



Public Health  
England

Protecting and improving the nation's health

# Progress towards ending the HIV epidemic in the United Kingdom

## 2018 report

Data to end of December 2017

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This report is published in association with the online data tables. The tables provide detailed breakdowns of the data.

# Terminology

**Combination HIV prevention:** According to UNAIDS, combination prevention are those programmes that are rights-based, evidence-informed, and community-owned and that use a mix of biomedical, behavioural, and structural interventions, prioritised to meet the current HIV prevention needs of particular individuals and communities, so as to have the greatest sustained impact on reducing new infections [1].

**Community HIV tests:** HIV tests performed by community organisations, and include different types of test (for example point-of-care tests or specimen collection as dried blood spot or capillary tube).

**Diagnosed HIV prevalence band per 1,000 residents aged 15 to 59 years<sup>i</sup>:**

- low: HIV prevalence less than 2
- high: HIV prevalence between 2 and 5
- extremely high: HIV prevalence of 5 or more

**Eligible sexual health service (SHS) attendee:** Any patient attending a SHS at least once during a calendar year, excluding those patients known to be HIV positive or for whom an HIV test was not appropriate, or for whom the attendance was reported as being related for reproductive healthcare only.

**Gay and bisexual men:** An inclusive term for gay, bisexual and other men who have sex with men; in previous reports, this group was referred to as men who have sex with men (MSM).

**HIV diagnoses among heterosexual men and women:** People who probably acquired their HIV infection through heterosexual sex and/or people reporting their sexual orientation as heterosexual.

**HIV test coverage:** The percentage of eligible sexual health service (SHS) attendees who accepted a test. It represents the number of attendees tested for HIV and not the number of tests reported.

**Late HIV diagnosis:** An HIV diagnosis made with a CD4 cell count  $<350$  cells/mm<sup>3</sup> within 91 days of diagnosis.

**Number needed to test:** The number of people needed to test in order to diagnose 1 HIV infection.

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<sup>i</sup> Diagnosed HIV prevalence bands for local authorities can be found at [Sexual and Reproductive Health Profiles](#)

**Reactive results:** When a service testing algorithm indicates the presence of HIV antibodies or antigens, the specimens are identified as reactive results. This is not equivalent to a confirmed HIV diagnosis.

**Self-sampling HIV kits/tests:** A test in which the specimen collection is performed by the individual and the specimen is returned to the laboratory or clinic for processing.

**Self-testing HIV kits:** A test carried out by the individual and the result is interpreted by that individual.

**Sexual health services (SHS) includes:**

- non-specialist sexual health services: level 2 sexual health services, including sexual and reproductive health (SRH) services, young people's services, enhanced GPs, online sexual health services, and other sexual health services
- specialist sexual health services: level 3<sup>ii</sup> sexual health services, including genito-urinary medicine (GUM) and integrated GUM/sexual and reproductive health (SRH) services

**Undetectable = Untransmittable (U=U):** Medicines to treat HIV can eliminate the risk of sexual and mother-to-child HIV transmission. People with HIV who maintain an undetectable viral load for at least 6 months do not transmit HIV [2].

**Unprotected sex:** HIV can be transmitted sexually if no protection is used and the sexual partner with HIV has a detectable viral load. Protective methods include consistent condom use, effective use of pre-exposure prophylaxis (PrEP) or use of antiretroviral treatment (ART) to achieve an undetectable viral load.

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<sup>ii</sup> Further information about the level of services provided can be found in the [BASHH/MEDFASH Standards for the management of STIs](#).

# Summary findings

## UNAIDS 90:90:90 targets

The latest estimates for undiagnosed HIV infections indicate that the UNAIDS 90:90:90 targets have been met both in the United Kingdom (UK) overall and in England. There has been a steady progression towards meeting these targets over the past decade, and it is now time to look beyond and identify new priorities that, if achieved, could accelerate the falls in HIV transmission that are well underway.

In 2017, 92% (Credible interval (CrI) 88 to 94%) of the estimated 101,600 (CrI 99,300 to 106,400) people living with HIV infection in the UK were diagnosed, 98% of people diagnosed were receiving treatment and 97% of people receiving treatment were virally suppressed. Overall, 87% of people living with HIV in the UK were estimated to have an undetectable viral load and therefore unable to pass on the infection.

## Decline in HIV incidence and diagnoses in gay and bisexual men

The estimated annual number of new infections acquired by gay, bisexual and other men who have sex with men<sup>iii</sup> in the UK has more than halved from a peak of around 2,700 (95% credible interval (CrI) 2,200 to 3,200) in 2012 to 1,200 (CrI 600 to 2,100) in 2017.

There has been a continuation of the decline in new HIV diagnoses among gay and bisexual men (31% decline, from 3,390 in 2015 to 2,330 in 2017). Previously, diagnoses among this group had been increasing year on year from 2,820 in 2008 to 3,390 in 2015. The decrease in numbers of new diagnoses has been observed within London (44%, from 1,415 in 2015 to 798 in 2017) and outside London including in the South of England (33%, 398 to 267) and the Midlands and East of England (29%, 411 to 293).

## Decline in HIV diagnoses acquired through heterosexual sex

New HIV diagnoses in both black African and black Caribbean heterosexuals<sup>iv</sup> have been decreasing steadily over the past 10 years (black African: 78%, from 2,424 in 2008 to 542 in 2017; black Caribbean: 77%, from 231 to 52). Declines have been observed for the first time among non-black African and non-black Caribbean heterosexual men, particularly among white heterosexual men (31%, from 429 in 2016 to 296 in 2017).

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<sup>iii</sup> Gay, bisexual and other men who have sex with men are hereafter referred to as gay and bisexual men; this group was previously referred to as men who have sex with men (MSM).

<sup>iv</sup> Heterosexual men and women refer to people who probably acquired their HIV infection through heterosexual sex and/or people reporting their sexual orientation as heterosexual.

## Living with diagnosed HIV infection

The population of people living with diagnosed HIV infection (93,385) is growing older and diversifying. In 2017, more than a third (39%) of people receiving HIV care were aged 50 years or above; 14% of gay and bisexual men receiving care were from black, Asian and other minority ethnic (BAME) groups; and 26% of heterosexuals receiving care were white. These figures were 18%, 12% and 21%, respectively, in 2008.

In 2017, 98% of people receiving care were on antiretroviral treatment and 97% on treatment had an undetectable viral load. Of the 87,057 people attending for care in 2015, 97% were retained in care 2 years later in 2017. Clinical outcome measures were high across all groups, although virological suppression was slightly lower among 15 to 24 year olds (87%) and non-retention was higher among people who inject drugs (PWID) (7%).

The excellent HIV treatment and care outcomes observed in the UK are reflected in the results of a national HIV patient survey, *Positive Voices*, which found that three-quarters (73%) of people with HIV accessing care in England rated their health as “very good” or “good”, compared to 81% of the general English population [3]. With regard to health-related quality of life, as measured by the Euroqol (EQ-5D-5L) instrument, which takes into account both physical and mental health, the score of 0.83 reported by people living with HIV (on a scale of 0 to 1 where 0 is the worst possible health and 1 is the best health) is comparable to the general English population (0.86). The main disparity in quality of life between people with HIV and the general population was mental health, with half (50%) of people with HIV having symptoms of depression and anxiety, compared to a quarter (24%) of the general public. HIV populations with markedly lower health-related quality of life were trans/non-binary populations (0.50), people infected through blood/blood products (0.48), and people who inject drugs (0.31).

In 2017, 428 people with HIV infection died from any cause and over half of deaths (62%) were among people aged 50 years and over. In 2017, the crude overall mortality rate among those aged 15 to 59 years who had their HIV infection diagnosed promptly (CD4 cell count  $\geq 350$  cells/mm<sup>3</sup>) was 1.22 per 1,000 compared to 1.66 per 1,000 in the general population of the same age group.



## Decline in late HIV diagnoses

The number of late HIV diagnoses<sup>v</sup> (CD4 cell count <350 cells/mm<sup>3</sup>) decreased from 3,895 in 2008 to 1,879 in 2017 and in 2017, 43% of HIV diagnoses were made at a late stage of HIV infection. Late diagnosis was highest in heterosexual men (59%, 307/523) and heterosexual women (50%, 312/624) and lowest among gay and bisexual men (33%, 524/1,571).

## Combination HIV prevention

The progressive implementation of combination HIV prevention is the principal explanation for the fall in HIV incidence in gay and bisexual men since 2012 [4].

Combination HIV prevention seeks to achieve maximum impact through simultaneous implementation of complementary evidence-based behavioural, biomedical and structural interventions in the context of a well-researched and understood local epidemic [1].

Current key components of combination HIV prevention in the UK include: condom provision, pre-exposure prophylaxis (PrEP), expanded HIV testing and prompt initiation of antiretroviral therapy (ART) after diagnosis. The needs of individuals change across their life course. A combination HIV prevention approach helps ensure that individuals have access to the types of interventions that best suit their needs as their life evolves.

## Condoms

Condoms remain fundamental to the combination prevention approach of HIV and sexually transmitted infections (STIs) and are highly effective in preventing transmission, when used correctly and consistently during vaginal and anal sex [5, 6]. Condom use has been a key component of prevention initiatives, which, along with other elements of combination prevention, will have contributed significantly to the containment of the HIV epidemic in the UK [7, 8].

## Pre-exposure prophylaxis (PrEP)

Pre-exposure prophylaxis (PrEP) when used consistently by individuals at risk of HIV infection is highly effective at preventing HIV acquisition [9-12]. With the development of internet self-purchasing in 2015, PrEP use in England is thought to have quadrupled during 2016 [13], so that an estimated 3,000 gay and bisexual men were taking PrEP by year end. This number will have increased again during 2017, especially since the **PrEP Impact Trial**, jointly co-ordinated by Chelsea & Westminster NHS Foundation Trust and PHE began, as did PrEP programmes and studies in **Scotland** and **Wales**.

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<sup>v</sup> Adjusted for missing CD4 information. CD4 count at diagnosis was 72% complete for new reports received in 2017.

It is very probable that this scale-up of PrEP use will have had a substantial effect at reducing underlying HIV incidence, additional to the effect of intensified HIV testing and the immediate treatment of those newly diagnosed as living with HIV. However, it is too soon to estimate the size of this additional effect from available data.

Meanwhile, the 2016 commitment by NHS England to support a **PrEP programme** that is informed by the PrEP Impact Trial results and the work that is underway to prepare for this programme are both welcome [14].

## HIV testing policy

HIV testing policies aim to encourage the offer and uptake of testing in a range of clinical and community settings and those at increased risk. This includes testing in all attendees with an STI-related need at sexual health services, people attending general practice, A&E and admitted to hospital in areas of high and extremely high HIV prevalence, people with HIV indicator conditions<sup>vi</sup> and encouraging regular test seeking by those at continuing risk of HIV acquisition.

The number needed to test to detect 1 HIV infection is a useful measure for assessing and comparing the efficiency of testing in different settings. In the next phase of the HIV response, the return for these testing policies will diminish as they become even more successful. Nevertheless, it is essential that these policies are further strengthened wherever there is scope for improvement.

## HIV testing in sexual health services in England

Testing activity at sexual health services (SHS) has continued to increase in 2017, largely driven by increased testing of gay and bisexual men. Encouragingly, the number of HIV diagnoses detected in these services in England has fallen across all groups, with 1,956 HIV infections diagnosed in 2017, 17% fewer than in 2016.

In 2017, 116,071 gay and bisexual men were tested in SHS, 9% more than in 2016. HIV test positivity among gay and bisexual men attending SHS has continued to decrease, falling from 1.2% in 2016 to 0.9% in 2017, reflecting both declining infection rates and changing testing routines. The number of HIV infections detected in this group fell by 20% between 2016 and 2017.

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<sup>vi</sup> People with symptoms that may indicate HIV or HIV is part of the differential diagnosis in line with HIV in Europe's **HIV in indicator conditions**

Gay and bisexual men should test annually for HIV, and every 3 months if they are having unprotected sex<sup>vii</sup> with new or casual partners. In 2017, 42% of gay and bisexual men tested for HIV at a specialist SHS<sup>viii</sup> had tested at least once before at the same service during the previous year. This proportion is similar to that in 2016 (41%).

Over three-quarters of HIV diagnoses (77%, 785/1,020) in gay and bisexual men attending specialist SHS were among those who had not tested in the 2 years before diagnosis (at the same service). Only 8% of HIV diagnoses in gay and bisexual men were made among men who had had 2 or more tests in the previous year (at the same service).

In SHS, the 2 groups who had the highest test positivity were the sexual partners of people with HIV, 4.3% of whom tested positive; and gay and bisexual men who recently had an anogenital bacterial STI. Of these men in this group who returned to the same clinic in the year following their STI diagnosis, 4.4% tested positive for HIV.

In 2017, over 67,000 heterosexual men and women who were of black African ethnicity or born in a high prevalence country (regardless of ethnicity) were tested for HIV in SHS. The number of people tested in this group stayed constant between 2016 and 2017. However, between 2016 and 2017 positivity rates fell among men (from 0.5% to 0.4%) but stayed stable among women (0.6%).

Many missed opportunities for testing continue to occur at SHS. Nearly 350,000 SHS attendees were not offered a test for HIV in 2017, despite being recorded as eligible for testing<sup>ix</sup>. This included over 10,000 gay and bisexual men and over 10,000 black African heterosexual men and women.

HIV testing practices vary between different SHS. Within specialist SHS, 12% (27/221) of services met BASHH standards of testing 80% of all eligible attendees. HIV test coverage was much lower among heterosexual men (78%) and heterosexual women (59%) than among gay and bisexual men (89%) attending specialist SHS. HIV test coverage rates in specialist SHS were much higher than in non-specialist SHS<sup>x</sup>. In particular, in 2017 only 29% of the 108,000 eligible heterosexual women attending sexual and reproductive health (SRH) services were tested for HIV compared with 59% of the 853,680 heterosexual women attending specialist SHS. Despite this

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<sup>vii</sup> Unprotected sex: HIV can be transmitted sexually if no protection is used and the person with HIV has a detectable viral load. Protective methods include consistent condom use, effective use of PrEP or use of ART to achieve an undetectable viral load.

<sup>viii</sup> Specialist SHS refers to level-3 sexual health services including genito-urinary medicine (GUM) and integrated GUM/sexual and reproductive health (SRH)

<sup>ix</sup> Eligible SHS attendee: any patient attending a SHS at least once during a calendar year; excluding those patients known to be HIV positive or for whom an HIV test was not appropriate, or for whom the attendance was reported as being related for reproductive healthcare only.

<sup>x</sup> Non-specialist SHS refers to level 2 sexual health services including sexual and reproductive health (SRH) services, young people's services, enhanced GPs, online sexual health services and other sexual health services.

difference in coverage, the test positivity was the same for women attending both service types.

Most (77%) people testing for HIV at SHS were not gay and bisexual men, or black African men or women, or born in a high prevalence country, or identified as trans. Testing these 'other heterosexual' attendees detected 24% of all HIV diagnoses made in SHS. The proportion of 'other heterosexual' men whose tests were positive for HIV fell from 0.11% in 2016 to 0.08% in 2017, but remained unchanged among 'other heterosexual' women (0.04%).

### HIV testing in other settings

HIV testing continues to be available in a wide variety of settings. In general practices reporting to Sentinel Surveillance of Blood Borne Viruses (SSBBV), HIV testing rates in extremely high prevalence areas (140/10,000) in 2017 were greater than in high prevalence areas (80/10,000), and over 4 times greater than in low prevalence areas (35/10,000). HIV test positivity was greater in extremely high prevalence areas (0.3% positive) than in high or low prevalence areas (both 0.2% positive).

Laboratories participating in SSBBV reported that 70,215 people attending A&E were tested for HIV in 2017, of whom 0.7% were positive for HIV. Within other secondary care settings, SSBBV reported 186,719 people were tested for HIV where 0.6% of HIV tests were positive.

In 2017, 127,364 HIV tests were obtained online or carried out in a community setting. This includes people who either tested through the national targeted HIV self-sampling service, other free online HIV self-sampling services, community providers, or privately purchased self-testing kits. Reactivity was higher in tests carried out in the national HIV self-sampling service (1.0%) than in tests carried out by community providers (0.4%) reflecting the targeting of the service.

'Opt-out' blood-borne virus testing has increased in prisons, and 41,455 HIV tests were carried out in the financial year 2017 to 2018. While 71% of eligible new receptions and transfers were offered an HIV test, only 33% accepted the offer of a test, and 1.1% of tests were positive.

Just over half of PWID reported that they had tested for HIV in the previous 2 years. However, only one third of PWID who had accessed a clinical service in the previous year had been tested for HIV.

## Treatment as prevention (TasP)

Among people diagnosed promptly (CD4 count  $\geq 350$  cells/mm<sup>3</sup>), the proportion starting treatment within 91 days of diagnosis increased from 30% (836/2,826) in 2013 to 75% (1,287/1,722) in 2017, which reflects changes in recommendations about the timing of starting treatment.

## Key messages

Although there has been steady progression in implementing combination prevention measures to end the HIV epidemic and the efforts are having a major effect, there still remain opportunities for further improvements. These key messages have been drawn together to support efforts to reach those living with HIV who are undiagnosed and to maintain high treatment and care standards.

Sexual health services should consider how they can:

- increase HIV test coverage among heterosexual attendees with an STI related need, including black Africans and people born in countries with high HIV prevalence
- increase HIV test coverage among gay, bisexual and other men who have sex with men, particularly those who have not tested recently or who have recently had a bacterial STI
- increase quarterly testing, including an STI screen, in gay, bisexual and other men who have sex with men if they are having unprotected sex with new or casual partners
- improve notification and testing of partners of heterosexuals and gay and bisexual men newly diagnosed with HIV

General practices and hospitals in high and extremely high prevalence<sup>xi</sup> areas should consider how they can better implement **NICE guidance** on offering HIV tests to patients.

Healthcare and other professionals should offer and recommend HIV and HCV tests to any patient who has injected drugs.

Prisons should consider how they can increase their 'opt-out' blood-borne virus testing activity for new receptions and transfers.

Local authorities should consider how they can:

- ensure that their population groups at increased risk can access HIV testing online and in community settings
- ensure that all commissioned HIV testing programmes have a well-defined referral pathway to HIV care for all people with a reactive/positive test result
- take account of the combination HIV prevention perspective when commissioning

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<sup>xi</sup> Areas where diagnosed prevalence HIV prevalence is of 2 or more per 1,000 in people aged 15 to 59 years.

HIV care providers should:

- continue to monitor their key clinical indicators for HIV care, especially in PWID and people aged 15 to 24 years, to ensure the current high standard is maintained and to improve clinical outcomes
- discuss the individual and public health benefits of treatment with all people newly diagnosed with HIV, offering and recommending immediate ART, in line with the 2015 BHIVA guidelines
- adopt long-term condition care frameworks for the management of HIV to ensure the holistic needs of HIV patients are met, thereby supporting their general health and well-being – the focus should be on quality of life, prevention of co-morbidities, and incorporating principles of patient-centred care and self-management already in use for other long-term condition services
- continue to support comprehensive surveillance by reporting to PHE in a timely manner; high quality HIV public health data is essential to monitor progress towards the elimination of HIV in the UK

## Recommendations for the public

All men who have ever had sex with another man should have an HIV test even if they consider themselves to be heterosexual.

Gay, bisexual and other men who have sex with men should have an HIV test at least annually.

Gay, bisexual and other men who have sex with men should test for HIV and have an STI screen every 3 months if they are having unprotected sex with new or casual partners.

Black African heterosexual men and women, and people born in countries where HIV is common<sup>xii</sup>, should have an HIV test, and repeat this every year if having unprotected sex with new or casual partners from countries where HIV is common.

Anyone who is diagnosed with HIV should accept the clinical recommendation that they start treatment immediately. Early treatment initiation enables people living with HIV to live a long and healthy life and minimises the risk of passing the infection to others. HIV treatment is free to all in the UK regardless of immigration or residency status.

A range of methods to prevent HIV acquisition are currently available in the UK. Resources are available that provide guidance on the combination of methods best suited to an individual's health and circumstances.

All HIV testing by the NHS is free and confidential for everyone, regardless of immigration or residency status.

There are many ways to get tested for HIV:

- go to an STI clinic or a community testing site  
([www.nhs.uk/Service-Search/HIV-testing](http://www.nhs.uk/Service-Search/HIV-testing))  
([www.aidsmap.com/hiv-test-finder](http://www.aidsmap.com/hiv-test-finder))
- ask your GP for an HIV test
- request a self-sampling kit online ([www.test.hiv](http://www.test.hiv)) or obtain a self-testing kit

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<sup>xii</sup> Countries where HIV prevalence is greater than 1%. A full list of these countries can be found in Appendix 2.

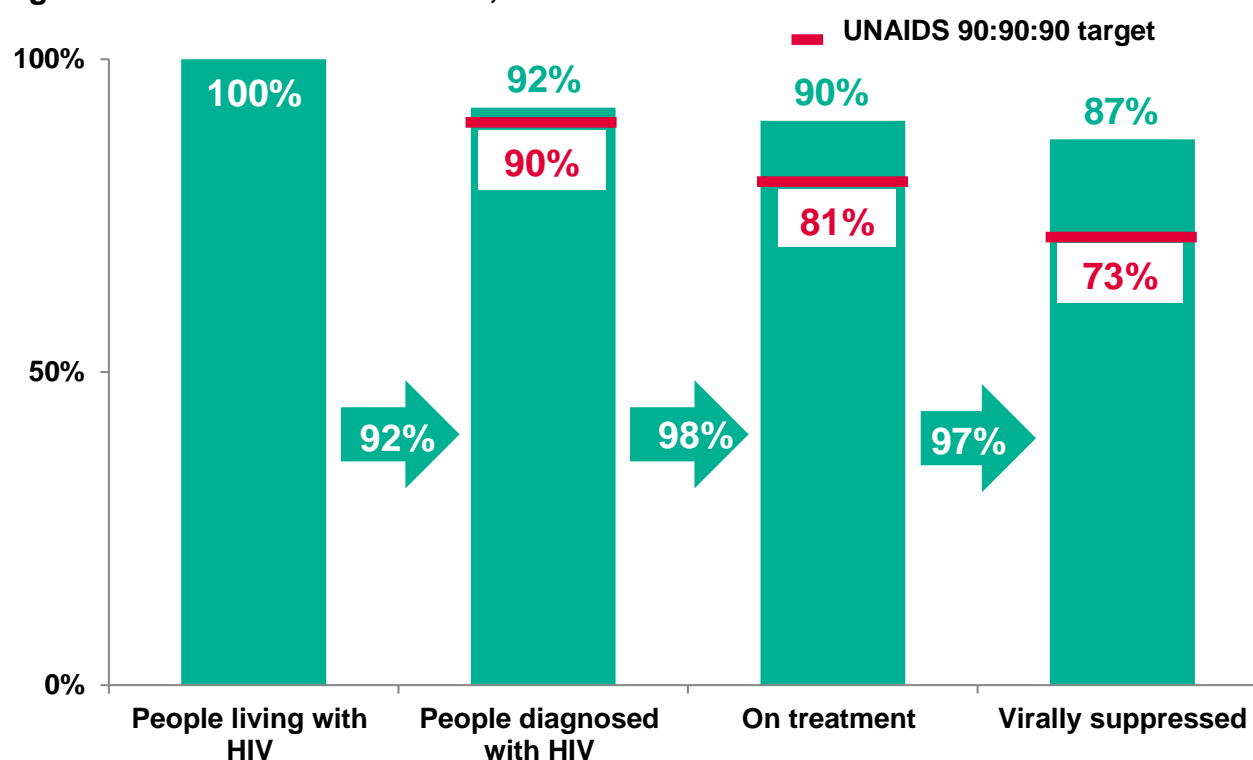


# 1. The UNAIDS 90:90:90 targets

The continuum of HIV care illustrates key measures of the HIV patient pathway and provides an opportunity to assess progress towards the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90:90:90 targets of 90% of people living with HIV being diagnosed, 90% of people diagnosed receiving ART and 90% of people on treatment virally suppressed and unable to pass on the infection [15].

The UK met the UNAIDS targets in 2017; 92% (Credible interval (CrI) 88 to 94%) of the estimated 101,600 (CrI 99,300 to 106,400) people living with HIV infection in the UK were diagnosed, 98% of people diagnosed were receiving treatment and 97% of people receiving treatment were virally suppressed (Figure 1). Overall, 87% of people living with HIV in the UK were estimated to have an undetectable viral load and therefore unable to pass on the infection.

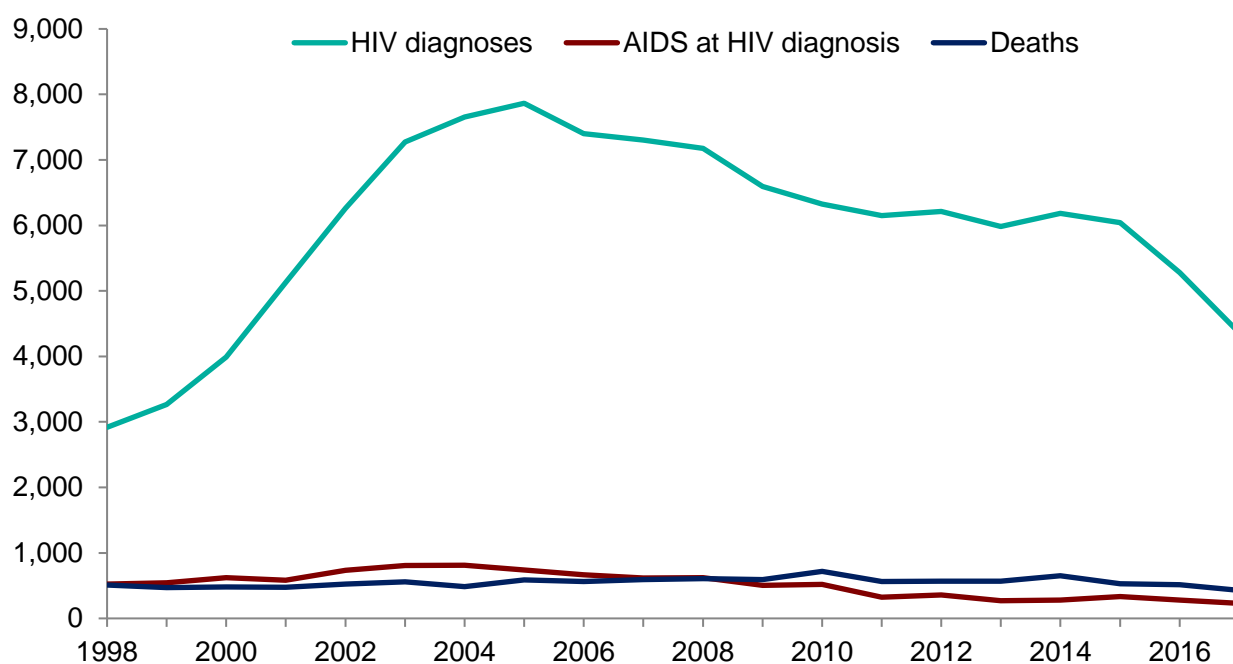
**Figure 1: Continuum of HIV care, UK: 2017**



## 2. New HIV diagnoses

In 2017, 4,363 people were newly diagnosed with HIV in the UK (3,236 men and 1,125 women<sup>xiii</sup>), with 230 cases of AIDS at diagnosis and 428 deaths in people living with HIV (Figure 2). Half of the diagnoses (53%, 2,330/4,370)<sup>xiv</sup> were reported among gay and bisexual and other men who have sex with men, and 18% (770) and 24% (1,040) among heterosexual men and women respectively. There were 140 diagnoses among people who inject drugs (PWID) and 90 among people infected through other exposure routes including, mother-to-child transmission (MTCT) and through blood or blood products.

**Figure 2: New HIV diagnoses, AIDS at HIV diagnosis\* and deaths: UK, 1998 to 2017**



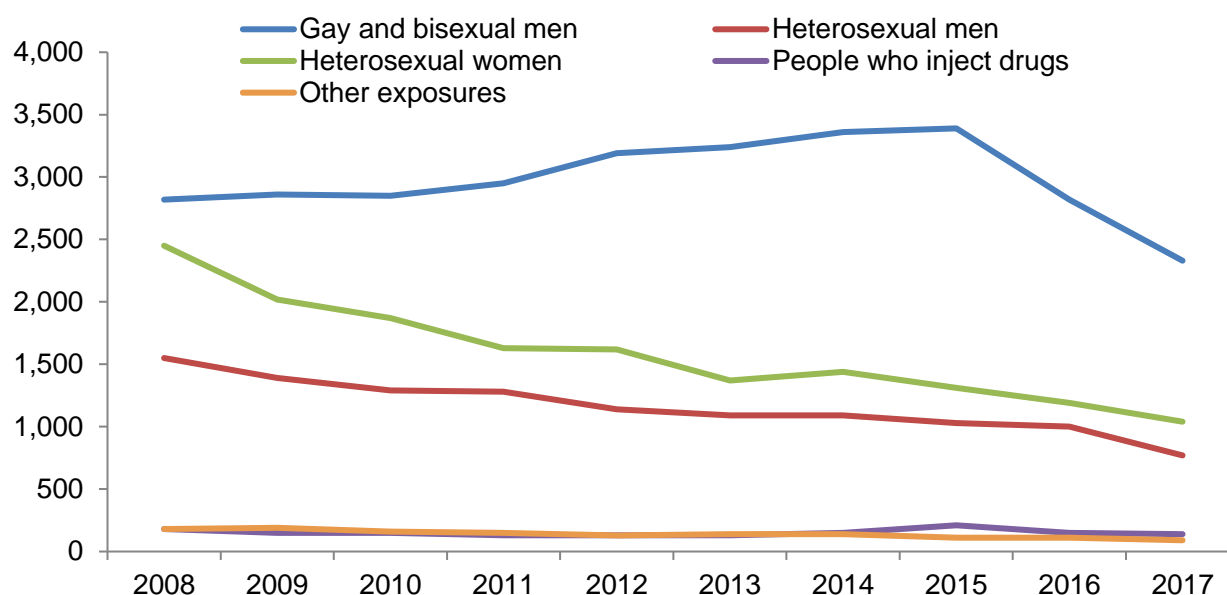
\*AIDS defining illness within 3 months of an HIV diagnosis

The 4,363 HIV diagnoses in 2017 represent a 17% decline from the 5,280 diagnoses reported in 2016. This decline is due to a sharp decrease in diagnoses among gay and bisexual men, and a more gradual decline in diagnoses in heterosexual men and women (Figure 3).

<sup>xiii</sup> New HIV diagnoses totals for men and women are based on gender identity and include trans people. The overall total includes people who identify in another way and those with gender identity not reported.

<sup>xiv</sup> Data rounded after adjustment for missing information.

**Figure 3: HIV diagnoses\* by exposure group: UK, 2008 to 2017**



\*Adjusted for missing exposure information.

HIV diagnoses made among residents in London continued to account for the largest proportion of diagnoses in the UK (36%, 1,549/4,363) in 2017, with residents in the Midlands and East of England region contributing the most diagnoses outside of London (22%; 957). Most people (68%, 2,959/4,363) newly diagnosed in 2017 were aged between 25 and 49 years. However, the number and proportion of people diagnosed at 50 years or over increased from 11% (790/7,176) in 2008 to 20% (873/4,363) in 2017.

## 2.1. Gay and bisexual men

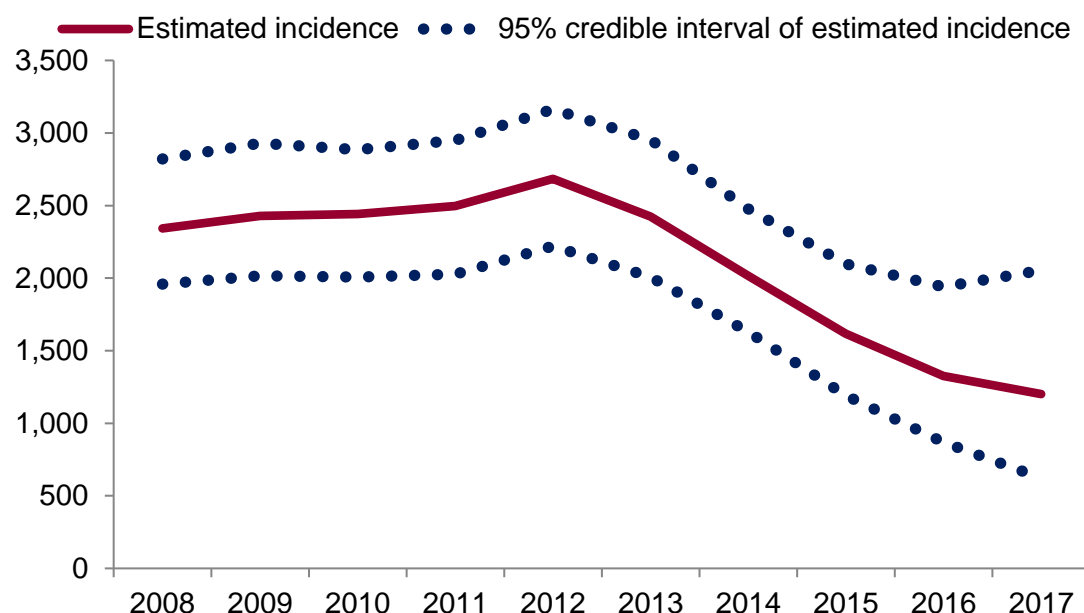
### 2.1.1. Incidence

In 2017, 47% of people newly diagnosed with HIV were assessed for recent infection using the recent infection testing algorithm (RITA) [16] with test coverage higher among gay and bisexual men compared to heterosexuals (51% and 46%, respectively). The number of gay and bisexual men who were diagnosed at a recent stage of infection (within the last 4 months) was 286 (30%) (Appendix 1). The proportion of gay and bisexual men diagnosed with recent infection increased from 23% (331/1,468) in 2011 to 36% in 2014 (638/1,784), after which a decline was observed.

A CD4 back-calculation model is used to estimate HIV incidence among gay and bisexual men living in England [17]. The estimated number of new infections acquired per year rose from around 2,300 infections (95% credible interval (CrI) 2,000 to 2,800)

in 2008, to a peak of 2,700 (CrI 2,200 to 3,200) in 2012, before falling to 1,200 (CrI 600 to 2,100) in 2017 (Figure 4).

**Figure 4: Estimates of HIV incidence in gay and bisexual men: England, 2008 to 2017**



### 2.1.2. New diagnoses

The number of new HIV diagnoses reported among gay and bisexual men decreased by almost a third (31%), between 2015 (3,390<sup>xv</sup>) and 2017 (2,330) (Figure 3). Almost three-quarters of gay and bisexual men newly diagnosed in 2017 were aged 25 to 49 years (71%, 1,396/1,967) with a median age at diagnosis of 33 years (inter-quartile range (IQR) 27 to 42); this has not changed substantially over the past 10 years.

In England, the greatest fall in diagnoses from 2015 to 2017 was in the London large fall clinics<sup>xvi</sup> (46%, 1,073 to 575) (Figure 5a). London accounted for less than half (41%, 798/1,967) of the diagnoses in 2017 compared to almost half (47%, 1,415/3,037) in 2015. Diagnoses also declined in the South of England (33%, 398 to 267) and the Midlands and East of England (29%, 411 to 293). Outside England, declines were observed in all the devolved nations: Wales (64%, 81 to 29), Scotland (31%, 127 to 88) and Northern Ireland (37%, 63 to 40).

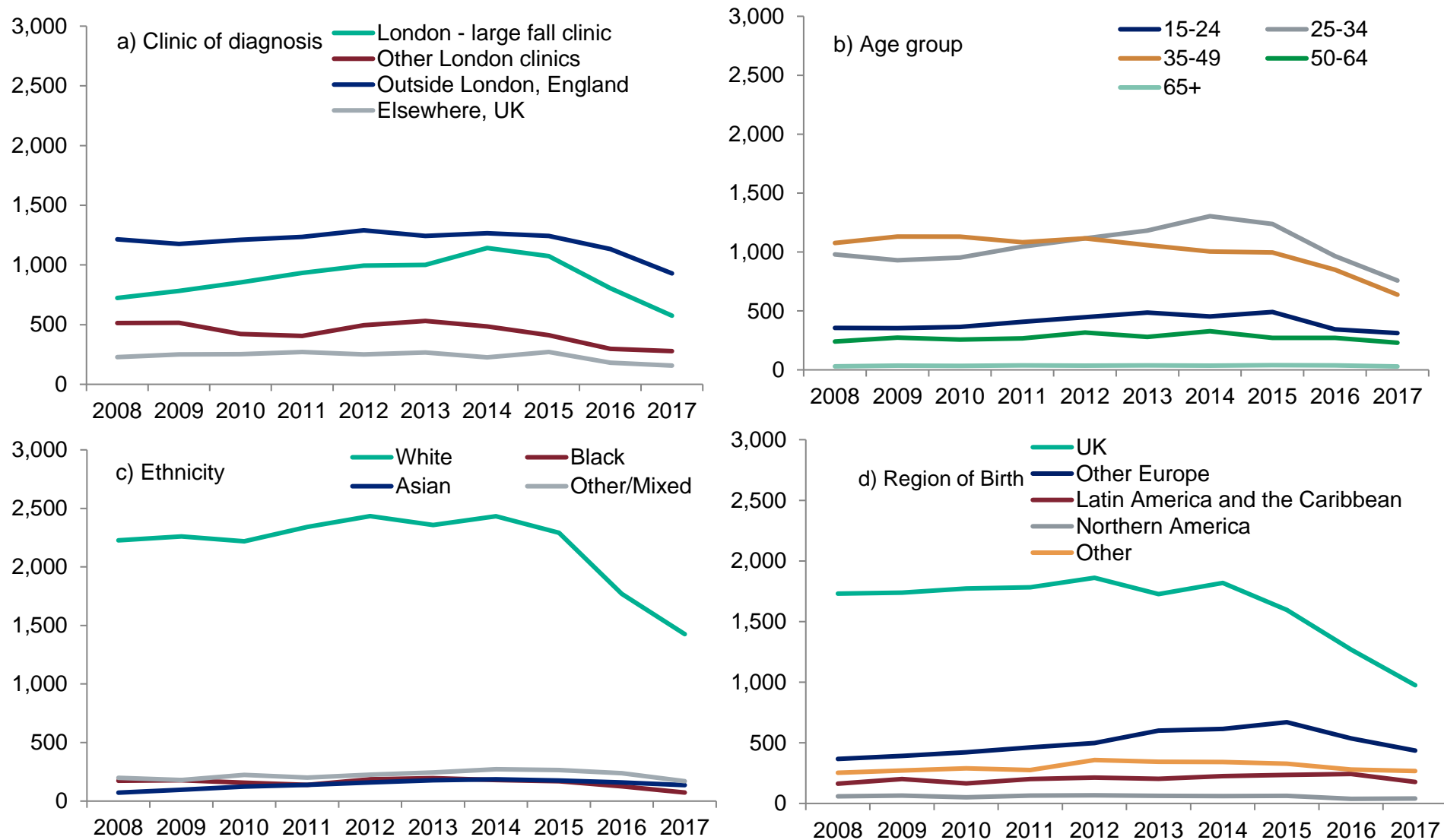
Declines have occurred across age groups. Between 2015 and 2017, the steepest decline in HIV diagnoses among gay and bisexual men was observed among those aged 25 to 34 years (39%, 1,238 to 758), followed by 15 to 24 years (36%, 491 to 312) and 35 to 49 years (36%, 997 to 638) (Figure 5b).

<sup>xv</sup> Adjusted for missing exposure information.

<sup>xvi</sup> Dean Street, Mortimer Market, Homerton, St Mary's, Guys' and St Thomas'

White men comprised 79% of all gay and bisexual men diagnosed in 2017 in the UK (Figure 5c); there was a 38% decline in new diagnoses in white gay and bisexual men from 2,292 in 2015 to 1,426 in 2017. While the overall numbers of black, Asian and minority ethnic (BAME) gay and bisexual men newly diagnosed with HIV were low, declines were also observed relative to 2015 among Asian men (22%, 176 to 137), black men (57%, 170 to 73) and men of other/mixed ethnicity (36%, 265 to 170). In 2017, 72% of diagnoses were among gay and bisexual men born in the UK or elsewhere in Europe. Both groups experienced a 38% decline in HIV diagnoses; 1,596 to 975 in UK-born men and 670 to 435 among men born elsewhere in Europe (Figure 5d).

**Figure 5: HIV diagnoses\* among gay and bisexual men, by population characteristics: UK, 2008 to 2017**



\*Observed data, not adjusted for missing information.

## 2.2. Heterosexual men and women

In 2017, 770 men and 1,040<sup>xvii</sup> women were newly diagnosed and were reported to have acquired HIV through heterosexual sex. The number of heterosexual men and women newly diagnosed with HIV peaked in 2004, and halved between 2008 and 2017, from 4,000 to 1,810 (Figure 3).

This decline was particularly steep among residents in London (from 1,346 to 418). After London, the number of diagnoses in 2017 was highest among heterosexuals resident in the Midlands and East of England (396), the North of England (267) and the South of England (250). In Wales, Northern Ireland and Scotland the number of new diagnoses among heterosexuals was lower at 29, 26 and 57, respectively.

The steepest decline in HIV diagnoses over the last decade was observed among heterosexual men and women aged 25 to 34 years (76%, 1,381 to 335), followed by 15 to 24 year olds (70%, 354 to 105) (Figure 6b). Overall, in 2017, 31% (203/648) of heterosexual men were aged 50 years or over at the time of their diagnosis, compared with 21% (170/794) of heterosexual women. This compares to 16% (242/1,472) and 9% (204/2,349) in 2008, respectively. The median age at diagnosis in 2017 was 44 years (IQR: 35 to 52) among heterosexual men and 38 years (IQR: 30 to 48) among heterosexual women.

The HIV epidemic among heterosexuals has diversified. In 2017, black African men and women comprised 38% (542/1,443) of heterosexual adults with a new HIV diagnosis, compared to 63% (2,424/3,821) in 2008, which represents a 78% decline in diagnoses in this group (Figure 6c). Over the same time, diagnoses among black Caribbean heterosexuals also declined, from 231 in 2008 to 52 in 2017 (77% fall). For the first time in 2017, there was a drop in the number of diagnoses among non-black African and non-black Caribbean heterosexual men. The largest fall was among white heterosexual men (31%, from 429 in 2016 to 296 in 2017) followed by other/mixed heterosexual men (22%, 51 to 40). The decline was primarily observed among men born in the UK (33%, 354 to 237) and elsewhere in Europe (21%, 92 to 73). The steepest decline was observed among heterosexual men aged 65 years and above (55%, 47 to 21), followed by 15 to 34 year olds (32%, 148 to 101). A smaller decline of 16% was observed among non-black African and non-black Caribbean heterosexual women from 487 in 2016 to 410 in 2017.

In 2017, 233 heterosexual men and 422 heterosexual women born in a country with high HIV prevalence (Appendix 2) were diagnosed with HIV in the UK. This compares to 797 and 1,641 diagnoses in 2008, respectively (Figure 6d). The majority (74%) of heterosexuals born in a high HIV prevalence country and diagnosed with HIV in 2017 were of black African ethnicity. The next 2 largest ethnic groups were other/mixed (7%)

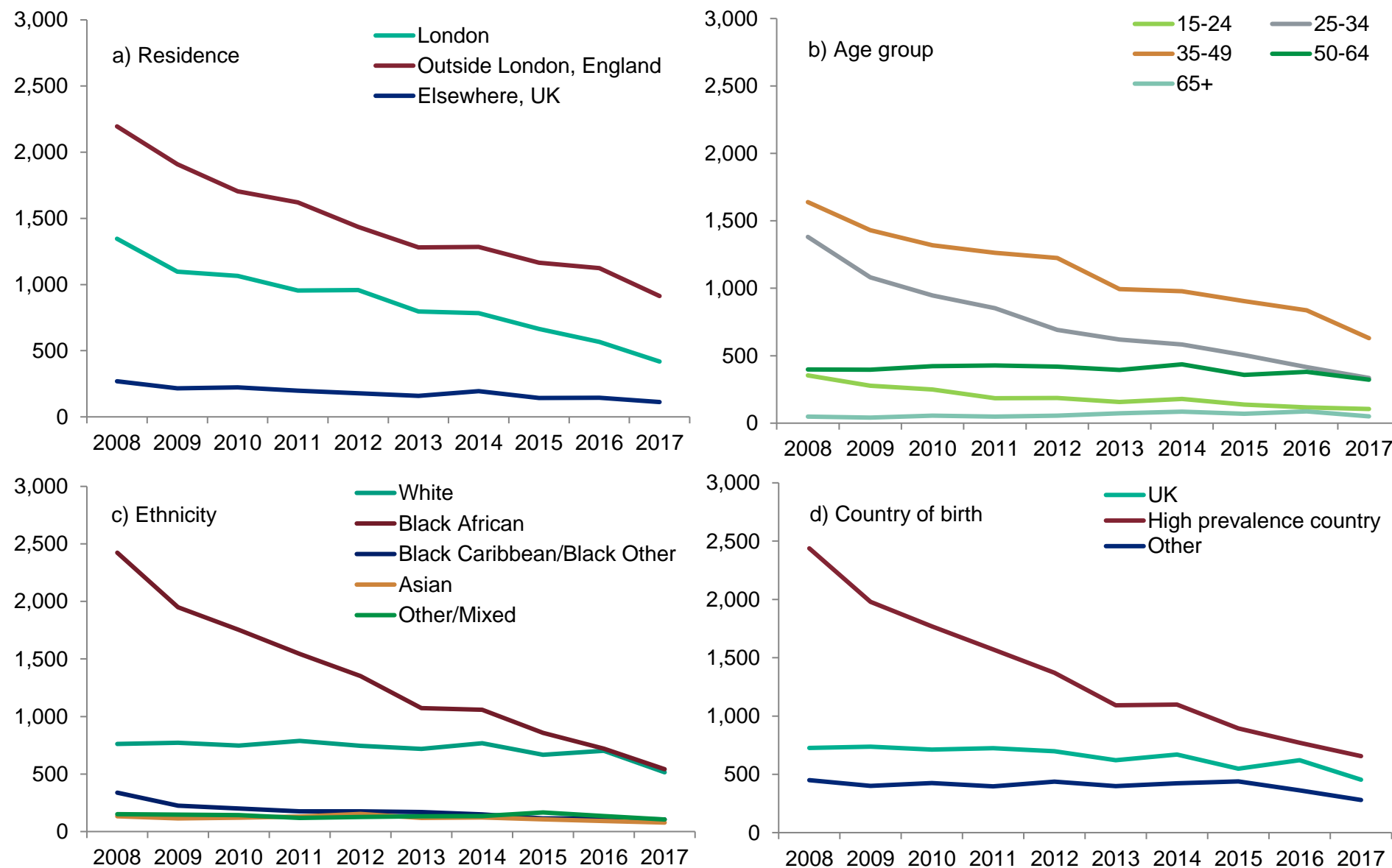
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<sup>xvii</sup> Data rounded after adjustment for missing information.

and other black (5%). Only 49% (714/1,443) of all diagnoses among heterosexuals were among black African heterosexuals or heterosexuals born in a high prevalence country (regardless of ethnicity).



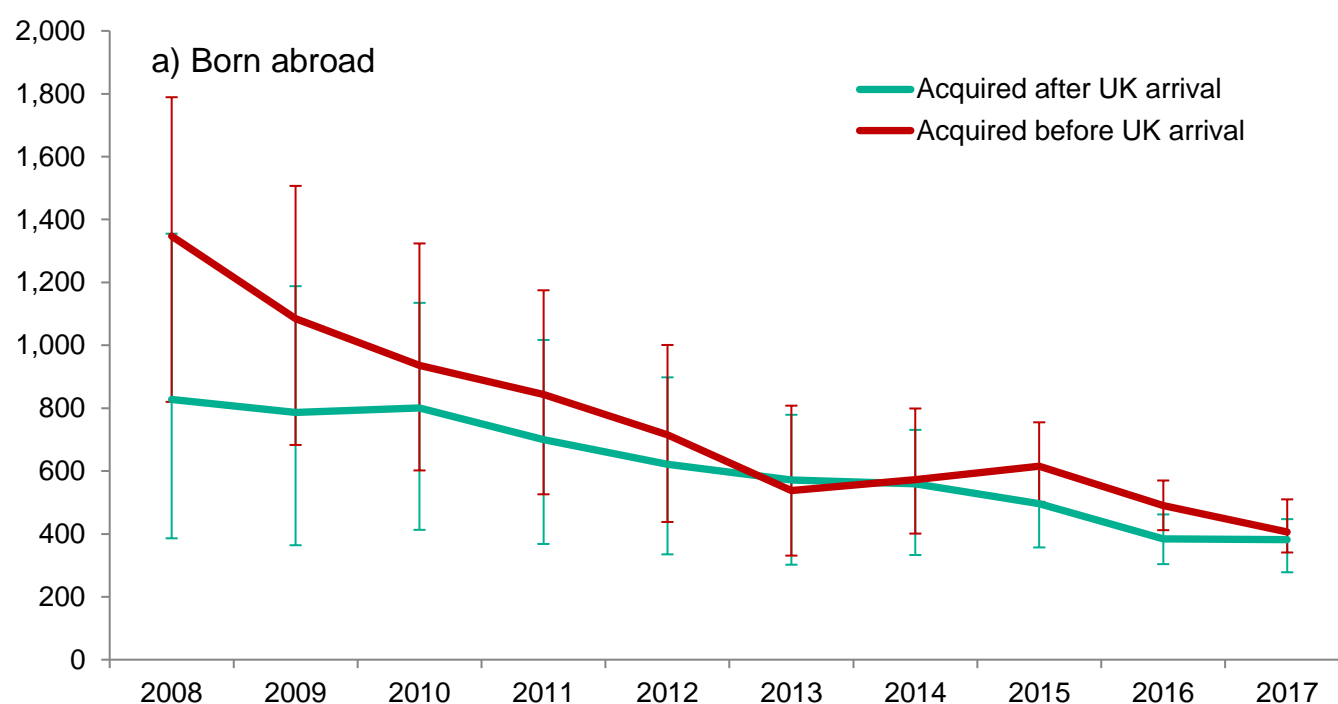
**Figure 6: HIV diagnoses\* among heterosexual men and women, by population characteristics: UK, 2008 to 2017**

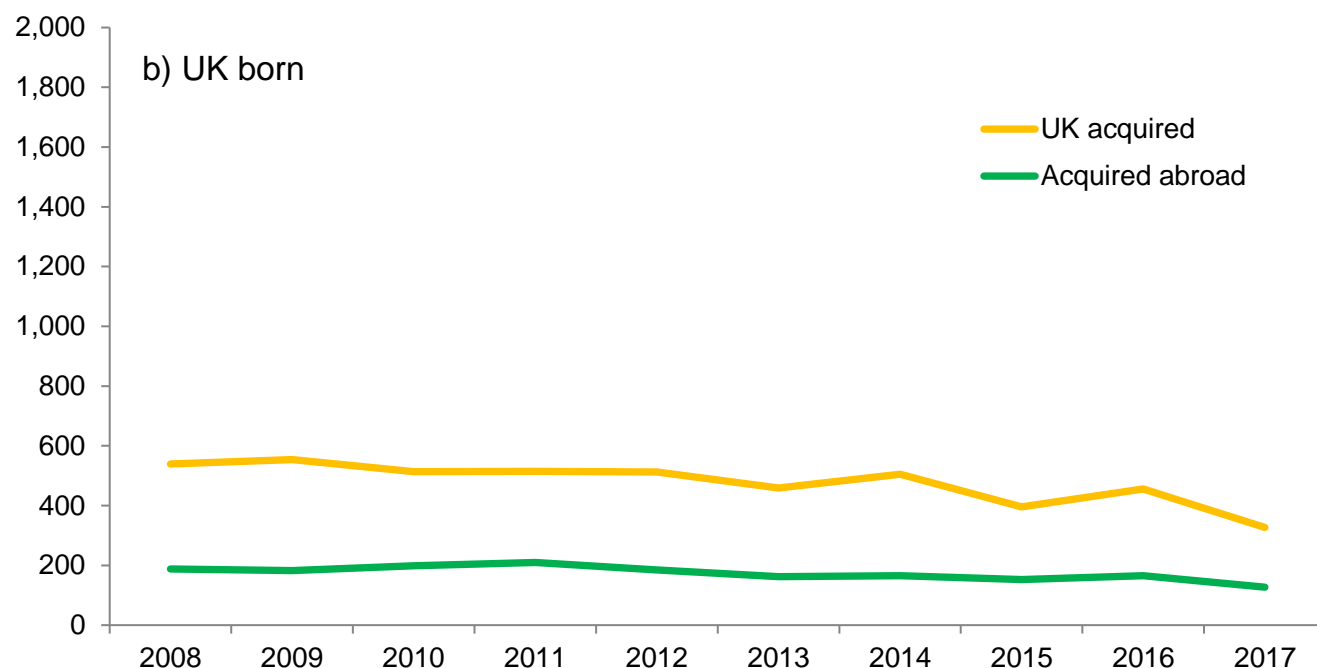


\*Observed data, not adjusted for missing information

Among heterosexuals born abroad, the number of diagnoses estimated to have been acquired before arrival to the UK declined more steeply from 1,350 (IQR 820 to 1,790) in 2008 to 410 (IQR 340 to 510) in 2017 (70% decline), than infections acquired after arrival to the UK (830, (IQR 390 to 1,360) to 380 (IQR 280 to 450), 54% decline) (Figure 7a). Among UK born heterosexuals, infections acquired abroad remain low and stable while a small decline was observed from 540 in 2008 to 330 in 2017 (39% decline) for UK acquired infections (Figure 7b). Overall it is estimated that just over half (58%) of all new diagnoses in heterosexuals in 2017 were acquired in the UK or after arrival in the UK.

**Figure 7: Estimated\* number of new diagnoses among heterosexual men and women acquired in the UK and abroad, by country of birth: UK, 2008 to 2017**





\*The numbers of infections acquired pre and post migration were estimated using CD4 counts at diagnosis, country of birth and year of arrival [18]

The estimated number of black African heterosexuals born abroad who also acquired HIV before arriving in the UK has declined from 1,070 (IQR 680-1,410) in 2008 to 230 (IQR 190-290) in 2017. A smaller decline was observed among those who acquired their infection after arrival in the UK, from 670 (IQR 330-1,070) in 2008 to 230 (IQR 160 to 270) in 2017.

## 2.3. Trans communities

Since the availability of information on gender identity in 2015, 33 new diagnoses have been recorded among trans<sup>xviii</sup> people with 8 of the diagnoses in 2017. Six trans people diagnosed in 2017 were aged 35 to 49 years, 3 were of white ethnicity, 2 were of mixed ethnicity and 3 of other ethnicity. Of the 6 individuals with CD4 counts, 2 were diagnosed late.

## 2.4. Other key populations

The number of people who acquired HIV through injecting drug use in the UK remains low (140<sup>xix</sup>) comprising 3% of all new HIV diagnoses in 2017, of which 77% (88/115<sup>xx</sup>) were men and 77% (89/115) were aged between 25 to 49 years. In 2017, 42 children were diagnosed with HIV following mother-to-child transmission. All the children were

<sup>xviii</sup> Trans is an umbrella term that refers to all people whose gender identity is different to the gender given at birth, this includes trans men, trans women, non-binary, and other gender identities

<sup>xix</sup> Adjusted for missing exposure information.

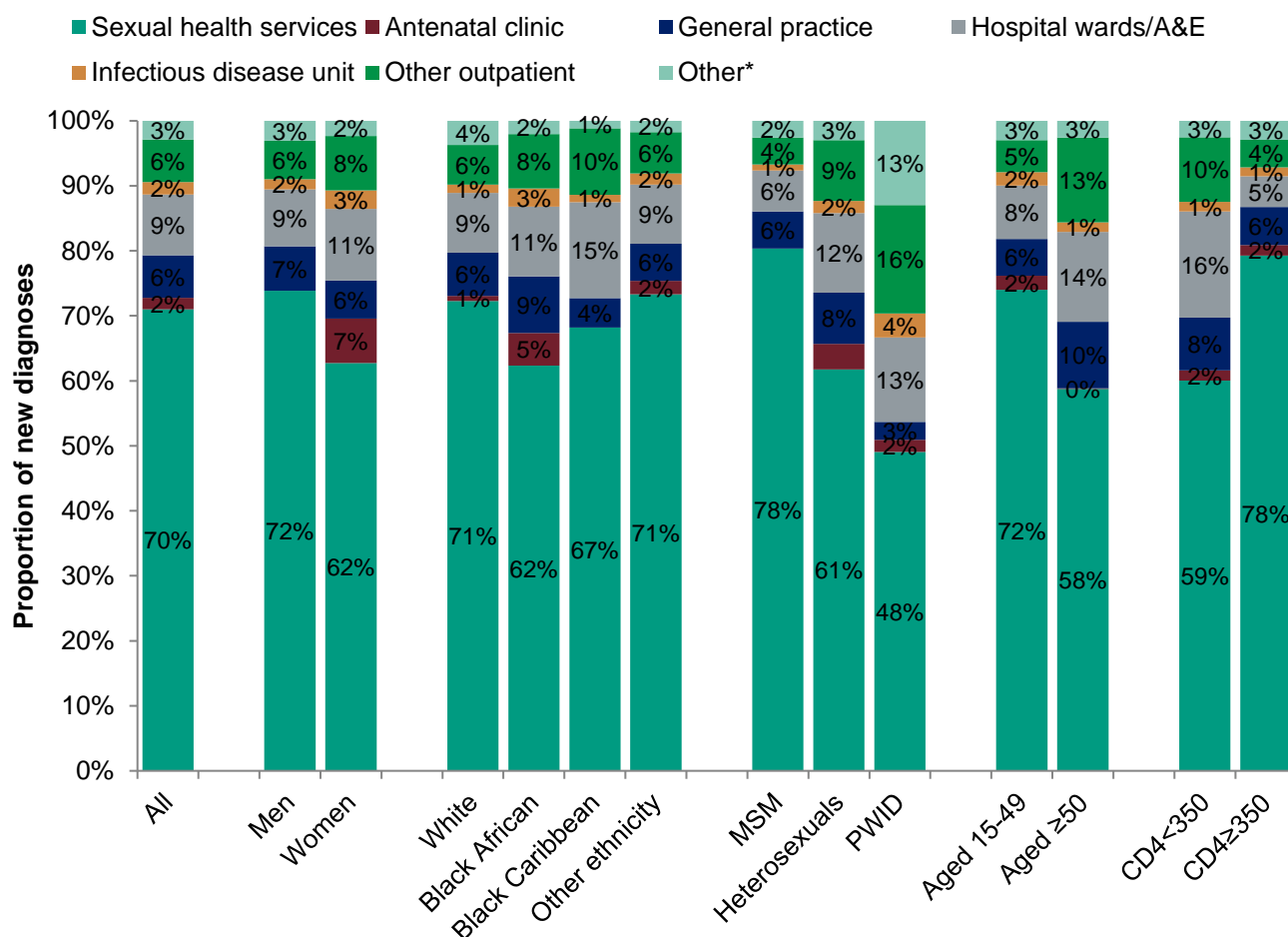
<sup>xx</sup> Observed data

born outside of the UK. The risk of vertical transmission of HIV in the UK remains extremely low; this is because almost all babies at risk were born to women living with HIV who were already aware of their HIV status and receiving ART. This benefits the mother's health and protects their child from acquiring HIV.

## 2.5. Setting of diagnosis

The setting of first positive test was reported for 89% (3,871/4,334) of adults (aged  $\geq 15$  years) newly diagnosed with HIV in the UK in 2017. Most adults (70%; 2,700/3,871) in the UK continue to have their first positive HIV test in sexual health services (SHS), followed by hospital wards/accident and emergency (A&E) (9%; 355/3,871), general practice (6%, 249/3,871) and outpatient services (6%; 248/3,781) (Figure 8). Key groups most likely to have been diagnosed outside of SHS include: women (38%; 375/990), people of black African ethnicity (38%; 251/652), PWID (52%; 57/110), people aged 50 years and above (42%; 312/749) and people diagnosed late with HIV (41%; 520/1,277). The proportion of HIV diagnoses made outside SHS has increased over the past decade in line with evolving HIV testing recommendations (Appendix 3) [19].

**Figure 8: Setting of first positive test among adults newly diagnosed with HIV by population group†: UK, 2017**



† Among new HIV diagnoses with setting of diagnosis reported (n=3,871)

\*Other diagnosis settings include: drug misuse services, prisons, the blood transfusion service, self- testing/self-sampling, private medical clinics and other services not specified

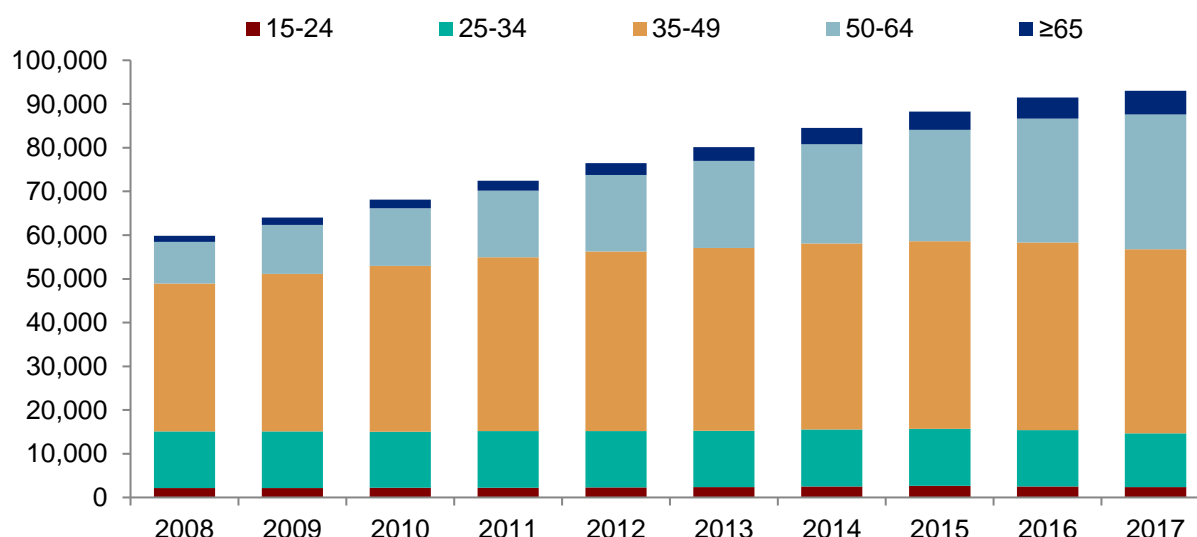
### 3. People living with diagnosed HIV

In 2017, 93,385<sup>xxi</sup> people (64,472 men and 28,877 women) living with diagnosed HIV infection received HIV care in the UK. This is a 54% increase on the number a decade ago (60,737 in 2008) and is due to effective treatment for HIV prolonging life, as well as ongoing new diagnoses.

The median age of people receiving care increased over the past decade, from 40 years in 2008 to 46 years in 2017. In 2017, more than a third (39%; 36,288/93,385) of people receiving HIV specialist care were aged 50 years and above (Figure 9a).

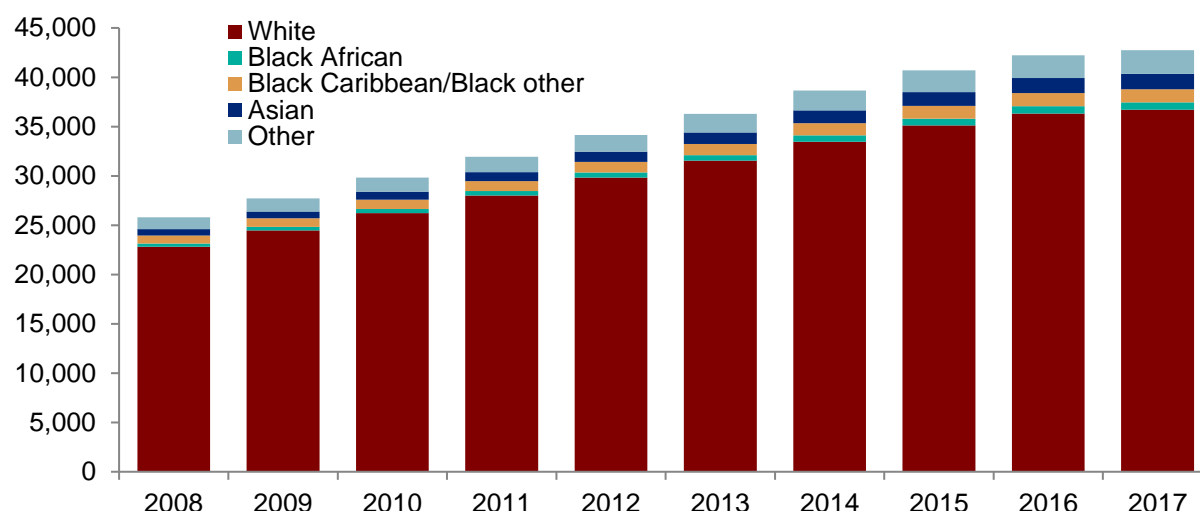
In 2017, 14% (6,029/42,739) of gay and bisexual men receiving HIV care were from BAME groups, similar to 2008 (12%; 2,994/25,806) (Figure 9b). Among heterosexuals, black African men and women accounted for the greatest proportion of those receiving care (57%; 24,548/42,668), while 26% (11,058) were of white ethnicity compared to 21% (6,429/30,631) in 2008 (Figure 9c). In 2017, 123 trans people were receiving HIV care in the UK; 62% were from white ethnic groups and 42% were aged between 35 to 49 years.

**Figure 9: People diagnosed with HIV receiving specialist care, UK, 2008 to 2017**  
a) By age group

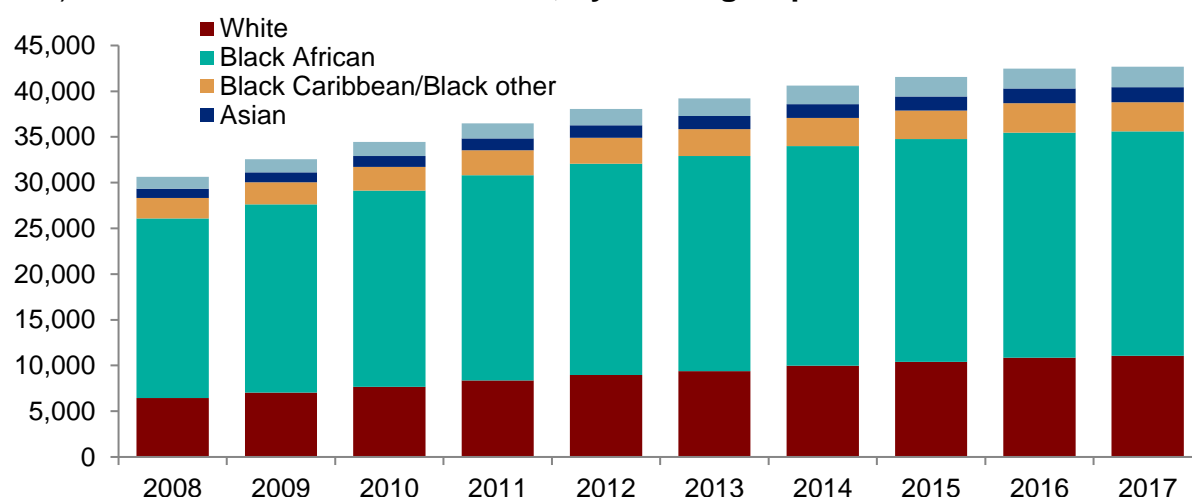


<sup>xxi</sup> The overall total includes people who identify in another way and those with gender identity not reported.

## b) Gay and bisexual men, by ethnic group



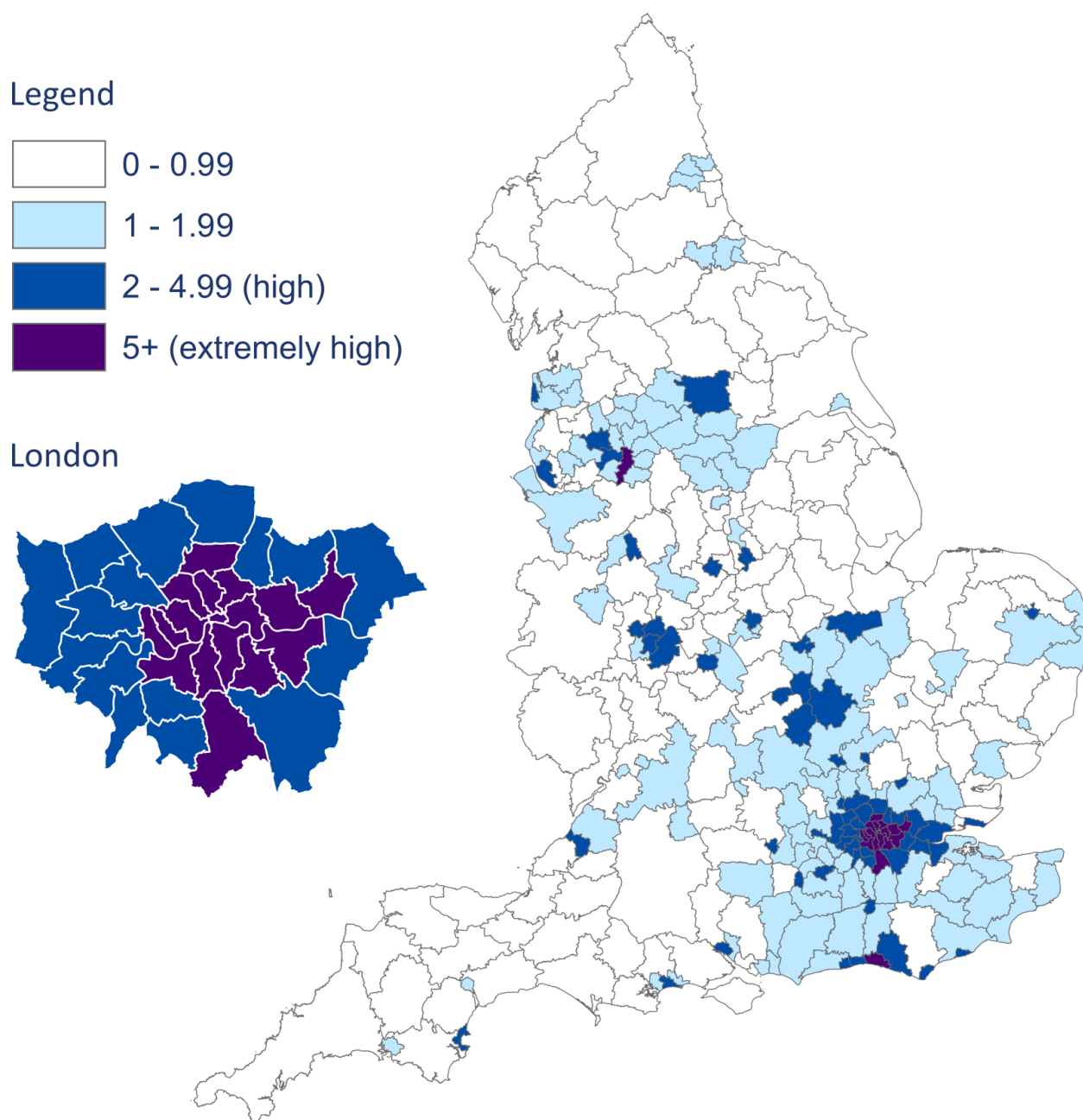
## c) Heterosexual men and women, by ethnic group



Among the 93,385 people who received HIV care in 2017, 4,891 (5%) were diagnosed with HIV abroad prior to arrival in the UK. There was no difference in the proportion previously diagnosed abroad between gay and bisexual men and heterosexual men and women (5% each). Three-quarters (3,691) of individuals first diagnosed abroad were also born abroad. Among those born and previously diagnosed abroad, 33% did not access care within 1 year of arrival in the UK and 35% had a CD4 count <350 cells/mm<sup>3</sup> at the time of diagnosis in a UK setting.

Overall, 79 of 325 local authorities in England had a high diagnosed prevalence that was greater than 2 per 1,000 population aged 15 to 59 years in 2017 (Figure 10). Of these, 19 had an extremely high diagnosed prevalence of greater than 5 per 1,000 population aged 15 to 59 years (17 London local authorities, Manchester, and Brighton and Hove). These are areas in which expanded HIV testing should be implemented and a full list is provided in Appendix 4.

**Figure 10: Diagnosed HIV prevalence in England, 2017 (per 1,000 population aged 15 to 59 years)**





## 3.1. Clinical outcomes

### 3.1.1. Retention in care

Once adults are receiving HIV care, remaining engaged with HIV care services is important to achieve good clinical outcomes including survival and viral load control. Retention also provides additional benefits through access to ancillary services and social support. After excluding deaths<sup>xxii</sup>, the large majority (97%, 84,032/87,057) of adults seen for care in 2015 were seen again for HIV care in 2016 or 2017. There were 3,025 people who have not received care since 2015; of these, 19% (568/3,008) were not on treatment at their last care attendance and 23% (550/2,351) were not virally suppressed. This is in comparison to people retained in care, where only 5% (4,355/83,783) were not on treatment and 9% (6,815/76,429) not virally suppressed.

Retention was lower among PWID with 7% (131/1,817) not retained compared to 3% (1,211/40,475) of gay and bisexual men. Non-retention was higher among those born in the Americas, Oceania and the Caribbean (6%, 254/4,577) and Europe (excluding the UK) (6%, 444/7,628) compared to people born in the UK (2%, 695/36,916). Among 15 to 24 year olds, 8% (198/2,622) had not received care since 2015 and this proportion decreased with increasing age; only 3% (2,102/71,454) of those aged 35 years and over were not retained in care. Though overall numbers were small (130), 9% of trans people were not retained in care after 2015. There was no difference in retention by geography.

Some of the loss to follow-up is due to emigration; the 2013 BHIVA audit on retention found that 26% of people who did not return for care or receive care after diagnosis had probably left the UK [20].

### 3.1.2. Treatment coverage

The 2016 interim BHIVA treatment guidelines recommend that all people living with diagnosed HIV infection should be offered treatment as soon as possible after diagnosis to prevent onward transmission [21]. In 2017, 98% (91,266/93,385) of people who attended for HIV care in the UK were receiving treatment. Treatment coverage was high in all sub-groups.

### 3.1.3. Virological suppression

With effective treatment, people living with HIV can achieve an undetectable viral load (less than 200 copies/ml). People who are virologically suppressed cannot pass on their

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<sup>xxii</sup> 1,216 deaths among people receiving HIV care between 2015 and 2017

HIV infection through sexual contact [22]. In the UK, in 2017, 88% of people receiving treatment had a viral load measurement reported. Of these, 97% (77,341/79,993) had an undetectable viral load. Virological suppression was high across all places and populations except among young people aged 15 to 24 years (87%, 1,720/1,978).

### 3.2. Quality of life

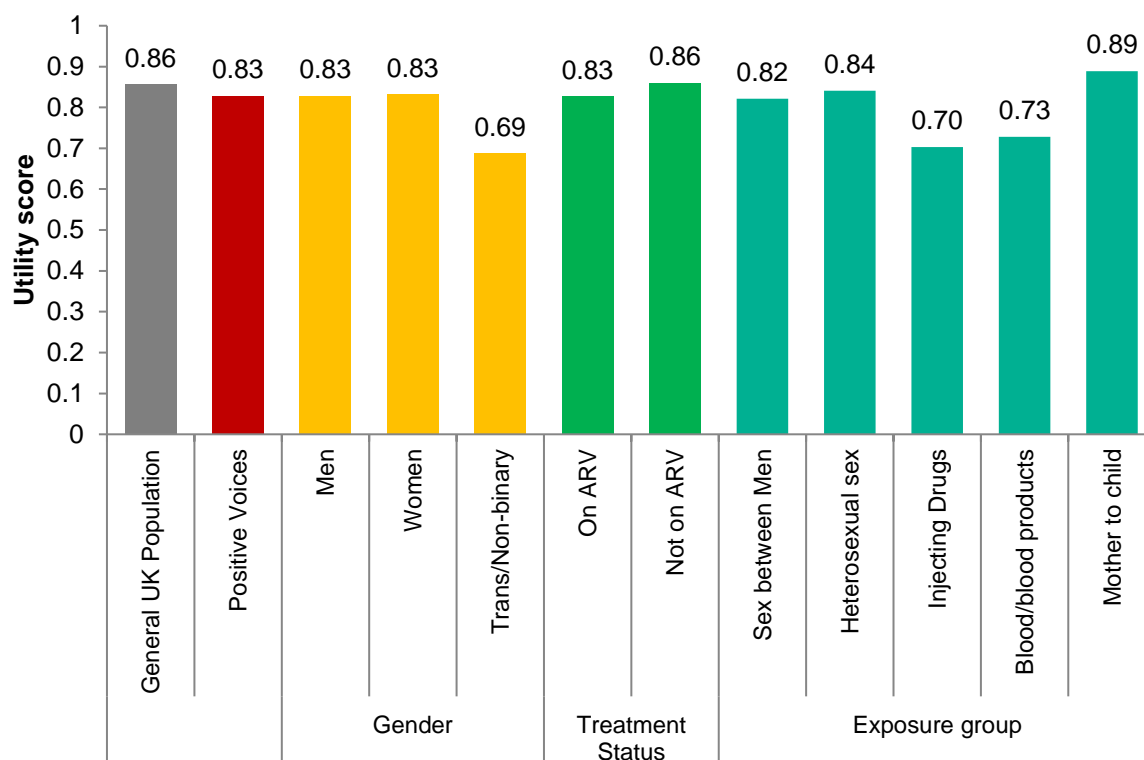
Positive Voices is a nationally representative survey of people living with HIV in England and Wales. Participants were randomly selected in 2017 from 73 HIV clinics. In total, 4,424 people completed the survey (51% response rate). The survey asked about: quality of life, health and wellbeing, non-HIV health conditions and medications, experiences with healthcare services, met and unmet needs, sex and relationships, lifestyle, and socioeconomic status. The questionnaire was designed in collaboration with people living with HIV, academics, clinicians and NHS commissioners. The full report of the 2017 survey findings will be published in January 2019.

Early diagnosis and treatment has dramatically improved the life expectancy of people with HIV. In the absence of a cure, HIV has evolved into a lifelong chronic condition, associated with other chronic conditions. With nearly all people diagnosed with HIV on effective treatment, the cohort of people with HIV is getting older. Supporting people with HIV to maintain a good quality of life is increasingly important to safeguard good clinical HIV outcomes into the future. Assessment of quality of life relates holistically to general health and overall well-being.

In 'Positive Voices', 73% of people with HIV rated their general health as "very good" or "good" compared to 81% of the general English population [3]. Similarly, people with HIV rated their satisfaction with life on average 7.4 out of 10, compared to 7.7 in the general English population [23].

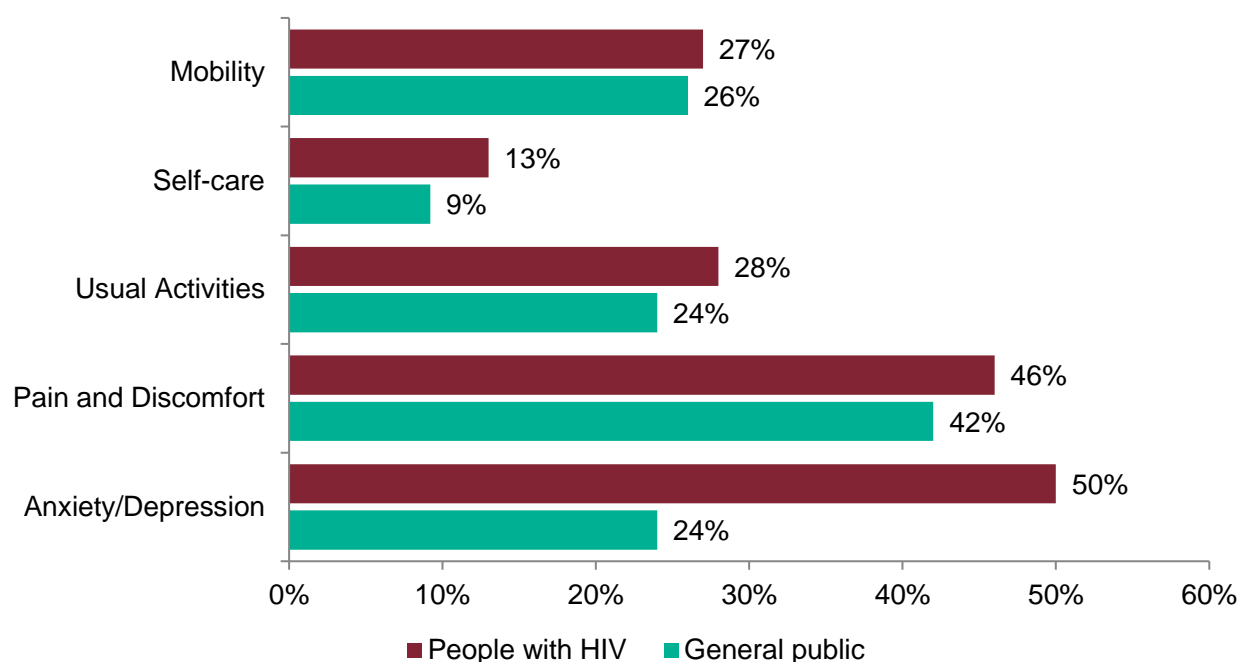
Health-related aspects of quality of life can be specifically measured using the Euroqol (EQ-5D-5L) questionnaire [24], which takes into account 5 aspects of quality of life (for example mental health, self-care [washing, dressing, etc.] and ability to do usual activities) to give an index score where 1 represents the best possible health and 0 the worst health. The overall utility score for health-related quality of life for people with HIV in the UK was 0.83, compared to 0.86 in the general English population [25] (Figure 11).

**Figure 11: Health-related quality of life utility scores among people living with HIV in England and Wales compared to the English general population, 2017**



The main disparity between people with HIV and the general population was mental health, with half (50%) of people with HIV reporting symptoms of depression and anxiety, compared to a quarter (24%) of the general public (Figure 12). Trans/non-binary persons had markedly lower quality of life scores (0.69), followed by PWID (0.70) and people infected through blood/blood products (0.73).

**Figure 12: Distribution the proportion of problems (EuroQol-5D) reported by people with HIV (2017) and the general English population (2018)**



Unmet needs can negatively affect quality of life in people with HIV. Positive Voices included a comprehensive needs assessment, asking respondents if they needed specific services (6 HIV-related services, 11 health-related services, and 12 social and welfare services) in the past year, and whether they had received that service. People who had a specific need for which they did not get help were defined as having an unmet need. Overall, three-quarters (74%) had an HIV-related health need, of which only 20% was unmet.

Two-thirds (63%) of respondents had a health-related need and 46% had a social and welfare need. Of these needs, nearly half (45%) of health-related needs and two-thirds (62%) of social care needs were unmet. The greatest area of unmet need was for help dealing with isolation and loneliness, with 1 in 5 people with HIV needing this help, of whom 75% reported that this need was unmet. Another key area of need was financial insecurity: 46% of women and 32% of men with HIV live at or below the poverty line (less than £20,000 annual household income), and 68% of women and 44% of men with HIV do not always have enough money to meet their basic needs (for example utilities, food, rent). In the past year, 1 in 6 (16%) needed financial advice, 1 in 5 (20%) needed housing support, and 1 in 4 (23%) needed help claiming benefits: overall, about half of these needs was unmet.

HIV-related stigma and discrimination can negatively impact quality of life. One in 8 (13%) people said they had not told anyone, other than healthcare professionals, about their HIV status (16% of women and 11% of men). A quarter of people said they had needed help disclosing their HIV status in the previous year (31% of women and 21% of

men). Of those who needed this help, 40% did not receive it. Stigma (including self-stigma) and discrimination also persist in healthcare settings. In the previous year, due to their HIV status, 16% were worried that they might be treated differently to other patients, 10% had avoided healthcare when they needed it and 5% felt they were refused healthcare or delayed a treatment or medical procedure.

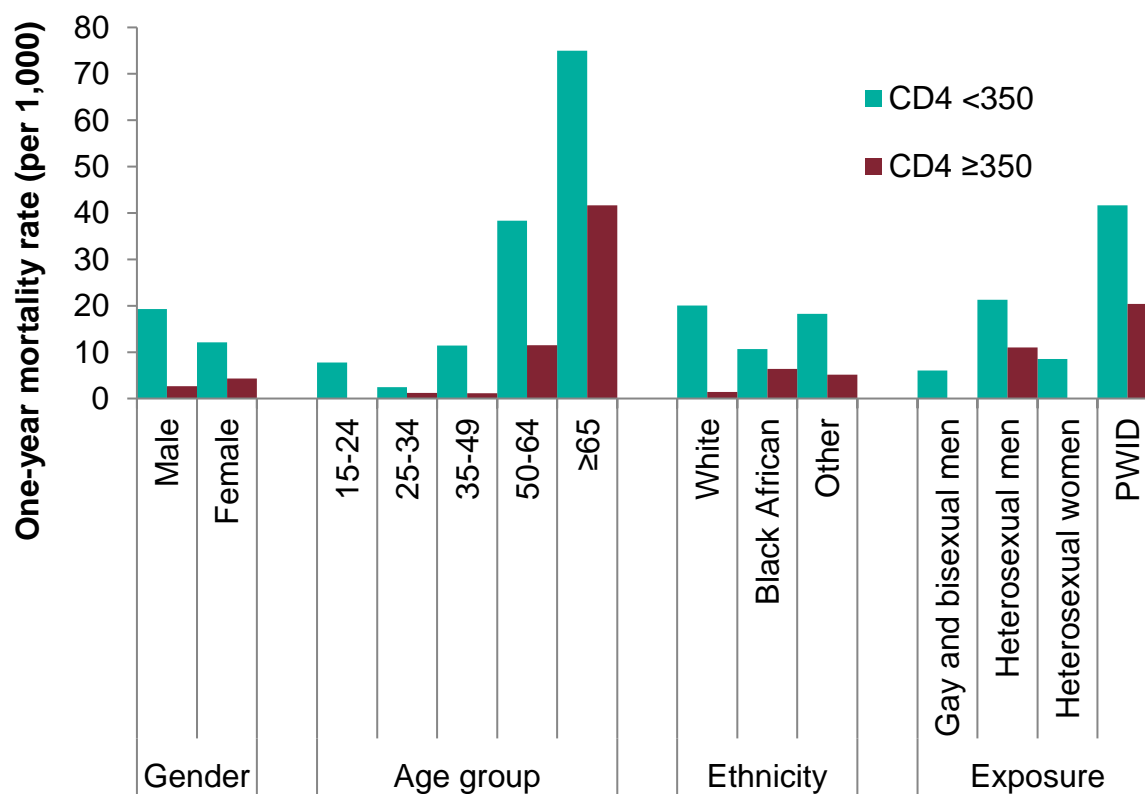
### 3.3. Deaths among people with HIV

In 2017, 428 people with HIV infection died from any cause and over half of deaths (62%; 267/428) were among people aged 50 years and over. Assuming that approximately 58% of deaths are attributable to AIDS-defining illnesses [26], 248 AIDS-related deaths in 2017 may have been preventable through earlier diagnosis.

Mortality rates were similar among gay and bisexual men and heterosexuals with diagnosed HIV, at 3.08 per 1,000 and 3.15 per 1,000 people with diagnosed HIV, respectively but higher among people diagnosed with HIV who injected drugs (14.21 per 1,000). In 2017, the crude mortality rate among people aged 15 to 59 years who were diagnosed promptly was 1.22 per 1,000 compared to 1.66 per 1,000 in the general population of the same age group.

Late HIV diagnosis (CD4 cell count  $<350$  cells/mm<sup>3</sup> within 91 days of HIV diagnosis) has a significant impact on survival within a year of diagnosis. One-year mortality among adults diagnosed late in 2016 was 18 per 1,000, compared to 3.01 per 1,000 among adults diagnosed promptly (Figure 13). One-year mortality was particularly marked among people aged 50 years and over, where 1 in 26 people diagnosed late in 2016 died within a year of diagnosis.

**Figure 13: One-year mortality rate among adults newly diagnosed with HIV by CD4 cells/mm<sup>3</sup> at diagnosis: UK, 2016**



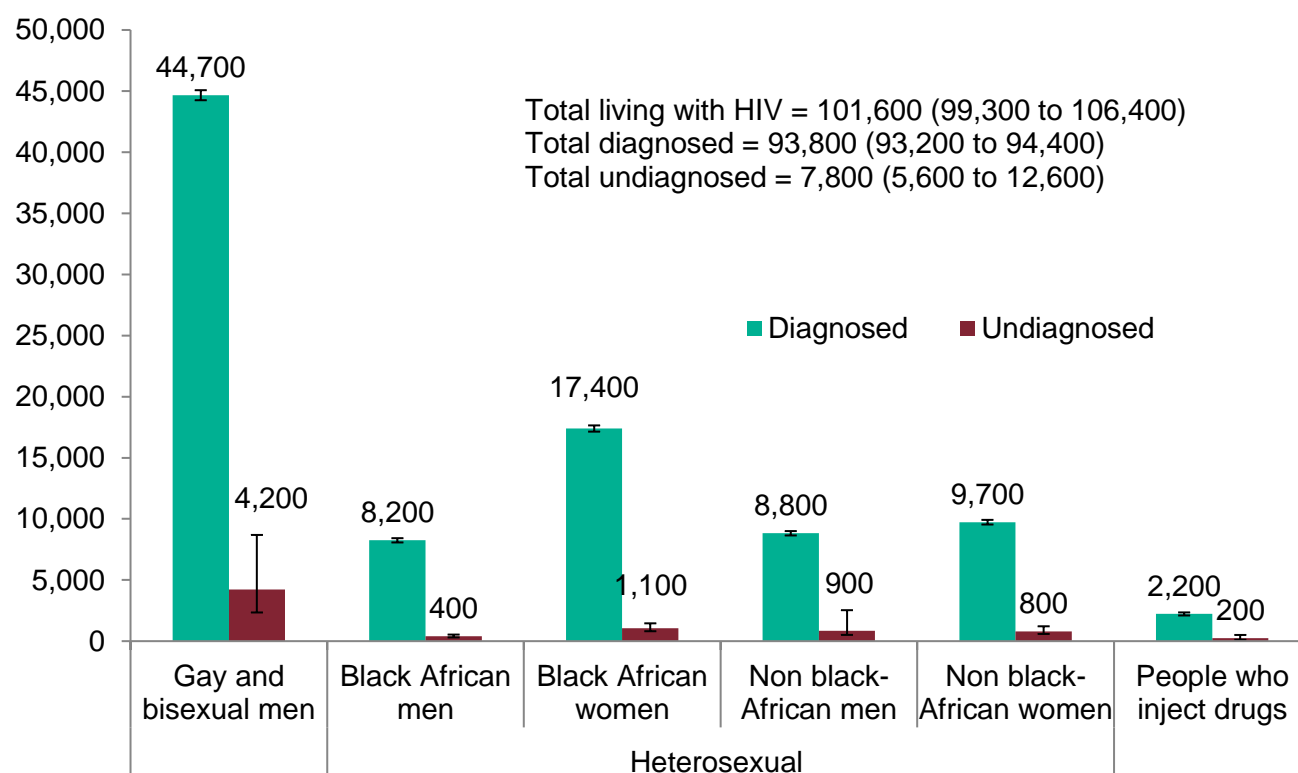
## 4. Undiagnosed HIV infection late diagnosis

### 4.1. Total numbers of people living with HIV

The Bayesian multi-parameter evidence synthesis (MPES) model used to estimate the total numbers of people living with HIV and the HIV undiagnosed fraction, has been updated since last year. These changes include the use of new data sources to provide better estimates for PWID and low risk groups, and changes to how existing data sources were applied to obtain estimates among black African heterosexuals and women. HIV prevalence by sub-groups can only be estimated for England as sub-population estimates are not available for the other countries of the UK.

In 2017, an estimated 101,600 (CrI 99,300 to 106,400) people were living with HIV infection in the UK (Figure 14). Using these estimates, the overall prevalence of HIV in England in 2017 was 1.7 per 1,000 (CrI 1.6 to 1.7) among people of all ages and 2.2 per 1,000 (CrI 2.1 to 2.3) among people aged 15 to 74 years. HIV prevalence was higher among men, estimated at 3.0 per 1,000 (CrI 2.9 to 3.2) compared with women, estimated at 1.3 per 1,000 (CrI 1.3 to 1.4).

**Figure 14: Estimated\* number of people living with HIV (diagnosed and undiagnosed) all ages: UK, 2017**



\*Estimates do not add to totals and subtotals due to rounding.

A total of 48,900 (CrI 47,000 to 53,400) gay and bisexual men were estimated to be living with HIV in the UK in 2017 (Appendix 5). The prevalence of HIV was 83 (CrI 73 to 96) per 1,000<sup>xxiii</sup> among gay and bisexual men aged 15 to 74 years. HIV prevalence in this group was higher in London compared with the rest of England (134/1,000 CrI 113 to 156 and 63/1,000 CrI 53 to 76, respectively). There were 18,400 (CrI 17,900 to 20,000) heterosexual men and 29,000 (CrI 28,500 to 29,700) heterosexual women estimated to be living with HIV in the UK, of whom 8,600 (CrI 8,400 to 8,900) were black African men and 18,500 (CrI 18,100 to 18,900) were black African women (Appendix 5). The estimated prevalence of HIV among heterosexual men and women aged 15 to 74 years was low (1.1, CrI 1.1 to 1.1 per 1,000), but greater among black African adults; 25 (CrI 24 to 26) per 1,000 among black African heterosexual men and 47 (CrI 46 to 47) per 1,000 among black African heterosexual women.

## 4.2. Numbers of people living with undiagnosed HIV

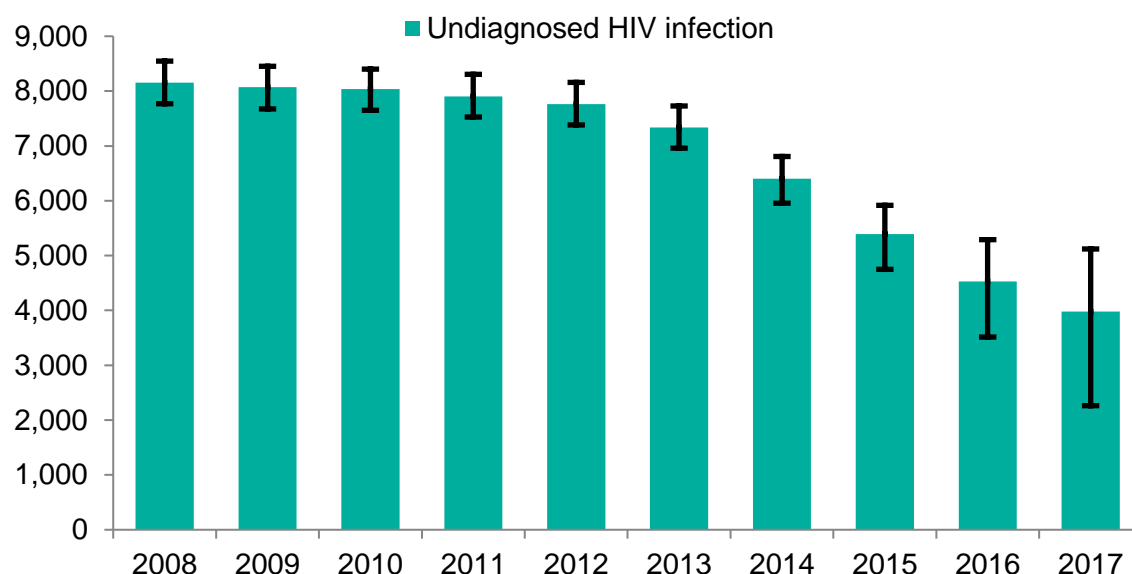
There were an estimated 7,800 (CrI 5,600 to 12,600) people unaware of their infection in 2017 (Figure 14, Appendix 5), equivalent to 8% (CrI 6 to 12%) of all people living with HIV in the UK. An estimated 4,200 (CrI 2,300 to 8,700) gay and bisexual men were living with an undiagnosed HIV infection, with lower proportions undiagnosed in London (5%, CrI 3 to 10%) compared to elsewhere in the UK (11%, CrI 5 to 22%).

A CD4 back-calculation model [17] is also used to estimate undiagnosed HIV infections among gay and bisexual men and this model has been refined to account for diagnoses made abroad prior to arrival in the UK. Following this adjustment, a similar number of gay and bisexual men were estimated to be living with an undiagnosed HIV infection in England (4,000, CrI 2,800 to 5,700) (Figure 15) as the MPES model (3,700, CrI 2,100 to 7,600). While the credible intervals generated from the back-calculation model overlap between years, estimated numbers appear to decline from 7,800 (CrI 7,400 to 8,100) in 2012 to 4,000 (CrI 2,800 to 5,700) in 2017.

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<sup>xxiii</sup> Estimating that 2.6% (CrI 2.3 to 3.0%) of men aged 15 to 74 years are men who have had sex with other men in the past 5 years (531,600, CrI 465,700 to 608,700 men in 2017).



**Figure 15: Estimates of undiagnosed HIV infection in gay and bisexual men using a CD4 back calculation method, England, 2008 to 2017**

Overall, 3,200 (CrI 2,500 to 4,900) heterosexual men and women were estimated to be living with an undiagnosed HIV infection, equivalent to 7% (CrI 5 to 10%) of heterosexual adults living with HIV in the UK, with similar proportions unaware of their HIV infection in London (5%, CrI 4 to 8%) and outside London (8%, CrI 6 to 12% (Appendix 6)).

### 4.3. Late HIV diagnosis

Late diagnosis is the most important predictor of morbidity and premature mortality among people with HIV infection [27] and people diagnosed late are likely to have been living with an undiagnosed HIV infection for around 3 to 5 years [28] and may have been at risk of passing on HIV to partners if having sex without condoms. For surveillance purposes, a late HIV diagnosis is defined as having a CD4 cell count <350 cells/mm<sup>3</sup> within 91 days of HIV diagnosis<sup>xxiv</sup>.

The adjusted number of late HIV diagnoses<sup>xxv</sup> decreased from 3,895 in 2008 to 1,879 in 2017 and overall, in 2017, 43% of HIV diagnoses were made at a late stage of HIV infection. Although the decline was most marked among black African heterosexual women (82% decline, from 1,053 to 188) and men (79%, from 592 to 126) (Figure 16), the proportion diagnosed late remained highest in these groups in 2017 (52%, 145/277<sup>xxvi</sup> and 69%, 102/147, respectively) (Appendix 7). In contrast, the number of

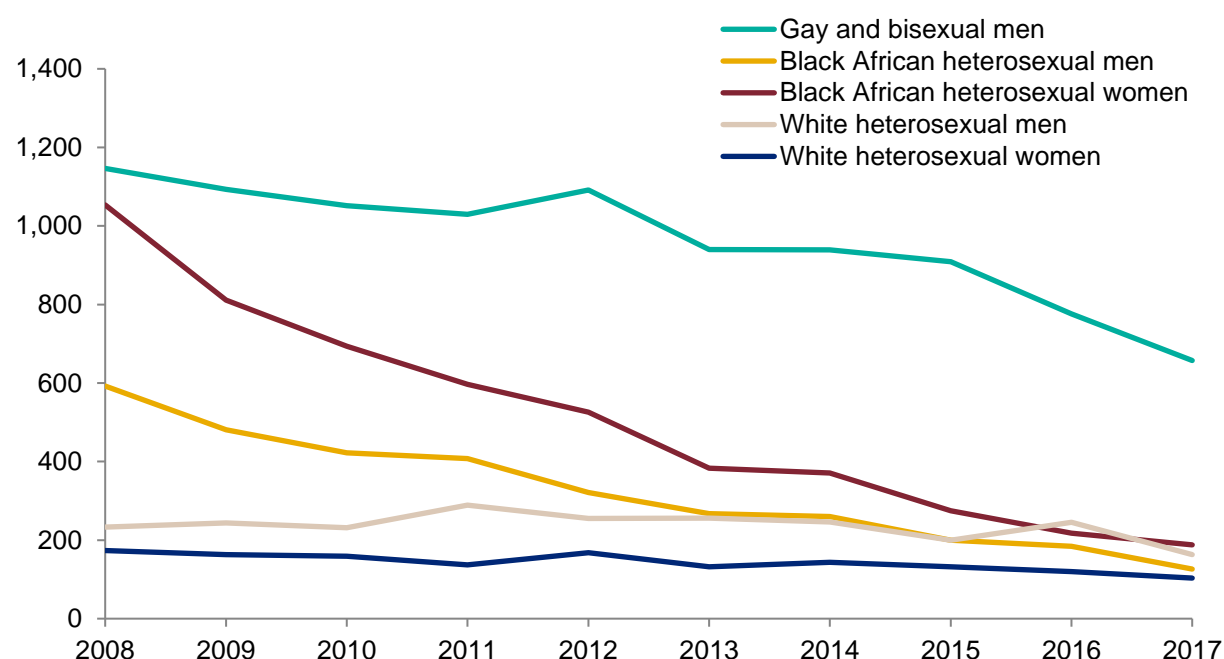
<sup>xxiv</sup> The definition of a late HIV diagnosis includes people reported to have had a diagnosis abroad prior to a UK diagnosis and does not currently exclude those with clinical indication of a recently acquired HIV infection (For example, through RITA or a recent HIV negative test).

<sup>xxv</sup> Trend data are adjusted for missing CD4 information. CD4 count at diagnosis was 72% complete in 2017.

<sup>xxvi</sup> Data reported for 2017 are observed (not adjusted for missing CD4 information).

white heterosexual men and women diagnosed late has declined less steeply over the past decade (30%, 233 to 163 and 40%, 173 to 103, respectively), and represented 52% of diagnoses in white heterosexual men and women in 2017. Between 2008 and 2017 late diagnoses declined by 36% among PWID (86 to 55) and in 2017, 47% were diagnosed late. A 43% decline from 1,146 to 657 in gay and bisexual men diagnosed late was observed over the same period and in 2017, 33% (530/1,586) were diagnosed late. Overall, 23% (720/3,118) of those diagnosed in 2017 were severely immunocompromised at the time of their diagnosis, with a CD4 count  $<200$  cells/mm<sup>3</sup>.

**Figure 16: Adjusted\* number of people diagnosed late by risk group: UK, 2008 to 2017**



\*Adjusted for missing CD4 count at diagnosis.

The proportion of HIV diagnoses made at a late stage of infection increased with age. In 2017, 31% (120/390) of people aged 15 to 24 years were diagnosed late compared to 55% (281/509) and 61% (50/82) among those aged 50 to 64 years and over 65 years, respectively. The number diagnosed late among 50 to 64 year olds has slightly declined from 473 in 2008 to 402 in 2017 (15%) while the number in the over 65s increased from 65 in 2008 to 119 in 2016 (83% increase) before declining to 88 in 2017.

#### 4.4. AIDS at diagnosis

The number of people diagnosed with AIDS at diagnosis has steadily declined over the past decade. In 2017, 230 people were diagnosed with an AIDS-defining illness at or within 3 months of their HIV diagnosis, a 63% decline on the 620 diagnoses made in 2008.

Pneumocystis pneumonia remained the most commonly diagnosed AIDS-defining illness, accounting for 43% (98/230) of AIDS diagnoses in 2017, followed by oesophageal candidiasis (17%; 40/230) and Kaposi's sarcoma (12%; 27/230).

## 5. Combination HIV prevention

Combination HIV prevention seeks to achieve maximum impact on HIV incidence by implementing complementary evidence-based behavioural, biomedical and structural strategies in the context of a well-researched and understood local epidemiology [1]. Some key elements of combination HIV prevention include: condom provision, pre-exposure prophylaxis (PrEP), expanded HIV testing and prompt initiation of ART after diagnosis.

Combination HIV prevention is not only a commissioning framework, it also serves as an individual's strategy for HIV prevention. Each individual can combine different tools or approaches (either at the same time or in sequence), according to their current situation, preferences and risk levels. A combination HIV prevention approach helps ensure that individuals have access to the types of interventions that best suit their needs as their life circumstances change.

Combination HIV prevention includes both primary prevention (focused on people who are HIV negative) as well as prevention of onward transmission.

Key features of combination HIV prevention include[1]:

- tailored to national and local needs and contexts
- combined biomedical, behavioural and structural interventions
- based on community-centred approaches to address social determinants of health
- flexible and adaptive to changing patterns and can rapidly deploy innovation

A combination of HIV prevention efforts has been a key reason for the recent declines in new HIV diagnoses. PHE continues to support combination HIV prevention by monitoring the uptake and supporting implementation of some of its key elements, including:

- condoms
- PrEP
- HIV testing
- treatment as Prevention (TasP) and U=U

This report explores the role of some of the key components of combination HIV prevention based on available monitoring data. Further components not explored include the role of social marketing, community outreach, post exposure prophylaxis (PEP) and other strategies presented in the published literature.

## 5.1 Condoms

Condoms remain an important component in the prevention of HIV and sexually transmitted infections (STIs) and are highly effective in preventing transmission when used correctly and consistently during vaginal and anal sex [5, 6].

Condom use with casual partners have been relatively high amongst gay and bisexual men in the UK, without which HIV incidence in this population would have been much higher than experienced [7, 8]. There has, however, been an increase in condomless anal sex with casual partners since the early 2000's; in 2016, 60% of gay and bisexual men participating in the London Gay Men's Sexual Health Survey, reported condomless anal sex in the 3 months prior to interview [29], compared to 43% in 2000 [30].

National and local efforts to promote condom use as a safer-sex strategy among gay and bisexual men and black African communities continue to take place around the UK. PHE commissions the national **HIV Prevention England** programme to promote evidence-based approaches to HIV prevention, including condom use.

Young people are at higher risk of acquiring STIs, and in a recent survey, almost half of sexually active young people said they had had condomless sex with a new partner; whilst 1 in 10 sexually active young people reported never having used a condom [31]. At the end of 2017, PHE launched a new condom campaign **Protect Against STIs**, aiming to reduce the rates of STIs among 16 to 24 year olds through condom usage.

Free condom distribution schemes, such as the C-Card scheme, are a key method of promoting condom use among young people under 25 years in the UK, due to their significant reach and easy access [32]. A recent PHE study of these schemes was carried out in London [33]. In 2016, over 36,000 London residents (equal numbers of males and females) used the scheme, which successfully reached key vulnerable groups, including young people of black and mixed ethnicity, and residents in deprived areas.

## 5.2 Pre-exposure prophylaxis (PrEP)

HIV pre-exposure prophylaxis (PrEP) involves the use of antiretroviral medicines, usually a tenofovir preparation combined with emtricitabine, by individuals who are HIV-negative in order to reduce their risk of acquiring HIV infection. Consistent PrEP use is highly effective at reducing the risk of HIV acquisition in gay and bisexual men and others at risk of HIV [9, 10, 34, 35]. PrEP is one of a range of HIV prevention options available in England and it facilitates regular sexual health service engagement and monitoring [35].

With the development of internet self-purchasing in 2015, PrEP use in England is thought to have quadrupled during 2016 [13], so that an estimated 3,000 gay and bisexual men were taking PrEP by year end. This number will have increased again during 2017, especially since the **PrEP Impact Trial**, jointly co-ordinated by Chelsea & Westminster NHS Foundation Trust and PHE began, as did PrEP programmes and studies in **Scotland** and **Wales**. PrEP is also available on private prescription and can be bought directly at low price from 1 London clinic [36]. In an online survey of PrEP users conducted in May 2018, 1,066 people reported currently using PrEP with over half (58%) obtaining PrEP from the trial while another third (34%) were buying it online [13].

The **PrEP Impact Trial** in England aims to recruit 13,000 participants across 150 specialist SHS over 3 years, and is open to all clinic attendees clinically assessed to be at high risk of HIV acquisition. Trial results will address outstanding questions regarding PrEP eligibility, uptake and duration of use, and impact on HIV and other STIs, to help inform future commissioning in England. As of October 2018, over 9,000 participants had been recruited across 139 sexual health services. Results from interim analyses will be available in early 2019.

Health promotion initiatives to increase PrEP knowledge and awareness in gay and bisexual men and other groups at high risk of HIV acquisition have been underway in England; however, there is some evidence of disparate activity by geography and limited activities tailored to heterosexuals, BAME and trans communities [37].

It is very probable that the scale-up of PrEP use in 2016 and 2017 will have had a substantial effect at reducing underlying HIV incidence, additional to the effect of intensified HIV testing combined with immediate treatment initiation in those newly diagnosed as living with HIV. However, it is too soon to estimate the size of this additional effect from available data.

Meanwhile, the 2016 commitment by NHS England to support a PrEP programme that is informed by the Impact Trial results [38], and the work that is underway to prepare for this programme are both welcome [14].

## 5.3 HIV testing policy implementation

HIV testing is pivotal in reducing HIV transmission as it reduces the number of people living with HIV who are unaware of their infection. National HIV testing recommendations aim to encourage the offer and uptake of testing in a range of clinical and community settings and population groups at increased risk [39]. NICE has produced guidance on increasing uptake of testing which builds on testing guidelines developed by British Association for Sexual Health and HIV (BASHH), British HIV Association (BHIVA) and the British Infection Society (BIS) [40]. Appendix 3 outlines which data sources are used to monitor the implementation and effectiveness of HIV testing guidance.

NICE has published quality standards to support the implementation of its guidance. These standards focus on improving HIV testing in hospitals and general practice in areas of high and extremely high HIV prevalence, among people with HIV indicator conditions, regular HIV testing among people with increased risk and testing those presenting following an HIV diagnosis in a sexual partner [41].

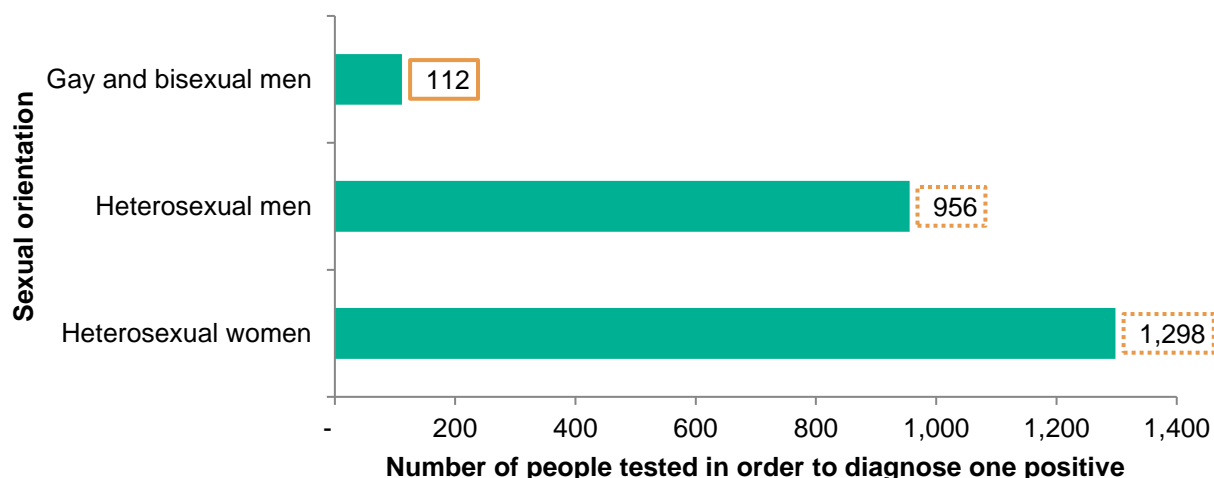
### 5.3.1. Sexual health services (SHS) in England

Most new diagnoses of HIV in England are made following HIV tests carried out in sexual health services (SHS). Both the number of people attending these services and the number of HIV tests carried out have continued to rise. Over 1.1 million people were tested for HIV in these services in 2017 (Appendix 8), and overall test positivity in SHS was 0.2%.

Most (91%, 1,006,652/1,107,743) of the people testing for HIV in SHS attended a specialist SHS, where test coverage was higher than in non-specialist SHS (66% vs. 41%) (Appendix 8). In 2017, 10% (116,071/1,107,743) of the people tested in SHS were gay and bisexual men. In 2017, 1,956 HIV diagnoses were made in SHS in England, 17% fewer than in 2016 (Appendix 9). Just over half of the new diagnoses made in SHS were in gay and bisexual men (1,038), with the remainder being in heterosexual men (412) and heterosexual women (425).

The number needed to test (NNTT) is a way of expressing test positivity, making it easier to compare testing across groups and settings. NNTT reflects the number of people needed to test in order to diagnose 1 HIV infection and it should be considered together with the number of diagnoses made in each population group. For example, in SHS overall, 112 gay and bisexual men need to be tested in order to diagnose 1 new diagnosis of HIV (Figure 17). As the UK progresses towards HIV elimination, the number needed to test to diagnose 1 HIV infection will increase.

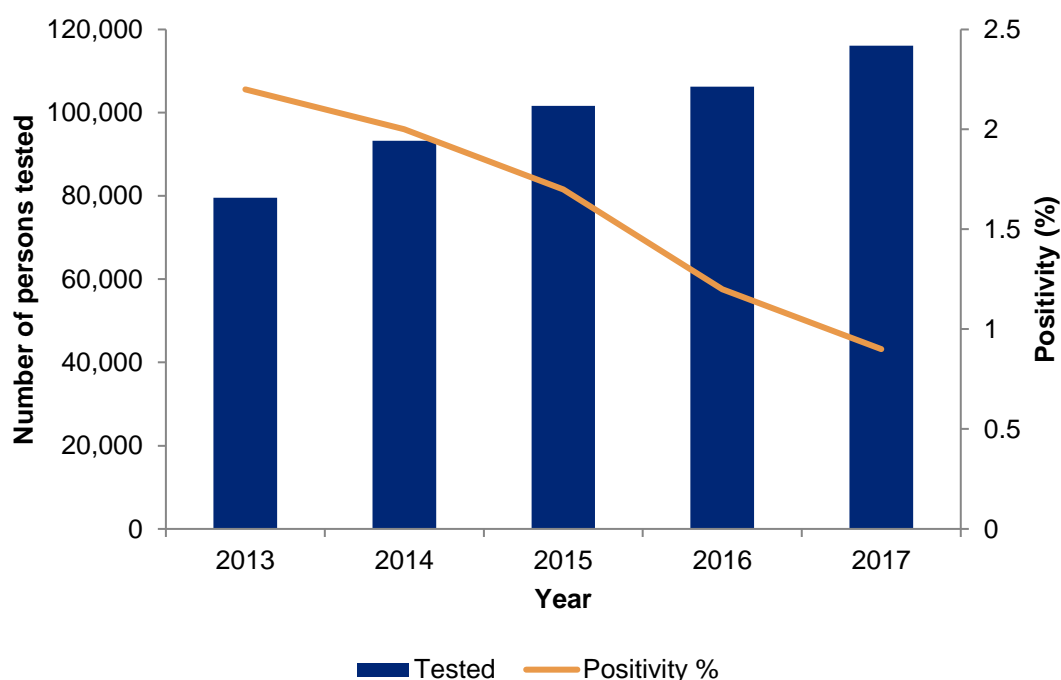
**Figure 17: Number needed to test in order to diagnose 1 person with HIV, all SHS attendees by sexual orientation, England, 2017**



### Gay and bisexual men

SHS continue to test an increasing number of gay and bisexual men for HIV with more than 116,000 men tested in 2017. HIV test positivity among gay and bisexual men more than halved between 2013 and 2017, falling from 2.2% to 0.9% (Figure 18).

**Figure 18: Trends in HIV testing and positivity for gay and bisexual male attendees at all SHS, England, 2013 to 2017**



Test coverage among gay and bisexual men was high, with 92% (120,524/130,617) being offered a test, and 89% (116,071/130,617) of eligible gay and bisexual male attendees being tested. However, this level of coverage still means that 14,546 eligible

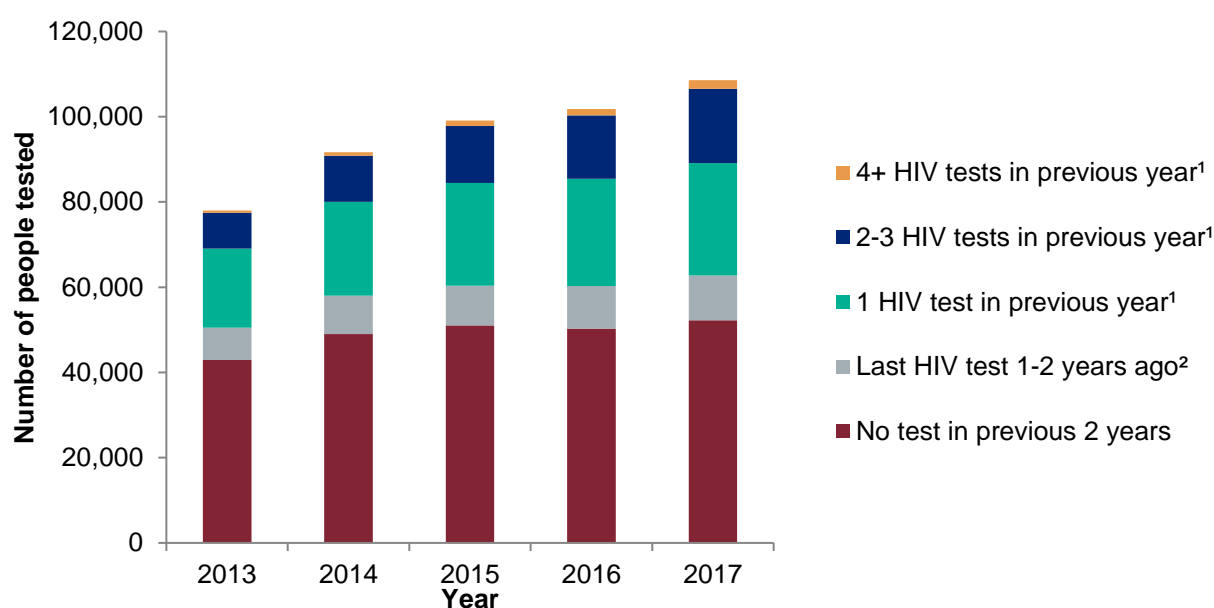


gay and bisexual men attended SHS but were not tested for HIV, 10,093 of whom were not offered an HIV test.

All people attending SHS for STI related needs should be offered and recommended an HIV test [40]. SHS should reach the BASHH service standard for HIV, testing 80% of people attending with STI related needs [42]. In 2017, 90% (198/221) of specialist SHS met this HIV test coverage standard for gay and bisexual male attendees (Appendix 10).

Gay and bisexual men should test annually for HIV, and every 3 months if they are having unprotected sex with new or casual partners. In 2017, 42% (45,804/108,548) of gay and bisexual men testing for HIV at a specialist SHS had at least 1 HIV test at the same service during the previous year (Figure 19); including 18% (19,438/108,548) who had 2 or more previous tests in the previous year (Appendix 11).

**Figure 19: Gay and bisexual men testing for HIV at specialist SHS: previous HIV tests at the same clinic, England, 2013 to 2017**

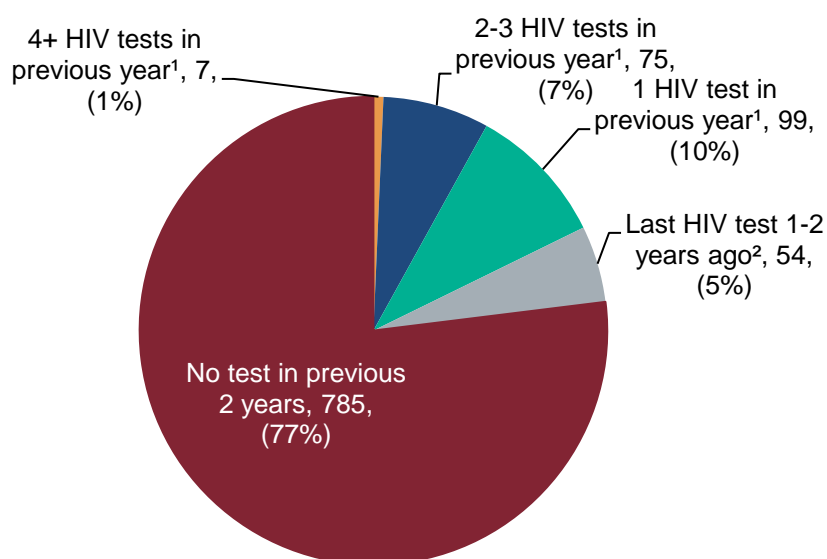


<sup>1</sup> Previous year – 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

<sup>2</sup> One to two years ago – at least 1 test in the 366 to 730 days and no tests in the 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

In 2017, 77% (785/1,020) of HIV diagnoses made in gay and bisexual men attending specialist SHS were among those who had not tested in the previous 2 years (at the same service) (Figure 20). Only 8% (82/1,020) of the diagnoses made in gay and bisexual men were among those who had tested frequently (had 2 or more tests in previous year at the same service).

**Figure 20: Gay and bisexual men diagnosed with HIV at specialist SHS: previous HIV tests at the same clinic, England, 2017**

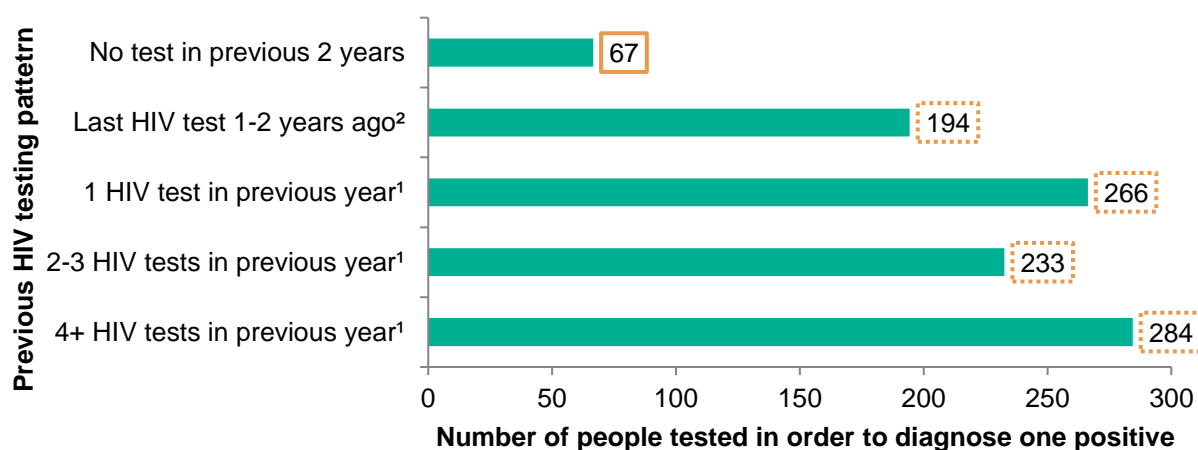


<sup>1</sup> Previous year – 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

<sup>2</sup> One to two years ago – at least 1 test in the 366 to 730 days and no tests in the 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

The heterogeneity of risk and testing patterns among gay and bisexual men is reflected in the number needed to test in order to diagnose one HIV infection. This ranged from 67 among men who were not tested at that service in the previous 2 years, to 284 among those who had at least 4 or more HIV tests in the previous year (Figure 21).

**Figure 21: Number needed to test, gay and bisexual men at specialist SHS: previous HIV test, England, 2017**



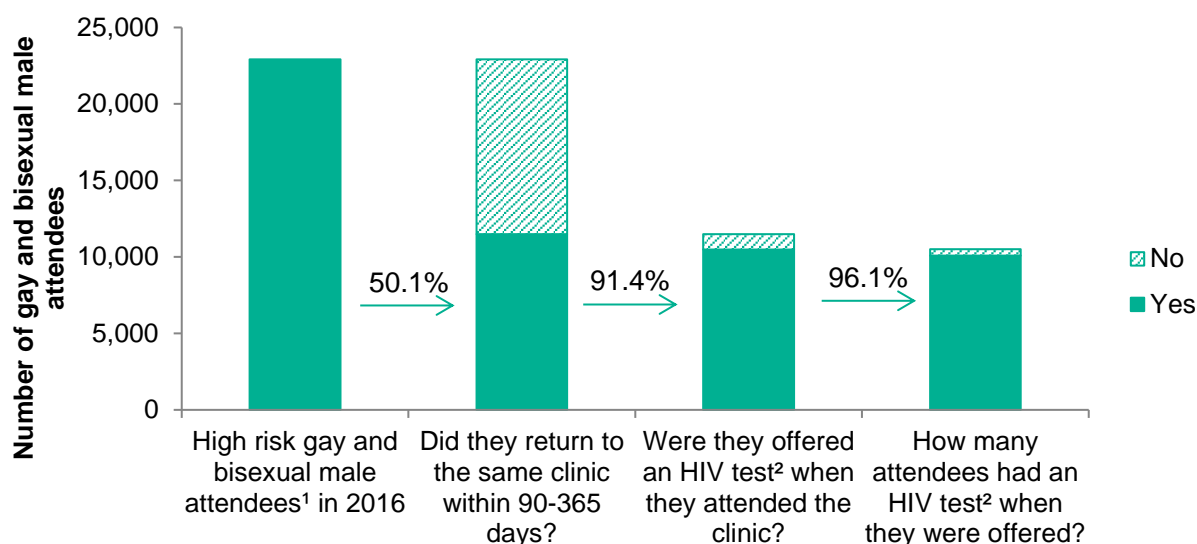
<sup>1</sup> Previous year – 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

<sup>2</sup> One to two years ago – at least 1 test in the 366 to 730 days and no tests in the 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

Gay and bisexual men who have a high risk of HIV infection (such as men with a recent anogenital bacterial STI diagnosis) should have an HIV test every 3 months. Of the 22,918 gay and bisexual men diagnosed with an anogenital bacterial STI in 2016, 44% (10,081/22,918) were tested at the same service for HIV in the year following their diagnosis. These tests identified 441 new diagnoses of HIV, a positivity of 4.4% (Figure 22). One HIV infection was diagnosed for every 23 men tested in this high risk group.

Most (89%, 11,433/12,837) of these high risk gay and bisexual men who were not tested for HIV did not re-attend the service (excluding those returning within 90 days who might not be eligible for an HIV test). Of those who did re-attend, 9% (991/11,485) were not offered a test, and 4% (413/10,494) declined the offer of a test.

**Figure 22: HIV testing cascade among gay and bisexual men who have a high HIV risk<sup>1</sup> who attended specialist SHS, England, 2016 to 2017**



<sup>1</sup> Includes gay and bisexual men with an anogenital STI diagnoses in 2016.

<sup>2</sup> Offered an HIV test at least once in the 90 to 365 days after their STI diagnosis.

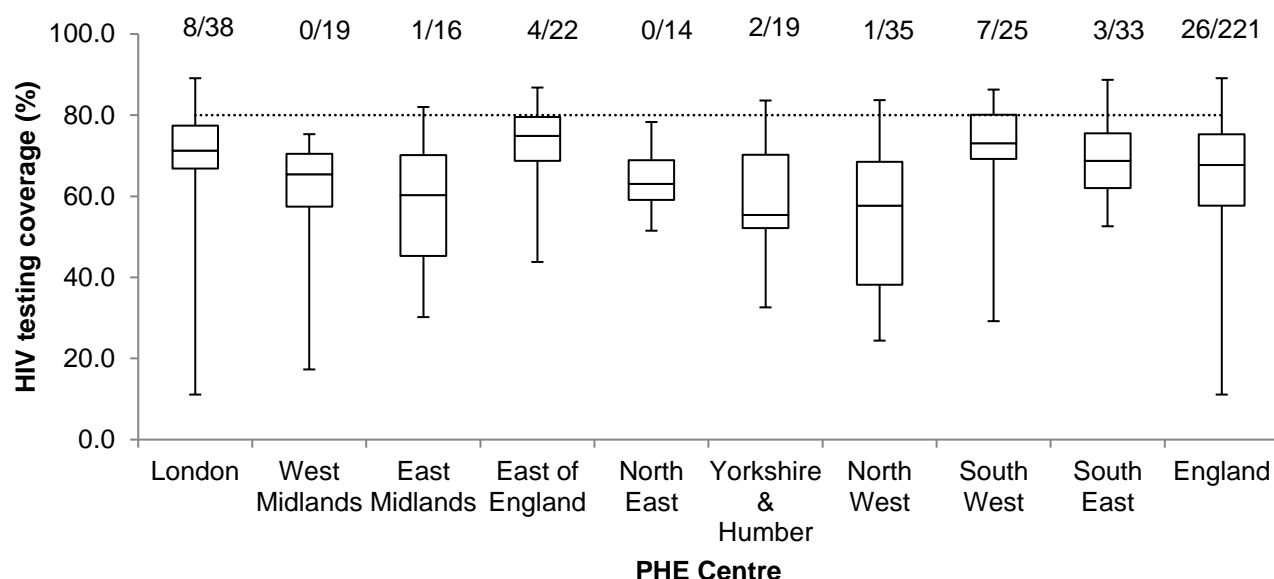
Among gay and bisexual men attending all SHS, 85% of people aged 50 years or older were tested for HIV; slightly lower than for younger age groups. Test positivity among 50 to 64 year olds (1%) was the same as among 36 to 49 year olds. 11% (111/1,038) of diagnoses among gay and bisexual men, and 11% (12,849/116,071) of tests were in men aged 50 years or more. Only 8 HIV diagnoses were made among gay and bisexual men aged 65+ years (positivity 0.4%) (Appendix 12).

## Heterosexual men and women

In specialist SHS, HIV test coverage among heterosexual men (78%, 366,714/472,184) and heterosexual women (59%, 499,179/853,680) was much lower than for gay and bisexual men (Appendix 8). This means that while most (90%) services reach the target

in gay and bisexual men, only 12% (27/221) of specialist SHS in 2017 met BASHH standards of testing 80% of all attendees, with considerable variation between services (Figure 23).

**Figure 23: Proportion of specialist SHS meeting or exceeding BASHH HIV testing coverage guidelines (80%) in all attendees by PHE region, England, 2017**



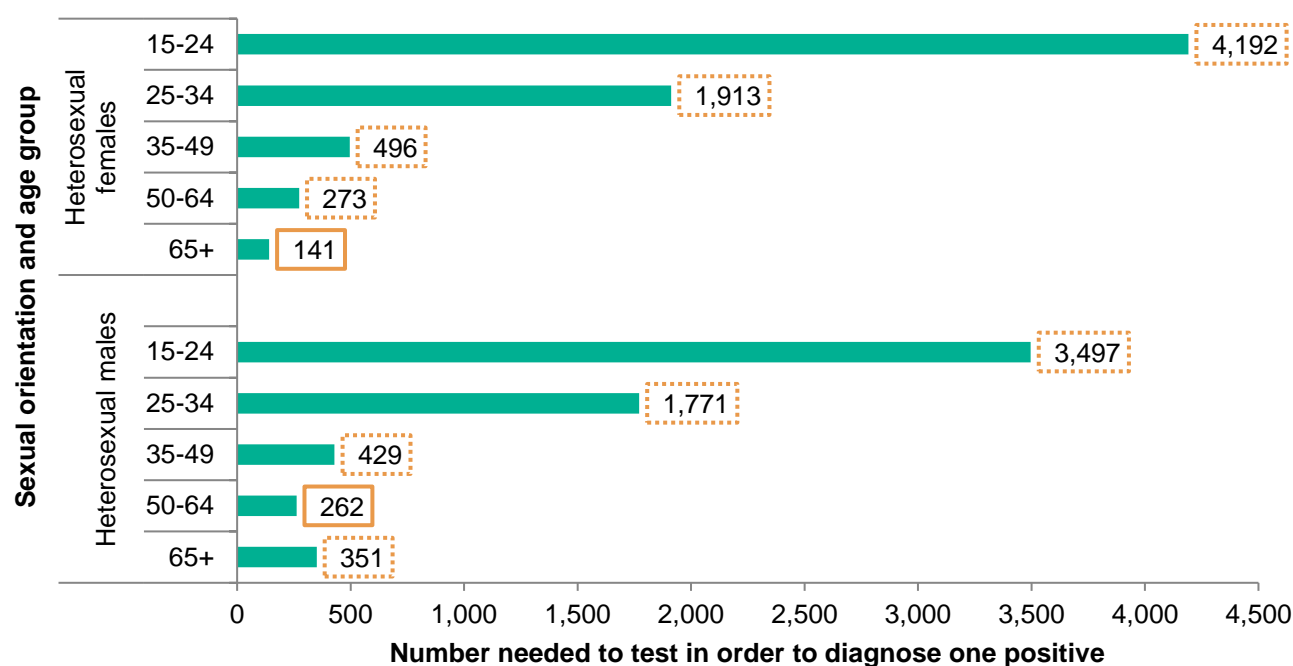
The low test coverage reflects the fact that 354,501 heterosexual women and 105,470 heterosexual men (who were eligible for testing) were not tested for HIV when they attended a specialist SHS in 2017. Of the eligible attendees at specialist SHS who were not tested, 160,057 heterosexual women and 44,254 of heterosexual men were not offered an HIV test.

A significant proportion of attendees attended non-specialist services in 2017 where test coverage was much lower. Eleven percent (108,947/996,358) of heterosexual women who attended a SHS attended a SRH service, where HIV test coverage was just 29% (32,004/108,947). However, HIV test positivity (0.1%) among these women was the same as among heterosexual women attending specialist SHS.

In 2017, HIV test coverage among heterosexuals varied by age group. Only 5% (48,781/945,477) of heterosexuals tested for HIV in 2017 were aged 50 years and above, but 22% (184/837) of heterosexual HIV diagnoses were in this age group (Appendix 12).

HIV test positivity among heterosexuals in 2017 increased with age from 15 to 24 to the 50 to 64 year old group and this is reflected in the NNTT (Figure 24). For example, SHS tested 273 heterosexual women aged 50 to 64 years to detect 1 HIV diagnosis compared with 4,192 heterosexual women aged 15 to 24 years old to detect 1 HIV diagnosis.

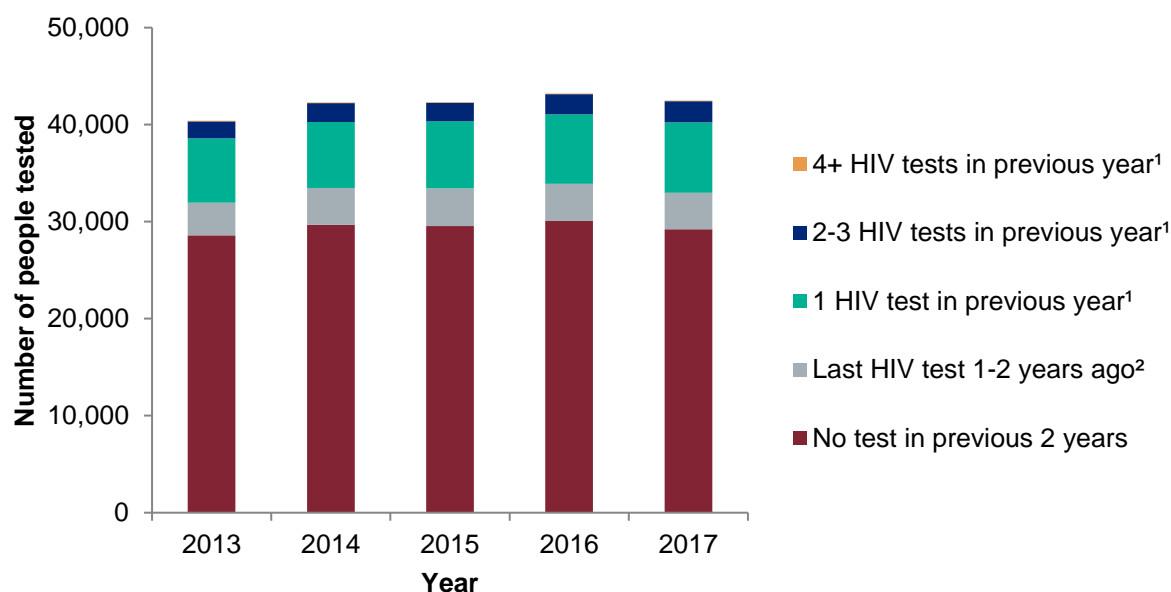
**Figure 24: Number of heterosexual attendees tested in order to diagnose 1 positive by gender and age group at all SHS, England, 2017**



### Black African attendees

Black African men and women should have annual HIV tests if they are having unprotected sex with new or casual partners from countries where HIV is common. Of the 42,475 people of black African ethnicity tested for HIV at specialist SHS in 2017, 22% (9,505/42,475) had at least 1 test in the previous year and a further 9% (3,749/42,475) had an HIV test 1 to 2 years ago. The proportion of repeat testing has remained fairly constant since 2013. Following a similar pattern to gay and bisexual men, positivity rates among those having repeat tests were much lower (0.1%) than among those who had not tested at that service in the previous 2 years (0.9%) (Figure 25). In 2017, 95% (298/313) of HIV diagnoses made in black African heterosexuals attending specialist SHS were among those who had not tested in the previous 2 years (at the same service) (Appendix 13).

**Figure 25: Black African heterosexuals testing for HIV at specialist SHS: previous HIV tests, England, 2013 to 2017**



<sup>1</sup> Previous year - 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

<sup>2</sup> One to two years ago - at least 1 test in the 366 to 730 days and no tests in the 43 to 365 days previous to the last test in a calendar year or date of new diagnosis.

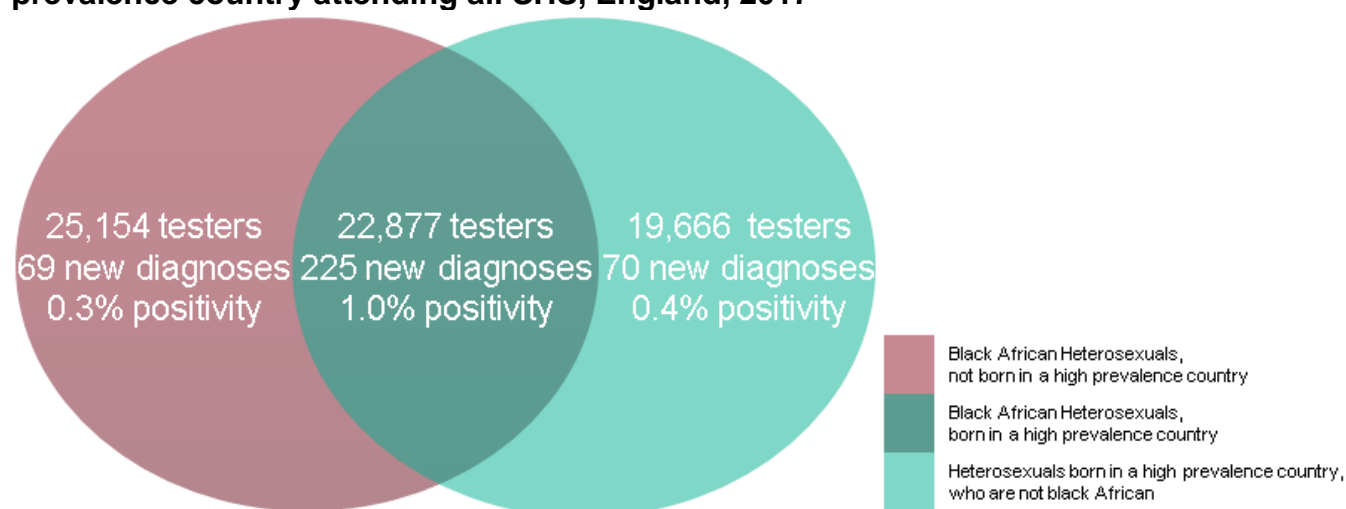
## Black Caribbean attendees

The number of black Caribbean attendees tested at SHS has remained fairly constant, with just over 50,000 black Caribbean heterosexual men and women tested in 2017. HIV test positivity in this group has remained stable at 0.1%.

## Black African and/or born in a country with a high HIV prevalence

This section combines information about heterosexual SHS attendees of black African ethnicity with information about those who were born in a country with high diagnosed HIV prevalence (a full list of countries with high HIV prevalence can be found in Appendix 2). The data has been combined because there are substantial overlaps between these 2 groups. Heterosexuals of black African ethnicity who were born in a high prevalence country have a higher HIV test positivity (1.0%) than those born in other countries, and account for 77% (225/294) of diagnoses among black African heterosexual SHS attendees (Figure 26). Data tables presenting these demographic factors separately are found in Appendix 14.

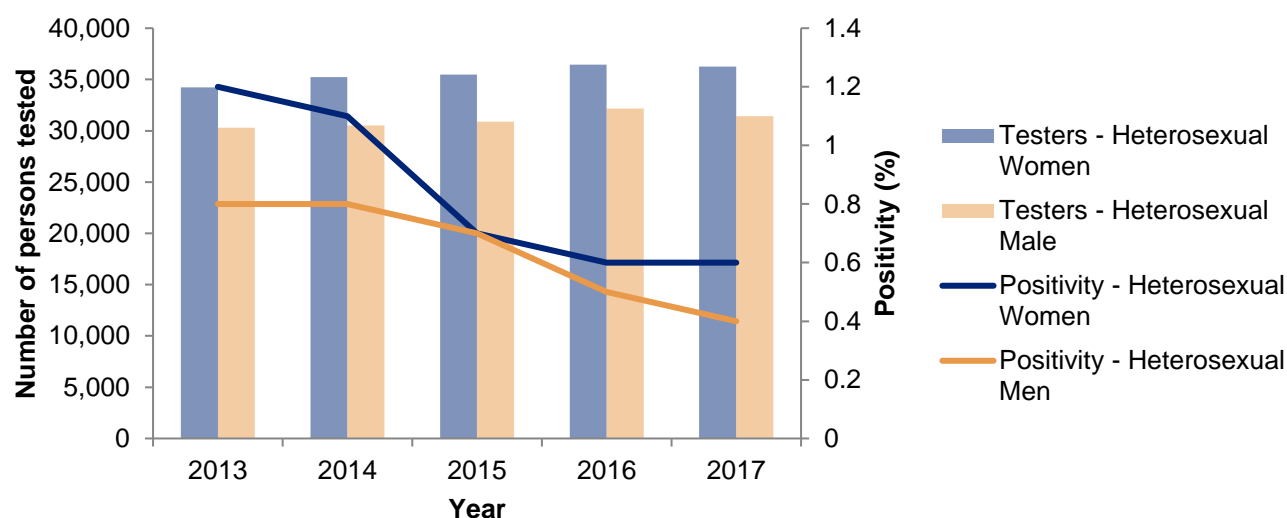
**Figure 26: Tests, new diagnoses and positivity in black Africans and/or born in a high prevalence country attending all SHS, England, 2017**



The number of heterosexual men and women of black African ethnicity, or who were born in a country with high HIV prevalence (regardless of ethnicity), tested for HIV at SHS increased by 6% from 64,523 in 2013 to 68,595 in 2016, with a slight fall in 2017 to 67,697 (Figure 27). Test coverage remained fairly stable over this period.

HIV test positivity among this group halved in both men and women from 2013 to 2017. For males positivity fell from 0.8% in 2013 to 0.4% in 2017. Positivity was slightly higher in heterosexual women; it also fell from 1.2% in 2013 to 0.6% in 2017.

**Figure 27: Trends in HIV testing and positivity for eligible<sup>1</sup> SHS heterosexual attendees of black African ethnicity and/or born in a country with high HIV prevalence<sup>2</sup> by gender at all SHS, England, 2013 to 2017**



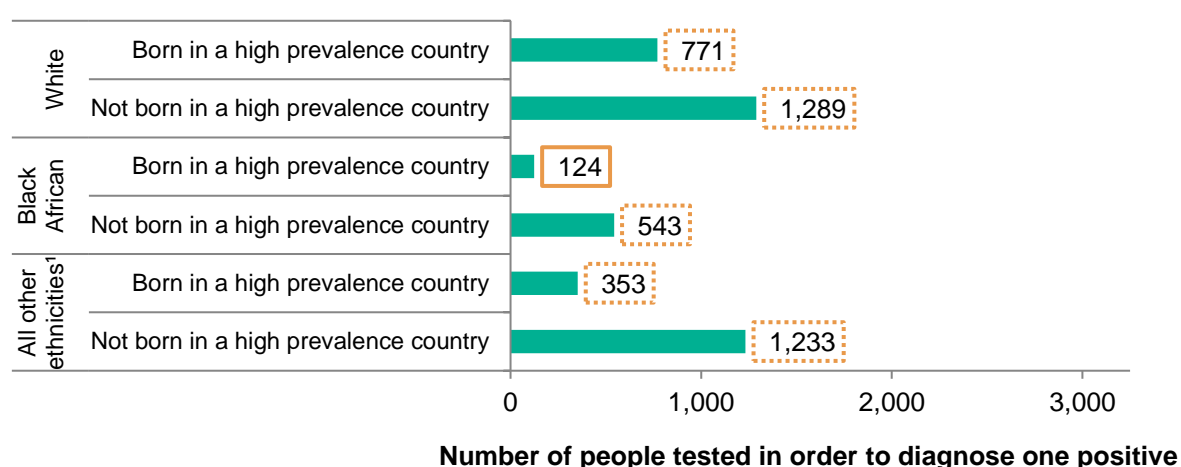
<sup>1</sup> Eligible SHS attendee: any patient attending a SHS at least once during a calendar year; excluding those patients known to be HIV positive or for whom an HIV test was not appropriate, or for whom the attendance was reported as being related for reproductive health care only.

<sup>2</sup> Countries where known HIV prevalence is >1% in people aged 15 to 49.

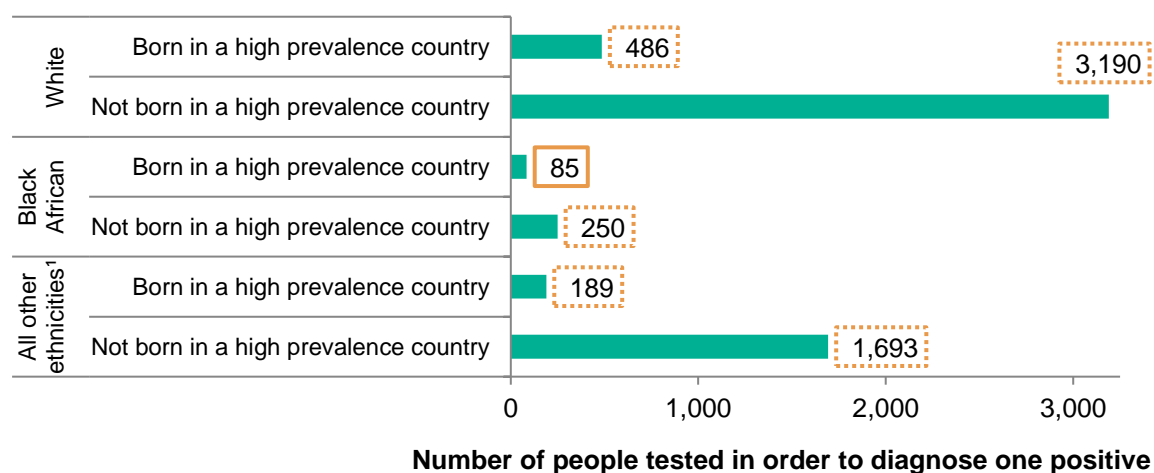
The different ethnicity and country of birth groupings for heterosexual men and women have revealed different patterns in test positivity and NNTT. The NNTT for white heterosexual women who were not born in a high prevalence country was much higher (3,190) than for any of the other gender, ethnicity, country of birth groups. The large number of women being tested in this group means that this testing activity nevertheless detected 29% (124/425) of diagnoses made among heterosexual women attending SHS (Figure 28b).

**Figure 28: Number of heterosexual attendees tested in order to diagnose 1 positive by gender, country of birth and ethnicity at all SHS, England, 2017**

**a) Heterosexual men**



**b) Heterosexual women**



<sup>1</sup> All other ethnicities includes all ethnicities that are not white or black African.

## Other heterosexual attendees

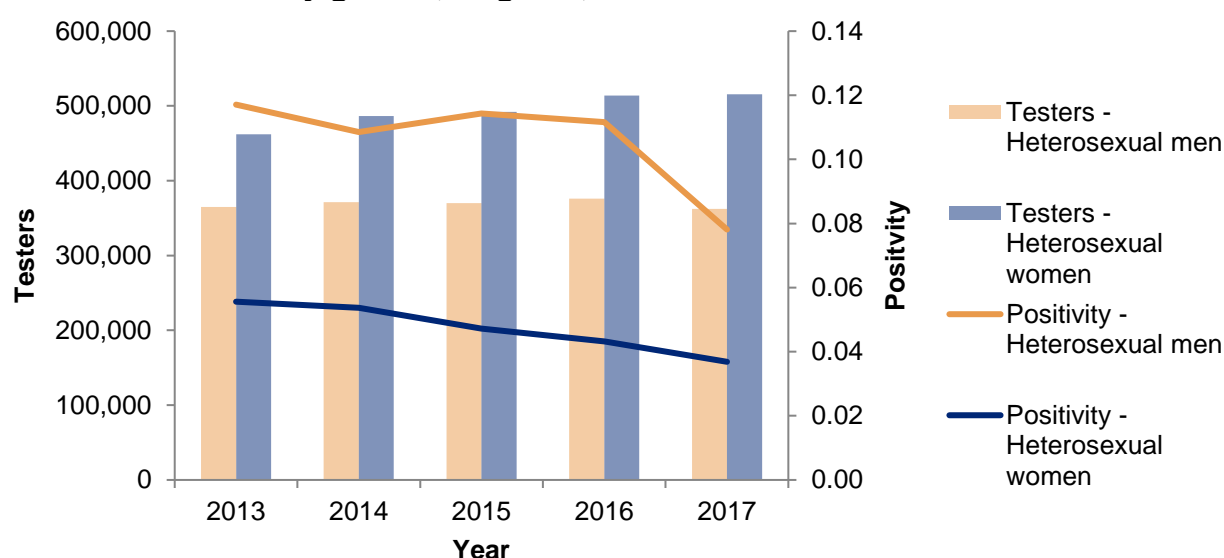
Most (77%, 1,370,291/1,777,412) eligible attendees attending SHS in 2017 were not gay and bisexual men, or black African men or women, or born in a high prevalence country, or identified as trans. In SHS, 76% (846,713/1,107,743) of people tested for HIV and 23% (444/1,956) of HIV diagnoses were in this 'other heterosexual' group.



The number of 'other heterosexual' men tested for HIV at SHS increased by 3% between 2013 and 2016, and then fell by 4% between 2016 and 2017. There was a small increase in HIV test coverage rates from 74% (363,274/476,190) in 2016 to 76% (349,139/457,063) in 2017. HIV test positivity among 'other heterosexual' men changed little between 2013 and 2016, but then fell from 0.11% to 0.08% in 2017.

The number of 'other heterosexual' women tested for HIV at SHS increased by 11% between 2013 and 2016, and then remained steady in 2017. HIV test coverage in this group remained stable at 55% (497,574/913,228) in 2017. The positivity rate among 'other heterosexual' women fell from 0.06% in 2013 to 0.04% in 2016, and remained steady in 2017 (Figure 29).

**Figure 29: Trends in HIV testing and positivity for eligible<sup>1</sup> 'other heterosexual'<sup>2</sup> attendees at all SHS by gender, England, 2013 to 2017**



<sup>1</sup> Eligible SHS attendee: any patient attending a SHS at least once during a calendar year; excluding those patients known to be HIV positive or for whom an HIV test was not appropriate, or for whom the attendance was reported as being related for reproductive healthcare only.

<sup>2</sup> Other Heterosexual attendee – all eligible heterosexual attendees excluding gay and bisexual men, black African men and women, those who identify as trans and those born in a high prevalence country.

## Trans communities

In 2017, 19 trans people were reported as having attended SHS and being eligible for HIV testing. All were offered an HIV test, 1 of whom declined the offer. These low numbers reflect the recent introduction of a new code in 2017 to identify trans attendees, which has yet to be fully implemented. Ongoing surveillance developments will allow for more accurate identification of trans people attending SHS and will be presented in future reports.

## Partner notification

In 2017, 1,903 people attended SHS because they had been told that they had a sexual partner with HIV (HIV partner notification). Eighty-five percent of these partner notified contacts were offered an HIV test, and 84% were tested for HIV. There were 69 new diagnoses made in this group, a HIV test positivity of 4.3%. While the number of partners notified fell between 2016 and 2017, HIV test positivity increased from 3.9% in 2016 (Appendix 15).

### 5.3.2. Expanded routine testing in areas of high and extremely high prevalence

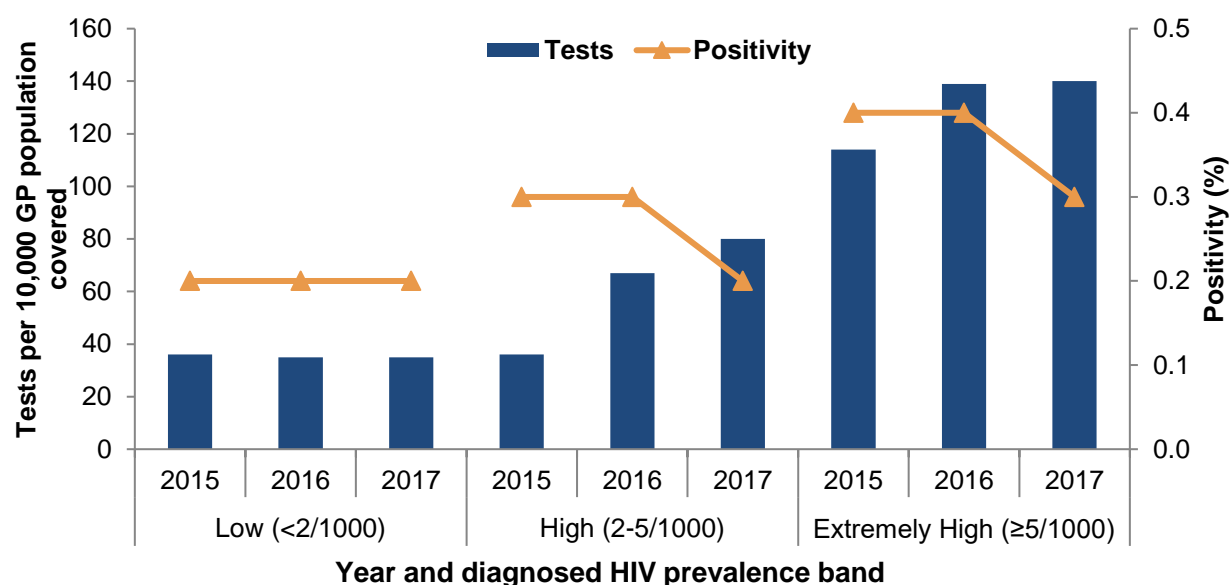
Testing data from general practices and hospitals are presented from laboratories reporting to Sentinel Surveillance of Blood Borne Viruses (SSBBV). SSBBV has collected data on HIV, hepatitis B (HBV) and hepatitis C (HCV) virus testing since 2002. The number of people tested includes all tests until a person is diagnosed positive; no tests are counted after a positive test. Antenatal HIV testing data were excluded from this SSBBV analysis.

## General practice

Testing trends are presented using data from laboratories for which SSBBV had HIV tests consistently reported between 2015 and 2017. This data represents 65% of the general practice population in extremely high prevalence areas, 26% in high prevalence areas and 20% in low prevalence areas. Between 2015 and 2017, HIV testing rates have increased in high and extremely high prevalence areas but have remained stable in low prevalence areas. Positivity rates have also fallen in both high and extremely high prevalence areas, while positivity in low prevalence areas has stayed constant at 0.2% (Figure 30).

In 2017, 140 per 10,000 of the general practice population living in extremely high prevalence areas were tested for HIV, with a positivity of 0.3%. In high prevalence areas, 80 per 10,000 of the general practice population were tested for HIV, 0.2% of whom were positive. HIV test positivity rates reflect both underlying prevalence and testing practices.

**Figure 30: HIV tests and positivity<sup>1</sup> in general practice<sup>2</sup> by diagnosed HIV prevalence band<sup>3</sup> in data captured by SSBBV, England, 2015 to 2017**



<sup>1</sup> Number of positive tests/number of total tests (x100%).

<sup>2</sup> GP practices who consistently reported to SSBBV from 2015 to 2017.

<sup>3</sup> Based on the diagnosed HIV prevalence data in those aged 15 to 59 in 2017, banding by service local authority.

## A&E and other secondary care

In 2017, SSBBV reported data on 70,215 people tested in accident and emergency (A&E) settings, and 186,719 people tested for HIV in other secondary care settings (including in-patient and out-patient settings). This testing identified 471 HIV diagnoses in A&E (0.7% positivity) and 1,113 diagnoses in all other secondary care settings (0.6% positivity). The number of people tested in A&E is likely to reflect local testing initiatives and will differ across sites.

**Table 1: HIV tests and positives in accident and emergency and all other secondary care settings<sup>1</sup> in data captured by SSBBV, 2017**

Service type	People tested	Number positive (Positivity %)	
Accident and emergency	70,215	471	(0.7)
Secondary care	186,719	1,113	(0.6)
Total	256,934	1,584	(0.6)

<sup>1</sup> Comprises of HIV tests carried out in all other secondary care services excluding A&E, antenatal and HIV services.

### 5.3.3. HIV testing in other services seeing at risk groups

#### Healthcare services for those diagnosed with tuberculosis (TB)

In 2017, testing information was available for 95% (4,627/4,864) of people notified with TB who had a previously unknown HIV status. Of these people, 93% (4,315) were tested for HIV.

The proportion of people notified with TB who were tested for HIV was highest in those born in countries with high HIV prevalence (97% coverage), followed by those born in all other countries except the UK (94% tested) and lowest in those born in the UK (89%).

In 2017, 2.8% (137/4,922) of notified TB cases were co-infected with HIV (as determined by matching TB cases to HIV cases)<sup>xxvii</sup>. Where known, 53% (71/134) of co-infected notified TB cases were born in countries with a high HIV prevalence.

#### Prisons

In 2014, PHE, NHS England (NHSE) and HM Prison and Probation Service (HMPPS) started implementing an 'opt out' blood-borne virus (BBV) testing programme in which all new prison receptions would be offered a test for HCV, HBV and HIV [43]. Full programme roll-out across the English prison estate was achieved in April 2018. For the financial year 2017/2018, data from the Health and Justice Indicators of Performance (HJIPs) showed that 71% of eligible new receptions and transfers were offered an HIV test and 33% of those were tested. This testing identified 469 HIV infections, a positivity of 1.1% [44].

#### Specialist services for people who inject drugs

In 2017, the prevalence of HIV among PWID who participated in the unlinked anonymous monitoring (UAM) survey in England was 0.87% (95% CI, 0.51% to 1.2%) [45]. In 2017, 54% (682/1,271) of survey participants reported recently testing for HIV.

In 2017, 67% (1,326/1,971) of PWID who accessed a clinical service in the preceding year had not been tested for HIV. Most of those who had not been tested for HIV were being prescribed a substitution drug (72%), had seen their general practitioner (GP) (60%) or had used a needle and syringe programme (59%) during the previous year.

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<sup>xxvii</sup> Includes TB and HIV cases aged 15 years and over

### 5.3.4. HIV testing at home and in the community

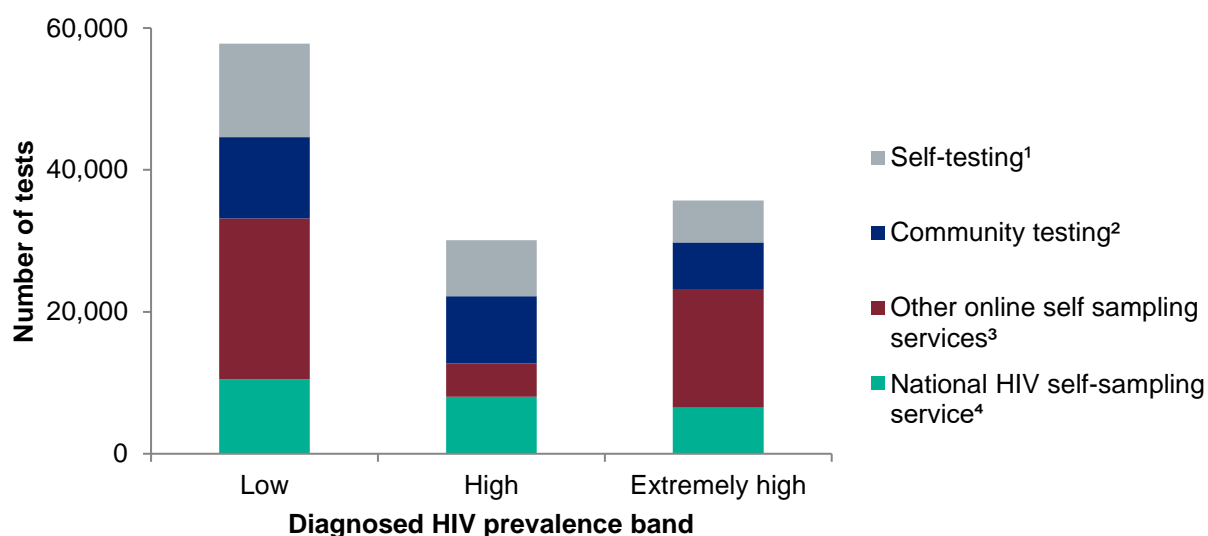
HIV testing is available in several non-clinical settings. This report includes data on self-sampling tests carried out in the National HIV Self-Sampling Service and other online services that report to the GUMCAD STI surveillance system. This report also includes data on HIV self-test kits and on tests carried out in a variety of community HIV testing settings.

In 2017, 127,364 HIV tests were carried out or purchased in community and home settings in England and the number of tests carried out varied between the different diagnosed prevalence bands (Figure 31). These included 25,599 self-sampling test kits returned via the national HIV self-sampling service; 43,890 self-sampling test kits returned via other online services; 26,939 self-testing HIV kits purchased online; and 30,936 HIV tests reported through a survey of HIV testing in community settings [46]. A list of the organisations who participated in the survey can be found in Appendix 16.

Test reactivity is available for the national HIV self-sampling scheme (1.0% reactivity) and for the community HIV testing survey (0.4% reactivity). These testing services identified a total of 343 reactive HIV results. Data on the number of confirmed HIV infections identified through these services is not available.

Further breakdowns of HIV tests and reactivities carried out in community settings are found in Appendix 17.

**Figure 31: HIV tests carried out through self-sampling schemes, community testing services and self-testing, diagnosed prevalence band, 2017**



<sup>1</sup> Self tests purchased privately online.

<sup>2</sup> Tests reported through the national survey of community testing.

<sup>3</sup> Tests returned to self-sampling services which report to the GUMCAD STI Surveillance System.

<sup>4</sup> Tests returned to the National HIV self-sampling service.

### 5.3.5. Universal screening

In 2017, coverage of HIV testing remained high in antenatal services (exceeding 99%) and all blood and tissue donations were tested for HIV.

**Table 2: HIV test coverage and newly diagnosed rate in pregnant women presenting at antenatal services and blood, bone and tissue donors, England, 2016 to 2017**

	Year period	Eligible	Tested	Coverage (%) <sup>1</sup>	New diagnoses/ Confirmed positive <sup>2</sup>	Newly diagnosed rate / 100,000 tested <sup>3</sup>
Antenatal <sup>4</sup>	2016/17	634,017	630,681	99.5	71	13.0
Blood donations	2017	-	1,613,157	100	6	0.4
Tissue donors	2017	-	3,958	100	0	0.0

<sup>1</sup> For antenatal data, coverage is presented for the 124/144 providers who submitted complete matched cohort data.

<sup>2</sup> For antenatal data, new diagnoses are presented and for blood donations confirmed positives are presented.

<sup>3</sup> For antenatal data, exclusions were applied where data for either infectious diseases in pregnancy screening (IDPS) standard 1 or standard 5 was missing or incomplete meaning absolute numbers reported are lower than those reported for individual standards.

<sup>4</sup> Data from financial year 2016/2017 is presented.

#### Antenatal services

Uptake of HIV screening in pregnant women who engage with antenatal care remains high and during the financial year 2016/2017, coverage exceeded 99% with 630,681 pregnant women tested for HIV. Positivity remains low and 0.013% of women were newly diagnosed with HIV during pregnancy.

#### Blood donors

NHS Blood and Transplant (NHSBT) screens all blood donations made in England for evidence of HIV infection [47]. People wishing to donate are advised not to give blood if they think they need a test for HIV.

In 2017, 1.6 million donations were tested for HIV with 6 confirmed positive (0.4 per 100,000 donations ie. 0.000004%) [48]. The positivity rate has declined from 0.8 per 100,000 donations in 2013. Three were new donors and 3 repeat donors. Four were male (1.1 per 100,000 male donors) and 2 female (0.4 per 100,000 female donors) with a median age of 29 years (range 27 to 49). Approximately 93% of blood donors were white. Three HIV confirmed positive donations were made by white donors (0.4 per 100,000 white donors); 2 by Asian donors (8.5 per 100,000 Asian donors) and 1 classified as 'other' ethnic origin.

Confirmed positive donors are offered a post-test discussion to ensure they understand their results and refer them to onward care, and also determine potential sources of infection and compliance with donor selection guidelines [49]. Donors are deemed non-compliant if they did not disclose, when asked at donation session, behaviour or history that does not meet the current criteria and thus donated when they should not have. In 2017, a source of infection was identified for 5/6 HIV infections detected in blood donors; 2 self-reported as sex between men, both non-compliant and 3 as sex between men and women, 1 non-compliant.

Following a review of the donor selection criteria by the Advisory Committee on the Safety of Blood, Tissues and Organs (SaBTO) in 2016/17 the deferral for higher risk sexual behaviour was reduced to 3 months [50]. From the end of November 2017 anyone who has had sex between men, sex with a higher risk partner (who had ever: injected drugs, had sex between men, been paid for sex, had hepatitis or HIV, or may have been sexually active in sub-Saharan Africa) or been paid for sex are eligible to give blood 3 months after last sexual contact.

## Tissue donors

In 2017, 629 living surgical bone donors and 3,329 deceased donors were screened by NHSBT for HIV and no confirmed HIV positive donors were identified. From 2006 to 2017, 1 HIV positive living surgical bone donor (3.1 per 100,000 donors) and 3 HIV positive deceased donors (12.4 per 100,000 donors) were identified.

## 5.4 Treatment as prevention (TasP)

Since 2013, people in the UK have started treatment earlier after diagnosis, which reflects changes in national HIV treatment guidelines. In 2012, guidance advised that treatment should be started in patients with a CD4 count  $>350$  cells/mm<sup>3</sup> if they wished to protect partners from sexual transmission. Most recently, in 2015, guidelines were further strengthened to recommend treatment for all individuals regardless of CD4 count to prevent onward HIV transmission (treatment as prevention (TasP)) and deliver clinical benefit to the patient. After a consultation period, in December 2017, NHS England announced that funding will be provided, from 1 April 2018, for immediate ART for patients newly diagnosed with HIV in England [51].

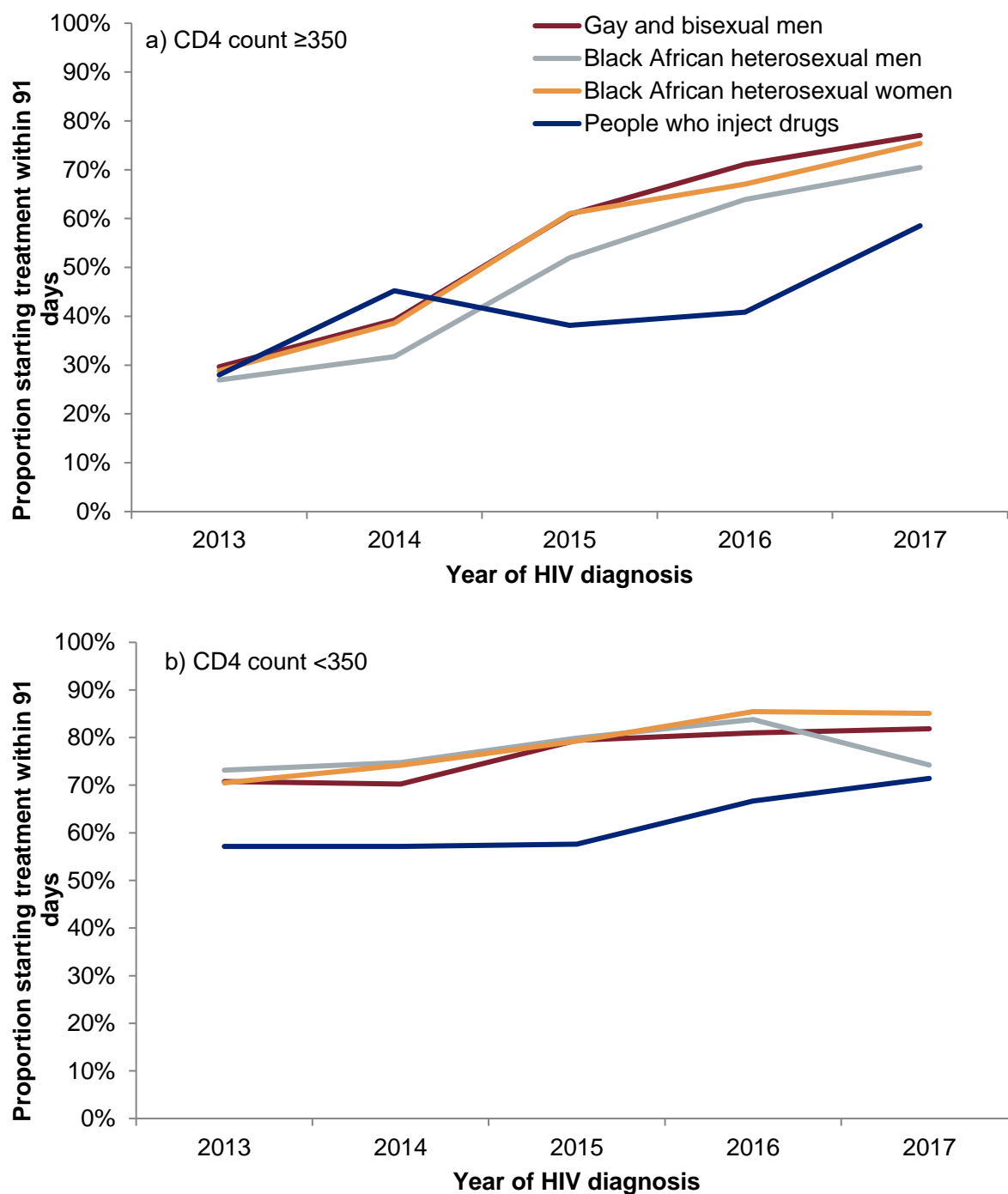
In 2017, 72% (2,784/3,869) of newly diagnosed people in care started treatment within 91 days of diagnosis compared to 49% (2,423/4,992) in 2013. Among people diagnosed promptly (CD4 count  $\geq 350$  cells/mm<sup>3</sup>), the proportion starting treatment within 91 days increased from 30% (836/2,826) in 2013 to 75% (1,287/1,722) in 2017, which reflect the changes in treatment recommendations and subsequent NHS policy detailed above.

Treatment initiation increased from 30% (554/1,868) in 2013 to 77% (795/1,032) in 2017 among gay and bisexual men, from 27% (31/115) to 70% (31/44) among black African heterosexual men, from 29% (71/246) to 75% (95/126) among black African heterosexual women, and from 28% (14/50) to 59% (24/41) among PWID (Figure 32a).

Among those with a CD4<350 cells at diagnosis, the proportion starting treatment within 91 days remained between 70% and 85% from 2013 to 2017 (Figure 32b).



**Figure 32: Proportion initiating HIV treatment within 91 days by exposure group and CD4 status: UK, 2013 to 2017**



## References

1. UNAIDS. *Combination HIV Prevention: Tailoring and Coordinating Biomedical, Behavioural and Structural Strategies 10 to Reduce New HIV Infections*. 2010.
2. Prevention Access. *Risk of sexual transmission of HIV from a person living with HIV who has an undetectable viral load. Messaging Primer & Consensus Statement 2016*; Available from: [www.preventionaccess.org/consensus](http://www.preventionaccess.org/consensus).
3. Office of National Statistics. *2011 Census*. 2011; Available from: [www.ons.gov.uk/census/2011census](http://www.ons.gov.uk/census/2011census).
4. Gill, O.N., et al, *The fall in HIV infections in MSM in England during 2012 through 2016: When did it begin and what caused it?* in *IUSTI World and European Congress*. 2018. Dublin, Ireland.
5. Giannou, F.K., et al, *Condom effectiveness in reducing heterosexual HIV transmission: a systematic review and meta-analysis of studies on HIV serodiscordant couples*. *Expert Rev Pharmacoecon Outcomes Res*, 2016. 16(4): p. 489-99.
6. Johnson, W.D., et al, *Per-partner condom effectiveness against HIV for men who have sex with men*. *AIDS*, 2018. 32(11): p. 1499-1505.
7. Phillips, A.N., et al, *Potential impact on HIV incidence of higher HIV testing rates and earlier antiretroviral therapy initiation in MSM*. *AIDS*, 2015. 29(14): p. 1855-62.
8. Phillips, A.N., et al, *Increased HIV incidence in men who have sex with men despite high levels of ART-induced viral suppression: analysis of an extensively documented epidemic*. *PLoS One*, 2013. 8(2): p. e55312.
9. McCormack, S., et al, *Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial*. *Lancet*, 2016. 387(10013): p. 53-60.
10. Molina, J.M., et al, *On-Demand Preexposure Prophylaxis in Men at High Risk for HIV-1 Infection*. *N Engl J Med*, 2015. 373(23): p. 2237-46.
11. Grulich, A.E., et al, *Population-level effectiveness of rapid, targeted, high-coverage roll-out of HIV pre-exposure prophylaxis in men who have sex with men: the EPIC-NSW prospective cohort study*. *Lancet HIV*, 2018.
12. Grant, R.M., et al, *Uptake of pre-exposure prophylaxis, sexual practices, and HIV incidence in men and transgender women who have sex with men: a cohort study*. *Lancet Infect Dis*, 2014. 14(9): p. 820-9.
13. PrEPster, iwantprepnw, and Public Health England. *PrEP User May 2018 Online Survey - Summary Results*. 2018; Available from: [www.aidsmap.com/Nearly-a-quarter-of-people-who-want-PrEP-currently-cant-get-it-UK-survey-finds/page/3297439/](http://www.aidsmap.com/Nearly-a-quarter-of-people-who-want-PrEP-currently-cant-get-it-UK-survey-finds/page/3297439/).
14. England, N. *NHS England PrEP Trial Updates – June 2018*. 2018; Available from: [www.england.nhs.uk/commissioning/spec-services/npc-crg/blood-and-infection-group-f/f03/prep-trial-updates/#june](http://www.england.nhs.uk/commissioning/spec-services/npc-crg/blood-and-infection-group-f/f03/prep-trial-updates/#june).
15. UNAIDS, 90-90-90 *An ambitious treatment target to help end the AIDS epidemic*. 2014, *Joint United Nations Programme on HIV/AIDS*. 2014.
16. Aghaizu, A., et al, *Recent infection testing algorithm (RITA) applied to new HIV diagnoses in England, Wales and Northern Ireland, 2009 to 2011*. *Euro Surveill*, 2014. 19(2).
17. Birrell, P.J., et al, *HIV incidence in men who have sex with men in England and Wales 2001-10: a nationwide population study*. *Lancet Infect Dis*, 2013. 13(4): p. 313-8.
18. Rice, B.D., et al, *A new method to assign country of HIV infection among heterosexuals born abroad and diagnosed with HIV*. *AIDS*, 2012. 26(15): p. 1961-6.

19. Croxford, S., et al, *Where do we diagnose HIV infection? Monitoring new diagnoses made in nontraditional settings in England, Wales and Northern Ireland*. HIV Med, 2018.
20. Curtis, H., et al, *People with diagnosed HIV infection not attending for specialist clinical care: UK national review*. BMC Infect Dis, 2015. 15: p. 315.
21. British HIV Association, *Guidelines for the treatment of HIV-1-positive adults with antiretroviral therapy 2015*. (2016 interim update), BHIVA: London.
22. British HIV Association. *U=U consensus statement: Risk of sexual transmission of HIV from a person living with HIV who has an undetectable viral load*. . 2016; Available from: [www.preventionaccess.org/consensus](http://www.preventionaccess.org/consensus).
23. Office of National Statistics. *Personal well-being estimates*. 2018; Available from: [www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/datasets/headlineestimatesofpersonalwellbeing](http://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/datasets/headlineestimatesofpersonalwellbeing).
24. Devlin, N.J., et al, *Valuing health-related quality of life: An EQ-5D-5L value set for England*. Health Econ, 2018. 27(1): p. 7-22.
25. Szende, A., et al, *Self-reported population health: An International perspective based on EQ-5D*. 2014, Netherlands: Springer.
26. Croxford, S., et al, *Mortality and causes of death in people diagnosed with HIV in the era of highly active antiretroviral therapy compared with the general population: an analysis of a national observational cohort*. Lancet Public Health, 2017. 2(1): p. e35-e46.
27. Chadborn, T.R., et al, *The late diagnosis and consequent short-term mortality of HIV-infected heterosexuals (England and Wales, 2000-2004)*. Aids, 2006. 20(18): p. 2371-9.
28. Lodi, S., et al, *Time from human immunodeficiency virus seroconversion to reaching CD4+ cell count thresholds <200, <350, and <500 Cells/mm(3): assessment of need following changes in treatment guidelines*. Clin Infect Dis, 2011. 53(8): p. 817-25.
29. Logan, L., et al *Combination prevention and HIV: a cross-sectional community survey of gay and bisexual men in London*. in *Fourth Joint Conference of BHIVA with BASHH*. 2018. Edinburgh.
30. Aghaizu, A., et al, *Sexual behaviours, HIV testing, and the proportion of men at risk of transmitting and acquiring HIV in London, UK, 2000-13: a serial cross-sectional study*. Lancet HIV, 2016. 3(9): p. e431-e440.
31. Public Health England. *Campaign to protect young people from STIs by using condoms*. 2017; Available from: [www.gov.uk/government/news/campaign-to-protect-young-people-from-stis-by-using-condoms](http://www.gov.uk/government/news/campaign-to-protect-young-people-from-stis-by-using-condoms).
32. Ratna, N., et al *A quantitative evaluation of the London "Come Correct" Condom Card (C-Card) scheme: Does it serve those in greatest need?* in *Fourth Joint Conference of BHIVA with BASHH*. 2018. Edinburgh.
33. Public Health England. *Condom distribution schemes in England 2015/16. A survey of English Sexual Health Commissioners*. 2017.
34. Baeten, J.M., et al, *Antiretroviral prophylaxis for HIV prevention in heterosexual men and women*. N Engl J Med, 2012. 367(5): p. 399-410.
35. British HIV Association and British Association of for Sexual Health and HIV, *BHIVA/BASHH guidelines on the use of HIV pre-exposure prophylaxis (PrEP)*. 2018, BHIVA, BASHH: London.
36. Dean Street PrEP shop. Available from: <http://dean.st/prepshop/>.
37. Public Health England. *PrEP and Health Promotion activity: Summary findings from a mapping exercise*. 2018; Available from: [www.bhiva.org/file/5b7fabf6b4b25/PrEP-and-Health-Promotion-activity.pdf](http://www.bhiva.org/file/5b7fabf6b4b25/PrEP-and-Health-Promotion-activity.pdf).
38. NHS England. *NHS England announces major extension of national HIV prevention programme with Public Health England and funding for 10 new specialised treatments* 2016; Available from: [www.england.nhs.uk/2016/12/hiv-prevention-preprogramme/](http://www.england.nhs.uk/2016/12/hiv-prevention-preprogramme/).

39. National Institute for Health and Care Excellence. *HIV testing: increasing uptake among people who may have undiagnosed HIV*. 2016; Available from: [www.nice.org.uk/guidance/conditions-and-diseases/infections/hiv-and-aids](http://www.nice.org.uk/guidance/conditions-and-diseases/infections/hiv-and-aids).
40. British HIV Association, British Association for Sexual Health and HIV, and British Infection Society. *UK National Guidelines HIV Testing 2008*. 2008; Available from: [www.bhiva.org/documents/Guidelines/Testing/GlinesHIVTest08.pdf](http://www.bhiva.org/documents/Guidelines/Testing/GlinesHIVTest08.pdf).
41. National Institute for Health and Care Excellence. *HIV testing: encouraging uptake*. 2017.
42. British Association for Sexual Health and HIV. *Standards for the management of sexually transmitted infections (STIs) 2014*; Available from: [www.bashh.org/documents/Standards%20for%20the%20management%20of%20STIs%202014%20FINAL%20WEB.pdf](http://www.bashh.org/documents/Standards%20for%20the%20management%20of%20STIs%202014%20FINAL%20WEB.pdf).
43. O'Moore, E., et al *PHE health and justice Annual Review 2017/18*. 2018; Available from: [www.gov.uk/government/publications/prison-health-health-and-justice-annual-report](http://www.gov.uk/government/publications/prison-health-health-and-justice-annual-report).
44. O'Moore, E., et al, *Infection Inside International* 2018; Available from: [www.gov.uk/government/publications/infection-inside](http://www.gov.uk/government/publications/infection-inside).
45. Public Health England. *Unlinked anonymous HIV and viral hepatitis monitoring among people who inject drugs: 2018 report*. 2018; Available from: [www.gov.uk/government/statistics/people-who-inject-drugs-hiv-and-viral-hepatitis-monitoring](http://www.gov.uk/government/statistics/people-who-inject-drugs-hiv-and-viral-hepatitis-monitoring).
46. Nash, S.G., et al *HIV Testing in England: 2017 report*. 2017; Available from: [www.gov.uk/government/publications/hiv-in-the-united-kingdom](http://www.gov.uk/government/publications/hiv-in-the-united-kingdom).
47. Joint UK Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee. *Guidelines for the Blood Transfusion Services in the UK - Chapter 9*. 2013; Available from: [www.transfusionguidelines.org.uk/red-book](http://www.transfusionguidelines.org.uk/red-book).
48. Public Health England. *Safe Supplies 2017: a year of change*. 2018; Available from: [www.gov.uk/government/publications/safe-supplies-annual-review](http://www.gov.uk/government/publications/safe-supplies-annual-review)
49. Reynolds, C.A., et al, *Notifying blood donors of infection: results of a donor satisfaction survey*. *Transfus Med*, 2015. **25**(6): p. 358-65.
50. Advisory Committee on the Safety of Blood Tissues and Organs. *Donor selection criteria report*. 2017; Available from: [www.gov.uk/government/publications/blood-tissue-and-cell-donor-selection-criteria-report-2017](http://www.gov.uk/government/publications/blood-tissue-and-cell-donor-selection-criteria-report-2017).
51. NHS England. *NHS England announces new specialised treatments for patients*. 2017; Available from: [www.england.nhs.uk/2017/12/nhs-england-announces-new-specialised-treatments-for-patients/](http://www.england.nhs.uk/2017/12/nhs-england-announces-new-specialised-treatments-for-patients/).