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What do primary care staff know and do about blood borne virus testing and care for migrant patients? A national survey

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Abstract

Background: UK migrants born in intermediate to high prevalence areas for blood borne viruses (BBV) including hepatitis B, hepatitis C and HIV are at increased risk of these infections. National guidance from Public Health England (PHE) and National Institute for Health and Care Excellence (NICE) recommends primary care test this population to increase diagnoses and treatment. We aimed to investigate primary care professionals' knowledge of entitlements, and perceptions of barriers, for migrants accessing healthcare, and their policies, and reported practices and influences on provision of BBV testing in migrants.

Methods: A pre-piloted questionnaire was distributed between October 2017 and January 2018 to primary care professionals attending the Royal College of General Practitioners and Best Practice in Primary Care conferences, via a link in PHE Vaccine Updates and through professional networks.

Survey results were analysed to give descriptive statistics, and responses by respondent characteristics: profession, region, practice size, and frequency of seeing migrant patients. Responses were considered on a per question basis with response rates for each question presented with the results.

Results: Four hundred fourteen questionnaires were returned with responses varying by question, representing an estimated 5.7% of English GP practices overall. Only 14% of respondents' practices systematically identified migrant patients for testing. Universal opt-out testing was offered to newly registering migrant patients by 18% of respondents for hepatitis B, 17% for hepatitis C and 21% for HIV. Knowledge of healthcare entitlements varied; fewer clinical staff knew that general practice consultations were free to all migrants (76%) than for urgent care (88%). Performance payment structure (76%) had the greatest reported influence on testing, followed by PHE and Clinical Commissioning Group recommendations (73% each). Language and culture were perceived to be the biggest barriers to accessing care.

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Conclusions: BBV testing for migrant patients in primary care is usually ad hoc, which is likely to lead to testing opportunities being missed. Knowledge of migrants' entitlements to healthcare varies and could affect access to care. Interventions to improve professional awareness and identification of migrant patients requiring BBV testing are needed to reduce the undiagnosed and untreated burden of BBVs in this vulnerable population.

Keywords: Hepatitis B, Hepatitis C, HIV, Blood borne virus, Testing, Screening, General practice, Migrants, Healthcare access, UK

Background

Migrants in the UK from intermediate or high prevalence areas for HIV, hepatitis B (HBV) and hepatitis C (HCV) are at increased risk of these infections compared to the UK-born population, and experience a disproportionate burden of disease [1–3]. In 2017 almost half (49%) of newly diagnosed cases of HIV among heterosexuals were among black Africans or heterosexuals born in a high prevalence country [2] and an estimated 95% of new chronic HBV infections in the UK are among individuals who probably acquired their infection overseas in endemic countries, often perinatally or in childhood [4]. For all three blood borne viruses (BBV) the undiagnosed fraction remains high, with a high proportion of infections diagnosed late, potentially contributing to avoidable morbidity and mortality and increased risk of onward transmission [5–8].

In 2016, the UK government signed up to the World Health Organisation (WHO) goal of eliminating viral hepatitis as a public health threat by 2030 [9]. HBV and HCV testing in primary care for migrants from countries with intermediate or high prevalence (>2%) has been recommended by National Institute for Health and Care Excellence (NICE) guidance since 2012 [10], and since 2018 European Centre for Disease Prevention and Control (ECDC) recommends screening newly arrived migrants for BBV [11]. Although surveillance data indicates that an increasing proportion of BBV diagnoses take place in primary care, evidence suggests a low proportion of eligible migrants receive the recommended BBV testing in this setting [12, 13].

Language, stigma and poor knowledge and understanding of disease create barriers for migrants to accessing testing and treatment for viral hepatitis [14, 15] and migrants often experience discrimination and bureaucratic obstacles when trying to access healthcare [16, 17]. In August 2017 UK healthcare entitlements for migrants changed and the list of chargeable services was expanded [18, 19]. While many services, including primary care, are still free to all migrants, for others a patient should now be deemed ordinarily resident in the UK to access services for free. Sexual health, family planning, GP and nurse consultations in primary care, emergency department (ED) and walk-in centres, and

treatment of mental and physical conditions caused by torture, female genital mutilation (FGM), domestic or sexual violence are free to all migrants, while communicable disease diagnosis and treatment is free to all for a list of specified diseases, including HIV, viral hepatitis, TB and Middle East respiratory syndrome [18–20]. For surgery or outpatient services in secondary care, a patient should be deemed ordinarily resident in the UK to access the service free of charge. This additional complexity may lead to uncertainty among both migrants and professionals about entitlements, and could create additional barriers to accessing services.

We, therefore, conducted a national survey to understand primary care staff's knowledge, attitudes, policies and practice regarding BBVs in migrant patients, influences on these, and their perceptions of the barriers for migrants in accessing healthcare.

Methods

Study design

A cross-sectional survey conducted among primary care staff in England.

Study population

The target population for this study were primary care staff working in general practices in England. All primary care staff were eligible for inclusion, but it was expected that respondents would primarily be general practitioners (GPs) and practice nurses.

Sampling procedures

A convenience sampling approach was used, with survey participants recruited through several routes during October 2017. Firstly, the link to the online survey was circulated via primary care networks of local Public Health England (PHE) Health Protection Teams across England. Secondly, the link to the online survey was circulated in the PHE publication Vaccine Updates, a newsletter primarily subscribed to by general practice professionals with distribution ~ 46,000. These two routes were used opportunistically and in parallel in order to access primary care professionals, as we did not have access to another primary care network with equivalent coverage across England.

In addition, stalls were held at the Royal College of General Practitioners (RCGP) annual conference in Liverpool and the Best Practice in Primary Care conference in Birmingham, both in October 2017. Attendees were approached and asked to participate in the survey via tablet devices, or offered shorter paper versions of the survey to take away and return once completed.

Due to the timeframe and budget of the project, participants were not followed up to respond to the survey, and the online survey was closed in January 2018.

Data collection

The survey was created as an online questionnaire using SelectSurvey.net™ software (ClassApps LLC, Kansas City, Missouri) and responses were exported into Excel for analysis. Shorter paper versions of the survey were also distributed among participants attending the two primary care conferences. Responses from paper surveys were manually input into Excel by the lead author.

Questionnaire design

The questionnaire was developed at PHE in collaboration with a project group of clinicians, academic GPs and qualitative researchers and piloted before launch with a group of 4 academic GPs.

The questionnaire consisted of 37 questions covering the following topics.

1. Respondent and practice characteristics
2. Clinical questions analysed for clinical staff (GPs and nurses) only: Knowledge of migrants' entitlements to health services; Issues considered for newly registering migrant patients; Knowledge of testing serology; Management of patients diagnosed with hepatitis B and C; Incentives / motivation for BBV testing
3. Practice policy questions analysed for all respondents: Practice policy for offering BBV testing to migrants; Identification of migrants for BBV testing; Recording of routine data
4. Barriers questions analysed for all respondents: Perceived barriers for migrants to accessing healthcare across the care pathway: Healthcare; BBV testing in primary care; Secondary care for patients with BBV; Barriers for asylum seekers

The full questionnaire took approximately 17 min to complete (see additional file 1 for full online questionnaire and additional file 2 for shorter paper questionnaire). Most questions were multiple choice, apart from those relating to barriers, practice size and practice population which were free text.

To investigate knowledge of healthcare entitlements respondents were asked, as of August 2017, which

services were free irrespective of migration status, using legislation and implementation guidelines to define correct responses [18, 19].

Respondents were asked about location of practice and professional role. No additional respondent characteristics were sought as the focus of the survey was on practice, not individual characteristics.

Definitions

A migrant is defined as someone who changes their country of usual residence, in whatever manner, for whatever reason and irrespective of their legal status. The UN defines a permanent migrant as someone who moves to a country for a period of 12 or more months, often for work, education or joining family, effectively making it their new country of usual residence [21]. A refugee is defined as someone who has fled their home country for reasons of feared persecution, conflict, generalised violence or other circumstances that have seriously disturbed public order and are seeking protection in another country [21]. In the UK, for a person to be officially recognised as a refugee they first have to make a claim for asylum and have this accepted by the government. An asylum seeker is a person who seeks safety from persecution or serious harm in a country other than their own and has formally applied for asylum (i.e. refugee status) from that country, but is awaiting a decision on their application [22].

A definitions sheet was provided with the survey to help respondents understand terms relating to migration which also included refused asylum seeker and undocumented migrant (not specifically mentioned in the questionnaire) (additional file 3).

Definitions of other terms used are as follows: Clinical staff: respondents who identified their role as either GP (GP partner, Salaried GP, Locum GP, or 'other' and specified GP), or nurse (Practice Nurse or 'other' and specified nurse). In questions relating to practice policy for BBV testing, new migrants refer to newly registering patients who were migrants from outside the UK (regardless of when they had migrated), and existing migrants refer to patients already registered with the practice who had ever migrated from outside the UK. When asking about practice characteristics, the proportion of new migrants on a practice list was defined as migrants registered with the practice who had lived in the UK for 5 years or less, regardless of when they registered.

The roles of GPs and nurses in the diagnosis and management of BBVs vary by practice. Practice nurses undertake a range of nursing assessments and provide appropriate care / treatment in conjunction with GPs according to practice policy and protocols and are likely to be responsible for vaccination and testing, whereas GPs

would usually be responsible for clinical diagnoses and referrals to secondary care.

Practice size was defined as small, medium or large using tertiles of practice populations in England reported by NHS Digital for December 2017 [23].

Data analysis

Results were collated and de-duplicated using email addresses. Practice names were checked to identify if there were multiple respondents from the same practice, but these were not de-duplicated as responses differed and were from different professionals.

Due to the methods used to circulate the survey via an e-bulletin to which practices subscribe, it was not possible to calculate a formal response rate. Instead, the number of responses as a proportion of GP practices in England (based on NHS data from 2017) was calculated to provide an indication of the proportion of England GP practices represented in responses [23].

Results were analysed in Excel and R for overall descriptive statistics (percentages and 95% confidence intervals (CI)) and then stratified by respondent and practice characteristics. Responses for clinical knowledge and practice questions were restricted to those who gave their role as GP or nurse and stratified by profession. Responses for practice policy questions were analysed for all respondents, and stratified by region, frequency of seeing migrant patients, and practice size.

To assess the statistical significance of differences in responses to questions, and for differences by stratified analysis, variables were dichotomised where required before performing Chi squared tests. Where this was done, the dichotomous outcome is highlighted in bold in results tables. Fishers exact tests were used where the cross-tabulation did not meet the criteria for Chi squared tests. Differences were considered statistically significant where $p < 0.05$.

Free text responses on barriers were grouped by thematic analysis into 10 themes: language/culture, patient information/knowledge, staff information/knowledge, psychological, accommodation, prejudice/discrimination, patient financial, organisational resource, geographical, and service/organisational issues.

Each question had a different response rate, and descriptive statistics were based on the number of respondents for each question, which are presented with the results.

Results

Respondent and practice characteristics

The survey was circulated through the PHE Vaccine Updates circulation list, although it is not known how many will have actively read this, and others may have been forwarded the survey link by contacts. After

deduplication 414 responses were obtained; 16 paper and 398 online, an estimated 5.7% response rate, based on the number of GP practices in England. The majority of responses came from circulation of the survey link as response at conferences was poor; no attendees completed the online survey on the day, and only 16 paper surveys were returned. Where practice name was reported (145 respondents), there were 3 practices that each had 2 respondents, all other practices were unique. Most respondents were practice nurses (49%, 202/414) and GPs (40%, 165/414) with the highest responses from the Midlands (21%, 86/414), the South East (16%, 65/414) and London (15%, 63/414) (Table 1). Responses were equally distributed among those who reported they saw migrant patients frequently (34%, 108/317), sometimes (33%, 103/317) and rarely (33%, 106/317) (77% response rate).

Practice characteristics were poorly completed; only 151 (38%) respondents reported their practice size and of these 26% (39/151) were small (< 5280 patients), 28% (42/151) were medium (5280–9300 patients) and 46% (70/151) were large (\geq 9300 patients). Of the 79 (20%) respondents who reported the proportion of new migrants (< 5 years in the UK) on their practice list, 50% (40/79) had < 10, 32% (25/79) had 10–24% and 13% (10/79) had over 50%. Similarly, of the 75 (19%) who reported the proportion of their practice list that were asylum seekers/refugees, 76% (57/75) had < 10, 9% (7/75) had 10–24% and only 11% (8/75) had over 50%. There were no significant differences in practice or other respondent characteristics by professional role ($p > 0.2$).

Professional knowledge and practice Issues considered for newly registering patients who are migrants

When asked which issues were always addressed for newly registering patients who are migrants (response rate 78% of GPs and nurses), vaccination history was the most common always addressed issue (58.2%, 167/287, 95% CI 52.4–63.7), and family planning, TB screening, sexual health and BBV screening more often considered on a situation-specific basis (Table 2). The proportion that never addressed issues ranged from 4.9% (14/287, 2.9–8.0) for vaccination history and family planning to 11.8% (34/287, 8.6–16.1) for TB screening. BBV risk assessments were considered for all newly registering migrant patients by 29.6% (85/287, 24.6–35.1), 27.2% (78/287, 22.4–32.6) and 30.0% (86/287, 25.0–35.5) for HBV, HCV and HIV respectively and this did not differ by the respondent's profession ($p = 0.763$, $p = 0.953$ and $p = 0.867$ respectively). TB screening was addressed for all newly registering migrant patients by 28.6% (82/287, 23.7–34.1) of respondents, and this did not differ by profession ($p = 0.072$). There were significant differences in

Table 1 Respondent and practice characteristics

		Overall	
		Number (%)	95% CI
1a: Respondent characteristics			
Position	General Practitioner (GP)	165 (39.9)	35.3–44.6
	Nurse	202 (48.8)	44.0–53.6
	Practice Manager	29 (7.0)	4.9–9.9
	Other clinical	6 (1.4)	0.7–3.1
	Other non-clinical	7 (1.7)	0.8–3.4
	Not stated	5 (1.2)	0.5–2.8
	Total responses	414	
Frequency of seeing migrant patients	Frequently	108 (34.1)	29.1–39.4
	Sometimes	103 (32.5)	27.6–37.8
	Rarely	106 (33.4)	28.5–38.8
	Total responses	317	
1b: Practice characteristics			
Location	East of England	36 (8.7)	6.3–11.8
	London	63 (15.2)	12.1–19.0
	Midlands	86 (20.8)	17.1–24.9
	North East	23 (5.6)	3.7–8.2
	North West	60 (14.5)	11.4–18.2
	South East	65 (15.7)	12.5–19.5
	South West	30 (7.2)	5.1–10.2
	Yorkshire & the Humber	51 (12.3)	9.5–15.8
	Total responses	414	
Size of practice	Small (0–5279 patients)	39 (25.8)	19.5–33.3
	Medium (5280–9299 patients)	42 (27.8)	21.3–35.4
	Large (> = 9300 patients)	70 (46.4)	38.6–54.3
	Total responses	151	
Proportion of practice population that are new migrants	Low (0–9%)	40 (50.6)	39.8–61.4
	Medium (10–24% patients)	25 (31.6)	22.4–42.5
	High (25–49% patients)	4 (5.1)	2.0–12.3
	Very high (50–100% patients)	10 (12.7)	7.0–21.8
	Total responses	79	
Proportion of practice population that are asylum seekers/refugees	Low (0–9%)	57 (76.0)	65.2–84.2
	Medium (10–24% patients)	7 (9.3)	4.6–18.0
	High (25–49% patients)	3 (4.0)	1.4–11.1
	Very high (50–100% patients)	8 (10.7)	5.5–19.7
	Total responses	75	

practice by profession for vaccination history, family planning, and sexual health advice and screening (all $p < 0.01$), with nurses more likely than GPs to address these issues for all newly registering migrant patients.

Knowledge of migrants' entitlements to health services

When asked about migrants' entitlements to health services (100% response rate), 88.3% (323/366, 84.5–91.2) of clinical staff correctly identified emergency

departments and walk-in centres as free to all and 76.0% (279/367, 71.4–80.1) correctly identified GP and nurse consultations in primary care as free to all, with no difference by profession ($p = 0.565$ and 0.262 respectively, Table 2). Surgery or outpatient services in secondary care were correctly identified as not free to all by 52.3% (192/367, 47.2–57.4), and this was higher for GPs (59.4%, 98/165, 51.8–66.6) than nurses (46.5%, 94/202, 39.8–53.4) ($p = 0.014$).

Table 2 Primary care clinical staff knowledge, perceptions and practice regarding BBV testing and care for migrant patients

Question	Overall - GPs and Nurses Number (%; 95CI)	GPs Number (%; 95CI)	Nurses Number (%; 95CI)	P (GPs vs nurses)
Which issues do you address when speaking to new migrant patients?	167 (58.2, 52.4–63.7)	58 (41.7, 33.9–50.0)	109 (73.6, 66.0–80.1)	< 0.0001
Vaccination history				
All new migrants				
Asylum seekers / refugees only	9 (3.1, 1.7–5.9)	4 (2.9, 1.1–7.2)	5 (3.4, 1.5–7.7)	
Never considered	14 (4.9, 2.9–8.0)	12 (8.6, 5.0–14.5)	2 (1.4, 0.4–4.8)	
Situation specific	97 (33.8, 28.6–39.5)	65 (46.8, 38.7–55.0)	32 (21.6, 15.8–28.9)	
Total	287	139	148	
HIV risk assessment	86 (30.0, 25.0–35.5)	41 (29.5, 22.5–37.5)	45 (30.4, 23.6–38.2)	0.867
Asylum seekers / refugees only	7 (2.4, 1.2–4.9)	0 (0.0, 0.0–2.7)	7 (4.7, 2.3–9.4)	
Never considered	23 (8.0, 5.4–11.7)	8 (5.8, 2.9–10.9)	15 (10.1, 6.2–16.0)	
Situation specific	171 (59.6, 53.8–65.1)	90 (64.7, 56.5–72.2)	81 (54.7, 46.7–62.5)	
Total	287	139	148	
Hepatitis B risk assessment	85 (29.6, 24.6–35.1)	40 (28.8, 21.9–36.8)	45 (30.4, 23.6–38.2)	0.763
Asylum seekers / refugees only	11 (3.8, 2.2–6.7)	1 (0.7, 0.1–4.0)	10 (6.8, 3.7–12.0)	
Never considered	24 (8.4, 5.7–12.1)	10 (7.2, 4.0–12.7)	14 (9.5, 5.7–15.3)	
Situation specific	167 (58.2, 52.4–63.7)	88 (63.3, 55.0–70.9)	79 (53.4, 45.4–61.2)	
Total	287	139	148	
Hepatitis C risk assessment	78 (27.2, 22.4–32.6)	38 (27.3, 20.6–35.3)	40 (27.0, 20.5–34.7)	0.953
Asylum seekers / refugees only	12 (4.2, 2.4–7.2)	1 (0.7, 0.1–4.0)	11 (7.4, 4.2–12.8)	
Never considered	29 (10.1, 7.1–14.1)	10 (7.2, 4.0–12.7)	19 (12.8, 8.4–19.2)	
Situation specific	168 (58.5, 52.8–64.1)	90 (64.7, 56.5–72.2)	78 (52.7, 44.7–60.6)	
Total	287	139	148	
TB screening	82 (28.6, 23.7–34.1)	39 (28.1, 21.3–36.0)	43 (29.1, 22.3–36.8)	0.852
Asylum seekers / refugees only	13 (4.5, 2.7–7.6)	4 (2.9, 1.1–7.2)	9 (6.1, 3.2–11.2)	
Never considered	34 (11.8, 8.6–16.1)	11 (7.9, 4.5–13.6)	23 (15.5, 10.6–22.2)	
Situation specific	158 (55.1, 49.3–60.7)	85 (61.2, 52.9–68.8)	73 (49.3, 41.4–57.3)	
Total	287	139	148	
Sexual health advice and screening	80 (27.9, 23.0–33.3)	27 (19.4, 13.7–26.8)	53 (35.8, 28.5–43.8)	0.002
Asylum seekers / refugees only	7 (2.4, 1.2–4.9)	0 (0.0, 0.0–2.7)	7 (4.7, 2.3–9.4)	
Never considered	18 (6.3, 4.0–9.7)	9 (6.5, 3.4–11.8)	9 (6.1, 3.2–11.2)	
Situation specific	182 (63.4, 57.7–68.8)	103 (74.1, 66.2–80.7)	79 (53.4, 45.4–61.2)	
Total	287	139	148	

Table 2 Primary care clinical staff knowledge, perceptions and practice regarding BBV testing and care for migrant patients (Continued)

Question	All new migrants	Overall - GPs and Nurses Number (%; 95CI)	GPs Number (%; 95CI)	Nurses Number (%; 95CI)	P (GPs vs nurses)
Family planning					
	Asylum seekers / refugees only	7 (2.4, 1.2-4.9)	0 (0.0, 0.0-2.7)	7 (4.7, 2.3-9.4)	0.001
	Never considered	14 (4.9, 2.9-8.0)	7 (5.0, 2.5-10.0)	7 (4.7, 2.3-9.4)	
	Situation specific	180 (62.7, 57.0-68.1)	103 (74.1, 66.2-80.7)	77 (52.0, 44.0-59.9)	
	Total	287	139	148	
To the best of your knowledge, as of August 2017 which of the following services are free to all irrespective of migration status?					
	GP or nurse consultations in primary care	279 (76.0, 71.4-80.1)	130 (78.8, 71.9-84.3)	149 (73.8, 67.3-79.3)	0.262
	No	56 (15.3, 11.9-19.3)	23 (13.9, 9.5-20.0)	33 (16.3, 11.9-22.1)	
	Don't know	32 (8.7, 6.2-12.0)	12 (7.3, 4.2-12.3)	20 (9.9, 6.5-14.8)	
	Total	367	165	202	
	Operations or outpatient services in secondary care				0.014
	Yes	100 (27.2, 22.9-32.0)	36 (21.8, 16.2-28.7)	64 (31.7, 25.7-38.4)	
	No	192 (52.3, 47.2-57.4)	98 (59.4, 51.8-66.6)	94 (46.5, 39.8-53.4)	
	Don't know	75 (20.4, 16.6-24.9)	31 (18.8, 13.6-25.4)	44 (21.8, 16.6-28.0)	
	Total	367	165	202	
	Family planning	259 (70.6, 65.7-75.0)	115 (69.7, 62.3-76.2)	144 (71.3, 64.7-77.1)	0.739
	No	32 (8.7, 6.2-12.0)	13 (7.9, 4.7-13.0)	19 (9.4, 6.1-14.2)	
	Don't know	76 (20.7, 16.9-25.1)	37 (22.4, 16.7-29.4)	39 (19.3, 14.5-25.3)	
	Total	367	165	202	
	Hepatitis B and C testing, diagnosis and management	268 (73.0, 68.3-77.3)	120 (72.7, 65.5-78.9)	148 (73.3, 66.8-78.9)	0.908
	No	18 (4.9, 3.1-7.6)	8 (4.8, 2.5-9.3)	10 (5.0, 2.7-8.9)	
	Don't know	81 (22.1, 18.1-26.6)	37 (22.4, 16.7-29.4)	44 (21.8, 16.6-28.0)	
	Total	367	165	202	
	Treatment of mental and physical conditions caused by torture, FGM, domestic or sexual violence	299 (81.5, 77.2-85.1)	125 (75.8, 68.7-81.7)	174 (86.1, 80.7-90.2)	0.011
	No	14 (3.8, 2.3-6.3)	12 (7.3, 4.2-12.3)	2 (1.0, 0.3-3.5)	
	Don't know	54 (14.7, 11.5-18.7)	28 (17.0, 12.0-23.4)	26 (12.9, 8.9-18.2)	
	Total	367	165	202	
	Communicable disease services	305 (83.3, 79.2-86.8)	138 (83.6, 77.2-88.5)	167 (83.1, 77.3-87.6)	0.806
	No	8 (2.2, 1.1-4.3)	4 (2.4, 0.9-6.1)	4 (2.0, 0.8-5.0)	
	Don't know	53 (14.5, 11.2-18.5)	23 (13.9, 9.5-20.0)	30 (14.9, 10.7-20.5)	
	Total	366	165	201	
	Sexually transmitted disease services	305 (83.3, 79.2-86.8)	135 (81.8, 75.2-87.0)	170 (84.6, 78.9-88.9)	0.552
	No	9 (2.5, 1.3-4.6)	5 (3.0, 1.3-6.9)	4 (2.0, 0.8-5.0)	
	Don't know	52 (14.2, 11.0-18.2)	25 (15.2, 10.5-21.4)	27 (13.4, 9.4-18.8)	
	Total	366	165	201	

Table 2 Primary care clinical staff knowledge, perceptions and practice regarding BBV testing and care for migrant patients (Continued)

Question	Emergency departments (ED) and walk in centres	Performance payment structure	Local targets	National goals	CCG recommendations	PHE recommendations	NICE guidance	NHSE recommendations	Overall - GPs and Nurses Number (% 95CI)	GPs Number (% 95CI)	Nurses Number (% 95CI)	P (GPs vs nurses)
Which of the following would be a motivation or incentive to test for BBVs?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	323 (88.3, 84.5–91.2)	147 (89.1, 83.4–93.0)	176 (87.6, 82.3–91.4)	0.565
	No	No	No	No	No	No	No	No	17 (4.6, 2.9–7.3)	6 (3.6, 1.7–7.7)	11 (5.5, 3.1–9.5)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	26 (7.1, 4.9–10.2)	12 (7.3, 4.2–12.3)	14 (7.0, 4.2–11.4)	
	Total	Total	Total	Total	Total	Total	Total	Total	366	165	201	
Emergency departments (ED) and walk in centres	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	181 (76.1, 70.2–81.0)	91 (74.6, 66.2–81.5)	90 (77.6, 69.2–84.2)	0.588
	No	No	No	No	No	No	No	No	21 (8.8, 5.8–13.1)	15 (12.3, 7.6–19.3)	6 (5.2, 2.4–10.8)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	36 (15.1, 11.1–20.2)	16 (13.1, 8.2–20.2)	20 (17.2, 11.4–25.1)	
	Total	Total	Total	Total	Total	Total	Total	Total	238	122	116	
Performance payment structure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	164 (69.2, 63.1–74.7)	74 (61.2, 52.3–69.4)	90 (77.6, 69.2–84.2)	0.006
	No	No	No	No	No	No	No	No	41 (17.3, 13.0–22.6)	31 (25.6, 18.7–34.1)	10 (8.6, 4.7–15.1)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	32 (13.5, 9.7–18.4)	16 (13.2, 8.3–20.4)	16 (13.8, 8.7–21.2)	
	Total	Total	Total	Total	Total	Total	Total	Total	237	121	116	
Local targets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	133 (56.1, 49.8–62.3)	56 (46.3, 37.6–55.1)	77 (66.4, 57.4–74.3)	0.002
	No	No	No	No	No	No	No	No	58 (24.5, 19.4–30.3)	45 (37.2, 29.1–46.1)	13 (11.2, 6.7–18.2)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	46 (19.4, 14.9–24.9)	20 (16.5, 11.0–24.2)	26 (22.4, 15.8–30.8)	
	Total	Total	Total	Total	Total	Total	Total	Total	237	121	116	
National goals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	174 (73.1, 67.1–78.3)	80 (65.6, 56.8–73.4)	94 (81.0, 73.0–87.1)	0.007
	No	No	No	No	No	No	No	No	35 (14.7, 10.8–19.8)	28 (23.0, 16.4–31.2)	7 (6.0, 3.0–11.9)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	29 (12.2, 8.6–17.0)	14 (11.5, 7.0–18.3)	15 (12.9, 8.0–20.2)	
	Total	Total	Total	Total	Total	Total	Total	Total	238	122	116	
CCG recommendations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	174 (73.1, 67.1–78.3)	84 (68.9, 60.2–76.4)	90 (77.6, 69.2–84.2)	0.129
	No	No	No	No	No	No	No	No	29 (12.2, 8.6–17.0)	21 (17.2, 11.5–24.9)	8 (6.9, 3.5–13.0)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	35 (14.7, 10.8–19.8)	17 (13.9, 8.9–21.2)	18 (15.5, 10.0–23.2)	
	Total	Total	Total	Total	Total	Total	Total	Total	238	122	116	
PHE recommendations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	161 (67.4, 61.2–73.0)	75 (61.0, 52.1–69.1)	86 (74.1, 65.5–81.2)	0.03
	No	No	No	No	No	No	No	No	39 (16.3, 12.2–21.5)	31 (25.2, 18.4–33.5)	8 (6.9, 3.5–13.0)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	39 (16.3, 12.2–21.5)	17 (13.8, 8.8–21.0)	22 (19.0, 12.9–27.0)	
	Total	Total	Total	Total	Total	Total	Total	Total	239	123	116	
NICE guidance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	105 (44.5, 38.3–50.9)	51 (42.5, 34.0–51.4)	54 (46.6, 37.7–55.6)	0.531
	No	No	No	No	No	No	No	No	50 (21.2, 16.5–26.8)	39 (32.5, 24.8–41.3)	11 (9.5, 5.4–16.2)	
	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	81 (34.3, 28.6–40.6)	30 (25.0, 18.1–33.4)	51 (44.0, 35.3–53.0)	
	Total	Total	Total	Total	Total	Total	Total	Total	236	120	116	

Table 2 Primary care clinical staff knowledge, perceptions and practice regarding BBV testing and care for migrant patients (Continued)

Question	CMO letter	Overall - GPs and Nurses Number (%; 95CI)	GPs Number (%; 95CI)	Nurses Number (%; 95CI)	P (GPs vs nurses)
What tests are requested when you test for hepatitis B?	Yes	104 (43.7, 37.5–50.0)	50 (41.0, 32.7–49.9)	54 (46.6, 37.7–55.6)	0.387
	No	53 (22.3, 17.4–28.0)	39 (32.0, 24.4–40.7)	14 (12.1, 7.3–19.2)	
	Don't know	81 (34.0, 28.3–40.3)	33 (27.0, 20.0–35.5)	48 (41.4, 32.8–50.5)	
	Total	238	122	116	
	HBsAg + HBcAb	76 (33.9, 28.0–40.4)	39 (35.8, 27.4–45.1)	37 (32.2, 24.3–41.2)	0.138
What tests are requested when you test for HCV?	HBsAg	73 (32.6, 26.8–39.0)	36 (33.0, 24.9–42.3)	38 (33.0, 25.1–42.1)	
	HBcAb	10 (4.5, 2.4–8.0)	5 (4.6, 2.0–10.3)	5 (4.3, 1.9–9.8)	
	Not known	45 (20.1, 15.4–25.8)	17 (15.6, 10.0–23.6)	27 (23.5, 16.7–32.0)	
	Other, please specify	20 (8.9, 5.9–13.4)	12 (11.0, 6.4–18.3)	8 (7.0, 3.6–13.1)	
	Total	224	109	115	
What tests are requested when you test for HIV?	Anti-HCV + HCV RNA	32 (14.3, 10.3–19.5)	17 (15.6, 10.0–23.6)	15 (13.0, 8.1–20.4)	0.007
	Anti-HCV	56 (25.0, 19.8–31.1)	36 (33.0, 24.9–42.3)	20 (17.4, 11.5–25.3)	
	HCV RNA	24 (10.7, 7.3–15.4)	11 (10.1, 5.7–17.2)	13 (11.3, 6.7–18.4)	
	Not known	86 (38.4, 32.3–44.9)	32 (29.4, 21.6–38.5)	54 (47.0, 38.1–56.0)	
	Other, please specify	26 (11.6, 8.0–16.5)	13 (11.9, 7.1–19.3)	13 (11.3, 6.7–18.4)	
What tests are requested when you test for HIV?	Total	224	109	115	
	Anti-HIV	118 (52.7, 46.2–59.1)	72 (66.1, 56.8–74.3)	47 (40.9, 32.3–50.0)	< 0.0001
	Not known	71 (31.7, 26.0–38.1)	20 (18.3, 12.2–26.6)	50 (43.5, 34.8–52.6)	
	Other, please specify	35 (15.6, 11.5–21.0)	17 (15.6, 10.0–23.6)	18 (15.7, 10.1–23.4)	
	Total	224	109	115	
Do you use Dried Blood Spot (DBS) testing?	Yes	21 (9.4, 6.2–13.9)	6 (5.5, 2.5–11.5)	15 (13.0, 8.1–20.4)	
	No	172 (76.8, 70.8–81.8)	89 (81.7, 73.4–87.8)	83 (72.2, 63.4–79.5)	
	Don't know	31 (13.8, 9.9–19.0)	15 (13.8, 8.5–21.5)	16 (13.9, 8.7–21.4)	
	Total	224	109	115	
	Total	176 (78.9, 73.1–83.8)	99 (91.7, 84.9–95.6)	77 (67.0, 57.9–74.9)	< 0.0001
These questions relate to diagnosed patients	Are all patients with hepatitis B referred to secondary care?	13 (5.8, 3.4–9.7)	8 (7.4, 3.8–13.9)	5 (4.3, 1.9–9.8)	
	Don't know	34 (15.2, 11.1–20.5)	1 (0.9, 0.2–5.1)	33 (28.7, 21.2–37.5)	
	Total	223	108	115	
	Are all patients with hepatitis C referred to secondary care?	180 (80.7, 75.0–85.4)	102 (94.4, 88.4–97.4)	78 (67.8, 58.8–75.7)	< 0.0001
	No	9 (4.0, 2.1–7.5)	5 (4.6, 2.0–10.4)	4 (3.5, 1.4–8.6)	
These questions relate to diagnosed patients	Don't know	34 (15.2, 11.1–20.5)	1 (0.9, 0.2–5.1)	33 (28.7, 21.2–37.5)	
	Total	223	108	115	

Table 2 Primary care clinical staff knowledge, perceptions and practice regarding BBV testing and care for migrant patients (Continued)

Question	Overall - GPs and Nurses Number (%; 95CI)	GPs Number (%; 95CI)	Nurses Number (%; 95CI)	P (GPs vs nurses)
Do you receive information or check whether a patient has attended?	Yes	67 (62.0, 52.6–70.6)	56 (48.7, 39.8–57.7)	0.045
	No	26 (24.1, 17.0–32.9)	11 (9.6, 5.4–16.3)	
	Don't know	15 (13.9, 8.6–21.7)	48 (41.7, 33.1–50.9)	
	Total	108	115	
Do you follow up patients that have not attended secondary care appointments?	Yes	57 (52.8, 43.4–61.9)	47 (40.9, 32.3–50.0)	0.075
	No	37 (34.3, 26.0–43.6)	14 (12.2, 7.4–19.4)	
	Don't know	14 (13.0, 7.9–20.6)	54 (47.0, 38.1–56.0)	
	Total	108	115	
Are close contacts of HBV cases offered testing?	Yes	161 (72.2, 66.0–77.7)	81 (70.4, 61.5–78.0)	0.544
	No	13 (5.8, 3.4–9.7)	4 (3.5, 1.4–8.6)	
	Don't know	49 (22.0, 17.0–27.9)	30 (26.1, 18.9–34.8)	
	Total	223	115	
Are close contacts of HBV cases offered vaccination?	Yes	165 (74.0, 67.9–79.3)	86 (74.8, 66.1–81.8)	0.781
	No	14 (6.3, 3.8–10.3)	5 (4.3, 1.9–9.8)	
	Don't know	44 (19.7, 15.0–25.4)	24 (20.9, 14.4–29.2)	
	Total	223	115	

Abbreviation Definition

- anti-HCV Hepatitis C antibody
- anti-HIV HIV antibodies
- BBV Blood borne virus
- CCG Clinical commissioning group
- CMO Chief Medical Officer
- HBcAb Hepatitis B core antibody
- HBsAg Hepatitis B surface antigen
- HBV Hepatitis B virus
- HCV Hepatitis C virus
- HCV RNA Hepatitis C virus ribonucleic acid
- HIV Human immunodeficiency virus
- NHSE NHS England
- NICE National Institute for Health and Care Excellence
- PHE Public Health England

Responses in bold indicate response used when creating dichotomised responses for Chi squared tests

Laboratory tests for BBV diagnosis

When testing for HBV (64% response rate), 32.6% (73/224, 26.8–39.0) of clinical staff requested tests for hepatitis B surface antigen (HBsAg) only, 33.9% (76/224, 28.0–40.4) requested both HBsAg and hepatitis B core antibody (HBcAb) testing, 4.5% (10/224, 2.4–8.0) tested for HBcAb only, 20.1% (45/224, 15.4–25.8) did not know what test was requested and 8.9% (20/224, 5.9–13.4) stated ‘other,’ with most in this group stating that the laboratory determined the tests (Table 2). These results did not differ by profession ($p = 0.138$).

For HCV (64% response rate), 33.0% (36/109, 24.9–44.3) GPs and 17.4% (20/115, 11.5–25.3) nurses tested for hepatitis C antibody (anti-HCV) only, 15.6% (17/109, 10.0–23.6) GPs and 13.0% (15/115, 8.1–20.4) nurses tested for both anti-HCV and HCV RNA, while 10.1% (11/109, 5.7–17.2) GPs and 11.3% (13/115, 6.7–18.4) tested for HCV RNA only. There were 29.4% (32/109, 21.6–38.5) of GPs and 47.0% (54/115, 38.1–56.0) of nurses who did not know which tests were ordered ($p = 0.007$), and 11.6% (26/224, 8.0–16.5) stated ‘other’; most of these stated that the laboratory determined the test, or that a tick-box ‘hep C screen’ was completed.

For HIV (64% response rate), 66.1% (72/109, 56.8–74.3) GPs and 40.9% (47/115, 32.3–50.0) nurses tested for HIV antibodies, 18.3% (20/109, 12.2–26.6) GPs and 43.5% (50/115, 34.8–52.6) nurses did not know what tests were ordered, and 15.6% (35/224, 11.5–21.0) stated ‘other.’ Significantly more nurses than GPs did not know which tests were required for diagnosis of HCV and HIV ($p < 0.01$).

Incentives for testing

Performance payment structure, PHE recommendations, Clinical Commissioning Group (CCG) recommendations, local targets, NICE recommendations and national goals were all endorsed as incentives or motivators to test migrants for BBVs by over 50% of clinical staff (65% response rate) (Table 2). Performance payment structure (76.1%, 181/238, 70.2–81.0) had the greatest reported influence on testing, followed by PHE recommendations and CCG recommendations (both 73.1%, 174/238, 67.1–78.3). Chief Medical Officer (CMO) recommendations (43.7%, 104/238, 37.5–50.0) and NHS England (NHSE) recommendations (44.5%, 105/235, 38.3–50.9) had the least. CCG recommendations, local targets, NICE guidance and national goals were all endorsed by a significantly higher proportion of nurses than GPs as incentives or motivators ($p < 0.05$).

Management of patients diagnosed with hepatitis B and C

All persons positive for HBV were referred to secondary care by 91.7% (99/108, 84.9–95.6) of GPs and 67.0% (77/115, 57.9–74.9) of nurses ($p < 0.01$) and this was 94.4% (102/108, 88.4–97.4) and 67.8% (78/115, 58.8–75.7)

respectively for persons positive for HCV ($p < 0.01$), with a higher proportion of nurses (28.7%, 33/115, 21.2–37.5) than GPs (0.9%, 1/108, 0.2–5.1) reporting they didn’t know for both questions) ($p < 0.01$, 54% response rate) (Table 2). Information on whether the patient had attended was received by 62.0% (67/108, 52.6–70.6) of GPs and 48.7% (56/115, 39.8–57.7) of nurses ($p < 0.01$) and 52.8% (57/108, 43.4–61.9) of GPs and 40.9% (47/115, 32.3–50.0) of nurses followed up patients who had not attended ($p < 0.01$). Close contacts of HBV infected cases were offered testing by 74.1% (80/108, 65.1–81.4) of GPs and 70.4% (81/115, 61.5–78.0) of nurses ($p = 0.544$), and vaccination by 73.1% (79/108, 64.1–80.6) and 74.8% (86/115, 66.1–81.8) respectively ($p = 0.781$).

Practice policy

Practice policy for offering BBV testing to migrant patients

HBV testing was offered on a universal/opt-out basis to all newly registering migrant patients by 17.8% (46/258, 13.6–23.0) of respondents, with 17.1% (44/257, 13.0–22.2) for HCV and 20.9% (54/258, 16.4–26.4) for HIV (all 62% response rate, $p = 0.498$) (Table 3). For existing patients who were migrants this was significantly lower: 11.2% (29/258, 7.9–15.7) for HBV ($p = 0.045$), 10.7% (27/252, 7.5–15.1) for HCV ($p = 0.041$) and 14.0% (36/258, 10.3–18.7) for HIV ($p = 0.048$) (62% response rate for HBV and HIV, 61% for HCV). Universal opt-out testing for newly registering migrant patients was significantly higher where respondents saw migrant patients frequently; 36.2% (34/94, 27.2–46.2) for HBV, 35.5% (33/93, 26.5–45.6) for HCV and 41.5% (39/94, 32.1–51.6) for HIV than where they saw them sometimes or rarely; 7.9% (13/164, 4.7–13.1) for HBV, 7.3% (12/164, 4.2–12.4) for HCV and 9.8% (16/164, 6.1–15.3) for HIV, $p < 0.0001$), and was higher in small practices, with a similar pattern for existing migrant patients.

Testing practices varied by PHE region. Practice policy for offering universal opt-out HIV testing for newly registering migrant patients ranged from 53.1% (17/32, 36.4–69.1) of respondents in Yorkshire and the Humber to 4.9% (2/41, 1.3–6.1) of respondents in the South East ($p < 0.0001$), and this regional pattern was similar for HBV and HCV (supplementary Table 1). For existing patients who were migrants, universal opt-out testing was highest in the Midlands (31.7%, 13/41, 19.6–47.0 for HIV) and lowest in the South East (4.9%, 2/41, 1.3–16.1 for HIV), $p < 0.05$ for all three BBV.

Identification of migrant patients for BBV testing

When asked if existing migrant patients were identified for testing opportunistically during consultation, 78.9% (191/242, 73.4–83.6) of respondents stated they were (61% response rate), while only 13.6% (33/242, 9.9–18.5) stated that systematic identification methods, either

periodic flagging of the GP system by automated software, or periodic manual audit of the GP system, were used (61% response rate) (Table 3). Flagging was significantly higher among those who saw migrant patients frequently (20.0%, 18/90, 13.0–29.4) than those who saw migrant patients sometimes/rarely (9.9%, 15/152, 6.1–15.6, $p = 0.026$), and in small practices (26.3%, 10/38, 15.0–42.0) compared to medium (9.5%, 4/42, 3.8–22.1) or large (10.0%, 7/70, 4.9–19.2) ($p = 0.04$) and was highest in Yorkshire and the Humber (25.0%, 8/32, 13.3–42.1) and London (22.5%, 9/40, 12.3–37.5) and lowest in the South East (0.0%, 0/15, 0.0–20.4), South West (2.6%, 1/38, 0.5–13.5), and North West (3.1%, 1/32, 0.6–15.7) ($p = 0.012$) (supplementary Table 1).

Services offered

Most (87.5%, 133/152, 81.3–91.8) practices provided interpreter services (38% response rate), and 22.0% (53/241, 17.2–27.6) offered longer appointments to migrants at registration (61% response rate), but few offered other services to facilitate BBV testing and care of migrants (Table 4): 9.5% (23/241, 6.4–13.9) had a specially designated clinic; 8.7% (21/241, 5.8–13.0) had a designated GP; 11.6% (28/241, 8.2–16.3) had specific projects to register migrants; 8.3% (20/241, 5.4–12.5) had outreach facilities, 7.5% (18/241, 4.8–11.5) had health support teams and 4.6% (11/241, 2.6–8.0) had incentive schemes for GPs. Outreach services ($p = 0.024$) and projects to register migrants ($p = 0.019$) were both more common in small practices, and projects to register new migrants, specially designated clinics, longer appointments at registration (all $p < 0.01$) and outreach services ($p = 0.029$) were all more common in practices where respondents saw migrant patients frequently. Provision of longer appointments at registration varied significantly by region and was highest in Yorkshire and Humber (46.9%, 15/32, 30.9–63.6), followed by the North East (41.7%, 5/12, 19.3–68.0) and was lowest in the North West (6.3%, 2/32, 1.7–20.1) ($p < 0.01$) (supplementary Table 2).

Routine recording of data

Ethnicity was routinely recorded by 90.1% (137/152, 84.4–93.1) of respondents' practices, whereas 58.6% (89/152, 50.6–66.1) reported that they routinely recorded country of birth (38% response rate), and this was significantly higher where respondents saw migrant patients frequently ($p < 0.01$) and in small practices ($p = 0.042$) (Table 4). Hepatitis diagnosis was routinely recorded by 74.3% (113/152, 66.9–80.3), and hepatitis prescription by 53.9% (82/152, 46.0–61.7) of respondents' practices (Table 4).

Perceived barriers for migrants to access healthcare across the care pathway

The content and proportion of responses in each theme varied according to which part of the care pathway was considered (Fig. 1, additional file 4).

For perceived barriers for migrants accessing healthcare (74% response rate), language and culture (predominantly language) were the most commonly reported (74.4%, 218/293, 69.1–79.1), followed by patient information and knowledge, particularly of the availability of health services and how to navigate the health system (54.9%, 161/293, 49.2–60.5), and psychological barriers, including fear (15.7%, 46/293, 12.0–20.3) (Fig. 1). Other common themes included accommodation or having no fixed abode (8.2%, 24/294, 5.5–11.9), prejudice and discrimination (7.5%, 22/293, 5.0–11.1), and patient financial barriers (10.2%, 30/293, 7.3–14.2).

Language and culture was also the most commonly cited barrier to accessing BBV services in primary care (28.3%, 67/237, 22.9–34.3, 60% response rate) followed by resource issues (27.0%, 64/237, 21.8–33.0), and staff knowledge and awareness (25.7%, 61/237, 20.6–31.7). Resource issues often related to time, whereas staff knowledge often related to a lack of staff training, or staff not being aware of patients' migrant status. Psychological barriers including stigma and fear of diagnosis were cited by 17.3% (41/237, 13.0–22.6) of respondents, and service issues, such as practices not having a policy for BBV testing, or not identifying migrant patients, were given by 14.8% (35/237, 10.8–19.8) of respondents.

For patients to access BBV services in secondary care, again language and culture was the most common theme (41.5%, 98/236, 35.4–47.9, 60% response rate), followed by patient information and knowledge, with responses often relating to patients not understanding the significance of the diseases and importance of accessing treatment (28.4%, 67/236, 23.0–34.5). Geographical issues were cited by 24.5% (58/236, 19.5–30.4), including transport costs and lack of locally available services, and 21.2% (50/236, 16.5–26.8) cited service issues, including communication methods around arranging appointments, waiting times and lack of an organised clinic.

Perceived barriers for asylum seekers accessing healthcare (74% response rate) were largely similar to those for all migrants, with some notable differences (Fig. 2). Language and psychological barriers were more frequently reported for asylum seekers than they were for all migrants. Psychological barriers again included fear, as well as highlighting mental health concerns for asylum seekers. To a lesser degree, accommodation, and prejudice and discrimination were also identified more often for asylum seekers than for all migrants.

Table 3 Primary care practice policy for blood borne virus (BBV) testing for migrant patients

Question	Blood borne virus (BBV)	Total Number (%; 95CI)	P (difference between questions)	By frequency of seeing migrant patients		By practice size				P (practice size)	
				Frequently Number (%; 95CI)	Sometimes or rarely Number (%; 95CI)	Number (%; 95CI)	Number (%; 95CI)	Number (%; 95CI)	Number (%; 95CI)		P (frequency of seeing migrant patients)
What is your practice policy for offering blood borne virus (BBV) testing to new migrants?	Hepatitis B										
	Universal / 'opt out'	46 (17.8, 13.6–23.0)		34 (36.2, 27.2–46.2)	13 (7.9, 4.7–13.1)	16 (42.1, 27.9–57.8)	6 (14.3, 6.7–27.8)	9 (12.9, 6.9–22.7)		0.001	
	Ad hoc	113 (43.8, 37.9–49.9)		37 (39.4, 30.1–49.5)	76 (46.3, 38.9–54.0)	11 (28.9, 17.0–44.8)	18 (42.9, 29.1–57.8)	31 (44.3, 33.2–55.9)			
	Other	18 (7.0, 4.5–10.8)		5 (5.3, 2.3–11.9)	12 (7.3, 4.2–12.4)	4 (10.5, 4.2–24.1)	2 (4.8, 1.3–15.8)	6 (8.6, 4.0–17.5)			
	Don't know	81 (31.4, 26.0–37.3)		18 (19.1, 12.5–28.3)	63 (38.4, 31.3–46.0)	7 (18.4, 9.2–33.4)	16 (38.1, 25.0–53.2)	24 (34.3, 24.2–46.0)			
	Total responses	258		94	164	38	42	70			
	Hepatitis C										
	Universal / 'opt out'	44 (17.1, 13.0–22.2)		33 (35.5, 26.5–45.6)	12 (7.3, 4.2–12.4)	15 (39.5, 25.6–55.3)	6 (14.3, 6.7–27.8)	8 (11.6, 6.0–21.2)		0.001	
	Ad hoc	114 (44.4, 38.4–50.5)		37 (39.8, 30.4–49.9)	77 (47.0, 39.5–54.6)	12 (31.6, 19.1–47.5)	18 (42.9, 29.1–57.8)	31 (44.9, 33.8–56.6)			
	Other	18 (7.0, 4.5–10.8)		5 (5.4, 2.3–12.0)	12 (7.3, 4.2–12.4)	4 (10.5, 4.2–24.1)	2 (4.8, 1.3–15.8)	6 (8.7, 4.0–17.7)			
Don't know	81 (31.5, 26.1–37.4)		18 (19.4, 12.6–28.5)	63 (38.4, 31.3–46.0)	7 (18.4, 9.2–33.4)	16 (38.1, 25.0–53.2)	24 (34.8, 24.6–46.6)				
Total responses	257		93	164	38	42	69				
What is your practice policy for offering BBV testing to existing migrants?	HIV										
	Universal / 'opt out'	54 (20.9, 16.4–26.3)		39 (41.5, 32.1–51.6)	16 (9.8, 6.1–15.3)	18 (47.4, 32.5–62.7)	7 (16.7, 8.3–30.6)	14 (20.0, 12.3–30.8)		0.002	
	Ad hoc	111 (43.0, 37.1–49.1)		35 (37.2, 28.1–47.3)	76 (46.3, 38.9–54.0)	10 (26.3, 15.0–42.0)	18 (42.9, 29.1–57.8)	29 (41.4, 30.6–53.1)			
	Other	17 (6.6, 4.2–10.3)		5 (5.3, 2.3–11.9)	11 (6.7, 3.8–11.6)	4 (10.5, 4.2–24.1)	2 (4.8, 1.3–15.8)	5 (7.1, 3.1–15.7)			
	Don't know	76 (29.5, 24.2–35.3)		15 (16.0, 9.9–24.7)	61 (37.2, 30.2–44.8)	6 (15.8, 7.4–30.4)	15 (35.7, 23.0–50.8)	22 (31.4, 21.8–43.0)			
	Total responses	258		94	164	38	42	70			
	Hepatitis B										
	Universal / 'opt out'	29 (11.2, 7.9–15.7)		21 (22.3, 15.1–31.8)	8 (4.9, 2.5–9.3)	11 (28.9, 17.0–44.8)	3 (7.1, 2.5–19.0)	3 (4.3, 1.5–11.9)		0.001	
	Ad hoc	133 (51.6, 45.5–57.6)		46 (48.9, 39.1–58.9)	87 (53.0, 45.4–60.5)	17 (44.7, 30.1–60.3)	21 (50.0, 35.5–64.5)	39 (55.7, 44.1–66.8)			
	Other	25 (9.7, 6.6–13.9)		11 (11.7, 6.7–19.8)	14 (8.5, 5.2–13.8)	5 (13.2, 5.8–27.3)	4 (9.5, 3.8–22.1)	7 (10.0, 4.9–19.2)			
Don't know	71 (27.5, 22.4–33.3)		16 (17.0, 10.8–25.9)	55 (33.5, 26.8–41.1)	5 (13.2, 5.8–27.3)	14 (33.3, 21.0–48.4)	21 (30.0, 20.5–41.5)				

Table 3 Primary care practice policy for blood borne virus (BBV) testing for migrant patients (Continued)

Question	Blood borne virus (BBV)	Total Number (%; 95CI)	P (difference between questions)	By frequency of seeing migrant patients		By practice size				
				Frequently Number (%; 95CI)	Sometimes or rarely Number (%; 95CI)	Number (%; 95CI)	Number (%; 95CI)	Number (%; 95CI)	Number (%; 95CI)	P (frequency of seeing migrant patients)
Total		258		94	164	38	42	70		< 0.0001
Hepatitis C										
Universal / 'opt out'		27 (10.7, 7.5–15.1)		20 (21.5, 14.4–30.9)	7 (4.4, 2.1–8.8)	11 (30.6, 18.0–46.9)	2 (5.0, 1.4–16.5)	2 (2.9, 0.8–10.0)		
Ad hoc		131 (52.0, 45.8–58.1)		46 (49.5, 39.5–59.4)	85 (53.5, 45.7–61.0)	16 (44.4, 29.5–60.4)	20 (50.0, 35.2–64.8)	39 (56.5, 44.8–67.6)		
Other		25 (9.9, 6.8–14.2)		11 (11.8, 6.7–19.9)	14 (8.8, 5.3–14.2)	5 (13.9, 6.1–28.7)	4 (10.0, 4.0–23.1)	7 (10.1, 5.0–19.5)		
Don't know		69 (27.4, 22.2–33.2)		16 (17.2, 10.9–26.1)	53 (33.3, 26.5–41.0)	4 (11.1, 4.4–25.3)	14 (35.0, 22.1–50.5)	21 (30.4, 20.8–42.1)		
Total		252		93	159	36	40	69		< 0.0001
HIV										
Universal / 'opt out'		36 (14.0, 10.3–18.7)		24 (25.5, 17.8–35.2)	12 (7.3, 4.2–12.4)	14 (36.8, 23.4–52.7)	4 (13.8, 5.5–30.6)	5 (9.8, 4.3–21.0)		
Ad hoc		133 (51.6, 45.5–57.6)		46 (48.9, 39.1–58.9)	87 (53.0, 45.4–60.5)	16 (42.1, 27.9–57.8)	21 (72.4, 54.3–85.3)	39 (76.5, 63.2–86.0)		
Other		25 (9.7, 6.6–13.9)		11 (11.7, 6.7–19.8)	14 (8.5, 5.2–13.8)	5 (13.2, 5.8–27.3)	4 (13.8, 5.5–30.6)	7 (13.7, 6.8–25.7)		
Don't know		64 (24.8, 19.9–30.4)		13 (13.8, 8.3–22.2)	51 (31.1, 24.5–38.5)	3 (7.9, 2.7–20.8)	13 (44.8, 28.4–62.5)	19 (37.3, 25.3–51.0)		
Total		258		94	164	38	29	51		< 0.0001
How are existing migrants identified for testing?										
Opportunistic during consultation			n/a							0.052
Yes		191 (78.9, 73.4–83.6)		77 (85.6, 76.8–91.4)	114 (75.0, 67.6–81.2)	34 (89.5, 75.9–95.8)	30 (71.4, 56.4–82.8)	53 (75.7, 64.5–84.2)		
No		9 (3.7, 2.0–6.9)		5 (5.6, 2.4–12.4)	4 (2.6, 1.0–6.6)	1 (2.6, 0.5–13.5)	2 (4.8, 1.3–15.8)	4 (5.7, 2.2–13.8)		
Don't know		42 (17.4, 13.1–22.6)		8 (8.9, 4.6–16.6)	34 (22.4, 16.5–29.6)	3 (7.9, 2.7–20.8)	10 (23.8, 13.5–38.5)	13 (18.6, 11.2–29.2)		
Total		242		90	152	38	7	70		0.026
Any periodic flagging										
Any periodic flagging			n/a							0.04
Yes		33 (13.6, 9.9–18.5)		18 (20.0, 13.0–29.4)	15 (9.9, 6.1–15.6)	10 (26.3, 15.0–42.0)	4 (9.5, 3.8–22.1)	7 (10.0, 4.9–19.2)		
No/don't know		209 (86.4, 81.5–90.1)		72 (80.0, 70.6–87.0)	137 (90.1, 84.4–93.9)	28 (73.7, 58.0–85.0)	38 (90.5, 77.9–96.2)	63 (90.0, 80.8–95.1)		
Total		242		90	152	38	42	70		< 0.0001

Responses in bold indicate response used when creating dichotomised responses for Chi squared tests

Table 4 Primary care practice facilities and practice policy for recording data

Question	No. (% 95%CI)	P (between questions)	By frequency of seeing migrant patients			P (frequency of seeing migrant patients)	By practice size			P (practice size)
			Frequently No. (% 95%CI)	Sometimes or rarely No. (% 95%CI)	Never No. (% 95%CI)		Small No. (% 95%CI)	Med No. (% 95%CI)	Large No. (% 95%CI)	
Services in place to facilitate blood borne virus (BBV) testing and care of migrant patients										
Interpreter facilities										
Yes	133 (87.5, 81.3-91.8)	n/a	60 (90.9, 81.6-95.8)	73 (84.9, 75.8-90.9)	35 (92.1, 79.2-97.3)	0.266	36 (87.8, 74.5-94.7)	59 (84.3, 74.0-91.0)	0.568	
No	14 (9.2, 5.6-14.9)		5 (7.6, 3.3-16.5)	9 (10.5, 5.6-18.7)	2 (5.3, 1.5-17.3)		4 (9.8, 3.9-22.5)	8 (11.4, 5.9-21.0)		
Don't know	5 (3.3, 1.4-7.5)		1 (1.5, 0.3-8.1)	4 (4.7, 1.8-11.4)	1 (2.6, 0.5-13.5)		1 (2.4, 0.4-12.6)	3 (4.3, 1.5-11.9)		
Total responses	152		66	86	38		41	70		
Longer appointments at registration										
Yes	53 (22.0, 17.2-27.6)	n/a	31 (34.4, 25.4-44.7)	22 (14.6, 9.8-21.1)	14 (36.8, 23.4-52.7)	< 0.0001	10 (23.8, 13.5-38.5)	12 (17.1, 10.1-27.6)	0.083	
No	162 (67.2, 61.1-72.8)		53 (58.9, 48.6-68.5)	109 (72.2, 64.6-78.7)	22 (57.9, 42.2-72.1)		29 (69.0, 54.0-80.9)	52 (74.3, 63.0-83.1)		
Don't know	26 (10.8, 7.5-15.3)		6 (6.7, 3.1-13.8)	20 (13.2, 8.7-19.6)	2 (5.3, 1.5-17.3)		3 (7.1, 2.5-19.0)	6 (8.6, 4.0-17.5)		
Total responses	241		90	151	38		42	70		
Specially designated clinic										
Yes	23 (9.5, 6.4-13.9)	n/a	17 (18.9, 12.1-28.2)	6 (4.0, 1.8-8.4)	6 (15.8, 7.4-30.4)	< 0.0001	1 (2.4, 0.4-12.3)	4 (5.7, 2.2-13.8)	0.074	
No	196 (81.3, 75.9-85.7)		69 (76.7, 66.9-84.2)	127 (84.1, 77.4-89.1)	30 (78.9, 63.7-88.9)		39 (92.9, 81.0-97.5)	61 (87.1, 77.3-93.1)		
Don't know	22 (9.1, 6.1-13.4)		4 (4.4, 1.7-10.9)	18 (11.9, 7.7-18.1)	2 (5.3, 1.5-17.3)		2 (4.8, 1.3-15.8)	5 (7.1, 3.1-15.7)		
Total responses	241		90	151	38		42	70		
Designated GP										
Yes	21 (8.7, 5.8-13.0)	n/a	12 (13.3, 7.8-21.9)	9 (6.0, 3.2-10.9)	3 (7.9, 2.7-20.8)	0.05	3 (7.1, 2.5-19.0)	5 (7.1, 3.1-15.7)	1.00	
No	195 (80.9, 75.5-85.4)		71 (78.9, 69.4-86.0)	124 (82.1, 75.2-87.4)	32 (84.2, 69.6-92.6)		37 (88.1, 75.0-94.8)	61 (87.1, 77.3-93.1)		
Don't know	25 (10.4, 7.1-14.9)		7 (7.8, 3.8-15.2)	18 (11.9, 7.7-18.1)	3 (7.9, 2.7-20.8)		2 (4.8, 1.3-15.8)	4 (5.7, 2.2-13.8)		
Total responses	241		90	151	38		42	70		
Specific projects to register migrants										
Yes	28 (11.6, 8.2-16.3)	n/a	19 (21.1, 14.0-30.6)	9 (6.0, 3.2-10.9)	8 (21.1, 11.1-36.3)	< 0.0001	1 (2.4, 0.4-12.3)	6 (8.6, 4.0-17.5)	0.024	
No	179 (74.3, 68.4-79.4)		63 (70.0, 59.9-78.5)	116 (76.8, 69.5-82.8)	28 (73.7, 58.0-85.0)		37 (88.1, 75.0-94.8)	57 (81.4, 70.8-88.8)		
Don't know	34 (14.1, 10.3-19.1)		8 (8.9, 4.6-16.6)	26 (17.2, 12.0-24.0)	2 (5.3, 1.5-17.3)		4 (9.5, 3.8-22.1)	7 (10.0, 4.9-19.2)		
Total responses	241		90	151	38		42	70		

Table 4 Primary care practice facilities and practice policy for recording data (Continued)

Question	No. (% 95%CI)	P (between questions)	By frequency of seeing migrant patients		P (frequency of seeing migrant patients)	By practice size			P (practice size)	
			Frequently No. (% 95%CI)	Sometimes or rarely No. (% 95%CI)		Small No. (% 95%CI)	Med No. (% 95%CI)	Large No. (% 95%CI)		
Outreach facilities										
		n/a			0.029					0.019
Yes	20 (8.3, 5.4-12.5)		12 (13.3, 7.8-21.9)	8 (5.3, 2.7-10.1)		7 (18.4, 9.2-33.4)	3 (7.1, 2.5-19.0)	2 (2.9, 0.8-9.8)		
No	190 (78.8, 73.2-83.5)		73 (81.1, 71.8-87.9)	117 (77.5, 70.2-83.4)		27 (71.1, 55.2-83.0)	36 (85.7, 72.2-93.3)	63 (90.0, 80.8-95.1)		
Don't know	31 (12.9, 9.2-17.7)		5 (5.6, 2.4-12.4)	26 (17.2, 12.0-24.0)		4 (10.5, 4.2-24.1)	3 (7.1, 2.5-19.0)	5 (7.1, 3.1-15.7)		
Total responses	241		90	151		38	42	70		
Outreach services specifically for migrants										
		n/a			0.888					0.048
Yes	11 (7.2, 4.1-12.5)		5 (7.6, 3.3-16.5)	6 (7.0, 3.2-14.4)		6 (15.8, 7.4-30.4)	3 (7.3, 2.5-19.4)	2 (2.9, 0.8-9.8)		
No	111 (73.0, 65.5-79.4)		50 (75.8, 64.2-84.5)	61 (70.9, 60.6-79.5)		25 (65.8, 49.9-78.8)	31 (75.6, 60.7-86.2)	53 (75.7, 64.5-84.2)		
Don't know	30 (19.7, 14.2-26.8)		11 (16.7, 9.6-27.4)	19 (22.1, 14.6-31.9)		7 (18.4, 9.2-33.4)	7 (17.1, 8.5-31.3)	15 (21.4, 13.4-32.4)		
Total responses	152		66	86		38	41	70		
Health support teams										
		n/a			0.517					0.123
Yes	18 (7.5, 4.8-11.5)		8 (8.9, 4.6-16.6)	10 (6.6, 3.6-11.8)		5 (13.2, 5.8-27.3)	4 (9.5, 3.8-22.1)	2 (2.9, 0.8-9.8)		
No	184 (76.3, 70.6-81.3)		73 (81.1, 71.8-87.9)	111 (73.5, 66.0-79.9)		29 (76.3, 60.8-87.0)	35 (83.3, 69.4-91.7)	61 (87.1, 77.3-93.1)		
Don't know	39 (16.2, 12.1-21.4)		9 (10.0, 5.4-17.9)	30 (19.9, 14.3-26.9)		4 (10.5, 4.2-24.1)	3 (7.1, 2.5-19.0)	7 (10.0, 4.9-19.2)		
Total responses	241		90	151		38	42	70		
Incentive scheme for GPs										
		n/a			0.065					0.693
Yes	11 (4.6, 2.6-8.0)		7 (7.8, 3.8-15.2)	4 (2.6, 1.0-6.6)		1 (2.6, 0.5-13.5)	3 (7.1, 2.5-19.0)	3 (4.3, 1.5-11.9)		
No	184 (76.3, 70.6-81.3)		71 (78.9, 69.4-86.0)	113 (74.8, 67.4-81.1)		32 (84.2, 69.6-92.6)	32 (76.2, 61.5-86.5)	56 (80.0, 69.2-87.7)		
Don't know	46 (19.1, 14.6-24.5)		12 (13.3, 7.8-21.9)	34 (22.5, 16.6-29.8)		5 (13.2, 5.8-27.3)	7 (16.7, 8.3-30.6)	11 (15.7, 9.0-26.0)		
Total responses	241		90	151		38	42	70		
Routine recording of data										
		Ethnicity vs country of birth P < 0.0001			0.168					0.939
Yes	137 (90.1, 84.4-93.9)		62 (93.9, 85.4-97.6)	75 (87.2, 78.5-92.7)		35 (92.1, 79.2-97.3)	37 (90.2, 77.5-96.1)	62 (88.6, 79.0-94.1)		
No	6 (3.9, 1.8-8.3)		1 (1.5, 0.3-8.1)	5 (5.8, 2.5-12.9)		3 (7.9, 2.7-20.8)	2 (4.9, 1.3-16.1)	1 (1.4, 0.3-7.7)		
Don't know	9 (5.9, 3.1-10.9)		3 (4.5, 1.6-12.5)	6 (7.0, 3.2-14.4)		0 (0.0, 0.0-9.2)	2 (4.9, 1.3-16.1)	7 (10.0, 4.9-19.2)		
Total responses	152		66	86		38	41	70		

Table 4 Primary care practice facilities and practice policy for recording data (Continued)

Question	No. (%; 95%CI)	P (between questions)	By frequency of seeing migrant patients		P (frequency of seeing migrant patients)	By practice size			P (practice size)	
			Frequently No. (%; 95%CI)	Sometimes or rarely No. (%; 95%CI)		Small No. (%; 95%CI)	Med No. (%; 95%CI)	Large No. (%; 95%CI)		
Country of birth										
Yes	89 (58.6, 50.6-66.1)		48 (72.7, 61.0-82.0)	41 (47.7, 37.4-58.1)	0.002	28 (82.4, 66.5-91.7)	24 (66.7, 50.3-79.8)	34 (66.7, 53.0-78.0)		
No	35 (23.0, 17.0-30.3)		10 (15.2, 8.4-25.7)	25 (29.1, 20.5-39.4)		6 (17.6, 8.3-33.5)	12 (33.3, 20.2-49.7)	17 (33.3, 22.0-47.0)		
Don't know	28 (18.4, 13.1-25.3)		8 (12.1, 6.3-22.1)	20 (23.3, 15.6-33.2)		4 (11.8, 4.7-26.6)	5 (13.9, 6.1-28.7)	19 (37.3, 25.3-51.0)		
Total	152		66	86		34	36	51	0.042	
Hepatitis diagnosis										
Yes	113 (74.3, 66.9-80.6)	n/a	54 (81.8, 70.9-89.3)	59 (68.6, 58.2-77.4)	0.064	30 (78.9, 63.7-88.9)	29 (70.7, 55.5-82.4)	53 (75.7, 64.5-84.2)		
No	23 (15.1, 10.3-21.7)		7 (10.6, 5.2-20.3)	16 (18.6, 11.8-28.1)		6 (15.8, 7.4-30.4)	6 (14.6, 6.9-28.4)	10 (14.3, 7.9-24.3)		
Don't know	16 (10.5, 6.6-16.4)		5 (7.6, 3.3-16.5)	11 (12.8, 7.3-21.5)		2 (5.3, 1.5-17.3)	6 (14.6, 6.9-28.4)	7 (10.0, 4.9-19.2)		
Total responses	152		66	86		38	41	70	0.711	
Hepatitis prescription										
Yes	82 (53.9, 46.0-61.7)	n/a	35 (53.0, 41.2-64.6)	47 (54.7, 44.2-64.7)	0.842	24 (63.2, 47.3-76.6)	24 (58.5, 43.4-72.2)	34 (48.6, 37.2-60.0)		
No	40 (26.3, 20.0-33.8)		20 (30.3, 20.6-42.2)	20 (23.3, 15.6-33.2)		11 (28.9, 17.0-44.8)	9 (22.0, 12.0-36.7)	18 (25.7, 16.9-37.0)		
Don't know	30 (19.7, 14.2-26.8)		11 (16.7, 9.6-27.4)	19 (22.1, 14.6-31.9)		3 (7.9, 2.7-20.8)	8 (19.5, 10.2-34.0)	18 (25.7, 16.9-37.0)		
Total responses	152		66	86		38	41	70	0.309	

Responses in bold indicate response used when creating dichotomised responses for Chi squared tests

Discussion

Primary care staff knowledge, attitudes, policy and practice regarding migrants' healthcare entitlements and their BBV testing and care was very variable in this sample of English practices. One in four were unaware that GP and nurse consultations are free for all. Universal opt-out BBV testing for migrants was not common practice, and only one in three clinical staff would routinely consider BBV risk assessments for newly registering migrant patients. Where testing was requested, most respondents requested the recommended tests, and over 90% indicated they would refer diagnosed cases to secondary care. Respondents identified access barriers relating to a range of factors including language; patient knowledge, stigma and fear; time pressures of appointments, practices not having a BBV testing policy and lack of knowledge and awareness among staff.

Knowledge of entitlements to health services varied. Of particular concern is that a quarter of clinical staff were unaware that GP and nurse consultations are free to all. Vulnerable patients, including migrants could be wrongly refused GP registration, despite national guidance that lack of documentation should not be a barrier to registering with a GP [24]. Three UK studies estimate that refusal ranges from 20 to 39% [25–27]. As primary care is the first point of access, 'gatekeeper' to other services, and a trusted source of health information, GP staff's poor knowledge of entitlements is likely to create a further access barrier in addition to the system, cultural and language barriers migrants face, especially when it comes to communicable disease control [28, 29]. There were no substantial differences in knowledge of healthcare entitlements of migrants between GPs and nurses; GPs were more likely to know that operations and outpatient appointments are not free, and nurses were more likely to know that care for FGM, torture etc. is free, which likely reflects their roles in general practice.

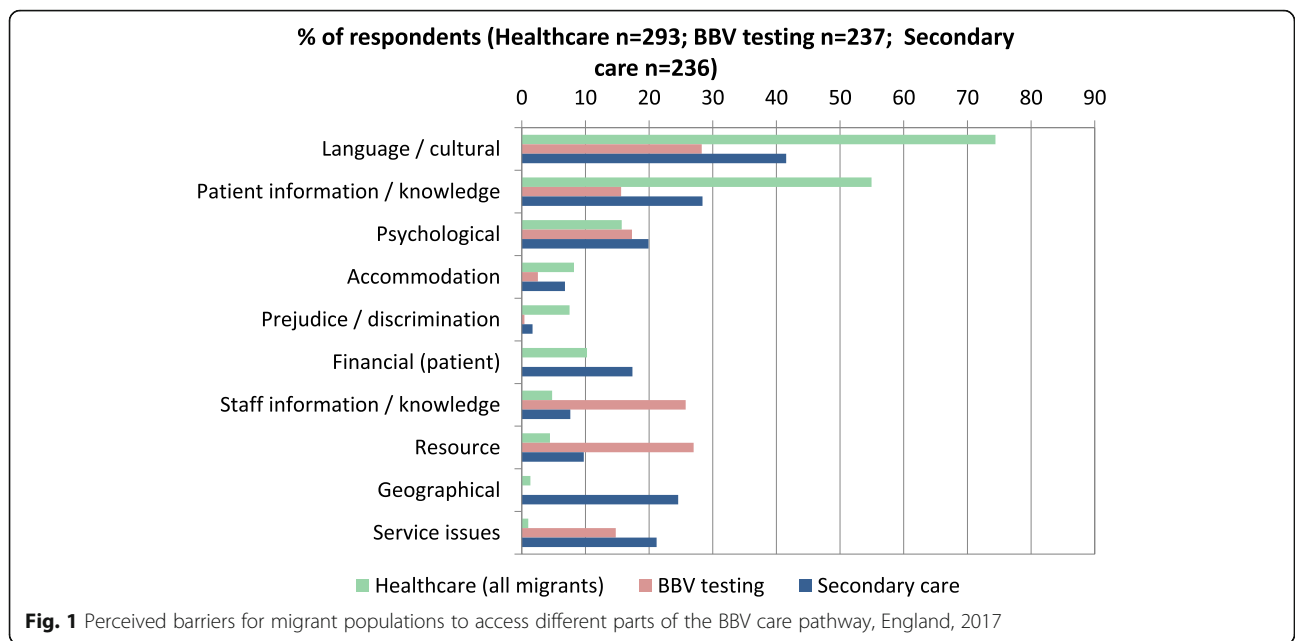
BBV testing was more often conducted on an ad-hoc than opt-out basis, and BBV risk assessments for newly registering migrant patients were routinely considered by only a third of respondents, and more often considered on a situation specific basis. Most respondents stated existing migrant patients were identified for testing opportunistically during consultation, and only 14% systematically flagged migrant patients for BBV testing. These findings suggest that migrant patients eligible for BBV testing are not often routinely identified as such, which is likely to hinder adherence to BHIVA, ECDC and NICE guidelines which recommend BBV testing for migrant patients from higher HBV and HCV prevalence ($> = 2\%$) areas and HIV testing for all patients in high (> 2 per 1000) prevalence areas in the UK [10, 11, 30], and is consistent with other studies which report low adherence to testing guidelines for BBVs outside of the

sexual and antenatal health setting [12, 31]. Opt-out rapid testing in general practice has been shown to increase diagnosis rates for HIV, and universal opt-out testing initiatives for migrants which offer opportunities to normalise testing are subject to ongoing evaluations and have been well received by staff and patients [32–34].

Improved practice staff knowledge is needed to help reduce barriers and variations in service provision. Resources are available, such as the PHE Migrant Health Guide which outlines NHS entitlements and gives guidance on assessing new patients from overseas [35], RCGP e-learning courses [36], but also PHE and charities co-branded promotional videos, posters and leaflets on BBV in multiple languages for patient waiting areas can be downloaded or ordered from gov.uk [37]. Further work is needed to understand current awareness and to increase uptake of these resources.

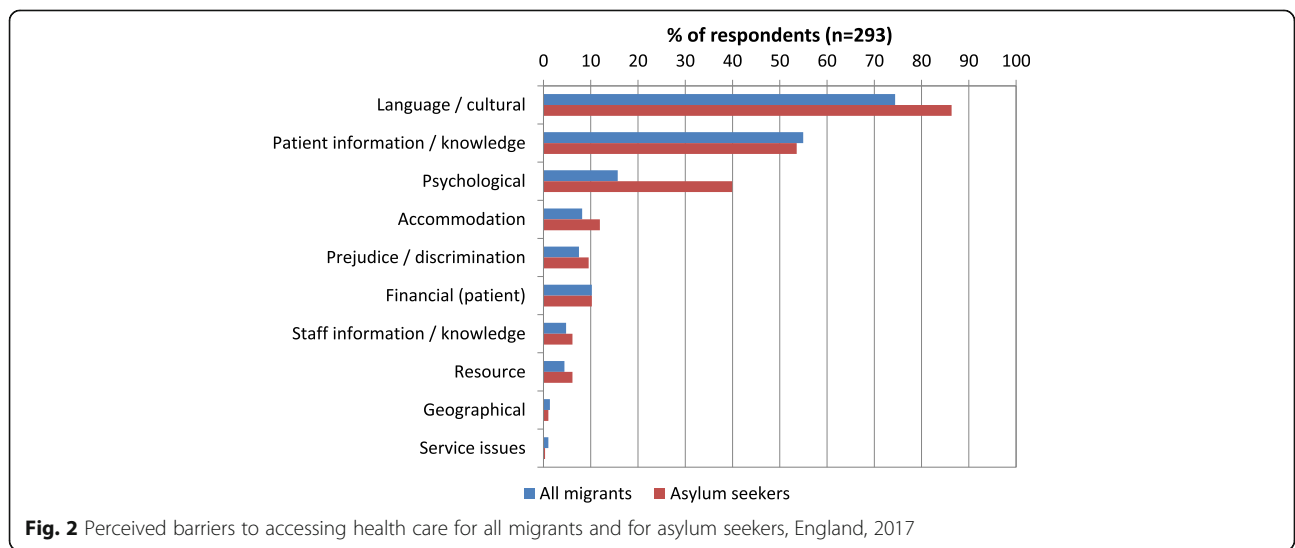
Use of software programmes to identify and automatically flag patients for testing based on risk factors or risk proxies recorded on practice registers has been shown to be effective for groups including migrants in primary care and other settings [38–40]. This requires migrant status to be recorded on GP systems for migrants to be flagged as at risk. Although 59% of respondents stated that their practice routinely recorded country of birth, data from the Clinical Practice Research Datalink suggests recording is a lot lower at 1.6% [41]. This discrepancy could in part be due to biases in our sample or respondents giving socially desirable answers, however it may be that practices are recording this data on other systems where the data is not extractable. This highlights a need to increase awareness of the importance of recording patient country of birth amongst practitioners and information service providers, and for practitioners to assess risks associated with country of birth as a part of the first registration consultation.

Flagging and opt-out testing for newly registering migrant patients was more frequently reported where respondents said they see migrant patients frequently, in smaller practices and highest in Yorkshire and Humber and London, but lowest in the South East. A similar pattern was observed for services such as specially designated clinics, longer appointments at registration and projects to register migrants – these were more frequently reported where respondents saw migrants frequently. Outreach services and projects to register migrants were higher in small practices. These variations may reflect GP surgeries adopting policies and practices that reflect the needs and diversity of their local populations, and the ability of smaller practices to be more responsive and adaptive in implementing migrant focused services.



Performance payment structure may be the most influential way to incentivise BBV testing [42–44], and PHE and CCG recommendations were also more often stated to provide motivation to test than alternative sources. Only half of respondents indicated that NHSE and CMO recommendations would provide motivation for testing, which may reflect a relative lack of confidence in these bodies versus the perceived scientific credibility and independence of PHE and the more direct relationship and understanding of local PHE teams with CCGs. Interestingly, nurses were more likely than GPs to be motivated by local targets, national goals, CCG recommendations and NICE guidance.

Over 90% of GPs reported referring diagnosed cases of HBV and HCV to secondary care, and over half followed patients up if they did not attend secondary care appointments. Three quarters would offer close contacts of HBV infected cases testing, and three quarters would offer close contacts hepatitis B vaccination. These proportions seem high, as many patients diagnosed with HBV and HCV are known not to be accessing secondary care – in a 2012 UK study only a third of HBV diagnosed patients were on treatment [45] and an analysis of England sentinel surveillance data showed that between 2004 and 2017 only 21% of viraemic HCV diagnosed patients had evidence of treatment [46], and baseline HBV



testing of close contacts was only 34% in a 2018 UK study [47]. Our results may be due to sampling and responder bias, due to initially contacting networks who were interested in migrant health, and those who were interested being more likely to respond, as well as wishing to give socially acceptable or desirable responses.

Differences in knowledge of BBV diagnosis and management were noted between nurses and GPs, with nurses being less likely to know whether all diagnosed HBV/HCV patients are referred and whether referrals are followed up, and less likely to know the diagnostic tests to request for HCV and HIV but there was no significant difference for HBV. Generally, there is a need for improved understanding of diagnostic testing for BBV in practices. Regardless of service, respondents cited language as the main barrier to accessing healthcare, which is consistent with the literature [14, 15, 48]. For patients who require linguistic support, interpreting services are recommended in General Medical Council guidance and were provided by 88% of respondents' practices [49–51]. Nevertheless, there is evidence that interpreting services are underused, despite incurring no direct cost for practices [52]. This may be partly due to time pressures within appointments and the indirect costs of longer appointment times, as well as the need for forward planning and a lack of professional confidence in working with interpreters [53]. Brief education may help improve professional confidence in when and how to use interpreters [54]. Improved provision of translated materials is also likely to be beneficial in improving patient access to health information; efforts to ensure materials about BBV are translated are ongoing [55].

Patient knowledge and understanding of disease, and the location of secondary care services were cited as barriers to accessing secondary care. Community based treatment pathways, as have been demonstrated to be effective for HCV [56, 57], could help to overcome geographic barriers, although one recent study found that (first and second generation) migrant patients were no more likely to complete treatment on a community pathway [40]. Assessing patient attitudes towards BBV, and increasing patient knowledge would also be valuable and could be considered by practices to improve their services.

Limitations

This survey has a low response rate and a relatively small sample size, and may be affected by sampling and responder bias, as the survey was disseminated by contacts and networks with an interest in migrant and asylum seeker health and through a publication which professionals with an interest in vaccines subscribe to, so practice professionals with interests in migrant health,

BBVs and vaccine preventable diseases may have been more likely to respond. This is likely to bias the responses towards more knowledge of healthcare entitlements and better practices for BBV screening and management of migrants. Response to recruitment at professional conferences was poor, possibly due to competing priorities for professionals with limited time in a conference setting.

No demographic data on respondents was collected, so it was not possible to assess how responses vary by individual respondent characteristics, which may have associations with personal bias, stigma and discrimination against individuals who have migrated from specific countries or settings.

Our findings may therefore not be representative of all general practice staff. It was not possible to obtain data on non-respondents which would help to identify biases in responses; further work to survey practitioners within a fixed sampling frame (for example all GP practices in one CCG) may help to address this issue. In addition, not all questions were completed by all participants and fewer respondents completed later questions in the survey. Again, those more motivated may be more likely to complete the whole survey, leading to potentially greater bias in questions that had fewer respondents.

The small sample size limited our power to detect statistically significant differences between subgroups, particularly in detecting regional variations. Increasing the responses to the survey would help to address this, and in hindsight, following up the circulation of the survey link in Vaccine Updates could have helped to increase sample size and potentially reduce response bias.

Another limitation was that questions about barriers for migrant patients were asked to general practice professionals rather than migrants themselves; responses will reflect only barriers that these professionals were aware of and may exclude those which migrants experience, but professionals are less aware of. However, our findings echoed those cited by migrants in a qualitative study on barriers to accessing healthcare for viral hepatitis [14], which suggests that our respondents were relatively well informed about these issues.

Conclusions

Systematic or universal opt-out testing for migrant patients are uncommon and testing is more often done on an ad hoc basis, despite BASHH, PHE and NICE guidelines. Achieving the WHO goal of eliminating viral hepatitis as a public health threat by 2030 requires coordinated efforts to increase case-finding of patients with HBV and HCV; our results suggest that current testing practices for high-risk migrants in primary care are likely to be inadequate to meet the elimination goal among this population. Improved systematic risk-based flagging of migrant

patients for BBV screening and checks or prompts for referral and attendance to specialist services is needed to reduce the burden of undiagnosed infection and improve uptake of treatment, noting this is curative for hepatitis C. Local and national commissioning specifications for primary care testing and management of BBV infected patients may be required to achieve this goal. General practice professionals' knowledge of migrants' entitlements to healthcare was variable and could affect migrants' access to care. Perceived barriers to accessing healthcare consistently included language and lack of patient and staff information and awareness. These are not insurmountable but require sustained commitment, professional awareness as well as resource. The ultimate goal is to reduce morbidity, mortality and inequalities associated with BBV infections in migrant populations, mindful of the fact that this population is already vulnerable to disparities in healthcare access and health outcomes.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-020-10068-x>.

Additional file 1. Full online questionnaire. Text version of the online questionnaire used for the survey.

Additional file 2. Shorter paper questionnaire. PDF of the paper questionnaire that was distributed at the RCGP and Best Practice in Primary Care conferences.

Additional file 3. Definitions sheet which accompanied the questionnaire.

Additional file 4. Example responses for barriers questions. Example responses for free text barriers questions, by theme and part of care pathway.

Abbreviations

Anti-HCV: Antibodies against hepatitis C virus; BASHH: British Association of Sexual Health and HIV; BBV: Blood borne virus; BHIVA: British HIV Association; CCG: Clinical commissioning group; CMO: Chief Medical Officer; DBS: Dried blood spot; ECDC: European Centre for Disease Prevention and Control; ED: Emergency department; GP: General practitioner; HBcAb: Hepatitis B core antibody; HBsAg: Hepatitis B surface antigen; HBV: Hepatitis B virus; HCV: Hepatitis C virus; HCV RNA: Hepatitis C virus ribonucleic acid; HIV: Human immunodeficiency virus; NICE: National Institute for Health and Care Excellence; PHE: Public Health England; TB: Tuberculosis; UK: United Kingdom; WHO: World Health Organisation

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Authors' contributions

SM came up with the initial concept. RS RR SM implemented and managed the study. All authors apart from MP reviewed the questionnaire. RR undertook the analysis and had access to the complete dataset. RR and RS drafted the initial manuscript. SM provided critical input to the manuscript. All authors reviewed and approved the final manuscript.

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Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

this project was subject to an internal review by the Research Support and Governance Office in PHE to ensure that it was fully compliant the NHS Research Governance Framework for Health and Social Care (April 2005), and with all other current regulatory requirements. The review also covered all ethical considerations. The study was categorized as a service evaluation, and as no ethical issues had been identified it was decided that review by an ethics committee would not be necessary. This is in accordance with the revised guidance in the Governance Arrangements for Research Ethics Committees (GAfREC) that was released in September 2011. Online surveys typically do not require consent; information was given to the participants about the survey before completion, with the completion of any of the questions taken as consent.

Consent for publication

Not applicable as no sensitive personal information was collected.

Competing interests

The authors declare that they have no competing interests.

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