Prevalence and epidemiology of hepatitis B

KEY POINTS

- In 2016, there were an estimated 230,000 people living with chronic hepatitis B (CHB) infection in Australia, representing 0.9% of the population.
- Only 63% of people living with CHB in Australia are estimated to have been diagnosed.
- Those born overseas and Aboriginal and Torres Strait Islander people comprise around two-thirds of all Australians living with CHB.
- A higher prevalence of CHB infection is also observed in people who inject drugs and in men who have sex with men.
- Over 90% of new cases of CHB in Australia are attributable to migration and cannot be prevented through local vaccination initiatives.
- Deaths due to CHB result from complications of cirrhosis, liver failure and liver cancer (specifically, hepatocellular carcinoma) in up to one-quarter of people living with CHB.

Hepatitis B virus background and global epidemiology

The global burden of hepatitis B virus (HBV) infection is profound. Around 250 million people are estimated to be living with chronic hepatitis B (CHB) (1, 2), and CHB causes liver-related death in up to one-quarter of people with the disease (1). Liver cancer, of which HBV is the leading cause, is the fourth most common cause of cancer death worldwide, making hepatitis B the second most important known human carcinogen after tobacco (3, 4). The Global Burden of Disease Study estimated that HBV infection was responsible for 815,100 deaths in 2016 (3).

Although the prevalence of CHB varies significantly by country, the majority of people in the world live in an area endemic for hepatitis B (considered as over 2% prevalence, see Figure 1.1). HBV is transmitted through blood or infected bodily fluids; for example, by mother-to-child transmission, sexual contact or percutaneous exposures (5). HBV infection is not transmitted through sharing food or casual contact.

The epidemiology of CHB is predominantly determined by the age at exposure, with about 90% of infants with the infection progressing to chronic infection, compared with only 5% of immunocompetent adults (5) (see: Natural History of hepatitis B virus infection). This is why most people currently living with CHB in Australia acquired infection early in life (as is the case globally), and why universal infant vaccination is crucial for HBV control across populations. Although most countries have now implemented universal infant vaccination (6), the long delay between initial infection and the onset of complications, and the large number of existing chronic infections, mean that the burden of disease attributable to CHB will remain high for several decades. Early diagnosis and appropriate management for those living with HBV are essential for addressing the increasing morbidity and mortality associated with CHB.
Epidemiology and burden of chronic hepatitis B in Australia

In 2016, an estimated 230,000 Australians (about 0.9% of the population) were living with CHB (8). The priority populations affected by CHB in Australia include those born in endemic areas overseas (particularly the Asia-Pacific region) (Figure 1.2), Aboriginal and Torres Strait Islander people, people who inject drugs (PWID), and men who have sex with men (MSM). These groups make up over three-quarters of those living with HBV (Figure 1.3). Other Australian-born people at higher risk for CHB include those whose parents were born overseas in an endemic area, and those exposed to hepatitis B through sexual contact or medical transmission before routine blood donor screening.

The prevalence of CHB in Australia has increased over the past decade, predominantly related to the increases in migration from endemic areas such as the Asia-Pacific region (9,10) and sub-Saharan Africa. Other areas with a higher prevalence of CHB include parts of southern and eastern Europe, and the Middle East (see Figure 1.1).
Figure 1.2 Top endemic countries of birth for chronic hepatitis B in Australia (11)

<table>
<thead>
<tr>
<th>Country</th>
<th>Proportion of people with chronic hepatitis B in Australia, 2016 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>40000</td>
</tr>
<tr>
<td>Vietnam</td>
<td>18600</td>
</tr>
<tr>
<td>Philippines</td>
<td>7300</td>
</tr>
<tr>
<td>Taiwan</td>
<td>5000</td>
</tr>
<tr>
<td>Italy</td>
<td>4600</td>
</tr>
<tr>
<td>Thailand</td>
<td>3400</td>
</tr>
<tr>
<td>Cambodia</td>
<td>3200</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>2600</td>
</tr>
<tr>
<td>South Korea</td>
<td>2500</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2500</td>
</tr>
<tr>
<td>Myanmar</td>
<td>1800</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1600</td>
</tr>
</tbody>
</table>
Figure 1.3 Distribution of Australia’s burden of chronic hepatitis B by priority population in 2016 (Adapted from [1])

- People born in Asia-Pacific
- People born in Africa/Middle East
- People born in Europe
- People born in other regions/not stated
- Aboriginal and Torres Strait Islander people
- People who inject drugs
- Men who have sex with men
- Other Australian-born non-Indigenous people
Australia implemented universal infant vaccination for hepatitis B in 2000 (12), as well as adolescent catch-up programs, which have been effective in reducing the number of people acquiring hepatitis B in adolescence and adulthood (8) (and will help prevent transmission to children born in Australia to mothers with CHB. However, given the large number of people already living with CHB and that most new CHB infections are entering the population through migration (13), vaccination programs are unlikely to have a substantial effect on morbidity and mortality associated with hepatitis B in Australia; instead, timely diagnosis and clinical management are the key components of an effective response (14). The current level of access to diagnosis, monitoring and treatment among Australians living with CHB is currently well below the levels needed to prevent adverse outcomes. The most recent evidence suggests that only 63% of people living with CHB have been diagnosed, 17% are receiving ongoing monitoring and 7% accessing treatment (8), less than half the national treatment uptake target (14).

Diagnosis of CHB requires notification to the relevant public health authority in all Australian states and territories. The rate of CHB diagnosis has remained relatively stable over the past decade, with about 7000 new diagnoses annually (Figure 1.4); however, it is estimated that only about two-thirds of those living with CHB in Australia have been diagnosed (16). Newly acquired (acute) HBV infections represent less than 5% of all notifications of hepatitis B. Notifications of newly acquired HBV infection fell over the course of the past decade, partly because of the impact of the universal infant and adolescent vaccination programs. The major risk factors for acquisition of newly acquired infection are injecting drug use and sexual transmission (8).

Figure 1.4 Notifications of hepatitis B to Australia’s National Notifiable Diseases Surveillance System, 2007–16 (16)
This increasing prevalence and the large number of people living with undiagnosed infection is contributing to a rising burden of advanced liver disease, including hepatocellular carcinoma (HCC) \((17,18)\). Liver cancer is now estimated to be the sixth most common cause of cancer mortality in Australia, and mortality is increasing faster than for any other cause of cancer death \((19,20)\).

Most of the liver cancer in Australia is thought to be attributable to chronic viral hepatitis (B and C) \((21,22)\), and the burden is greatest in Aboriginal and Torres Strait Islander people \((23-25)\), and those born overseas \((18,26)\).

### Chronic hepatitis B prevalence in specific populations

#### Culturally and linguistically diverse communities

In the 2016 Census, about six million Australians (28%) were born overseas \((27)\), with more than half migrating from regions with a population CHB prevalence of 2% or more \((28)\). The prevalence of CHB in migrants generally reflects that in their country of origin \((29)\) and in Australia, particularly in urban areas, the prevalence of CHB by geographic area reflects the proportion of residents who were born overseas \((28,30)\).

Of overseas-born Australians living with CHB, the largest group is made up of those born in the Asia-Pacific region (41% of all Australians living with CHB) \((11)\). People born in Africa and the Middle East (6% of the total) and Europe (9% of the total) also make up a substantial proportion of people with CHB in Australia \((11)\). This is reflected in the finding that Australians born overseas in HBV endemic areas have a much higher incidence of liver cancer than non-Indigenous Australian-born people, with those born in countries such as Cambodia, China, Korea and Vietnam up to 10 times more likely to be diagnosed with liver cancer than other Australians \((9,18,26)\).

#### Aboriginal and Torres Strait Islander Australians

According to the 2016 Census, there were 674,000 Aboriginal and Torres Strait Islander Australians, representing 2.8% of the population \((27)\). However, Aboriginal and Torres Strait Islander people are estimated to account for 11% of Australians living with CHB infection \((11)\).

The prevalence of CHB in Aboriginal and Torres Strait Islander people has decreased over the past two decades, but it remains more than three times higher than in the non-Indigenous population \((31-33)\). One explanation for this reduction in prevalence is the implementation of universal infant and adolescent vaccination programs. Despite these successes, there is evidence of gaps in the immunity of Aboriginal and Torres Strait Islander people. Several studies have demonstrated that significant numbers of Aboriginal and Torres Strait Islander people lack markers of immunity to HBV infection \((34,35)\), and 93.2% of children have been fully vaccinated (receiving three doses by 12 months of age), as compared to 94.6% of non-Indigenous children \((36)\). Importantly, there is also evidence of vaccination failure even in children who were documented to have received a full course of vaccine \((37)\). Further studies of the reasons for failure of vaccination policy in Aboriginal and Torres Strait Islander people are required (see: Primary prevention of hepatitis B virus infection).

The incidence of HCC has been demonstrated to be two to eight times higher in Aboriginal and Torres Strait Islander people compared with non-Indigenous Australians, in a number of areas of Australia \((20,23,24)\). People living in remote areas of Australia often have limited access to primary health care and specialist services \((11)\). A higher proportion of Aboriginal and Torres Strait Islander people compared with non-Indigenous Australians live in remote areas (25% compared to 2%) \((27)\), with people living in remote areas often needing to travel great distances to access health services. Assessment of treatment and monitoring uptake according to geographic area shows much lower access to hepatitis B care for those...
living in rural and remote areas of Australia (11). A study conducted in the Torres Strait Islands outlined a range of barriers for community members in accessing HBV testing, vaccination and ongoing management, together with numerous issues for clinical staff around workforce development, training and mentorship (38).

**People who inject drugs**

The most recent evidence suggests that 4% of Australians who currently or recently injected drugs are living with CHB (39). Given that about 1.6% of the Australian population has injected drugs at some time (40), a conservative estimate of the number of people with a history of injecting drug use living with CHB is about 13,600, or 6% of all Australians living with CHB. Australian seroprevalence studies in people who inject drugs have shown that only about one-quarter of participants had serological markers of immunity to HBV infection (41,42), with a longer history of injecting and exposure to hepatitis C being independently associated with HBV infection.

**Men who have sex with men**

The prevalence of CHB among MSM is around three times higher than the population prevalence in Australia, and MSM are estimated to comprise around 5% of all people living with CHB (11). Although the prevalence has declined among the MSM population since the 1980s, recent studies still indicate an increased risk in this community; for example, a sexual health clinic in Melbourne found a prevalence of 3% (43). Levels of immunity through both prior infection and immunisation have been demonstrated to be high, with studies involving men in Melbourne and Sydney showing that more than half had serological evidence of immunisation (43,44). Factors associated with increased risk of HBV infection among MSM include increased age, a higher number of sexual partners and a history of sexually transmissible infections (43, 44).

**Other priority populations**

A number of other population groups are identified as being at increased risk of HBV infection, including commercial sex workers (45), people in correctional facilities (46), people with haemophilia or a history of transfusion conducted before the implementation of screening in the late 1970s, and people born in Australia to mothers from endemic areas before commencement of universal infant vaccination in 2000. People living with human immunodeficiency virus (HIV) or hepatitis C, or both, are at increased risk of HBV infection, experiencing severe acute infection, and (for HIV) progression to chronic infection. A comprehensive list of populations recommended for routine testing in Australia is given in Table 1.1.

<table>
<thead>
<tr>
<th>Table 1.1 People recommended for routine hepatitis B virus screening in accordance with the National Hepatitis B Testing Policy (see testingportal.ashm.org.au/hbv)</th>
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<tbody>
<tr>
<td><strong>All patients undergoing chemotherapy or immunosuppressive therapy</strong> (due to risk of reactivation)</td>
</tr>
<tr>
<td>People born overseas in areas with 2% hepatitis B virus prevalence or greater (see Figure 1.1)</td>
</tr>
<tr>
<td>Aboriginal and Torres Strait Islander peoples</td>
</tr>
<tr>
<td>People who have ever injected drugs</td>
</tr>
<tr>
<td>Men who have sex with men</td>
</tr>
</tbody>
</table>
People living with HIV or hepatitis C, or both

Sex workers

People with haemophilia/history of blood transfusion in the pre-screening era

People with multiple sexual partners

Household and sexual contacts of people with chronic hepatitis B

People who are undergoing dialysis

People who have ever been in custodial settings

**Putting epidemiology into practice: health-care service delivery to the populations affected by chronic hepatitis B**

Understanding the epidemiology of CHB is crucial to identifying those at risk and guiding screening activities, but also for delivering appropriate and effective care to those groups disproportionately burdened.

Many people who belong to communities at greater risk for CHB have low awareness about hepatitis B, even when engaged with health-care services (47-49). This situation highlights the need for improved targeting and engagement of high-risk groups by clinicians.

Those Australians born overseas, and Aboriginal and Torres Strait Islander peoples, often have lower rates of participation in preventive care services such as cancer screening (23, 50). This has significant implications for the clinical management of people from these populations living with CHB, with ultrasound-based screening for liver cancer a vital part of management for those at risk (see: Hepatitis B related hepatocellular carcinoma).

In addition to general practice and other primary health-care services in Australia, there are over 150 Aboriginal Community Controlled Health Services (ACCHS), which provide culturally appropriate medical and allied health care to Indigenous peoples. Studies indicate that ACCHS are preferred primary health-care providers by Aboriginal and Torres Strait Islander peoples (52) and – with appropriate resourcing, training and support – have the potential to improve HBV testing uptake and vaccination coverage, as well as to provide ongoing monitoring and treatment for Aboriginal and Torres Strait Islander peoples living with CHB.

**Conclusion**

In Australia, CHB disproportionately affects those from culturally and linguistically diverse backgrounds, with more than two-thirds of those living with infection born overseas or being Aboriginal and Torres Strait Islander people. Most people currently living with CHB acquired it at birth or in early childhood. Despite CHB affecting around 230,000 Australians, only two-thirds of these people have been diagnosed, highlighting the importance of routine CHB screening in these groups. Diagnosis is an essential component in engaging those living with hepatitis B infection in ongoing care, which is currently provided to fewer than one in five of those living with CHB. Given substantial contribution to the Australian population of people born in endemic areas of the world such as Africa, the Asia-Pacific region and the Middle East,
targeted testing must intensify to increase detection rates and avert further increases in adverse outcomes of CHB, such as liver cancer, which has become the fastest increasing cause of cancer death in Australia.

Knowledge of the Australian communities most affected by CHB is essential when planning and implementing clinical and public health responses aimed at addressing the increasing burden of disease, low levels of disease awareness and diagnosis, and low treatment uptake. Such an epidemiological understanding will help to ensure that any interventions are effective, understood and appropriate for the communities most affected.

References

2. WHO. Hepatitis B Key Facts 5 July 2017 Available at: http://www.who.int/news-room/fact-sheets/detail/hepatitis-b (last accessed 17 July 2018)


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