

Supplementary information

Supplementary Table 1: Definitions of GUMCAD variables used in the analysis

Variable	Definition
History of STI in past year	Diagnosed with a new STI (excluding HIV) in the year prior to attendance (1-365 days)
HIV diagnosed	An individual is defined in GUMCAD as living with diagnosed HIV for all attendances following either a new HIV diagnosis code or an attendance for HIV related care
Country of birth / WHO region of birth	Patients' country of birth as self-reported by the patient at registration. WHO region of birth derived from this using the 6 WHO regions (1).
HAV diagnosis	Recorded diagnosis of acute HAV (defined as detection of hepatitis A virus specific IgM antibodies)
HAV vaccine (1st)	First dose of a new hepatitis A vaccination course
HAV vaccine (2nd)	Second dose of a hepatitis A vaccination course (including those who may have received an earlier dose at another sexual health service);
HAV immune	HAV immunity includes those who have i) natural immunity – via self-reported or documented history of hepatitis A infection, ii) vaccine-induced immunity – via documented history of 2 doses of monovalent or 3 doses of bivalent vaccine
HBV vaccine (1st)	First dose of a new hepatitis B vaccination course (including those who may have been previously vaccinated at any sexual health service but are now starting a new vaccination course).
HBV vaccine (2nd, 3rd, 4th)	Second, third or fourth dose of a HBV vaccination course (including those who may have received an earlier dose at another sexual health service);
HBV vaccine booster	HBV vaccination booster dose (including those who may have been vaccinated at another sexual health service)
HBV immune	HBV immunity includes those who have: i) natural immunity – via self-reported or documented history of hepatitis B infection, ii) vaccinated immunity – via documented history of 3 doses of vaccine
HBV diagnosed	Recorded first diagnosis of HBV (first diagnosis of viral hepatitis B – HBsAG antigen positive)

Supplementary Table 2: Sample size calculations

BBV	Age group	Estimated prevalence	Sample size	Estimated numerator	LCI	UCI
HAV ¹	<40	20.0%	260	52	15.6%	25.3%
	40-59	46.4%	250	116	40.3%	52.6%
	60+	73.5%	150	110	65.9%	79.9%
HBV ²	18-24	78.8%	60	47	66.9%	87.3%
	25-29	50.0%	150	75	42.1%	57.9%
	30-39	31.3%	150	47	24.4%	39.1%
	40+	24.0%	100	24	16.7%	33.2%

1. HAV seroprevalence estimates taken from Morris et al 2002 (2) and age groups as initially planned for this study before sample collection.

2. HBV seroprevalence estimates taken from Pitasi et al 2014 (3), age groups as shown in that study.

Supplementary Table 3. Sample characteristics vs other GBMSM clinic attendees

Characteristic		Sample			Other GBMSM clinic attendees			P (difference between sample and comparison group (Chi ²))	
		Number	% of total	95% CI	Number	% of total	95% CI		
TOTAL		2577	100		5939	100			
Clinic group	TDL North London	450	17.5		539	9.1			
	Homerton Hospital	566	22.0		1441	24.3			
	St Mary's Hospital	467	18.1		733	12.3			
	St Thomas' Hospital	643	25.0		2711	45.6			
	Leeds Sexual Health	451	17.5		515	8.7			
Age group	All								
	18-25	525	20.4	18.9-22.0	1100	18.5	17.6-19.5	0.014	
	26-35	979	38.0	36.1-39.9	2406	40.5	39.3-41.8		
	36-45	600	23.3	21.7-25.0	1451	24.4	23.4-25.5		
	46 and over	473	18.4	16.9-19.9	982	16.5	15.6-17.5		
	TDL North London								
	18-25	114	25.3	21.5-29.5	118	21.9	18.6-25.6	0.014	
	26-35	174	38.7	34.3-43.2	172	31.9	28.1-36.0		
	36-45	85	18.9	15.5-22.8	130	24.1	20.7-27.9		
	46 and over	77	17.1	13.9-20.9	119	22.1	18.8-25.8		
	Homerton Hospital								
	18-25	107	18.9	15.9-22.3	267	18.5	16.6-20.6	0.027	
	26-35	290	51.2	47.1-55.3	666	46.2	43.7-48.8		
	36-45	121	21.4	18.2-24.9	322	22.3	20.3-24.6		

	46 and over	48	8.5	6.5-11.1	186	12.9	11.3-14.7	
	St Mary's Hospital							
	18-25	59	12.6	9.9-16.0	95	13.0	10.7-15.6	0.326
	26-35	167	35.8	31.5-40.2	225	30.7	27.5-34.1	
	36-45	121	25.9	22.1-30.1	210	28.6	25.5-32.0	
	46 and over	120	25.7	21.9-29.8	203	27.7	24.6-31.0	
	St Thomas' Hospital							
	18-25	100	15.6	13.0-18.6	484	17.9	16.5-19.3	<0.0001
	26-35	181	28.1	24.8-31.7	1155	42.6	40.8-44.5	
	36-45	197	30.6	27.2-34.3	695	25.6	24.0-27.3	
	46 and over	165	25.7	22.4-29.2	377	13.9	12.7-15.3	
	Leeds Sexual Health							
	18-25	145	32.2	28.0-36.6	136	26.4	22.8-30.4	0.092
	26-35	167	37.0	32.7-41.6	188	36.5	32.5-40.7	
	36-45	76	16.9	13.7-20.6	94	18.3	15.2-21.8	
	46 and over	63	14.0	11.1-17.5	97	18.8	15.7-22.4	
History of STI in past year	All							
	No	1889	73.3	71.6-75.0	4045	68.1	66.9-69.3	<0.0001
	Yes	688	26.7	25.0-28.4	1894	31.9	30.7-33.1	
	TDL North London							
	No	351	78.0	73.9-81.6	385	71.4	67.5-75.1	0.018
	Yes	99	22.0	18.4-26.1	154	28.6	24.9-32.5	
	Homerton Hospital							
	No	389	68.7	64.8-72.4	1007	69.9	67.5-72.2	0.613
	Yes	177	31.3	27.6-35.2	434	30.1	27.8-32.5	
	St Mary's Hospital							
	No	268	57.4	52.9-61.8	422	57.6	54.0-61.1	0.95
	Yes	199	42.6	38.2-47.1	311	42.4	38.9-46.0	

	St Thomas' Hospital							
	No	530	82.4	79.3-85.2	1853	68.4	66.6-70.1	<0.0001
	Yes	113	17.6	14.8-20.7	858	31.6	29.9-33.4	
	Leeds Sexual Health							
	No	351	77.8	73.8-81.4	378	73.4	69.4-77.0	0.11
	Yes	100	22.2	18.6-26.2	137	26.6	23.0-30.6	
HIV status	All							
	Negative	2228	86.5	85.1-87.7	4494	75.7	74.6-76.7	<0.0001
	Positive	349	13.5	12.3-14.9	1445	24.3	23.3-25.4	
	TDL North London							
	Negative	361	80.2	76.3-83.6	337	62.5	58.4-66.5	<0.0001
	Positive	89	19.8	16.4-23.7	202	37.5	33.5-41.6	
	Homerton Hospital							
	Negative	546	96.5	94.6-97.7	1164	80.8	78.7-82.7	<0.0001
	Positive	20	3.5	2.3-5.4	277	19.2	17.3-21.3	
	St Mary's Hospital							
	Negative	323	69.2	64.8-73.2	526	71.8	68.4-74.9	0.335
	Positive	144	30.8	26.8-35.2	207	28.2	25.1-31.6	
	St Thomas' Hospital							
	Negative	590	91.8	89.4-93.6	2022	74.6	72.9-76.2	<0.0001
	Positive	53	8.2	6.4-10.6	689	25.4	23.8-27.1	
	Leeds Sexual Health							
	Negative	408	90.5	87.4-92.8	445	86.4	83.2-89.1	0.05
	Positive	43	9.5	7.2-12.6	70	13.6	10.9-16.8	
Country of birth	All							
	UK	1363	52.9	51.0-54.8	3233	54.4	53.2-55.7	0.229
	non-UK	1123	43.6	41.7-45.5	2475	41.7	40.4-42.9	

	unknown	91	3.5	2.9-4.3	231	3.9	3.4-4.4	
	TDL North London							
	UK	241	53.6	48.9-58.1	282	52.3	48.1-56.5	0.618
	non-UK	209	46.4	41.9-51.1	256	47.5	43.3-51.7	
	unknown	0	0.0	0.0-0.8	1	0.2	0.0-1.0	
	Homerton Hospital							
	UK	251	44.3	40.3-48.5	617	42.8	40.3-45.4	0.219
	non-UK	254	44.9	40.8-49.0	627	43.5	41.0-46.1	
	unknown	61	10.8	8.5-13.6	197	13.7	12.0-15.5	
	St Mary's Hospital							
	UK	160	34.3	30.1-38.7	262	35.7	32.4-39.3	0.32
	non-UK	291	62.3	57.8-66.6	456	62.2	58.6-65.6	
	unknown	16	3.4	2.1-5.5	15	2.0	1.2-3.3	
	St Thomas' Hospital							
	UK	364	56.6	52.8-60.4	1665	61.4	59.6-63.2	0.081
	non-UK	277	43.1	39.3-46.9	1039	38.3	36.5-40.2	
	unknown	2	0.3	0.1-1.1	7	0.3	0.1-0.5	
	Leeds Sexual Health							
	UK	347	76.9	72.8-80.6	407	79.0	75.3-82.3	0.7
	non-UK	92	20.4	16.9-24.4	97	18.8	15.7-22.4	
	unknown	12	2.7	1.5-4.6	11	2.1	1.2-3.8	
Region of birth	All							
	UK	1363	52.9	51.0-54.8	3233	54.4	53.2-55.7	0.574
	Africa	77	3.0	2.4-3.7	187	3.1	2.7-3.6	
	Americas	230	8.9	7.9-10.1	505	8.5	7.8-9.2	
	Eastern Mediterranean	71	2.8	2.2-3.5	151	2.5	2.2-3.0	
	Europe	565	21.9	20.4-23.6	1270	21.4	20.4-22.4	

	South-East Asia	47	1.8	1.4-2.4	80	1.3	1.1-1.7	
	Western Pacific	132	5.1	4.3-6.0	281	4.7	4.2-5.3	
	Unknown	92	3.6	2.9-4.4	232	3.9	3.4-4.4	
HAV Vaccine (1st)								
	No	2224	86.3	84.9-87.6	5266	88.7	87.8-89.4	0.002
	Yes	353	13.7	12.4-15.1	673	11.3	10.6-12.2	
HAV Vaccine (2nd)								
	No	2495	96.8	96.1-97.4	5693	95.9	95.3-96.3	0.034
	Yes	82	3.2	2.6-3.9	246	4.1	3.7-4.7	
HAV vaccine (any)								
	No	2192	85.1	83.6-86.4	5139	86.5	85.6-87.4	0.072
	Yes	385	14.9	13.6-16.4	800	13.5	12.6-14.4	
HAV immune								
	No	2022	78.5	76.8-80.0	5174	87.1	86.2-87.9	<0.0001
	Yes	555	21.5	20.0-23.2	765	12.9	12.1-13.8	
HBV Vaccine (1st)								
	No	2129	82.6	81.1-84.0	5087	85.7	84.7-86.5	<0.0001
	Yes	448	17.4	16.0-18.9	852	14.3	13.5-15.3	
HBV Vaccine (2nd)								
	No	2316	89.9	88.6-91.0	5360	90.3	89.5-91.0	0.59
	Yes	261	10.1	9.0-11.4	579	9.7	9.0-10.5	
HBV Vaccine (3rd)								
	No	2345	91.0	89.8-92.0	5488	92.4	91.7-93.1	0.028
	Yes	232	9.0	8.0-10.2	451	7.6	6.9-8.3	
HBV Vaccine (4th)								
	No	2550	99.0	98.5-99.3	5894	99.2	99.0-99.4	0.179
	Yes	27	1.0	0.7-1.5	45	0.8	0.6-1.0	

HBV Vaccine (any)	No	1855	72.0	70.2-73.7	4496	75.7	74.6-76.8	<0.0001
	Yes	722	28.0	26.3-29.8	1443	24.3	23.2-25.4	
HBV Booster	No	2382	92.4	91.3-93.4	5518	92.9	92.2-93.5	0.434
	Yes	195	7.6	6.6-8.7	421	7.1	6.5-7.8	
HBV immune	No	1955	75.9	74.2-77.5	5102	85.9	85.0-86.8	<0.0001
	Yes	622	24.1	22.5-25.8	837	14.1	13.2-15.0	

Supplementary table 4: Positivity by age group and clinic

Characteristic	HAV IgG				Anti-HBs and combined HAV IgG and anti-HBs						
	No. tested HAV	No. (%) positive HAV IgG	95% CI	P	No. tested anti-HBs	No. (%) positive anti-HBs	95% CI	P	No. (%) positive HAV IgG and anti-HBs	95% CI	P
TOTAL	2577	1919 (74.5)	72.7-76.1		2551	1967 (77.0)	75.4-78.7		1562 (61.2)	59.3-63.1	
Clinic											
TDL North London	450	377 (83.8)	80.1-86.9	<0.0001	443	341 (77.0)	72.8-80.7	0.001	304 (68.6)	64.2-72.8	<0.0001
Homerton Hospital	566	401 (70.9)	67.0-74.4		564	443 (78.6)	75.0-81.7		341 (60.5)	56.4-64.4	
St Mary's Hospital	467	395 (84.6)	81.0-87.6		466	390 (83.7)	80.1-86.8		335 (71.9)	67.6-75.8	
St Thomas' Hospital	643	477 (74.2)	70.7-77.4		628	466 (74.2)	70.6-77.5		372 (59.2)	55.3-63.0	
Leeds Sexual Health	451	269 (59.7)	55.1-64.1		450	327 (72.7)	68.4-76.6		210 (46.7)	42.1-51.3	
Age group											
18-25	525	320 (61.0)	56.7-65.0	<0.0001	515	321 (62.3)	58.1-66.4	<0.0001	219 (42.5)	38.3-46.8	<0.0001
26-35	979	693 (70.8)	67.9-73.5		970	780 (80.4)	77.8-82.8		587 (60.5)	57.4-63.5	
36-45	600	497 (82.8)	79.6-85.6		596	499 (83.7)	80.5-86.5		425 (71.3)	67.5-74.8	
46 and over	473	409 (86.5)	83.1-89.3		470	367 (78.1)	74.1-81.6		470 (70.4)	99.2-100.0	
Age groups by clinic											
TDL North London											
18-25	114	90 (79.0)	70.6-85.4	0.179	112	72 (64.3)	55.1-72.6	0.001	61 (54.5)	45.2-63.4	0.001
26-35	174	145 (83.3)	77.1-88.1		169	133 (78.7)	71.9-84.2		118 (69.8)	62.5-76.2	
36-45	85	77 (90.6)	82.5-95.2		85	75 (88.2)	79.7-93.5		69 (81.2)	71.6-88.1	
46 and over	77	65 (84.4)	74.7-90.9		77	61 (79.2)	68.9-86.8		56 (72.7)	61.9-81.4	
Homerton Hospital											
18-25	107	62 (57.9)	48.5-66.9	0.001	106	61 (57.6)	48.0-66.5	<0.0001	42 (39.6)	30.8-49.1	<0.0001
26-35	290	204 (70.3)	64.8-75.3		289	244 (84.4)	79.8-88.2		184 (63.7)	58.0-69.0	
36-45	121	93 (76.9)	68.6-83.5		121	98 (81.0)	73.1-87.0		79 (65.3)	56.5-73.2	
46 and over	48	42 (87.5)	75.3-94.1		48	40 (83.3)	70.4-91.3		36 (75.0)	61.2-85.1	

St Mary's Hospital											
18-25	59	42 (71.2)	58.6-81.2	<0.0001	58	44 (75.9)	63.5-85.0	0.028	32 (55.2)	42.5-67.3	<0.0001
26-35	167	134 (80.2)	73.6-85.6		167	136 (81.4)	74.9-86.6		111 (66.5)	59.0-73.2	
36-45	121	109 (90.1)	83.5-94.2		121	111 (91.7)	85.5-95.4		99 (81.8)	74.0-87.7	
46 and over	120	110 (91.7)	85.3-95.4		120	99 (82.5)	74.7-88.3		93 (77.5)	69.2-84.1	
St Thomas' Hospital											
18-25	100	57 (57.0)	47.2-66.3	<0.0001	95	48 (50.5)	40.6-60.4	<0.0001	33 (34.7)	25.9-44.7	<0.0001
26-35	181	112 (61.9)	54.6-68.6		178	135 (75.8)	69.1-81.5		89 (50.0)	42.7-57.3	
36-45	197	166 (84.3)	78.5-88.7		193	158 (81.9)	75.8-86.7		139 (72.0)	65.3-77.9	
46 and over	165	142 (86.1)	80.0-90.5		162	125 (77.2)	70.1-83.0		111 (68.5)	61.0-75.2	
Leeds Sexual Health											
18-25	145	69 (47.6)	39.6-55.7	<0.0001	144	96 (66.7)	58.6-73.8	0.061	51 (35.4)	28.1-43.5	0.011
26-35	167	98 (58.7)	51.1-65.9		167	132 (79.0)	72.3-84.5		85 (50.9)	43.4-58.4	
36-45	76	52 (68.4)	57.3-77.8		76	57 (75.0)	64.2-83.4		39 (51.3)	40.3-62.2	
46 and over	63	50 (79.4)	67.8-87.5		63	42 (66.7)	54.4-77.1		35 (55.6)	43.3-67.2	

- World Health Organisation. Countries [Available from: <https://www.who.int/countries>].
- Morris MC, Gay NJ, Hesketh LM, *et al*. The changing epidemiological pattern of hepatitis A in England and Wales. *Epidemiology and Infection*. 2002;128(3):457-63.
- Pitasi MA, Bingham TA, Sey EK, *et al*. Hepatitis B Virus (HBV) Infection, Immunity and Susceptibility Among Men Who Have Sex with Men (MSM), Los Angeles County, USA. *AIDS and Behavior*. 2014;18(3):248-55. Available from: <https://doi.org/10.1007/s10461-013-0670-2>.