

## Introduction

In the UK, an estimated 180,000 persons are chronically infected with the hepatitis B virus (HBV) and 101,200 are living with HIV<sup>1,2</sup>. The vast majority of persons chronically infected with HBV acquired their infection abroad, with some countries also having a high prevalence of HIV.

Persons with HBV who are co-infected with HIV have poorer outcomes than those mono-infected<sup>3</sup>, with studies showing faster progression to advanced liver disease.

In 2012, the UK CHIC study estimated HBV infection prevalence in their HIV positive cohort to be 6.9%<sup>4</sup>. However, no studies have estimated the UK burden of HIV in persons with HBV.

We estimate diagnosed HIV prevalence among those being testing for HBV and examine associated risk factors, using data from the Sentinel Surveillance of Blood Borne Virus Testing (SSBBV) and the national HIV database of persons diagnosed and a living with HIV.

## Methods

Demographic and testing data on all hepatitis B surface antigen (HBsAg) tests between January 2008 and December 2014 were extracted from 23 laboratory information systems participating in the SSBBV. Tests were excluded if they were quality control samples, reference tests or on persons less than 15 years of age.

A person's first positive HBsAg test and requester service were identified. Persons with no positive HBsAg test had their most recent negative test and requester details recorded.

In order to identify person's with HIV, all positive HIV antibody tests held within SSBBV were extracted and a person's first positive test was linked to the HBV testing cohort. Additionally, persons within SSBBV were linked to PHE's HIV and AIDS Reporting System (HARS) using deterministic and probabilistic methodology. Information on route of HIV transmission and country of probable infection was extracted from HARS.

Persons were identified as co-infected if they had a HIV-diagnosis before their positive HBsAg test, or in the 6 months following.

## Results

Between 2008 and 2014, 1.3% (28,789/2,149,933) of persons tested for HBsAg were positive, of whom 3.9% (1,129) were co-infected with HIV (Table 1).

Co-infection rates were highest in males (5.1%), persons aged 34-44 years (5.7%), persons of white ethnicity (7.0%) and persons tested in primary care services (4.3%).

Significant predictors of a co-infection included being of black ethnicity (black females: aOR 1.8; 95% CI 1.3-2.6, black male: aOR 1.6; 95% CI 1.1-2.2) or a male of white ethnicity (aOR 1.9; 95% CI 1.5-2.3) when compared to white females, increased age (aOR 1.1 per 10 year increase; 95% CI 1.1-1.2), and when the positive HBsAg test was requested in sexual health (aOR 49.2; 95% CI 37.7-64.2), A&E (aOR 5; 95% CI 2.9-8.7), specialist liver (aOR 6.2; 95% CI 4.6-8.4) and renal services (aOR 2.5; 95% CI 1.5-4.4) when compared to GPs.

Most persons (60.4%) had a HIV diagnosis more than six months before their HBV diagnosis, with a further 20.2% diagnosed HIV positive in the six months prior to their positive HBsAg test. 15.1% were diagnosed HIV positive on the same day as their HBsAg test and 4.3% were diagnosed HIV positive in the subsequent six months following their positive HBsAg test.

Among persons of black ethnicity and where probable region of infection was reported (73.7%), 86.7% had probable region of HIV acquisition reported as Africa.

Probable route of HIV-infection was reported for 71.3% of co-infected persons, with almost all co-infected women probably acquiring their HIV through heterosexual contact (97.0%) and 35.0% and 58.7% of men acquiring their HIV through heterosexual contact and sex between men respectively.

A further 52 persons were diagnosed with HIV more than six months after their first HBsAg positive test. Of these, 76.9% were male, 63.5% were white and the median age was 37.5 years. Where probable route of HIV infection was reported (61.5%), all women (5) probably acquired their HIV infection through heterosexual contact and 61.5% (16) of men acquired their HIV through sex between men.

**Table 1. Characteristics of persons diagnosed with HIV among persons tested for HBsAg and testing HBsAg positive between 2008 and 2014 in sentinel laboratories in England.**

	HBsAg Tested			HBsAg Positive		
	n	HIV+ (n)	HIV+ (%)	n	HIV+ (n)	HIV+ (%)
Total	2,149,933	31,900	1.48	28,789	1,129	3.92
Sex						
Male	797,835	23,395	2.93	16,354	828	5.06
Female	1,327,910	8,206	0.62	11,774	281	2.39
Not Reported	24,188	299	1.24	661	20	3.03
Age Group						
15 - 24 years	407,831	1,749	0.43	4,133	54	1.31
25 - 34 years	786,635	7,930	1.01	10,453	283	2.71
35 - 44 years	456,003	11,108	2.44	7,426	425	5.72
45+ years	492,093	11,085	2.25	6,709	364	5.43
Not Reported	7,371	28	0.38	68	3	4.41
Ethnicity						
White	1,351,146	18,604	1.38	9,256	645	6.97
Asian	247,218	1,676	0.68	5,393	73	1.35
Black	42,444	1,991	4.69	2,739	133	4.86
Mixed/Other	64,065	720	1.12	5,019	39	0.78
Not Reported	445,060	8,909	2.00	6,382	239	3.74
Speciality						
Primary Care	1,049,328	22,277	2.12	15,863	706	4.45
Secondary Care	631,168	8,718	1.38	10,601	403	3.80
Antenatal testing	468,372	892	0.19	2,310	20	0.87
Not Reported	1,065	13	1.22	15	-	0.00
Year of HBsAg test						
2008	237,893	2,721	1.14	4,368	285	6.52
2009	254,016	3,739	1.47	4,268	184	4.31
2010	262,027	4,394	1.68	4,017	145	3.61
2011	280,242	4,197	1.50	3,990	148	3.71
2012	313,160	4,952	1.58	3,928	132	3.36
2013	369,520	5,645	1.53	3,815	126	3.30
2014	433,075	6,252	1.44	4,403	109	2.48

## Discussion

To our knowledge, this is the first estimate of HIV co-infection rates among those with HBV in England. We found rates of diagnosed HIV infection in persons testing for HBV to be higher than the national average (0.2%)<sup>2</sup>.

High levels of HIV-HBV co-infection among persons of black ethnicity likely reflect the high prevalence of HBV and HIV in certain African countries. In many cases, it is likely that both infections were acquired prior to migration to the UK. Although these infections were more likely to have occurred outside the UK, it remains important to test for HBV so that persons are aware of their infection, have access to treatment and so that onward transmission is prevented by vaccinating family members.

The majority of co-infected men of white ethnicity probably acquired their HIV infection through sex between men, highlighting the need to increase HBV vaccine coverage among the MSM population.

1. Public Health England. Hepatitis B: Migrant Health. <https://www.gov.uk/guidance/hepatitis-b-migrant-health-guide>. Accessed: Jan 2017  
 2. Public Health England. HIV in the UK: 2016 report. <https://www.gov.uk/government/publications/hiv-in-the-united-kingdom> accessed Jan 2017  
 3. Rajbhandari R et al. HBV/HIV coinfection is associated with poorer outcomes in hospitalized patients with HBV or HIV. J Viral Hepat. 2016; 23(10):820-9.  
 4. Price et al. Hepatitis B Virus Infection in HIV-Positive Individuals in the UK Collaborative HIV Cohort (UK CHIC) Study