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Tracking the uptake of outcomes of hepatitis B virus testing using laboratory data in Victoria, 2011–16: a population-level cohort study

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Abstract. ***Background*:** A priority area in the 2016 Victorian Hepatitis B Strategy is to increase diagnostic testing. This study describes hepatitis B testing and positivity trends in Victoria between 2011 and 2016 using data from a national laboratory sentinel surveillance system. ***Methods*:** Line-listed diagnostic and monitoring hepatitis B testing data among Victorian individuals were collated from six laboratories participating in the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) of sexually transmissible infections and blood-borne viruses. Diagnostic tests included hepatitis B surface antigen (HBsAg)-only tests and guideline-based hepatitis B tests (defined as a single test event for HBsAg, hepatitis B surface antibody and hepatitis B core antibody). Using available data, the outcomes of testing and/or infection were further classified. Measures reported include the total number of HBsAg and guideline-based tests conducted and the proportion positive, classified as either HBsAg positive or chronic hepatitis B infection. ***Results*:** The number of HBsAg tests decreased slightly each year between 2011 and 2016 (from 91 043 in 2011 to 79 664 in 2016; $P < 0.001$), whereas the number of guideline-based hepatitis B tests increased (from 8732 in 2011 to 16 085 in 2016; $P < 0.001$). The proportion of individuals classified as having chronic infection decreased from 25% in 2011 to 7% in 2016, whereas the proportion classified as susceptible and immune due to vaccination increased (from 29% to 39%, and from 27% to 34%, respectively; $P < 0.001$). ***Conclusions*:** The study findings indicate an increased uptake of guideline-based hepatitis B testing. The ongoing collection of testing data can help monitor progress towards implementation of the Victorian Hepatitis B Strategy.

Additional keywords: communicable disease control, surveillance, viral hepatitis.

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Introduction

Hepatitis B infection is a major cause of global morbidity and mortality due to liver cirrhosis, liver failure and hepatocellular carcinoma (HCC), and over 248 million people are infected chronically worldwide.[1] Chronic hepatitis B, defined as detectable hepatitis B surface antigen (HBsAg) for more than 6 months, can have up to four distinct phases of natural infection: immune tolerance, immune clearance, immune control and immune escape.[2] Treatments for chronic hepatitis B are available that suppress viral replication, preventing progression to cirrhosis, and reducing the risk of HCC and liver-related deaths.[3] Current international and national guidelines recommend treatment for individuals in either Stage 2 or 4 of infection (i.e. the immune clearance and immune escape phases).[2,4,5] Therefore, timely diagnosis of chronic hepatitis B is important to ensure patients are appropriately stratified into disease phase and receive timely treatment initiation and follow-up to reduce the long-term

*For a full list of collaborators in the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) of sexually transmissible infections and blood-borne viruses, see Appendix 1.

sequelae of infection. However, many individuals living with chronic hepatitis B do not know they are infected and are not engaged in care; among the estimated 240 000 individuals living with chronic hepatitis B infection in Australia (estimated national prevalence of 1%), only two-thirds (62%) have been diagnosed and only 15% are engaged in care.[7] People born overseas comprise the majority (56%) of people living with chronic hepatitis B in Australia; the other main risk populations include Aboriginal and Torres Strait Islander people, people who inject drugs and men who have sex with men, comprising 9%, 6% and 4% respectively of people living with chronic hepatitis B in Australia.[6,7]

A priority area identified in the 2016 Victorian Hepatitis B Strategy,[8] the first hepatitis B strategy in Victoria, is to increase diagnostic testing, with a target of 90% of individuals living with chronic hepatitis B to be diagnosed by 2030. The Strategy notes that action will focus on priority populations, and that opportunistic testing will take place for priority populations across community and primary care settings. Priority populations identified in the Strategy include people born in high-prevalence countries (particularly South-east Asian and Sub-Saharan African countries and parts of the Middle East), Aboriginal Victorians, children born to mothers with chronic hepatitis B and unvaccinated adults at higher risk of infection.[8] The Australian Hepatitis B Testing Policy (most recently updated in 2015) provides technical guidance on appropriate testing pathways, using currently available technologies and the interpretation of hepatitis B test results.[9] For individuals at risk of chronic hepatitis B, the Policy recommends testing for HBsAg, hepatitis B surface antibody (anti-HBs) and hepatitis B core antibody (anti-HBc).[9] For individuals suspected of acute infection, the Policy recommends testing for HBsAg, anti-HBc and anti-HBc IgM.[9] In addition to individual testing, HBsAg screening is conducted at a population level (i.e. for all individuals rather than those suspected of having acute or chronic infection) on blood or tissue before transfusion or transplantation, as well as antenatal screening.[9,10]

A new diagnosis of hepatitis B infection is notifiable in all states and territories in Australia. In Victoria, cases notified to the Department of Health and Human Services (DHHS) are classified as newly acquired or unspecified based on available laboratory and clinical evidence.[11] The notification rate of annual newly acquired and unspecified (presumed to be mostly chronic) hepatitis B notifications in Victoria has decreased in recent years; the notification rate for unspecified hepatitis B was greatest in 2000 (35.6 per 100 000 population; decreasing to 27.6 per 100 000 population in 2017), whereas the notification rate for newly acquired hepatitis B was greatest in 2001 and 2002 (3.9 per 100 000 population; decreasing to 0.6 per 100 000 population in 2017) (http://www9.health.gov.au/cda/source/cda-index.cfm, accessed 14 December 2018). However, a substantial proportion of individuals estimated to be living with chronic hepatitis B has not been diagnosed and testing rates are unknown. There are several limitations with this form of traditional passive surveillance system: (1) it only collects information on positive cases and notifications are heavily dependent on testing patterns;[12,13] (2) denominator testing data (i.e. the total volume of tests conducted) are needed to help interpret the number of notifications, but these data are not collected; and (3) most of notifications are classified as unspecified because patients' testing histories from different laboratories are not used in the interpretation of test results. Given the importance of early detection and targeted testing, it is paramount that hepatitis B testing data are collected and monitored over time to ensure we are meeting the targets laid out in the Victorian Hepatitis B Strategy.

The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) of sexually transmissible infections (STIs) and blood-borne viruses (BBVs) has collected information on hepatitis B testing and positivity from laboratories in Victoria and New South Wales (NSW) since 2011. In ACCESS, individuals can be tracked over time and between laboratories. The aims of the present study were to describe hepatitis B testing and positivity among individuals residing in Victoria between 2011 and 2016, and to assess the representativeness of new diagnoses compared with notifications of newly diagnosed cases reported to the DHHS.

Methods

Study design

This study used a retrospective cohort study design using data collected in a laboratory sentinel surveillance system. Retrospective hepatitis B testing data conducted since 2009 are collated from participating laboratories in Victoria and NSW on a regular basis; data collected in June 2017 were used in this analysis.

Data source

Hepatitis B testing data were collected from laboratory sites that participate in the ACCESS surveillance system. The laboratory sentinel surveillance system incorporates a retrospective cohort design whereby basic demographic data and all diagnostic and clinical monitoring tests for STIs and BBVs are collated from participating pathology laboratories in a line-listed format. Testing data are extracted as individual tests, which are then collapsed into hepatitis B test events that include all hepatitis B test events conducted within a 1-week period. Testing data for the years 2009–16 were requested, but some records with testing before 2009 or with unknown date of testing were extracted. Laboratory testing data were extracted using GRHANITE data extraction software (Health and Biomedical Informatics Centre, The University of Melbourne, Vic., Australia), which also encrypts personal identifying information to create an anonymous unique identifier. This identifier is applied to each test record and is used to link individuals within and between participating laboratories participating in ACCESS.

Victoria and NSW are bordering states, and to account for individuals living in Victoria but accessing healthcare services in NSW or accessing services that send specimens to NSW laboratories, some NSW-based laboratories were included in the initial data extract. Victoria and NSW both have a system of public and private laboratory pathology services. Public laboratories provide services to public hospitals and some community-based services, and are jointly funded by the Australian Federal, state and territory governments, principally through the National Healthcare Agreement.

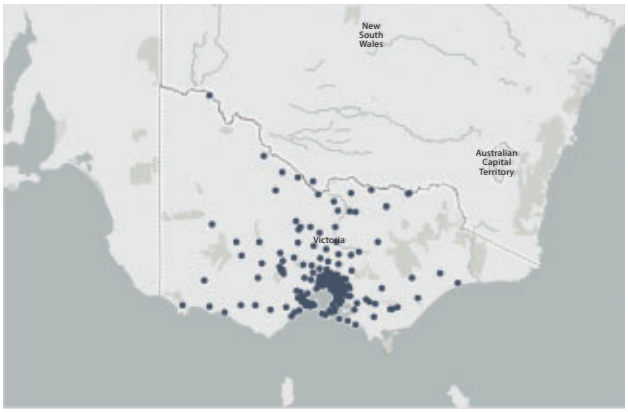

Fig. 1. Location of pathology laboratory collection centres in Victoria by postcode, 2016. Note, one marker per postcode is presented. The size of the marker is not proportional to the number of collection centres in each postcode.

Private laboratories provide services primarily to community-based services, as well as to some private hospitals on a contracted basis. Private pathology services in the community and in private hospitals are subsidised by the Australian Government through the Medicare Benefits Schedule.[14] Victorian laboratories include a total of 474 specimen collection centres (see Fig. 1). We were unable to determine the number of specimen collection centres included in this analysis from NSW.

Study population

The study population comprised individuals with a Victorian postcode that had at least one hepatitis B test conducted at a laboratory participating in ACCESS between 2011 and 2016. Participating laboratories included six Victorian and one NSW-based laboratory. Test events rather than individuals were used in the analysis, but data for individuals are presented in the results. The following criteria had to be met for test events to be included in the analysis:

(1) Hepatitis B tests had to be conducted between 2009 and 2016. However, only data for 2011–16 are presented here to account for misclassification of hepatitis B clinical monitoring tests as diagnostic tests in the first 2 years of data collection.
(2) Test events had to be for individuals residing in the state of Victoria. Patient residential postcodes were used to allocate state or territory of residence, and the requesting clinic postcode (which is recorded by laboratories) was used as a proxy when residential postcode was missing. Individuals were then allocated a state of residence. Patient postcode was matched to the corresponding state using the Australian Bureau of Statistics (ABS) Australian Statistical Geography Standard (ASGS).[15] Patients with non-standard postcodes (i.e. PO boxes, competition mail, government departments, large companies etc.) were not able to be allocated a state, as per ABS standard procedures, but their state could be derived from the first digit of the four-digit postcode (e.g. postcodes starting with '2' or '3' were deemed to be NSW and Victorian postcodes respectively).
(3) Test events had to be for individuals with known sex (categorised as male and female).

Variables extracted

Results for each hepatitis B test were extracted alongside patient demographics (sex, age at test, postcode), request details (requesting clinician, clinic postcode, clinician provider number, date of test request) and testing details (including laboratory ID, test name, specimen site, date of test).

Study definitions

Hepatitis B testing event

A hepatitis B testing event included one or more hepatitis B diagnostic tests (namely HBsAg, anti-HBc, anti-HBs, anti-HBc IgM) or clinical monitoring tests (namely hepatitis B DNA, hepatitis Be antibody and hepatitis Be antigen) conducted within 1 week. Clinical monitoring tests were collected to aid in the interpretation of test results (e.g. to identify previously diagnosed cases), but monitoring testing data are not reported here.

HBsAg testing

The National Hepatitis B Testing Policy[9] and guidance from the Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine[16] were used to guide the interpretation of hepatitis B testing. Data from 2009 and 2010 were used (when available) for the classification of test results as a previous positive. The result of an individual's HBsAg test was classified as either hepatitis B infected (HBsAg positive among individuals with evidence of a previous negative HBsAg test within the previous 24 months) or not infected (HBsAg negative). The outcome of the first positive HBsAg test result was further classified as chronic infection (HBsAg positive and with evidence of a subsequent positive HBsAg test >6 months after the initial positive HBsAg test), cleared infection (HBsAg positive with evidence of a subsequent negative HBsAg test) and unknown outcome (HBsAg positive with no additional testing data to determine the outcome of infection).

Guideline-based hepatitis B testing

A guideline-based test event to assess hepatitis B status was defined as a single test event for HBsAg and anti-HBs and anti-HBc (and anti-HBc IgM if conducted) within a 1-week period. Individuals who had evidence of a positive HBsAg before the date of testing and individuals that had a previous test event that indicated previous diagnosis, such as a test request for hepatitis B virus DNA, were excluded because these tests were assumed to be for monitoring previously diagnosed infections. The results of an individual's first guideline-based test events were classified as chronic (HBsAg positive, anti-HBc positive, anti-HBs negative), acute (HBsAg positive, anti-HBc positive, anti-HBs negative, anti-HBc IgM positive), susceptible to infection (HBsAg negative, anti-HBc negative, anti-HBs negative), immune due to resolved infection (HBsAg negative, anti-HBc positive, anti-HBs positive), immune due to vaccination (HBsAg negative, anti-HBc negative, anti-HBs

positive) and other (HBsAg negative, anti-HBc positive, anti-HBs negative) An anti-HBs titre $\geq$10 mIU mL^{-1} was used to indicate immunity. For those classified with other infection, the result had various possibilities, including distant resolved infection, recovering from acute hepatitis B and false positive.[16]

There are differences in guideline-based hepatitis B testing algorithms used between public and private laboratories. Privately funded pathology laboratories commonly conducted anti-HBs and anti-HBc tests only among HBsAg-positive individuals, resulting in an inflated proportion positive for chronic hepatitis B infection among individuals receiving a guideline-based hepatitis B test. For this reason, the proportion of individuals positive for chronic hepatitis B infection among those receiving a guideline-based hepatitis B test is also presented separately for public and privately funded pathology laboratories.

Study outcomes

Study outcomes pertained to either HBsAg testing or guideline-based hepatitis B tests. Study outcomes based on HBsAg tests were: (1) the total number of HBsAg tests conducted; (2) the proportion of HBsAg tests that were positive; and (3) the outcome of the first HBsAg-positive test.

Study outcomes based on guideline-based hepatitis B tests were: (1) the total number of guideline-based hepatitis B tests conducted; and (2) the number and proportion of individuals identified as having chronic or acute hepatitis B, susceptibility, immunity (natural or vaccine derived), other and indeterminate interpretation.

Statistical analyses

Participating laboratories included two privately funded and four publicly funded pathology laboratories. Individuals may have had several hepatitis B tests during the time period. The result of each test event was captured and interpreted, but only the first HBsAg test or guideline-based hepatitis B test conducted for an individual during 2011–16 is reported here, because assessment of hepatitis B status for the majority of individuals from priority populations requires a one-off test only.[9] Data were stratified by sex; individuals with no described sex were excluded. Data were also stratified according to whether the pathology laboratories were public or privately funded. Poisson regression was used to test for trends over time in the number of individuals tested and the proportion of individuals who tested positive.

Comparison with additional data sources

Diagnoses captured in ACCESS were compared with notifications of unspecified hepatitis B made to the DHHS in 2016.[17] The comparison groups were: (1) unspecified notifications made to the DHHS; (2) HBsAg-positive cases identified in ACCESS (among individuals having their first HBsAg test); and (3) chronic hepatitis B infection cases identified in ACCESS (among individuals having their first guideline-based hepatitis B test). Cases were allocated to one of the eight DHHS geographical regions using patient postcode; individuals with non-standard Victorian postcodes were coded as unknown region.

Ethics approval

Ethics approval for the study was provided by the Alfred Hospital Ethics Committee (Project no. 90/12 for 2009–16 data; Project no. 248/17 for 2017 onwards). A waiver to collecting individual consent was approved because data collected in this study was considered 'routine' and no personal information that can reasonably identify the individual was collected.

Results

In all, 2 808 998 hepatitis B test events, representing 1 943 249 individuals, were extracted from participating laboratories, among which 480 546 events were excluded because they were outside the study period (Fig. 2). Further exclusions included 19 414 events with an unknown postcode, 1 524 088 events with non-Victorian postcodes and 6734 events of unknown sex. Records for another 132 492 events were then excluded because their testing did not include HBsAg testing (i.e. was anti-HBc or anti-HBs only). Thus, 645 724 HBsAg test events, representing 492 537 individuals, were included in this analysis.

The number of HBsAg tests conducted each year was approximately stable, with a 1% decrease each year ($P < 0.001$; Fig. 3). More females received an HBsAg test each year, and females comprised 59.4% of all tests conducted during the 6 years. In all, 11 010 individuals (2.2%) were found to be HBsAg positive, among which 85.1% ($n = 9374$) were classified as having chronic infection, 2.3% ($n = 254$) cleared their infection and 12.6% ($n = 1382$) had unknown infection outcome (outcome of infection not presented in Fig. 3).

The number of guideline-based tests increased over time from 8732 tests in 2011 to 16 085 tests in 2016 (an average increase of 12% each year; $P < 0.001$; Fig. 4). The majority of all guideline-based tests were conducted in males (54%). Among all individuals receiving a guideline-based hepatitis B test, 27 534 (37.8%) were susceptible to infection, 23 048 (31.7%) had vaccine-derived immunity, 8620 (11.8%) had chronic infection, 9490 (13.0%) had resolved infection and 173 (0.2%) had acute infection. The proportion of individuals receiving a guideline-based hepatitis B test who were classified as having chronic infection decreased from 24.9% in 2011 to 6.9% in 2016, whereas the proportion of individuals classified as susceptible and immune due to vaccination increased from 28.5% to 39.4%, and from 26.5% to 34.4% respectively ($P < 0.001$).

Data published by the DHHS[17] reported 1822 notifications of unspecified hepatitis B in 2016 (excluding cases with unknown or non-Victorian postcodes); in this time period ACCESS identified 1347 HBsAg-positive cases (73.9% of the total DHHS notifications) among individuals having an HBsAg test and 1112 chronic cases of hepatitis infection (61.0% of the total DHHS notifications) among individuals having a guideline-based hepatitis B test (Table 1). The geographic distribution by DHHS health region for positive HBsAg tests more closely mirrored the geographic distribution of notifications to DHHS than chronic cases among individuals having a guideline-based hepatitis B test. The greatest

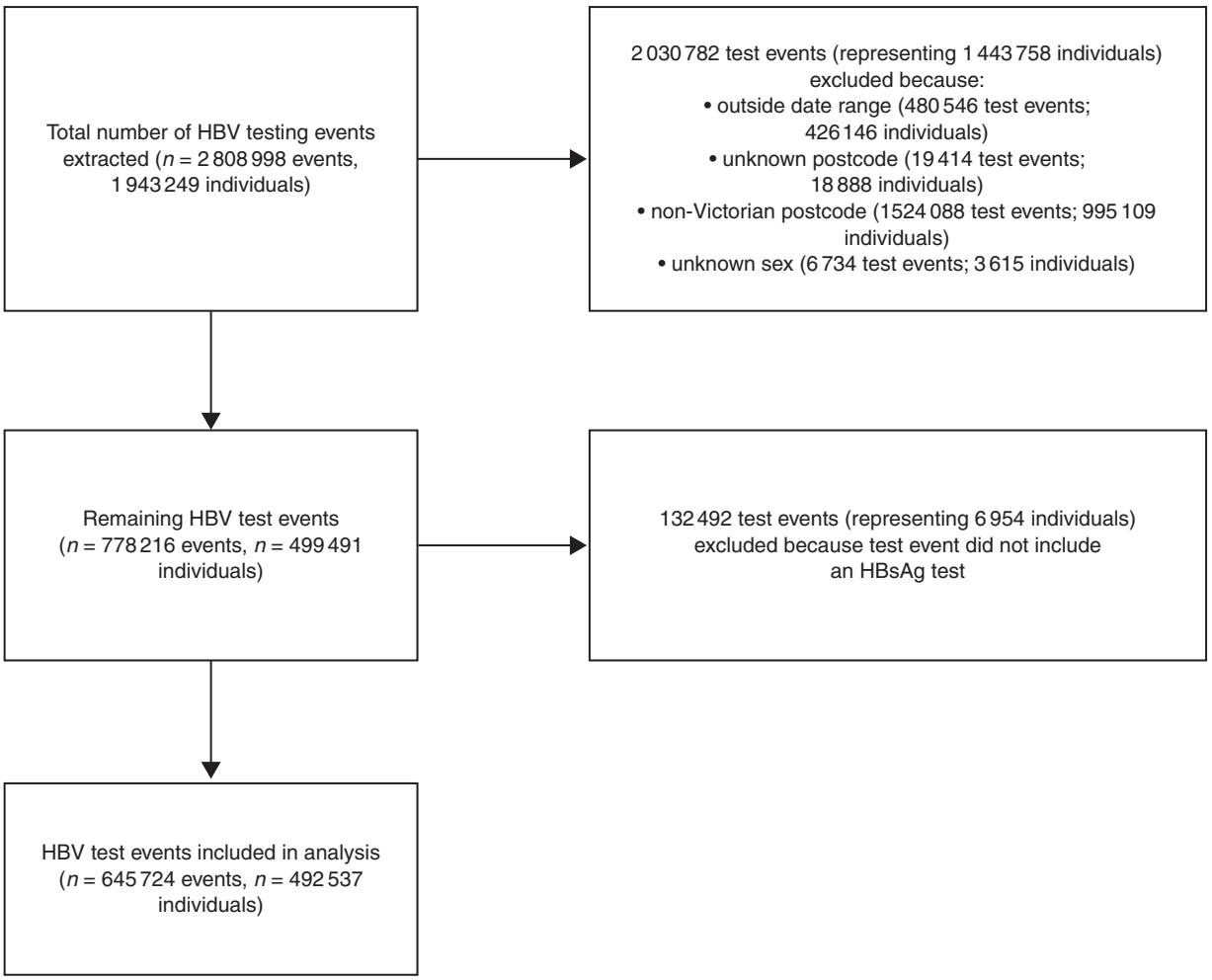

Fig. 2. Flow chart for the selection of study participants using hepatitis B testing events. HBsAg, hepatitis B surface antigen; HBV, hepatitis B virus.

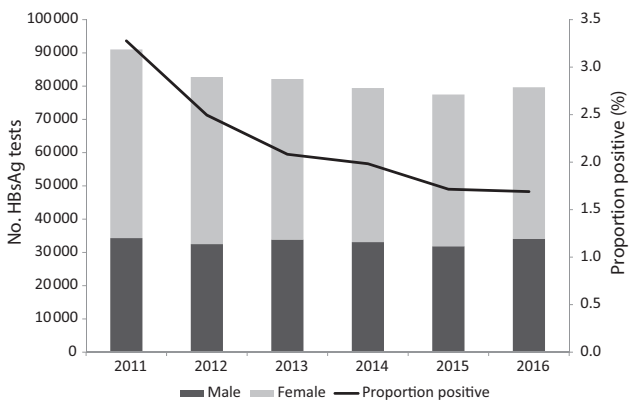

Fig. 3. Number of hepatitis B s antigen (HBsAg) tests performed in males and females and the proportion positive in Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) laboratories in Victoria, 2009–16.

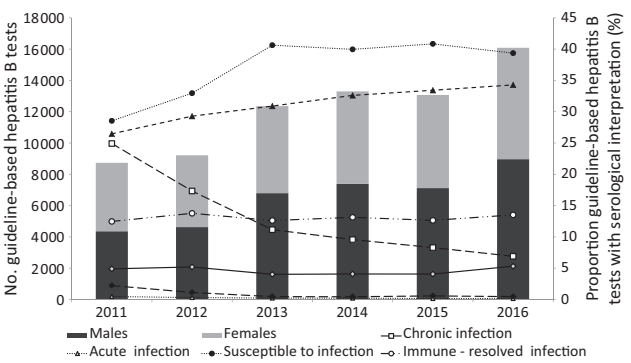

Fig. 4. Number of guideline-based hepatitis B tests performed in males and females and case classification in Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) laboratories in Victoria, 2009–2016.

Table 1. Geographic distribution of Department of Health and Human Services (DHHS) notifications, hepatitis B s antigen (HBsAg)-positive cases and chronic cases among individuals having a guideline-based hepatitis B test in Victoria by health region, 2016

Unless indicated otherwise, data are given as either the number of notifications captured within each region with the percentage of all notifications captured in Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) in parentheses, or as the percentage difference compared with the DHHS notifications

	Population size (2012 data)	Unspecified notifications (DHHS data)	HBsAg-positive cases in ACCESS (among those having their first HBsAg test)		Chronic HBV cases in ACCESS (among those having their first guideline-based HBV test)	
	n (%)	*n* (%)	*n* (%)	% Difference vs DHHS	*n* (%)	% Difference vs DHHS
Victoria (*n*)	5 534 526	1822	1347 (73.9)		1112 (61.0)	
Geographic region						
Barwon South West	366 900 (6.6)	29 (1.6)	12 (0.9)	0.7	11 (1.0)	0.6
Eastern Metropolitan	1 029 481 (18.6)	382 (21.0)	211 (15.7)	5.3	165 (14.8)	6.1
Gippsland	259 271 (4.7)	19 (1.0)	10 (0.7)	0.3	7 (0.6)	0.4
Grampians	223 848 (4.0)	12 (0.7)	19 (1.4)	–0.8	17 (1.5)	–0.9
Hume	267 071 (4.8)	41 (2.3)	34 (2.5)	–0.3	33 (3.0)	–0.7
Loddon Malee	308 782 (5.6)	31 (1.7)	67 (5.0)	–3.3	61 (5.5)	–3.8
Northern and Western Metropolitan	1 742 727 (31.5)	880 (48.3)	661 (49.1)	–0.8	569 (51.2)	–2.9
Southern Metropolitan	1 336 333 (24.1)	392 (21.5)	332 (24.6)	–3.1	248 (22.3)	–0.8
Unknown or non-Victorian	113 (0.0)	36 (2.0)	1 (0.1)	1.9	1 (0.1)	1.9

proportion of chronic cases was in the Northern and Western Metropolitan regions of Melbourne (*n* = 661; 49.1% of HBsAg positive cases), followed by the Southern Metropolitan region (*n* = 332; 24.6% of HBsAg positive cases).

Discussion

Increasing hepatitis B testing is a priority action identified in the 2016 Victorian Hepatitis B Strategy. Chronic hepatitis B infection prevalence, diagnosis, monitoring and treatment have been well described in Victoria,[6] but results of hepatitis B diagnostic testing, including both HBsAg tests alone or guideline-based hepatitis B tests, are important complementary data that can help monitor progress towards achieving targets set in the 2016 Strategy. To our knowledge, the present study is the first population-level cohort study of hepatitis B testing in Victoria. The findings suggest the number of HBsAg tests remained stable between 2011 and 2016, whereas the number of guideline-based hepatitis B tests doubled, likely reflecting the implementation of the National Hepatitis B Testing Policy in 2012 and other guidelines that recommend comprehensive serological testing to assess hepatitis B status rather than testing for HBsAg alone.

The proportion found to be HBsAg positive in this system (3.3% in 2011, decreasing to 1.7% in 2016) was higher than a separate estimate of the prevalence of chronic hepatitis B infection of 1.06% calculated by the Hepatitis B Mapping Project.[6] Although some of the difference is possibly due to the population tested being of higher prevalence than the general population (in line with the 2016 Victorian Hepatitis B Strategy focus), the difference also probably reflects an overestimation of prevalence in ACCESS due to some individuals having been diagnosed before the study period but misclassified as being a new diagnosis in the present study. A method to improve case classification of previously diagnosed cases is to link ACCESS data to the DHHS surveillance data management system, which includes records of hepatitis B notifications since 1991. Such linkage would increase the utility and efficiency of ACCESS data enormously because it would allow ACCESS to determine whether a newly identified case is a true new infection or a previously diagnosed infection and allow a more accurate estimation of hepatitis B incidence. This is currently being explored by the collaborators of ACCESS (i.e. the Burnet Institute, Kirby Institute and NRL). In addition, linkage to administrative datasets, such as cancer and death registry and perinatal datasets, would increase the capacity for Australia and other low-prevalence countries to monitor progress made against other targets included in national and global strategies.

Among those who received a guideline-based hepatitis B test, the proportion of individuals classified as having chronic infection decreased each year, whereas the proportion of those positive who were classified as susceptible and immune through vaccination increased. As with positive HBsAg tests, some of the individuals identified as having chronic infection may not be true new diagnoses (i.e. some may have been diagnosed before the period of data collection), but the accompanying anti-HBc and anti-HBs tests may suggest that these tests were diagnostic rather than monitoring, and therefore these tests may be an individual's first hepatitis B test. The reason for the reduction in chronic positivity requires further investigation, because it may be an artefact of a range of factors, including, for example, an increase in the proportion of people from high-risk populations being vaccinated.

We found a higher proportion of HBsAg-positive tests among individuals receiving HBsAg testing from publicly funded pathology laboratories, and a higher proportion positive for chronic infection among individuals receiving guideline-based hepatitis B testing from privately funded pathology laboratories. This may be due to several factors, including differences in patient profiles and funding arrangements between public and private laboratories.

Further investigation of hepatitis B diagnostic testing procedures of pathology laboratories, particularly privately funded laboratories, is recommended to better understand structural, funding and systems barriers to appropriate hepatitis B testing and to help evaluate the National Hepatitis B Testing Policy.

A greater number of HBsAg tests was conducted each year among females than males. This is likely due to antenatal HBsAg testing among females; HBsAg screening is recommended by The Royal Australian and New Zealand College of Obstetricians and Gynaecologists.[10] A higher proportion of males had unspecified hepatitis B infection, consistent with both Victorian and national trends (http://www9.health.gov.au/cda/source/cda-index.cfm, accessed 14 December 2018). Global estimates of HBsAg prevalence also report that males have higher rates of HBsAg positivity.[18]

Although caution should be taken when interpreting data presented here, the unique and important data available through ACCESS (i.e. comprehensive testing information over time and linked between laboratories) have been demonstrated. However, some limitations of the study should be considered. First, chronic hepatitis B infection is concentrated in several priority populations, defined by demographic and/or behavioural risk, and data collected by laboratories have limited ability to identify priority population. Laboratory data provide a unique snapshot of population-level testing and outcomes; however, the utility of hepatitis B infection surveillance system data would be greatly enhanced by improving the capacity to report according to ethnicity. There are several ethnicity classification systems used globally,[19,20] and ACCESS collaborators are currently exploring the potential to integrate an ethnicity classification system with ACCESS in the future. Second, we used clinic postcode as a proxy for patient postcode when patient postcode was missing, and patients may have had their state or health region misclassified. Patients with missing postcode (both home and clinic) were excluded from the analysis, and these individuals may have been Victorian residents. Third, it is not possible to determine whether a single positive HBsAg test result was a new diagnosis or whether the individual was diagnosed before data collection, which may have resulted in misclassification of a previous positive as a newly diagnosed hepatitis B infection. Finally, linkage was conducted to link individuals within and between participating laboratories participating in ACCESS and some links may not be accurate.

Conclusion

The ongoing collection of hepatitis B diagnostic testing data provides an important mechanism to monitor progress towards implementation of the 2016 Victorian Hepatitis B Strategy. Hepatitis B testing data collected in ACCESS laboratories provide data on the uptake of hepatitis B testing at a population level and guideline-driven testing, not available from any other data source, and these data are required to interpret trends in diagnoses. Data presented here complement existing estimates of chronic hepatitis B prevalence, diagnosis and monitoring and treatment uptake in Victoria. Since the introduction of the National Hepatitis B Testing Policy in 2012, the number of HBsAg tests has remained stable and the number of guideline-based tests has increased.

Conflicts of interest

Margaret Hellard has received support from Gilead Sciences, Abbvie and BMS for investigator-initiated research. All other authors declare that they have no competing interests.

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