



Public Health  
England

Protecting and improving the nation's health

# Annual review of the epidemiology of Hepatitis B in Yorkshire and Humber 2017 data

**Field Service Yorkshire and Humber**

February 2020

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Public Health England, Wellington House, 133-155 Waterloo Road, London, SE1 8UG  
Tel: 020 7654 8000 | [www.gov.uk/phe](http://www.gov.uk/phe) | Twitter: [@PHE\\_uk](https://twitter.com/PHE_uk)  
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### About the Field Service

The Field Service (FS) supports Public Health England (PHE) Centres and partner organisations through the application of epidemiological methods to inform public health action. FS does this in 2 main ways: by providing a flexible expert resource, available, as and when needed, to undertake epidemiological investigations for key health protection work, and through the expert analysis, interpretation and dissemination of surveillance information to PHE centres, local health partners, service providers and commissioners of services. Within the FS network, excellence and innovation is encouraged; we foster academic collaborations and take active part and lead in research, development and training.

Prepared by: Yorkshire and Humber Field Service, National Infection Service, Public Health England, 2nd Floor, Blenheim House, Duncombe Street, Leeds, West Yorkshire LS1 4PL. For queries relating to this document, please contact:  
Tel: +44(0)113 855 7346 Fax: +44(0)113 386 0306 Email: [yhfes@phe.gov.uk](mailto:yhfes@phe.gov.uk)



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Published February 2020

PHE publications

gateway number: GW-1046

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## Executive summary

The rate of all newly diagnosed hepatitis B infections in Yorkshire and Humber for 2017 remained below the average for England and close to the rate in 2016. Yorkshire and Humber continues to have the third highest rate among PHE centres outside London. Although a data loss in 2016 means the overall number of cases in 2016 were likely underestimated, the number of acute cases managed by the PHE Health Protection Team (HPT) in Yorkshire and Humber was similar, with 27 cases in 2016 compared with 34 in 2017.

Numbers of acute cases of hepatitis B managed by the HPT in Yorkshire and Humber fell for two-thirds of local authorities in 2017 (when compared with the average for the 3 previous years) although numbers of cases are in many areas very small. The highest burden of hepatitis B in 2017 was in Leeds (215 cases), Sheffield (102), Bradford (48) and Kirklees (46). This distribution of cases is consistent with previous years. Together these 4 areas made up 70% of all cases in the region. Laboratory reports from York remain artefactually high due to relatively recent commencement of reporting.

Data for 2017 shows little change in the demographics of those infected with hepatitis B virus and the distribution of risk factors that are known to be associated with acquisition; the epidemiology of hepatitis B in Yorkshire and Humber remaining similar to that observed nationally. The greatest burden of chronic infection remains in men aged 25-34 years (34% of acute cases), with heterosexual exposure the risk factor most commonly reported to the HPT for acute cases, although there may be an underestimate of injecting drug use. Sentinel surveillance data indicates that screening and testing for those with liver disease remain the most commonly documented reasons for first testing for hepatitis B, although, as with information reported for public health management, injecting drug use may be under-recorded. Nonetheless, rates of direct or indirect sharing of injection equipment remain high at 34% of people who inject drugs; as the potential for transmission persists, control measures continue to be essential for reducing the risk of hepatitis B for those that inject drugs.

Screening for hepatitis B as part of the routine antenatal programme remains an effective approach for interrupting vertical transmission of hepatitis B. Although data is limited, there is currently no evidence to suggest maternal ethnicity is associated with an increased probability of testing positive for hepatitis B infection in Yorkshire and Humber.

Nationally, the burden of hepatitis B remains higher than the equivalent for hepatitis C – despite the availability of a highly effective vaccine. Approximately 9% of all liver

transplants in Yorkshire and Humber are related to hepatitis B infection. Mortality rates due to hepatitis B in Yorkshire and Humber remain comparable to those other areas of England with a similar burden.

# 1. Introduction

## Aim of this report

The aim of this report is to describe the recent epidemiology of hepatitis B infection in Yorkshire and Humber up to 2017. The report provides an update on trends, areas of high burden of disease and at-risk population groups, as well as identifying opportunities for interventions to reduce disease burden. Data is presented on trends in acute and chronic hepatitis B infection in Yorkshire and Humber. There is also data relating to various relevant preventative and treatment services. The findings and recommendations in this report highlight scope for further interventions to reduce the disease burden caused by hepatitis B.

The hepatitis B virus (HBV) is a vaccine-preventable blood borne virus for which humans are the only known host (1). The infection can be categorised into acute (a self-limiting infection) and chronic (a long-term infection). How the infection progresses depends on a number of factors including: age at infection, the susceptibility of the host and the genotype of HBV causing the infection. Chronic infection is defined by the presence of hepatitis B surface antigen in the blood for greater than 6 months (2, 3). Chronic infection can result in long-term liver disease and liver cancer (hepatocellular carcinoma). Individuals with chronic HBV infection can be highly infectious (HBeAg positive) or less infectious (HBeAg negative).

HBV is transmitted through parenteral exposure to infected blood or bodily fluids (2). Knowledge of routes of transmission is essential for identifying high risk groups and implementing appropriate control measures. There are a wide range of exposures associated with risk of infection, including: horizontal transmission, sexual contact, blood to blood contact (sharing of needles/needlestick injury), vertical and perinatal transmission (2). High risk groups therefore consist of: household and sexual contacts, injecting drug users (IDUs), healthcare workers, and babies born to a HBV-positive mother (2). Liver disease has an increasing mortality rate in England and hepatitis B is an important contributory cause for this increase (4).

## Data sources

This report presents data from a number of sources including:

- Immunisation, Hepatitis and Blood Safety Department Hepatitis (IHBSD) database
- SGSS; laboratory data from Yorkshire and Humber and national NHS laboratories
- Sentinel Surveillance of Hepatitis Testing
- HPZone; PHE Health Protection Team case and incident management system
- Regional Surveillance of Antenatal Infection screening
- National Antenatal Infection Surveillance Monitoring
- unlinked anonymous Monitoring Survey of HIV and Hepatitis in People who Inject Drugs
- NHS Blood and Transplant, UK Transplant Registry
- Cover of Vaccination Evaluated Rapidly programme
- mortality data from the Office for National Statistics

All data excluding HPZone was extracted from a workbook updated and maintained by PHE Field Service, West Midlands. Rates per 100,000 population have been calculated using mid-year population estimates supplied by the Office for National Statistics ([www.ons.gov.uk/](http://www.ons.gov.uk/)).

This report includes data from a range of sources and while no single data source will provide a complete record of all hepatitis B infections, together they do provide a representative picture of the burden of disease and trends in its epidemiology. A consequence of the multiplicity of data sources used in this report is a risk of disagreement between figures. This therefore means the data needs to be interpreted in the context of the datasets from which they are derived. The biggest challenge in reporting the epidemiology of hepatitis B is the multiple testing routes and incomplete information making it difficult to eliminate duplication of data from different sources.

The data sources below have been assigned a colour code to make it easier to identify the data source used for individual charts and tables.

<b>IHBSD Hepatitis database</b>
<b>SGSS laboratory data from Yorkshire and Humber NHS laboratories reconciled with HPZone data</b>
<b>Sentinel Surveillance of Hepatitis Testing</b>
<b>Unlinked Anonymous Monitoring Survey of HIV and Hepatitis in people who inject drugs</b>
<b>Office for National Statistics</b>
<b>HPZone</b>
<b>COVER programme</b>

## Sentinel surveillance for hepatitis B

The Sentinel Surveillance of Hepatitis Testing Study was set up to collect data on laboratory test results and demographic data for all individuals tested for hepatitis in 24 sentinel laboratories in England, covering approximately one third of the population. Limitations of the data include some duplication of individual patients and exclusion of dried blood spot, oral fluid, reference testing, and testing from hospitals referring all samples where the original location is not identified.

Individuals aged less than one year, in whom positive tests may reflect the presence of passively-acquired maternal antibody rather than true infection, are excluded.

Test results include specimens taken for diagnostic and for screening purposes. All data is provisional. There are 2 actively participating centres in Yorkshire and Humber; Leeds and Grimsby. Together they provide estimated population coverage in Yorkshire and Humber of 20–39%. While the data is not comprehensive for the whole region, it provides a helpful demographic and epidemiological profile of hepatitis B in Yorkshire and Humber.

## National laboratory data for hepatitis B

Positive hepatitis B results from local NHS laboratories are reported to the PHE national laboratory Second Generation Surveillance System (SGSS). This data includes laboratory reports for both acute and chronic hepatitis B infections and therefore cannot be used to directly estimate the incidence of newly diagnosed infections. Efforts have been made to estimate incidence of acute and probably acute cases. This is outlined in the surveillance definitions for hepatitis B below.

These laboratory results are subject to removal of duplicate records with earlier entries in the system with matching identifiers. The intention is to enable enumeration of new diagnoses, whether acute infections or newly identified chronic infections. However, it is not always possible to entirely exclude positive specimens from individuals previously diagnosed, and this may result in overestimation of the number of cases. HPZone data represents cases that have been managed for health protection purposes and it is expected the number of cases reported to SGSS will therefore be higher.

NHS laboratory data, while achieving high levels of completeness, should also be interpreted with some caution as there may be both differential use of alternative diagnostic methods and reporting from non-NHS laboratories across different parts of the country; these may affect hepatitis B data available for inclusion in the NHS laboratory dataset. The increased use, particularly in specialist services, of dried blood spot and salivary testing also requires that interpretation of trends over time based upon traditional blood samples are made cautiously.

Data are summarised by PHE Centre of residence, not the PHE Centre of the testing laboratory. Data is assigned to PHE Centre by patient postcode where present; if patient postcode is unknown, data is assigned to PHE Centre of registered GP; where both patient postcode and registered GP are unknown, data is assigned to PHE Centre based on location of the testing laboratory.

## HPZone

HPZone is a web-based system used by PHE health protection teams to manage cases and incidents of infection. This system is independent of the IHBSD Hepatitis database meaning variation between numbers of cases is highly likely. While data from HPZone gives an indication of the activity of local services, it must be noted that not all cases current residence is Yorkshire and Humber. HPZone is a live system so figures may vary depending on the date of data extraction. Data was extracted from HPZone for this report on 11 June 2019. From HPZone data, a case of acute hepatitis B infection is defined as one classified as acute hepatitis by the Health Protection Team or local testing laboratory and/or with anti-HBc (hepatitis B core antibody) IgM.

## Data linkage

PHE Centre cases with a date entered from 1 January 2017 to 31 December 2017 were extracted from HP Zone and matched to a laboratory dataset using Microsoft Access and algorithms comparing combinations of the following variables: surname, first name, date of birth, sex, clinic number and NHS number. The laboratory database contained all confirmed hepatitis B infections reported to PHE by laboratories in England and Wales (SGSS). A final reconciled dataset included cases classified as acute or probable acute and reported from the PHE Centre and/or from laboratories to SGSS. After follow-up with the clinician and/or the patient, PHE Centre staff assigned a probable route of exposure and collected information on other possible exposure routes. For analysis purposes, where the probable route of exposure had not been assigned due to more than one exposure, the most likely route was assigned hierarchically (people who inject drugs, sex between men, heterosexual exposure, etc.).

## Missing data

In September 2016, the Leeds laboratory suffered a large system failure which resulted in data being lost and unrecoverable. The missing data is from September 2016 to March 2017. This has affected the SGSS laboratory data and the Sentinel Surveillance data. The Leeds laboratory provided most of the Sentinel Surveillance data for Yorkshire and Humber. As Sentinel Surveillance data only includes testing locations that have continuously provided data for the entire period, Leeds data



(including testing for Bradford) has been excluded from the trend data in this report, resulting in substantially lower numbers of cases than in previous reports. For this reason, all Sentinel Surveillance trend data has been excluded from this report.

HES data on hospital admissions for HBV-related ESLD and HCC in 2017 and 2018 is not included in this report due to an issue with classification of HBV codes by NHS Digital. As a result, unique identifiers that can link an individual to their hospital admission data were removed from some HBV-positive patients. The issue is temporary and has since been resolved but prevented the elimination of data duplication of multiple admissions for the same individual; 2017 and 2018 data therefore suggests there has been a drastic increase in the incidence of HBV-related ESLD and HCC which does not reflect a true increase in incidence.

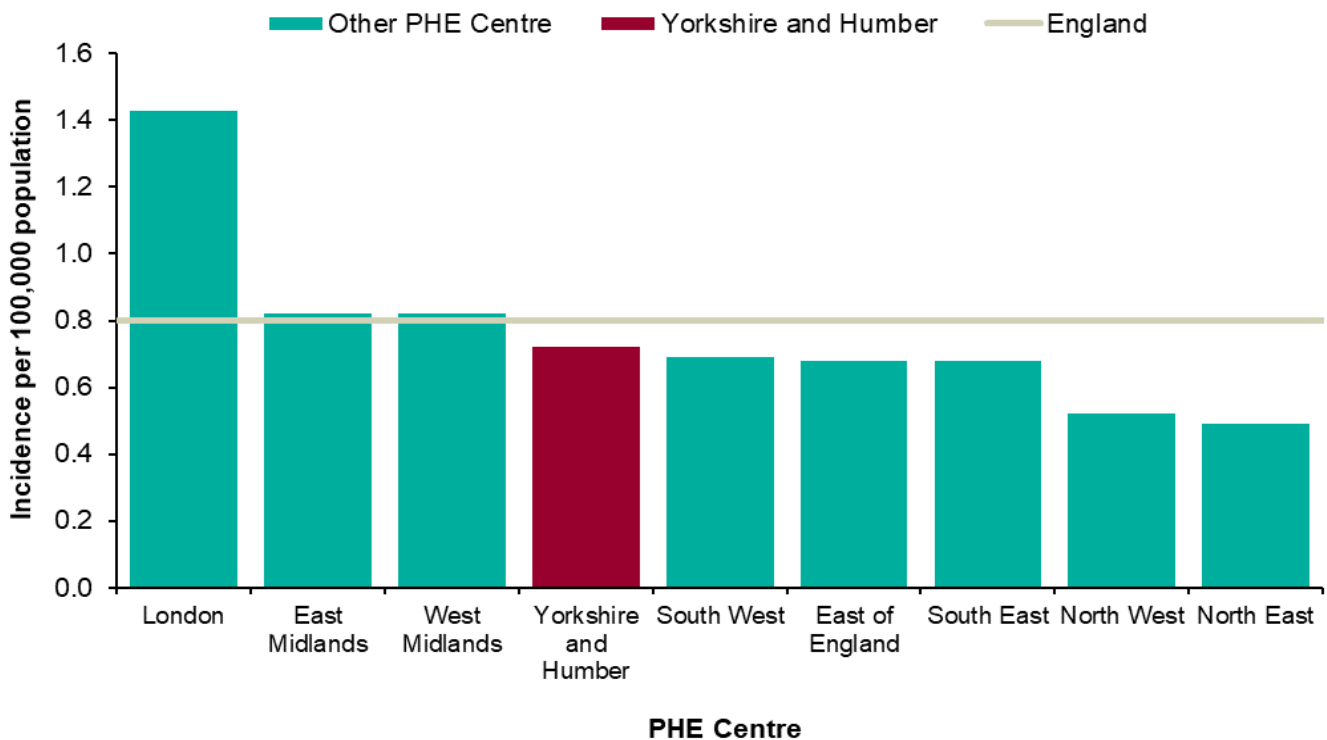
## 2. Newly diagnosed hepatitis B infections

### National and regional epidemiology

#### Acute or probably acute infections

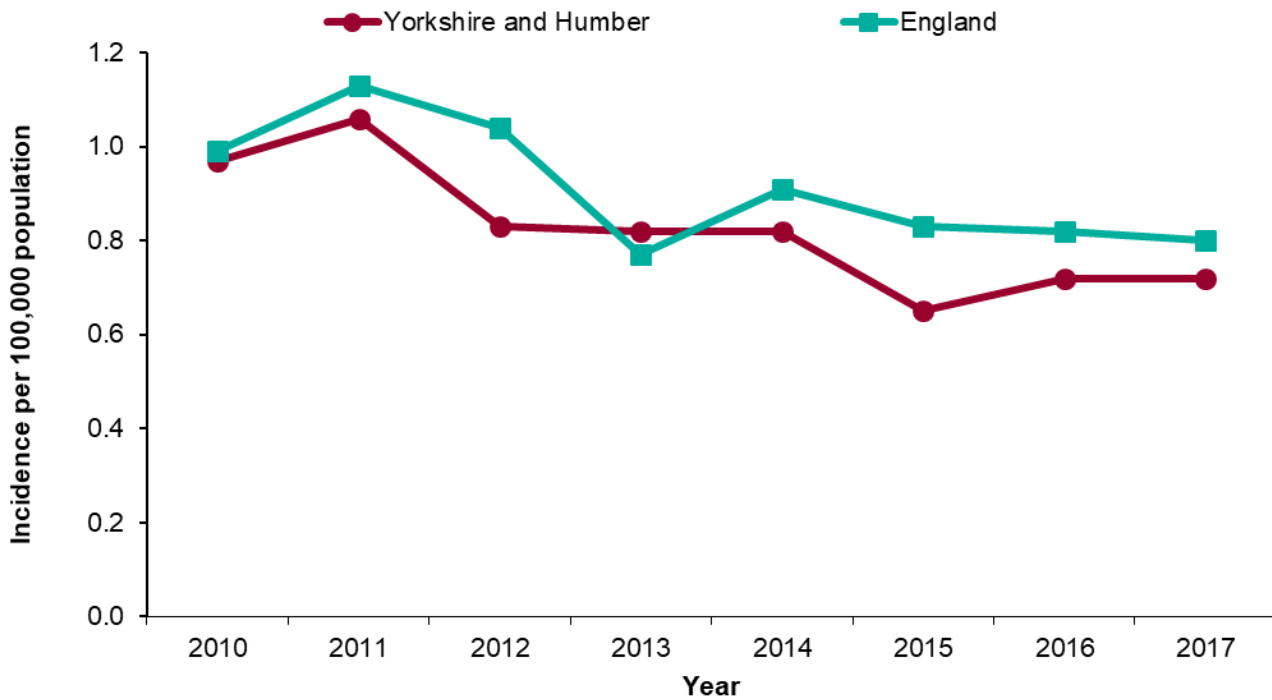
In 2017 there were 445 acute or probably acute cases of hepatitis B reported in England; an annual incidence of 0.80 per 100,000 population and similar to 0.82 per 100,000 observed in 2016. The rate of acute and probably acute hepatitis B infection diagnosed in NHS laboratories in Yorkshire and Humber (0.72 per 100,000) remains below the England average, as the fourth highest rate among all PHE centres according to national laboratory data (Figure 2.1). In line with the England trend, the incidence of acute and probably acute cases of hepatitis B show a general downward trajectory in Yorkshire and Humber (Figure 2.2).

**Figure 2.1 Incidence of acute or probable acute hepatitis B per 100,000 population by PHE centre, 2017**



Source: NHS laboratory data reconciled with HPZone data

**Figure 2.2 Incidence of acute or probable acute hepatitis B per 100,000 population, Yorkshire and Humber PHE Centre and England, 2010-2017**



Source: NHS laboratory data reconciled with HPZone data

### All new diagnoses

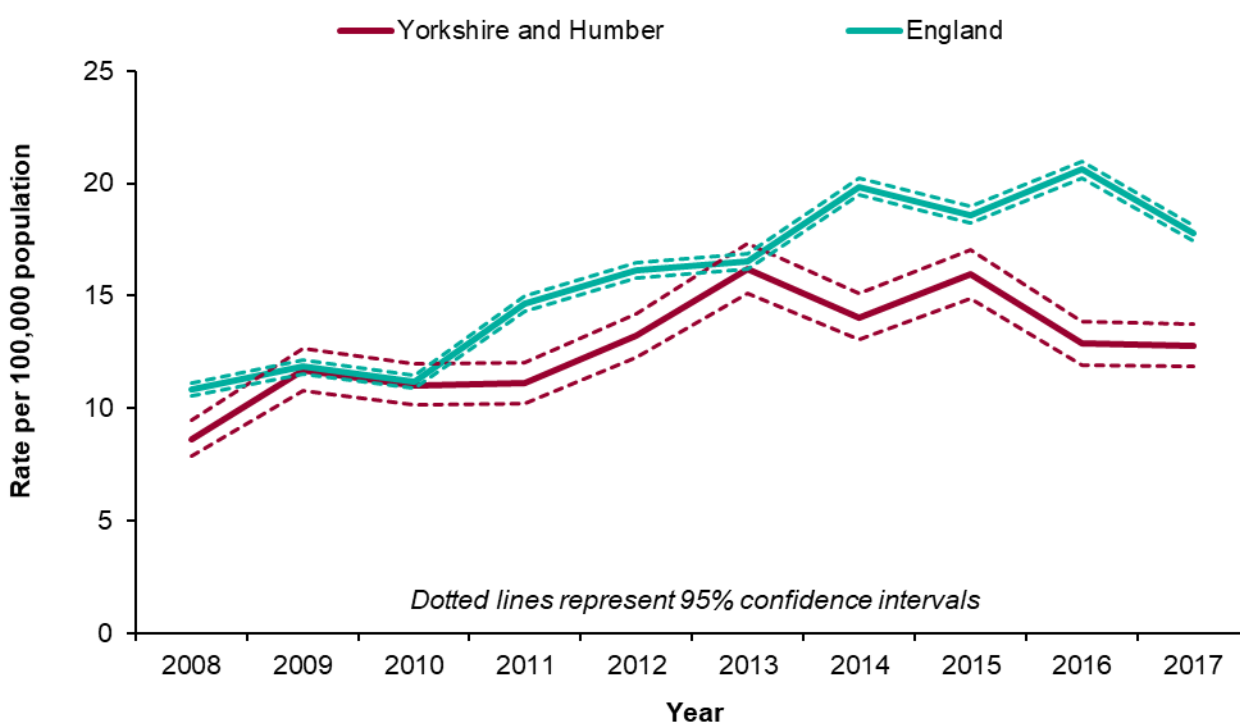
Total new diagnoses of hepatitis B infection include both acute infections and previously undiagnosed chronic infections. There were 696 cases of hepatitis B infection diagnosed in Yorkshire and Humber at local laboratories during 2017. Compared to last year, the rate of new diagnosis has remained unchanged, although the number of cases in 2016 was likely underestimated due to a serious data loss\* (Figure 2.3). When comparing PHE centres, Yorkshire and Humber has the third highest rate of newly diagnosed acute and chronic Hepatitis B outside of London. When examining the 5-year average, Yorkshire and Humber has the second highest 5-year rate outside London for the period of 2013–2017 (Figure 2.4). It is worth noting that differential use of alternative diagnostic methods and non-NHS testing laboratories across different parts of the country may have affected hepatitis B data available for inclusion in the dataset. Hepatitis B diagnosis rates have remained stable or fallen in recent years for the highest burden PHE Centres (London, West Midlands, Yorkshire and Humber). In particular London recorded a large drop in the number of laboratory reports compared to 2016 (6,687 in 2016; 4,737 in 2017). The national decrease in diagnoses in 2017 is primarily due to the decrease in London, despite increased rates among some PHE Centres (Figure 2.4).

\*Please refer to missing data section on page 8

Given the small decline of acute and probable acute cases in England, the decrease in total national diagnoses (Figure 2.2) can be attributed to the reduced detection of chronic cases in London (Figure 2.4). Yorkshire and Humber has relatively stable rates of acute and chronic hepatitis B although, as previously mentioned, cases for 2016 may have been underestimated (Figures 2.2 and 2.4).

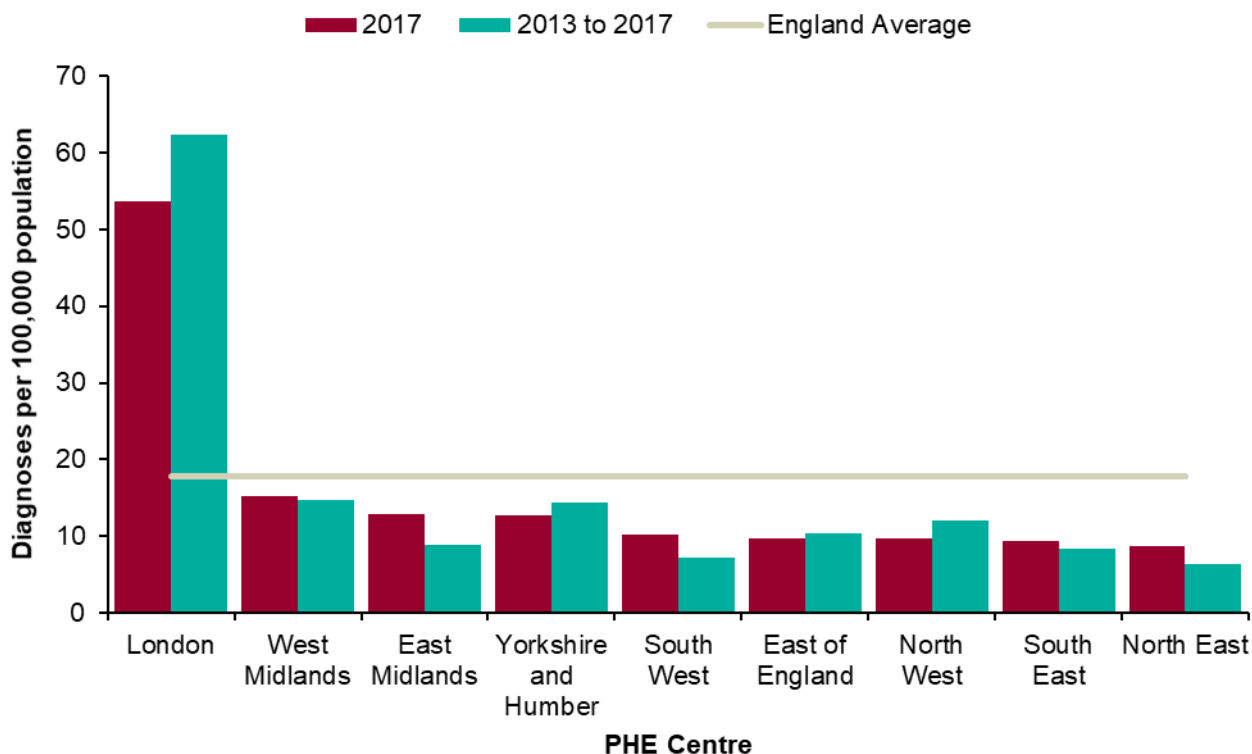
According to Sentinel Surveillance, Yorkshire and Humber has the lowest percentage of individuals testing positive for HBsAg (excluding antenatal testing) at 0.4% between 2013 and 2017 (Figure 2.5).

**Figure 2.3 Laboratory reports of hepatitis B (acute and chronic) per 100,000 population, residents of Yorkshire and Humber PHE Centre and England, 2008 to 2017**



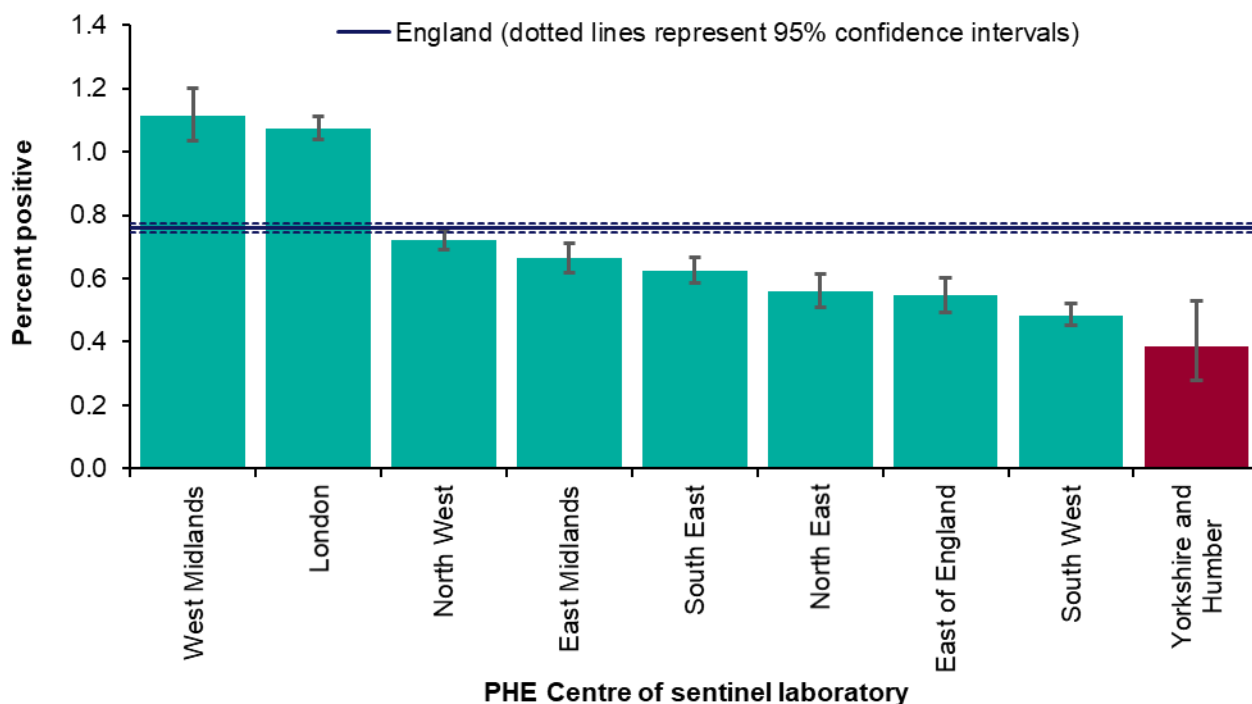
IHBSD Hepatitis database

**Figure 2.4 Newly diagnosed hepatitis B (acute and chronic) per 100,000 population by PHE Centre, 2013 to 2017 (5-year average) and 2017**



**IHBSD Hepatitis database**

**Figure 2.5 Percentage of individuals testing positive for HBsAg in sentinel laboratories by PHE Centre of laboratory (excluding antenatal testing), 2013 to 2017**



Source: Sentinel Surveillance of Hepatitis Testing

## Epidemiology of hepatitis B in Yorkshire and Humber

There were 585 cases of hepatitis B infection (both acute and chronic) recorded in 2017 on the PHE case and incident management system, 34 of which were acute infections (Table 2.1). The proportion of acute cases reported to the Health Protection Team for 2014–2017 has remained stable, ranging between 4–6% over the 4-year period (6% in 2017).

**Table 2.1 New diagnoses of hepatitis B infection reported to the Yorkshire and Humber Public Health England Health Protection Team, by lower tier local authority and year, Yorkshire and Humber, 2014 to 2017**

Local authority	Acute				Chronic and unspecified			
	2014	2015	2016	2017	2014	2015	2016	2017
Barnsley	1	0	1	0	10	3	12	20
Bradford	6	6	4	2	141	127	76	46
Calderdale	2	0	2	0	13	12	19	8
Hull	1	0	1	2	37	23	27	28
Craven	0	0	1	0	2	2	0	0
Doncaster	1	1	1	1	25	39	26	20
East Riding of Yorkshire	0	1	0	3	8	8	6	11
Hambleton	1	1	0	0	2	3	1	2
Harrogate	2	1	0	1	9	8	2	0
Kirklees	3	4	7	3	68	67	36	43
Leeds	13	8	2	11	236	215	177	204
North East Lincolnshire	0	0	1	1	7	7	2	7
North Lincolnshire	0	1	0	1	8	11	11	10
Richmondshire	0	1	0	0	2	3	2	1
Rotherham	2	0	0	0	24	23	24	9
Ryedale	2	0	0	0	1	3	1	4
Scarborough	0	1	1	1	11	4	4	7
Selby	2	0	0	0	8	4	1	3
Sheffield	1	3	1	2	119	160	113	100
Wakefield	2	1	1	3	23	39	18	17
York	0	1	4	3	20	19	11	11
<b>Yorkshire and Humber</b>	<b>39</b>	<b>30</b>	<b>27</b>	<b>34</b>	<b>774</b>	<b>780</b>	<b>569</b>	<b>551</b>

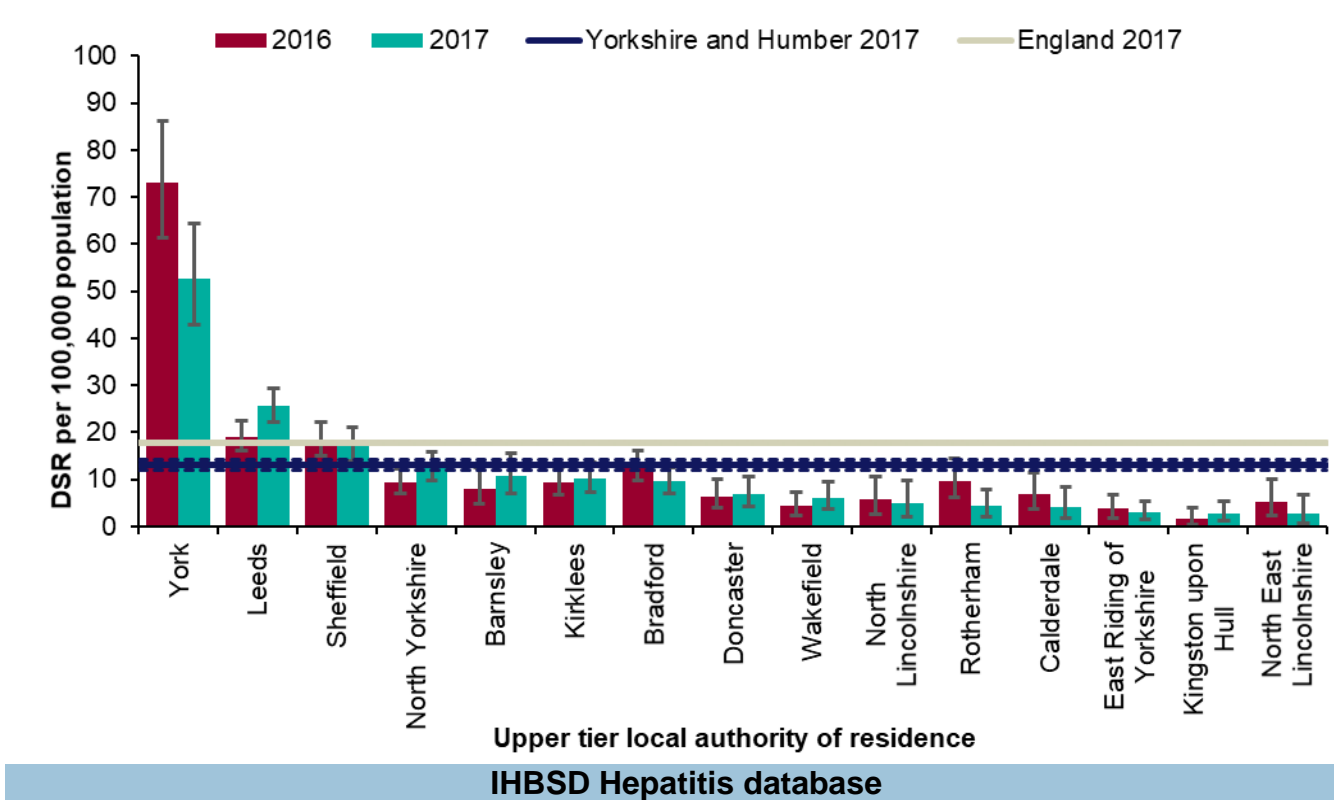
Source: HP Zone

Numbers of acute hepatitis B cases have remained relatively stable, although numbers are small. For chronic cases of hepatitis B there has been a marked drop in case numbers for 2016 and 2017 (Table 2.1). Using the 3-year average from 2014–16, numbers of acute and chronic cases in 2017 are lower for 14 of the 21 LTLAs. Of those that exceed the 3-year average, the margin of exceedance is small ( $\leq 2$ ), with only 2 above this (Barnsley 11 and East Riding 6). Based on the number of cases reported to HPZone, the areas with the highest burdened are Leeds (215), Sheffield 102), Bradford (48) and Kirklees (46), together accounting for 70% of all acute cases of hepatitis B.

The age standardised rates show the 3 local authorities reporting the highest rates are York, Leeds and Sheffield (Figure 2.6). Bradford previously was one of the highest reporting areas but is now seventh of the fifteen upper tier local authorities.

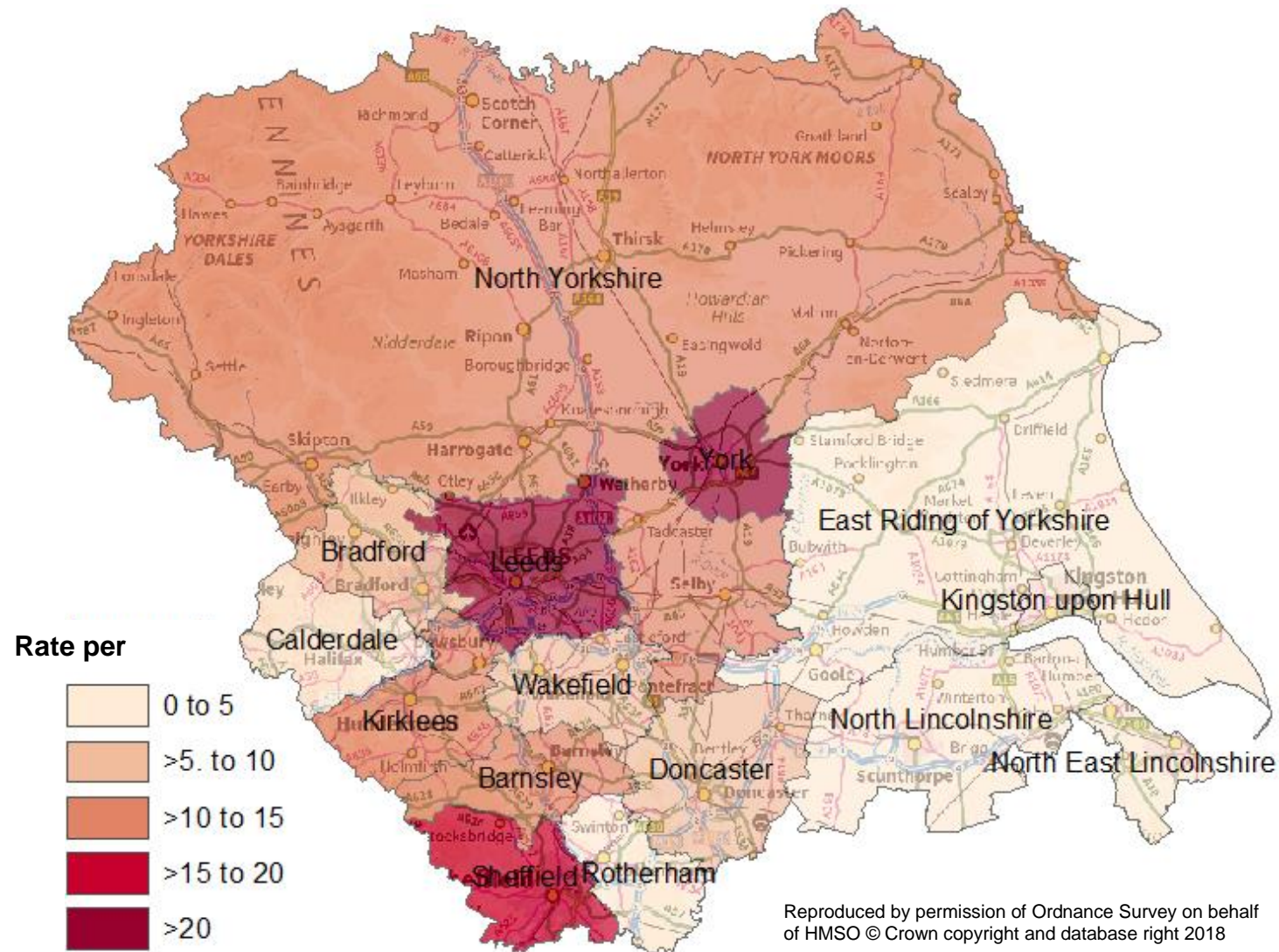
Reporting of hepatitis B laboratory results from York commenced in 2014 and the increased number of diagnoses in this area is unlikely to represent a true increase in York, instead representing reporting of data for previously ascertained cases now being recorded in the laboratory system for the first time. This is supported by the low number of cases reported to the Health Protection Team for York (Table 2.1). The large system failure at the Leeds laboratory resulted in no laboratory test results being reported to SGSS for September to December 2016 and the increased rates observed for Leeds should be interpreted accordingly.

**Figure 2.6 Laboratory reports of hepatitis B (acute and chronic), directly standardised rate (DSR) per 100,000 population by upper tier local authority of residence, Yorkshire and Humber PHE Centre, 2016 and 2017**





**Figure 2.7 Laboratory reports of hepatitis B (acute and chronic), directly standardised rate (DSR) per 100,000 population by upper tier local authority of residence, Yorkshire and Humber PHE Centre, 2016 and 2017**



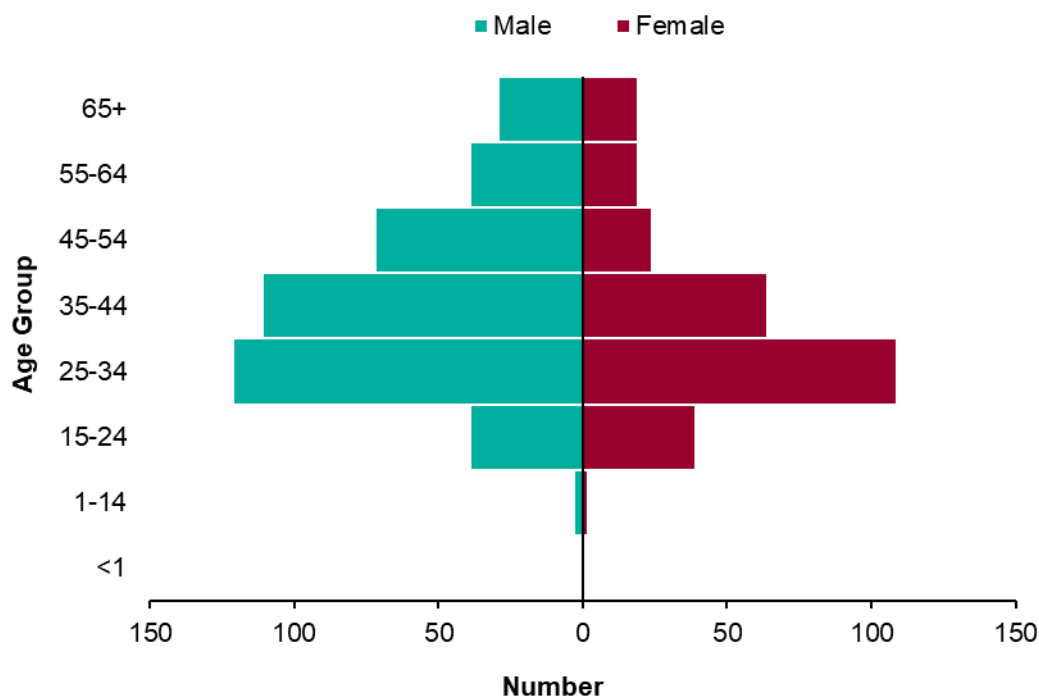
### 3. Demographics

#### Age and sex

Cases of newly diagnosed hepatitis B infection ascertained from laboratory data peak in the 25–34 year age group for both men and women (Figure 3.1). Men account for a higher proportion of cases in each age group, except for 15–24 which have similar numbers for each sex. HPZone data allows a comparison between the age profile of acute and chronic cases (Figure 3.2). For acute infections, there are a greater number of males across all age groups; whereas in chronic cases, there are a greater number of females in the 5–14, 15–24 and 65+ age groups. The age distribution for chronic cases is similar to that of the laboratory data. The age distribution for acute cases differs from the laboratory data, although this is for a very small number of cases. Males aged between 15–34 account for 34% (11/32) of acute cases.

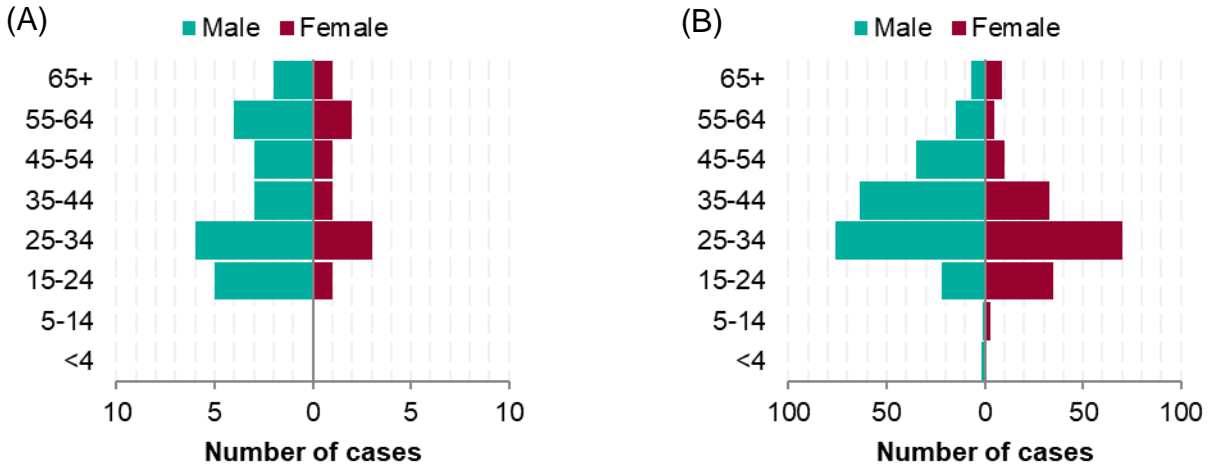
The positivity rate of sentinel surveillance data in those tested is highest in the 25–34 and 35–44 years age group at 1.4% for each (Figure 3.3). The positivity percentage is higher in males (1.3%, 94,368 tested) than in females (0.7%, 82,237 tested) for all ages and across all age groups.

**Figure 3.1 Age group and sex of laboratory reported cases of hepatitis B (acute and chronic), residents of Yorkshire and Humber PHE centre, 2017**



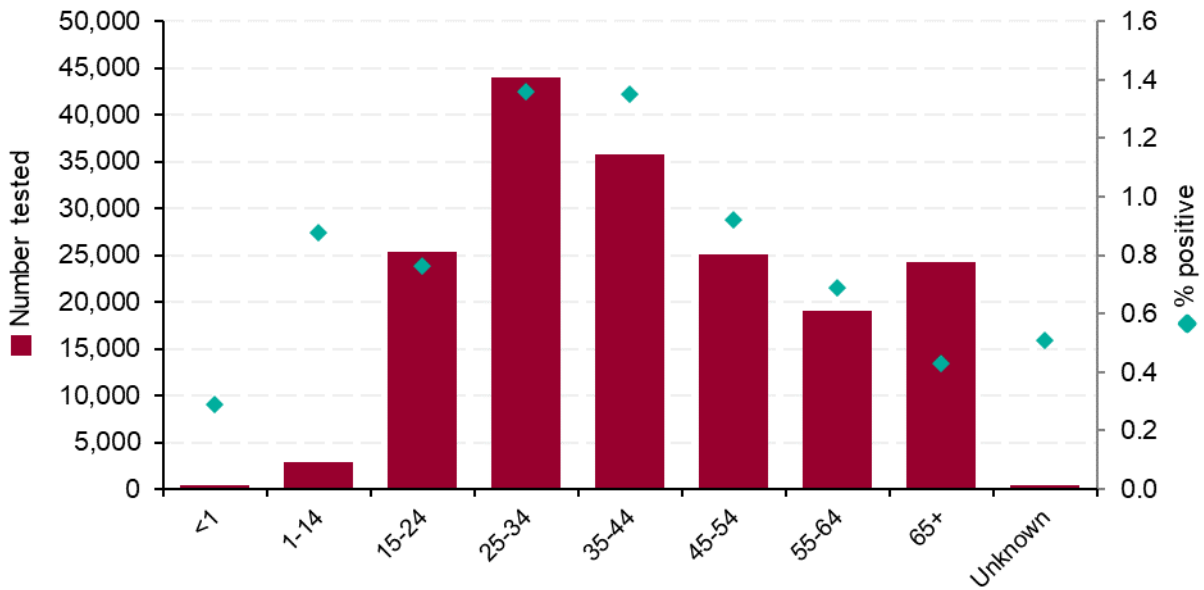
IHBSD Hepatitis database

**Figure 3.2 Age and sex distribution of (A) acute and (B) chronic hepatitis B infections reported to Health Protection Teams, Yorkshire and Humber, 2017**



Source: HPZone

**Figure 3.3 Number of individuals testing positive for HBsAg by age group in sentinel laboratories, Yorkshire and Humber PHE centre (excluding antenatal testing), 2013 to 2017**



Source: Sentinel Surveillance of Hepatitis Testing

## Ethnicity

Ethnicity data tends to be poorly recorded by health protection teams within HPZone, even for acute hepatitis B cases where it is part of the national standard surveillance dataset. In 2017, ethnicity was recorded for 1 of 34 cases of acute hepatitis B reported in Yorkshire and Humber. For chronic hepatitis B recording of ethnicity is similarly low (6/413). Improving completion of ethnicity data in HPZone would be useful for understanding the epidemiology of hepatitis B infection in Yorkshire and Humber and the HPT in Yorkshire and Humber should consider ways to improve completion of ethnicity for all cases of hepatitis B recorded in HPZone.

The acute case of laboratory-confirmed hepatitis B infection in Yorkshire and Humber was recorded as Chinese (3%), the rest were not stated. For chronic and unspecified infections, individuals of Black-African and Other-White ethnicities accounted for 0.2% and 1.2% respectively.

## 4. Risk factors

### Route of transmission

The most likely route of transmission ascertained during public health management of a hepatitis B case is based on information obtained from case interviews or from their attending clinician. Where the most likely transmission risk has been recorded, heterosexual exposure is the most commonly reported risk exposure for acute hepatitis B infection in Yorkshire and Humber (58%; 7 of 12 where the likely route of transmission could be ascertained).

A history of injecting drug use is seldom documented for acute hepatitis B infections in Yorkshire and Humber. It is unknown if this risk factor is present among some of the individuals for whom exposure history is unavailable. The association of injecting drug use with the risk of hepatitis B infection, especially sharing equipment, is well established. Availability of hepatitis B vaccination to clients of drugs services is an important and effective intervention to reduce this risk, made more important for those whose livers may already be at risk of damage from hepatitis C infection.

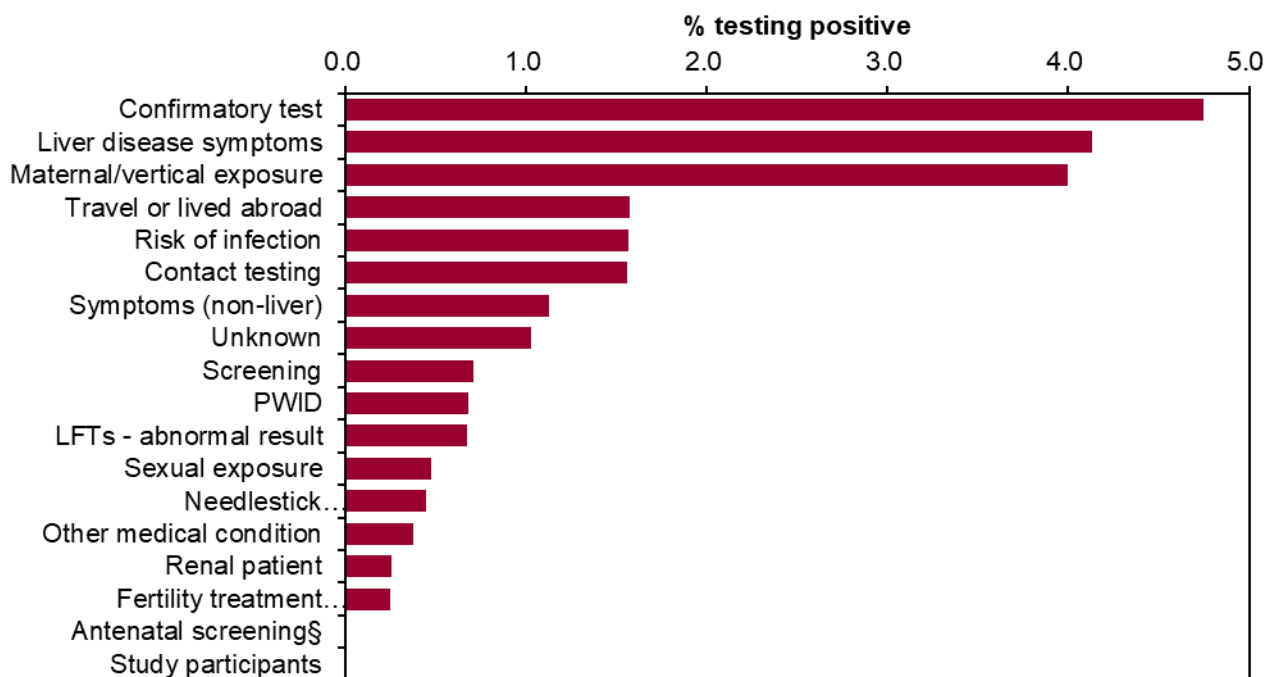
**Table 4.1 Risk factor/reason for test for individuals testing positive for HBsAg in sentinel laboratories, Yorkshire and Humber PHE centre, 2013 to 2017**

Risk exposure/reason for testing	Number tested	Number positive	% testing positive	% of all positive cases
Confirmatory test	3,746	128	4.7	9.5
Liver disease symptoms	3,874	124	4.1	9.2
Maternal/vertical exposure	273	10	4.0	0.7
Travel or lived abroad	243	3	1.6	0.2
Risk of infection	928	11	1.6	0.8
Contact testing	296	4	1.6	0.3
Symptoms (non-liver)	2,309	21	1.1	1.6
Unknown	89,505	765	1.0	56.5
Screening	33,260	194	0.7	14.3
PWID	1,632	8	0.7	0.6
LFTs - abnormal result	6,336	36	0.7	2.7
Sexual exposure	1,782	7	0.5	0.5
Needlestick donor/recipient	2,122	8	0.4	0.6
Other medical condition	3,840	11	0.4	0.8
Renal patient	15,971	8	0.3	0.6
Fertility treatment screening	10,891	16	0.3	1.2
Antenatal screening§	155	0	0.0	0.0
Study participants	2	0	0.0	0.0
<b>Total</b>	<b>177,165</b>	<b>1,354</b>	<b>1.0</b>	<b>100</b>

Source Sentinel Surveillance of Hepatitis Testing

The reasons for requesting a test for those with a positive hepatitis B result is ascertained through sentinel surveillance, although information is not available for over half of tests (56.5%) (Table 4.1 & Figure 4.1). The largest proportion of positive cases is from screening programmes (14.3%) confirmatory tests (9.5%) and those with signs and symptoms of liver disease (9.2%). The proportion in any given group testing positive is highest among confirmatory test (4.7%), those with symptoms of liver disease (4.1%) and maternal/vertical transmission (4%). It is not possible to assess whether persons who inject drugs are over represented among the positive cases with unknown risk factor data or those with liver disease. Contact testing and travel or residency abroad, while generating fewer tests, were also associated with a high risk of positivity at 1.6%.

**Figure 4.1 Percentage of individuals testing positive for HBsAg by risk factor/reason for test in sentinel laboratories, Yorkshire and Humber PHE centre, 2013 to 2017**

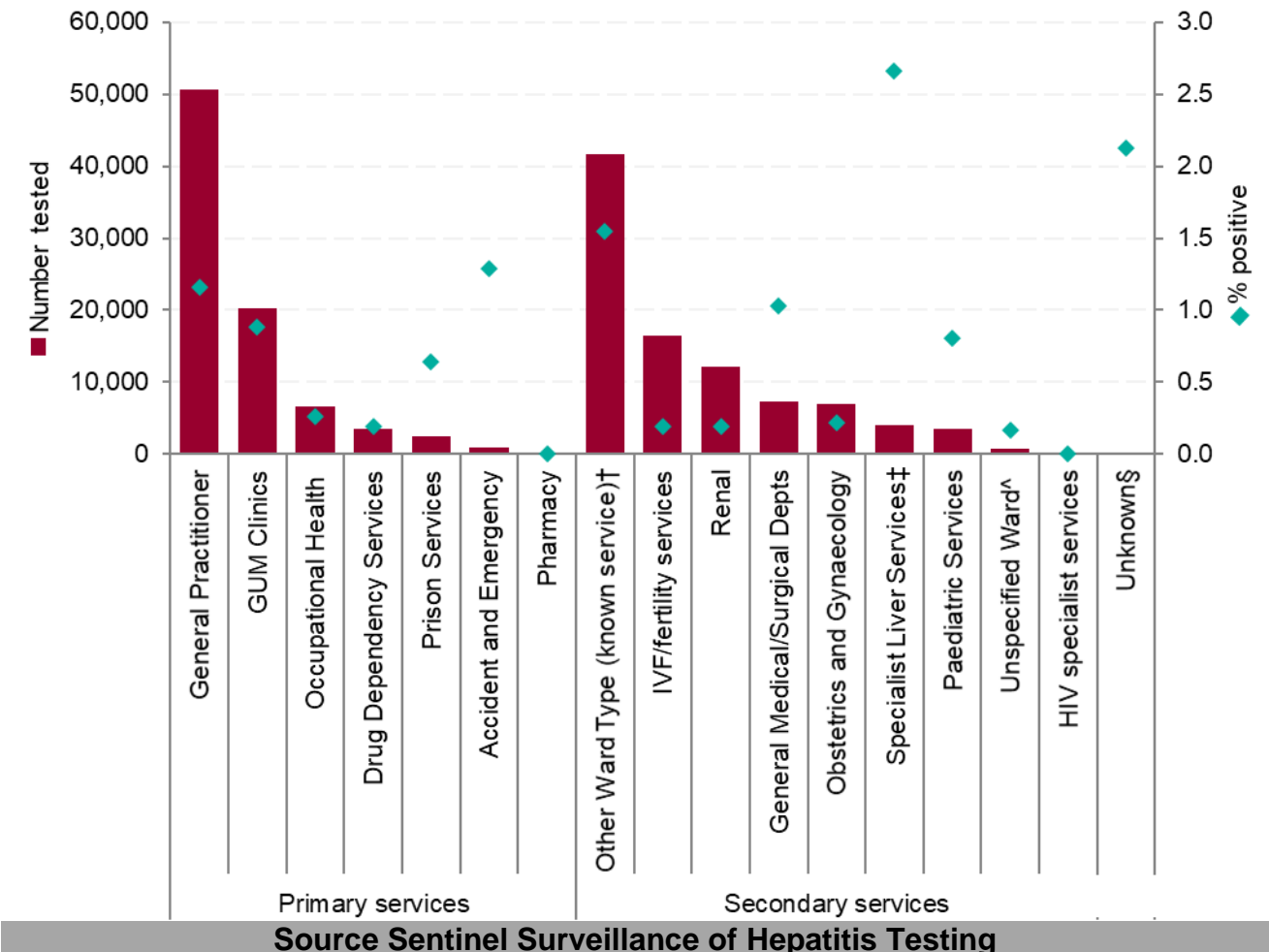


**Source Sentinel Surveillance of Hepatitis Testing**

§ Although this data excludes routine antenatal screening of women aged 12-49 years, persons with a risk reported as antenatal who are either male or female and aged outside of the 12-49 years age requirement are included

General practitioners and other wards† were the greatest source of tests for HBsAg (Figure 4.2). Of all the specimens taken across primary and secondary services, GPs and GUM services accounted for 37% and 11% of positive specimens respectively. Other significant primary sources include prison health, accident and emergency departments, drugs services and occupational health services – reflecting locations where most diagnostic or screening activity takes place and in turn reflecting what is known of the epidemiology and transmission risks for hepatitis B infection. It is not clear from the available data whether positive results in specimens from secondary care services represent new diagnoses or repeated testing for people admitted with hepatitis-related conditions. Another important caveat to this data is the differential use of alternative diagnostic services such as dried blood spot testing, increasingly used by some community services.

**Figure 4.2 Number of individuals tested for HBsAg and percentage positive by service type in sentinel laboratories, Yorkshire and Humber PHE centre (excluding antenatal testing), 2013 to 2017**



† Other ward types include: cardiology, dermatology haematology, ultrasound, x-ray.

‡ This refers to infectious disease services, hepatology departments and gastroenterology departments.



## 5. Hepatitis B in specific settings

### Antenatal screening

Antenatal infection screening is now routinely offered to all women during pregnancy. For women who are identified as positive for hepatitis B virus infection, there is the opportunity to receive care for their infection and apply public health interventions for their contacts. The primary purpose of the programme however, is to identify at risk babies and protect them from vertical transmission through the early use of vaccine and, in some circumstances, immunoglobulin. This programme has been highly successful in interrupting vertical transmission of hepatitis B.

Information from the sentinel surveillance system provides some indicative data on age and ethnicity for participants in the antenatal screening programme. In keeping with patterns of maternity, the numbers tested through the screening programme peaks between 25 and 34 years (n=45,448) and declines substantially for women aged 35-44 years (n=12,774). The percentage women being diagnosed as HBsAg positive in the 25-34 and 35-44 age group are 0.3% and 0.2% respectively.

Sentinel surveillance data on ethnicity categorised using the NamPechan programme to identify South Asian names, indicates that women in Yorkshire and Humber with a South Asian name were no more likely to be HBsAg positive than women with non-South Asian names (both 0.2%). Among HBsAg positive women, those with South Asian names are more likely to be diagnosed HBeAg positive (20.7% vs. 7.5%). The numbers of cases in Yorkshire and Humber are insufficient for robust statistical analysis, but the findings are consistent with the known epidemiology of hepatitis B; infection may have been acquired at an early age for women of South Asian origin if they were born in or spent a part of their childhood in a high hepatitis B prevalence country.

Where ethnicity has been directly recorded within the sentinel surveillance system, further insight into the role of ethnicity is possible, although many records do not declare ethnicity. Where ethnicity was recorded, those of White ethnicity account for the largest proportion of the number of tests done. The proportion of Black and Other/Mixed ethnicity testing positive for HBsAg is high at 1.3% for both, compared to 0.2% for both Asian and White ethnic groups. HBeAg positivity in these groups is high for women of Asian (18.2%) and Other/Mixed (11.8%) ethnicity as well as

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<sup>^</sup> These are hospital services which are currently being investigated to identify specific service type and may include any of the secondary care services mentioned above.

<sup>§</sup> These services are currently being investigated to identify specific service type, where possible.

Cumulative data will not necessarily balance back to trend data because only locations that have been consistently reported in each of the 5 years can be included in trend data.

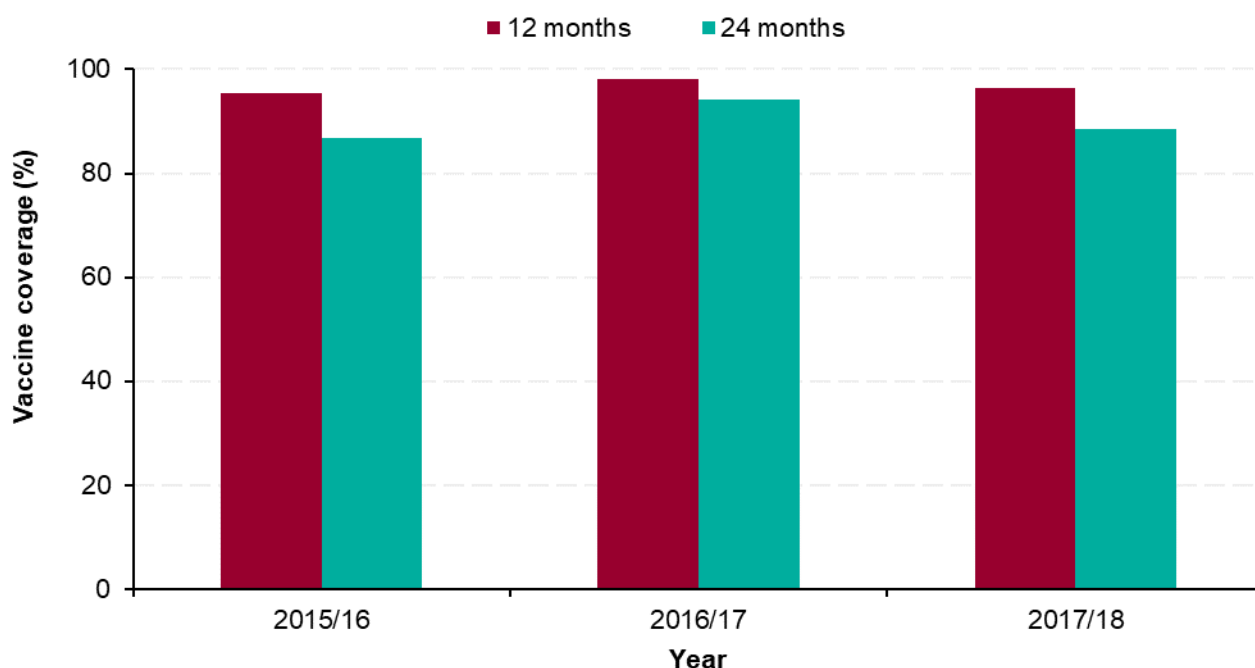


Unknown (13.6%). Positivity for HBeAg remains an important indicator of the risk of onward transmission and reflects patterns in the age of acquisition of infection.

### Neonatal vaccination

Coverage for 3 doses of the hepatitis B vaccine at 12 months has remained high for the past 3 years, with an average of 96.7% (Figure 5.1). Those receiving 4 doses of the vaccine by 24 months was slightly lower, with an average of 89.9% across those 3 years. The trend for both vaccination time points remains consistent.

**Figure 5.1 Neonatal hepatitis B vaccine coverage of 3 doses at 12 months and 4 doses at 24 months, Yorkshire and Humber PHE Centre, 2015/16 to 2017/18**



### Persons who inject drugs

Sentinel surveillance data for Yorkshire and Humber shows a slightly lower positivity rate among those reporting a history of injecting drug use than those without; 0.5% for PWID\* (8/1,613) and 0.8% for those not reported as PWID (1,346/175,552). However, this needs to be interpreted with caution due to the limitations of this dataset.

Stabilization of injection of drugs as a risk factor for hepatitis B most likely reflects both the continued high levels of vaccination coverage achieved among PWID (5-year average 2013-2017: 78%) and low numbers of those in direct sharing of injection equipment (2017: 15%).

\* People who inject drugs

The reported level of vaccination for PWID is greatest in Yorkshire and Humber compared to other PHE Centres based on the current 5-year average; this degree of vaccination has remained constant since 2013. Indirect and direct sharing is still reported by 34% of PWIDs in the unlinked anonymous survey for 2017; the 5-year average for each year since 2013 has remained consistent at close to 40%. Clearly, the potential for transmission remains high and maintaining control measures is essential for reducing the risk of hepatitis B infection for this group.

The reported anti-HBc prevalence has remained below 16% since 2010. There was no change between 2016 and 2017, with anti-HBc prevalence remaining at 14%. The number of samples submitted decreased from 270 in 2016 to 235 in 2017.

## 6. Health care impact

Hepatitis B infection can impact upon the health service at many points along the clinical pathway. Admissions to hospital may result from acute infection or reactivations of previous infections. Antiviral therapy, additional treatment or support for those living with hepatitis B infection while undergoing other treatments or pregnancy, contribute to the impact on health services, as does public health action required to reduce the risk of onwards transmission to contacts of known cases. For those with chronic Hepatitis B infection the impact of liver damage may precipitate further, sometimes extensive admissions which may culminate in liver failure and transplantation.

### Liver transplants and mortality

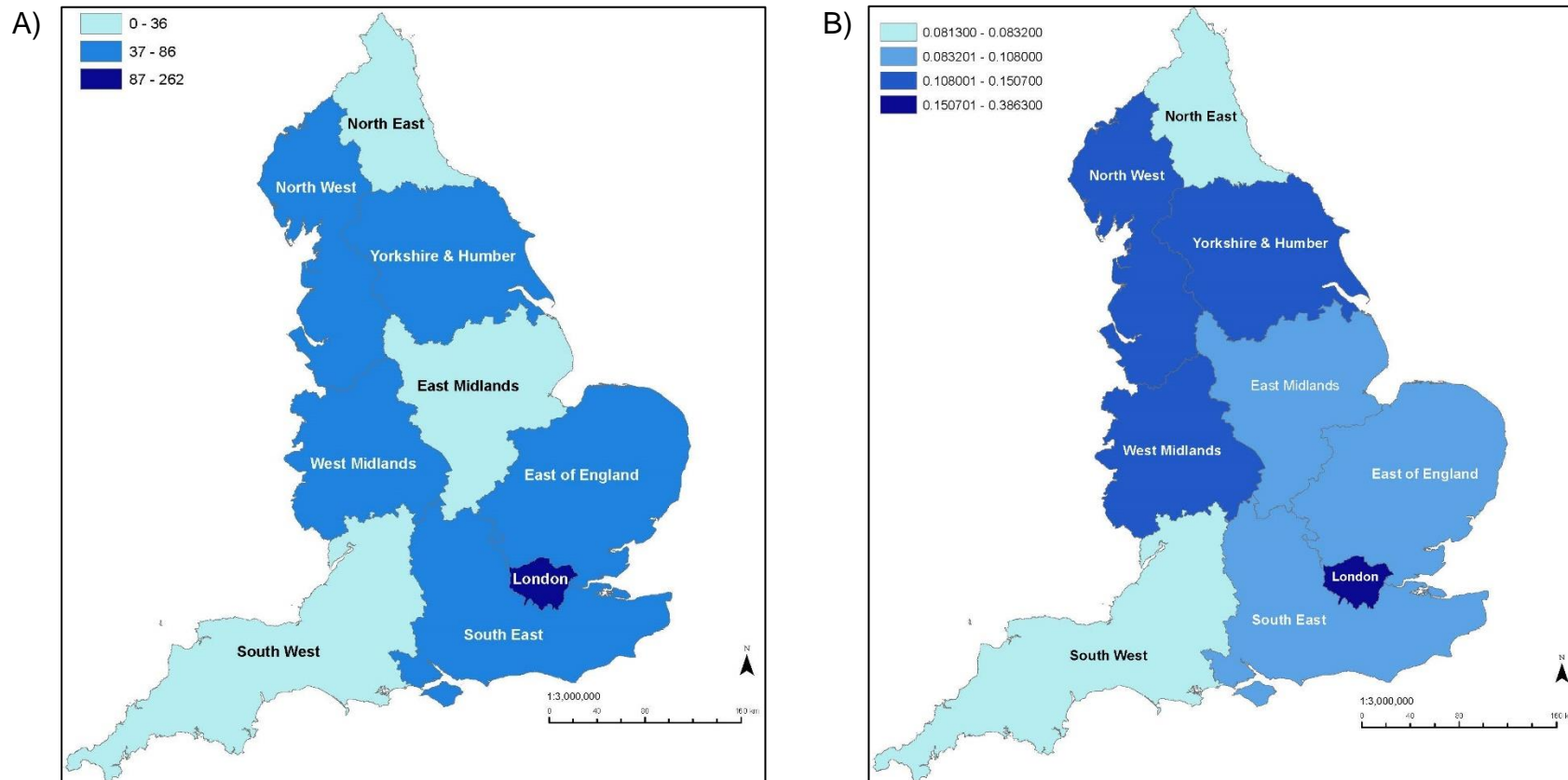
Despite hepatitis B being a vaccine-preventable disease the burden of hepatitis B infection is currently higher than the equivalent for Hepatitis C infection. During 2013–2017 in Yorkshire and Humber there were 347 liver transplants, of which 30 (8.6%) were first liver transplants where hepatitis B related morbidity was indicated at registration and the patient was hepatitis B virus positive at the time of transplantation (UK Transplant Registry).

Mortality rates in Yorkshire and Humber from end-stage liver disease or hepatocellular carcinoma in individuals with hepatitis B has remained within the same range as last year (Figure 6.2).

Due to missing HES data, the trends for hospital admissions for individuals with a diagnosis code for acute or chronic Hepatitis B HBV-related end-stage liver disease (ESLD) or HBV-related hepatocellular carcinoma (HCC) cannot be included in this report.

## Hepatitis B-related deaths

**Figure 6.2 (A) Number and (B) rate per 100,000 of deaths from end-stage liver disease\* of hepatocellular carcinoma in those with hepatitis B virus infection mentioned on their death certificate by Public Health England Centre, 2010 to 2017\*\***



Source: Office for National Statistics, Death Certification. Map produced using PHEGIS

Data is for both acute and chronic hepatitis B.

\*Methodology used to create this map is in line with that used in the “2nd Atlas of variation in risk factors and healthcare for liver disease in England” (numerator = aggregate numbers of deaths by PHEC, denominator = mid-year population estimates by PHEC for 2010 - 2017)

\*\*Changes have been made to the way deaths are counted this year, moving away from monitoring deaths (registered in England) in the year they occurred to monitoring deaths according to the year they were registered where postcodes of individuals’ usual place of residence were in England.

## 7. References

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## Reader information

This report is aimed at healthcare professionals involved in the diagnosis and/or treatment of patients with hepatitis B, commissioners, providers and public health professionals involved in planning and provision of preventative and treatment services for hepatitis B services, and other stakeholders working in the field of hepatitis B.

### Authors

Gareth Hughes, Consultant Epidemiologist, PHE Field Service, Leeds

Madeline Cox, Senior Scientist, PHE Field Service, Leeds

Aston Quinney, Epidemiology and Information Analyst, PHE Field Service, Leeds

### Acknowledgements

We would like to gratefully acknowledge the work of all those who contributed information on hepatitis B in Yorkshire and Humber, including hospitals, laboratories, service users, the National Treatment Agency, and Sentinel Surveillance of hepatitis Testing.

We would like to thank the Office for National Statistics (ONS) for providing the data used in this report. ONS carried out the original collection and collation of the data but bear no responsibility for their future analysis or interpretation.

## Suggested citation

Annual Review of the Epidemiology of Hepatitis B in Yorkshire and Humber, 2017 data.  
PHE Field Service, Yorkshire and Humber

## Acronyms

Anti-HBc	Anti-Hepatitis B core antibody
CCDC	Consultant in Communicable Disease Control
COVER	Cover of Vaccination Evaluated Rapidly programme
GP	General Practice
GUM	Genitourinary Medicine
HBsAg	Hepatitis B surface antigen
IHBSD	Immunisation, Hepatitis and Blood Safety Department
LTLA	Lower Tier Local Authority
NHS	National Health Service
PHE	Public Health England
PIP	Prison Infection Prevention
PWIDs	People who inject drugs
SGSS	Second Generation Surveillance System
UTLA	Upper Tier Local Authority