



## Infection reports / Immunisation

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### Acute hepatitis B (England): annual report for 2015

Hepatitis B is a blood borne infection of the liver caused by the hepatitis B virus (HBV). The virus can provoke an acute illness characterised by nausea, malaise, abdominal pain, and jaundice but can also produce a chronic persistent infection that is associated with an increased risk for chronic liver disease and hepatocellular carcinoma. Transmission is by parenteral exposure to infected blood and body fluids contaminated by blood, most often through sexual contact, blood to-blood contact and perinatal transmission from mother to child. HBV infection can be prevented by immunisation and in the UK immunisation is recommended for individuals at high risk of exposure to the virus e.g. people who inject drugs (PWID), healthcare workers, household contacts of people chronically infected with hepatitis B. Immediate post-exposure immunisation is used to prevent infection, especially in babies born to infected mothers or following needle-stick injuries [1].

Surveillance of acute hepatitis B is essential to target prevention and control activities such as the selective immunisation programme. Public Health England, formerly the Health Protection Agency (HPA) implemented national surveillance standards [1] for hepatitis B in 2007 which provided the framework for more consistent reporting of cases from PHE Centres. Available data on confirmed acute infections reported from laboratories can then be used to augment the epidemiological data collected from the local centres. The first report was published in 2008, and this current report provides an update and presents acute hepatitis B surveillance data for 2015.

#### Methods

The surveillance definition for acute hepatitis B [2] is

“HBsAg positive and anti-HBc IgM positive and abnormal liver function tests with a pattern consistent with acute viral hepatitis.”

As information on liver function is usually not available to PHE, for the purpose of this analysis:

- cases classified as acute viral hepatitis B by the local PHE Centre or the laboratory and/or with a documented positive anti-HBc IgM were classified as acute cases;
- cases classified as acute viral hepatitis B by the PHE Centre but without anti-HBc IgM test results, or not classified but with a positive anti-HBc IgM reported were assumed to be probable acute hepatitis B cases;
- cases classified as acute by the PHE Centre but with contradictory evidence e.g. positive hepatitis serology results dated before July 2012 were reclassified as chronic infections;

- cases classified as chronic infections or those not classified where anti-HBc IgM was negative or equivocal were assumed to be chronic infections;
- and cases that remained unclassified and without anti-HBc IgM results were excluded from further analysis.

PHE Centre cases with a date entered from 1 January 2015 to 31 December 2015 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, soundex, 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). The SGSS data was used to determine final status of any matching cases reported from the PHE Centre. A final reconciled dataset included cases classified as acute or probable acute and reported from the PHE Centre and/or from laboratories around the country 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 the analysis, where the probable route of exposure had not been assigned due to more than one exposure, the most likely route was assigned hierarchically (injecting drug use, followed by homosexual exposure, then heterosexual exposure, etc.).

## Results

The PHE Centres reported 5,090 hepatitis B cases from 1 January to 31 December 2015 to the PHE Immunisation, Hepatitis and Blood Safety Department. The matching and classification exercise resulted in 368 of these being confirmed as acute and 17 re-classified as probable acute cases with the remainder classified as chronic or excluded. After deduplication, 20 cases reported as acute from the PHE Centres were excluded or reclassified because they had no anti-HBc IgM result, or were matched to a case classified as chronic in the SGSS data.

A total of 11,708 confirmed hepatitis B infections were reported from laboratories to SGSS in the same period, 329 (2.8%) of which were classified as acute cases, 13 (0.1%) as probable acute cases, 9,715 (83%) were classified as chronic and 1,651 (14.1%) remained unclassified.

After the two databases were linked and reconciled, a total of 457 acute or probable acute cases of hepatitis B were reported for England in 2015. This gives an annual incidence of 0.83 per 100,000 population, lower than the incidence of 0.91 per 100,000 reported for 2014.

London is still the region with the highest incidence (1.53 per 100,000) and this has increased slightly from the previous year (1.52 per 100,000). The highest increase was reported from East Midlands region (from 0.41 to 1.07 per 100,000 in 2014 and 2015 respectively). The largest decrease was reported from South West (from 1.08 to 0.49 per 100,000 in 2014 and 2015 respectively) and North East (from 0.84 to 0.34 per 100,000 in 2014 and 2015 respectively), followed by a smaller decrease reported by North West region (from 0.82 to 0.64 per 100,000 in 2014 and 2015 respectively). In the remaining regions incidence was similar or slightly declined from last year (table 1). There continues to be regional variation in the contribution of the different data sources to the overall total, although the overlap between sources has

continued to improve suggesting that completeness of reporting by laboratories and local clinicians has also improved.

As in previous years, where known the majority of cases were in men (69.8%) who had an overall incidence of 1.17 per 100,000 – a decrease from 1.26 per 100,000 in 2014 compared to a continuing decline from the previous year [3]. The corresponding incidence in women in 2015 was 0.49 per 100,000 - a slight increase from 0.48 per 100,000 in the previous year. Men aged 45-54 years had the highest incidence of acute hepatitis B at 2 per 100,000. Most males, except those aged less than 15 and those aged 55-64, had a slightly lower incidence than in 2014, compared to females who generally had a slight increase in the incidence (except those aged less than 24 and those aged the 55-64). The incidence in children remains very low (table 2).

Only 102 (22.3%) of the total acute or probable acute hepatitis B cases had their ethnicity recorded; a slightly higher proportion than the previous year. Sixty six percent of the cases were white (decrease from 67% in 2014), followed by Black or Black British (20.6%) and Asian or Asian British (11.8%), the latter lower than in 2014.

Of the total 457 acute and probable acute cases of hepatitis B, 256 (56%) had associated exposure information recorded (with the most probable route of acquisition assigned by the PHE Centre). A lower proportion (50.2 245/488) had exposure information available in 2014.

As in previous years where known the commonest reported risk attributed was heterosexual exposure, implicated as the probable route of exposure in 145 (56.6%), compared to 54.7% in this category in 2014 (n=134). Cases attributed to sex between men were reported in 40 (15.6%); a similar proportion to the 43 (17.6%) reported in 2014.

Nine cases (3.5%) with known exposure were attributed to PWID (a decrease from 4.9% in the previous year).

Where known, 21 (8.2 %) cases had health care related exposures (2 of which reported recent travel abroad), including surgery, dental treatment dialysis and other hospital exposure – an increase compared to the 14 cases assigned to medical risk factors last year. Skin piercing, tattooing and acupuncture combined were listed as probable exposures for twelve cases (4.7%, 12/256). A further 21 cases (8.2%) had other unspecified risk related to travel abroad. A range of other risks were reported for the remaining 8 cases. Of all cases with a risk exposure reported, 63 (24.6%) also had information stating recent travel abroad.

## **Discussion**

In 2015, reporting of acute cases of hepatitis B from PHE Centres has continued to exceed the number reported from laboratories but the proportion of cases reported by both PHE Centres and laboratory systems is high at 59.1% (270/457), compared to 61% (296/489) of cases reported in 2014. This slight decrease in overlap may be due to the introduction of SGSS a new laboratory reporting system to replace LabBase that could on its initial stages of implementation compromise the quality of identifiers used for matching the data from both sources.

There was nonetheless an overall improved matching over the years that could be explained given the introduction of statutory laboratory reporting in October 2010 and the continued decline in the proportion of cases of unknown status reported from laboratories. Combining data from both sources does minimise under ascertainment and improve the completeness of associated data for analysis. Interpretation of trends should be made with caution, but based on this combined data, the incidence of acute hepatitis B remains low. Given the improved quality and completeness of data provided in 2014/2015, it is likely that there has been a continued gradual decline in incidence since 2008 which has become more apparent in the more recent years.

It is known that anti-HBc IgM, normally a marker of acute infection, may be detected during flares in chronic infections. To minimise misclassification, matching to historical laboratory reports can identify those chronic infections detected previously. However, there is still likely to be some misclassification of chronic cases as acute infections in both datasets. Given the large number of chronic cases diagnosed each year, even a small proportion of cases misclassified as acute can substantially increase the estimated incidence of acute hepatitis B, and confuse the attribution of exposures. Further testing using anti-HBc avidity is now being offered at PHE Colindale, to enable better distinction between acute and chronic infection. Local laboratories can send samples from IgM positive cases to the national virus reference laboratory where both genotyping and avidity testing will be undertaken free of charge [5].

Risk factor data were available in 56% of cases. The interpretation of these data is difficult because in many instances, more than one possible exposure is listed and a probable exposure had not been assigned by the local HPT. Despite this, the data suggest that the number of cases in PWID has remained low in 2015. The overall low incidence in this group is supported by the 2012 unlinked anonymous survey among PWID in contact with drug services which showed that anti-HBc prevalence has remained low and self-reported uptake of hepatitis B vaccine has remained high since 2009, particularly in recent initiates [6].

The incidence of acute hepatitis B continues to remain higher in males than females. This excess of male cases is partly explained by cases in men who have sex with men (MSM); the number of cases with this exposure reported has remained high again this year, following a large increase in 2010. Such cases are more likely to attend GUM clinics, reinforcing the important role of GUM clinics in providing opportunistic hepatitis B immunisation to MSM and individuals with multiple sexual partners. In 2010 the HPA worked with the British Association of Sexual Health and HIV (BASHH) to introduce a standard form for GUM clinics to report acute hepatitis to their local health protection team [7]. This may have helped to increase the reporting of cases diagnosed in this group. This year, a higher proportion of cases (8.2%) were attributed to medical exposure, compared to previous year (5.7). It is still likely that many of these attributions are incorrect, as further investigation may have been undertaken – for example by NHS Blood and Transplant and excluded transmission by this route. It is therefore recommended that cases with these exposures assigned are checked prior to reporting.

## References

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**Table 1. Acute or probable acute hepatitis B cases by region and source of report, 2015 (incidence 2008-2014 – mid 2013 population, incidence 2015 – mid 2015 population ONS [4])**

REGION	HPU	Lab/y	BOTH	TOTAL	Incidence of reported acute hepatitis B per 100,000 in 2015	Incidence of reported acute hepatitis B per 100,000 in 2014	Incidence of reported acute hepatitis B per 100,000 in 2013	Incidence of reported acute hepatitis B per 100,000 in 2012	Incidence of reported acute hepatitis B per 100,000 in 2011	Incidence of reported acute hepatitis B per 100,000 in 2010	Incidence of reported acute hepatitis B per 100,000 in 2009	Incidence of reported acute hepatitis B per 100,000 in 2008
EAST MIDLANDS	23	0	27	50	<b>1.07</b>	0.41	0.35	0.77	0.76	0.74	0.85	1.3
EAST OF ENGLAND	8	3	35	46	<b>0.76</b>	0.89	0.81	0.89	1.08	0.78	0.85	0.97
LONDON	25	33	75	133	<b>1.53</b>	1.52	1.22	2.02	2.06	1.82	1.8	1.83
NORTH EAST	3	0	6	9	<b>0.34</b>	0.84	0.65	0.46	0.54	0.54	1.28	0.7
NORTH WEST	20	4	22	46	<b>0.64</b>	0.82	0.87	0.61	0.99	0.96	1.64	1.79
SOUTH EAST	15	12	35	62	<b>0.69</b>	0.71	0.67	0.84	0.96	0.84	1.03	1
SOUTH WEST	4	12	11	27	<b>0.49</b>	1.08	0.63	1.40	1.16	1.05	0.78	0.85
WEST MIDLANDS	12	4	33	49	<b>0.85</b>	0.78	0.55	0.98	0.90	0.66	0.74	0.76
YORKS AND HUMBER	5	4	26	35	<b>0.65</b>	0.82	0.82	0.83	1.06	0.97	1.05	1.18
<b>NATIONAL</b>	<b>115</b>	<b>72</b>	<b>270</b>	<b>457</b>	<b>0.83</b>	<b>0.91</b>	<b>0.77</b>	<b>1.04</b>	<b>1.13</b>	<b>0.99</b>	<b>1.15</b>	<b>1.21</b>

**Table 2. Age and sex breakdown of acute or probable acute hepatitis B reports, 2015 (incidence 2008-2014 – mid 2013 population, incidence 2015 – mid 2015 population ONS [4]).**

Age group	Female		Male		NK		TOTAL	
	Number of cases	Incidence of reported acute hepatitis B per 100,000 population	Number of cases	Incidence of reported acute hepatitis B per 100,000 population	Number of cases	Incidence of reported acute hepatitis B per 100,000 population	Number of cases	Incidence of reported acute hepatitis B per 100,000 population
Less than 15	2	0.04	4	0.08	0	-	6	0.06
15-24	31	0.93	33	0.95	0	-	64	0.94
25-34	32	0.86	61	1.63	1	-	94	1.26
35-44	36	1.01	58	1.64	1	-	95	1.34
45-54	20	0.51	76	2.00	0	-	96	1.25
55-64	5	0.16	60	1.97	0	-	65	1.05
GE65	9	0.17	25	0.57	0	-	34	0.35
NK	2	0.01	0	0.00	1	-	3	0.01
<b>Total</b>	<b>137</b>	<b>0.49</b>	<b>317</b>	<b>1.17</b>	<b>3</b>	<b>-</b>	<b>457</b>	<b>0.83</b>