

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.
-

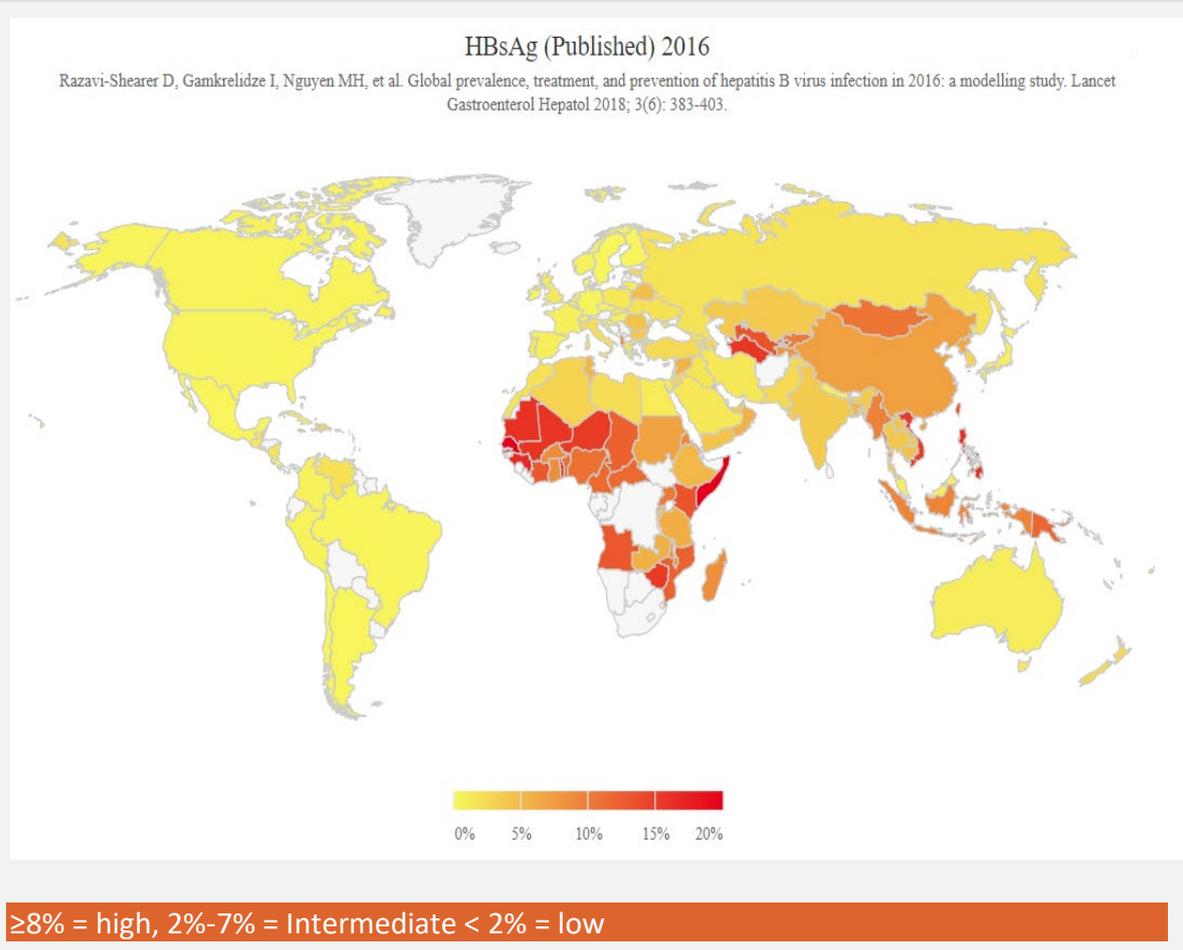
Hepatitis B virus background and global epidemiology

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.

Figure 1.1 Geographical distribution of hepatitis B virus (7)

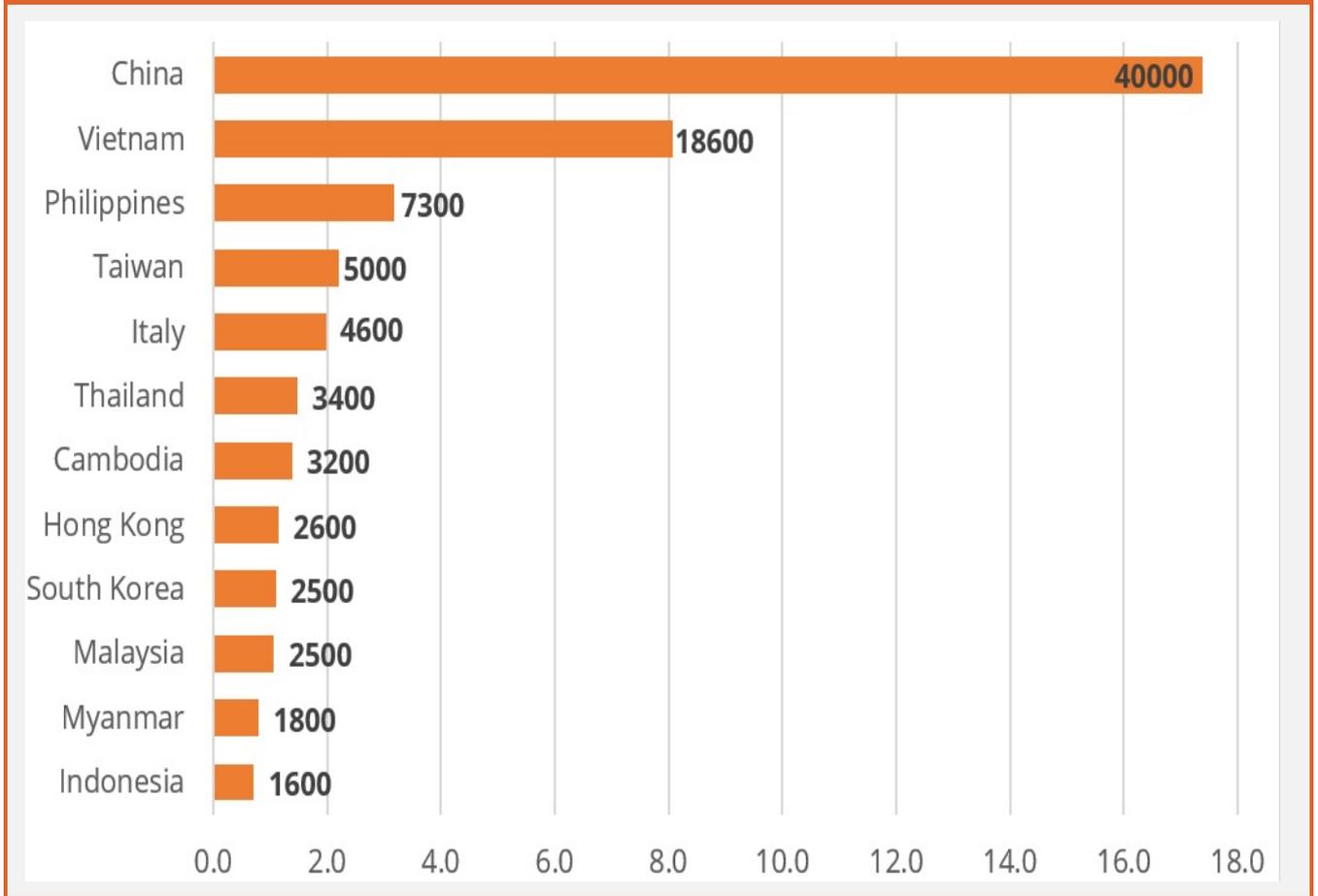


Epidemiology and burden of chronic hepatitis B in Australia

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.

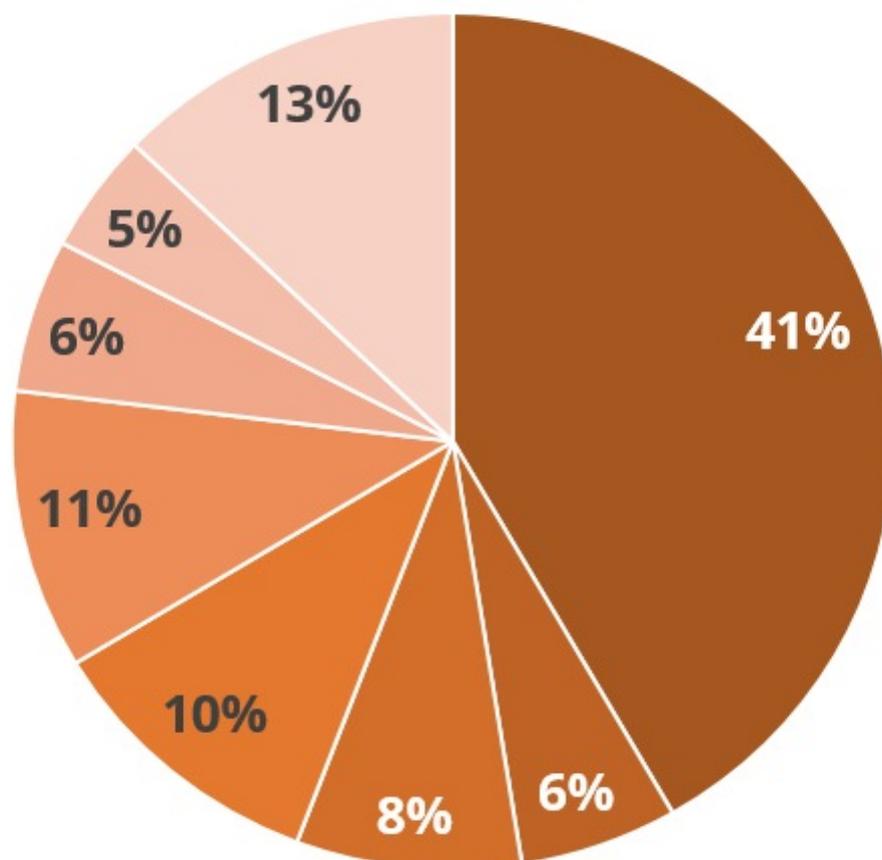
The prevalence of CHB in Australia has increased over the past decade, predominantly related to the increases in migration from endemic areas such as the Asia-Pacific region (9,10) and sub-Saharan Africa. Other areas with a higher prevalence of CHB include parts of southern and eastern Europe, and the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

Figure 1.2 Top endemic countries of birth for chronic hepatitis B in Australia ([11](#))



Proportion of people with chronic hepatitis B in Australia, 2016 (%)

Figure 1.3 Distribution of Australia's burden of chronic hepatitis B by priority population in 2016 (Adapted from [11](#))

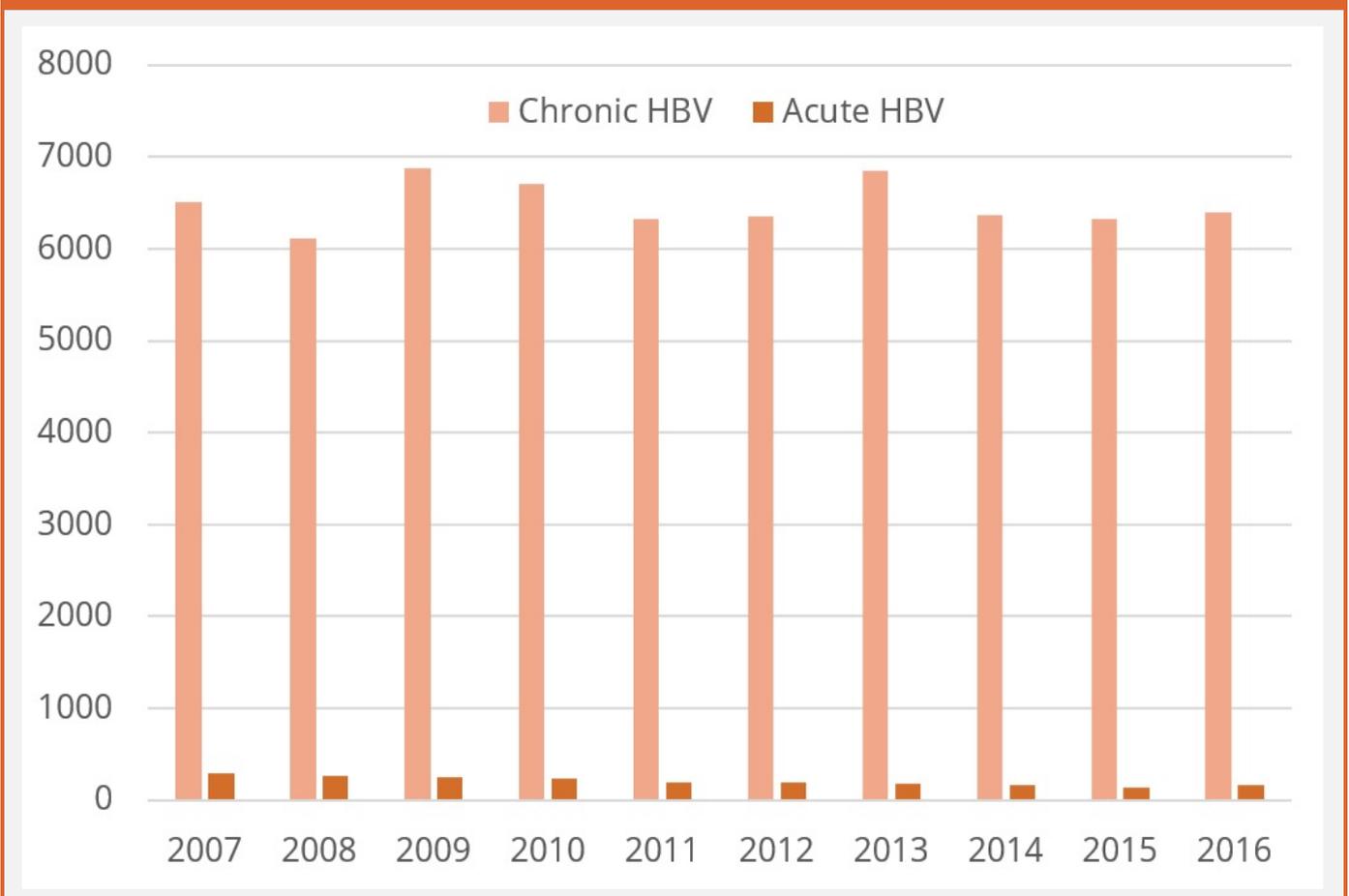


- People born in Asia-Pacific
- People born in Africa/Middle East
- People born in Europe
- People born in other regions/not stated
- Aboriginal and Torres Strait Islander people
- People who inject drugs
- Men who have sex with men
- Other Australian-born non-Indigenous people

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 (15)



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 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)

All patients undergoing chemotherapy or immunosuppressive therapy (due to risk of reactivation)

People born overseas in areas with 2% hepatitis B virus prevalence or greater (see [Figure 1.1](#))

Aboriginal and Torres Strait Islander peoples

People who have ever injected drugs

Men who have sex with men

People living with HIV r hepatitis C, or both
Sex workers
People with haemophili/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

1. Schweitzer A, Horn J, Mikolayczyk R, Krause G, Ott J. Estimation of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. *Lancet* 2015;386:1546-55.
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)
3. GBD Causes of Death Collaborators. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017;390:1151-210
4. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA Cancer J Clin* 2011;61:69-90.
5. Lavanchy D. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures. *J Viral Hepat* 2004;11:97-107.
6. World Health Organization. *Global Hepatitis Report, 2017*. Geneva: World Health Organization, 2017.
7. Polaris Observatory Collaborators. Global prevalence, treatment, and prevention of hepatitis virus infection in 2016: a modelling study. *Lancet Gastroenterol Hepato*. 2018;3:383-403. Available at: <http://cdafound.org/polaris-hepb-map/> (last accessed 5 July 2018).
8. The Kirby Institute. *HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2017*. Sydney: The Kirby Institute, The University of New South Wales; 2017.
9. Supramaniam R, O'Connell D, Robotin M, Tracey E, Sitas F. Future cancer trends to be influenced by past and future migration. *Aust N Z J Public Health* 2008;32:90-2.
10. Australasian Society for HIV Medicine and Victorian Infectious Diseases Reference Laboratory. *Hepatitis B Mapping Project: Estimates of CHB prevalence and cultural and linguistic diversity by Medicare Local. National Report 2011*. Darlinghurst: Australasian Society for HIV Medicine; 2013.
11. WHO Collaborating Centre for Viral Hepatitis Epidemiology, Doherty Institute, ASHM. *Hepatitis B Mapping Project. Estimates of geographic diversity in chronic hepatitis B prevalence, diagnosis, monitoring and treatment. National Report 2016*. ASHM: Darlinghurst; 2018.
12. Australian Government. Australian Technical Advisory Group on Immunisation (ATAGI). *The Australian Immunisation Handbook. 10th edition (updated 22 June 2015) [internet]*. Canberra: Department of Health; 2015. Available at: <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home~handbook10-updates~handbook10-updates-22-06-2015> (last accessed 24 June 2018).
13. MacLachlan JH, Allard N, Towell V, Cowie BC. The burden of chronic hepatitis B virus infection in Australia, 2011. *Aust NZ J Public Health* 2013;37:416-22.
14. Robotin MC, Kansil M, Howard K, George J, Tipper S, Dore GJ, et al. Antiviral therapy for hepatitis B-related liver cancer prevention is more cost-effective than cancer screening. *J Hepatol* 2009;50:990-8.
15. Australian Government Department of Health. *Second National Hepatitis B Strategy 2014-2017*. Canberra: Australian Government Department of Health; 2014. Available at: www.health.gov.au/internet/main/publishing.nsf/Content/ohp-bbvs-hepb (last accessed 19 June 2018).

16. MacLachlan JH, Allard N, Carville KS, Haynes K, Cowie BC. Mapping progress in chronic hepatitis B: geographic variation in prevalence, diagnosis, monitoring and treatment, 2013-15. *Aust NZ J Public Health* 2018;42:62-8.
17. Wong N, Haydon A, Kemp W, Wijeratne P, Roberts S. Improved survival trend of patients with hepatocellular carcinoma at an Australian tertiary hospital between 1995-2009. *Intern Med J* 2013;43:197-203.
18. Carville KS, MacLachlan J, Thursfield V, Cowie B. Hepatocellular carcinoma over three decades in Victoria, Australia: epidemiology, diagnosis, and trends, 1984-2013. *Intern Med J* 2018 Mar 31. [Epub ahead of print].
19. Brown CR, Allard NL, MacLachlan JH, Cowie BC. Deaths from liver cancer continue to rise in Australia: is elimination by 2030 possible? *Intern Med J* 2017;47:604-5.
20. Australian Institute of Health and Welfare. *Cancer in Australia 2017*. Cancer series no.101. Cat. no. CAN 100. Canberra: AIHW; 2017.
21. Hong TP, Gow P, Fink M, Dev A, Roberts S, Nicoll A, et al. Novel population-based study finding higher than reported hepatocellular carcinoma incidence suggests an updated approach is needed. *Hepatology* 2016;63:1205-12.
22. Global Burden of Disease Liver Cancer Collaboration, et al. The burden of primary liver cancer and underlying etiologies from 1990 to 2015 at the global, regional, and national level: results from the Global Burden of Disease Study 2015. *JAMA Oncol* 2017;3:1683-91.
23. Cunningham J, Rumbold AR, Zhang X, Condon JR. Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *Lancet Oncol* 2008;9:585-95.
24. Parker C, Tong SY, Dempsey K, Condon J, Sharma SK, Chen JW, et al. Hepatocellular carcinoma in Australia's Northern Territory: high incidence and poor outcome. *Med J Aust* 2014;201:470-4.
25. Clark PJ, Stuart KA, Leggett BA, Crawford DH, Boyd P, Fawcett J, et al. Remoteness, race and social disadvantage: disparities in hepatocellular carcinoma incidence and survival in Queensland, Australia. *Liver Int* 2015;35:2584-94.
26. Waziry R, Grebely J, Amin J, Alavi M, Hajarizadeh B, George J, et al. Trends in hepatocellular carcinoma among people with HBV or HCV notification in Australia (2000-2014). *J Hepatol* 2016;65:1086-93.
27. Australian Bureau of Statistics. 2024.0. *Census of Population and Housing: Australia revealed, 2016* [internet]. Canberra: Commonwealth of Australia; 2017. Available at: www.abs.gov.au/ausstats/abs@.nsf/mf/2024.0 (last accessed 20 June 2018).
28. MacLachlan JH, Allard N, Carville KS, Haynes K, Cowie BC. Mapping progress in chronic hepatitis B: geographic variation in prevalence, diagnosis, monitoring and treatment, 2013-15. *Aust NZ J Public Health* 2018;42:62-8.
29. Reekie J, Gidding HF, Kaldor JM, Liu B. Country of birth and other factors associated with hepatitis B prevalence in a population with high levels of immigration. *J Gastroenterol Hepatol* 2013;28:1539-44.
30. Cowie B, Karapanagiotidis T, Enriquez A, Kelly H. Markers of hepatitis B virus infection and immunity in Victoria, Australia, 1995 to 2005. *Aust N Z J Public Health* 2010;34:72-8.
31. Deng L, Reekie J, Ward JS, Hayen A, Kaldor JM, Kong M, et al. Trends in the prevalence of hepatitis B infection among women giving birth in New South Wales. *Med J Aust* 2017;206:301-5.
32. Davies J, Li SQ, Tong SY, Baird RW, Beaman M, Higgins G, et al. Establishing contemporary trends in hepatitis B sero-epidemiology in an Indigenous population. *PloS One* 2017;12:e0184082.
33. Reekie J, Kaldor JM, Mak DB, Ward J, Donovan B, Hocking JS, et al. Long-term impact of childhood hepatitis B vaccination programs on prevalence among Aboriginal and non-Aboriginal women giving birth in Western Australia. *Vaccine* 2018;36:3296-300.
34. Harrod ME, Couzos S, Delaney-Thiele D, Dore GJ, Hammond B, Saunders M, et al. Markers of hepatitis B infection and immunity in patients attending Aboriginal Community Controlled Health Services. *Med J Aust* 2014;201:339-42.
35. Carroll E, Page W, Davis JS. Screening for hepatitis B in East Arnhem Land: a high prevalence of chronic infection despite incomplete screening. *Intern Med J* 2010;40:784-7.
36. Australian Government Department of Human Services. *Australian Immunisation Register (AIR) statistics* [internet]. Available at: www.humanservices.gov.au/corporate/statistical-information-and-data/medicare-statistics/australian-childhood-immunisation?utm_id=9 (last accessed 5 July 2018).

37. Dent E, Selvey C, Bell A, Davis J, McDonald M. Incomplete protection against hepatitis B among remote Aboriginal adolescents despite full vaccination in infancy. *Commun Dis Intell* 2010;34:435–9.
38. Wallace J, Pitts M, McNally S, Ward J, Nakata Y, Fagan P. A situational analysis of chronic hepatitis B in the Torres Strait. Monograph Number 82. Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University; 2011.
39. Degenhardt L, Peacock A, Colledge S, Leung J, Grebely J, Vickerman P, et al. Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: a multistage systematic review. *Lancet Glob Health* 2017;5:e1192-e207.
40. Australian Institute of Health and Welfare. National Drug Strategy Household Survey detailed report 2013. Drug statistics series no. 28. Cat. no. PHE 183. Canberra: AIHW; 2014.
41. Miller ER, Hellard ME, Bowden S, Bharadwaj M, Aitken CK. Markers and risk factors for HCV, HBV and HIV in a network of injecting drug users in Melbourne, Australia. *J Infect* 2009;58:375–82.
42. Day CA, White B, Dore GJ, van Beek I, Rodgers C, Cunningham P, et al. Hepatitis B virus among injecting drug users in Sydney, Australia: prevalence, vaccination and knowledge of status. *Drug Alcohol Depend* 2010;108:134–7.
43. Gamagedara N, Weerakoon AP, Zou H, Fehler G, Chen MY, Read TR, et al. Cross-sectional study of hepatitis B immunity in MSM between 2002 and 2012. *Sex Transm Infect* 2014;90:41-5.
44. Jin F, Prestage GP, Pell CM, Donovan B, Van de Ven PG, Kippax SC, et al. Hepatitis A and B infection and vaccination in a cohort of homosexual men in Sydney. *Sex Health* 2004;1:227–37.
45. Seib C, Debattista J, Fischer J, Dunne M, Najman JM. Sexually transmissible infections among sex workers and their clients: variation in prevalence between sectors of the industry. *Sex Health* 2009;6:45–50.
46. Butler T, Belcher JM, Champion U, Kenny D, Allerton M, Fasher M. The physical health status of young Australian offenders. *Aust N Z J Public Health* 2008;32:73–80.
47. Richmond J, Smith E, Wallace J, Duncan D, Lucke J. Hepatitis B testing and diagnosis experiences of patients and primary care professionals in Australia. *Aust Fam Phys* 2017;46(7):513-9.
48. Caruana SR, Kelly HA, De Silva SL, Chea L, Nuon S, Saykao P, et al. Knowledge about hepatitis and previous exposure to hepatitis viruses in immigrants and refugees from the Mekong Region. *Aust N Z J Public Health* 2005;29:64–8.
49. Wallace J, McNally S, Richmond J, Hajarizadeh B, Pitts M. Managing chronic hepatitis B: a qualitative study exploring the perspectives of people living with chronic hepatitis B in Australia. *BMC Res Notes* 2011;4:45.
50. Anikeeva O, Bi P, Hiller JE, Ryan P, Roder D, Han G-S. The health status of migrants in Australia: a review. *Asia Pac J Public Health* 2010;22:159–93.
51. Ward J, Bryant J, Worth H, Hull P, Solar S, Bailey S. Use of health services for sexually transmitted and blood-borne viral infections by young Aboriginal people in New South Wales. *Aust J Prim Health* 2013;19:81–6.

Authors

Jennifer MacLachlan - WHO Collaborating Centre for Viral Hepatitis, Doherty Institute and Department of Medicine, University of Melbourne, Melbourne VIC

Benjamin Cowie - WHO Collaborating Centre for Viral Hepatitis, Doherty Institute, Royal Melbourne Hospital, and Department of Medicine, University of Melbourne, Melbourne VIC

Acknowledgement

Simon Graham - Kirby Institute, The University of New South Wales, Sydney, NSW. Co-authored the original version of this chapter (2012 edition).