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Public and Healthcare Practitioner Attitudes towards HIV Testing: Review of Evidence from the United Kingdom (UK)

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Authors' contributions

This work was carried out in collaboration between all authors. Author CFD designed the study, managed and performed the literature searches. Author CFD wrote the first draft of the manuscript. Authors MTM and MG helped with re-drafting and revising the article. All authors read and approved the final manuscript.

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Review Article

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ABSTRACT

Aims: To explore attitudes towards HIV testing in the United Kingdom (UK) from the public and healthcare practitioners (HCP) to more fully understand the barriers and motivators towards testing.
Methodology: Electronic databases Pubmed, Web of Science, OVID Medline and Google were searched. We included studies conducted in the UK that had explored public and HCP attitudes towards HIV testing, published in the combination antiretroviral therapy era (1996-2014). We excluded studies relating to HIV testing or screening of pregnant women.
Results: In a total of 64 studies identified, 41 and 23 were on positive and negative attitudes towards HIV testing of the public and HCP, respectively. Common barriers reported by the public

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were stigma, fear, denial, and low perception of risk. Common barriers reported by HCP were lack of confidence or anxiety around offering a test, privacy and confidentiality, and insufficient knowledge/training in HIV. Public motivators towards testing were: HCP offering/recommending a test, universal testing at practice registration, outreach rapid point-of-care (POC) testing offered as part of a check-up, availability of home testing/sampling, and informing patients about HIV and the benefit of receiving treatment.

Conclusions: Recommendations to overcome barriers include making HIV testing routine, easier and more accessible. Outreach POC testing, home testing and sampling offer motivators to testing such as ease of access, privacy and confidentiality. A proactive offer of an HIV test by the HCP is an important factor which could help increase testing rates. This could be facilitated by further education and training of HCP in General Practice.

Keywords: HIV testing; attitudes; anxiety; fear; motivation; confidentiality; general practice; HIV infections.

1. INTRODUCTION

Public Health England (PHE) estimated that in 2013 there were 107,800 people living with HIV (PLWHIV) in the UK of whom approximately 24% were unaware of their infection [1]. In 2013, 6000 people were newly diagnosed with HIV infection, with the largest proportion among men who have sex with men (MSM) (3,250) and heterosexual men and women (2,490) [1,2]. The majority of new infections are transmitted by those who are undiagnosed, although, the proportion of undiagnosed to diagnosed individuals does vary between countries [3]. Patients are unlikely to transmit HIV if they are diagnosed and successfully treated with effective antiretroviral therapy (ART) so that the virus is undetectable in peripheral blood [4,5]. Late diagnosis of HIV, defined as after the CD4 count has fallen below the recommended threshold for treatment (currently 350 cells/ml) [1], is associated with increased morbidity and a ten-fold increased risk of death in the year following diagnosis compared to those diagnosed promptly [6,7]. In the UK in 2013, 530 people with HIV infection were reported to have died, most of whom were diagnosed late [1]. PLWHIV can expect a near-normal life span if they are diagnosed promptly [8] whereas those who have a late diagnosis may need acute care in hospital, are less able to benefit from ART, and are more expensive to treat. Prompt HIV diagnosis results in wider societal benefits due to reduced transmission and lower NHS treatment costs since each prevented infection saves an estimated £300,000 in lifetime treatment costs [6,9]. Therefore it is a public health imperative to increase HIV testing and diagnosis.

The UK HIV epidemic is largely concentrated among MSM and Black African communities [10,11]. Currently there is huge impetus to increase HIV testing in the UK with recent policy documents and national guidelines recommending wider routine (opt-out) HIV testing outside the genitourinary medicine (GUM) setting [1,10-12]. Universal HIV testing is considered to be cost-effective in areas with a local diagnosed HIV prevalence that exceeds 2 per 1000 (in adults aged 15-59yrs) [13] which in 2013 applied to 52/152 (34%) of Upper Tier Local Authorities across England [1]. In these high HIV prevalence areas a routine offer of an HIV test should be offered to all new General Practice registrations and all new hospital medical admissions. However, regardless of local prevalence data, a routine offer of a test should still be offered to patients in primary care when presenting with any HIV indicator condition, listed in British HIV Association (BHIVA) guidelines, and/or if patients are from high risk groups [12]. Because the UK HIV epidemic is concentrated among MSM and Black African communities the National Institute for Health and Care Excellence (NICE) has issued special guidance on increasing testing in these communities [10,11], which were recently updated in June 2014 (www.nice.org.uk/advice/lgb21) [14].

Patients presenting with clinical indicator conditions to their General Practitioner (GP) provide a valuable opportunity to diagnose HIV and avoid hospitalisations due to late diagnosis [15]. Research has shown that the majority of patients (up to 75%) newly diagnosed with HIV had been seen in the healthcare system 12 months prior to their diagnosis resulting in a missed opportunity to test [16-18]. Expanded opt-out HIV testing has been shown to be feasible, acceptable and cost effective in eight pilot studies conducted in community, primary and secondary care settings in high prevalent areas

across England [19]. However, recent evidence shows that HIV testing guidelines have not been fully implemented and therefore testing has been slow to increase in many settings [20-22].

Reasons for inadequate testing rates are multifactorial and include both structural and personal issues. Provision of medical resources and infrastructure, with good access are essential, but testing also depends on whether there are barriers to being offered or accepting an HIV test. This review examines attitudes towards HIV testing in the UK from the perspective of both the public and patients and healthcare practitioners (HCP), in order to more fully understand the main barriers and motivators towards HIV testing. We consider the attitudes of MSM and Black Africans to testing separately as most research studies have focused on a particular group and separate NICE guidelines have been written for these communities. We also review research on HCP knowledge and awareness of testing guidelines. Our review may aid policy makers and HCP in developing strategies to improve and increase HIV testing in the UK.

2. MATERIALS AND METHODS

2.1 Search Strategy

Our review included a broad literature search of published documents including peer reviewed publications, published reports and British HIV Association (BHIVA) conference proceedings. The following electronic databases were searched; OVID Medline, Google, Web of Science and Pubmed. The last search date was performed on 31st October 2014. We used a combination of focused computerised retrieval and hand searching. Hand searching involved manual page by page examination of recent BHIVA conference proceedings to identify eligible studies (this review only includes BHIVA conference abstracts from 2008 to 2014). Also reference lists of articles deemed relevant were hand searched for additional publications.

Basic searches were performed using a combination of the following words; 'HIV' 'HIV testing' 'HIV screening' 'GP' 'clinicians' 'Doctors' 'health professionals' 'primary care' 'secondary care' 'patients' 'public' 'attitudes' 'views' 'opinions' 'UK' and 'United Kingdom'. We also included an advanced search phrase used on OVID Medline only: ("HIV test*"OR "HIV counselling and test*" OR "HIV antibody test*" OR screen* OR Human immunodeficiency virus) AND (factors OR barriers OR facility *OR motivate OR pathways OR "Reasons for test*") AND (Britain OR England OR "United Kingdom" OR UK). This search phrase was adapted from that used by Kaai and colleagues [23].

2.2 Selected Studies

Papers included in the review had to meet the following inclusion criteria: studies conducted in the UK that had investigated attitudes to HIV testing from patients and the public and HCP, published in the combination ART era (1996-2014), (for abstracts in BHIVA conference proceedings, between 2008 and 2014 only). Documents had to be accessible through the University of Bristol institutional library service. We excluded studies relating to HIV testing or screening of pregnant women. For the purposes of this review a "barrier" was defined as a reason given by patients for not requesting or declining an HIV test, and in respect to doctors, as a reason why an HIV test was not offered.

3. RESULTS

In total 64 studies were identified and met the inclusion criteria; of which 41 studies were on the attitudes towards HIV testing of the public (Table 1) and 23 studies of HCP (Table 2). Tables 1 and 2 show the summaries of the studies included in the review. For each study, the reference, study location and population, method/study type and the main objectives and outcomes are shown. Some of the same studies appear in both Tables 1 and 2 as they had investigated both public and HCP attitudes within one study [34, 39, 51 and 53]. They have therefore been counted as separate studies in Tables 1 and 2 for the purposes of this review.

3.1 Characteristics of the Studies

Studies included in the review (including both public and HCP attitudes to testing) were peer reviewed papers (n= 40) [16,24-28,30,32,33,35, 38-41,43,45-50,52-57,59,61,62,65,69,71,72, 75, 79,80,84] abstracts from BHIVA conference proceedings (n=20) [29,31,36,37,42,51,58,60] and published reports (n=4) [34,44,85]. UK locations of included studies were as follows; Scotland (n=9) [34,40,45,47-49,59,68,80], Wales (n=2) [37,52], London (n=25) [16,33,36,38,39,41,42,43,46,53,55-58, 60, 66,69, 70,75-77,79,84], Brighton (n=5) [29,32,41,51,54], Blackpool (n=1) [31], Bristol (n=1) [85], Sheffield (n=3) [35,71,74], Manchester (n=1) [64], Nottingham (n=1) [65], Liverpool (n=2) [61,63],

Surrey (n=1) [78], Newcastle (n=1) [80], Sunderland (n=1) [67], Cornwall (n=1) [73], Plymouth (n=1) [72] and studies across the UK (n= 9) [24-28,30,44,50,62]. The majority of the studies were conducted in areas of high HIV prevalence (> 2/1000 adult population) such as London, Brighton and Glasgow. Studies used a variety of different data collection methods which included: questionnaires (n= 29) [31,33,35,38-41,47,48,51-53,55, 58, 59, 60,62,65,66,67,70,71, 73,74,75, 76,78] focus groups (n=5) [32,51,54 69,84] interviews (n=4) [29,30,50,56], surveys (n=13) [16,24-28, 44,64,68,72,77,80,85], questionnaires and surveys (n=1) [43], questionnaires and focus groups (n=1) [61], interviews and focus groups (n=3) [45,46,49], interviews and questionnaires (n=2) (study included in Table 1 (public attitudes) and also Table 2 (HCP attitudes) [34], survey and questionnaire (n=1) [43], survey and interviews (n=1) [63], audit and questionnaires (n=1) [79], and reviews of case notes/admission notes (n= 3) [36,37,42]. National surveys included the National Survey of Sexual Attitudes and Lifestyles (NATSAL 2000) (general population [24] and Black Africans [25]) and National community surveys of Black Africans (Base Line surveys 2007/8 [26], 2008/9 [27] and 2014 [28]).

For evidence on attitudes of the public towards HIV testing the review included the following population groups: newly registered patients in primary care (n=2) [51,56], GP population (n=1) [31], general population living in Britain (n=3) [24,52,60], patients who were offered an HIV test in 4 settings (Emergency Department, Acute care unit, Dermatology outpatients, and primary care) (n=1) [53], HIV positive women attending Genito-urinary Medicine (GUM) clinics (n=1) [50], individuals presenting to polyclinic in hospital (n=1) [55], young people (aged <24 years) attending an open clinic (n=1) [85], users of STI testing service (n=1) [54], patients within hospital medical admissions (n=1) [36], patients attending GUM clinics and open access clinics (n=5) [33,35,37,40,57], NHS staff in hospital (n=1) [39], MSM attending GUM clinics and sexual health clinics (n=1) [41], HIV positive and negative MSM (n=3) [29,46,48], Black Africans (tested and untested) (n=10) [25-28,34,42-44,58], HIV positive Black Africans (n=3) [16,30,38], gay men (tested and untested) (n=4) [45,47,49,59], groups of MSM, Black Africans, heterosexual men and women (tested and untested)(n=2) [32,61].

For evidence on attitudes of HCP towards HIV testing the review included the following study populations; GPs in primary care practices (n=7) [34,51,62-64,67,77] GPs and nurses in primary care practices (n=1) [66], GPs attending study day on STDs (n=1) [65], hospital doctors (n=8)(70-73,76,78-80), NHS staff working in hospital (n=2) [39,68], hospital consultant surgeons (n=1) [75], hospital Intensive Care Unit (ICU) staff (n=1) [74], staff working in four settings (Emergency Department, Acute care unit, Dermatology outpatients and primary care) (n=2) [53,69].

3.2 Attitudes of the Public and Patients towards HIV Testing

Studies investigating attitudes of the public and patients towards HIV testing are shown in Table 1 and are grouped by study setting: 1) primary care 2) secondary care 3) both primary and secondary care 4) community settings 5) national surveys. Firstly we review the barriers to testing by setting (primary/secondary care) and then by risk transmission group (Black Africans/MSM). Next we review the motivators or facilitators for testing again by setting and risk group.

3.2.1 Public and patient level related barriers in primary care

3.2.1.1 Low perception of risk/expectation of negative test

Among late presenting HIV-infected MSM a low perceived risk of acquiring HIV was identified as a reason for not testing earlier [29]. A survey of HIV-positive Black Africans found that participants felt there was high HIV awareness but this did not translate into a perception of individual risk [30]. A predominant factor that stopped earlier HIV testing of HIV-positive Black Africans was that they had not considered the possibility that they might be HIV-positive (69.9%) with 64.4% not expecting a positive result at time of testing [16]. Views from a GP population in a high prevalence area on patients' acceptance of routine HIV screening in primary care, found that when asked if they would have the test, 67% did not agree. The main reason given for refusing a test was that 75% perceived that they were "not at risk" [31]. Attitudes from the public attending focus groups discussing opt-out testing for HIV in primary care also found that the main barrier to testing was expectation of a negative test [32].

Table 1. Summary of UK studies of public and patient attitudes towards HIV testing included in the review (n = 41)

Reference & Location	Study population	Method/Study type	Main objective and outcomes of study
Studies of attitudes towards HIV testing in primary care			
Bryce et al. 2011 [51] Brighton & Hove, UK	Newly registered patients assessed in primary care (aged 16-59 years)	Questionnaires	**Objective:** to assess the acceptability**,** feasibility and cost-effectiveness of universal HIV testing with newly registering patients within primary care. **Outcome:** Across all 10 practices, 799 patients who were offered an HIV test completed a questionnaire. HIV testing was accepted by 596 (74.6%) patients of whom 369 (61.9%) were female. Accepting an offer of an HIV test was significantly associated with practice, age band, gender and timing of last HIV test. No significant association was found with sexual identity. Overall, 96.7% of patients agreed that the offer of HIV testing was a good idea, with 81.7% reporting that they had enough time to make the decision to test. Patients reported being happy to have an HIV test at their GP surgery (92.4%) and only 9% stated that they would prefer to have at a specialist sexual health clinic. Patients rated the experience of being offered a test as helpful and useful (92.1%).
Glew et al. 2014 [32] Brighton, UK	Distinct groups of MSM, Black Africans, heterosexual men and women either previously tested or untested	Focus Groups	**Objective:** to understand the public perspective on opt-out testing of HIV in primary care. **Outcome:** opt-out method of testing for HIV must be routinely offered to all who are eligible to increase uptake and to prevent communities feeling targeted. Any pressure to test is likely to be poorly received. Inaccurate concerns about medical records being shared with financial services are a disincentive to test.
Prost et al. 2009 [56] London , UK	Patients registering with primary care in London (aged 18-55 years)	Interviews	**Objective**: assess the acceptability & feasibility of offering rapid HIV tests to patients registering with primary care in London. **Outcome:** offering patients a rapid HIV test in primary care is feasible & could be effective way to increase testing rates in this setting. The main reason for accepting a test was because it was offered as "part of a check-up". As a combined group, Black African and Black Caribbean patients were more likely to test in the study compared with patients from other ethnic backgrounds.
Wasef et al. 2010 [31] Blackpool, UK	A GP practice population in a high prevalence area	Questionnaires	**Objective:** to explore patients' acceptance of routine HIV screening in a primary care setting in a high-prevalence area. Patients were asked about their views for offering the test at GP practices and within all areas of healthcare settings. **Outcome:** 389 completed questionnaires were analysed. 65% were completed by females and 33% by males, 2% undisclosed. Majority were Caucasian (96%), 82% were heterosexual, 4% gay, 2% bisexual, 12% did not comment.

			262 (67%) of respondents did not agree to have the test while 121(31%) agreed and 6 (2%) no comment. The reason being 75% perceived that they were “not at risk”, 1% “not a good idea”, 14% “other reasons” and 10% undisclosed. 88% of respondents thought it was a good idea to offer HIV test in GP practices and all other health care areas, respectively. 71 tests were carried out and all had negative results.
Studies of attitudes towards HIV testing in secondary care			
Anderson et al. 1996 [50] National, UK	Cohort of women with HIV in Britain from 15 GUM/HIV clinics (aged 20-74 years)	Interviews	**Objective:** to examine ethnic differences in the socio-epidemiological & clinical characteristics of cohort of women with HIV from Britain & Ireland. **Outcome:** perceived risk (33%) or investigation of symptoms (26%) were the most common reasons for testing-there are important differences between Black African & white women in sexual history and route of transmission disease stage at diagnosis & pattern of AIDS defining illness.
Ashby et al. 2012 [55] London, UK	Individuals presenting to a polyclinic in London Hospital	Questionnaires	**Objective:** to explore acceptability of HIV testing experience. **Outcome:** 76% of individuals accepted testing and of these 75% had never previously tested for HIV despite 85% being registered with GP. 38% of individuals testing had at least one risk factor and of these 63% had never previously tested for HIV, showed uptake of HIV testing in this setting to be high and acceptable to patients.
Brook Report 2014 [85] Bristol, UK	Young people registering to see a clinician (aged<24 years)	Survey	**Objective:** to pilot an HIV POC test for 4 months between November 2013 and March 2014 to assess client take up of the offer of opportunistic testing for HIV and a survey was given to all clients registering to see a clinician. **Outcome**: 687 surveys were completed from 1869 eligible individuals. 81% of respondents had never been offered a test.
Chan et al. 2010 [36] London, UK	Patients within medical admissions in a hospital setting	Data from adult medical admissions	**Objective:** to explore acceptance and feasibility of HIV testing in medical inpatients. **Outcome:** 84/101 patients agreed to be tested. 31 men, 69 women and 1 transgendered patient. 76/101 reported no prior HIV test, 43/101 had clinical indicators where HIV testing should be offered. 17/101 patients declined a test. Concerns included being too unwell with their current illness to deal with a HIV test, perception that they were low risk or a very recent negative HIV test. Most patients who had questions were more concerned with having an additional blood test rather than HIV itself. It took 5-20 min to consent each patient.
Erwin et al. 2002 [38] London, UK	HIV-positive Black Africans attending HIV clinic in London	Questionnaire survey	**Objective:** to examine factors associated with uptake of HIV clinic services by HIV positive Africans living in London. **Outcome:** Although Black Africans are a high risk group they generally do not suspect status. They may delay testing but

			their uptake of HIV clinic care & usual support services after diagnosis is similar to their white counterparts. However they lack informal support networks.
Forsyth et al. 2008 [57] London, UK	All new and rebooked patients attending GUM clinics	Cross-sectional survey/ Questionnaires	**Objective:** to describe reasons why high-risk patients (HRP) decline HIV testing and whether offering rapid POC testing along with standard testing would increase uptake of testing in two London GUM clinics. **Outcome:** 899 questionnaires were analysed of which 598 were HRP. Uptake of testing was 77.1% among HRP and 65.8% among the rest. A total of 51.1% of HRP who declined testing said they would be more likely to accept a POCT and 32.8 % a saliva test.
Hamill et al. 2006 [39] London, UK	NHS staff in London Hospital	Cross-sectional postal questionnaire	**Objective:** to understand the barriers to HIV testing among NHS staff and observe how these maybe overcome at a London hospital. **Outcome**: Commonest reasons to consider testing were knowledge of status, treatment benefit & to inform family members. Commonest reasons not to test were already tested negative, rather not know. Since NHS staff are recruited from high prevalence areas HIV testing should be encouraged. NHS staff require information on how to access testing as well as benefits of early detection.
Madge et al. 1999 [33] London, UK	People attending an open access clinic/ same day testing clinic (SDTC)	Questionnaires	**Objective:** to find out reasons for using an open access clinic rather than primary care for testing for HIV. **Outcome:** despite access to GPs HIV testing in primary care was rarely discussed. Main barriers for using primary care were due to issues on recording sensitive information on notes, future life insurance and confidentiality. Facilitators included having same-day result clinics and doctor recommended test.
Saing et al. 2011 [37] Swansea, UK	200 GUM clinic attendees in South Wales	Case note review	**Objective:** to find out the level of uptake of HIV testing among GU clinic attendees' in a South Wales clinic and compare the difference between doctors and nurses. **Outcome:** Study involved 105 male patients and 95 female patients. More patients seen by doctors agreed to have HIV testing (69%) than those seen by nurses (51%). Male patients accepted HIV testing more readily (68.57%) than females (50.52%). Patients over 35 years showed highest acceptance (65.9%) followed by 25-35 years group (65%) and the <25 year group (54.5%). Of 80 patients who refused testing, 27.5% declined to give a specific reason. The remainder gave the following reasons: window period (18.75%); recent HIV test (12.5%); perceived low risk (12.5%); regular blood donation (7.5%); other reasons (6.25%); no documentation (15%).
Salt et al. 2001 [40] Scotland, UK	Patients from 2 GUM clinics in Scotland	Questionnaires	**Objective:** to evaluate factors that predict HIV testing & analyse factors that encourage or inhibit seeking an HIV test. **Outcome:** Perceived risk was the strongest predictor of HIV testing, perception of risk and actual risk were not

			correlated. Those not seeking testing endorsed less benefits of testing and more denial of the need to be tested. Same day testing and testing without an appointment were endorsed as factors to promote testing. Conclusion: to encourage people who have high risk factors to access HIV testing need to highlight benefits, effective drug treatments, increase range of testing services & determine main predictors of perceived risk.
Whitlock et al. 2013 [41] London & Brighton, UK	MSM attending 2 UK sexual health clinics	Questionnaires	**Objective:** to determine the reasons for declining an HIV test among MSM. **Outcome:** 19 MSM were recruited. All were aware that treatment for HIV was available. 95% were aware that prosecutions had occurred as a result of alleged HIV transmission, however for 89% this did not cause them to decline a test. Most commonly cited reason (79%) for declining HIV test was being emotionally unprepared for a positive result. Stated benefits of HIV testing were peace of mind (84%) and timely access to HIV treatment (84%). For 89%, HIV testing was stressful; a further disincentive.
Wickramasinghe and Rogstad 2002 [35] Sheffield, UK	Patients attending a GUM clinic (14-60 yrs)	Questionnaires	**Objective:** to identify factors associated with uptake of HIV testing **Outcome:** barriers included perceiving a low risk of being HIV-positive. Facilitators included being tested previously, receiving a leaflet about testing and past history of STIs.
Studies of attitudes towards HIV testing in primary and secondary care			
Burns et al. 2007 [30] National, UK	HIV-positive Africans	Semi- structured interviews	**Objective:** to identify key issues affecting utilisation of HIV services for Africans living in Britain. **Outcome:** respondents felt there was high HIV awareness but this did not translate into perception of individual risk and attitudes to health services. Institutional barriers exist, such as lack of cultural understanding, lack of community clinics, failure to integrate care with support organisations and inability for GPs to address HIV effectively.
Burns et al. 2008 [16] London, UK	Newly diagnosed HIV-positive Africans attending HIV treatment centres across London	Survey consisting of self-completed questionnaire linked to clinician completed clinical records	**Objective:** identify opportunities for earlier HIV diagnosis within primary and secondary care settings in the UK in Africans with newly diagnosed HIV infection. **Outcome:** 89.6% trusted staff at their HIV clinics, 39.6% trusted staff at their GP surgery. Principle concerns were lack of confidentiality (54.1%), behaviour and attitudes of reception staff (53.2%) discrimination (33%) and lack of knowledge about HIV (30.3%). 36% of respondents had disclosed their HIV status to their GP. Predominant factor identified that stopped earlier HIV testing was they had not considered possibility that they maybe HIV-positive (69.9%), with 64.4 % not expecting a positive result at time of testing. 59.1% believed they would have tested earlier if someone had told them they were at risk of HIV. Advice from a doctor was main reason for having HIV test (40.2%).

Drayton et al. 2010 [52] Cardiff, UK	General population	Questionnaires	**Objective:** to investigate the acceptability of implementing BHIVA guidelines (routinely offering an HIV test to patients in certain clinical settings) in a population with a low HIV prevalence in primary and secondary care. **Outcome:** Of the 616 respondents, 579 (94%) stated they would be willing to be tested if presenting with a condition known to be associated with HIV. 440/616 (71%) stated they would be willing to be tested as part of their routine care, while 445/616 (72%) stated they would be willing to have the result in their main medical notes. Although the patients' responses were largely receptive to increased testing we encountered notable negative attitudes to the project from professional and administrative staff. Resistance to increased HIV testing may be related to health-care workers rather than patients.
Kober et al. 2010 [29] Brighton, UK	Late presenting HIV-infected MSM	Semi-structured Interviews	**Objective:** to identify ideas and themes as to why late presenting HIV infected MSM do not test earlier**. Outcome:** following themes were generated – fear of HIV (fear of unknown and dying) and a positive diagnosis, low perceived risk for acquiring HIV, stigma of having the test and diagnosis, subthemes- feeling healthy and not considering a test necessary and lack of understanding/knowledge about current prognosis of HIV which did not always correlate with assessment of their own risk. Some MSM had discussed HIV with their GP and many felt, if made, an offer of testing would have been taken up at this opportunity and this was more acceptable than testing in GUM. Key issues: reducing stigma of testing, educating MSM of their own risk assessment and a more pro-active approach by all healthcare professionals, especially in primary care where MSM appear to want to be tested and offering 'routine' testing would decrease late diagnosis.
Pollard et al. 2013 [54] Brighton, UK	Users of sexually transmitted infection testing service	Focus Groups	**Objective:** People's perspectives & attitudes towards being offered opt-out HIV testing in area of high prevalence**. Outcome:** broad support for opt-out testing based on public & individual health benefits. Opt-out testing when registered with GP or administered in hospital was acceptable. Attitudes regarding testing influenced by levels of perceived risk.
Rayment et al. 2012 [53] London, UK	Patients (aged 16-65 years) in four settings: Emergency Department, Acute Care Unit, Dermatology Outpatients and Primary Care in London	Questionnaires	**Objective:** to assess the feasibility and acceptability to patients of routinely offering HIV tests in 4 settings: **Outcome:** Questionnaires were returned from 1003 patients. The offer of an HIV test was acceptable to 92% of respondents, individuals who had never tested for HIV before were more likely to accept a test, but no association was found between test uptake and sexual orientation. Conclusions: HIV testing in these settings is acceptable, and operationally feasible. The strategy successfully identified, and transferred to care, HIV-positive individuals. However, if HIV testing is to be included as a routine part of

			patients' care, additional staff training and infrastructural resources will be required.
Studies of attitudes towards HIV testing in community settings			
Brady et al. 2011 [58] London, UK	Black African Communities in areas of South and East London	Questionnaires	**Objective:** to assess the feasibility and acceptability of assertive outreach and community testing to reduce the late diagnosis of HIV (using 4th generation HIV POCT). **Outcomes:** 3789 people were approached and 459 (12.1%) tested. 272/3028 who declined a test completed a questionnaire (9%). The mean age of those testing was 33. 57.3% were men and 89.4% were heterosexual. 77% were Black African or Afro-Caribbean. 44.4% had never tested before. 96.3% thought the service was appropriate, 91.5% said they would use the service again and 97.9% would recommend it to a friend. Of those declining an HIV test 50.4% said it was because they had recently tested and only 5.3% said it was because they didn't want testing in this setting. 83.6% had tested in the last year. 90.7% felt the setting was appropriate and 95.9% said they were likely to recommend to a friend.
Cree 2008 [34] Scotland, UK	African community in Glasgow	Interviews & questionnaire survey	**Objective:** to evaluate the planning and delivery of Waverley Care's Campaign to increase HIV awareness and the benefits of early testing to the African community in Scotland, to find out what African people felt about the campaign and their views about HIV testing. **Outcome:** those interviewed demonstrated high levels of knowledge and understanding about HIV and importance of testing. Over half of those surveyed preferred to use specialist services for testing. GPs were the favoured option for testing by all but one of the people who were interviewed and felt that GPs should take a more active role in inviting people to be tested. Most of those that responded to the survey said nothing would stop them going for an HIV test (57%) , others felt that fear of finding out that they were HIV positive(23%) and the stigma associated with HIV (20%) would put them off being tested.
Fenton et al. 2002 [43] London UK	Migrants from 5 sub-Saharan African communities resident in London	Survey & Questionnaire	**Objective:** to describe the demographics and behavioural factors associated with HIV testing among migrant sub-Saharan Africans living in London **Outcome:** Valid questionnaires were obtained from 748 participants (396 men and 352 women). Median length of UK residence was 6 years. 34% of men and 30% of women reported ever having an HIV test. HIV testing was significantly associated with age and previous STI diagnosis of an STI and perceived risk of acquiring HIV for men remained independently associated. Data suggests that HIV testing remains largely associated with an individual's STI history or self-perceived risk. Antenatal testing combined with proactive targeted HIV testing promotion should be prioritised.

Flowers et al. 2001 [45] Scotland, UK	Scottish MSM	Interviews & focus groups	**Objective:** Scottish MSM understanding of HIV testing. In context with availability of new treatments for HIV. **Outcome:** there is rise in HIV optimism, risk complacency, HIV fatigue & ongoing need to attend to psychological and social issues.
Flowers et al. 2003 [47] Scotland. UK	Scottish MSM in gay bars	Questionnaires	**Objective:** to explore the psychosocial barriers to HIV testing for MSM. **Outcome:** most important factor associated with never having tested was fear of a positive result particularly for men reporting higher levels of risky sexual conduct. Stigma and social exclusion of HIV + people need to be addressed before MSM seek HIV testing.
Flowers et al. 2003 [49] Scotland, UK	Scottish MSM	Interviews & focus groups	**Objective:** to explore the psychosocial cost & benefit associated learning ones HIV status in MSM to find psychosocial factors associated with decision to have HIV test. **Outcome:** decision to test or not involved many complex medical, psychological & social factors, testing policies must understand & appreciate these complexities.
Knussen et al. 2004 [59] Scotland, UK	Visitors of gay bars in Glasgow and Edinburgh	Cross sectional questionnaire survey	**Objective:** to determine the contributions of a range of psychosocial, demographic and behavioural variables to MSM's intentions to take an HIV test. **Outcome:** Those with a stronger intention to test had previously tested and they were younger, with two or more unprotected anal sex partners in the previous year, perceiving their HIV status to be unknown, with less fear of a positive test result and perceiving more benefits to testing. With regard intention to test there exists various sub groups within the gay population.
Knussen et al. 2014 [48] Scotland, UK	MSM residing in Scotland	Questionnaires in bars and clubs	**Objective:** to consider the factors that were associated with recency of HIV testing among MSM residing in Scotland. **Outcome:** there is a need for promotion of HIV testing in Scotland among those under 25 and over 45, those with high fear of testing and those whose sexual behaviour puts them at risk. Interventions to increase HIV testing should promote positive norms and challenge the fear of a positive result.
Macpherson et al. 2011 [61] Liverpool, UK	Marginalised communities (IDUs, MSM, UK Africans)	Questionnaires & focus groups	**Objective:** to increase testing uptake in primary care and marginalised communities through a community and GUM-based point of care testing (POCT) programme. **Outcome:** 127/154 participated in the client satisfaction questionnaire. Of these 78% were male and 75% white British. 52% had never tested before and 25% said they would not have had an HIV test if rapid testing were not available. 84% preferred POCT and 92% would recommend it to others. Rapid POC HIV testing is feasible and acceptable to both service users and providers in community and GUM clinical settings.
Mayisha II Collaborative	Black African communities in England	Community based surveys	**Objective:** to evaluate the feasibility and acceptability of providing un-linked

Group, HPA Centre for Infections, 2005 [44] London, UK			anonymous oral fluid samples for HIV testing as part of the community based survey. **Outcome:** around half of female respondents and 43% of men reported ever having had a confidential HIV test, the majority in last 5 years. Respondents cited the importance of community out-reach work and HIV awareness-raising as key factors in motivating them to take a voluntary HIV test. Fear of stigmatisation and/or deportation and expectations of HIV as a 'death sentence' continued to deter people from testing.
Millett and Creighton 2010 [42] London, UK	2 community health check clinics (church hall and community centre) tailored toward local Black African community	Data gathered from health check clinic	**Objective:** to enhance uptake of HIV testing using rapid HIV testing (POC) within routine NHS Health check clinics carried out in 2 community settings. Health checks were promoted by community leaders, media coverage and peer mediated outreach, tailored toward the local Black African community. **Outcome:** In first 3 months 112 people accessed the service (40 female, 72 male), 62/112 (55%) were Black African, 37/112 (33%) Black other and 12/112 (11%) White. 84/112 (75%) consented to HIV testing. 60% of testers and 43% of non-testers were Black African. Reasons for declining an HIV test included: already diagnosed HIV-positive (3/28), recent negative HIV test (5/28), no prior sexual history (3/28) and not wanting to know (17/28). Of 84 people accepting HIV testing, 50% had never had a previous test HIV test. 2/84 (2%) tests were reactive.
Prost et al. 2007 [46] London, UK	MSM in gay social venues	Interviews & Focus Groups	**Objective:** explored feasibility and acceptability of offering rapid HIV testing to MSM in gay social venues. **Outcome:** strong concerns about confidentiality and privacy, and many felt that HIV testing was "too serious" an event to be undertaken in social venues. Concerns about issues relating to post-test support and behaviour, and clinical standards. There are currently substantial barriers to offering rapid HIV tests to MSM in social venues. Further work to enhance acceptability must consider ways of increasing the confidentiality and professionalism of testing services, designing appropriate pre-discussion and post-discussion protocols, evaluating different models of service delivery and considering their cost effectiveness in relation to existing services.
Prost et al. 2007 [84] London, UK	African community in London	Focus groups & workshop	**Objective:** explored feasibility and acceptability of translating a successful voluntary counselling and testing (VCT) service model from Kenya to African community in London. **Outcome:** offering community VCT with rapid tests appears feasible & acceptable to African Community in London as long as confidentiality is ensured and support for newly diagnosed.
Studies of attitudes towards testing from National surveys			
Bourne et al. 2014 [28]	Black Africans living in England	Health & sex survey	**Objective:** 2 of the 4 main objectives were to understand barriers and

England, UK			motivators for HIV testing and assess awareness and understanding of HIV testing options. **Outcome:** Out of 1008 respondents 35% had never received an HIV test result. Reasons given for HIV testing (or not) (n=584) among those whose test result was negative included : lack of trust of current or recent partners, purposes of an insurance application or beginning a new employment, new relationship and wanting peace of mind, and a test was offered to them. Other reasons for testing among those who diagnosed HIV-positive included: having a partner who was ill or had died; as part of an insurance application or encouragement from family members. Of those who had tested for HIV 26.5% did so because they like to test regularly. Only 8.4% had tested because doctor had recommended or partner wanted them, to test (5.3%). Reasons giving for not testing (n= 353) nearly two thirds (63.1%) said they had no reason to think they had HIV, small number of respondents said they did not know where to get tested (7.8%) or because they were too afraid they might have HIV(6.6%).
Burns et al. 2005 [25] National, UK	Black Africans (16-44) living in Britain (heterosexuals)	British national survey of sexual attitudes and lifestyles (NATSAL 2000)	**Objective:** to describe factors associated with HIV testing among heterosexual Black Africans living in Britain. **Outcome:** structural level factors were important correlates of testing for both women & men. Results indicate gender-based similarities & differences in correlates of testing. Access to healthcare may deter or facilitate opportunities for HIV testing.
Dodds et al. 2008 [26] England, UK	Black Africans living in England	Base Line 2007/8 Survey (National)	**Objective:** to assess the sexual HIV prevention needs of African people living in England. **Outcome:** Just under half of respondents had never received an HIV test result. 15.5% of respondents were diagnosed with HIV infection, half of whom had been diagnosed within previous 5 years. More than a quarter of those who wanted to have an HIV test said they would not know where to test (represents more than one-in-ten of all respondents). When those who had never tested were asked why not, their most common response was “I’ve no reason to think I have HIV”(69.5%), the only other reason given by more than one-in-ten people was being “too afraid I might have HIV” (12%).
Hickson et al. 2009 [27] England, UK	Black Africans living in England	Base Line 2008/9 survey (National)	**Objective:** to explore experiences and barriers to HIV testing. **Outcome:** 39.5% of 2542 people who completed the survey had never tested for HIV. Three quarters believed themselves to be HIV negative with two thirds (61%) who felt they were definitely negative. Most common reason given for not testing was “I’ve no reason to think I have HIV” (53%). It was more common for homosexually active men and women to say they did not trust the places they knew they could test compared to heterosexuals, suggesting that perceived racism or homo-phobia maybe barriers to testing for those in this group. Fear of a positive result was highest amongst homosexually active African men. 38%

			did not know that Africans are not deported from the UK solely because they have HIV.
McGarrigle et al. 2005 [24] National , UK	Sample survey of 16-44 year olds living in Britain	NATSAL 2000 survey data (computer assisted face to face interviews & self-interviews	**Objective:** to estimate prevalence of and identify factors associated with HIV testing in Britain. **Outcome:** A total of 32.4% of men and 31.7% of women reported ever having had an HIV test, the majority of whom were tested through blood donation. When screening for blood donation and pregnancy were excluded, 9.0% of men and 4.6% of women had had a voluntary confidential HIV test (VCT) in the past 5 years. However, one third of injection drug users and MSM had a VCT in the past 5 years. VCT in the past 5 years was significantly associated with age, residence, ethnicity, self-perceived HIV risk, reporting greater numbers of sexual partners, new sexual partners from abroad, previous sexually transmitted infection diagnosis, and injecting non-prescribed drugs for men and women, and same-sex partners (men only). Whereas sexually transmitted disease clinics were important sites for VCT, general practice accounted for almost a quarter of VCT.
Power and Slade 2011 [60] London, UK	Survey advertised via newsletters, Facebook, twitter and other on- line media by the Terence Higgins Trust	Survey/Questionnaires	**Objective:** to find out the acceptability and usefulness or otherwise of home testing for HIV. **Outcome:** In all 654 people responded of whom 337 (52%) were gay men and 167 (26%) were HIV-positive. 64% of HIV-positive respondents believed home testing should be legalised and regulated, compared to 77% of those whose last test was negative. 62% of negative respondents said they would consider using home testing kits if they were legally available and 51% of negative respondents said they thought they would test more often for HIV if home kits were legally available. 35% of people diagnosed with HIV thought they would have been diagnosed earlier if home testing had been available and this rose to 44% of those diagnosed with CD4 <350. Of the 47% of MSM who last tested negative or had had never tested, 3% had used an illegal home testing kit, 65% would consider using home testing if it were legally available and 60% thought they would test more often.

Table 2. Summary of UK studies of the attitudes of healthcare practitioners (HCP) towards HIV testing included in the review (n= 23)

Reference & Location	Study population	Method/Study type	Main objective and outcome of study
Studies of attitudes towards HIV testing in primary care			
Bryce et al. 2011 [51] Brighton & Hove, UK	Clinicians (n=10) from primary care practices in Brighton & Hove	Focus Group	**Objective:** to assess clinicians' views of the feasibility of universal HIV testing with newly registering patients (aged 16-59). **Outcome:** Clinicians' views of the feasibility of universal testing were positive overall. In a small focus group (n=10) all agreed that the universal testing policy had been adopted well despite some early anxieties about offering an HIV test and managing reactive results. A challenge remains in supporting clinicians to be confident in offering HIV testing to patients, particularly if this may potentially involve delivering "bad news".
Chauhan and Bushby 2010 [67] Sunderland, UK	GPs working in the North East of England (low prevalence area)	Questionnaires	**Objective:** to ascertain the degree of awareness of UK National Guidelines for HIV testing and knowledge of HIV infection among GPs practicing in an area of low prevalence. **Outcome:** 52 out of 228 (25%) questionnaires were returned. 7 (13%) said they had read guidelines whilst 26 (50%) responded that they heard about it but not read it. Questions regarding current HIV testing practice- 42 (81%) responded that they had considered HIV in the differential diagnosis of their patients within the past year. However of these only 24 (46%) had actually performed an HIV antibody test. The main barriers to testing included lack of training and knowledge (48%) and concerns regarding pre-test counselling (44%). Surprisingly only 19% responded that there would be insufficient time in practice to discuss HIV testing. Questions regarding 17 clinical indicator (CI) diseases for adult HIV infection showed that over 80% or more would test for HIV if diagnosis was pyrexia of unknown origin, weight loss of unknown cause and glandular fever type illness. However other CI diseases such as lymphoma, thrombocytopenia, gastrointestinal infections and various dermatological conditions, less than 30% would test. A question regarding routine testing if background prevalence of HIV in the area was >2/1000, only 27% responded that they would routinely test for HIV.
Cree 2008 [34] Scotland, UK	GPs in Glasgow	Interviews & questionnaire survey	**Objective:** to evaluate the planning and delivery of Waverley Care Campaign to increase HIV awareness and the benefits of early testing to the African community in Scotland, to find out what GPs felt about the campaign and the issues with which it was concerned. **Outcome:** GPs would like to have access to skills training which focuses on asking difficult questions; working through interpreters; helping people who may be frightened and stigmatised. GPs would like more knowledge and information about HIV; about HIV and African people and about cultural differences.
Dhairyawan et al. 2010 [66] East London, UK	GPs and nurses from an East London Primary Care Trust	Questionnaires	**Objective:** to determine whether an educational intervention (2 day basic clinical HIV course) could increase rates of HIV testing and improve self-assessed confidence in HIV clinical diagnosis in primary care providers in East London. **Outcome:** 26 GPs and 4 practice nurses

			attended the course. 27/30 (90%) pre-course questionnaires were returned. 21 from GPs and 2 from nurses representing 8 PCTs. Pre course, barriers to HIV testing were: lack of knowledge of clinical signs of HIV and failing to recognise the patient as “high risk”. 21/30 (70%) post course questionnaires were returned. Lack of knowledge of both HIV risk assessment and benefit to the patient of knowing their HIV status were no longer a barrier to testing. Participants’ confidence was most improved in HIV epidemiology; conducting a “pre-test discussion”; recognising clinical indicators of HIV: advising on post exposure prophylaxis; third party disclosure; goals of antiretroviral therapy and managing drug interactions.
Hindocha et al. 2013 [62] UK	80 GPs in the UK in areas of high and low HIV prevalence	Questionnaires	**Objective:** to explore the awareness of and opinions towards HIV guidelines within general practice. **Outcome:** 80 out of 191 GPs replied, 44% were aware of guidelines and 89% felt comfortable discussing and carrying out an HIV test themselves. Respondents felt main barrier to HIV testing was patient acceptability, 70% believed it would be feasible to follow guidelines in practice. Those who disagreed felt that time implications were most important reason not to adopt guidelines.
Hughes et al. 2009 [77] London, UK	Healthcare providers in GP practices within 3 London Primary Care Trusts	Survey	**Objective:** to survey GPs to assess the impact of a letter from the Chief Medical Officer/Nursing Officer (CMO)/(CNO) to attempt to improve the detection of HIV in non HIV specialties, to evaluate knowledge of HIV risk factors, indicators diseases and attitudes to HIV testing. **Outcome:** Overall 37/124 (30%) of practices responded. Regarding HIV risk factors: 32/37 (86%) reported drug misuse/IDU, 30/37 (81%) MSM, 23/37 (62%), endemic areas, 8/37 (22%) unprotected sex, 7/37 (19%) partners with risk factors and 6/37 (16%) paid sex. 26/37 (70%) listed at least one HIV or AIDS indicator disease (range 1-10, median 4) and 29/37 (78%) had no concerns with testing or referral pathways. 17/37 (46%) suggested various improvements regarding local clinics. 15/37 (41%) are interested in further training and 3/37 (8%) have already attended a HIV course.
Keating 2014 [64] Manchester, UK	GPs in an urban GP practice in Central Manchester	Survey	**Objective:** to find out practitioner attitudes towards increasing HIV testing and investigate the practicalities of the tests. **Outcome:** The survey revealed gaps and anxieties around how to counsel and follow up patients and how to maintain confidentiality. Results suggest that an education campaign is required to target both staff and patients, one that encourages closer links between GPs and GUM services.
Kellock and Rogstad 1998 [65] Nottingham, UK	GPs attending a local study day on STDs	Questionnaire	**Objective:** to find out the likelihood of GPs raising the subject of HIV testing and if they had any anxiety in doing so for different patient groups. **Outcome:** A high level of anxiety was found when raising this topic in certain patient groups and a proportion of GPs would never discuss HIV testing, even in high risk groups. No respondents were aware that vertical transmission could be reduced by antiretroviral drug therapy.
Milligan and Obasi 2014 [63] Liverpool, UK	Random sample of 137 GPs in Liverpool	Postal survey and semi-structured interviews	**Objective:** to explore current practice and perceptions of routine HIV testing of GPs in Liverpool. Outcome: 44 GPs completed the survey (32%). 86% of respondents were happy to

			do an HIV test as part of their practice. 55% had done at least one HIV test in the past year. 43% described themselves as 'not at all knowledgeable' about HIV and 27% did not think they were prepared enough to offer HIV counselling and testing. 50% of GPs had not heard of the 2008 National HIV testing guidelines. Only 14% of GPs thought that HIV testing should routinely be offered to everyone aged 18-44 years. Barriers to routine testing were identified as: lack of training and knowledge; too busy with insufficient time; concerns about time and skills for pre-test counselling & concerns regarding patient acceptance of wide-spread testing. Interview respondents felt that they should be offering testing more often, but worried about offending patients. Patients rarely requested tests themselves. Suggestions for overcoming barriers to routine testing included GP education, offering financial incentives and national public health campaign.
Studies of attitudes towards HIV testing in secondary care			
Alston et al. 2013 [78] Surrey, UK	50 doctors working in acute medicine at a district general hospital in Surrey	Questionnaires	**Objective**: to assess compliance with 2008 National Guidelines on HIV testing & establish attitudes towards & knowledge of HIV amongst doctors within the acute medical admissions team. **Outcome**: on average doctors could name 3.48 clinical indicator conditions out of 38, 50% reported sufficient knowledge of HIV, 68% were confident asking about risk factors & 74% were confident consenting for HIV testing. However 88% felt that they needed further training in HIV medicine.
Bulteel and Wilks 2013 [68] Scotland, UK	169 healthcare professionals working at NHS Lothian hospitals	Online survey during National HIV testing week	**Objective**: to explore the attitudes of staff working in NHS Lothian hospitals towards universal HIV testing. **Outcome:** when restricted to clinicians, perceived barriers to HIV testing included time constraints (23%), privacy (19%) and concern that patient would have questions that the staff were unable to answer (23%). A third of clinicians felt they would require further training before routinely offering HIV tests to patients.
Danziger et al. 1996 [75] London, UK	115 consultant surgeons working in 12 different London Hospitals	Questionnaires	**Objective:** to investigate attitudes and practices regarding pre-operative HIV testing among a small sample of surgeons. **Outcome**: majority favoured some form of compulsory or routine pre-operative HIV testing, only a small proportion reported having tested patients without obtaining their consent.
Dodd and Pryce 2010 [74] Sheffield, UK	42 Intensive Care Unit (ICU) staff attending a regional critical care meeting	Questionnaires	**Objective:** to examine current HIV testing policy and practice, attitudes to testing, referral pathways and educational provision within a critical care network. **Outcome:** 23/42 questionnaires were completed. All 6 ICUs in the region were represented. 14 Consultants, 4 middle grade doctors and 6 senior nurses responded. 55% felt comfortable testing patients who lack the capacity to consent. 65% disagreed with testing "high risk behaviour" patients and 83% disagreed with testing all acute ICU admissions. 74% stated a patient's perceived reaction to being tested would not influence their decision to test, but 78% felt global testing of patients without "behavioural risk factors" was likely to cause upset.
Gupta and Lechelt 2011 [79]	Physicians at Basildon	Audit/Questionnaire	**Objective:** to audit the implementation & knowledge of BHIVA UK National Guidelines for HIV

Basildon, UK	&Thurrock University Hospital		testing (2008) in key conditions at Basildon &Thurrock University Hospital, physicians involved were questioned as to their knowledge of HIV testing guidelines. **Outcome:** of the 348 patients assessed only 13.8% with any of the key conditions had received an HIV test. Only one non HIV physician was aware of guidelines. Knowledge of 2008 guidelines is scanty among non-HIV trained physicians. Health care professionals should work hard to disseminate information to reduce prejudice that decreases testing of at risk individuals.
Hamill et al. 2006 [39] London, UK	NHS Staff in London Hospital	Cross sectional postal Questionnaire	**Objective:** to understand the barriers to HIV testing among NHS staff and observe how these maybe overcome at a London Hospital. **Outcome:** commonest reasons to consider testing were knowledge of status, treatment benefit and to inform family members. Commonest reasons not to test were already tested negative, rather not know. Since NHS staff are recruited from high prevalent areas HIV testing should be encouraged. NHS staff require information on how to access testing as well as benefits of early detection.
Herbert et al. 2011 [76] London, UK	Randomly selected doctors (all medical specialities and grades) working in a large district hospital in London	Questionnaire	**Objective:** to identify any barriers to HIV testing and any training needs, prior to roll out of HIV testing for acute admissions, to establish doctors' confidence in discussing and carrying out the test. **Outcome:** 40 questionnaires were completed by doctors from all medical specialties and grades. Consultants 27.5% (11/40) were the majority of respondents. Overall, 22.5% (9/40) felt confident and experienced to offer HIV testing, 45% (18/40) felt confident but had limited experience, 32.5% (13/40) felt unconfident but were prepared to offer testing. No respondents felt inexperienced and unconfident. Senior doctors were more experienced than juniors, but many reported lack of experience. When asked about their experience of pre-test discussion (PTD), the majority of doctors 60% (24/40) had rarely carried out pre-test discussion, 30% (12/40) sometimes, 2.5% (1/40) often and 5% (2/20) had no experience. 55% (22/40) had received some training in HIV PTD, training being carried out at medical school in the majority of cases 25% (10/40). 17.5% (7/40) respondents thought HIV testing could only be carried out by infectious disease/HIV physicians or nurses and only 15% (6/40) thought that any doctor could do a test. 50% (20/40) respondents were unaware of indicator conditions for HIV testing; of those 20% (5/20) were consultants, 40% (8/20) FY1, 15% (3/20) FY2, 15% (3/20) ST2, 5% (1/20) ST3. 90% (36/40) expressed an interest in further training prior to implementation of HIV testing in acute settings.
Hunter et al. 2012 [80] Edinburgh & Newcastle, UK	Non-HIV specialist physicians in 2 low prevalence areas (Edinburgh & Newcastle)	Online Survey	**Objective:** to survey knowledge, attitudes & practice of non-HIV specialist physicians regarding HIV testing in two low prevalence areas. **Outcome:** study found a low awareness of current guidance on HIV testing and a high level of perceived barriers to testing (low HIV prevalence was one of the main barriers to routine testing).
Partridge et al. 2009 [71] Sheffield, UK	Registrars of all admitting specialties' within the Sheffield NHS teaching hospitals	Questionnaire	**Objective:** to examine the HIV testing practices and barriers in a British hospital. **Outcome:** barriers included doctor's perception that HIV test distresses patients, poor doctor-patient relationship, lack of a suitable location for counselling and anxiety on the part of doctor regarding how to manage a positive result.

Rayment et al. 2012 [53] UK	Staff working in 4 settings (Emergency department, acute care unit, dermatology outpatients and primary care) in high HIV prevalence areas	Questionnaire	**Objective:** to assess the feasibility and acceptability to patients and staff of routinely offering HIV tests in 4 settings. **Outcome:** 96% of staff supported the expansion of HIV testing but only 54% stated that they would feel comfortable delivering testing themselves, 72% identified a need for training.
Rachman & Ehmann 2013 [73] Cornwall, UK	50 medical doctors working at the Royal Cornwall Hospital	Questionnaire	**Objective:** to assess HIV testing in an acute medical unit, a survey of practice and doctors' awareness of HIV testing guidelines in an area of low HIV prevalence. **Outcome:** only 33% were aware of BHIVA guidelines. Indications for HIV testing were correctly identified 52% of the time but poor recognition of pneumonia (28%) and dementia (22%). 34% listed stigma as a barrier to testing and 32% listed insufficient knowledge of testing.
Rycroft et al. 2012 [70] London, UK	68 clinicians working in acute medical setting in a London general hospital (high prevalence area)	Questionnaire	**Objective:** to assess knowledge and explore current practice and determine the potential barriers to offering HIV testing among clinicians. **Outcome:** 41% felt that all medical admissions should be offered testing for HIV, however in practice no one implemented this. 24% of respondents never or rarely offer an HIV test when patient perceived to be from high risk group. 37% felt that the process of obtaining consent for HIV testing was fundamentally different to that for other tests. 59% believed that counselling was required prior to HIV testing. Reasons for not routinely offering HIV testing included perception that testing was inappropriate (79%), lack of clarity regarding who to test (18%), lack of confidence in ability to manage a positive result (13%). 46% were unaware of local arrangements for requesting an HIV test.
Thornton et al. 2012 [69] London, UK	Staff working in 4 settings (Emergency department, acute care unit, dermatology outpatients and primary care) in high HIV prevalence areas	Focus groups	**Objective:** To explore staff attitudes towards and experiences of the implementation of routine HIV testing in four healthcare settings in areas of high diagnosed HIV prevalence. **Outcome:** Four major themes were identified: the stigma of HIV and exceptionalisation of HIV testing as a condition; the use of routine testing compared with a targeted strategy as a means of improving the acceptability of testing; the need for an additional skill set to conduct HIV testing; and the existence within these particular settings of operational barriers to the implementation of HIV testing. Specifically, the time taken to conduct testing and management of results were seen by staff as barriers. There was a clear change in staff perception before and after implementation of testing as staff became aware of the high level of patient acceptability.
Warwick 2010 [72] Plymouth, UK	Consultants in Plymouth Teaching Hospital	Survey	**Objective:** To survey consultants in Plymouth Teaching Hospital to identify barriers to HIV testing in secondary care. To compare testing practices with those recommended by the UK HIV testing guidelines and to find out barriers to testing. **Outcome**: Stigma was a significant barrier to consultants when offering tests.

3.2.1.2 Fear of HIV and having a positive test

The fear of HIV and having a positive test were also common patient related barriers. Among late presenting HIV-positive MSM the fear of HIV (fear of unknown and dying) and having a positive diagnosis were the main reasons given for not testing earlier [29]. The fear of a positive result was also raised in focus groups carried out in Brighton especially among higher prevalence groups [32].

3.2.1.3 Stigma and discrimination

Among late presenting HIV-positive MSM, the stigma associated with having the test and a positive diagnosis was an important reason cited for not testing earlier [29]. These views were echoed by HIV-positive Africans among whom the perception of potential discrimination was an important concern [16].

3.2.1.4 Disclosure and confidentiality

Concerns regarding disclosure and keeping HIV testing information confidential were also commonly cited barriers to seeking an HIV test. Main barriers for HIV testing in primary care were due to issues around recording sensitive information on notes, confidentiality, and future life insurance [33]. These were also concerns raised by focus groups considering opt-out testing in primary care due to documenting HIV testing within medical records and its possible impact on future financial applications [32]. Lack of confidentiality was reported as the principle concern about having an HIV test by newly diagnosed HIV-positive Africans [16].

3.2.1.5 GPs not offering testing

Late presenting HIV-infected MSM reported that if they had been offered testing they would have taken up the opportunity and they believed testing in GP setting was more acceptable than testing in GUM [29]. A survey of HIV-positive Black Africans found that 59% believed they would have tested earlier if someone had told them they were at risk of HIV [16]. A survey in Glasgow found that members of African communities expressed the opinion that GPs should take a more active role in inviting people to be tested [34].

3.2.1.6 Lack of knowledge/understanding of HIV

One of the principle concerns identified by HIV-positive Black Africans as a barrier to testing was a lack of knowledge about HIV (30%) [16]. In late presenting HIV-infected MSM lack of understanding or knowledge about current prognosis of HIV was also a significant barrier to testing [29].

3.2.1.7 Perceptions of attitudes of staff

One of the principle concerns towards HIV testing perceived by HIV-positive Black Africans was behaviour and attitudes of reception staff (53%) [16]. A perceived pressure to test from HCPs was also cited as a barrier to testing [32].

3.2.2 Patient level barriers in secondary care (Hospital, GUM, and HIV clinics)

3.2.2.1 Low perception of risk

Attitudes towards HIV testing from patients attending a GUM clinic found that the main barrier to testing was the perception of low risk of being HIV-positive [35]. In hospital medical admissions, 17/101 patients declined a test, one of the main concerns given was the perception that they were low risk, or had recently tested negative for HIV [36]. In a study of GUM clinic attendees investigating acceptance of HIV testing 80/200 refused testing, of whom 12.5% gave perceived low risk as their reason for refusal [37]. A questionnaire completed by HIV-positive Black Africans attending an HIV clinic in London found that they generally did not suspect their status [38]. NHS staff working in a London Hospital reported that the commonest reason for not testing themselves was that they had already tested negative [39].

3.2.2.2 Denial/ rather not know

A questionnaire of patients from two GUM clinics in Scotland found that one of the main reasons that inhibited seeking a test was denial of the need to be tested [40]. A common reason given by hospital staff in London not to test was that they would rather not know [39] and MSM attending two sexual health clinics cited that they were “emotionally unprepared for a positive result” (79%) as a reason to decline testing [41].

3.2.2.3 Current illness

Other HIV testing barriers outlined in secondary care were being too unwell with a current illness and also the concern about having an additional blood test [36].

3.2.3 Barriers to testing reported by Black Africans

Studies within the Black African community have shown that there is a general awareness of HIV but individuals do not have a perception of being at risk. Many Black Africans do not suspect their status, believing they have no reason to think they have HIV, or because they have had a recent negative test [38,30,16,26,27,42,28]. The most frequently mentioned institutional barriers to HIV testing reported by Black Africans included lack of cultural understanding, lack of community clinics, failure to integrate care with support organisations, and an inability of GPs to address HIV effectively [30]. Lack of informal support networks for Black Africans was reported as an important impediment to getting tested [38]. Data from NATSAL 2000 showed that Black African women who perceived themselves "at not very much risk" were more likely to have tested for HIV compared to those women who thought they were "at no risk" [25]. Unsurprisingly, attendance at a GUM clinic increased the likelihood of testing compared to those who had not attended [25]. A study of Africans living in London found that HIV testing was largely associated with an individual's history of previous sexually transmitted infection or self-perceived risk of HIV [43]. Two large national surveys found that Black Africans did not know where to go to get an HIV test [26,28].

A psychological barrier reported by Black Africans that would deter them from testing was the fear of finding out they were HIV-positive [34,42]. This fear was highlighted in the BASS Line surveys of 2007 and 2008/09 of Black Africans living in the UK [26,27] with additional reports that having HIV was considered a "death sentence" [44,34]. The stigma associated with having HIV [44,34] and the fear of deportation were also barriers towards testing in the Black African community [44,27]. Although these research reports are not recent and attitudes may now be less fearful, the African Health and Sex Survey conducted in 2013/14 still reported that the main barrier to testing was the fear of finding out they were HIV-positive [28].

3.2.4 Barriers to testing reported by MSM

Among MSM the main personal related reasons given for declining or not testing included; risk complacency [45,29], low perceived risk of acquiring HIV [29], confidentiality and privacy [46], unwilling to make lifestyle changes following test results [45], and the financial costs associated with testing due to difficulties obtaining life insurance [45]. The most frequently mentioned personal barriers towards testing were fear of and/or emotionally unprepared for positive result [47,29,41,48,49] particularly from men reporting higher levels of risky sexual contact [47,48]. Other reasons included the stigma of having the test and diagnosis [47,29], fear of social exclusion of people with HIV [47], that HIV testing was stressful [41], and the anxiety over waiting for test results [45].

3.2.5 Main motivators to testing reported from primary and secondary care studies

3.2.5.1 Offer of HIV test by doctor

Doctors actually recommending an HIV test has been shown to be a key motivator towards HIV testing for patients. Among newly diagnosed HIV-positive Africans attending HIV treatment centres across London, 40% said that the main reason for having a test was advice from a doctor and 59% believed they would have tested earlier if someone had told them they were at risk of HIV [16]. Similarly, one of the main facilitators for people attending an open access clinic to have an HIV test was recommendation to test by a doctor [33]. Interviews with late presenting HIV-infected MSM indicated that if an offer of a test had been made by their GP they would have taken up this opportunity, and that testing in general practice was more acceptable than testing in the GUM setting [29].

3.2.5.2 Perceived risk/ health concern

Interviews from a cohort of women with HIV from GUM and HIV clinics revealed that perceived risk (33%) or investigation of symptoms (26%) were the most common reasons for having an HIV test [50]. Likewise, a study of patients attending two GUM clinics in Scotland found that the strongest predictor of HIV testing was perceived risk of HIV [40]. The benefits of HIV testing stated by MSM attending two sexual health clinics were peace of mind (84%) and timely access to HIV treatment [41].

3.2.5.3 Universal offer/routine (opt-out) testing

The universal offer of an HIV test when registering at a GP practice with the opportunity to opt-out was reported to increase likelihood of patients accepting a test [51,32]. Questionnaires

gathered from the general population in a low HIV prevalence area on the acceptability of routinely offering an HIV test to patients in certain clinical settings, found that 71% of individuals would be willing to be tested as part of their routine care [52]. Further studies have also shown evidence for strong patient support for opt-out testing in primary care [31,53,54] and equally strong support has been shown for routine testing in secondary care [53,50,55].

3.2.5.4 Benefits of knowing status

The most frequent reasons to consider personal testing reported by NHS staff in a London Hospital were to get knowledge of status, to access the benefits of treatment, and to be able to inform family members if a positive diagnosis was made [39].

3.2.5.5 Rapid testing

The offer of rapid point of care (POC) testing in primary care has shown to be feasible and acceptable to patients [56], with the main reason given for accepting a test being that it was offered as part of a 'check-up' [56]. Patients attending same day testing in GUM clinics reported that having results on the same day without the need for an appointment encouraged them to test [33,40]. Amongst high risk patients who declined testing in two London GUM clinics 51% said they would be more likely to accept a POC test and 33% a saliva test at a GUM clinic [57].

3.2.5.6 Education on HIV testing

The importance of informing patients about HIV testing issues was evident in a study of GUM users [35]. Patients within the study were more likely to accept testing if they had previously tested or had a history of sexually transmitted infections (STI), were told about the window period between infection and sero-conversion (the need for a re-test), had received a leaflet about HIV testing, were told about the availability of counselling, were given insurance advice, and finally if they were told that the test was part of a 'check-up.'

3.2.6 Main motivators to testing reported from Community studies and National surveys

3.2.6.1 Motivators reported by Black Africans

The HIV Awareness Campaign in Glasgow, led and delivered by Waverley Care's African Health Project, was an initiative which aimed to collect evidence on the reasons for late HIV testing amongst Africans and improve service delivery [34]. In 2008 Waverley Care carried out a consultation with Black Africans living in Glasgow on ways to make HIV testing easier [34]. Suggestions on ways of increasing testing uptake included providing information on where to go, out-of-hours clinics, GP offering HIV tests, and making it as quick and easy as possible. The survey found that African people were just as likely to see their GP for an HIV test as any other specialist clinic. Those with a preference to be tested by their GP viewed them as a key person for the delivery of health services, with specialist clinics viewed as more confidential and offering more expertise. Of interest from this study was the broad support for more routine screening for HIV as part of a general health screen and that 57% of the Black African survey respondents said that "nothing would stop them from having an HIV test".

Amongst Black Africans, a previous diagnosis of an STI and self-perceived risk of catching HIV/AIDS (men only) were associated with having an HIV test [43]. Amongst Black African men HIV testing was found to be associated with recent arrival in the UK and also with attendance at a GUM clinic [25]. Studies of community testing with HIV POC tests in Black Africans showed that a high percentage thought this was an appropriate setting for testing [46,58].

A large amount of data on reasons for Black Africans getting tested for HIV has come from national health and sex surveys carried out in the UK [25,26,27,28]. A recent survey by Bourne and colleagues [39] found that common reasons for having an HIV test included lack of trust of current or recent partner, new relationship and wanting peace of mind, a test was offered to them, having a partner that was ill /or had died, part of an insurance application or beginning a new employment, encouragement from family members, liked to test regularly, and finally because their doctor or partner had recommended a test.

3.2.6.2 Motivators reported by MSM

A study investigating intention to test in MSM [59] found that there was a stronger intention to test in younger men, those who had tested before, and in those who reported having two or more recent partners with whom they had unprotected sex. Additionally, this group perceived their HIV

status to be unknown, had less fear of a positive test, and believed there were more benefits to testing. Acceptability and usefulness of home testing in MSM has also been investigated [60]. Results showed that of the 47% of MSM who had last tested negative or had never tested, 65% would consider using home testing if it was legally available, and 60% said they would test more often. A community and GUM-based POC HIV testing programme aimed at MSM (and injection drug users (IDUs) and Africans) was shown to be feasible and acceptable to patients, many of whom would not have tested if this form of testing had not been offered to them [61].

3.3 Attitudes of Healthcare Practitioners towards HIV Testing

Studies investigating attitudes of HCP towards HIV testing are shown in Table 2 and are grouped by study setting: 1) primary care 2) secondary care.

Firstly we review the barriers to testing by setting (primary/secondary care) which are divided into structural, interpersonal and personal barriers. Then we review research which has investigated HCP knowledge and awareness of the BHIVA guidelines on testing in primary and secondary care.

3.3.1 What are the main barriers to testing reported by GPs in primary care?

3.3.1.1 Structural

Perceived structural barriers to testing by GPs include concerns about patient acceptability of widespread testing [62,63] and difficulty knowing how to maintain patient confidentiality [64]. In addition recent research has highlighted time constraints as a barrier to offering testing in the primary care setting [62,63].

3.3.1.2 Interpersonal

Interpersonal barriers reported by GPs included having a high level of anxiety about bringing up the subject of HIV testing [64], even amongst high risk groups [65,34] and the fear of offending patients [63]. The main feedback given by GPs participating in the Waverley Care HIV awareness campaign [34] was the need for skills training that focused on asking difficult questions and helping those who were frightened and stigmatised. The GPs interviewed as part of this campaign stated that they would like to have more knowledge and information about HIV and African people and the cultural differences that exist [34].

3.3.1.3 Personal

Personal barriers perceived by GPs included insufficient knowledge of clinical signs of HIV, how to identify high risk patients [66], and how to carry out a test [53,63]. A number of studies highlighted that GPs feel they needed further HIV training and didn't feel comfortable delivering testing themselves [67,53,63]. GPs also reported concerns surrounding patient pre-test counselling [67,63].

3.3.2 What are the main barriers to testing reported by HCP in secondary care?

3.3.2.1 Structural

The main structural barriers reported by doctors in secondary care included time constraints [68], in particular the time taken to conduct testing and the management of the HIV result itself [69], and issues around patient privacy [68]. Other barriers included lack of clarity regarding who to test and being unaware of local arrangements for requesting an HIV test [70].

3.3.1.2 Interpersonal

Interpersonal barriers included lack of confidence or anxiety about how to manage a positive result [71,70], not feeling comfortable delivering testing themselves [53], the perception that HIV testing distresses patients [71], or was inappropriate [70]. Stigma was seen as a barrier to testing [72,69,73] and also poor doctor-patient relationship [71]. A lack of a suitable location for counselling [71] and obtaining patient consent for a HIV test [70] were perceived as barriers to testing. Interestingly, 78% of staff from intensive care units (ICU) thought that global testing of patients without 'behavioral risk factors' was likely to cause upset [74], while majority of consultant surgeons in 12 different London hospitals favored compulsory or routine pre-operative HIV testing [75].

3.3.1.3 Personal

Personal barriers included insufficient knowledge of HIV testing and also feeling the need for further training before being able to offer a test [68,53,73,69,76]. In addition, HCPs who were not experts in HIV were concerned that patients

would ask questions that they would be unable to answer [68].

3.4 What is Current Knowledge and Awareness of BHIVA Testing Guidelines in Primary and Secondary Care?

The current guidelines on HIV testing were published by BHIVA in 2008 and are based on clinical indicator conditions, lifestyle, and groups with higher prevalence [12]. These have been adopted by NICE and supplemented with advice on testing in MSM and Black African high risk groups in 2011 [10,11] and 2014 [14]. Studies of HCP have shown a lack of awareness, knowledge and adherence to the BHIVA HIV testing guidelines. A study of 80 GPs from high and low HIV prevalence areas in the UK showed that only 44% of responders were aware of the 2008 BHIVA guidelines, 70% believed it would be feasible to follow the guidelines in practice, but those that disagreed felt that time implications were the most important reason not to implement guidelines [62]. A recent study using a postal survey of 137 GPs in Liverpool found that 50% of GPs had not heard of the 2008 BHIVA HIV testing guidelines [63]. Lack of knowledge of clinical indicator conditions reported by practice GPs and nurses was also a common issue [77,67,66].

In a secondary care setting doctors were only able to name a few of the 38 clinical indicator conditions, with only 50% of doctors reporting sufficient knowledge of HIV and 88% feeling that they needed further training in HIV medicine [78]. Research carried out in a hospital in Basildon and an online survey in Edinburgh and Newcastle showed that awareness of BHIVA guidelines was very limited among non-HIV specialist physicians [79,80]. A study of 50 medical doctors working in an acute medical unit in a hospital in Cornwall (an area of low prevalence) showed that only 33% were aware of BHIVA guidelines, in particular there was poor recognition of clinical indicator diseases for HIV, specifically pneumonia and dementia [73]. A study in a large district hospital in London also found a lack of awareness of indicator conditions for HIV and the need for further training in a high proportion of doctors [76].

4. DISCUSSION

This review has summarised studies which show that there are barriers and facilitators to HIV testing both among HCP and their patients in primary care and in specialist clinic or hospital settings. Many of the barriers reported in the earlier studies persist even in the most recent studies indicating the need for further education of both HCP and the public. Common barriers experienced by HCP around offering HIV testing to patients included lack of confidence and anxiety towards offering a test, issues around privacy and confidentiality, and insufficient knowledge of HIV. Amongst patients, stigma, fear and denial or low perceptions of risk were commonly reported barriers towards HIV testing. Many of these barriers can be addressed through opt-out testing, in which tests are routinely offered to all patients. Opt-out testing helps to normalise and de-stigmatise the HIV testing process. A good example of this is the successful national policy recommendation that all pregnant women have an HIV test along with other antenatal screening tests. This policy has been shown to have 96% acceptance in antenatal settings and has led to a dramatic reduction in the number of women undiagnosed post-delivery since its introduction in 1999 [19,81]. In 2008 the Department of Health funded eight pilot projects to investigate expanded testing initiatives in high prevalence areas in the UK (London, Brighton, Leicester and Sheffield) which sought to normalise testing. The “Time to test for HIV” report concluded that the routine offer (opt-out) of an HIV test in general medical services was acceptable to patients and feasible in a variety of medical settings (including community, secondary and primary care settings). The pilot studies were cost-effective and successful in detecting previously undiagnosed infection: 50 new HIV diagnoses were made among 11,000 patients tested (positivity of 4/1000 tests) [19]. More recent qualitative studies have shown that opt-out testing is acceptable to patients in both primary and secondary care settings [54,32].

Processes that depersonalise testing and makes the patient think “that it is offered to all” facilitate and encourage individuals to test and improve testing rates. In this context, the use of electronic flagging on GP computer systems to indicate when a patient should be offered a test could be useful [82]. Such an approach would help to eliminate the perceived view that a judgement is being made by the HCP about an individual’s sexuality or race, or that they have been singled out. Normalisation is a key factor in increasing testing rates as evidenced by the National Chlamydia Screening Programme (NCSP) in the UK (www.chlamydiascreening.nhs.uk). Chlamydia testing is now common place, with

self-testing kits widely available to young people free of charge over the pharmacy counter.

Current recommended HIV testing practice involves a simple pre-test discussion between a doctor, nurse, midwife or other trained HCP with the outcome of this discussion recorded in the patient's medical notes [83]. The discussion should include the rationale for the test, the level of individual risk, an explanation of the window period (the time after exposure to HIV before the antigen or antibody can be reliably detected, with a repeated test advised after 3 months if patient is within this window period), information on how the patient will obtain their results, and the effectiveness and benefits of treatment. If the patient is found to be positive for HIV, then post-test information, advice and support should be available and linkage to HIV care facilitated [83]. However, GPs often reported concerns regarding pre-test counselling as a barrier to offering HIV tests. In the 1980s and early 90s HIV-infection was perceived as a "death sentence", consequently testing and finding out a patient's HIV status required extensive pre-test counselling, including the taking of an in-depth account of their sexual history, and signed informed consent. Because very successful antiretroviral therapy is available to treat HIV, there is no longer a requirement for in depth pre-test counselling or written consent. Therefore, these barriers should no longer be an issue for GPs [83]. However, as recently as 2014, a study by Milligan and Obasi [63] reported that GPs in Liverpool were "concerned about time and skills for pre-test counselling" required for routine HIV testing. This misconception held by some GPs in the UK needs to be addressed through training and education in order to encourage them to be more proactive and confident in offering testing. HIV testing should be viewed as a means to access effective treatments particularly as those who are diagnosed and treated in a timely manner are predicted to have a normal life expectancy [8]. Time constraints and the perception that GPs are too busy to test were relatively recent reported barriers to testing. However, carrying out an HIV test should not take a GP any longer than any other requested routine blood test and can be carried out by a nurse [12].

Patients reported that the delay period and anxiety of waiting for test results were barriers to testing. Rapid HIV POC tests are useful in addressing this issue. POC tests are quick and simple to carry out and results are available between 30 seconds to 30 minutes and confirmed with standard serological tests [83]. Making testing quick and easy with same day results were reported motivators towards testing in this review [33,40,34]. POC tests are also useful in outreach programmes which seek to access high risk groups who may traditionally avoid conventional testing services. The use of POC tests has been shown to be feasible and acceptable in several settings, such as in the Black African community [84,58] and in primary care for new registrants [56], but require confidentiality and support available for the newly diagnosed. However, it is also important to acknowledge that POC tests may not be correctly used or as cheap as laboratory tests. The College of American Pathologists (CAP) have provided a detailed list of the advantages and disadvantages of the POC testing toolkit (www.cap.org/apps//cap.portal). Commissioners of sexual health services should consider whether POC tests would be clinically and cost-effective in different settings.

Never being offered a test in primary care was also a patient reported barrier to testing. Cree (2008) reported within an African community in Glasgow that 'GPs should take a more active role in inviting people to be tested'. One of the main reported motivators for HIV testing within primary and secondary care settings were that HCPs had offered testing or the view that HCPs should offer testing to patients [33,16,29]. A survey of users of a pilot HIV POC test carried out by the Brook open clinic for young people based in Bristol between 2013 and 2014 (https://www.brook.org.uk) found that 81% of respondents had never previously been offered a HIV test [85]. These examples highlight the need for GPs in particular to be more engaged and knowledgeable about when and how to offer an HIV test.

UK HIV testing guidelines state that individuals with any of the 35 indicator diseases should always be offered testing in any setting [12]. However, the HIV indicator conditions have quite low sensitivity and specificity as demonstrated by a retrospective case control study in primary care [86], which used data from The Health Improvement Network (THIN) general practice database. The study found that 12 out of the 37 indicator conditions were associated with a subsequent diagnosis of HIV infection. Bacterial pneumonia, oral candidiasis and herpes zoster were the most strongly associated with HIV infection, although 74% of HIV cases did not

present with any indicator conditions before their HIV diagnosis. A large HIV testing initiative in primary care that incorporated awareness of clinical indicators conditions was conducted by Public Health England (PHE) in 2012. The 3Cs (Chlamydia screen, Contraception advice and free Condoms for young adults 15-24 years) and HIV programme involved general practices in South West England [87]. The programme promoted general practice involvement in sexual health and included opt-out testing for HIV for adults (aged >16). In accordance with current clinical guidelines an HIV test was offered to all with clinical indicator conditions for HIV and also to all new registrants in high prevalence areas. For the practices fully involved with the intervention their screening tests for chlamydia doubled in number [87].

Important evidence for routine testing in patients with indicator conditions also comes from the HIV Indicator Diseases across Europe Study 1 (HIDES I) [88]. The study showed that indicator guided testing was advantageous for eight of the indicator conditions studied (overall prevalence rate of 1.8%), showing it to be acceptable, feasible and cost-effective. The HIDES II study is currently expanding the testing approach by increasing the number of indicator diseases to 11 and the number of participating centres. Preliminary data has shown very high positivity rates associated with certain conditions [89]. Based on the European research from the HIDES I and II studies on HIV indicator conditions, routine testing is now likely to be recommended by NICE in dementia patients as well as individuals presenting with specifically glandular fever (GF)-like illness in primary care [90]. Hsu and colleagues (2013) made the case for universal testing of individuals with GF-like illness, from the samples submitted in primary care for a GF screen; 11 out of 857 (1.3%) were found to have HIV infection, 73% of these had been missed at the initial GP appointment with the patient. This is important information for HCP in the UK to acknowledge and act on. Recent studies included in this review, reported that knowledge of clinical indicators in both primary and secondary care settings was weak [62,78,73,63]. This issue was also highlighted in a recent review by Elmahdi et al. [22] which showed that adherence to the 2008 BHIVA guidelines for HIV testing in the UK was poor when patients had presented with clinical indicator conditions. The Medical Foundation for HIV and Sexual Health (MEDFASH) have recently published a website for GPs called “HIV Testing in Practice” (http://www.medfash.org.uk/hiv-tips). This online resource aims to educate GPs about HIV epidemiology, risk factors, clinical indicator conditions, when to test, how to test, and the benefits of treatment and linkage to care of those infected with HIV. Crucially it also provides suggestions on how to approach talking about the subject of HIV with patients so that testing is normalised and the patient does not feel judged or stigmatised.

In 2014 NICE reviewed their recommendations on increasing HIV testing among key groups [14] and found emerging evidence that white migrant groups, particularly from Eastern Europe, may be growing into a key risk group which might need to be addressed in future recommendations on testing. There have also been recent changes in the laws on HIV testing and in April 2014 self-sampling and home testing became legal in the UK. Pilot projects of outreach HIV testing using home sampling kits (individuals take their own saliva or blood sample and post to a laboratory for analysis) advertised via social media and internet websites have been shown to be feasible and highly acceptable within hard to reach communities [91]. This manner of testing is increasing in popularity and can help address some of the common barriers such as stigma, access issues and confidentiality. Brady and colleagues (2014) showed that 32% of individuals that had used the service had never tested for HIV before, however uptake of these home sampling kits was much higher in MSM than Black Africans due to the targeted advertising [91]. The feasibility and acceptability of home sampling kits to increase testing among Black Africans is currently being investigated in London and Glasgow within the HAUS study (http://haus.org.uk/), which aims to establish how best to embed home sampling kits within existing services. Results will be available in 2016. It is predicted by the National AIDS Trust (NAT) that self-testing and home sampling kits will become available to the general public by early 2015 once they meet EU quality standards and companies wanting to sell kits have applied for a licence.

5. LIMITATIONS

The review is not a full review as it only includes grey literature from BHIVA conference proceedings (2008 to 2014 only) and articles included in the review are only those that have encompassed the search term keywords outlined in the methods section (found within the article

title, keywords or abstract). Therefore some relevant articles may not have been included. However, further articles were found by hand searching article reference lists. The focus of the review was on UK studies only so there may be different barriers and motivators towards HIV testing that are relevant in other countries. Most of the results from the studies in this review come from questionnaires, surveys, interviews and focus groups so recall bias may be a factor to consider when interpreting the data. However the findings from this review provide a broad picture of attitudes to testing from both the public and HCP and may inform initiatives to increase HIV testing rates in the UK.

6. CONCLUSIONS AND RECOMMENDATIONS

Key recommendations include normalising and making HIV testing routine, making testing easier and more accessible, and removing the stigma associated with having an HIV test. Our review shows that increased community testing through outreach POC testing or home testing and sampling would provide a number of benefits and motivators towards testing. These include ease of access, quick and simple to use, cost-effectiveness, and are more appealing to individuals that tend to avoid conventional/clinical testing services due to issues such as trust and confidentiality. Home testing or sampling may also be useful for high risk individuals who should test more frequently and for whom multiple clinic visits are burdensome. Important priorities include addressing false perceptions of low risk of HIV infection, both in the public and in HCP, reaching individuals in high risk groups, particularly those that are least likely to test, and within the general population where local diagnosed HIV prevalence exceeds 2 per 1000 adults which is now a third of Upper Tier Local Authorities across England [1]. Settings for testing need to be acceptable to at risk groups who also need to be encouraged to accept testing when offered by their HCP.

This review shows the need for ongoing education of HCP in primary and secondary care settings on both HIV clinical indicator diseases and HIV risk factors [92]. In addition, training and education of GPs to be more pro-active in offering and recommending testing through opt-out approaches, particularly in practices in high prevalence areas, should be considered. The MEDFASH online resource for GPs called “HIV Testing in Practice” provides important suggestions on how to approach talking about the subject of HIV with patients so that testing is normalised and the patient does not feel judged or stigmatised. Whilst initiatives such as this should help to reach the undiagnosed population and contribute to reducing HIV transmission, further research is required on evaluating the usefulness and impact on testing and HIV case finding of such educational measures.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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