03</b>	<b>1.13, 8.48</b>			
<b>Outcome 2: Orders of two or more HBV tests per week</b>						
	<b>OR</b>	<b>P value</b>	<b>95% CI</b>	<b>AOR</b>	<b>P value</b>	<b>95% CI</b>
Male (reference: female)	<b>0.37</b>	<b>&lt;0.0001</b>	<b>0.22, 0.63</b>	<b>0.47</b>	<b>0.012</b>	<b>0.26, 0.85</b>
Age (for each one year increase)	<b>0.95</b>	<b>&lt;0.0001</b>	<b>0.93, 0.98</b>	<b>0.96</b>	<b>0.01</b>	<b>0.94, 0.99</b>
Years as a GP (for each one year increase)	1	0.47	1.00, 1.00			
Graduated from Australian medical school (reference: graduated internationally)	<b>0.46</b>	<b>0.02</b>	<b>0.24, 0.86</b>	<b>0.43</b>	<b>0.015</b>	<b>0.22, 0.85</b>
Estimated proportion of patients who are migrants from culturally and linguistically diverse community is >50%	<b>2.55</b>	<b>0.05</b>	<b>0.99, 6.58</b>			
Completed HBV education activities within <5 years (reference: no educational activities)	<b>1.95</b>	<b>0.03</b>	<b>1.07, 3.56</b>	<b>2.01</b>	<b>0.03</b>	<b>1.06, 3.8</b>
Correctly answered all knowledge scores	1.2	0.55	0.65, 2.21			

Note: Statistically significant ( $P < 0.05$ ) results are in bold type

AOR, adjusted odds ratio; CI, confidence intervals; HBV, hepatitis B virus; OR, odds ratio

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